# BETTER CROPS W

# *The Pocket Book*

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# Better Crops WITH PLANT FOOD

July 1931 10 Cents


The Pocket Book of Agriculture

# Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*
Editorial Offices: 19 West 44th Street, New York

VOLUME XVII NUMBER ONE

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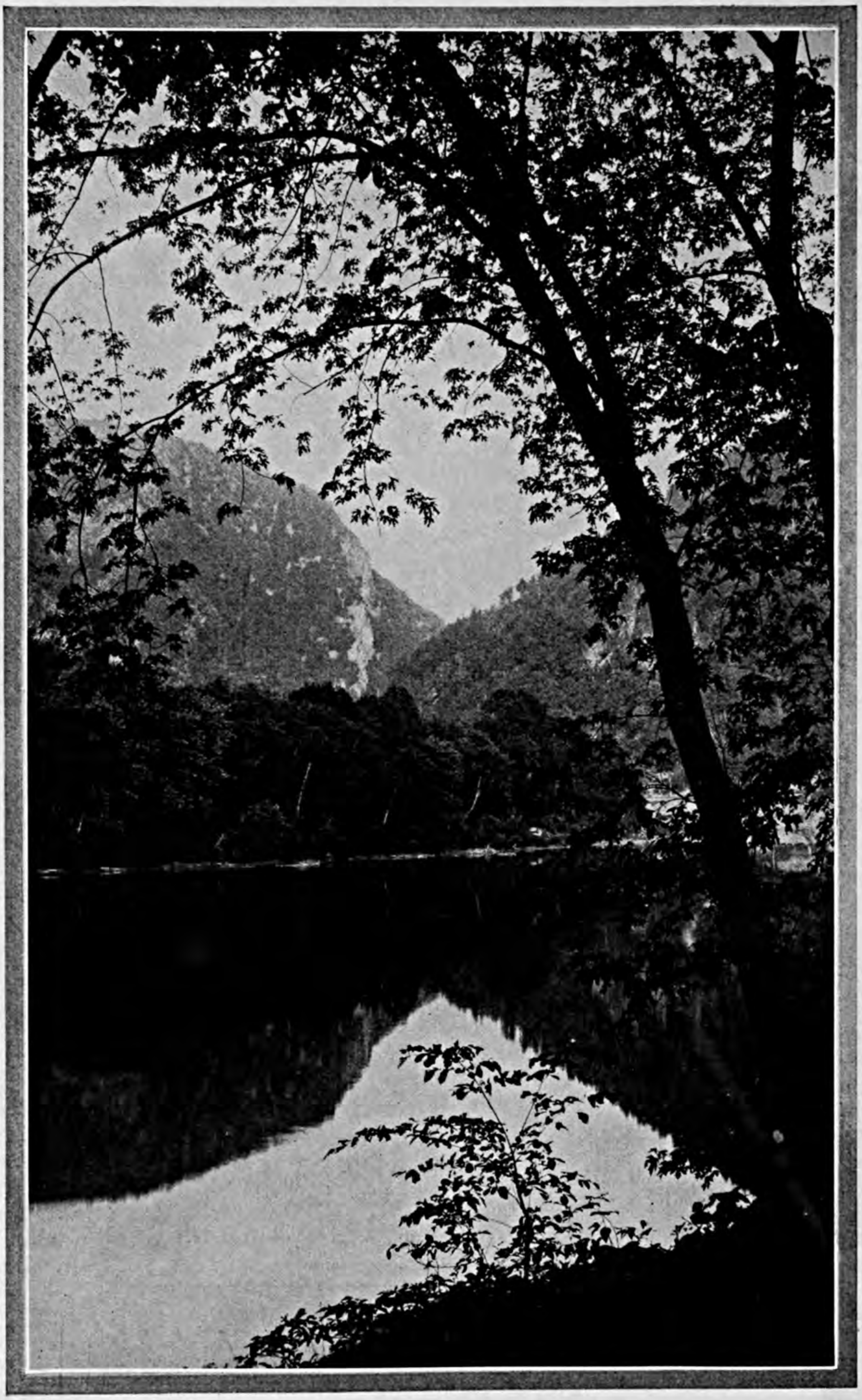

THE DELAWARE WATER GAP IS A FAVORITE SPOT OF EASTERN VACATIONISTS.

# Better Crops with Plant Food

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Vol. XVII NEW YORK, JULY, 1931 No. 1

*A look at the cover page and Jeff thought of*

# MUSIC

*By* Jeff McDermid

HE who said "let me write the songs of a nation and I care not who makes its laws" must have foreseen the harvest of this radio and concert racket of 1931, in contrast to the common disregard of legal statutes made and provided.

"Dona Clara" and "Mm, Mm, Mm, Would You Like to Take a Walk" (by permission of the copyright owners) are easily more popular than the Volstead Act (by permission of the Wickersham Commission).

Midsummer and melodies are inseparable themes. Old, home-town concert bands, practicing for the Fourth of July with neurotics buying railroad tickets on the third to escape it; the blare of the circus trumpeters atop the rumbling, gilded chariot; moonlight sonatas to senoritas on piazzas; the pumpernickel trio at the corner saloon; and the grinding chantry of the Urban Pan with his dancing bear or clawing ape—of such are my remnants of raptures and thrills.

Reared amid such stray jetsam of surplus rhapsody, it has always been my suppressed complex to be a musician—to receive the admiring glances, to listen for applause, to be welcome anywhere as long as the refreshments lasted—just exactly like the "symphony-for-simpletons" advertisements proclaim. I was intended for a virtuoso or a maestro from my vocal infancy, for I had fairly long fingers, a penchant for notes (scored or endorsed), and a real Polish everbearing crop of hair.

MY dream of musical conquest began on a parlor organ under the tutelage of an Advent revival minister who endured the ordeal for his board bill nearly a fortnight. He finally became convinced that Moody, Sankey, Talmadge, or Billy Sunday would be able to convert all the heathens quicker than I could tell clef from bass, and he left me to play by ear or die unhung. That's not the only time I have been knocked for a row of ivories.

Next I tried to join the local band, but the leader told me that they didn't require any more wind instruments and could dispense with the oboe or the bones. But harmonicas were readily available, so I turned from salvos to Saliva—much to the relief of the patient neighbors. Thus I came to the end of my musical melange without ever realizing, as my daughter does, that painful practice means perfection.

But I still possess Musical Appreciation. You can't take it away from me while I am able to listen, and obviously you cannot give me any more. I can tell a flat note quicker than a flat tire, and much cheaper. I am just like the Chicago civic opera season—the lower the seats cost the higher the thrill.

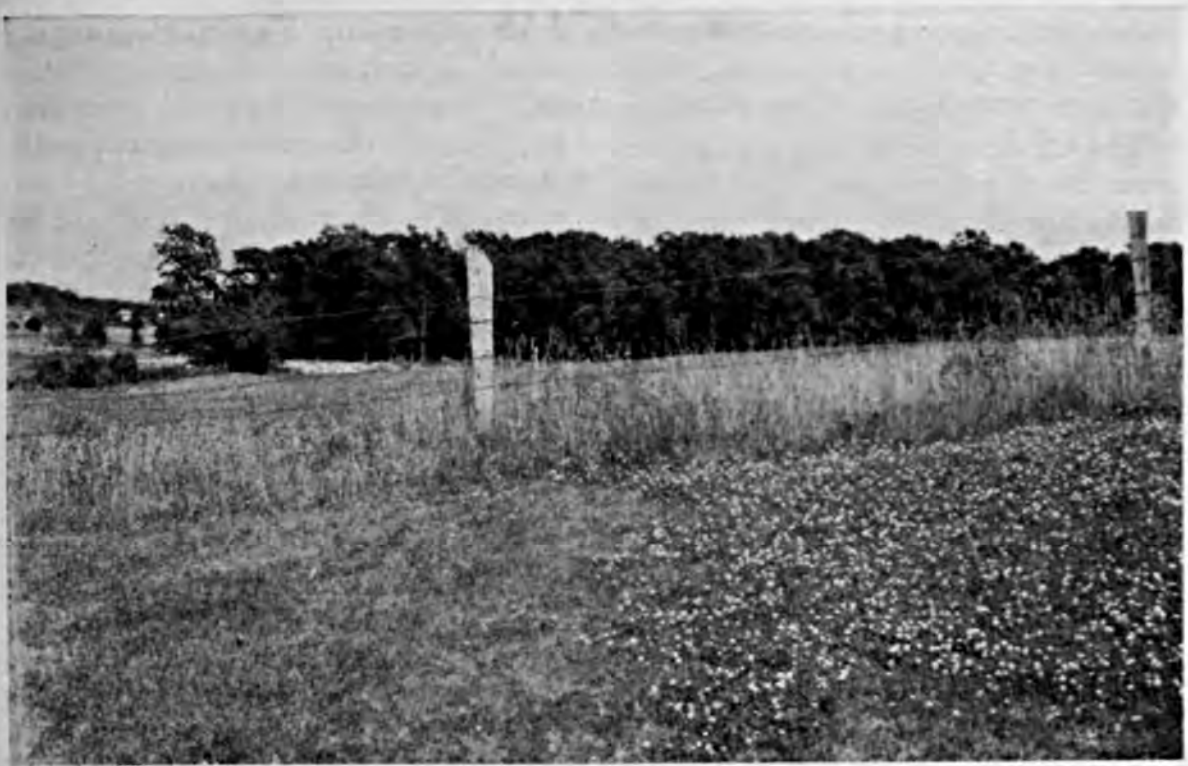
But in expression I am limited to Congregational Sundays and Kiwanis Mondays. Between "Rock of Ages" and "Builders We," I get eclat if not encore. And as revenge on myself for neglected opportunity and a misspent life, I feed chewing-gum to the girl at the 10-cent-store piano, and tote home popular rag-time to our domestic musical apprentice.

Music has fallen somewhat into the same straits with many of us as athletics, inasmuch as we of the mob take it by proxy. So much so that we frequently applaud the bush-league, old-time fiddler quite as approvingly as we endorse the major-league orchestras with private reservations.

However, musical discrimination finds me groping. I went to a tea at no remote time and place where they were discussing American music and composers. The air was full of Edward MacDowell, Charles Loeffler, Leo Ornstein, Horatio Parker, Edgar Varese, Dane Rudhyer, Carl Ruggles, and Aaron Copeland. I asked somebody how they liked "My Country 'Tis of Thee," for the composer's name was Smith and easy to remember. The astounded critic reminded me that the original tune to this anthem was the English "God Save the King," to which I countered that Smith's song got the best results anyhow. To be at ease in a circle of that sort you must be pretty sharp or fall flat. It is no place for anyone whose only audible degree is a "B A" in agriculture.

OUR musical historians tell us that the Renaissance of cultural music in America has only lately arrived. Some of them smile at the "mores" of the people. They won't allow that the negro spirituals are original music, claiming that they are relics of the sad howls of African slaves shipped over here by the pious founders, who were more interested in destiny than dulcimers. They see old Scotch-Irish ballads lurking in the plaintive songs of the Appalachian mountaineers. A few will admit there is a mere glimmer in Gershwin. Foreign impresarios are particularly interested in maintaining the myth that we are backward as a musical nation, but by the saving grace of patience and investment in opera tickets they have hopes of our salvation anon, if not allegro. Now

(*Turn to page 61*)



White clover, the friend of bluegrass, rushes in to help swell the pasture yields when liming, phosphating, and potashing are practiced.

# POTASH

# *in* Permanent Pasture Fertilization

*By George B. Mortimer*

Professor of Agronomy, Wisconsin College of Agriculture

IT has been conclusively demonstrated that grass, as much as any crop, needs complete fertilization to restore old pastures to the credit side of the ledger in farm crop accounting. The first mile-stone in a sane program of permanent pasture management is passing. As it now stands, however, there are still far too many of these old pastures which are liabilities when they could just as well be real assets. The results of wide-spread experiments in recent years have established this fact, which now stands as a challenge for better pastures here in America, particularly in humid regions where grass-growing climates are at their best for the effective influences of fertilizers. The other side of the story for better pastures lies within the realms of controlled grazing.

But fertility, whether natural or restored, is the key to abundant grass on these old, worn pastures, as it is everywhere else. While the character of grazing concerning its intensity and the kind of livestock used is important in maintaining sward superiority with respect to the species of plants supported, and also to its productivity and permanency, the elementary truth of managing the grazing herd intelligently lies first, last, and always in having plenty of grass upon which judicious control may be practiced.

The explanation back of these unproductive, old pastures that have a reasonably optimum, natural grass setting with respect to soil and topography is not to be had in root limitations caused by overgrazing, important as that consideration may be. Rather is this explanation to be found in the accumulative effects of grazing time upon soil fertility combined with injudicious grazing practices during such time. Doubt as to the truth of that statement is soon cleared away if one but takes the trouble to examine the grass, early in the spring, found growing on the spots of the previous season's urine droppings on any old, worn pasture. There, where nitrogen and potash combine, abundant, luscious grass is found early in the season in the midst of a slow, stubborn growth that covers the remainder of the pasture.

The first principle for health in all life, plant and animal alike, is in the right kind of nourishment. And while the direct foods for plants consist of such organic compounds as they elaborate during growth, what they take from the soil in the way of nitrogen and mineral compounds is primary in the synthesis of such foods, both quantitatively and qualitatively. Therefore, it must be recognized that soil fertility is really the backbone of the whole manufacturing process in plants. Removing old pastures from service to rest them on their worn-out soils is a futile recommendation. They can be kept in service and improved at the same time through the restoration of their fertility. That is the one way out.

### *Practices Are Evolutionary*

Most students of fertilizing practices have been caused to modify many of their first recommendations in the light of experiences gained from the field. One has but to follow the trend in fertilization practices with such crops as potatoes and corn during the past 10 years to appreciate the change in fertilizing thought for these crops. Phosphate alone was once quite the finished recommendation for corn. Today, both nitrogen and potash are generally known to exert decided benefits along with phosphate for this crop. Potato fertilization has steadily stepped up the use of potash with correspondingly larger yields of better quality tubers.

Fertilization practices for grass lands have likewise been undergoing modifications based upon field results. Early English experiments condemned the practice of nitrogenous manuring of grass lands. Sir William Somerville was at an early date found writing thus:

"The use of any nitrogenous manure along with phosphates on grass land, where phosphate stimulates clover to a marked extent, must be condemned as bad practice. No doubt the nitrogenous manure brings early verdure over the pasture and it does undoubtedly stimulate growth of grass, but the herbage so grown is very deficient in feeding properties, so much so in fact that the increased weight of food will produce less meat than the smaller yield grown by phosphate alone. What happens is this: the phosphate stimulates clover and the grass stimulated by the nitrogen smothers it. The two manures are consequently antagonistic."

Late findings on the chemistry of nitrogen-treated grass, together with the practice of proper stocking of the pasture, and the role that nitrogen is now known to play in building back worn swards would hardly be in support of that point of view today. It is now known that nitrogenous manuring of pastures practiced with mineral treatment is a warranted recommendation in the production of the most and best grass that can be had.

Nitrogen fertilization makes extra leaf which in turn causes larger amounts of plant substances to be made. Certainly this is something to be desired for the benefit of the livestock on one hand and for the welfare of the pasture on the other. And always it should be remembered that nitrogen fertilization in its effects on producing early grass may be likened to a spell of warmth in the midst of weather yet too cold to force growth.

### *Potash for Pasture Strengthens*

Since the earliest grass-land experiments, phosphates for pastures have become a recommended practice. The earlier views on the use of potash for pastures were not considered so favorable excepting in the special cases of sandy and peaty soils. Such views were largely built on the well-known facts that most soils possess relatively large amounts of potassium; that potassium in plant growth is contained largely in the vegetative portions and hence is not so readily sold away from the farm as is phosphorus; and that animals need but comparatively small amounts of this element, and therefore they excrete most of it in their manures.

Correct as that judgment may have been, it should be reminded that soils that were young then are now old, a sufficient reason for a changing point of view. It may be argued that pastures hardly fall into the same class as tillable lands with respect to potash needs, since the droppings from grazing animals are constantly returned to them. However, at least in the case of dairy cattle, this is hardly the rule since the way they are managed in the night pasture and barn lot causes much of the manure to be dropped elsewhere than back to the pasture producing it. If tillable lands finally reach a stage in their cropping history when they respond to potash treatment, the case for potash on pastures strengthens, because in the comparison the practices of returning stable manure to them and the growing of deep-rooted legumes should delay the need for such treatment.

Wherever nitrogen fertilization of pastures is resorted to in fairly heavy applications as practiced in the Hohen-

When you want the old pasture to be better this is the one way out.

heim recommendations for pasture management, then potassium is needed in increasing amounts for equipping the cells of the extra leaf surface made by nitrogen for efficient carbohydrate synthesis and translocation of these materials. Surplus nitrogen beyond what makes maximum leaf growth is damaging to the plant unless sufficient carbohydrate substances are made to balance it. Potash equips the leaves for more efficient carbohydrate synthesis. More substance is thus made by the same amount of leaf surface, and nitrogen excesses thus become properly balanced. On old pastures under nitrogen treatment it is reasonable to assume this expanded role for potassium, and there is sufficient experimental evidence to support it. Furthermore any practice that stimulates more grass, providing it is all consumed, makes a heavier draft on all essential plant elements.

A case to the point reported from the Rothamsted experiments in England, while not one of grass-land fertilization, may serve to illustrate the principle in question. Mangels when treated with superphosphate and nitrogen in excess made 2.84 tons of leaves an acre and 10.16 tons of roots. The addition of potash to the treatment did not materially increase leaf weight, while the roots increased to 18.14 tons an acre. It is obvious that the introduction of potash caused the leaves to work more efficiently. Even though grass is not a root crop, it would seem to be a case in logic that a parallel reasoning might be made, and that nitrogen fertilization of pastures should be supported by its partner, potash fertilization. And in addition to this function, the well-known fact of potash in relation to legume support adds strength to the argument.

The case of phosphates for pastures has long since been settled. It is accepted to be the nucleus about which the fertilization program should be built. The case for potash on pastures is likewise being settled through experimental evidence. Old pastures more intensively managed will in general demand potash fertilization along with nitrogen and phosphorus for most efficient production and quick building back of turfs.

### *Evidence Favors Potash*

A few cases from the writer's experience will suffice to support this judgment. On an old, much worn pasture under fertility experimentation for the past five years, complete treatment produced an average of 3,728 pounds of dry matter an acre in 1929 against 2,338 pounds when potash was omitted from the treatment. In the spring of 1930 one of the plats from which potash had been omitted was treated with the same amount of muriate of potash as had been used in the completely treated plats in order to check back on potash needs for this pasture. The results were what might have been predicted, for at the end of the season this plat yielded 2,607 pounds of dry matter an acre against its duplicate with 2,176 pounds and compared with 2,542 pounds for the previously completely treated plats. All 1930 yields were greatly reduced owing to the severe drouth settling in during July and continuing up to early September. The data following is descriptive of the facts just set forth. The second plat in the series was the one to which potash was added in 1930.

| | *Blank* | *L-SP-N* | *L-SP-K-N* | *Blank* | *L-SP-N* | *L-SP-K-N* |
|---|---|---|---|---|---|---|
| 1927 | 1009* | 1300 | 1576 | 695 | 1827 | 1371 |
| 1928 | 1127 | 1376 | 1584 | 949 | 1848 | 1667 |
| 1929 | 1472 | 2331 | 3922 | 1351 | 2348 | 3535 |
| 1930 | 1015 | 2607** | 2529 | 937 | 2176 | 2556 |

* Pounds of dry matter an acre
** Received potash in 1930

(*Turn to page 54*)

Tourists inspected an excellent stand of onions secured with 500 lbs. of 4-8-10 per acre. A yield of 800 bushels per acre was predicted.

# *An* Oklahoma Tour

## *By L. J. McDonald*

Agricultural Agent, Chamber of Commerce, Henryetta, Oklahoma

"BOY, a blind man could tell the difference," exclaimed one of the tourists as more than 40 farmers and specialists from three States visited some of the onion and Irish potato fields in the Henryetta district during the Annual Oklahoma Potato Tour held May 28. The speaker spoke the truth, as evidenced by hearty approval given his statement by those who were looking at the differences in growths due to various fertilizer treatments.

For the past several seasons this district has been included in the Annual Tour. Every year demonstrations and educational events have made it worth while for farmers and business men to gather at the various farms inspecting the results of certified seed versus home-grown seed, low analysis fertilizers as compared to high analysis complete fertilizers, and the various kinds and combinations of commercial fertilizers. Specialists, Railroad Agricultural agents, U. S. Department of Ag-

(*Turn to page 58*)

Below: This party is noting the difference in growth where 500 lbs. of 4-8-10 per acre and no fertilizer were applied in a field of 120 acres of potatoes.

Above: The members of the tour observed the vigorous growth in this 40-acre field of potatoes which received 1,000 lbs. of 4-8-10 per acre.

# The Importance *of* Organic Matter *in* Orcharding

*By Dr. E. C. Auchter*

Principal Horticulturist in Charge, U. S. Department of Agriculture

IN order to have satisfactory fruit yields, it is necessary to maintain good growth conditions in the orchard. Thus there should be a good yearly growth of fruit spurs, terminal growth, trunks, branches, and roots. To secure this good yearly growth, all practices of pruning, thinning, spraying, fertilizing, and soil management must be properly performed.

The lack of sufficient water (moisture) and nitrates are often the two big limiting factors in successful tree growth and fruit production in the United States. Of course we might enumerate several other factors which are also essential, but water and nitrates appear to be the most important in most cases.

### *Importance of Water*

The great importance of water in tree growth and successful fruit growing cannot be over-emphasized. The absolute dependence of the tree's welfare on water can readily be seen from the fact that all soil foods must first be dissolved in water before they can be taken into the plant. These soil foods, however, do not flow into the plant in a water stream, but their intake depends upon their solubility and their relative concentration within and without the plant. Whenever their concentration is higher in the soil solution than in the plant, they diffuse into the plant. If it were not for water these mineral foods would not be transported up through the plant.

Water again is necessary in the formation of the carbohydrates, proteins, fats, etc., and their translocation down from the leaves to all parts of the branches, fruit, trunk, and roots. Large amounts of water are likewise transpired daily. Something like 500 pounds of water are transpired for each pound of dry matter produced, and fruits contain from 85 to 90 per cent of water. Such troubles as cracking of fruit, water core, fruit pit, cork drought spot, and die-back, are all exaggerated by improper watering relations. Mathematics show that each vigorous, mature apple tree will use from 15 to 20 tons of water per year when it is making a good growth and is producing a good crop.

### *Importance of Nitrogen*

Fertilizer experiments conducted in many different orchards of this country have uniformly shown the great value of nitrogen in peach and apple orchards. When quickly available nitrogen fertilizers are used, terminal growth, fruit spur growth, and branch and trunk growth are greatly increased. The leaves become larger and greener, more fruit buds are formed, and greater crops result.

### *Role of Organic Matter*

The addition of organic matter to orchard soils, either through growing heavier sods in the sod orchard or by turning under heavy cover crops in the cultivated orchard, will influence greatly the water and nitrogen supply for fruit trees. In the handling of orchard soils, we need to conserve moisture, keep up a nitrogen supply, and keep a proper physical condition of the soil. The addition of large amounts of organic matter will greatly aid in doing all these things.

General farmers have realized for years the value and necessity of having organic matter turned under, but orchardists have not benefited by this experience and in many regions in this country have allowed the organic matter content of their soils to decrease to such an extent that many of the soils now puddle during rains, or the soils erode and wash badly during winter and bake and crack during summer.

Many of our orchard soils, because of a lack of organic matter, have gradually become unproductive. Fruit spur and terminal growth on the trees are short; the bark becomes tight; the fruit doesn't size up; much of the fruit cracks during summer when dry spells followed by rainy periods occur; die-back or rosette appears on the terminals; more top and root injuries occur in winter; and in many cases the addition of nitrogen fertilizers gives very little response.

In such cases orchardists have pruned harder and thinned the fruit heavier in an attempt to keep up the size and quality of fruit. These practices, which have reduced the number of fruits and total possible yield per tree, have simply allowed more water and nitrates for each of the fruits left and, of course, have improved it to a degree.

It seems to me that such orchardists should immediately turn their attention to getting more organic matter in their soils. It is the only way to permanently improve the soils and prevent the occurrence of such troubles.

### *Advantages of Organic Matter*

From the moisture standpoint, I like to think of organic matter as a sponge in the soil. The hard, shaley, or clay soils are loosened up and made more porous, so that during rains the water soaks in instead of running off and is absorbed by the organic matter. Thus large amounts of water are held in the soil, and this is available for the trees gradually during the season. This is especially important in order to keep the fruits growing steadily and normally so that cracking will, to a large extent, be eliminated.

As the organic matter decays in the soil, nitrogen is, of course, liberated and becomes available for the trees. If leguminous cover crops have been used, the soil nitrogen content is considerably increased, while if non-legumes have been used, much of the nitrates

A typical scene on Lake View Farm at Southington, Connecticut, showing luxuriant growth of cover crop, fertilized with a liberal application of 6-9-6 fertilizer. This practice is relatively new, but most promising.

which might have leached away are taken up and held by the plant and thus returned to the soil. This means that it will probably be possible to apply smaller amounts of nitrogen-carrying fertilizers per tree and get equally as good results.

When the organic matter decays, carbon dioxide is also given off into the soil. This results in a more acid soil solution, and more of the plant foods already in the soil are dissolved and made available for the tree's use.

The addition of organic matter improves the physical condition of all soils. As a result they become better aerated and their bacterial content is increased. Such soils are warmer in winter and cooler in summer, and all conditions for tree growth are improved.

### *Sod Orchards*

If orchards are being grown in sod and the sod is thin and poor, there will be very little organic matter to cut and thus add to the soil. A lime test should be made and lime added if the test shows that lime is needed for improving the growth of the sod. Whatever fertilizers are needed for improving the growth of the sod should be added. This may mean a high grade, complete fertilizer consisting of nitrogen, phosphorus, and potassium. The important thing is to grow a heavy sod so that the large amounts of organic matter can be cut twice a year and left on the ground to improve the soil.

### *Cultivated Orchards*

In the case of cultivated orchards, the object should be to plow under heavy cover crops yearly. Select the cover crop which will do best under your conditions and make the most organic matter. If legume crops as soybeans, cowpeas, crimson clover, or vetch will thrive and produce large amounts of organic matter, they should be used because of the fact that the nitrogen of the air is fixed by the bacteria in the nodules and thus the nitrogen content of the soil is increased as well as the organic matter content. But remember that a large amount of organic matter is the important thing in order to improve the physical condition of the soil and especially its moisture-holding capacity. As a result, if non-legumes as rye, buckwheat, sorghum, sudan grass, millet, or rape, and cowhorn turnips will produce more organic matter, they should be used. Additional nitrogen can easily and cheaply be added, if this is found desirable, in the form of some quickly available nitrogen carrier. In many parts of this country a mixture of one bushel of rye and 10 to 15 pounds of winter vetch makes a very satisfactory cover crop.

As with the sod orchard, a lime test should be made and lime and fertilizer should be added, if these are necessary in order to produce a heavy cover crop. Nitrogen, phosphorus, and potassium will probably all have to be added on many soils to get a heavy growth of cover crops.

### *Time of Sowing Cover Crops*

Cover crops should be sown much earlier than has been the practice in many parts of the United States. If weather and soil conditions will permit, the crops should be seeded early enough in the summer so that practically all of their growth will be completed by fall, especially in the northern sections. However, in the middle or southern sections of the country, certain crops will grow some during the winter thus increasing the bulk of organic matter. It would appear best, as a general rule, to have the cover crops plowed or disked under before tree growth begins in the spring—otherwise they will compete with the trees for moisture, nitrates, and other mineral nutrients.

It will be recalled that fruit-spur growth for the year is completed about two weeks after blossoming, and that terminal growth is usually completed about July 15. It can thus be seen how important it is that nothing competes with the trees early in the season

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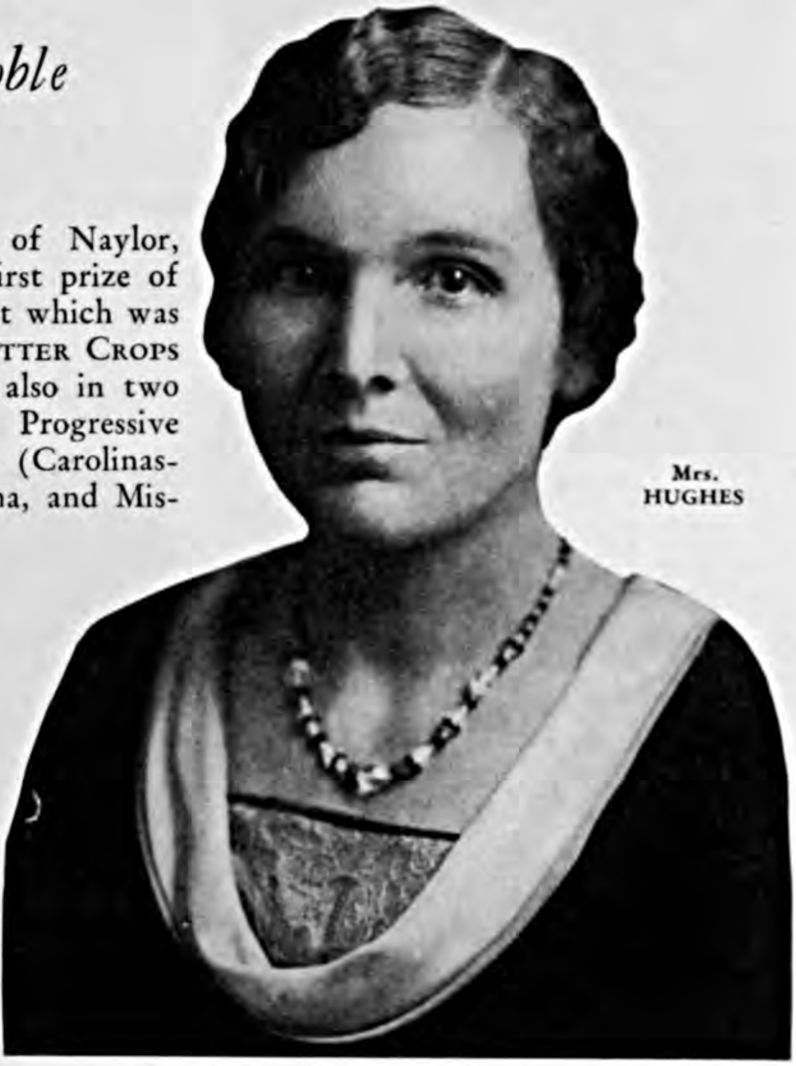
# POTASH CONTEST Winners Announced

*By Sid Noble*



Mrs. HUGHES

MRS. A. HUGHES of Naylor, Georgia, won the first prize of $500 in the Potash Contest which was announced recently in BETTER CROPS WITH PLANT FOOD and also in two advertisements in the Progressive Farmer-Southern Ruralist (Carolinas-Virginias, Georgia-Alabama, and Mississippi Valley editions).

The prize was awarded for the best answer to the question: "How does a top-dressing of 100 pounds of muriate of potash per acre help cotton to pay extra cash?"

J. C. Manning of Valley Head, Alabama, won the second prize of $200, and C. P. Johnston of Sasser, Georgia, was awarded the third prize of $100.

The other prize-winners were as follows:

Ten prizes of $25 each to:

J. H. Ansley, Route 3, Laurel Hill, Fla.
R. P. Burson, Monroe, Ga.
Lyle D. Flynn, McKenzie, Ala.
James A. Holder, Pattison, Miss.
Jesse F. Johnston, Route 6, Albertville, Ala.
Mrs. R. L. Montgomery, Route 2, Waxhaw, N. C.
S. H. Parker, Route 1, Ernul, N. C.
I. C. Strickland, Route 1, Dunn, N. C.
Isadore Washington, Box 143, Pickensville, Ala.
W. E. Woodruff, Route 3, Nashville, N. C.

Twenty-five prizes of $10 each to:

H. J. Brown, Skippers, Va.
M. A. Coleman, Millport, Ala.
Ruth E. Daniel, Route 2, Wake Forest, N. C.
N. B. Dulin, Bowling Green, S. C.
J. W. Dunn, Route 1, Camden, S. C.
A. L. Garner, Route 1, Rosemary, N. C.
T. L. Grambling, Orangeburg, S. C.
W. H. Hamm, Ray City, Ga.
Cuber W. Hamrick, R. 3, Ellenboro, N. C.
C. E. Huff, Danielsville, Ga.
A. P. Johns, Toccoa, Ga.
Nathan M. Johnston, Littleton, N. C.
T. E. Keitt, Newberry, S. C.
Mrs. Ben A. Lincoln, Paragould, Ark.
Pauline McWhirter, Manila, Ark.
Mrs. Clyde Michum, R. 2, Lincolnton, N. C.
Hudson Nix, Route 1, Fair Mount, Ga.
Mrs. B. B. Pace, Route 2, Nicholson, Ga.
James W. Phillips, Newton, Miss.
Myrtle Pickett, Gholson, Miss.
R. C. Pittman, Route 1, Taxahaw, S. C.
I. O. Pitts, Route 3, Carrollton, Ga.
J. M. Shealy, Pomaria, S. C.
R. A. Shearer, Lyerly, Ga.
M. B. Tucker, Box 306, Pelzer, S. C.

One hundred prizes of $2 each to:

Mrs. Miller Arant, Route 2, Coila, Miss.
James C. Ash, Route 1, Good Hope, Ga.
Henry F. Baker, Route 2, Moultrie, Ga.
Joe Ballenger, Route 3, Inman, S. C.
David H. Barnett, Newtonville, Ala.
M. H. Barnett, Washington, Ga.
Hoyt J. Bishop, R. 2, Roanoke, Ala.
James L. Black, Box 150, Charleston, Miss.
W. F. Blanchard, Route 3, Burgaw, N. C.

J. C. Manning, second prize winner

Davis Bonner, Box 59, Milledgeville, Ga.
Carl Boyd, Route 2, Box 45, Cullman, Ala.
W. W. Braselton, Pendergrass, Ga.
L. J. Browning, Route 2, Union, S. C.
Mrs. R. D. Brownlee, R. 3, Honea Path, S. C.
Milton Bryant, Route 6, Blakely, Ga.
R. P. Bullock, Route 5, Greenwood, S. C.
E. O. Caldwell, Zebulon, Ga.
J. C. Caviness, Ashland, Miss.
Mrs. G. W. Champion, Fuquay Springs, N. C.
C. B. Choate, Route 3, Charlotte, N. C.
J. W. Collier, Winburn, Miss.
Sara Drennan Craig, Lancaster, S. C.
Amy Lou Culbreth, Route 1, Dearing, Ga.
Julia Daily, Route 1, Sunset, La.
W. H. Davidson, Route 1, Fort Valley, Ga.
Mrs. E. A. Davis, Folkston, Ga.
Hunter Daughtrey, Carrsville, Va.
Edgar Deaton, Box 233, Troy, N. C.
Ruth Ellington, Box 12, La France, S. C.
J. E. Ferguson, Box 202, Rison, Ark.
Leonard Finch, Star Route, Chipley, Fla.
Chas. S. Fisher, Route 4, McDonough, Ga.
Clifton W. Galloway, R. 2, Hartsville, S. C.
Mrs. Lula Garrett, Route 2, Alapaha, Ga.
Alton Gibbons, Turbeville, S. C.
R. B. Goodgion, Williamston, S. C.
E. S. Griner, R. 2, Box 49, Sylvania, Ga.
Shelor G. Harbin, Westminster, S. C.
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J. W. Haynie, Cordele, Ga.
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Mrs. Johnnie Hester, Bigelow, Ark.
Mrs. Thad R. Howell, Severn, N. C.
Dink Ingram, Morganton, Ark.
W. A. Ingram, Bee Branch, Ark.
Mrs. W. A. Ingram, Bee Branch, Ark.
J. J. Johnson, R.F.D., Wendell, N. C.
V. M. Johnson, Route 1, Greer, S. C.
Mrs. J. S. Jones, R. 1, Goldston, N. C.
Mrs. S. T. Kendrick, Fallston, N. C.
Gray R. King, Nashville, N. C.
A. F. Korb, R. 1, Taylorsville, Miss.
H. E. Lathan, Route 5, Monroe, N. C.
G. R. Maness, Selmer, Tenn.
G. C. Martin, Conway, N. C.
Jas. D. Mason, Raeford, N. C.
Mrs. F. V. O'Dell, Route 2, Easley, S. C.
John S. Offenhanser, Texarkana, Ark.
C. A. Parish, Blountstown, Fla.
Howard Peyton, Raymond, Miss.
Elton Phillips, Route 1, Orrum, N. C.
Orene Phillips, Savage, Miss.
A. W. Porter, Rockingham, N. C.
J. R. Raines, Route A, Cordele, Ga.
J. H. Rhinehart, Harrison, Ark.
A. U. Rhodes, R. 1, Box 78, Homer, La.
P. H. Roach, Bogart, Ga.
Mrs. C. H. Roberts, Box 11, Youngsville, N. C.
Mrs. J. L. Rosencrant, R. 2, Stuttgart, Ark.
Chas. M. Rosser, Jonesboro, N. C.
Carl I. Rowe, Route 5, Carrollton, Ga.
Mrs. Ida McCain Rowe, Carrollton, Ga.
Mrs. Belle Russell, Pigeon Creek, Ala.
Frances Sanders, Box 59, Longview, Miss.
W. R. Sanderson, Town Creek, Ala.
W. H. Sangster, R. 1, Box 62, Elko, Ga.
R. L. Short, Berlin, Ga.
J. B. Silvey, Prescott, Ark.
Herbert Solomon, Goodway, Ala.
Bennie Spigner, Jr., Athens, La.
L. D. Smith, Route 3, Swainsboro, Ga.
Mrs. A. M. Smith, R. 1, Ridgeland, S. C.
Ralph Sullivan, R. 3, Simpsonville, S. C.
Left Thompson, Route 3, Town Creek, Ala.
Paul Torrance, Box 50, Milledgeville, Ga.
Geo. O. Trapnell, Metter, Ga.
Zack Trimm, Route 5, Gordo, Ala.
Estelle Uptain, Route 1, Clarksville, Ark.
J. C. Vaughn, Route 1, Philomath, Ga.
J. A. Wade, Vincent, Ala.
J. P. Wade, Route 1, Albertville, Ala.

C. P. Johnson, third prize winner

Joe E. Walker, Fayetteville, Ark.
S. J. Walker, Rhine, Ga.
T. Webber Welborn, Route 3, SoSo, Miss.
A. F. Wilkerson, Route A, Climax, Ga.
Ernest Wilson, Eutaw, Ala.
Mrs. Ernest Wilson, R. 3, Eutaw, Ala.
Berth Lee Wynns, R. 1, Branchville, S. C.

When the contest was announced 5,249 replies were received, of which 4,111 were entries.

The judges who selected the prize-winning letters were: R. P. Bledsoe, Georgia Experiment Station; Gilbeart H. Collings, Clemson College, South

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# Top-dressed Alfalfa Feeds Better

*By F. G. Hall*

Wilmington, Ohio

CENTURIES ago, the bewhiskered but observing old Arabian herdsman always pitched his tent in a spot where the tufts of lucerne were thickest. It was for his horse, with whom he shared his tent at night, that he sought these spots, because the horse seemed to relish the alfalfa better than any other kind of feed.

Only recently has Western intelligence looked with a scientific eye for the reasons why these clumps of alfalfa persisted, though the superiority of alfalfa as a feed has been known since the maneuvers of the Roman Cavalry were recorded.

One of the rare places where the combined experience of feeding alfalfa with careful observation of the limiting factors in producing it is the Harris farm in Logan county, Ohio.

On this 150-acre farm, Goerring Harris sowed the first alfalfa seed 35 years ago. Mr. Harris is now 78, but he still enjoys watching alfalfa grow, pitches it onto the wagon with zest, and notes the varying degrees of avidity with which his sheep and cattle plunge into mangers full of the "long green."

Harold Harris, the son, is now in active charge of the farm where alfalfa has been fed to livestock for more than three decades.

The Harris farm is technically described as Bellefontaine gravelly clay loam. The soil is underlaid with a gravelly subsoil that has enough limestone pebbles in it so that thus far, lime has been no factor. "But it takes a lot of plant food to grow good alfalfa year after year," Harold Harris said. They will "*make*" 70 acres of hay this year.

During the first few years of the 35-year period, the Harrises grew good alfalfa. Then followed a few years when they did not get such stands. When they top-dressed the alfalfa with manure, bluegrass came in to such an extent that they could track the manure spreader around over the field by means of the bluegrass which appeared a few months later.

They tried improved seed. From Michigan they secured some Hardigan alfalfa seed which was hardier and stuck through the winter on low spots where other alfalfa could not stand the tugging and pulling, called heaving.

But good seed was not enough. They had other questions the answers to which only the alfalfa could give.

### *Top-dressing Solves Problem*

Since the immediate question was whether or not they could rejuvenate the old stands of alfalfa with fertilizer top-dressings, they established a 20-acre field of alfalfa on which to experiment. Both soil and stand were uniform, and three plots similar in all respects were laid out. One was to have no fertilizer, for comparison with the other treatments. One got 852 pounds of 0-20-0 per acre, while another got 852 pounds of 0-20-10 per acre. The fertilizer was broadcast in the spring of 1929 and harrowed in.

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# *The* Inquiring Mind *and the* Seeing Eye

*By Dr. A. S. Alexander*

University of Wisconsin

IT has been well said of Charles Embree Thorne, Director of the Ohio Agricultural Experiment Station from 1887 to 1921, that he is honored as a pioneer and leader in field experiments and is one who has enjoyed the uninterrupted confidence of Ohio farmers and the respect and admiration of his fellow scientists throughout the nation. The Ohio Station stands today as a monument to his ideals and steadfast, undaunted character, which have met and conquered the trials that beset the development of research in Ohio agriculture.

In recognition of Director Thorne's distinguished services and the high place he occupies in their esteem and affection, the faculty of the Ohio College of Agriculture and the farmers of the State publicly extended him their hearty congratulations on February 2, 1928. His friends throughout the land will be glad to know that, although now in his eighty-fifth year, he is still "in harness" and actively interested in research, looking to the betterment of agriculture from a scientific and practical standpoint.

### *A Humble Beginning*

Director Thorne was born October 4, 1846, in Green county, Ohio, reared on a little backwoods farm, and educated in the district schools. For a time he taught in a country school, and then studied at Michigan Agricultural College. The college farm was, at that time, "chiefly occupied with native forest and tamarack swamp, swarming with mosquitoes." There, unfortunately, he became inoculated with malaria, but remained long enough to receive inspiration from the teachings of Professor A. N. Prentiss and Dr. Manly Miles.

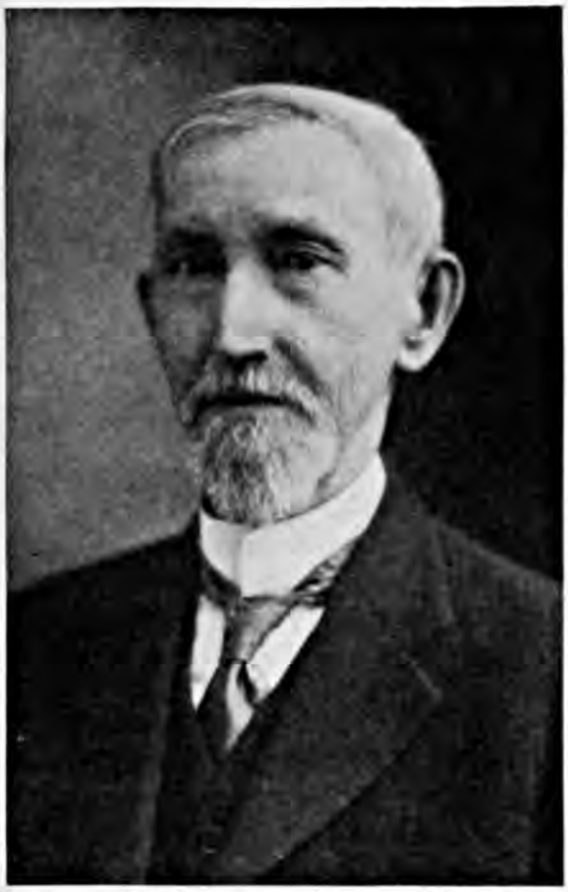
On recovery, he studied at Antioch College, Ohio, to fit himself as a teacher of agriculture. In 1870 he farmed in eastern Kansas, then returned to Ohio, married, and settled on a small farm. His marriage he pronounced "the greatest good fortune that ever befell me." In 1887 he was farm foreman at the Ohio Agricultural College and next year farm manager, doing field and feeding experimental work under the guidance of Dr. Norton S. Townsend. Then the publishers of *Farm & Fireside* coaxed him away, and he served successfully as editor of that journal from 1881 to 1888.

### *Dean of Experiment Stations*

The Ohio Agricultural Experiment Station had been established in 1882 and located on the farm of the State University under the supervision of Professor W. R. Lazenby as Director. In 1886 the directorship was transferred to Dr. Townsend, and in 1887 when the Hatch Act went into effect, Professor Thorne was made Director.

Professor Thorne is, if we are not mistaken, entitled to be called "Dean of American Agricultural Experiment Stations." That, indeed, was a title given him by Professor William Arnon Henry of Wisconsin, who, in turn, has popularly been termed "Dean of Deans," of the agricultural colleges. That august gentleman wrote of Professor Thorne in the *Ohio Farmer* of June 21, 1913, "Early he began a systematic study of the depletion and maintenance of soil fertility that by thoroughness and continuity is already of immeasurable value to our agriculture. His quiet earnestness, persistence of effort, and simplicity of statement combine in a splendid example to the younger generation of research workers in the ever-widening field of agricultural opportunity."

The results of his life's labors in research, relative to fertility problems, led Professor Thorne in 1913 to publish his notable book, "Farm Manures," and in 1930 his maturer text, "The Maintenance of Soil Fertility." Those illuminating books condense in a simple, readable way a vast amount of careful, continuous, and thoroughly proved experimental work and present conclusions that have been of great scientific and practical value to his fellow workers and to the farmers of Ohio and the nation.



CHARLES EMBREE THORNE

The faithfulness of Professor Thorne in his lifelong efforts and the supreme importance of his contributions to agricultural science have been appreciated and recognized throughout the land, and at home. They brought him the honorary degree of Master of Agricultural Science from Ohio State University in 1890 and honorary Doctor of Science from the College of Wooster in 1926. Among honorable official positions he has held are the presidency of the American Society of Agronomy, 1914-15, the Society for the Promotion of Agricultural Science, 1916, and Association of Agricultural Colleges and Experiment Stations, 1916.

Professor Homer C. Price, when Dean of Ohio College of Agriculture, said that he regarded the Ohio Agricultural Experiment Station as the "Rothamsted of America." That was high praise, and he attributed the proud position of the institution to the far-sighted plan on which the plat work had been arranged and which, he predicted, will always remain as an expression of thoroughness, accuracy, and practicability of the man who laid it out — Director Thorne.

The late Joe Wing, of the *Breeder's Gazette*, was a sincere admirer of Director Thorne and liked him because of his clear vision and his steadfast and persistent purpose. He was correct when he said, "His strong point is that he sees the underlying principles that are at the foundation of farm prosperity and country life, that is, the fertility of the soil; and he has been working for a long time steadily toward finding out, in a practical way, how farmers can build their soils good and strong."

The single purpose of mind of Director Thorne in seeking the advancement of the agriculture of Ohio also greatly impressed Dr. Eugene Davenport, when Dean and Director of the Illinois College of Agriculture and Agricultural Experiment Station. He truthfully said, in 1913, "He has not worked for individual glory or personal advancement, but he has kept strictly to the one purpose that he had in mind from the beginning. He has developed one of the strongest of all the experiment stations and one of the most helpful. This does not mean that the work has been transient or popular in character, but quite to the contrary; indeed, some of the most scientific as well as the most reliable data come from the bulletins and records of Wooster Station."

### *Acts As Consultant*

Since 1921, Director Thorne has been acting as consulting chief in soil fertilization at the Ohio Agricultural Experiment Station at Wooster. Despite his long life of active experimentation, he does not by any means consider his work finished; indeed, he says "effective field experimentation is still in its infancy;" but he is encouraged to note that the necessity for this type of work is being more widely recognized. He is of the opinion, however, that the time is coming when the problem of fertility maintenance may be treated in a far more adequate manner than is possible today. Modestly, he acknowledges his limitations, and those of many other investigators who have contributed a wealth of useful knowledge relative to agricultural problems. "It is not possible," he has said, "to duplicate in the laboratory the conditions of soil, subsoil, rain, frost, and sunshine that prevail in the field under varying seasonal conditions, nor to deal with sufficient numbers to counterbalance the variations due to individuality; but until this is done, the teaching of the laboratory may be an even less reliable guide to the farmer than the empiricism that preceded it."

Nor, in his opinion, can this confirmative work be left to the farmer, "for effective field experiment is one of the costliest and most tedious and difficult forms of scientific research. An experiment limited to a single soil or a few seasons may be altogether misleading in its indications; it is only when the effects of different treatments on different soils are compared under scientific observation, and when these comparisons are continued throughout a cycle of changing seasons, that we may be reasonably confident in our interpretation of results."

### *Firm Believer of Thoroughness*

The beginning research worker will do well to note and heed what Director Thorne has said regarding thoroughness in experimental research work. Ever there is a pressing temptation to publish results of indefinite experiments, in the desire to attract attention and gain approbation and applause. Throughout his career Director Thorne has been careful, thorough, conservative, and always assured of his facts, with a background of adequate experience, before publishing his conclusions and deductions. These fine attributes should characterize every research worker and dominate his every act. They have given the work of Director Thorne a high reputation for integrity and reliability among scientists and farmers. So manifold have been the results of his long years of experimentation that we can mention but a few of his conclusions, but the following will be of interest to many readers:

The farmer now has it in his power very materially to increase the yield of the acre and at the same time to reduce the unit cost of production through methods some of which have become available since the beginning of the present century.

The mixing together of manufactured fertilizing products involves no more technical skill than is required for the intelligent combination of va-

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# From Tobacco to Potatoes

## *By W. W. Smith*

Superintendent and Director of Vocational Agriculture, Monroe Township Rural Schools, Pitsburg, Ohio.

MONROE township, Darke county, Ohio, has never been considered a potato community. General farming with tobacco as the one intensive crop has been the rule for years past and potatoes have received attention only as a home garden crop.

The deep, fertile, black soil of this section made tobacco a profitable crop, and because of this fact, tobacco acreage increased to a point where overproduction became a serious menace to the price. Out of this situation the local Department of Agriculture conceived the idea that in view of the close proximity to good consuming markets, potatoes should replace much of the tobacco acreage to the mutual benefit of both potato and tobacco producers.

Two years ago several students chose potatoes as a project, and every effort was made to secure the adoption of the best recognized practices. Sod ground was used, with fertilizing done to a rather modest degree because of the uncertainty of results. Spraying needs were met to a limited degree by a Department-constructed sprayer using locally available parts.

The results of the year's work showed several yields slightly above the 200-bushel mark, and a greatly increased public interest.

During the past year five students entered the project with Dad's wholehearted support, determined to see what could be done with potatoes as a major farm crop. Three local farmers entered the work with the same ambitious intentions.

This single stalk holds 10 No. 1 grade potatoes.

The practices used were nearly uniform. Sod ground fall-manured was selected in most cases. Fertilizer applications ranged from 800 to 1,200 pounds of 2-10-6, or comparative ratio, all of which were applied in the row at planting time.

The ground was plowed deep and worked to as near full plow depth as the limitations of local cultivating tools would permit. The seed used were northern-grown, certified White

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# "We Thank You *for* Your Attention"

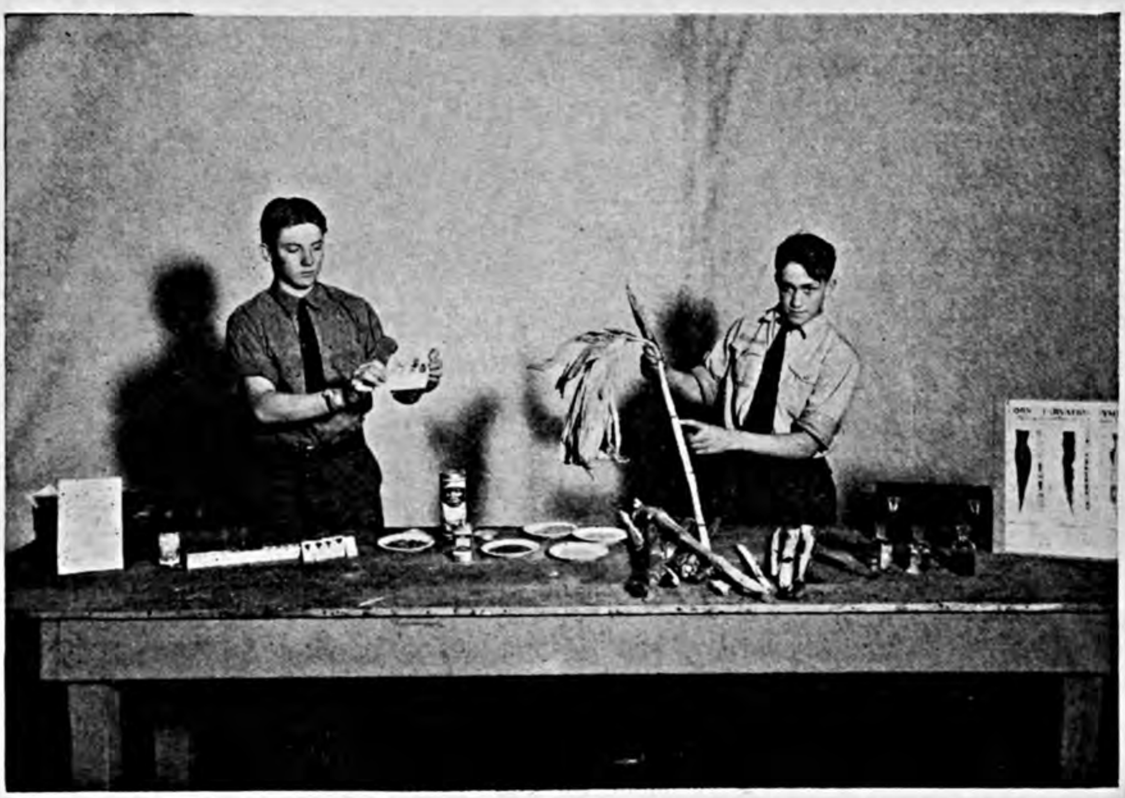
*So much interest was aroused by the picture of a fertilizer demonstration team appearing on page 36 of our June issue that we are reprinting the picture below and giving the dialogue used by these two boys.*
*—The Editors.*

4-H CLUB members, leaders, and judges, my partner's name is Keith Vance and I am Joseph Noel. We are both 4-H corn club members of Washington township, Cass county, Indiana.

We are going to conduct, for your approval, a demonstration on the analysis of the soil's plant food. This consists of three tests, namely, the Hoffer corn-stalk test, the Illinois Hi-lo-phosphate test, and the LaMotte soil acidity test.

It is economical and profitable for every farmer to follow a sound soils program which includes using the proper analysis of fertilizer, lime, legumes, and crop rotation.

These simple tests are well-known methods of determining plant-food needs in the field and are therefore of value to the corn club member, farmer,



Joseph Noel (left) and Keith Vance (right) comprised the demonstration team from Cass county, Indiana, which showed attentive audiences at the 4-H Club Round-up at Purdue University what happens when the plant obtains a sufficient or insufficient amount of nitrogen, phosphoric acid, and potash.

Robert Meyer (left) and Arthur Reutebuch (right) of Pulaski county, Indiana, were the members of another team demonstrating the composition and proper use of fertilizers.

or anyone interested in the progress of agriculture.

My partner will now show you the Hoffer corn-stalk test.

*Keith Vance:*

If we could read plant signs, we would be able to tell whether a plant was getting the proper kind and amount of food. Take the corn plant for example.

This chart represents three different corn-stalks and leaves. It shows in the one case a normal, healthy plant; and in the other two, various plant-food deficiencies. On the left the healthy, dark green leaf indicates a sufficient quantity of plant food. On the right, the leaf with the light, yellowish-green color and firing up the midrib shows nitrogen starvation. While the middle leaf with the brown edges is an indication of potash starvation.

We also have chemical tests which check, or rather double check, these starvation symptoms.

To test for nitrogen, apply diphenylamine solution on the corn-stalk pith. If it turns dark blue, there is an abundance of reserve nitrogen, as shown here. If it does not develop any blue color, as in this case, it shows that there is no reserve nitrogen. This condition may be corrected, by manuring the field, growing a legume, or by an application of commercial nitrogen in the form of nitrate, ammonium sulphate, or some other nitrogen carrier.

For the potash test two chemicals are applied to the joint tissues (1) diluted hydrochloric acid and (2) 10 per cent solution of potassium thiocyanate. If the joints turn dark red, as in this case, it shows a deficiency of available potash. If only slight streaks of red appear, as shown here, we may conclude that the plant has had a sufficient supply of potash up to the time the test was made.

Corn-stalk testing should be done in late August and September, before frost. Since it is impossible for us to obtain growing corn at this time of year, I will use some dried stalks, selected from fields last fall before frost.

A stainless steel knife should be used

in splitting the stalks. A common steel blade might rust and leave iron rust on the joint tissues. This would interfere with the potash test.

I will first use the nitrate test. A few drops of diphenylamine solution are applied on the corn-stalk pith. There is an abundance of nitrogen present in the stalk as indicated by the dark blue color. I will test this stalk. There is no blue color present in the tissues covered by the test solution. The plant has used all the available nitrate in its tissues to grow.

Next, I will make the potash test. I will apply diluted hydrochloric acid and potassium thiocyanate to the joint tissues of these stalks. This stalk shows a few red streaks. I would say that plant had a normal amount of potash present. This stalk shows a deep red color. There is enough iron collected in these joint tissues to interfere with the proper flow of sap. This condition, due to the lack of potash, may result in an immature ear, or the possible death of the plant itself. This condition may be corrected in future crops by an application of potash to the soil.

My partner will now show you the Hi-lo-phosphate test, and the LaMotte soil acidity test.

*Joseph Noel:*

This test is conducted by filling a test tube ¼ full of soil and filling it up with the Hi-lo-phosphate solution. The test tube is then vigorously shaken and the test set aside to settle. The clear solution on top of the soil is then stirred up with this tin pencil and the color of the solution noted. If it is colorless it is low in phosphate. If it is light blue, the soil carries a medium, and if it is dark blue it carries a high amount of available phosphate.

Experience in reading the tests will help to translate it on various types of soils.

Here I have a few samples which I have just shaken up and allowed to settle. We will read the tests (reads them). This Hi-lo-phosphate test has only been discovered about two years. It is used quite extensively by Illinois farmers and county agents.

The chief purpose of the LaMotte test is to determine whether or not the soils need lime for the successful growth of a legume crop. Some person might say "What is the use of liming the legume crops for the proper development of corn for example?"

When lime is applied to the legume crop, it increases the growth of the legume and when legumes grow, they add nitrogen to the soil. Nitrogen is frequently one of the limiting elements for corn plant growth.

There are several ways besides this test to find out whether the soils are sour and in need of limestone. When red sorrel tends to crowd out clover or bluegrass and dewberries appear, it is a good indication of acid soil. There are also several kits on the market besides this one that I am going to use. These are: Soiltex, Rich or Poor, litmus paper, and others.

The kit used in this demonstration consists of this test solution, this color chart, and these porcelain dishes.

Soil tests should be made of both the surface soil and the subsoil or the soil below plow depth. The soil to be tested is put in the large cup in the end of the dish and a few drops of the test solution applied. The mixture is then gently agitated and set aside for about one minute. While the mixture penetrates the grains of the soil, I will illustrate the color chart. (Illustrates it.)

Now we shall see what is the result of the soil tested. (Reads it). Here are some other samples that I have previously prepared. (Reads them).

This concludes our demonstration in which we have shown the Hoffer corn-stalk test for nitrogen and potash, the Illinois Hi-lo-phosphate, and the LaMotte soil acidity test to determine if the soil is in need of phosphate and limestone respectively.

Are there any questions? ? ? ?

If there are no further questions, we thank you for your kind attention.

The growth of sweet clover pasture on this soil well supplied with lime was so rapid that the cattle could not keep it down.

# Soil Liming Data

## *By A. F. Gustafson*

Extension Professor of Soil Technology, New York State College of Agriculture

TEN years ago it became apparent to the writer that accurate tonnage data of liming materials used on New York farms would be of real value. This information is of service to the manufacturers of the different liming materials in planning for the future and to farmers and experiment station, college, and extension workers as a measure of the changes taking place in farm liming practice.

Many have estimated the tonnage of lime or fertilizer used during any year in a given territory, but such estimates unfortunately are not always sufficiently accurate to have the desired value. For this reason the writer set about obtaining more reliable tonnage information.

On January first each year a tonnage questionnaire has been addressed to every manufacturer known to be supplying any form of lime to New York farmers. The manufacturers have been definitely assured that any data supplied by them would be held strictly confidential to be used only for the purpose of arriving at the aggregate tonnage used each year on New York soils. At first they were a bit reluctant to release such data lest some competitor might obtain and use them. Nothing, however, has been divulged except the total tonnage of each form of lime and the grand total of all forms used each year. This policy is to be continued.

These tonnage data are published in a bulletin, "Liming New York Soils," originally dated February, 1924. The first revision was made October, 1928, and a second revision was made last December.

After all the data for any year are in they are compiled and the manu-

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# Building Fertility *on* "Cut-over" Clay

## *By M. J. Thompson*

Director, Northeast Minnesota Experiment Station, Duluth, Minnesota

IN establishing the value of fertilizers in stepping up production, we believe too much emphasis is placed on the immediate crop. From our experience, the influence upon succeeding crops builds both interest and conviction.

Tell a farmer to fertilize his cash crop and harvest some of the benefits on the succeeding feed crops and he thinks it may be worth while. It appears to be good management, for he is discounting the speculative element; he is dividing the hazard of a given year by three; and he is splitting the price three ways as well.

This table records our results here at Duluth (N. E. Experiment Station).

Assume some potato grower realized this modest average of 43.3 bushels per acre increase in 1930, under the very trying conditions of that season. What interests the farmer is the fact that he can count on this fertilizer to step up his oats in 1931 by better than 10 bushels per acre; what looks better still is the fact that the fertilizer in-

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Field Crop Yields From Fertilizer Treatment

| Kind and amount of Fertilizer per A. | *Potatoes* No. of Crops | Increase over Check (bus.) | *Oats* No. of Crops | Increase over Check (bus.) | *Hay* No. of Crops | Increase over Check (lbs.) |
|---|---|---|---|---|---|---|
| Check | 9 | 168.5* | 4 | 38.9* | 4 | 2600* |
| 385 lbs. Nitrate of soda | 9 | 25.9 | 4 | 8.3 | 4 | 484 |
| 385 lbs. Sulphate of Ammonia | 4 | 12. | 3 | 5.2 | 2 | 698 |
| 326 lbs. Treble Superphosphate | 9 | 18.6 | 4 | 12. | 4 | 1280 |
| 220 lbs. Muriate of Potash | 9 | 34.7 | 4 | 11.2 | 4 | 366 |
| 326 lbs. Treble Superphosphate, 220 lbs. Muriate of Potash | 9 | 52.5 | 4 | 9.1 | 4 | 1078 |
| 385 lbs. Nitrate of Soda, 220 lbs. Muriate Potash | 9 | 42.4 | 4 | 15. | 4 | 900 |
| 326 lbs. Treble Superphosphate | 9 | 68.2 | 4 | 8.2 | 4 | 962 |
| 385 lbs. Nitrate of Soda, 931 lbs. Complete Fertilizer | 9 | 92.2 | 4 | 15.5 | 4 | 790 |
| Average—all treatments | | 43.3 | | 10.6 | | 819 |

*Actual average yields on check plots; a base for computing increases.

Edgar Pflantz standing between the two piles of corn husked from the fertilized (left) and unfertilized (right) parts of the field with which he won the State 5-acre Yield Contest sponsored by the Missouri Corn Growers Association in 1930.

# Thirty-four Prizes *from* One Bushel

*By O. T. Coleman*

Assistant Professor of Soils, Missouri College of Agriculture

THIRTY-FOUR prizes have been won in the last two years as a result of the purchase of one outstanding bushel of seed corn. These winnings include grand champion single ear at the International Hay and Grain Show in Chicago for the purchaser, State champion on 10 ears, first in the State 5-acre Yield Contest, besides eight first in Junior and 4-H Club classes at State, national, and international corn shows.

John Pflantz of Marion county, Missouri, bought this bushel of Reids Yellow Dent corn at the Hannibal National Corn Show at Hannibal, Missouri, in the fall of 1928 from R. A. Hatfield, a veteran producer of certified seed corn of Grundy county, Missouri, giving him $11.00 for it. The corn was planted on eight acres of good sandy loam, creek bottom land, in the spring of 1929, and his two industrious sons, Edgar, aged 18, and Wilbert, aged 15, were taken in as partners. Naturally, these boys kept all the weeds out of this field and kept it well cultivated. That fall, the crop was divided between the three and each made their individual entries in the International Hay and Grain Show at Chicago, and the National Corn Show at Hannibal, Missouri. When the final "check-up" was made, it was found they had the following winnings to their credit:

John Pflantz — Grand champion single ear and eighteenth place in the open 10-ear class of yellow corn at the International Hay and Grain Show, and ninth on single ear in the national class and sixth on bushel of yellow corn in the local class at the Hannibal National Show.

Edgar—Fourth for region four in junior class on 10 ears of yellow corn at the International Hay and Grain Show; first in both the local and 4-H Club classes and fifth in the national class on the best 10 ears of yellow corn; and third in the 4-H Club class and seventh in the local class on the best bushel of yellow corn at the Hannibal National Corn Show.

Wilbert—Second in the 4-H Club class and fifth in the local class on the best bushel of yellow corn; and second in the local class and eighth in the national class on the best 10 ears, yellow, at the Hannibal National Corn Show.

In addition to this prize-winning corn and that which they saved out for their own seed to plant the next year's crop, they had 60 bushels of seed corn that was certified by the Missouri Corn Growers' Association. This means it was pure, uniform, well-matured, bright, sound, practically free from disease, and would germinate 95 per cent or above.

In the spring of 1930, this same eight acres of creek bottom land, which had overflowed once or twice in the meantime, was put back in corn by Edgar and entered in the State 5-acre Yield Contest sponsored by the Missouri Corn Growers Association. Wilbert also entered this contest but selected a piece of upland ground which, because of the dry summer, did not do so well as the bottom land. Mr. Pflantz planted 24 acres for himself, part on bottom land and part on hill land.

In the fall of 1930 Mr. Pflantz and his two sons had the following winnings chalked up to their credit:

Edgar won first in the State 5-acre Yield Contest with a yield of 85.9 bushels of corn per acre on the part of his field where he had broadcast 125 pounds of a 3-14-6 fertilizer and disked it in the ground well just before planting the corn, and 80.1 bushels per acre where he had used no fertilizer. At the International Hay and Grain Show at Chicago he won first in region four in the junior class on 10 ears yellow; at the State Certified Seed Show held at Columbia, Missouri, his 10 ears yellow was champion of the junior class and his bushel and 10-ear entries were first in the junior class. At the Hannibal National Corn Show he won first in the local and 4-H Club classes on his 10 ears yellow and first in the 4-H class on his bushel entry. Besides this, he won second in the local class on both his bushel and single-ear entries and ninth in the national class on the latter.

Wilbert won third in both his yellow bushel and yellow 10-ear entries in the 4-H Club class and eighth in both the bushel and 10-ear local class at the Hannibal National Corn Show, and fifth in the yellow 10-ear junior class at the International Hay and Grain Show.

Mr. Pflantz won ninth in the 10-ear yellow class at the International Hay and Grain Show and sixth in the local one-bushel yellow class at the Hannibal National Corn Show. He also had 210 bushels of Reids Yellow Dent seed corn eligible to certify but which was all sold before the representative of the Missouri Corn Growers Association could get around in January to inspect it for certification.

The fact that Mr. Pflantz paid $20 for the second prize bushel of Reids Yellow Dent corn at the Hannibal National Corn Show last fall is proof that he still believes in the value of good seed corn. Not only this, but he and the boys expect to increase their acreage in 1932 with the hope that they will not only win better prizes themselves but interest more people in good seed corn and 4-H corn club work.

# Penn State Celebrates 50 Years of Soil Tests

*By E. H. Rohrbeck*

Agricultural Editor, Pennsylvania State College

NITTANY VALLEY, green-garbed and sun-kissed, joined the Pennsylvania State College in a cordial welcome to 150 soil scientists and representatives of the fertilizer industry attending the Soil Fertility Conference at State College, June 24, 25, and 26.

Pages of history carefully recording the events transpiring during 50 years of experimentation in the feeding of soil appetites were turned back during the 3-day conclave. There were thrusts, too, into the hazy, dim days of the geological past. Soils experts took theses which they developed diligently to prove points. Listeners questioned and scientists answered.

It was an interesting and interested group which came to see, hear, and discuss the oldest continuous field fertility experiments in America and second only to Rothamsted in the world. The venerable Dr. C. E. Thorne, octogenarian former director of the Ohio Agricultural Experiment Station at Wooster, bright-eyed and eager, rubbed shoulders with younger men from a score of States, Washington, D. C., Quebec, Germany, and India. Experience and experiments—vital, dynamic things in the quest for truth on the part of age and youth.

Many who came to this birthday celebration were sad of heart, for their beloved associate of more than a half century, Dr. Whitman Howard Jordan, who was to have been guest of honor, had passed away on May 8, full of years and honors. He it was who,

A view of part of the Old Fertility Plots, Pennsylvania State College.

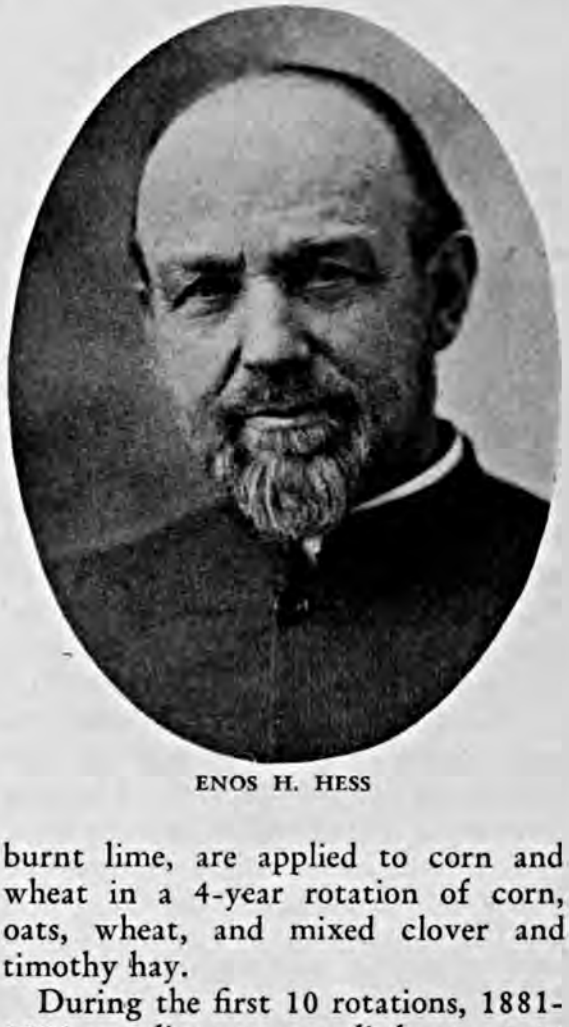
while professor of agricultural chemistry at Penn State in 1881, had established the general fertility plots. Now these plots bear his name.

On the afternoon of the opening day of the conference, the visitors joined their Penn State hosts in dedicating the plots in his honor. Dr. S. W. Fletcher, director of research of the agricultural experiment station, presiding, said "In recognition of the service of Whitman Howard Jordan to agriculture through his pioneer work at this institution, The Pennsylvania State College now designates the experiment which he established as the Jordan Soil Fertility Plots. They will carry his name as long as they endure. We trust that the quality of the work that shall be done by his successors in the years to come, in interpreting the results of the experiment that he initiated, shall be worthy of the name." A marker, bearing an appropriate inscription, then was set.

Opening the program on Wednesday morning Dean R. L. Watts, of the School of Agriculture and director of the agricultural experiment station, welcomed the guests. Dr. A. L. Patrick, of the college department of agronomy, told of the origin, nature, and extent of the Hagerstown soil on which the plots are located. Dr. C. F. Marbut, of the Bureau of Chemistry and Soils, United States Department of Agriculture, discussed this paper. Professor F. D. Gardner, head of the department of agronomy at Penn State, then described the plots and the economic returns from the fertilizer treatments. Dr. Thorne discussed his paper. C. D. Jeffries, assistant professor of soil technology, then gave the results of studies made on nitrification in relation to plot yields. Dr. A. B. Beaumont, head of the department of agronomy, Massachusetts Agricultural College, discussed this paper.

Following dedication of the Jordan Soil Fertility Plots and taking of the group photograph, the group gathered before a Hagerstown soil profile which was explained by Dr. Marbut. The group then separated into small bands and under the guidance of Professors Gardner, Noll, White, Patrick, Merkle, Jeffries, Holben, and Irvin, of the agronomy department, made a tour of inspection of the 144 plots.

These plots of one-eighth acre each are arranged in four tiers of 36 plots each. Twenty-three different fertilizer treatments, with the exception of



ENOS H. HESS

burnt lime, are applied to corn and wheat in a 4-year rotation of corn, oats, wheat, and mixed clover and timothy hay.

During the first 10 rotations, 1881-1921, no lime was applied except to plots in which it was included in the scheme of treatments. In 1922 and 1923 all plots of tiers two and four respectively, with the exception of two P-K treated plots and those previously limed, received a dressing of pulverized limestone. The only source of organic matter has been the roots and stubble of harvested crops, except on those plots which receive biennial dressings of farm manure.

The remainder of the afternoon was devoted to inspection trips to the phosphate plots, which deal with different forms and amounts of phosphates; the vegetable fertilizer plots; the orchard soil fertility plots and rim experiments, and to a trip over the college farms of 1,800 acres, second largest farm operation in the State.

Dinner and a business meeting of the Northeastern Section of the American Society of Agronomy drew 75 visitors and local faculty members to the near-by Centre Hills Country

W. H. JORDAN

Club, beside the winding Slab Cabin Creek and in the long shadows of Penn State's beloved Mount Nittany. The section voted to omit the regular winter meeting and to convene next June at Cornell University and the Geneva Experiment Station. T. E. Odland, Rhode Island State College, president, and M. H. Cubbon, Massachusetts Agricultural College, secretary-treasurer, will continue in office. B. A. Brown, Connecticut Agricultural College, reported for the committee on pasture investigations; A. B. Beaumont, on fertilizer ratios, and S. A. Waksman, New Jersey Agricultural Experiment Station, on soil organic matter.

With the college staff as host, an informal reception then was enjoyed in Penn State's rebuilt Old Main, limestone encased and towered. In an upper room the evening program ensued.

Touched by a beautiful tribute to Dr. Jordan voiced by Dr. Fletcher, the entire group stood silently in respect to their departed comrade, whose name appeared in the printed program, from which the death could not erase it ere the presses turned out the Golden Anniversary souvenir booklet.

Said Dr. Fletcher, "The Pennsylvania State College places a wreath of affectionate esteem on the grave of one of the most distinguished members of its agricultural faculty, Dr. Whitman Howard Jordan, whose death occurred at Orono, Maine, on May 8, 1931. We are met to observe the fiftieth anniversary of the soil fertility experiments which he here established. The substantial contribution of these plots to American agriculture is an index to the character of the man who established them. We shall do well to consider his life and his service as we inspect this work of his early years.

"Dr. Jordan was born in Raymond, Maine, on October 27, 1851. He graduated from the University of Maine in 1875 and completed work for the Master's degree in 1878. The honorary degree of D. Sc. was conferred on him by the University of Maine in 1896, and the honorary degree of LL.D. by the Michigan Agricultural College in 1907 and by Hobart College in 1911.

"The professional career of Dr. Jordan opened with his appointment as Assistant Chemist of the Connecticut Agricultural Experiment Station in 1878. He returned to Maine the following year as instructor in Chemistry. His service at The Pennsylvania State College, as Professor of Agricultural Chemistry and Agricultural Chemist in the Experiment Station, extended from 1880 to 1885. He was called back to his native State in 1885 as Director of the newly organized Maine Agricultural Experiment Station at Orono, where he served for 11 years. At that time there were only nine agricultural experiment stations in operation under definite state appropriations, although most of the agricultural colleges were conducting some experimental work. Then came his quarter century of fruitful service as Director of the New York State Experiment Station at Geneva, where he attained an international reputation as a scientist and administrator. Dr. Jordan was one of the pioneers who founded the American system of agricultural research.

### *A Great Administrator*

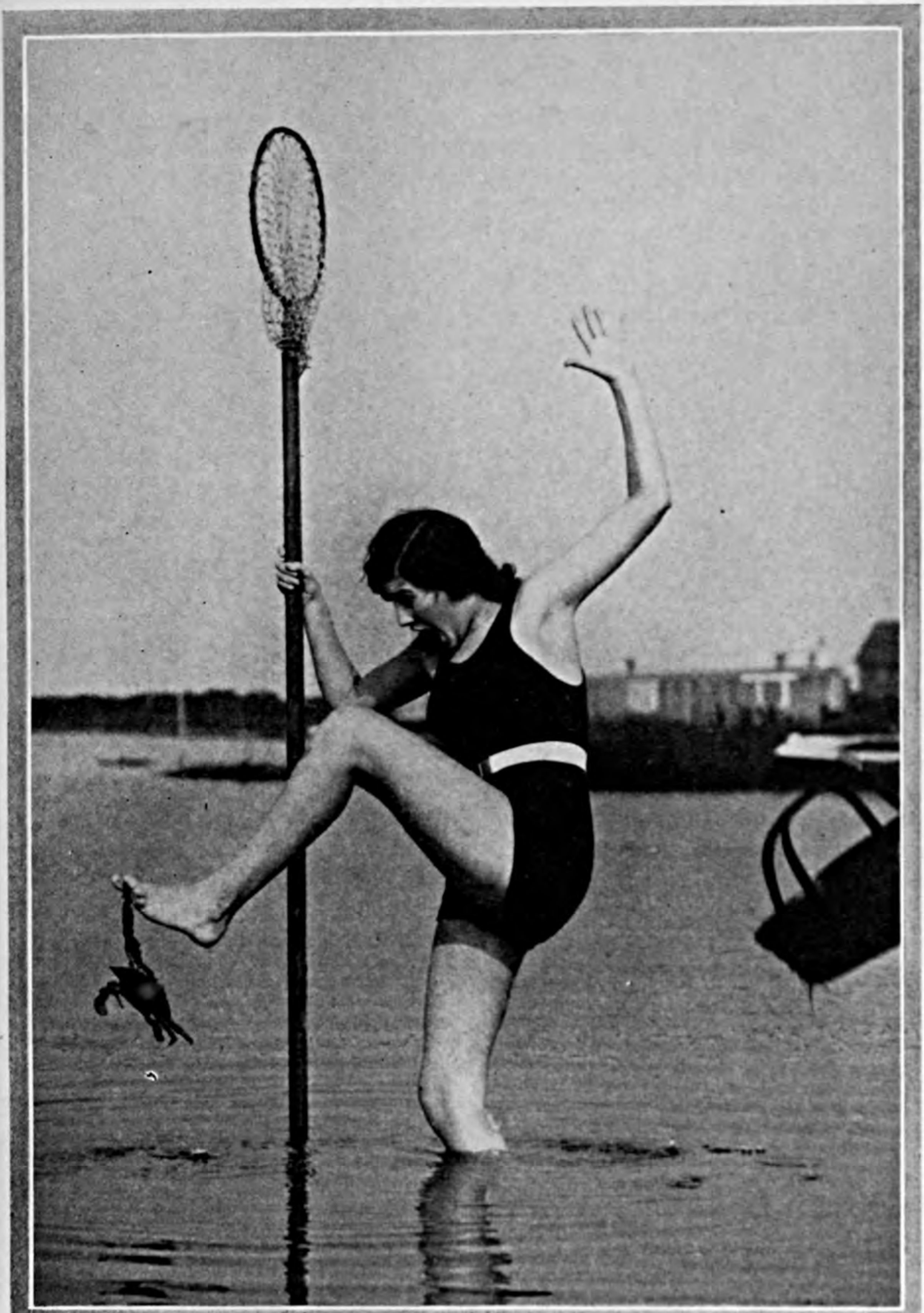
"In attempting to evaluate his service, we must place first his contribution as an administrator. He was an Experiment Station Director for 36 years. Under his leadership, the New York State Experiment Station became one of the foremost institutions of its kind in America, as measured by the quality of its work. Throughout the formative years of the experiment stations, he stood consistently for high standards in research. His voice was heard on many occasions setting forth, in no uncertain terms, his conception of the obligations of the experiment stations as publicly supported institutions, and in criticism of tendencies that he considered dangerous. At a time when the state experiment stations were under constant pressure to dissipate their resources, by becoming agencies for popular instruction as well as for experimentation, he pleaded for strict adherence to the research objective. 'A new truth,' said he, 'may have greater value than many volumes of pleasing addresses.' At a time when the popular clamor was for investigations that were 'practical,' he championed the cause of fundamental research. 'We should guard,' he counselled his colleagues, 'against centering an experiment around facts or conditions which are of mere local or temporary importance. The discoveries of scientific truth which are today aiding the farmer in his daily toil are mostly those which have been reached through the severest and most searching investigation.'

"He was one of the first experiment station directors to recognize that the best foundation for research in agriculture is a thorough training in the sciences. In selecting the members of his staff, he insisted that they be men with a scientific, rather than a vocational background.

"The greatest contribution of Dr. Jordan to American agriculture, other than the high standard in research set by the New York Experiment Station under his direction, was in shaping the policies of the State Experiment Stations generally. He was identified with the American Association of Land Grant Colleges and Universities from its beginning. He attended the first convention in 1885. He served as President in 1911, and was a member of the Executive Committee for 17 years. He was a member of the committee whose epoch-making report (1908) resulted in the foundation of the *Journal of Agricultural Research*. He served on the committee in charge of the combined exhibits of the State Experiment Stations at the Chicago Exposition (1893), Paris (1900), Buffalo (1901) and St. Louis, (1904). He was requested to address the Association more often, perhaps, than any other member. Many of us recall his vigorous and pungent remarks at these meetings. At the time, they may have hurt a little, here and there, but we have all come to know, long since, that he was right. There can be no dissent from the appraisal of Dr. E. W. Allen: 'The influence of such a vigorous, clear-visioned character on the counsel of the experiment stations for a period of 36 years can hardly be over-estimated.'

"The contribution of Dr. Jordan as a scientist was scarcely less conspicuous than his service as an administrator. He was the author of several books on human and animal nutrition, and of numerous experiment station publications and special

(*Turn to page 51*)



THIS PICTURE NEEDS NO LEGEND

# PICTORIAL

Left: They say daisies won't tell.

Below: Com'mmeer to me.

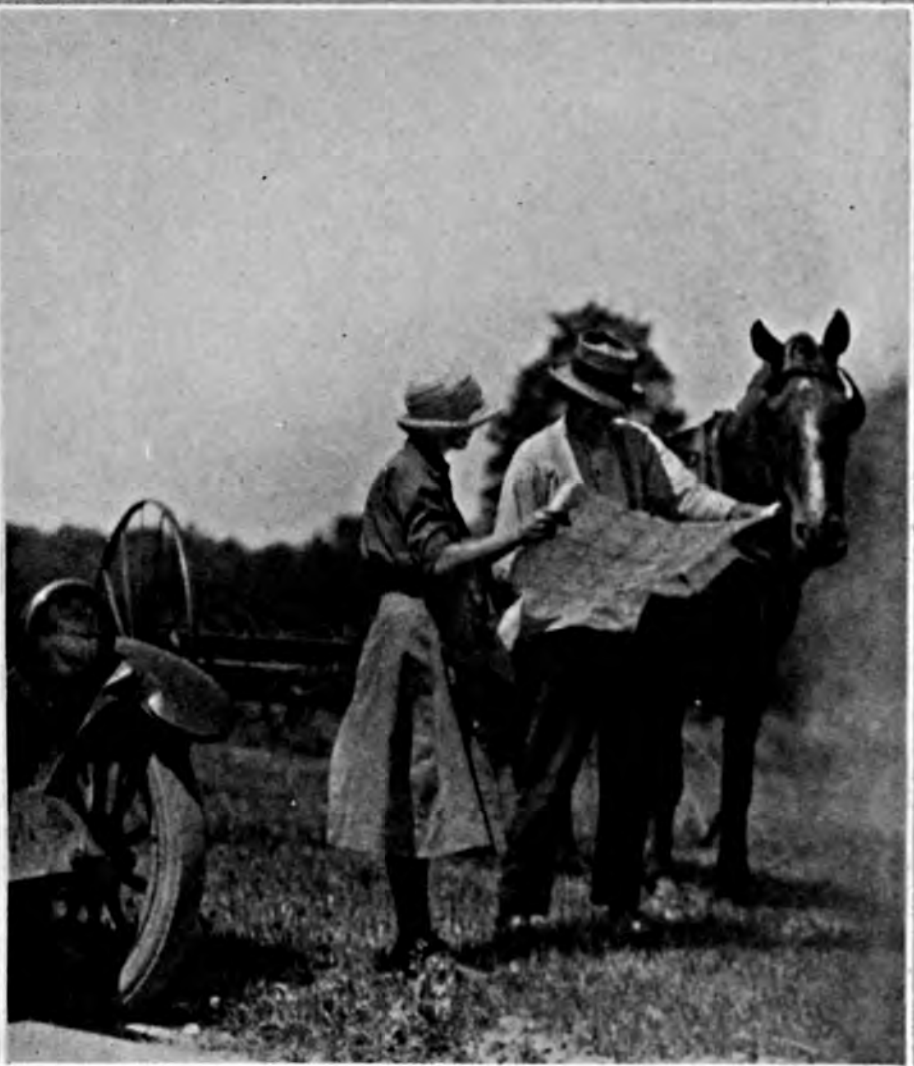
Right: Huckleberry Finn's brother, Raspberry Joe.

Below: Ready for a Sunday morning ride.

**Above: $5,000 worth of silver fox pups.**

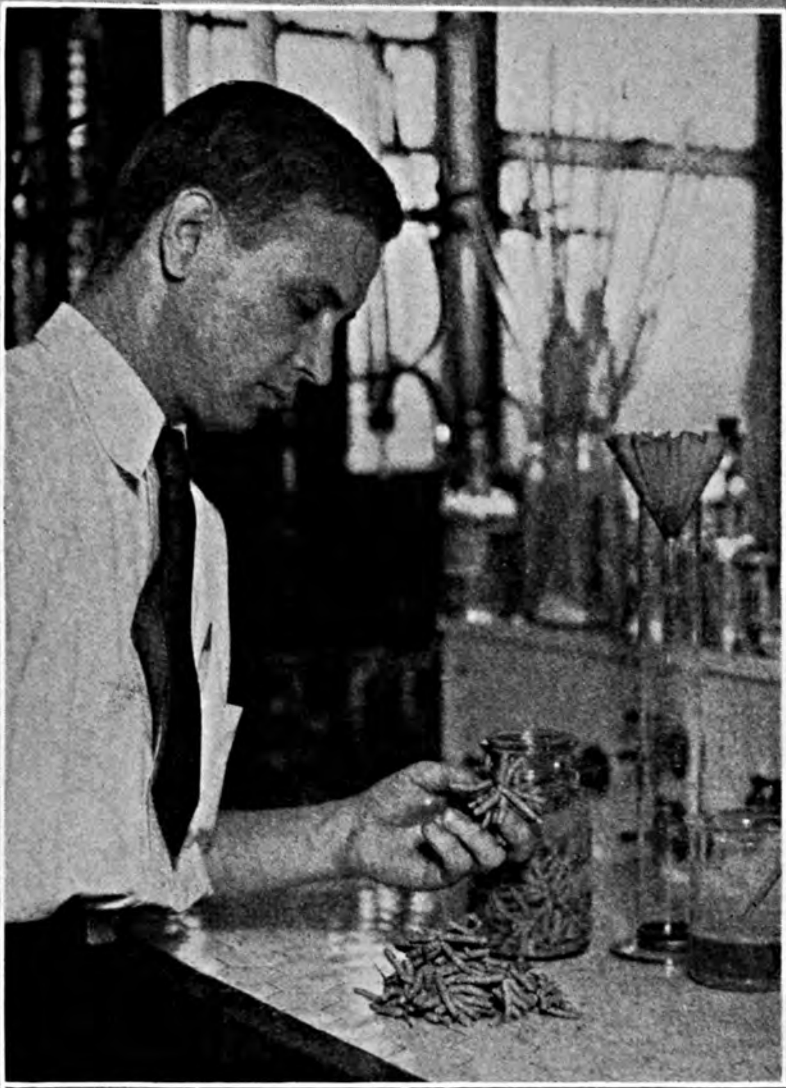
**Left: Feasting his eyes.**

Right: Maybe the horse knows.



Below: The store at the crossroads.

© *Ewing Galloway, N. Y.*



Left: One of Uncle Sam's young chemists examines a cluster of screw beans. This plant, which now grows wild in parts of the West, was an important food for the Indians before the white man came. The U. S. Department of Agriculture is now analyzing a number of native plants, formerly used by Indians, to learn if they can again be utilized for food.

Below: What would you do if your house became infested with houseflies as large as this one? This model is being built by the U. S. Department of Agriculture for an exhibit at fairs this fall. The monster stands two feet high and is equipped with mechanism which enables him to show by characteristic motions how flies carry disease germs.

# The Editors Talk

## Efficiency a Good Weapon

In these days, with everyone eagerly watching for a well-grounded note of optimism and a sound suggestion for economic betterment, the comments of experienced observers assume an unusual interest. Therefore, when a man like Dr. G. F. Warren, Professor of Agricultural Economics and Farm Management at Cornell University, with an experience and insight which has won him a national and international reputation, states that there are still opportunities for financial success but that all business acts must be based more on reason and less on tradition, he immediately finds an audience.

"There are two ways of obtaining a satisfactory price," Dr. Warren says, "reduce production until prices rise, or reduce costs. Both ways are generally used in varying degrees. If a single product is out of line with the general level of prices, reduced production is the major remedy. If the whole price structure falls, reducing costs to correspond with the reduced prices is the major remedy.

"The question is constantly asked by business men as to why the farmer does not stop producing until he can get a satisfactory price. When prices are too low, a factory closes and throws most of the burden on unemployed laborers until prices rise so that it can operate at a profit. Agriculture does adjust as surely as industry, but very slowly because of the nature of the business. A farm is a biological industry. It cannot be closed and opened at will. Because of the facts of nature, it has a very slow turnover. It is a family industry. If the farmer stops production and throws the burden on an unemployed worker, he himself is the worker that is out of a job.

"When the whole price level falls, business cannot rely on its old remedy of closing down. It also must reduce costs."

Dr. Warren goes on to say: "If the trouble is over-production, the charge that extension work and scientific research are to blame may have a grain of truth in it. But if the trouble is monetary, and if we must learn to produce at a profit with prices at pre-war levels, and wages far above pre-war, then there was never before a time when research and education should be pushed with more vigor. Farmers must know how to adjust and act quickly.

"Scientific research, agricultural extension teaching, the use of improved machinery, greater output per man, are not the causes of the depression, but are the major ways in which the depression can be met. The farmer, the manufacturer, or the country that cannot increase efficiency quickly will be left behind.

"Higher crop yields should be obtained by dropping out of use, the fields that do not give high yields. Such fields may be used for pasture or, if very poor, may be left idle. This often means renting, or buying all or part of an adjoining farm and working only the best land on both. There are some entire farms that should be abandoned, and some whole regions should go out of use. There are many of these particularly in the hill lands from New York to

Georgia, and from Missouri to Cape Cod. Much of this land should be purchased for State and national forests.

"The fields that are used for cultivated crops should be well fertilized and well cared for. Fertilizers are cheap, but wages are high. More care in using good seed, attention to disease control, and the like are essential. Such changes mean more production per man, but mean fewer men and some reduction in total agricultural production. How much reduction occurs depends on how many acres are thrown out of use or into lower classes of use."

In concluding his remarks Dr. Warren says, "There is some consolation in the fact that the two largest price drops are behind us, one in 1920-1921, and one this year, and all of us who are here are still alive. In such a period of adjustment, not all the years are bad years. Nor are all farmers in distress. Some have made money in the past ten years. There are still opportunities for financial success, but all business acts must be based more on reason and less on tradition."

## Improving Rural "Looks"

A highly commendable movement is on foot in Indiana to improve the appearance of the country-side. More than 5,000 homes are represented in the home ground improvement work at Purdue University under the direction of R. B. Hull, extension specialist in landscape gardening. In fifteen different counties, through the cooperation of farm bureaus, home economic clubs, and other organizations, home owners have been organized and given suggestions in improving their home gardens. Much of this takes the form of classes in landscaping, with each "pupil" drawing a plan of his home ground and landscaping it.

There is a great deal of activity over the State in yard and garden contests, school ground improvement, and street planting according to Professor Hull. A number of flower shows are being planned for different communities this year as a result of an increased interest in flower growing. In one small town the telephone company has started removing pole lines and putting their wires in underground conduits, adding materially to the appearance of the town. The State Highway Commission has planted honeysuckle on bare banks where cuts have been made, and has made extensive grass seedings along roadsides in southern Indiana.

All of this activity will, no doubt, prove manifoldly justified in increased community pride and interest on the part of travelers.

## Congratulations

We join the other voices in American agriculture in extending our congratulations to Dr. L. O. Howard in being selected on June 12 to receive the Capper agricultural award for distinguished service to American agriculture.

Dr. Howard, chief from 1894 to 1927, of the Department of Entomology of the U. S. Department of Agriculture, was chosen from more than 200 eligible nominees including some of the most distinguished students of agriculture and practical business men in the country. The committee of awards was headed by F. D. Farrell, president of the Kansas State College as chairman.

Other members included Alexander Legge, president of the International Harvester Company; Carl R. Gray, president of the Union Pacific Railroad; John H. Finley, associate editor of The New York *Times;* Dr. H. A. Morgan, president of the University of Tennessee; Dr. Walter T. Swingle, plant physiologist with the United States Department of Agriculture, and James T. Jardine, director of the Oregon Agricultural Experiment Station. These men chose Dr. Howard because of his most outstanding benefaction to the agriculture and welfare of this country in his contribution of insect control measures.

Dr. Howard organized and developed the biological method of insect control. In this he has long been recognized as the outstanding leader not only in the United States, but also in the world. His method of insect control contributes millions of dollars annually in preventing loss to the citrus fruit industry in California, Texas, and Florida, and in Hawaii. He further discovered that mosquitoes, house flies, and other insects carry diseases malignant to the human race. Identification of the carriers of malaria and yellow fever is also a result of his work.

The honor carries with it a sum of $5,000 in cash and a gold medal. This is the second annual award to be made by Senator Capper who states its purpose is to provide a concrete expression of gratitude to some of the people who make contributions of national importance to American agriculture and to assist in stimulating public appreciation of unusually fine service to our basic industry. Dr. S. M. Babcock of the University of Wisconsin received the award last year for his discovery of a test to indicate the amount of butterfat in milk.

## The Pasture Idea

It is not very long ago that certain leaders in the fertilizer and dairy fields advocated what seemed the rather strange idea of fertilizing the old and long-neglected pasture. The amazing thing is how rapidly and intensely the idea has taken hold. From many parts of the Northeast there come reports that farmers are buying fertilizers for their pastures. In Maine for instance, the 5-8-7, the 10-16-14, and the 10-16-20 are being recommended and used for this purpose.

The idea has spread all the way to the Pacific Coast, north to Canada, and to many parts of the South. In the State of Washington the fertilizer trade is furnishing fertilizer materials for 20 one-acre intensive pasture management demonstrations in cooperation with and to be supervised by the State authorities. This project is to be carried on for three years. In Canada experimental and demonstrational work with pastures has been carried on by the Provincial authorities of Ontario, Quebec, and the Maritime Provinces. The weather in eastern Canada this spring is reported to have been not very favorable for this season's results, but it is hoped that sufficient success will be achieved to further demonstrate the value of fertilizers used in this way.

As over-production looms more and more as the overwhelming problem, the cost of production, whether it be of any particular crop or of milk and meat, becomes of increasing importance, for as prices fall it is more than ever essential to produce at a low cost per unit. From this point of view there is a great field of study and practical application in producing cheap feed at the right time from pastures all over the country. Nature, unaided by man, has carried the job of feeding her livestock for many months of the year. Fortunately nature is to be relied upon and every spring produces feed for our farm stock. But if the farmer is to successfully compete in the economic stress of the present time, it will pay him to assist nature in extending the pasture season later into the summer when normally there is not much growth available. In fertilizing pastures it is not only the increase in feed that counts but the increased value of that feed in additional protein content and the availability for a longer feeding period.

Probably there is no other project on the dairy and stock farm that offers such profitable possibilities today as the right use of the right fertilizers in producing more feed on the farm.

# The American Appetite

We are eating less. Authority for this statement is found in preliminary figures by Dr. O. E. Baker of the Bureau of Agricultural Economics, U. S. Department of Agriculture, on the foodstuffs the American public consumed in 1930.

According to Dr. Baker, our chief food groups are flour, sugar, dairy products, and meat, constituting about three-fourths of our diet. In each one of these groups the figures for 1930 show a decline from those for 1929. We used in 1930, .88 barrels of flour per capita as compared with .89 in 1929. The per capita consumption of butter was 2 per cent less, cheese about 3 per cent, and condensed and evaporated milk about 6 per cent less. In terms of whole milk, these declines represent about a 2½ per cent reduction in milk used. The reduction in meat production was chiefly in pork and pork products. The meat consumption in 1929 was 136.8 pounds per capita, while the preliminary figure for 1930 is 131.7 pounds. The figures show that the 1930 per capita consumption of potatoes also declined slightly.

While there may be many factors influencing what we eat, it would seem that changes in food habits sometimes become permanent. For instance, the consumption of flour which suffered a sharp decline during the World War has never regained its previous level.

On the other hand, many of these food habits are of temporary duration. Statistics show that during previous business depressions there have been sharp declines in meat consumption which have disappeared after the depressions ended.

Other points of interest in our eating last year are indicated in increased shipments of tomatoes, green peas, onions, and lettuce and a decline in the shipments of sweet potatoes, cabbage, and oranges. Shipments of pears, peaches, and apples increased.

The attention given our eating habits by the Department of Agriculture is warranted in the effect that changes in them have upon our agriculture. A diet high in meat requires a large acreage in farm land, whereas one consisting mostly of vegetables and plant products requires a small acreage. It is estimated that it now requires more than two acres of crops to feed the average American one year but only one acre to feed an average German, one-half an acre to feed a Chinese, and one-fourth of an acre to feed a Japanse. The differences are due largely to the difference in diet, except that the difference between China and Japan is caused by higher crop yields in Japan.

# AGRICULTURAL DEVELOPMENTS

## NEW CHEMICAL RECOVERED FROM SURFACE OF APPLES

Ursolic acid, a new chemical that appears to have promising possibilities for commercial use, is being extracted from the waxlike coating of apple peels in a laboratory of the United States Department of Agriculture. Dr. Charles E. Sando, of the Bureau of Chemistry and Soils, who for many years has been investigating the chemical nature of the surface coating of apples, perfected the method for extracting the compound, in the form of a powder, from apple pomace. Recently he has sent samples to several commercial concerns for study by their research departments.

Perhaps the most promising use for this new chemical is in the paint and varnish industry. The fact that the powder is resinous to the touch and is water repellant suggested its use in varnishes. Preliminary tests made by the American Paint and Varnish Manufacturers' Association show that ursolic acid increases the gloss and water resistance of cellulose lacquers.

Another effect of adding small amounts of ursolic acid to lacquers is to extend the time required for drying. This seemed to improve the brushing qualities of the lacquers so treated, especially for the first coat.

Doctor Sando has found that apples differ with respect to the amount of waxlike substance found on their surface at harvesting time. Arkansas Black, Delicious, and Grimes Golden contain relatively large quantities of ursolic acid, while Yellow Transparent, Rhode Island Greening, and York Imperial have much smaller amounts.

If there is sufficient demand it would be possible to produce 500,000 pounds of ursolic acid in this country annually, it is estimated. The principal sources would be wastes from canning plants, skins left from dehydration of apples, and from apple pomace, the residue produced in the manufacture of cider and vinegar.

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## PASTURE IMPROVEMENT DEMONSTRATIONS ARE POPULAR

The pasture improvement demonstration program of the New Brunswick, Canada, Department of Agriculture is meeting with a generous response from the farmers of the province. A number of field days have already been held in various parts of the province, at all of which keen interest has been displayed in the use of commercial fertilizers.

The series of demonstrations being conducted this year is similar to the 1930 program. During the season past the carrying power of numerous tracts of grazing land under observation more than doubled through the proper application of commercial fertilizer, and it was proven that the regular use of the fertilizer is both practical and economical for the average farmer.

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## TREE LOVERS INVITED TO REPORT NEW ELM DISEASE

Every person who has ever admired the sweeping beauty of an elm tree is invited to serve as a volunteer scout for the protection of the elms. Last summer the United States Department of Agriculture learned of four elm trees in Ohio—three at Cleveland and one at Cincinnati—which were infected with the "Dutch elm disease," a disease that has spread over a large part of Europe and is killing the elms there.

No other such diseased trees have yet been found. Representatives of the Department of Agriculture and of the Ohio Agricultural Experiment Station will be on the watch again this year; but as they can examine only a very small number of the elms even in Ohio, the department is asking every tree lover to report suspected cases. "Watch the elm trees this summer," the department requests. "Look for signs of wilting twigs. Examine the inside of the twigs for brown stains in the sapwood. If you observe these symptoms, collect a few of the affected twigs 8 or 10 inches long. Wrap them well in paper and mail them to the Dutch Elm Disease Laboratory, care of Ohio Agricultural Experiment Station, Wooster, Ohio. Include a careful record of the exact location of the tree from which you take the wilted twigs, so that no time will be lost if the disease is discovered in them."

Federal and State scientists are puzzled as to how the four trees in Ohio became infected. There are no records of elms having been imported into Ohio since the Dutch elm disease was first reported in Europe. European scientists believe that the disease is spread by beetles, but this does not account for its appearance in Ohio. It is feared that it may occur elsewhere. It is not a disease which, at present, can be diagnosed in the field, even by experts. Laboratory studies are required, and the Federal specialists working with the Ohio scientists are anxious to get specimens of any diseased elms that might have the Dutch elm disease.

## FACTORY FARMS UNLIKELY IN PACIFIC STATES

"Factory farms" on the Pacific Coast are not likely to develop to a degree where they will play an important part in the agriculture of the West, but there is now a trend toward the development of chain farm systems, according to R. L. Adams, professor of farm management, California College of Agriculture.

Professor Adams believes that the advantages of large power units, such as tractors, trucks, multiple plows, and combined harvesters, are largely offset by the large amounts of capital needed to finance the acquiring of land and equipment, to meet labor payrolls, and to carry on the enterprise. Present day returns from agriculture, he says, do not lend encouragement to capitalists asked to finance large-scale farming operations.

"On the other hand," Professor Adams says, "the changing economic conditions affecting farming on the Pacific Coast justify a trend in the direction of large sized family farms, the handling of farms in groups of chains under the supervision of a paid manager, and the further development of managerial service. The trend is under way."—*Marketing Activities, June* 10, 1931.

## PENNSYLVANIA GROWERS TO DISCUSS POTATOES

"King Spud" will again reign supreme when the Pennsylvania Potato Growers hold their second Potato Exposition at State College, Pennsylvania, August 24, 25, 26.

Many features of the 1929 Exposition, when 5,000 growers attended, have been combined with new plans to make this one of the largest and greatest educational exhibits that has ever been attempted by the Pennsylvania Potato Growers' Association. The exposition will be three-fold in extent, covering the production, marketing, and consumption of potatoes. Demonstrations, exhibits, and various programs will be combined so that all phases of the potato industry will be touched upon.

According to L. T. Denniston, potato disease specialist of the Pennsyl-

(*Turn to page* 49)

## Foreign and International Agriculture

# How Germany Grows Potatoes

## *By H. R. Cox*

Extension Agronomist, New Jersey Experiment Station

GROWING more potatoes than any other nation, the German Republic produces more than 25 per cent of the world's crop. The yield amounts to about one and one-third billion bushels a year, or about four times that of the United States. The average yield per acre is more than 200 bushels, or about double that of ours. Germany does well with the potato crop, and a picture of the potato industry of that country might be of interest to our own growers.

The average pre-war consumption of potatoes in Germany as human food was about 8.5 bushels per capita, and it may be assumed that the figure is very close to that at the present time. In other words, Germans eat about three times as many potatoes per capita as do Americans. Much as the Germans enjoy the taste of potatoes, however, it must not be assumed that they eat all the vast quantity of tubers produced in that country. In the years immediately preceding the war the crop was utilized as follows:

| | | |
|---|---|---|
| For | seed | 15 per cent |
| | human food | 33 " " |
| | drying | 3 " " |
| | starch | 3 " " |
| | alcohol | 6 " " |
| | waste | 10 " " |
| | other purposes | 30 " " |

The potatoes included in "other purposes" are largely fed to hogs, and include most of the small and low grade tubers. It is customary to steam these potatoes before feeding.

As one travels through the country he sees potato fields everywhere—on the sandy plains of East Prussia, on the fertile valley lands of the Rhine,

A potato field at the experiment station of the University of Halle, where the average yield is 600 bushels per acre if certified seed is used.

and in the foothills of the Bavarian alps. For the most part the fields are small, from one-tenth acre to an acre each, alternating with other small fields devoted to grain, grass, corn, and many other crops. Germany is predominately a country of small farms, the farmers living in villages. The land between the villages is unfenced and is intensively cultivated, to a considerable extent by hand methods. In some sections, however, there are large farms and estates, particularly in East and West Prussia and Saxony, and in these regions one sees potato fields of 20 acres or more. The following remarks apply more particularly to Brandenburg, in which province the writer visited a number of growers and experiment station men during the past summer.

Of the varieties used for human food, there are two general types—the white and the yellow fleshed. Generally speaking, there is no difference in yield between the two types although the starch content of the white is higher than that of the yellow. Some markets prefer the one kind and some the other. In Brandenburg the white is preferred by consumers, but the growers and dealers seem to be promoting the use of the yellow kind.

### *Quality of Seed*

German potato growers are much alive to the question of seed quality. Years ago the German Agricultural Society initiated seed certification. In later years the administration of certification was transferred largely to the chambers of agriculture. The German Agricultural Council, a private body, now cooperates with the chambers in seed certification. The grower first has to prove that his foundation stock was certified. There are two inspections, the first at blossoming time, the next shortly before harvest. The inspector may insist upon a third inspection if he was in doubt at the time of the first or second as to whether the crop was satisfactory or whether the tubers will keep in storage. Potatoes generally are stored in outdoor pits.

The points considered in the inspection of potatoes for certification are: (1) disease, (2) trueness to type, and (3) yield. In the case of varieties grown for the manufacture of starch, the starch content of the tubers is also considered in seed certification. In the matter of yield, the ideal is to have uniform and fairly high yields for the hills.

As to disease the following are the rules: With *leaf roll* there is a tolerance of 5 per cent; *mosaic*, a tolerance of 5 per cent, but the disease has to be in pronounced form and is considered only at second inspection; *scab* is not considered unless in so advanced a form that germination might be affected; *blight*, if seriously present, certification is refused; *black leg* and *rhizoctonia*, same as blight.

There are certain men, the more advanced growers, who specialize in the production of certified seed potatoes. In Brandenburg about 400 growers are certified seed producers, a very small proportion of the total number of potato growers. The seed is sold to the growers of market potatoes. Most of the market growers purchase only enough certified seed to plant a seed plat the following year. Only a few market growers use certified seed for growing their entire acreage of market potatoes.

There has been some experimental work done on seed treatment, but results do not indicate that the practice would be uniformly profitable. The German markets do not discriminate against scabby potatoes unless the disease is present in a very advanced form.

### *Planting Practices*

The amount of seed used depends somewhat upon the size of the tubers. Tubers of the smaller sizes are generally used for seed and the seed tubers are never cut. The average amount of seed used is about 35 bushels to the acre.

(*Turn to page* 60)

# REVIEWS

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

## Fertilizers

*"Illinois Fertilizer Report,* 1930," *Dept. of Agronomy, Agr. Exp. Station, Urbana, Ill., E. E. De Turk.*

*"Nitrate Assimilation in Soils," Agr. Exp. Sta., Ames, Ia., Res. Bul.* 135, *Jan.,* 1931, *F. B. Smith and P. E. Brown.*

*"Fertilizer Sales and Inspection Report,* 1930," *Kansas State Bd. of Agr., Topeka, Kan.*

*"Report of the Kansas State Board of Agriculture for the Quarter Ending March,* 1930," *Control Division, Kan. State Bd. of Agr., Topeka, Kan. Vol. XLIX, No.* 193 *B.*

*"Michigan Fertilizer Bulletin," State Dept. of Agr., Lansing, Mich., Bul.* 63, 1929 *Fall Report,* 1930 *Spring Report.*

*"Registration, Labeling, Inspection, and Sale of Commercial Fertilizers,* 1930," *Agr. Exp. Sta., Columbia, Mo., Bul.* 298, *Mar.,* 1931, *F. B. Mumford and L. D. Haigh.*

*"Composition and Cost of Commercial Fertilizers in New York from* 1913 *to* 1930," *Agr. Exp. Sta., Geneva, N. Y., Bul.* 594, *Mar.,* 1931, *A. W. Clark, W. F. Walsh, and F. J. Kokoski.*

*"Commercial Fertilizers, A Report Covering the Biennium* 1929-1930," *Agr. Exp. Sta., Corvallis, Ore., Cir.* 98, *Jan.,* 1931, *J. S. Jones and C. F. Whitaker.*

*"Commercial Fertilizers," Wis. Dept. of Agr. and Markets, Madison, Wis., Bul.* 117, *Feb.,* 1931, *W. B. Griem.*

## Soils

High fruit yields in an orchard over a period of years are largely dependent on the soil organic matter, according to a recent publication of Dr. R. D. Anthony of Pennsylvania State College. As a result of work continuing for 20 years, Dr. Anthony concludes that those treatments which will best maintain or improve the organic matter in the soil will be the most profitable in the long run. He found the use of a complete fertilizer and cover crops plowed under to be the most practical way of assuring high fruit yields. The complete fertilizer produces a large cover growth to be turned under, as well as directly feeds the trees. The use of a cover crop without the complete fertilizer was not sufficient to keep up fruit yields. Barnyard manure was also satisfactory, but usually is not available for fruit crops in sufficient amounts.

Dr. Anthony shows the importance of following a fundamentally sound soil management policy by the following statement:—"While tree growth and yield are the ultimate measures of the performance of the orchard, we have shown that these are not quickly responsive to decreasing soil fertility. If we use these records only as an index to the value of an orchard practice, we may continue an unprofitable system of soil management for years before the situation is recognized. The growth of the cover crop seems to be a more reliable index to soil fertility than tree growth and yield, both because the cover crop responds more quickly to variations in soil fertility and because cover crop residues are our chief source of organic matter for future vigor."

Another very significant observation is that the "correlations between the amount of cover crop produced 10 years ago and the general condition of the practice at present is very striking."

Fruit growers are more and more being faced with the problem of maintaining good yields of high quality fruit, and the question of the best system of orchard management and fertilization to this end is of paramount importance. Practical orchardists, as well as investigators will welcome the valuable ideas, of which we could mention only a few here, which Dr. Anthony has included in Bulletin No. 261 of the Pennsylvania Agricultural Experiment Station, entitled "Soil Organic Matter as a Factor in the Fertility of Apple Orchards." Since the findings are presented as general principles rather than as a series of rules of thumb, the bulletin can well serve as a guide to profitable soil management in orchards in many parts of the country.

*"A Study on the Influence of Climate Upon the Nitrogen and Organic Matter Content of the Soil," Agr. Exp. Sta., Columbia, Mo., Res. Bul. 152, Nov., 1930, Hans Jenny.*

*"The Chemical Composition of Some Chernozem-like Soils of North Dakota," Agr. Exp. Sta., Fargo, N. D., Tech. Bul. 246, Feb., 1931, T. H. Hopper, L. L. Nesbitt, and A. J. Pinckney.*

*"Soil Survey of the Salt River Valley Area, Arizona," U. S. D. A., Washington, D. C., No. 32, Series 1926, W. G. Harper, F. O. Youngs, A. T. Strahorn, S. W. Armstrong, and H. C. Schwalen.*

*"Soil Survey of Clark County, Georgia," U. S. D. A., Washington, D. C., No. 7, Series 1927, G. L. Fuller.*

*"Piatt County Soils," Agr. Exp. Sta., Urbana, Ill., Soil Report No. 47, Dec., 1930, R. S. Smith, E. E. DeTurk, F. C. Bauer, and L. H. Smith.*

*"Effingham County Soils," Agr. Exp. Sta., Urbana, Ill., Soil Report No. 48, Feb., 1931, E. A. Norton, R. S. Smith, E. E. DeTurk, F. C. Bauer, and L. H. Smith.*

*"Soil Survey of Iowa, Carroll County," Agr. Exp. Sta., Ames, Iowa, Report No. 60, Oct., 1930, W. H. Stevenson, P. E. Brown, A. M. O'Neal, R. H. Meldrum, and L. W. Forman.*

*"Soil Survey of Iowa, Howard County," Agr. Exp. Sta., Ames, Iowa, Report No. 61, Oct., 1930, W. H. Stevenson, P. E. Brown, C. L. Orrben, L. W. Forman, H. R. Meldrum, and R. E. Bennett.*

*"Soil Survey of Iowa, Warren County," Agr. Exp. Sta., Ames, Iowa, Report No. 62, Oct., 1930, W. H. Stevenson, P. E. Brown, A. M. O'Neal, L. W. Forman, H. R. Meldrum, A. J. Englehorn, and R. E. Bennett.*

*"Soil Survey of Iowa, Chickasaw County," Agr. Exp. Sta., Ames, Iowa, Report No. 63, Oct., 1930, W. H. Stevenson, P. E. Brown, C. L. Orrben, H. R. Meldrum, L. W. Forman, and R. E. Bennett.*

*"Soil Survey of Iowa, Kossuth County," Agr. Exp. Sta., Ames, Iowa, Report No. 64, Nov., 1930, W. H. Stevenson, P. E. Brown, T. H. Benton, D. S. Gray, H. R. Meldrum, L. W. Forman, and R. E. Bennett.*

*"Soil Survey of Iowa, Clayton County," Agr. Exp. Sta., Ames, Iowa, Report No. 65, Nov., 1930, W. H. Stevenson, P. E. Brown, T. H. Benton, R. H. Meldrum, L. W. Forman, and R. E. Bennett.*

*"Soil Survey of Clay County, Kansas," U. S. D. A., Washington, D. C., No. 26, Series 1926, James Thorp, R. H. Davis, and Eugene S. Lyons.*

*"Soil Survey of Labete County, Kansas," U. S. D. A., Washington, D. C., No. 30, Series 1926, E. W. Knobel, R. L. Von Trebra, and W. H. Higbee.*

*"Soil Survey of Tuscola County, Michigan," U. S. D. A., Washington, D. C., No. 29, Series 1926, E. B. Deeter and A. E. Matthews.*

*"Soil Survey of Hamilton County, Nebraska," U. S. D. A., Washington, D. C., No. 10, Series 1927, A. W. Goke and W. H. Buckhannan.*

*"Soil Survey of The Camden Area, New Jersey," U. S. D. A., Washington, D. C., No. 28, Series 1926, R. T. Avon Burke and L. L. Lee.*

*"Soil Survey of The Bergen Area, New Jersey," U. S. D. A., Washington, D. C., No. 32, Series 1925, L. L. Lee, J. E. Tine, and R. L. Gillett.*

*"Soil Survey of The Deming Area, New Mexico," U. S. D. A., Washington, D. C., No. 2, Series 1928, A. T. Sweet and E. N. Poulson.*

*"Soil Survey of Hampshire County, West Virginia," U. S. D. A., Washington, D. C., No. 9, Series 1927, B. H. Williams.*

*"Soil Survey of The Eugene Area, Oregon," U. S. D. A., Washington, D. C., No. 33, Series 1925, E. J. Carpenter, T. W. Glassey, A. O. Alben, and V. D. Young.*

*"Soil Survey of Orange County, Virginia," U. S. D. A., Washington, D. C., No. 6, Series 1927, B. H. Hendrickson.*

## Crops

"A complete fertilizer in all cases produced higher yields on both limed and unlimed plots than incomplete fertilizers." This statement as a result of pasture fertilization work is found in the Forty-first Annual Report of the Agricultural Experiment Station, Alabama Polytechnic Institute, Auburn. "Plants showed more response to nitrogen than to any other single element. Nitrogen increased the percentage of Dallis grass; phosphorus and potash increased the percentage of both Dallis grass and legumes. Of the plants originally seeded, hop clover in early spring and Dallis grass and lespedeza in summer have furnished the bulk of the harvested material." The bulletin gives a concise resumé of all the important phases of agricultural experimental work for the fiscal year ending June 30, 1930.

*"Experiments with Hay Crops in Alabama," Agr. Exp. Sta., Auburn, Ala., Cir. 58, Apr., 1931, D. G. Sturkie and R. Y. Bailey.*

*"The Trench Silo," Agr. Exp. Sta., Auburn, Ala., Cir. 59, Apr., 1931, J. C. Grimes and M. L. Nichols.*

*"Cost of Pumping and Duty of Water for Rice on the Grand Prairie of Arkansas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 261, May, 1931, B. S. Clayton.*

*"Monthly Bulletin," Dept. of Agr., Sacramento, Calif., No. 4, Vol. XX, Apr., 1931.*

*"Small Grain Production in the Coastal Plain of Georgia," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Bul. 15, June, 1931, W. J. Davis.*

*"Results of the 1930 More and Better Cotton Per Acre Contest," Ga. State Col. of Agr., Athens, Ga., Bul. 398, Vol. XIX, Feb., 1931, Edison C. Westbrook.*

*"Five-acre Corn Production Contest, 1930," Ga. State Col. of Agr., Athens, Ga., Bul. 401, Vol. XIX, Apr., 1931, E. D. Alexander.*

*"Alfalfa in Iowa," Ia. State Col. of Agr., Ames, Ia., Ext. Bul. 168, Dec., 1930, H. D. Hughes, F. S. Wilkins, M. A. Hauser, and E. S. Dyas.*

*"Practices in Seeding Meadow and Pasture Crops," Univ. of Ky., Lexington, Ky., Cir. 242, Jan., 1931, E. J. Kinney, Ralph Kenney, and E. N. Fergus.*

*"Rice Farm Irrigation Systems in Louisiana, 1929," La. State Univ., Baton Rouge, La., Bul. 216, Nov., 1930, R. J. Saville.*

*"Experiments with Hedges," Agr. Exp. Sta., Amherst, Mass., Bul. 272, Mar., 1931, Frank A. Waugh.*

*"Supplement to Flax Facts," Agr. Ext. Div., Univ. of Minn., St. Paul, Minn., Minn. Pamph. 22; Mont. State Col., Bozeman, Mont., Ext. Bul. 112; N. D. Agr. Col., Fargo, N. D., Ext. Cir. 97; and S. D. State Col., Brookings, S. D., Ext. Cir. 306, Feb., 1930, F. W. Peck, J. C. Taylor, C. F. Monroe, and A. E. Anderson.*

*"Growing Orchard Grass in South Missouri," Agr. Exp. Sta., Columbia, Mo., Bul. 294, Nov., 1930, C. A. Helm.*

*"Variety Tests of Oats, Barley, and Spring Wheat," Univ. of Neb., Lincoln, Neb., Bul. 253, Mar., 1930, T. A. Kiesselbach and W. E. Lyness.*

*"North Dakota Weeds," Agr. Exp. Sta., Fargo, N. D., Bul. 243 (Second Revision of Bul. 162), Dec., 1930, O. A. Stevens.*

*"Trebi Barley, Yield and Feeding Value," Agr. Ext. Serv., N. D. Agr. Col., Fargo, N. D., Cir. 98, Apr., 1931, T. E. Stoa, F. W. Christensen, and Al Severson.*

*"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, No. 150, May-June, 1931.*

*"Manual of Ohio Weeds," Agr. Exp. Sta., Wooster, Ohio, Bul. 475, Apr., 1931, H. A. Runnels and J. H. Schaffner.*

*"Orchard Drainage in the Medford Area, Jackson County, Oregon," Agr. Exp. Sta., Corvallis, Ore., Sta. Cir. 100, Jan., 1931, M. R. Lewis and Arch Work.*

*"Some Phases of Apple Growing in Rhode Island," Agr. Exp. Sta., Kingston, R. I., Bul. 226, Dec., 1930, A. E. Stene.*

*"Texas Extension Work in 1930," Ext. Serv., Agr. & Mech. Col., College Station, Tex.*

*"Variations in Vitamin A and Chemical Composition of Corn," Agr. Exp. Sta., College Station, Tex., Bul. 422, Mar., 1931, G. S. Fraps.*

*"Grain Sorghum Date of Planting and Spacing Experiments," Agr. Exp. Sta., College Station, Tex., Bul. 424, Apr., 1931, R. E. Karper, J. R. Quinby, D. L. Jones, and R. E. Dickson.*

*"Abstracts of Bulletins 405-420 and Circulars 55-58," Agr. Exp. Sta., College Station, Tex., Cir. 59, Dec., 1930, A. D. Jackson.*

*"The Chemical Eradication of Ribes," U. S. D. A., Washington, D. C., Tech. Bul. 240, May, 1931, H. R. Offord.*

*"Crotalaria, a New Legume for the South," U. S. D. A., Washington, D. C., Cir. 137, Feb., 1931, Roland McKee and C. R. Enlow.*

*"Department of Agriculture and Immigration," Richmond, Va., Bul. 282, June, 1931.*

## Economics

"The tax burden on farmers has assumed such proportions in recent years that today it is one of the major economic problems in the rural sections. There is, perhaps, no other problem confronting the farmer for which legislation is so essential in its solution and for which the farmer has more reason to expect governmental action." This is the opening statement of F. P. Weaver, Head of the Department of Agricultural Economics, Pennsylvania State College, State College, Pa., in his new Bulletin 263, "The Rural Tax Problem in Pennsylvania." Professor Weaver then goes on to discuss the results of research on the increase in governmental expenses; distribution of the tax burden by enterprises; the problem of the support of public schools; the problem of maintaining township roads; the assessment situation in rural sections; the cost of tax collection; and suggestions for improving the Pennsylvania tax system. Without doubt, everyone interested in the taxation problem will add to his store of knowledge with a reading of this bulletin.

*"Alabama Economic Review," Ala. Polytechnic Inst., Auburn, Ala., Vol. 1, No. 7, June 1, 1931.*

*"Economic Digest for Connecticut Agriculture," Agr. Col., Storrs, Conn., No. 23, May, 1931.*

*"Iowa Monthly Crop Report," Dept. of Agr., Des Moines, Ia., May 1, 1931.*

*"Some Economic Problems in the Rice Farming Area, 1929," La. State Univ., Baton Rouge, La., La. Bul. 217, Nov., 1930, R. J. Saville.*

*"Tractors and Trucks on Louisiana Rice Farms, 1929," La. State Univ., Baton Rouge, La., La. Bul. 218, Dec., 1930, R. J. Saville and G. H. Reuss.*

*"Financing Production and Marketing of Louisiana Strawberries and Suggested Reorganization," La. State Univ., Baton Rouge, La., La. Bul. 219, Jan., 1931, R. L. Thompson.*

*"Cotton Price-quality Relationships in Local Markets of Louisiana," La. State Univ., Baton Rouge, La., La. Bul. 221, May, 1931, C. C. Farrington.*

*"Economic Review of New Jersey Agriculture," Ext. Serv., State Col. of Agr., New Brunswick, N. J., No. 74, May, 1931.*

*"Credit Problems of Oklahoma Cotton Farmers," Agr. Exp. Sta., Stillwater, Okla., Bul. 198, Oct., 1930, Arthur N. Moore and J. T. Sanders.*

*"Systems of Dairy Farm Management for the Richmond Milk Producing Area," Agr. Exp. Sta., Blacksburg, Va., Bul. 272, June, 1930, J. L. Maxton, R. S. Kifer, and J. J. Vernon.*

*"Virginia Fruit," Va. State Hort. Soc., Staunton, Va., Vol. XIX, No. 6, June, 1931.*

### Insects

*"Codling Moth and Peach Worm Investigations," Agr. Exp. Sta., Lafayette, Ind., Cir. 179, Jan., 1931, H. J. Reed.*

*"Spray Calendar for Peaches," State Col. of Agr., State College Station, Raleigh, N. C., Ext. Cir. 185, May, 1931.*

### Diseases

*"The Relative Susceptibility of Alfalfas to Wilt and Cold," Agr. Exp. Sta., Lincoln, Neb., Res. Bul. 52, Dec., 1930, George L. Peltier and H. M. Tysdal.*

*"The Control of Bunt (Stinking Smut) in Wheat," Agr. Ext. Div., N. D. Agr. Col., Fargo, N. D., Cir. 99, Apr., 1931, W. E. Brentzel.*

*"Treatments for Seed Potatoes," Agr. Ext. Div., N. D. Agr. Col., Fargo, N. D., Cir. 102, Apr., 1931, W. E. Brentzel.*

*"Cotton Root-rot and Its Control," Agr. Exp. Sta., College Station, Tex., Bul. 423, Apr., 1931, J. J. Taubenhaus and Walter N. Ezekiel.*

## YEARBOOK OF AGRICULTURE 1931

The 1931 Yearbook of Agriculture is being distributed by the U. S. Department of Agriculture. This annual of short popular articles, reports, and statistics offers a condensed record of what has happened in and to agriculture, on the farm and in the laboratory. The volume touches on a thousand and one phases of farming and research, and includes a fairly complete statistical record not only of the production of crops and livestock but also of their disposition and distribution through the channels of industry and in foreign and domestic commerce. It also discusses the service activities of the department. As usual, it includes the Secretary's annual report to the President. A series of charts tracing the increase in the production of the more important commodities in the last 40 years is a valuable feature.

In a foreword Secretary Hyde says that farmers and research workers are partners in the task of shaping the agricultural industry to the most profitable and desirable ends. The Yearbook, he points out, is designed to facilitate contacts between farmers and research workers.

Four hundred thousand copies of the Yearbook are printed, under a special congressional appropriation, and the distribution is largely by the Members of Congress. Those who cannot get a copy from a Senator or a Representative may buy the Yearbook for \$1.50 from the Superintendent of Documents, Government Printing Office, Washington, D. C.

## Pennsylvania Growers

(From page 42)

vania State College and executive secretary of the exposition, the morning programs will consist of addresses by prominent speakers who will talk on subjects of general agricultural interest as related to the potato industry.

In the afternoon programs, visitors to the exposition will be free to view the machinery displays, field demonstrations, and educational exhibits which will be staged by the Potato Growers' Association in cooperation with authorities of the Pennsylvania State College. Twelve to fifteen acres of land have been set aside by the school of agriculture for field demonstrations. Plots have been planted to potatoes at different dates to insure proper conditions for demonstrating cultivation, weeding, spraying, and digging by the machinery on display by the various implement companies. Still other plots have been planted to cover crops of sweet clover, soybeans and other crops to be used for plowing, seed bed preparation, and planting demonstrations.

One of the big features of the evening entertainments will be a banquet for the famous "400 Bushel Club" members and their wives. There are over 600 of these members and the greater part of them are expected to attend this event.

Invitations to attend the exposition have been extended to growers outside of Pennsylvania.

## "AMERICAN FARMERS CAN DEFEAT WORLD IN AGRICULTURAL PRODUCTION"

*—Secretary Hyde*

"The intelligence, the thrift, the industry and the efficiency of American farmers are great enough to meet and defeat the world in producing any of our great agricultural products. But to do so they will have to sell on world markets at world prices," Secretary Hyde of the United States Department of Agriculture declared at the American Institute of Cooperation, Manhattan, Kansas, June 8.

He said: "We can probably continue to produce tobacco, lard (and to some extent pork), rice, apples and citrus fruits for the export market, and, unless foreign expansion becomes too great, sell them at a profit. In cotton, we face a prospect of severe competition. The consumption of foreign growths of cotton is increasing faster than is the consumption of our own cotton. Sensational expansion of foreign cotton lands, however, is not likely. By reducing our costs and producing a higher quality of cotton, we can probably maintain our foreign market. Cotton growers need to balance their production both as to volume and quality against their market demands.

"The growth of domestic demand has practically eliminated exports of dairy products, beef, and poultry products, but there is little, if any room, for expansion of the volume of their production. Of all of our agricultural products, wheat is most vulnerable. Our advantage in wheat production over our competitors is not great. Our low cost wheat land is small in comparison with the limitless areas in Canada, Australia, Russia, and Argentina. Our production costs are similar."—*Marketing Activities, June* 10, 1931.

## CONTEST PROMOTES FARM BEAUTIFICATION PROGRAM

The beautification of the exterior of the farm home has seemed so important in several States that bankers and business men have offered substantial prizes for the best improvements made. The Rural Women, of Lincoln county, Colorado, started an improvement contest sponsored by the county banking association and the county home-demonstration agent. The contestants were divided into two groups—those in a 1-year contest and those who expected to take three years to accomplish certain improvements. Awards were made on a basis of general appearance, condition of house, outbuildings, and fences, plantings of flowers, shrubs, trees, and vines, and even the vegetable garden.

Among the suggestions made for improvements the Lincoln County Agent mentions the following in reporting to the United States Department of Agriculture:

"Clean: Back yard, front yard, vacant lots, porches, garages, stockyards, roads, outbuildings.

"Plant: Trees, shrubbery, grass plots, vegetable garden, flower garden, flower boxes.

"Paint: House, fences, outbuildings, screens, porches.

"Miscellaneous: Rubbish piles burned, insect breeding places destroyed, fences repaired, porches and steps repaired, roof repaired, screens repaired, junk and papers properly disposed of, refuse cans provided, old signs removed, shrubbery and trees trimmed."

These suggestions were widely circulated in the county in the form of entry blanks for the contest, and many who did not actually enroll in the competition were stimulated to adopt one or more of the "clean-up" hints as a matter of pride and community consciousness.

# The Importance of Organic Matter

*(From page 12)*

if satisfactory growth is to be attained.

The first year that cover crops are sown earlier than usual (June 15 to July 1) they may reduce the soil moisture content to such an extent, especially in a dry season as to affect the size of the developing fruit, but the following year and thereafter the soil moisture content should be so much higher, because of the previously turned-under organic matter, that the growth of the cover crops should not affect the growth of the fruit adversely except under some unusual drought conditions.

In some of the Eastern fruit-growing sections, especially through the Shenandoah-Cumberland Valley region, the possibility of growing two cover crops each year is being given consideration by the growers. In such cases, after the orchard has been plowed or disked thoroughly, the cultivation is stopped about May 15, and such cover crops as soy-beans, sudan grass, millet, or cowpeas are seeded. These are allowed to grow until the middle of July when they are turned under and the ground cultivated until about September 1, when another cover crop such as rye, or rye and vetch is sown. This cover crop grows through the fall and early winter and is also turned under before growth of the trees starts in the spring. This plan, together with others, is being investigated by different Experiment Stations and the Government. It emphasizes the importance placed upon organic matter by the growers in the East.

Several orchards in which the soil had become depleted and the trees stunted, have been reinvigorated in this country by increasing the organic matter content of the soil, together with fertilization. After turning under heavy crops for two seasons, many of the troubles resulting from insufficient moisture were corrected and the trees again responded well in growth and production to application of nitrogen fertilizers.

### *Summary*

In order to have satisfactory tree growth and the production of large crops of normally developed, high-quality fruit, several essentials are necessary. Water and nitrates appear to be two of the most important and limiting factors, however, if these desirable conditions are to be attained.

The addition of large amounts of organic matter to our orchard soils will improve the physical condition of all soils, and less washing, puddling, and eroding of soils will occur; they will be better aerated, and their bacterial content and productive power will be increased.

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Presented before the Maryland State Horticultural Society, January, 1928, and now reprinted from Vol. 1, No. 1, February, 1931, issue of the *Maryland Fruit Grower*, the official publication of the Maryland State Horticultural Society.

# Building Fertility on "Cut-Over" Clay

(*From page* 24)

vestment of 1930 is still at work in 1932, with an increase of two-fifths of a ton of hay per acre as substantial proof. Such facts as these count with an extension audience.

We have had excellent results with nitrates in orchard trials and on jack pine sandy loams. But on the northern hardwood soils, the stony clay loams, the white pine lands, the "Popple valley" soils, the single treatment with nitrates has been much inferior to complete fertilizer. The combination of three plant foods has been better than two just as two have been more effective than one used alone.

Our work indicates that the use of farm manure has been somewhat overdone at times, in garden culture. The use of 30 tons per acre per year, a practice not uncommon, is likely to be wasteful according to the results of a six-year test on carrots, beets, rutabagas, parsnips, onions, and cabbage.

| Treatment | Per cent yield |
|---|---|
| 30 tons manure, per acre, per year | 100 |
| 15 tons manure, per acre, per year | 82 |
| 15 tons manure plus one-half ton commercial fertilizer | 139 |
| One ton complete fertilizer | 170 |

While the last treatment leads the others owing to heavy excess on some crops, treatment No. 3 is generally the better practice.

# Penn State Celebrates

(*From page* 30)

articles.

"The outstanding personal quality of Dr. Jordan was his forth-rightness. His reactions to external stimuli of all kinds were positive, never negative; yet he was known as a man of calm judgment. He was forceful in speech and resourceful in debate. Nobody could listen to one of his incisive talks, sitting under the spell of his burning eye, and not be impressed with the rugged earnestness and integrity of the man.

"Whitman Howard Jordan was more than a distinguished agricultural scientist; he was also a Christian gentleman. As elder and trustee of his church for 25 years, Director of the Y. M. C. A. for 25 years, Superintendent of the Sunday School for 20 years, and as the sympathetic friend of all his associates, he achieved the more permanent values of life. The friendly affections of the man outstripped his other achievements, great though they were.

"Dr. Jordan maintained an active interest in agricultural science up to the close of his four-score of years. He was an honored guest at the last meeting of the American Association and at the time of his death was looking forward to returning to Penn State to see the fruits of his early work. We regret that this ambition could not have been realized, but we are grateful that he lived to the fulness of years and honors. One of his associates, Dr. U. P. Hedrick, sums up the service of Dr. Jordan in these words: 'He left behind him a legacy of work well done, a life well spent and a record of great achievement as a scientist, citizen, and church man.' "

### *Fills Place on Program*

Dr. H. J. Patterson, director of the Maryland Agricultural Experiment Station, student of Dr. Jordan when he was professor of agricultural chemistry at Penn State from 1881 to 1885, came back to his alma mater to take the place of his old teacher on the program, and he did it nobly. He spoke tenderly of his association with the founder of the 50-year-old plots and of his own work on the experiment in the early years.

To complete the evening program, Dr. Frank M. Swartz, of the Penn State geology department, gave an illustrated lecture on the geology of the Nittany Valley. He described the rock formations of the region and revealed the secrets of mountain heights and valley depths.

With Professor Gardner as chairman the Thursday morning program got under way with F. J. Holben, assistant professor of soil technology, speaking on soil respiration in relation to plot yields; Professor F. G. Merkle, describing the effect of fertilizer treatments on the content of exchangeable cations in Hagerstown soil; Professor J. W. White, presenting the nitrogen balance in a four-year grain rotation, and Dr. Walter Thomas, plant chemist of the station, giving the reciprocal effects of nitrogen, phosphorus, and potassium on absorption by plants. These papers were discussed by Dr. S. A. Waksman, New Jersey Agricultural Experiment Station; Dr. Richard Bradfield, Ohio State University; Dr. J. A. Bizzell, Cornell University, and Professor Emil Truog, University of Wisconsin, respectively.

In the afternoon the group took an automobile ride up over the Allegheny escarpment to the plateau to inspect the soil fertility plots on DeKalb soil at Snowshoe and Kylertown. The profile of DeKalb and Upshur soils was studied en route. The project at Snowshoe was started 15 years ago, and the pasture fertility experiment at Kylertown was begun in 1929. Here are 60 acres in a cooperative project of the United States Bureau of Dairying and the college departments of agronomy and dairy husbandry.

Upon return to State College 134 persons gathered at the new Nittany Lion Inn for dinner and diversion. Dean Watts served as toastmaster. Dr. J. G. Lipman, director of the New Jersey Agricultural Experiment Station; E. S. Bayard, editor-in-chief of the Capper-Harman-Slocum farm papers; H. L. Knight, editor of the Experiment Station Record; Dr. H. J. Patterson, and J. D. Luckett, editor of the *Journal of the American Society of Agronomy*, spoke briefly; Mrs. J. W. White, Mrs. C. F. Noll, and Mrs. F. J. Holben, sang trio selections, and H. N. Worthley, research entomologist of the station, sang solos. Mrs. Mignon Quaw Lott, Baton Rouge, Louisiana, presented a humorous experiment station report.

Friday morning the program closed. Dr. C. F. Noll, in charge of the old plots since 1908, gave the comparative effects of different phosphates on yield and maturity. Professor S. D. Conner, Indiana Agricultural Experiment Station, discussed his paper. Dr. J. G. Lipman then spoke on the nitrogen outlook. He traced the story of nitrogen from its early uses up to the present and predicted future uses and amounts. Enos H. Hess, president of the Messiah Bible School, Grantham, Pa., assistant to the director of the experiment station from 1894 to 1901, then gave the early history of the old plots. He prepared the report on the first 16 years' results and also made the first chemical studies on the old plots. He recalled that the first notebook given him carried at the top of each page "Nothing is too insignificant to be noted." Although 30 years have passed since he left the station Hess still can give from memory the treatment of each plot.

"Fifty years of agricultural experimentation by the Pennsylvania State College and similar work by other institutions have now brought us to the point where our goal should be a national unification and coordination of soil fertility and fertilizer research in which the State experiment stations and the United States Department of Agriculture can attack regional problems of agriculture," said Dr. H. G. Knight, chief of the Bureau of Chemistry and Soils. The Bureau now assists 22 States by conducting field experiments with State agricultural experiment stations or by establishing field laboratories where problems of major significance have arisen, he reported. "The kind of work started 50 years ago as a continuous experiment by the Pennsylvania State College has now become so important that today soil fertility and fertilizer research affects not only the soil scientist but the agronomist, the entomologist, the plant pathologist, the geneticist, the chemist, and the physicist, as well."

In conclusion, quoting Dr. Fletcher, "The Pennsylvania experiments, and similar research in other States, show that if farm soils are properly handled, they are indestructible; that the so-called 'worn-out soils' of certain sections of our country are merely the result of careless farming; that there is no good reason why the farm lands of the United States should not be fully as productive 2,000 years from now as they were when first brought under the plow. This is the goal of the agricultural colleges and experiment stations—a permanent agriculture."

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## APHIDS MOVE ABDOMENS TO FRIGHTEN ENEMIES

When aphids, or plant lice, line up on the stem of a plant and bury their beaks in the tissues to suck sap they move their abdomens up and down and from side to side in unison, like a battery of animated bellows. Some observers have suggested that the aphids use their abdomens to pump the juices from the plant. But Dr. Floyd F. Smith, entomologist of the United States Department of Agriculture, believes they move in this manner to shake off or frighten away their enemies.

On the approach of danger or the occurrence of a slight mechanical disturbance, such as jarring, the aphid twitches its abdomen without withdrawing its beak, Doctor Smith says. This is a reaction to danger from small parasitic flies or wasps attempting to lay eggs on or within the aphid's body. When the first one twitches, it startles the next aphid. Thus a wave of twitching moves along the line of insects.

Doctor Smith has observed that this twitching is not essential to sucking, for some species of aphids do not twitch, and yet they seem to feed as much and to propagate as rapidly as others. Delicate muscles within the insect's head enable it to extract the plant sap, he says, and apparently the abdomen does not function as a bellows.

# Top-Dressed Alfalfa Feeds Better

(*From page* 15)

Five cuttings of hay have been secured from these plots, and they show that top-dressing an old stand of alfalfa under these conditions is very beneficial to the alfalfa and, incidentally, profitable to the owner.

The net gain for fertilizer is the value of the hay from which has been subtracted the cost of the fertilizer and the cost of harvesting the extra hay produced at $1.50 per ton. The value of the hay is computed at the prices which Mr. Harris sold hay from the several cuttings.

The unfertilized plot produced in the two years a total of 7,812 pounds of hay worth $77.95; the plot receiving 852 pounds of 0-20-0 produced 10,756 pounds of hay worth $106.62 of which $14.45 is net gain per acre for the phosphorus applied.

The third plot, receiving 852 pounds of 0-20-10, produced a total of 11,499 pounds of hay worth $118.21 of which $20.11 was net gain for the fertilizer and of this, $5.66 is due to the potash contained in the 0-20-10.

We have seen what difference was produced by both phosphoric acid and potash in the weights of hay produced. But weight isn't all there is to it. The feeding value of alfalfa lies in its leaves, according to these cattle and sheep feeders. When weeds are in alfalfa hay, they swell the weight but add no meat—the cattle refuse them. Mr. Harris's experience is that the weaker a stand of alfalfa becomes from vanishing soil fertility, the greater the number of weeds that intrude themselves.

After two seasons, Harold Harris says: "We saw a marked difference in the quality of hay produced on the three plots. By actual count, there were more weeds in both plots which received no potash. The alfalfa that had access to the 0-20-10 fertilizer was the most leafy."

Goerring Harris, the father, put it this way, "If you want to keep on growing big crops of alfalfa hay, you'd better see that the plants have plenty of both phosphoric acid and potash."

# Potash in Permanent Pasture Fertilization

(*From page* 8)

In a pasture improvement started last spring on six old, permanent blue grass pastures located in southwestern Wisconsin, results the first year indicate a specific improvement in yields on five of them when 200 pounds of muriate of potash per acre were applied in addition to 400 pounds of 20 per cent superphosphate and 2 tons of ground limestone as detailed in the data given.

| *Pasture* | *Blanks* | *L-SP* | *Per cent increase over blanks* | *L-SP-K* | *Per cent increase over blanks* |
|---|---|---|---|---|---|
| 1 | 1382* | 1679 | 21.50 | 1989 | 43.90 |
| 2 | 1066 | 1347 | 26.40 | 1525 | 43.10 |
| 3 | 1153 | 1186 | 2.86 | 1468 | 27.30 |
| 4 | 1208 | 1663 | 37.70 | 1682 | 39.20 |
| 5 | 1694 | 2141 | 26.40 | 2424 | 43.10 |

* Pounds of dry matter an acre

Liming old pastures when their soils are sour, if practiced alone, may in the course of time effect some slight improvement; phosphating with liming is basically sound and usually effects a decided change; but for bringing a pasture to the most and best grass, and to do so in the shortest possible time, nitrogen and potash fertilization should not be overlooked. Complete treatment operates with the greatest efficiency.

# Potash Contest

(*From page* 14)

Carolina; W. E. Stokes, Florida Experiment Station; C. B. Williams, North Carolina Experiment Station; and J. T. Williamson, Alabama Experiment Station.

The contest was conducted by N. V. Potash Export My., Inc., 740 Hurt Building, Atlanta, Georgia, and under the direction of Mr. J. N. Harper, Co-Director of the Agricultural and Scientific Bureau of this company. In announcing the contest winners as selected by the judges, Mr. Harper made the following statement: "The judges faced a tremendous task in selecting the winning letters from the thousands of excellent entries which were sent in. We feel that the winners should be especially proud of the fact that the competition was exceptionally keen.

"We regret that every entrant could not win a prize, however, we trust that through the additional information each entrant may have gained on the value of using extra potash, he may be able to collect much extra cash from his future crops.

"Whether you entered the contest or not, we hope that you are one of the fortunate farmers who have found that it pays to make sure that every crop you grow gets plenty of potash in fertilizer. 'Extra Potash pays Extra Cash.'"

The rules under which the contest was conducted were:

1. This contest is open to any cotton grower and to any cotton grower's wife, son and daughter.

2. It is not necessary for you to have used potash top-dressing for you to compete. Simply write a letter giving your opinions of potash top-dressing for cotton.

3. If you wish you may mention results obtained on your own farm, or on farms or experiment stations you have visited. You may also mention facts you have noted in potash advertisements, farm papers, fertilizer literature, or agricultural bulletins.

4. Answers are limited to 250 words. Write on one side of the paper only. Be sure to give your name and address.

5. Letter-writing ability, spelling, grammar, etc., are of secondary importance. You must simply show yourself to be a keen observer of the beneficial effects of potash top-dressing in helping cotton to pay extra cash.

6. Your fertilizer man may be able to give you suggestions that will be helpful. Talk it over with him.

7. Address your answers to POTASH, 740 Hurt Building, Atlanta, Georgia. All answers must be received at this address not later than midnight, May 15th, 1931.

8. If you wish you may write this same address now for free literature which may help you to learn more about the advantages of using potash as a top-dressing.

9. Leading agricultural college authorities will select the winning letters in this contest.

# Soil Liming Data

(*From page* 23)

facturers advised by letter of the tonnage used the preceding year. They are thus kept informed annually and need not wait for the next revision of the bulletin.

Shortly after each revision of the bulletin is issued, a copy of it is sent to each manufacturer cooperating. In addition to this radio talks and other timely information have been sent to them from time to time so that a very fine spirit of mutual cooperation between the various lime producers and the college workers has been developed.

The following table gives the tonnage of the different liming materials used on the soils of New York each year during the past decade.

During the past few months the "National Lime Association" of Washington, D. C. under the direction of Mr. H. A. Huschke of its agricultural department has collected data on the tonnage of lime used in 1929 in the different States. He has kindly granted permission to reproduce the Lime Association's data here. All of the tonnage figures available are given in the following table on the next page.

While these figures are incomplete and for some of the States are only estimates, they are presented here because of their being regarded as having real value. As already suggested, such tonnage information should be of service to the agricultural worker in a general way and in a specific way

TONS OF LIMING MATERIALS USED ON NEW YORK SOILS*

| Year | Total of all forms of lime Tons | Per cent of Total Limestone | Hydrate | Burned lime |
|---|---|---|---|---|
| 1921 | 136,000 | | | |
| 1922 | 150,000 | 92.0 | 5.3 | 2.7 |
| 1923 | 157,000 | 91.1 | 6.7 | 2.2 |
| 1924 | 159,000 | 92.4 | 3.6 | 4.0 |
| 1925 | 160,000 | 92.3 | 5.7 | 2.0 |
| 1926 | 170,500 | 92.2 | 6.0 | 1.8 |
| 1927 | 190,000 | 91.6 | 7.4 | 1.0 |
| 1928 | 169,000 | 87.7 | 10.9 | 1.4 |
| 1929 | 185,000 | 85.7 | 13.2 | 1.1 |
| 1930 | 191,650 | 85.0 | 13.3 | 1.7 |

*Extension Bulletin 78, Cornell University 1924 (revised 1928 and 1930, latest revision not ready for distribution.)

In 1921 only total tonnage was asked for, and so the percentage represented by each form of lime cannot be given. The increase in the percentage of hydrate used during the past three years has been rather marked. In part at least this may have resulted from the popularity of hydrate for the control of clubroot of cabbage and related crops. Undoubtedly some shading of the price of hydrate during the past year has been a factor, also.

to the manufacturer of agricultural lime in planning his operations for the next few years.

It is interesting to note that limestone, including screenings, accounts for 88.08 per cent of the total tonnage of liming materials used in the entire country in 1929. The burned lime used was 2.1 per cent of the total while the hydrated lime used accounts for 6.87 per cent. The remainder, nearly 3 per cent, was marl and various by-products containing lime.

APPROXIMATE CONSUMPTION OF LIMING MATERIALS[1] ON FARMS IN THE UNITED STATES[2] DURING 1929

| States | Ground limestone tons | Burned lime tons | Hydrated lime tons | Miscellaneous liming materials tons | Total tonnage |
|---|---|---|---|---|---|
| California | 6,502 | | 1,399 | 23,121 | 31,022 |
| Connecticut | 25,000 | | 2,500 | | 27,500 |
| Delaware | 650<br>240[3] | 5,610 | 10,640 | 30 | 17,170 |
| Florida | 3,000 | 1,000 | 3,000 | | 7,000 |
| Illinois | 950,000[3] | | | | 950,000 |
| Indiana | 184,996 | | 10,649 | 8,487 | 204,132 |
| Iowa | 350,000[3] | | | | 350,000 |
| Kansas | 41,250<br>2,100[3] | | 25 | | 43,375 |
| Kentucky | 270,000 | 10,000 | | 26,000 | 306,000 |
| Maine | 1,500 | | 308 | 6,535 | 8,343 |
| Maryland | 2,521<br>522[3] | 7,312 | 16,937 | 1,554 | 28,846 |
| Massachusetts | 30,315 | | 18,034 | 7,987 | 56,336 |
| Michigan | 35,273<br>66,141[3] | | 9,688 | | 111,102 |
| Minnesota | 11,700<br>3,560[3] | | | 2,680 | 17,940 |
| Mississippi | 8,000 | | 2,000 | | 10,000 |
| Missouri | 236,897 | | | | 236,987 |
| Montana | 222 | | | | 222 |
| New Hampshire | 5,000 | | 500 | | 5,500 |
| New Jersey | 10,674 | 1,322 | 35,079 | 1,261 | 48,336 |
| New York | 158,545 | 2,035 | 24,420 | | 185,000 |
| North Carolina | 100,000 | | | | 100,000 |
| Ohio | 198,504 | | 26,683 | 12,194 | 237,381 |
| Oregon | 2,000 | | | | 2,000 |
| Pennsylvania | 139,654 | 25,632 | 80,523 | 9,369 | 255,178 |
| Rhode Island | 381 | | 825 | 70 | 1,276 |
| Tennessee | 350,000[4] | | | | 350,000 |
| Virginia | 75,000<br>10,000[3] | 25,000 | 10,000 | | 120,000 |
| Vermont | 7,101 | | 1,500 | | 8,601 |
| Washington | 4,000 | | | | 4,000 |
| West Virginia | 10,000 | 568 | 2,180 | 682 | 13,430 |
| Wisconsin[5] | | | | | |
| Total | 3,301,248 | 78,479 | 256,890 | 99,970 | 3,736,587 |

[1]These data, except for New York, were supplied by H. A. Huschke of the National Lime Association, Washington, D. C.

[2]The seventeen states, Alabama, Arizona, Arkansas, Colorado, Georgia, Idaho, Louisiana, Nebraska, New Mexico, Nevada, North Dakota, Oklahoma, South Carolina, South Dakota, Texas, Utah, and Wyoming are listed as using no lime or only a negligible quantity during 1929.

[3]Limestone screenings, or mostly screenings.

[4]Mostly limestone.

[5]No estimate available.

# An Oklahoma Tour

(*From page* 9)

riculture Representatives, County Agents, and farmers have participated in the tour every year and have gradually seen the use of commercial fertilizer come into its own.

High analysis fertilizers containing a liberal amount of potash are recognized as essential to profitable production. The 16 per cent superphosphate was replaced with 4-8-6, and today 4-8-10 is supplanting 4-8-6 with growers who observe what the market demands. Five hundred pounds per acre are no longer considered a large application and 1,000-pound applications are to be found.

Growers have found during the past few years that high quality onions and Irish potatoes cannot be produced with an unbalanced fertilizer, especially if potash is lacking. Color, smoothness, and excellent texture are given by the potash.

# The Inquiring Mind

(*From page* 18)

rious feeding stuffs into a suitable ration for livestock feeding; but whether one practices home-mixing or not, no one who uses fertilizers to any extent can afford not to understand the principles involved.

Manure as used in ordinary farm practice, owes its value to the nitrogen and inorganic elements contained, and by employing manure in the light of knowledge which modern science has given us, we may very greatly increase its value.

Even when most carefully handled, farmyard manure fails to meet the requirements of a phosphorus-hungry soil, and a further increase in yield beyond that produced by the manure may be gained by supplementing the manure with superphosphate. One pound of superphosphate per 1,000-pound animal may be applied daily in the stable securing some arrest of ammonia and reducing, or at least not increasing, the labor of distribution.

Deficiency of the soil in potassium is usually shown at a later date than that of phosphorus, but potassium supply may eventually become the more important of the two. The sensitiveness of the potato to potash deficiency would suggest the use of the plant as a means of determining the need of potash treatment.

There are exceptional soils in which the demands for potassium takes precedence over that of phosphorus.

The effects of potassic fertilizers are generally greater on soils derived from limestone than on those derived from sandstones, and the addition of lime to soils of sandstone origin appears to favor the utilization of such fertilizers.

Potatoes and corn are apparently more responsive to potassic fertilizing than wheat, oats and clover, but this difference may become evident only on land that has been limed.

If crops are grown continuously without intervention of any nitrogen-accumulating crop, the time ultimately arrives when nitrogen, as well as mineral elements, must be restored to the land in approximately the ratio to each other in which they are found in the harvested portions of the crops, if the yield is to be maintained without impoverishment of the soil.

A liberal supply of available phosphorus and potassium is essential to the economical utilization of nitrogen.

In the case of other field crops than corn, considerably less nitrogen will be recovered in the increase of crop than has been given in the fertilizer, the exception in the case of corn being apparently due to the fact that the conditions under which the crop is grown favor the nitrification of organic matter of soil.

The immediate effect of nitrogen of chemical fertilizers is expended chiefly in the crop receiving the application, and any further effect is mainly due to the nitrogen carried over in the increased growth of the roots and stubble of this crop.

Liming increases the activity of nitrifying organisms of the soil, and hence the use of lime as a substitute for manure or fertilizer will eventually injure the land by wasting its store of organic nitrogen. Liming and manuring or fertilizing, each increases the effectiveness of the other.

The time eventually arrives when the crops grown in systematic rotation with clover give very much greater yields than those grown continuously, except where available nitrogen is added to the continuously grown crops in such quantity as to make the cost prohibitive in the case of ordinary cereal crops.

Clover surpasses all other crops as a preparation for wheat, chiefly because it adds to instead of depleting the nitrogen store in the soil, and because its root growth is of such a character as to leave the land in better physical condition than is done by any other crop.

It appears that if the supply of available phosphorus and potassium be made ample, and if the land be kept hospitable to clover by liming when necessary, the root growth of clover grown in rotation with other crops may be relied upon to furnish to subsequent crops, directly or indirectly, more than half as much nitrogen as that contained in the hay, and that the nitrogen thus supplied will so nearly meet the requirements of two or three crops following the clover that the application of nitrogenous fertilizers will be without effect on many soils and of relatively small effect generally.

Soils lying over sandstone or shales are generally in need of lime, and the time eventually comes when such soils cannot be made to produce full crops until lime has been added; but when the soil is derived from limestone, it is only when the land has been a very long time under cultivation, or where the effect of the limestone is obscured by a deep covering of loess, that liming is likely to be profitable.

There are comparatively few long-cultivated fields in the Mississippi Valley on which cereal and clover will not respond profitably to superphosphate.

Instead of increasing soil acidity, superphosphate has a slight neutralizing effect; but this is not sufficient to render liming of acid soils unnecessary.

The full effect of superphosphate is only attained when it is supported by ample supplies of available nitrogen and potassium.

Director Thorne concludes his book on maintenance of soil fertility with the following significant paragraph:

### *A Word for Peace*

"One feature of the present situation should not pass unnoticed, and that is that if the millions of young men who were slaughtered in the World War had been left alive, they, with the families that would be growing up around them, and with the wealth that would have been saved from destruction, would be consuming all the food that the world is producing today, and at better prices than those now prevailing."

Evidently, the venerable Director looks for a day when the people of the world "shall beat their swords into plowshares and their spears into pruning hooks," and "when nation shall not lift up sword against nation, neither shall they learn war any more."

Meanwhile, we rejoice that his declining years are being spent in a day of peace, among the fertile fields of Ohio he so fondly loves.

# From Tobacco to Potatoes

(*From page* 19)

These potatoes yielded 389 bushels per acre.

Rurals and were planted to as great depth as the planter could place them.

Cultivation for the most part was done with weeders, spike harrows, rotary hoes, and shallow-cutting cultivators. Spraying was done with a traction-sprayer rented from one of the farmers interested in the project.

The severe drought through the summer of 1930 made the prospects appear very gloomy, and it seemed inevitable that much of the time and effort would be wasted.

The deep planting, the complete weed control, and the fertilizer used enabled the vines to grow through the drought period, while neighbors' crops literally dried up. Hoppers did not seem to be in evidence as the cause of the drying as much as the evidence of starvation caused by the lack of available plant food.

The harvest brought surprises which from present indications will have a pronounced effect on the future of the crop in the community. Five of the eight projects gave yields varying from 340 to 389 bushels per acre, in crops ranging in size from one acre to five acres. Only one of the crops fell below the 300-bushel mark. The above yields made in a community that had never grown potatoes commercially and in a drought-cursed year made the record an unusual one.

It is particularly pleasing to the local Department of Agriculture to note that the two highest acre yields, 387 and 389 bushels, were made by two vocational students, who in doing so created State vocational records.

The potatoes graded high and sold at an average of about one dollar a bushel. The labor incomes from the two winning projects were $227.81 and $293.48 per acre respectively. The lowest labor income was well in excess of $150.

The public interest is high, and we feel justified in the statement that the results secured will vitally affect the agriculture of the community in future years, possibly to the very pleasant mutual benefit of both potato and tobacco growers.

# How Germany Grows Potatoes

(*From page* 44)

As the result of experiments, it has been found that the most favorable distance of planting potatoes is about 24 inches between rows, with the tubers about 16 inches apart in the row. Most of the growers are now planting approximately at these distances, although some are planting in rows 20 inches apart with the tubers 20 inches apart in the row.

Sometimes market potatoes are green sprouted, particularly those planted near the cities for the early crop. App-rently the practice is on the increase with early market potatoes. Seed to be used in the production of certified potatoes is never green sprouted.

A very important cause of the high average yield of potatoes in Germany is the careful attention devoted by the farmers to the fertility of the soil. The German potato grower is a firm believer in commercial fertilizers. Furthermore, he makes liberal use of barnyard manure, sods, and green manures in producing the crop.

Most farms growing potatoes also carry livestock. It is customary to apply manure before plowing the land intended for potatoes, the amount varying considerably. After plowing, all of the mineral fertilizer, phosphoric acid and potash, as well as part of the nitrogen, is applied broadcast. The furrows are then struck out and the seed is dropped by hand and covered. Some growers vary these planting practices by using a tool which makes a hole in the marked row, the seed piece being dropped into the hole.

After planting the field is harrowed a number of times, both before and after the tops appear. This is followed by cultivation between the rows. It is common to make side-dressings of nitrogenous fertilizer, usually sulphate of ammonia.

The total amount of fertilizer applied varies greatly. Much depends upon the quantity of manure used. Many farmers using fair quantities of manure apply the following amounts of fertilizer:

Fifty pounds ammonia—equivalent to 200 pounds per acre of sulphate of ammonia.

Sixty pounds phosphoric acid—equivalent to 360 pounds of 16 per cent superphosphate.

Eighty pounds potash—equivalent to 160 pounds of muriate of potash.

Some growers of potatoes use fertilizer considerably in excess of the amounts indicated above. Some of the best managed farms are reported to use as much as 150 pounds of potash to the acre, equivalent to 300 pounds of muriate of potash, in addition to manure. And even higher amounts of potash are reported in case little or no manure is applied.

The German potato grower is in a particularly fortunate position in having no insects to trouble his crop. Such pests as the Colorado potato beetle, flea beetle, and leaf-hopper seem to be totally absent, and the aphis does not seem to do much damage. Both early and late blight occur in the crop, but spraying to control these diseases is seldom practiced even with the seed crop. The reason assigned was that the practice of spraying costs too much. If these diseases were more damaging than they are, it would probably be found economical to spray.

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# Music

*(From page 4)*

if it hadn't been for rough foot work on that old parlor organ and my diffidence, I'd show them myself.

There is quite a flare nowadays for educating the ears of the rural proletariat to respond with warmth to something more pretentious than "Irish Washerwoman" or "Turkey in the Straw." The rosin of the rural fiddler must become more than a squeak preventive and the old singing school needs more than a tuning fork and vocal endurance. Certain ambitious agencies have labored long and late to teach the farmers how to cooperate in marketing, and now they want to do it in melody. Full jugs after a tough day of barn-raising used to be sufficient to bring out all the latent vocality the countryside possessed. Now that jugs are blacklisted, the Feminine Federation, the Kiwanis clubs and the Rotarians have to stimulate the peasant overture by contests or choruses. Direction and selection are provided by the urban leaders, so all the ruralites furnish is motor gas to get there and lung power to stay there.

NOT satisfied with making the district schools echo to predigested sagas, the modern urbanite has moved his club house and his entertainment inns out next to the hay stacks, thereby treating the farmer to more midnight hullabaloo than feline gladiators and wolves ever provided. Even the most remote sanctuary on the mud road can get nothing else but by tuning in.

Quite possibly all this jazzmania has its compensations in the lot of the hard-pressed farmer. When one can learn to smile and snap the fingers in rhythmic measures, swing the hips and teeter the toes to racking roundelays, the mortgage marathon loses some of its prosaic dullness. Even the Chicago stockyards quotations take on an encouraging aspect when smothered in harmony. We are prone to forgive the delay in farm relief that relieves when they play "Semper Fidelis" or "Stars and Stripes Forever." Root rot and potato bugs have less terror in the tempo of Percy Grainger's "Country Gardens"

Lest I become too perverse, I would hasten to express sincere pleasure over Mr. Damrosch and his cultivation of a love of good music in youth, to counteract some of the other too numerous cults.

It is a delight for the layman to realize the relationship between mathematics and physics on the one hand and music and harmony on the other. Time itself is beaten and measured. The blood stream courses in waves. Nature in the tides, waterfalls, winds, and wood growth asserts the unity of rhythm. It is as vital and universal as protoplasm. The noon whistles may be music to tired ears, but unless the tones of anything are broken up into beats and accents we rightly call it a blast.

It is here in the elemental grasp of rhythm, it seems to me, that humanity takes its first musical steps. Once I wandered through a north-country woods on a Chippewa reservation. Suddenly afar off from some tribal ceremonial of the sacred drum there came to me the steady thumping of the instrument. The braves had the fundamentals of rhythm, but they, like many other aboriginals, lack the tone structure which must accompany rhythm. Some folks pretend to enjoy their chants, but I refrain from further comment; although I pronounce their time in music to be worth more than their time in anything else.

Aside from fish, Indians have no knowledge of scales. Variations, surprising complexes, runs and trills—in short, what we call melody or tune—are largely unknown to primitives. Hence the muscular accompaniment of their music is the stamping dance, with no changes, no fixed mazes or winsome variations. I have met some white folks not far off who danced like that, too, and they blamed it on the orchestra. But some folks are deaf to music and time just as others are blind to color.

DO you remember that day at the county fair, when you sidled up to the barker's stand before the greasy tent and saw and heard for the first time the entrancing hoochy-kootchy? The tom-tom and the pipes, the gypsy-like gyrations of the harem—ah me! what a back number thou art since the advent of Earl Carrol. The old world's fair at Chicago in 1893 brought a wave of provincial popularity for the oriental dancers and their musical assistants.

Anyhow, on a little research excursion, we find that the Persians were the chief oriental musicians. In the third chapter of Daniel there is quite a drama unfolded concerning King Nebuchadnezzer, which would make quite a scenario for the modern moment. Neb set up a graven image at some public expense and a boost in the property tax. To get the good-will of the county boards of supervisors and the highway commissioners, he sent out bids to his dedication party, including in the list the probate judges, the treasurers, the sheriffs, and, of course, the coroners. He always required coroners at his festivals. At the auspicious moment he called out his adjutant-general, who shouted, "When ye hear the sound of the cornet, flute, harp, sackbut, psaltery, dulcimer, and all kinds of music, ye must fall down and worship the golden image the king hath set up." The audience groveled in the dust of Babylon, except three smart young Jews, Shadrach, Meshech, and Abednego. They well knew that in due time their nation would absorb the whole entertainment business, and refused to pay homage to such an inferior musical comedy.

GOING still further back in my archives, I consulted the book of Genesis in search of musical inspiration. You may be as surprised as I was to learn that the farmer, the blacksmith, and the music teacher were brothers and the sons of Cain. Look it up for yourselves in verse twenty-one of the fourth chapter of Genesis. After Cain was deported, he went to the land of Nod, and three of his great-grandsons deserve your attention. Jabal Cain was the "father of such as dwell in tents and have cattle," Tubal Cain was "an instructor of every artificer in brass and iron," so mote it be. But Jubal Cain himself, least heard of among the brothers, was "father of all such as handle the harp and organ." Since which time even the farmers and the blacksmiths have themselves joined the "anvil chorus."

I have also looked up the first charivari, antedating quite some centuries the fun we used to have with stingy bridegrooms. When Jacob got tired of living with the old folks, he packed up his camels and carted his bride elsewhere. Thereupon Laban hurried after him and remonstrated, "Wherefore didst thou flee away secretly and didst not tell me that I might have sent thee away with songs and with tabaret and harp?"

Paul Whiteman had nothing on David either. David organized the first band. I think it was also used for dancing purposes. But the proceeds of it, like those of Zion City, Illinois, went toward the temple. It's located in first Chronicles. David "separated the services of the sons of Asaph, Heman, and Jeduthun, with psaltries and with cymbals." I know how many harpers and trombone blowers he had besides. There were "two hundred plus four-score and eight" in that first band. And Jonathan remained his friend in spite of it.

"Making a joyful noise unto the Lord" rings down through all history to prove that vocal and instrumental expression is as vital to humanity as to lower forms of life. Bards and birds are traceable to a common denominator.

PLATO contended that gymnastic and music should be compulsory in education. He thought that the first study promoted ferocity and strength, masculinity and power, while the latter study lent beauty and imagery, femininity and delicacy to the student.

Our city schools usually make music compulsory, but out in the creamery and silo sections they think that the art of hog calling is the supreme test of the human voice. Our legislature has had a bill before it for sixteen sessions asking that music be added to the possible curriculum of the common country schools. Each year it comes in with a G-chord and goes out with a dirge. Courses in bull fighting and cooperative misdemeanor have the upper hand, and unless we can tax the sale of saxophones or radio sets, I fail to see where the solons will subsidize song with any alacrity. Plato simply didn't understand politics.

THERE are many "supreme goods" in music that *is* music. I do not pretend to classify the sheep from the goats in that respect, nor do I believe that anyone can prescribe music with certainty for anyone. It's like food. We must have plenty and let each man choose for himself, either by leaving the room or turning the dial.

Good music promotes good listening. I fear that we Americans are not usually good enough listeners. We get the habit when young and stick to it. Somehow one can hear and not listen when a person is talking, but there are few who can fail to listen when a favorite tune is played. Maybe if some of us husbands were more musical we could get a message over more frequently.

Good music is good medicine. That goes for more common ailments than melancholia and delirium tremens, too. If it doesn't keep the doctor away like apples, it compensates for his visits and soothes us when we get his bill.

Good music of the proper stirring kind arouses our patriotism out of the depths of our bread-winning. I recollect with freshness those evenings spent as a boy in the old Grand Army lodge hall. I presume the Southern lads gathered similarly in the Confederate headquarters. It matters not. Over in the corner beneath the draped battle flags reposed the fife, the drum, and the bugle. On occasions and under sundry partial and harmless stimulant, the wrinkled old-timers would pounce eagerly upon those instruments of fanfare. Albeit the tones were cracked and somewhat stringy, the flamboyant airs of the sixties ebbed into our being and gave us a picture of willing youth caught in the meshes of an irrevocable conflict. And on Memorial Day the slower, sadder strains came as a benediction on those who never returned to the old hometown.

Good music and good neighbors form an equation that does not yield such instant recognition or solution. It is here if anywhere that the tests of the alleged benefits and blessings of musical ability plus appreciation come to the fore.

If I were left to select my neighbor's instrument, perhaps it would be a guitar. Less real damage can be done with a guitar than with any other stringed instrument. You can hardly touch one without producing *some* harmony. Personally, I prefer to pay for my fiddling rather than to get it gratis over the neighborhood ozone. And some day when we get those central kitchens and community baths, et cetera, we may invoke the powers to provide us with a public practice room for embryo Sousas.

MY daughter's music teacher insists that music *should* train one in concentration and orderly mental qualities. This is easier to swallow for the pupil of tender years during the winter season than when the joy cries of the gang are heard on the hill at this particular time. But with a mother's firmness to fortify her, and her dad's strength of character as an inherited asset, I think she will pull through the recital fairly well.

Looking at her and some other troubled youngsters at their piano lessons, I envy the stolid and determined type of little Fauntelroys who persisted through the trying years to blossom forth on the church organ or the vaudeville stage.

Were I trained myself in the expressive art, perhaps I could help her over the rough places, but with me silence is golden, and lest I blunder or offend my only alternative is to exert the privilege of the uninitiated in the musical pun—I *refrain*.


## NO SUICIDES

"Why is it, Rastus," an old negro was asked by his employer, "that so few negroes ever commit suicide?"

"It's dis way, boss," replied Rastus. "When a white man gets in trouble and sets down to worry over it, he gets despret and kills hisself. When a nigger sets down he jus' goes to sleep."
—*Comfort Chat.*

---

A rookie in the cavalry was told to report to the lieutenant.

"Private Rooney," said the officer, "take my horse down and have him shod."

For three hours the lieutenant waited for his horse. Then, impatiently, he sent for Rooney.

"Private Rooney," he said, "where is that horse I told you to have shod?"

"Omigosh!" gasped the private, growing pale around the gills, "Omigosh! Did you say SHOD?"

---

Rag Merchant: Any beer bottles, lady?

Lady: Do I look as if I drank beer?

Rag Merchant: Well, vinegar bottles, lady?—*Staley Journal.*

---

## WRONG SPELLING

"Things that a fellow thinks don't amount to a darn sometimes pile up a mountain of trouble. Just the other night my wife was working a cross-word puzzle and she looked up and said: 'What's a female sheep?' And I said, 'ewe,' and then there was another big war on."

## PREPAREDNESS

An old maid went to have her picture taken and the photographer noticed her tying a piece of clothes line around the bottom of her skirt.

"What's the idea of that?" he asked. "I can't take your picture that way."

"You can't fool me, young man," said the old girl. "I know you see me upside down in that camera."—*Exchange.*

---

Jack: "How did you come to marry a girl you didn't particularly care for?"

Tom (gloomily): "I attribute it to the fact that she wanted me worse than I didn't want her."

---

## MY FLAME

A girl from out west of Saint Paul
Made a newspaper dress for a ball;
She made a great hit,
Till somehow she got lit,
And burned, funny section and all.
*M. I. T. Voo Doo.*

---

Two colored privates were discussing the relative merits of their buglers.

"Why, man, dat bugler of mah reg'ment am so good dat when he plays 'Pay Day' it sounds zactly lak de symphony orchestra playing 'De Rosary'."

"Hush yo' mouf, nigger. When Snowball Jones wraps his lips 'round his bugle an' plays de mess call, ah looks down at mah beans an' say: 'Strawberries, behave yo'self, you're kickin' de whipped cream out o' de dish'."

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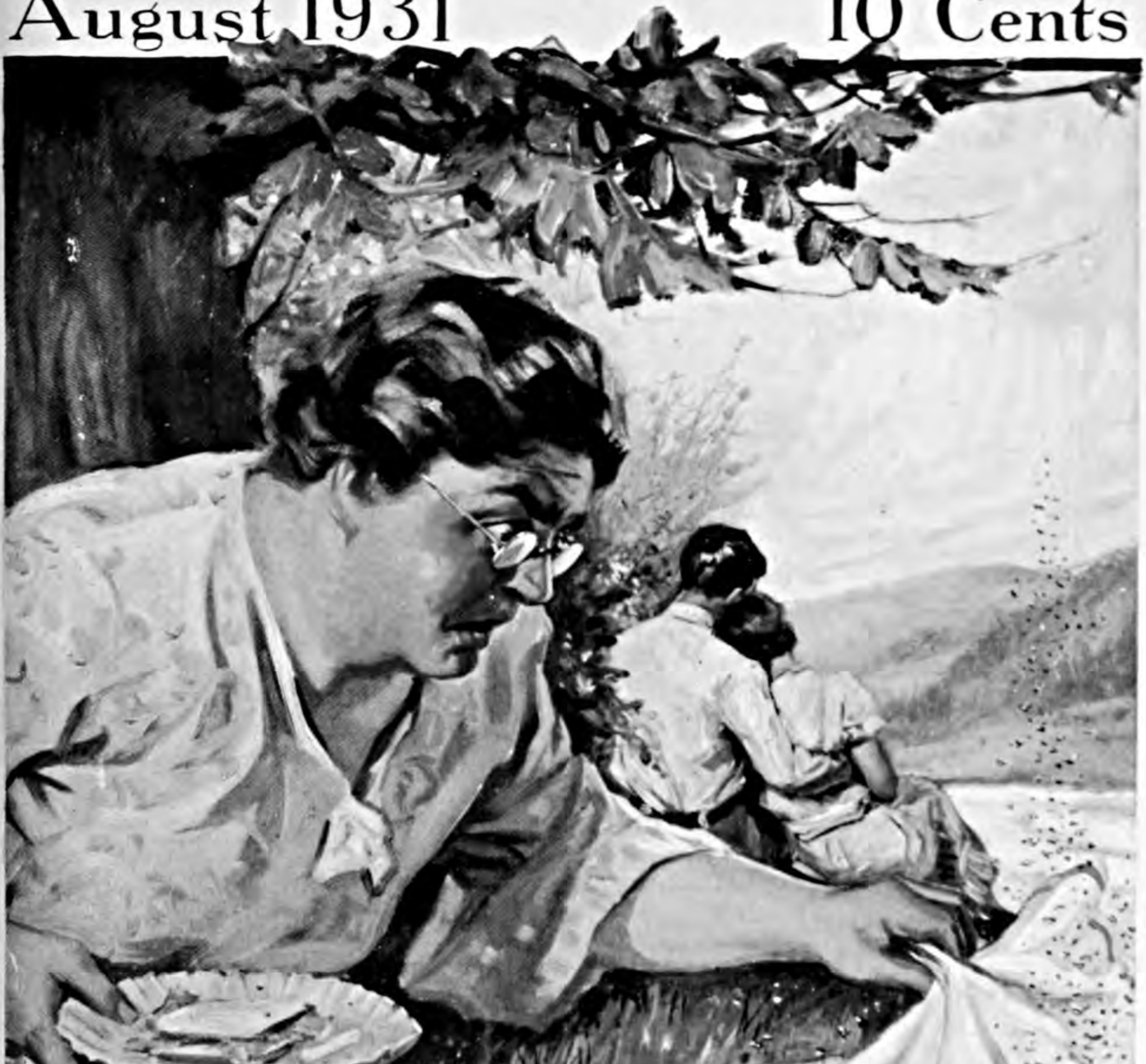

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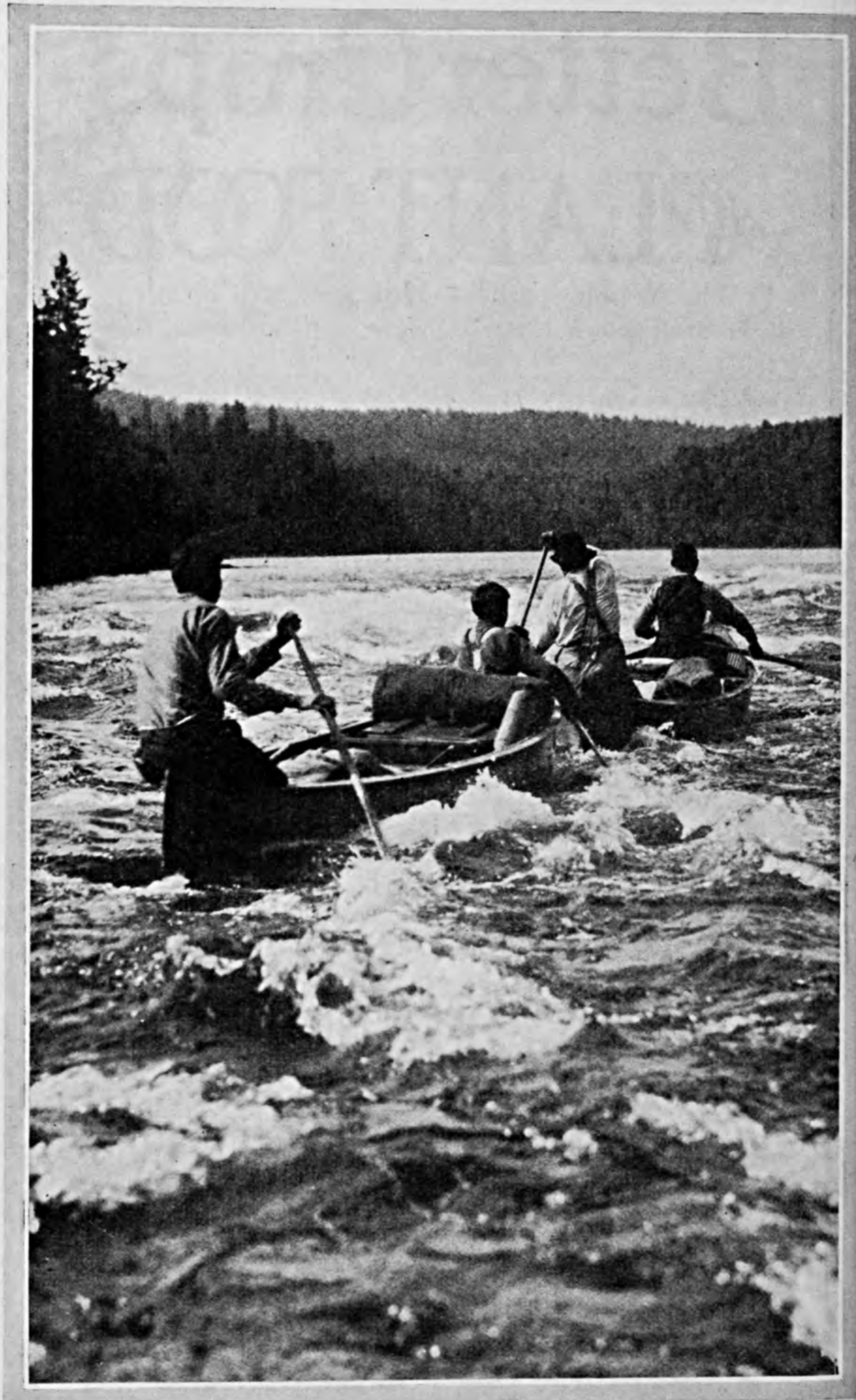

NATURE LOVERS FIND PLENTY OF THRILLS ON THE NIPIGON RIVER IN CANADA.

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*Jeff says we have them in America*

# SACRED COWS

*By* Jeff McDermid

NO matter how emaciated or weakened a bovine may become in certain Oriental lands, she cannot be touched with curatives or put out of her misery because her carcass is sacred and her legendary standing is too great for interference.

Strange as it may seem, we rural-minded folks in America have our own sacred cows, and to approach them with a trocar or a syringe, or perhaps a dose of Epsom salts, is considered a threat against all the laws of the prophets.

So we turn them along the public highway of figurative speech and let them become the victims of mischance or abuse by agencies radically opposed to the "milk" of human kindness that might be found in the flowing udders ultimately. Or else we let some person or group milk these sacred cows right in our own barnyards, and maybe hold the pails for them while they are doing it. Then they churn the lactic booty into butter for their own johnny-cake.

When the agricultural colleges were founded, the main theme of American agriculture was production, abundant, cheap, and profuse. Economical lands and growing population combined to hasten this theory, until the inventors of improved machinery and facilities caught up with the feverish farmers and showed them how to do more with less backache, and with fewer hired hands. Along with this movement for more food on the raw lands there came the indolent life of the metropolis, with large pay, more leisure, and much smaller appetites. The first speed forward soon felt the tempering effect of the second movement. Hence about a decade ago our colleges and farm leaders grudgingly admitted that the tune must be "production plus a profit," and when they failed to gauge the proper margin of profit as between the good and bad farmers, they fell back into the trenches with the slogan "stabilized production based on economy and market control." Here we find them today, a little bruised in battle, it is true, but hanging on with a determined confidence in the future —if nobody harms the aforesaid sacred cows or runs them too hard through the stinted pastures.

NOT so long ago a conference of farm leadership rallied at Chicago for a re-expression of support for the Federal Farm Board. Discussing details of that resolution or the causes for it is not herein proposed. It may or may not be a sacred cow of potential prepotency in agriculture. But in any event, the source of the trouble is not with the "head of the herd" but exists away down in the nether regions of the hinterlands, out in the far-off fields of local cooperation, out in the regions where the shibboleth of cooperation has become such a fetish that any corrective measures aimed at building true foundations are tabooed.

It is out where the rival leadership among the local ring-masters of cooperation keeps the whips singing around the ears of the confused proletariat, making them too timid or too prejudiced to swing into the general forward movement to make the utmost of the federal laws we possess already for farm organization.

It is not in Washington, D. C., or on the institute platforms that the reform movement will be accomplished to make the sacred cow of cooperation less an idol and more a producer. Those who aver that it is lack of cooperative education or cooperative mindedness which deters the national unity of thought and action in agriculture are only partly right. It is the stubborn provincial "meanness" and some local politics, glossed over with a modicum of sentimental reverence for the word "cooperation" which is hindering the Federal Farm Board and all other regional movements from coming to quick fruition.

IT exists in dairy organizations and in livestock shipping associations, and likewise in grain pools and other commodity marketing alignments. The reason is not so hard to find. Cooperation began as a local issue around some hamlet or trading center, some place with mutual assembling problems that grew in time to wider marketing vexations. Men with natural inclinations for bossing things assumed the rôle of leadership and direction as these movements grew.

The combination of personal power and political preferment went to their heads somewhat and they came to assume a proprietary air toward the community enterprises which they helped out at nativity. From the position of foster fathers they soon became guardians and Dutch uncles, pastoral heads of cooperative clans, jealous seers, and critical philosophers.

They criticised the early attempts of the colleges at getting on the bandwagon in the cooperative parade. They listened to Aaron Sapiro and other latter-day exponents of legal red-tape and judicial tactics, meanwhile keeping an eye on the cud-chewing bucolic bovine of their own home-raising—the sacred cow of the native pastures. They

(*Turn to page* 61)

# He Did It This Year

*After trying for 15 years, Cap'n Charlie Davis has succeeded in growing more than 100 barrels of early potatoes per acre*

*By G. Chalmers McDermid*

Windermere, Charleston,
South Carolina

Cap'n Charlie Davis says that potash did the trick.

WHAT a crop—10,807 barrels of potatoes from 107 acres, a yield of 101 barrels per acre! And it was made with a 7-7-10 fertilizer!

Now, good reader from the Northland, just keep your shirt on and listen to the rest of it. That's not much of a crop, maybe, for you folks who grow spuds in Maine, Pennsylvania, Wisconsin, Idaho, California, or some other potato States; but just ask any early potato grower from the Carolinas, Florida, Alabama, Mississippi, or "Loo Weezy Anna" whether or not he ever did it.

Cap'n Charlie Davis did it, down on Wadmalaw Island, near Charleston, on the South Carolina Coast—101 barrels of U. S. No. 1 potatoes per acre on 107 acres of good chocolate-colored sandy loam dirt. He'd been trying to make 100 barrels of "taters" per acre for his whole crop for 15 years, and this season his hopes were realized. But the real mean part of the whole works was that he made so little profit on the crop, because that old white potato market in early June was the

*Photo—Courtesy, Horticultural Division, Clemson Agricultural College*
**Cap'n Davis in one of his potato fields which yielded 143 barrels of U. S. No. 1 potatoes per acre.**

"orneriest" thing that ever was.

Cap'n Charlie was an old cotton planter before the boll-weevil came in, and he turned to potatoes because he found that he wasn't willing to divide his cotton crop in half—half for him and the other half for the weevil. Between Miss Patty, his good wife, and himself, they have managed to send three boys and three girls through college and the fourth boy is about ready to get his college course now.

To use the Cap'n's words, he'd been "messin' around" trying to find out why that good looking dirt wouldn't make more potatoes, and one day he, and his County Agent, and his fertilizer man got into a huddle, and figured out a fertilizer formula, doubling the potash. He made a trial of this analysis (7-7-10) and was "right well pleased." So well pleased was he, in fact, that the following February he ordered his whole fertil-

(*Turn to page* 54)

**Note the young corn crop in the potato alley at Cap'n Charlie's left foot. Most potato growers in Coastal Carolina make a splendid crop of corn following the early potatoes.**

# Fertilizing the Apple Orchard

*By R. D. L. Bligh, B. S. A.*

Dominion Experimental Station, Kentville, Nova Scotia

BORDEAUX mixture is made of a definite amount of lime and bluestone with a definite amount of water. These materials mixed in the right proportions make Bordeaux anywhere, anytime: all fruit growers know this. Many fruit growers think, or are tempted to believe, that orchard fertilization can be carried on by the same invariable formula, or because nitrogen increases the yield of fruit on trees in one orchard it will do so in all orchards in that neighborhood. Unfortunately these beliefs are not always true. The Bordeaux formula always works because it deals with inert materials which are always of the same chemical combination. But the soils in our orchards are not always the same in chemical constituents or alike in physical properties, and more important still, all apple trees are not alike even when growing in the same soil.

That is why sometimes an orchard fertilized with a nitrogenous fertilizer alone is extremely profitable or sometimes distinctly unprofitable. That is why Farmer Bill Jones swears by nitrogen only, and Farmer Bill Smith swears against nitrogen alone. Bill Brown, a neighboring farmer, scratches his head and wonders which is right. It is likely they are both right, but where does this leave Bill Brown? This is the problem that every farmer or fruit grower should solve for himself.

There are four ways in which fertilization may, at least theoretically, increase apple crops.

### *Four Reasons for Fertilizing*

1. By increasing the size of the apples so that it takes fewer to fill a barrel. The effect of fertilizer on size of apples is variable. With moderate crops there is apparently at times an increase in size accompanying fertilization but this will never double the yield. Again fertilization may increase the set to such a point that the apples if left to maturity are smaller. In such cases thinning is the recommended practice to enhance the size and color of the fruit.

2. By increasing the percentage of "set," so that though the number of blossoms is not increased the number of apples are. The effect of fertilizers, particularly nitrogen, on set is very marked, especially on distinctly weak trees. An increase from 5.3 barrels on unfertilized to 14.39 barrels on fertilized trees over a period of 18 years has been recorded. To secure such benefit the fertilizer should be applied at the rate of from 2 to 4 pounds of a quickly available nitrogenous fertilizer per tree that is of good bearing age, 10 to 14 days before the trees are in full blossom. Applications of fertilizers on the "off year" to affect a set are of questionable use; applying fertilizers to increase the set is a temporary stimulation only. More trees will show evidence of response to this method of

fertilization than in any of the other three, but unless this method of stimulating the tree and thereby increasing the set is augmented by some other fertilizer application to build up a bigger and better tree, it will eventually fail to respond to even this method.

3. By increasing the frequency with which the various spurs on the tree form fruit buds. In the majority of our mature orchards no great benefit can be expected from increasing the frequency of fruit bud formation on the older spurs. Even in very weak orchards the trees continue to blossom in alternate years and even after several years of fertilizing, their performance remains the same. It is difficult to change the fruiting habits of varieties such as Wagner and Baldwin which are almost persistently biennial croppers.

4. By making a bigger and better tree with more spurs on which blossoms can be borne:

(a) As the trees grow older, even in good soil they tend to make less terminal growth.

(b) The less terminal growth made this year, the less room there will be next year for formation of new spurs to bear the following year and to replace the wastage of the older spurs.

(c) Without this new growth and new spur formation the tree may continue fruitful for a while but will hardly hold its own in yield and will go down sooner or later.

(d) The effects of fertilization are evident more often in stimulating this new terminal and new spur growth than they are in stimulating the old spurs.

(e) This effect cannot be translated into fruit for at least three years, but once the additional frame work is established it is a permanent ground while the effect in set is but temporary.

### *How Measure Fertilization Effect*

Therefore, from this we learn two lessons in orchard fertilization. In considering the advisability of orchard fertilization or in measuring its effect watch: first, the set of the blossoms, and second, the formation of new fruiting wood. If these are both satisfactory where no fertilizers have been used, the money set aside for fertilizers can be invested elsewhere to better advantage.

If the shoot or terminal growth in your mature orchard is long enough so that each terminal of last year's growth forms two to six new fruit spurs, the grower can feel rather satisfied. The chances are very strong in trees of this kind that the old spurs are doing all that can be expected of them. If they are not, attention to pruning rather than to more fertilization is necessary. If new spurs are not appearing you can use your money on fertilizers in hope of getting good returns. Fertilization for wood growth is as good one year as another.

Some orchards up to standard in other respects, i. e., growth, bud formation, and bloom, may still have the set profitably increased by application of a quickly available nitrogenous fertilizer. It is better to have some excess to be "thinned off" than to have a poorly distributed load. If they fall below this standard, fertilization in the blossoming year is advisable.

### *Age of Tree Must Be Considered*

One other aspect of fertilization should be considered, age of tree. Many trees which now respond markedly to fertilization, showing need of it in three distinct ways, have in former years been productive without it. The age of the tree makes a great difference in its requirements.

Trees in sod are much more likely to repay and to require fertilizers. To no little extent nitrogen-carrying fertilizers act as substitutes for cultivation.

It is doubtful if they would serve as substitutes for cultivation in soils subject to drought.

In many orchards so situated as to dispense with cultivation for a few years at least, using fertilizers is a cheap substitute, and at the same time,

With the fertilization the same on all cultural plots, the largest average annual yield was obtained on the sod-strip plot.

in some measure, secures the high colored fruit, that characterizes sod-grown trees. Before ordering fertilizers look at the trees rather than the soil. Where fertilizers are needed, apply around the tree and out slightly beyond the tips of the branches.

### *Consider Plant Food Requirements*

The successful orchardist must consider the food requirements of his trees as a stockman considers the rations for his stock. He must provide for growth and maintenance of the trees as well as provide, in addition to these, the fertilizer necessary for the annual production of fruit.

Nature may materially aid in this fertilization if the orchardist's efforts are directed in the right channels. The action of soil bacteria on the humus or unavailable forms of plant food, particularly the unavailable surplus of nitrogen, changes them to nitrates, the only form in which nitrogen can be taken up by the plant roots. Nitrification requires a warm and well-aerated soil, hence nitrification is not possible in very early spring when the ground is wet and cold.

Science has given us some general principles which may materially assist us in understanding and probably reducing our fertilizer bills.

Briefly, they are as follows:

(1) Correct balance between nitrogen,carbohydrates, and moisture to get vegetation and fruitfulness.

(2) Nitrogen and moisture without a balance of available carbohydrates results in unfruitfulness.

(3) Abundant nitrogen and available carbohydrates give increased vegetation and unfruitfulness.

(4) Lack of nitrates without available carbohydrates results in unfruitfulness.

That is, we must have available carbohydrates and moisture but not an over-abundant supply of nitrates if fruitfulness or vigor are to be obtained. And these must be in the right proportion, of 4-2-1, or 4 lbs. nitrogen, 2 lbs. phosphoric acid, 1 lb. potash. In short it is not so much the absolute amount of each fertilizing element present that counts as their proportion to each other.

### *The Importance of Moisture and Nitrogen*

Nitrogen must be taken up by apple trees in the form of nitrates and always in a water solution. This shows the importance of moisture.

Nitrogen promotes development of stems, leaves, branches, etc., demanded largely during the active vegetation period. Deficiency of nitrogen is shown by the following symptoms:

Pale green or yellow foliage.

Bright red colored foliage in dry weather denotes nitrogen starvation.

Bright red colored foliage in autumn denotes nitrogen starvation.

Light brown or reddish colored bark on two- or three-year wood denotes nitrogen starvation.

Weak growth of terminals denotes nitrogen starvation.

The average Annapolis Valley orchard soil analyzes .1 to .2 per cent nitrogen, which is low. Some may reach .5. Marsh soils may go over 1 per cent, while in some orchard soils in Colorado the nitrogen content is around 5 per cent.

Carbohydrates are complex substances consisting of starches, sugars, gums. These are made up of carbon, hydrogen, oxygen in varying proportions. Carbohydrates are manufactured by the leaves of the tree from the constituents nitrogen, phosphoric acid, and potash entering the roots in solution and from carbon dioxide taken in by the leaves from the air. Any excess of carbohydrates above what the tree needs for immediate consumption is stored in the form of starches in the portion of the tree close to the leaves which manufactured it. That is, the healthy tree has usually stored within its tissues a reserve supply of carbohydrates.

Nitrogen may be stored in limited quantities but the tree in the spring looks to the soil for further supply of this element. In our apple tree, then, we may have:

(1) A limited reserve of stored nitrogen,

(2) Possibly a good reserve of stored available carbohydrates, and

(3) Usually a sufficient supply of soil moisture. And as we have pointed out, as nitrification of the unavailable supply of nitrogen is slow in the early spring, we should endeavor to balance our carbohydrates and moisture by a little more quickly available nitrogen at this time, not only to aid in fruitfulness but to supply nitrogen for the rapid development of the leaves so that they in turn may get to work on their annual function of making and storing carbohydrates.

Applications of nitrate after nitrification has commenced may upset balance and produce winter-killing.

### *The Role of Phosphoric Acid and Potash*

Phosphoric acid, or $P_2O_5$, promotes root development, seed development, and fruit development. The average soil analysis is .15 or .25 per cent. Soils falling below .15 usually give a response to its application.

Potash ($K_2O$) is essential to fruit production in that it aids in the formation of carbohydrates, that is, starches, sugars, etc. Potash also aids in the production of proteins. Analysis of bearing or fruiting apple spurs show them to contain a considerable amount of potash, whereas non-bearing spurs show only a trace. Average soil analysis, .25 to .5 per cent. Soils falling below .15 per cent respond.

Lime is important in the process of nitrification in the soil and is essential in the production of leguminous cover crops, but with our tests with apples has not proved beneficial in increasing the apple crop.

### *Drainage Is Essential*

It is quite possible that under certain conditions and proper soil management that one or two or all of these elements, nitrogen, phosphoric acid, and potash, may be supplied by nature from the soil and air to meet the full requirements of the fruitful apple tree, but unfortunately there is no accurate way at present by which this can be determined.

### *Solving the Problem*

We have, at Kentville, made a determined effort to solve some of these problems as to the fertilizer requirements of apple trees, but find so wide a variation in production of individual trees under same treatment due to some factors other than in the fertilizer supplies, that it is difficult to make many definite recommendations.

We have, in our orchard fertilizer experiments started in 1912, variations in yields from plots receiving the same fertilizers that are very conflicting. For instance, with plots 1 and 16, each of the same varieties receiving the same fertilizers (150 lbs. nitrate of soda, 350 lbs. superphosphate, and 150 lbs. muriate of potash per acre) applied on the same day each year, and receiving the same cultural treatment each year, yet plot 1 has given a total yield since planting of 319.69 barrels, while plot 16 has yielded 777.06 barrels per acre. These plots are not 300 feet apart. I ask you what is the cause of the variation? The trees are thrifty and vigorous and apparently normal. But there are some factors affecting the yields of these trees that we are unable to explain. We think it due most likely to the variation in the type of rootstock upon which these trees are propagated.

Again, in our limed plots where ground limestone has been applied at the rate of two tons per acre, five applications being given since 1916, usually one application each three years, the limed trees show a slightly greater tree diameter, but the unlimed plots have outyielded the limed plots by 0.19 barrel per tree over a period of 18 years. In this orchard, .19 barrel for 54 trees per acre equals 10.26 barrels more apples per acre, which at \$2 per barrel tree run equals \$20.54. The 10 tons of limestone at \$4 would amount to \$40 and the cost of applying it at \$2 per ton would make an additional \$20, making a total of \$60 expended, for which we received \$20.54 less apples in the total yields.

During the first 10 years of this orchard's growth there was practised a three-year rotation, potatoes, wheat, and clover hay, when the yields from the limed plots particularly of clover hay were much greater than those from the unlimed plots. This clover hay was harvested and removed as hay. Had it been left to be returned to the orchard soil as a green manure in building up and maintaining the humus content of the soil, the results might have been different, but the fact remains that the better growth of an aftermath and the better clover sod, both rich in nitrogen, were returned to the soil and in spite of this the apple yields on the limed plots were not augmented.

A view of the Experimental Farm Orchard at Kentville, Nova Scotia.

The series of tests on the source of nitrogen for apple tree growth and fertilizers was started in 1927 in an orchard set in 1912 and was conducted with the varieties Baldwin, King of Tompkins, with Wagner fillers. The trees are set 40 x 20 feet. Duplicate plots in both the Baldwin and King's blocks make quadruple plots of each test. All plots except the check received a blanket application of two pounds of superphosphate and one pound of muriate of potash per tree, The nitrogenous fertilizers were applied in proportion to the nitrogen content. All plots received exactly the same amount of nitrogen per tree. These fertilizers were applied, regardless of their composition, about mid-May. The results to date covering four years are given in Table I.

**Table I—Source of Nitrogen for Apple Tree Growth and Fertilizers**

| Treatment | Total yield four years per tree (bbl.) | (bbl.) per acre | Cost of fertilizer |
|---|---|---|---|
| Nitrate of soda 5 lbs. | 6.595 | 356.13 | 38.32 |
| Nitrate of lime 5 lbs. | 6.50 | 351. | 37.92 |
| Cyanamid 3½ lbs. | 5.87 | 317.25 | 29.52 |
| Sulphate of ammonia 3¾ lbs. | 5.36 | 289.44 | 29.78 |
| Check | 5.23 | 282.82 | ..... |
| Superphosphate 2 lbs. Muriate of potash 1 lb. | 4.86 | 262.44 | 8.10 |

In the study of these results, which are not conclusive, the indications are that the nitrogenous fertilizers that are in the nitrate form are the better to use. Both nitrate of soda and nitrate of lime have given in this test better results than the other nitrogenous fertilizers. Had the cyanamid and sulphate of ammonia been applied at an earlier date so that the nitrogenous compounds would have had a chance to disintegrate prior to the bloom period, the results might have been different. However, other investigators have reported that they have found nitrate of soda, sulphate of ammonia, and cyanamid in the order named effective in increasing the total nitrogen content of fruit spurs on trees that are fertilized annually.

### *Potash Increases Apple Yields*

From Table II it will be observed that potash has been a factor in increasing the yields of apples harvested, and these increased yields, with one exception which can be accounted for by a favored soil condition, have been in direct proportion to the amount of potash applied.

Previous to the World War potash was one of our standard orchard fertilizers, but during the years of strife with Germany, who is the world's chief exporter of this material, our supplies were cut off and we did without potash in our apple orchards without any apparently very harmful results. This was probably due to our method of orchard fertilization for some years prior to the World War.

In those days some orchardists were using barnyard manure, others com-

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**TABLE II—EFFECTS OF POTASH ON APPLE TREE YIELDS. VARIETIES: GRAVENSTEIN AND WAGNER. TREES SET IN 1912.**

| Plot. | How Fertilized, pounds per acre | Av. yield per tree since planting: Gravenstein | Av. yield per tree since planting: Wagner | Average yield per tree, two varieties | Yield per acre since planting: Total | Yield per acre since planting: Annual | Total cost of fertilizer | Value of apples, $2.00 tree run | Value of apples less cost of fertilizing |
|---|---|---|---|---|---|---|---|---|---|
| | | bbls. | bbls. | bbls. | bbls. | bbls. | $ | $ | $ |
| 16 | N*, 150; P*, 350; K*, 150 | 16.44 | 12.34 | 14.39 | 867.06 | 48.17 | 174.40 | 1734.12 | 1559.72 |
| 5 | N*, 150; P*, 350; K*, 100 | 12.86 | 9.18 | 11.02 | 595.08 | 33.06 | 158.70 | 1190.16 | 1031.46 |
| 9 | N*, 150; P*, 350; K*, 60 | 11.43 | 8.00 | 9.61 | 518.94 | 28.83 | 146.14 | 1037.88 | 891.74 |
| 13 | N*, 150; P*, 350; K*, 30 | 10.97 | 5.00 | 7.88 | 431.46 | 23.97 | 136.42 | 862.92 | 726.50 |
| 24† | N*, 150; P*, 350; K*, 0 | 14.29 | 5.02 | 9.66 | 521.46 | 28.97 | 127.30 | 1042.92 | 915.62 |
| 15 | K*, 150 | 10.38 | 5.00 | 7.24 | 400.96 | 22.28 | 47.10 | 801.92 | 754.82 |
| 14 | Check | 5.77 | 4.83 | 5.30 | 286.20 | 15.90 | ..... | 372.40 | 372.40 |

† This plot has a favored soil condition.
* N—nitrate of soda

* P—superphosphate.
K—muriate of potash.

# Taking Time Out *for* Recreation

*By Jerome J. Henry*

National Broadcasting Company, Inc., Chicago, Illinois

CALVIN COOLIDGE advised us to take a vacation this summer, and suggested the action as an aid to brushing the cobwebs off prosperity.

Maybe he's right. The truth is there may be a good many ways a vacation might be used and remembered as more than an idle holiday.

Particularly fortunate, for instance, are those of us who love the soil and have a chance to vacation among the trees and wild life good old Mother Nature supports. Along about this time of the year agricultural teachers, county agents, and "cow college" faculty members often think more of the fish pole than they do about liming campaigns and test tubes.

But either is a worthy adventure, and what better time is there for constructive thinking than early morning along a cool trout stream?

A vacation in the woods, a drive through some farming section, or camping along a favorite fishing stream or lake gives one a fine chance to view, and estimate, the value of our resources, and also reflect upon the damage already done by short-sighted interests.

Did you ever view a hillside half washed away; or perhaps a field where heavy rainfall has taken a fresh alfalfa seeding down into a ravine? These are examples of destruction which might have been averted if trees had been left standing on some of the less productive soil only fit to raise trees.

And it is the agricultural leader who can best use his ideas toward improving the existing conditions. To him a well-planned jaunt may result not only in refreshment but also in ideas that are really constructive.

Few people in this day and age disbelieve the theory that farmers should enjoy an annual vacation. They too may spend it in the great out-of-doors, probably accompanied by the county agent, Smith Hughes teacher, or extension worker. What better opportunity is there for one to learn to understand the other? And what better chance for both to look into

The Great Outdoors—Forever Inviting.

*Photo—Courtesy, Wisconsin Conservation Commission.*

**Scenes to remember! Overhanging rocks clinging in their positions—resisting for years and years the slow but never-ending wear of the waters.**

existing conditions of forests, streams, wild life, and other resources.

Let's suppose a group of farm families together with some agricultural leaders are enjoying a fishing trip near some favored spot in the North woods. When darkness falls and even the music of birds ceases except for the occasional owl or whip-o'-will, a huge campfire stimulates conversation that probably would never otherwise be revealed.

Such a setting is indeed fitting for thoughts and words having to do with the conservation of the splendid resources of trees and game, and also probably, at the same time, helping to make the farming industry more profitable.

Efficiency in farming often means getting the most out of every good acre. Can this be possible so long as everyone is interested in the number of acres available for agriculture rather than the use of good land properly fertilized?

Proper fertilization of land for forests, then, is closely related to the use of land for agriculture. Furthermore, it may result in greater efficiency and protection from one of the most devastating factors in American farming, soil erosion.

It is estimated that only about 40 per cent of the original forests in the United States remain, and that the existing timber is being used at a rate four times as great as unaided nature can restore it. Forest fires also contribute immensely to the destruction. Like a red demon eating everything in its path, fire spreads havoc not only to trees but also to game and streams.

But that's not all. Another silent destroyer of our resources, and one which is more quickly felt, soil erosion, is aided every time trees are cut down. Washing fertility from tens of thousands of acres down into the Gulf of Mexico each year, soil erosion damages close to three quarters of the farms in the United States. In terms of dollars the resultant loss divided equally among all the farmers in the country amounts to a very appreciable figure.

Reforestation is one of the most effective ways of curbing this difficulty. Coupled with systematic cropping and pasturing, this method would relieve a great percentage of the loss.

Driving through many farming sections the losses due to erosion can be easily seen. And the remedy is indeed a pleasant one, we agree, while we're sitting around the campfire recounting stories of Paul Bunyan and the winter of the blue snow, or perhaps, having some difficulty with getting the trout cooked on more than one side before the fire burns low. Reforestation, then, is not only a way to profits but also to pleasure and stability.

Yet there are those who say that trees are not a profitable crop, and they present the argument that, if they were, commercial lumber companies would grow them on a large scale. How unreasonable is this contention when one stops to think that much of the 200-million-dollar annual loss due to erosion might be stopped by reforestation and, in addition, the trees would in time give returns not to be slighted. Too, some lumber concerns have undertaken reforestation projects and have seen fit to treat the crop with as much care as science dictates should be given wheat, corn, and livestock. Even to the point of fertilizing nursery soils with commercial plant foods has this undertaking gone.

Let us imagine, if possible, that the greatest percentage of soil erosion on our farms is under control. According to the beliefs of many foresters, extension specialists, and other agricultural leaders, farming practices could be greatly improved were it not for this robber of plant foods.

Commercial applications of nitrogen, phosphoric acid, and potash could be made with much less precaution and greater profit since, without erosion dangers, much of it could be depended upon to enter the tiny root hairs of the farm-crop plants.

Soluble mixtures of commercial fertilizers might be applied in larger amounts with better assurance of highest possible returns, say soil specialists.

Unlike taking medicine, the remedy for soil erosion is indeed pleasant. Love of the outdoors and character

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*Photo—Courtesy, Wisconsin Conservation Commission.*

**A paradise for the angler is this walled-in spot on the St. Croix river in northwestern Wisconsin.**

# Getting Ready *for the* Fair

*By E. N. Bressman*

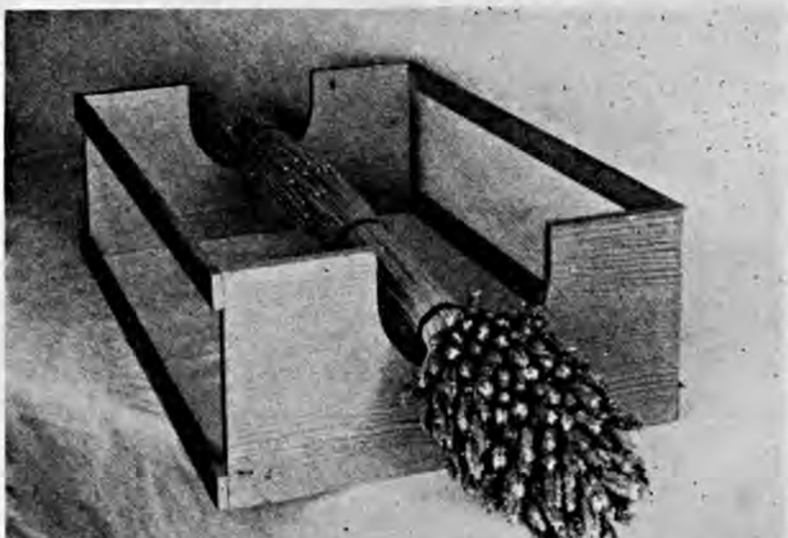
Associate Professor of Farm Crops, Oregon Agricultural College

GROWERS who exhibit their products at the various county, State, and local fairs are among our very best farmers. They are interested not only in going to the fair but also in taking an active part by having some of their best products judged. More than a decade of experience has taught me that these observations are true, and in addition I have been able to obtain many pointers in regard to the showing of crop products. I have judged products of all kinds at more than 100 different fairs, and the experience has shown me that many exhibitors have failed to observe some minor detail and have, therefore, lost both a ribbon and a premium.

Growers who have a county agent in their county are fortunate, for they are able to consult their agent in regard to the details of showing products. If there is no agent present, the grower should get a premium list from the fair and study it thoroughly. Many awards do not receive prizes because they do not conform to the rules of entry. Help may also be obtained from the agricultural colleges. For example, the Extension Service of the Alabama Polytechnic Institute at Auburn, Alabama, has a very interesting circular with the title, "Fairs." Growers, particularly those in the South, may get much of their information from this bulletin. It contains not only information on field crops, but such a varied assortment as vegetables, fruits, nuts, meats, lard, foods, clothing, art work and livestock.

Most fairs request a certain size of exhibit. If they do not the usual exhibit includes three specimens of the larger vegetable crops, such as pumpkins, cabbages, and melons. The smaller vegetables such as onions, parsnips, carrots, and sweet corn are made up of six specimens.

Fruit is usually exhibited as plate samples. These plate samples usually consist of five specimens for such things as apples and peaches. Smaller fruits require 10 specimens.



A mold facilitates the work of making a grain sheaf.

This refers to things such as prunes and nuts. Berries are often exhibited in pint boxes or a pint specimen is put out on a plate.

As a rule most fairs require a 10-ear corn exhibit and the small grain specimens usually consist of one peck. The requirements on sheath samples differ greatly, but as a rule fairs of any size require three sheaves. This matter of size or number of specimens to include in an exhibit is of importance and is one that is too often overlooked by the grower.

These are good forage sheaves—alsike clover, red clover, Kentucky bluegrass, and redtop.

If the exhibit conforms to the requirements of the fair, then it is judged from many different standpoints. Some of the factors which are applied to nearly all exhibits are shape, size, condition, uniformity, and quality. One of the most important requirements is condition. If an exhibit is not in good condition and free from disease, it has little chance of receiving an award. Some of the common faults of exhibits are mechanical injury to potatoes, scab of potatoes and apples, smut of the grains, mold on corn, and insect blemishes on the various vegetables.

### *Quality Counts*

Size is very often over-done in most exhibits. It is not size that counts, but quality. Many times the large, over-grown exhibits are extremely poor in quality and are not considered for premiums. Exhibits should be of medium size and typical of what is grown in the community. More emphasis should be placed on quality and condition than large size. It is true that small, under-sized exhibits are not typical of a locality and should not be entered.

In all of my experiences of judging, I find that the most common defect is lack of uniformity of specimens. Take corn, for example. When a 10-ear sample is required, the judge hopes to find 10 ears of corn as nearly alike as possible. This indicates to him that the grower has a large quantity of this type of seed. Many growers will pick 10 good ears without consideration for the uniformity. Individually each of the ears may be excellent, but collectively they vary greatly in size, shape, breadth, indentation, color, and type. If three pumpkins are exhibited they should be as nearly alike in general type, size, and shape as possible. This applies to all exhibits, and it appears that it is one of the hardest factors for the grower to get right.

Threshed grain should be pure for the variety and free from all objectionable foreign material such as weed seeds and dirt. Small seeds such as clover and alfalfa should by all means be free of noxious weeds, such as dodder, Canada thistle, and quack grass. Clean, bright samples go a long way in indicating to the judge the samples of seed are of good germination ability and are of this season's crop. Practically all exhibits require that the specimens be produced during the cur-

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# *The* Inquiring Mind *and the* Seeing Eye

*By Dr. A. S. Alexander*

University of Wisconsin

NEW YORK CITY and State owe much to the able and enterprising men who emigrated from Holland.

Ever since September 3, 1609, when Henry Hudson, in the employ of the Dutch India Company, sailed into New York Bay, in the *Half Moon,* and the founding of the Netherland Company by merchants of Amsterdam, various "Vans" have been prominent in the business and political affairs of the New Amsterdam they established in 1626 and which, later, became New York City.

Van Rensselaer, Van Twiller, Van Dam, and Van Buren were famous names among the Dutch celebrities of those early days. Later, the name of Vanderbilt became noted, and today one finds many a "Van" rendering eminent service in our universities and agricultural colleges and experiment stations. Of these we have chosen Dr. Lucius Lincoln Van Slyke, agricultural chemist of the New York State Agricultural Experiment Station, Geneva, N. Y., as the subject of this month's biographical sketch.

### *Turned to Chemistry Early*

That eminent scientist was born at Centerville, Alleghany county, N. Y., January 6, 1859. He is descended from a Holland family which has been in America for 250 years and associated with agricultural pursuits for several successive generations. His great grandfather was a soldier in the War of the Revolution.

After spending his boyhood days in Pike, Wyoming county, N. Y., and preparing for college in Pike Seminary, the great chemist-to-be studied in Michigan University, where he was given his A.B. degree in 1879, and then taught for a year in Pike Seminary. Returning to Michigan University, he majored in agricultural chemistry, gained the A.M. degree in 1881, and in 1882 was made Doctor of Philosophy.

### *Opportunity Came in 1890*

The experience he then gained was wide, unique, and a valuable preparation for what was to be his life's work. After acting as an instructor in chemistry at Michigan University, from 1882 to 1885, he served as professor of chemistry and Government chemist in Oahu College, Honolulu, from 1885 to 1888; then he returned to Michigan University, and for one year was a lecturer in agricultural chemistry. In 1890, came the real opportunity of his life, when he was appointed chemist of the New York Agricultural Experiment Station, N. Y., where he served with distinction until 1929.

Under the affiliation arrangement between the Geneva station and the State College of Agriculture, he was likewise professor of dairy chemistry at Cornell University, Ithaca, N. Y., from 1920 to 1923, and under the new administrative merger of the two institutions, a member of the graduate school faculty of the University. During the year preceding the appointment of Dr. H. H. Jordan as the Director of the New York Agricultural Experiment Station 1895-6), Dr. Van Slyke served as acting Director, and inaugurated many systems for clarifying and regulating the business procedures.

Dr. Van Slyke's work at the New York Experiment Station has included several different lines, in addition to the investigation of dairy problems. He has had charge of the inspection analysis laboratories of the State ever since their establishment. The food analysis laboratories are elsewhere, but all analyses inspections, connected with the operation and enforcement of the State feeding stuffs, fertilizer, insecticide, and fungicide laws, are made at the Geneva experiment station. Dr. Van Slyke has had a large part in forming and interpreting these laws, and has been continuously in charge of the analytical service necessary to their enforcement. A large part of their success has been due to his painstaking and intelligent management of this part of the State's activities.

DR. LUCIUS LINCOLN VAN SLYKE

He has also been an active member of the Association of Official Agricultural Chemists, has served often as one of its referees, and once as its president. He is a Fellow of the American Association for the Advancement of Agricultural Science, and was president of the New York State Dairymans' Association, in 1897.

His son, Dr. Donald Dexter Van Slyke is one of the leading biochemists of the present era.

From an appreciation written by Dr. R. W. Thatcher, at that time Director of the New York Experiment Station, and now president of the Massachusetts Agricultural College, published in *Industrial and Engineering Chemistry* of November 1925, we learn that all of Dr. Van Slyke's work in this country has been in research; therefore he does not have a host of former students to remember his personal touch in their lives; but his many contributions to the literature of agricultural chemistry have made him known professionally to multitudes of scientist readers. His publications include 54 station bulletins of 1,926 pages on dairy research; 5 bulletins of 132 pages on the preparation and chemistry of spraying materials; 2 bulletins of 28 pages on experiments with fertilizers for potatoes; 2 bulletins of 58 pages on experiments in testing sugar beets; 1 bulletin of 55 pages on the chemistry of home-made vinegar; 63 bulletins of 2,858 pages on inspection of fertilizers, feeds, and insecticides, and 3 circulars of 27 pages; or a total of 130 publications, of 5,084 pages.

He has also contributed many instructive articles to scientific journals and published several standard textbooks, including *Modern Methods of Testing Milk and Milk Products,"* *"The Science and Practice of Cheese Making"* (with C. A. Publow), *"Fertilizers and Crops,"* *"Cheese"* (with Price), and a contribution to Allen's *"Commercial Organic Chemistry."*

### *Special Interest in Fertilizers*

It would seem from his publications that Dr. Van Slyke has taken special interest and pleasure in his work relative to fertilizers and crops. His conclusions regarding the various phases of those subjects show deep insight, and practical knowledge of their utilitarian importance. After his long years of research work in this connection, and granting that our knowledge of the functions and proper use of fertilizers has been largely increased during the past generation, as the result of experimental investigation, and that even more rapid advances are now being made, he has frankly confessed that there is yet no simple way of determining, beyond doubt, when and how best to use fertilizers in crop growing. He considers the conditions involved so complex that they do not usually permit any reliable short-cut method of reaching satisfactory conclusions. In seeking to arrive at them, one must carefully and exhaustively consider the conditions under which fertilizers should be used, the specific constituents of plant food needed, the amount of each fertilizing constituent needed, the forms in which it is best to supply plant-food constituents, the facts about commercial fertilizers and home-made fertilizers, methods and seasons of applying fertilizers, and crop rotation in relation to the use of fertilizers and plant-food mixtures for different crops. These, and related subjects, are interestingly and instructively discussed in his book *Fertilizers and Crops.*

From what Dr. Van Slyke has written, it is evident that scientists have as yet touched only the rim of the crop growth and fertilizing problem; therefore, the rising generation of research men need not worry that the "old fellows" have left little for them to do. The scope for research remains illimitable.

Dr. Van Slyke believes that the present appears to be preeminently a time of flux and transition. Especially is this true in regard to the theories of soil fertility and soil infertility. He says that a theory is simply a proposed explanation of an observed fact or set of facts, and that theories usually change with the accumulation of new facts. Let the younger generation seek for these facts.

He is of the opinion that farmers who purchase fertilizers blindly, on the sole basis of the hope of obtaining larger crops and greater net income, inevitably run the risk of throwing away money by buying what may not give good commercial returns, due either to applying constituents not needed, or to the application of needed materials under conditions so abnormal as not to permit of proper utilization. Much work remains to be done that the farmer may be confidently and correctly guided in making his purchases of fertilizers and in the intelligent application of them to his land.

### *Fertilizers Are Not Mere Stimulants*

It is well known that commercial fertilizers, whether complete or in the form of unmixed materials, are often regarded as stimulants, injuring the physical qualities of the soil, as well as leading to more rapid exhaustion of plant food. Relative to this subject, Dr. Van Slyke has said that commercial fertilizing materials are not mere stimulants, but contain genuine plant-food constituents which will promptly manifest their beneficial action, when given a fair chance.

His conception of a real soil stim-

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Mr. Masino's son showing one of his customers a quality green specimen. The four acres of cucumbers can be seen in the background.

# Quality Cucumbers

*By L. J. McDonald*

Agricultural Agent, Chamber of Commerce, Henryetta, Oklahoma

IT has taken Delfino Masino several years to learn how to grow a quality green cucumber, but at last he has mastered the art to his entire satisfaction. He says, "4-8-10 fertilizer and good seed tell the story."

Mr. Masino, at one time mined coal in the Henryetta fields, but when coal consumption declined and work was scarce, he turned to other activities to provide a livelihood. He purchased a small tract of bottom and semi-bottom land and started growing truck. A pond was built and irrigation practiced to some extent. Yet his yields were not satisfactory. Finally he was induced to try commercial fertilizer, and after three years experimenting has concluded that 4-8-10 puts the quality in all of his products. The fame of "Masino-grown" products has extended many miles and has built a ready market. His two-ton truck makes regular trips to Tulsa and to the Kansas City markets.

Mr. Masino depends upon a large variety of seasonal crops to supply his trade, but realizes most profit from his mid-season plantings. Tomatoes, squashes, cucumbers, okra, egg plants, sweet peppers, and cantaloupes are his best money makers. This year, when the season was only half over, he had already harvested more than 400 bushels of cucumbers from four acres. It is a common thing for the cucumbers in one of his baskets to average 10 to 12 inches in length and quality from one end to the other. He often uses as much as 500 lbs. of 4-8-10 and always secures a good yield.

"Pure seed, a high-analysis complete fertilizer, and frequent cultivation are necessary for quality vegetable production," according to Mr. Masino.

# Why Raise Food *for* Bugs?

*By C. H. Brannon*

Extension Entomologist, North Carolina State College

FEW people realize the enormous tax collected by insect pests. We hear a great deal of talk about taxes these days, but American people demand a certain standard of living and it is difficult to reduce taxes; on the other hand taxes must be continually increased to meet the demand of higher standards of living. Insect pests collect a tax of well over $2,000,000,000 each year in the United States. This tax is used for no good purpose; it builds neither good roads, schools, nor parks. This tax money is absolutely destroyed at the expense of the American people.

### *These Taxes Can Be Reduced*

Something can be done about the $2,000,000,000 tax collected by insect pests. We are asleep at the switch. If we continue, tragedy may be the result. It is the purpose of this article to arouse American agricultural interests to consider insect pest control more seriously; to include insect control as a regular part of the crop system. We are in the habit of taking a chance; of humbly accepting what the bugs leave. Can we construct sound farming on such a basis? We talk of relief. Who can help us until we make an intelligent effort to help ourselves?

The cotton boll-weevil causes an average yearly loss of $300,000,000 to the South and to the nation. This tax, like all others, is passed on to the consumer. How slowly the cotton States have taken action to meet this problem!

We boast of living in a scientific age, we speak scornfully of primitive peoples and of the narrowness of the middle ages, but today insect pests are causing more damage on the face of the earth than ever before in the history of the world. Why is this true? Medical science has suppressed most dread diseases such as smallpox, yellow fever, rabies, tetanus, etc. Many diseases have been practically eradicated. The great cancer problem is believed to be nearing at least partial solution. Human disease is decreasing—insects pest damage is increasing! In spite of the thousands of dollars expended yearly on investigation, the problems continue to increase. Why?

We grow certain crops in certain areas best suited for their growth. This is the only wise system. There are certain areas best suited for peaches, apples, cotton, wheat, tobacco, etc. But this favors insect damage, too. Pests preferring the product grown find plenty of food close at hand and can increase at an enormous rate. In early times this was not true; vast areas often separated one farm from another; pests spread with difficulty.

### *Are Unwelcome Immigrants*

A great many of our major pests have gained entrance from foreign countries, to wit: boll-weevil, Mediterranean fruit-fly, Japanese beetle, Mexican bean beetle, Hessian fly, European corn borer, gypsy and brown tail moths, pink boll-worms. These pests are no longer attacked by many natural enemies which kept them under control in their native homes. If they can adjust themselves to our climate, they find themselves in a paradise and

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# *Chinese* Jujubes Are Good

## *By U. V. Wilcox*

Washington, D. C.

"HAVE some jujubes," says Uncle Sam, "you'll like them, they're good."

As evidence of the fact that he knows what he is talking about there is the testimonial of connoisseurs of the Far East who have enjoyed their jujubes for thousands of years. These are not the tiny, skin and pit variety sometimes found growing upon the ornamental jujube tree, but large, delicious fruits, fragrant, tasty, and easily grown.

A Chinese living more than 300 years ago, Li Shi Chen, told of 43 varieties of jujubes known in his country, and an explorer of ancient writings, De Candolle, says that the Greeks and Romans became acquainted with the jujube, perhaps, 2,500 or 3,000 years ago after it had been carried about in the commerce of Asia for long generations. Europe has its jujube trees but most of them are small and the fruit likewise small.

The alert Chinese apparently took the small variety of jujube and through a process of selection developed a large, delicious-tasting fruit. It is this variety that is so well adapted to many regions of America. The jujube, it seems, will grow in semi-alkali soils, in dry soils, and because it flowers so late, it is rarely injured by spring frosts. Furthermore, it is a certain bearer having learned somehow, throughout the ages, to have no off years.

The Lang jujube is considered the most promising for use in the United States.

The peculiar habit of the jujube of shedding its young branches gives the tree an open appearance which, with the rather short curved woody branches and gray bark, makes the tree distinctly ornamental, even during the winter months. So says C. C. Thomas of the Office of Foreign Seed and Plant Introduction. Mr. Thomas sees a place particularly in the south-western parts of the United States and in the regions where the weather is not too cold, for the use of the hardy jujube not only as a source of a delicious fruit but in ornamental plantings, for hedges, and for property line plants.

Some varieties of jujube have long been grown in America. The trees are found in California, Texas, Florida, Georgia, and intermediate States. No one has complained of their hardiness or their inability to survive, in fact even in the more northern States they will grow well.

Jujube fruit appears in various colors thus fitting into the color-conscious schemes of modern life. Jujubes first appear reddish with brown spots on green. As the size increases the spots merge and then the fruit turns to a dark chestnut brown. In the Mu Shing Hong variety the fruit is beautifully mottled. Eventually the fruit becomes wrinkled and dries out into a reddish brown.

The fleshy portion of the jujube fruit is drier than that of our common fruits. The Li variety is more crisp and not so dry. In the Southwest, the jujube ripens in August while in other parts it waits until the early part of September. The hardiness of the tree is shown in the fact that while only a year old it may begin bearing, and in the second and third year may yield abundantly.

Speaking horticulturally, Mr. Thomas says that "the jujube grows vigorously in hot climates and reaches its best development where the weather is dry, the sunshine brilliant, the nights warm, and the summer long and hot. The southwestern section of the United States, where such weather prevails, is especially well adapted to jujube culture. The trees do well in Texas without irrigation and they also do well in California with irrigation. After the trees have become well established they can withstand a considerable drought."

Another valuable credit to the plant is that it will resist insect pests. In the long years under which it has been under observation, no insect pests have been discovered.

And speaking from the standpoint of the palate, the jujube adapts itself to many and numerous appetites. It can be eaten as any other fruit, right off the trees, preserved, or made into confections. Chefs who have used the jujube list it for use in breads, cakes, cake fillings, puddings, as mince

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As a rule the jujube is a heavy bearer, and the contrast of the smooth, dark-brown fruits with the glossy, green foliage makes the tree decidedly ornamental. This specimen is 12 years old and about 20 feet high.

There is a prosperous look about the buildings on the Helgeland stock farm.

# "It Makes Me Money"

## *Commercial Fertilizers Pay Profits on This Stock Farm*

*By Van M. Storm*

County Agent, Blue Earth, Minnesota

TEDDY HELGELAND, of Bricelyn, Minnesota, a beef cattle feeder and a dairyman operating a rich, black land farm, has found that it pays to use commercial fertilizer in his system of farming for net profits.

Mr. Helgeland farms 160 acres. He is a stock farmer in every sense of the word, for at the present time he has two carloads of beef cattle on full feed, in addition to his regular herd of 12 grade dairy cows. He has 12 young cattle and 100 head of hogs on his farm.

He raises red clover and alfalfa for his hay crops, and plants 20 acres of sweet clover each spring which he uses as pasture for one year and plows up the following spring for corn. He has a large silo and threshes his small grain in the barn lot each year.

This is the system of farming which Mr. Helgeland has followed for a number of years, and when asked why he used commercial fertilizer in addition to all the benefit he gets from his legume crops and the large quantities of manure he gets from his livestock, his reply was:

"IT MAKES ME MONEY. Whenever I can invest a couple of dollars in phosphate and potash and get back a net return of $8 or $10 I am going to do it."

When asked what induced him to start using commercial fertilizer, Mr. Helgeland told the following story:

"Two years ago the County Agent was advising the use of fertilizers and asked me to try some. One day while in town I bought a sack. I do not know now what kind it was, and after I got home I didn't know what to do with it. I had no machine with which to spread it on my land, so I scattered it by hand on one corner of a field of oats in which I seeded sweet clover. I didn't pay much attention to it and couldn't see much difference in the oats, for the shocks looked about even all over the field. That fall though I did see a big difference in the sweet clover. It was about twice as thick and grew much higher where I had put the fertilizer than in any other part of the field.

### *Sees More Difference in Spring*

"The following spring, which was last spring, when the sweet clover came up, the corner I had fertilized seemed to come on earlier, it grew faster and was much thicker than in the rest of the field. Then again, later on, when I turned the cows into pasture it, they ate that corner off first and kept it short all summer.

"The way that little corner went ahead of the rest of the field, early in the spring, opened my eyes, so I decided to try some fertilizer on my sweet corn, and that is where I was able to figure my net profit.

"I asked the manager of the canning factory what kind of fertilizer I should use. As soon as I told him I was using clovers and lots of manure in my rotation of crops, he recommended that I use an 0-20-10 mixture.

"I had contracted to plant five acres of sweet corn, so I took enough 0-20-10 for 2½ acres or just one-half of my sweet corn patch. I measured the field carefully and used the fertilizer on only half of it. The whole field had the same care and treatment throughout the growing season.

"The field man for the canning company watched my field closely when it came near time to gather the corn. One day he told me to start hauling the fertilized corn to the factory and it was at this stage of the game I found out that commercial fertilizer was a real plant food and not a stimulant. My fertilized corn had matured nearly a week earlier than the unfertilized part of the field. I kept my weights separate, and when the last load of the whole five acres was taken to the factory, the manager figured out the yield for both parts of the field.

"The half I had fertilized averaged 3.05 tons per acre and the unfertilized part of the field only 1.77 tons per acre, a difference of 1.28 tons per acre in favor of the fertilized corn, or a net cash profit of $13.67 per acre after deducting the cost of the fertilizer. It was the best investment I ever made.

### *Neighbor Has Similar Experience*

"My neighbor, Alfred Halverson, living northwest of Bricelyn, had about the same experience with a different kind of fertilizer. He planted 10 acres of sweet corn and used an 0-10-20 mixture on 3½ acres and nothing on the other 6½ acres. The 3½ acres, fertilized, averaged 3.23 tons per acre and the unfertilized 6½ acres averaged only 1.97 tons per acre. His net profit was $13.32 per acre by using the 0-10-20 mixture.

"We had a lot of fun at the factory while we were hauling our corn in. The factory chemist told us he could tell the difference in the corn that was fertilized and that which was not by making a chemical test. We would give him an ear of each kind and after he ran his test he would always tell

(*Turn to page 54*)

# Plant Food *and* Milk

## *By C. A. LeClair*

*St. Paul, Minnesota*

WHEN farmers of Wisconsin, Minnesota, and Iowa saw butterfat prices slip down to less than "two-bits" a pound, they began doing just what good business men must do. They rapidly sought means of reducing their cost of producing milk.

Already through the work of cow-testing associations, few farmers were carrying unproductive individuals in their herds. Balanced feeding is nowhere in the world more of an art than it is on the farms of the North Central West.

What was there left for these wide-awake farmers to do? Thanks to the work of such missionaries as F. L. Musbach of Wisconsin, J. L. Boatman of Iowa, and F. J. Alway of Minnesota, the new trail was blazed. These men preached the sound economic gospel of how, by practising the same care in studying the production of every acre on the farm as had been employed in detecting boarder cows, cheaper feed and hence lower cost milk and meat was a possibility.

Musbach brought to the attention of the dairy industry the evidence of the tremendous loss of plant food from the land. Boatman pointed out how the yield and quality of corn were dependent upon the available fertility of the soil. To Alway and his associates is due the credit of working out the proper commercial fertilizer recommendations which have had much to do with the tonnage of alfalfa increasing in Minnesota from less than 6,000 tons in 1910 to more than 1,000,000 tons at the present time.

Cows that produce 300 pounds of butterfat pay profits when fed generously fertilized crops.

Unless one glances back a few decades, it is difficult to realize how much the harvest of silage corn has added to the wealth of Northwest farmers. In 1900 silos were a curiosity. Today a farm without one is the exception. But what is more important, whereas once they were filled with a mixture of short, immature, earless stalks of corn and weeds garnered from a needlessly large acreage, today with the aid of commercial fertilizers they are filled with big, leafy silage corn with large ears of golden grain grown on a relatively small acreage. Fertilizer attachments for applying complete fertilizer in the hill or drill row at corn planting time now are considered as necessary as milk pails by pro-

Top-dressing alfalfa with commercial fertilizer made this difference. Four times the hay was produced on the left, following an application of plant food, as compared with the untreated part of the field at the right.

tion of an unbalanced mixture might have such a tendency. On the other hand, I have never seen corn grown in a field on which a complete fertilizer, having a proper balance of all three elements, was applied which did not withstand dry weather better than corn grown on similar untreated land.

Again, in the fall if early frosts come as they often do after the fifth of September, the corn treated with commercial fertilizers has a ten to one better chance of escaping stalk and ear injury.

gressive dairymen.

Every farmer who has applied fertilizer in the hill or drill row knows what happens. R. M. Salter of the Ohio Agricultural Experiment Station, however, took the trouble to accurately measure the results of hill fertilization and he gave the world the facts so that anyone could follow the method and profit thereby. Salter found that if one is delayed for one reason or another in putting in his crop he can use fertilizer and get fully as good results as would be the case if the corn were planted three weeks sooner without fertilizing.

But supposing one plants his corn early and fertilizes it in an approved way, what can he expect? In the event of a late spring frost, the chances are better that the crop will escape injury than they would be if it hadn't been fertilized. The fertilizer applied makes that corn come into tassel at least a couple of weeks earlier than otherwise would be the case. If the season proves to be dry, the corn will yield far more bushels than if it had been starving for nourishment.

If anyone thinks that fertilizer has a tendency to make corn fire in years of drought, he is mistaken. Applica-

But what really counts is that the plant food applied in the hill or drill frequently makes a third larger crop of perhaps twice the feeding value as would be obtained without it. This provides one of the important ways in which dairymen are obtaining lower production costs and insuring their profits.

Rapidly, too, more attention is being given to the improvement of pastures. It is no longer believed that land in sod which is heavily grazed is resting. More commercial fertilizer was applied to pastures in Wisconsin in the spring of 1931 than had been applied since the beginning of time. Yet only a beginning has been made, for the value of fertilizer to extend the grazing season and improve the feeding value of grass is still realized by far too few farmers.

### *Boons to Dairy Industry*

Maintaining clover and establishing more acres of alfalfa on every dairy farm are other boons to Northwest agriculture that the greater use of commercial fertilizer is accomplishing. To establish these rich feed crops

(*Turn to page 53*)

# Asparagus Ferns

## *May Use as Much as 12 Tons of Fertilizer per Acre*

*By C. D. Wilder, Jr.*

Gainesville, Florida

ONE of the most intensively grown crops of Florida is *Asparagus plumosus manus*, or the so-called "asparagus fern." Many growers apply 12 tons of fertilizer per acre in applications of a ton per acre per month for 12 months in the year. Few growers apply less than 9 tons per year. Approximately two-thirds of this tonnage is applied in the form of mixed fertilizer analyzing around 5-5-5.

The mixed fertilizer is supplemented with such materials as goat manure, tankage, fish scraps, ground tobacco stems, guano, and kainit. There is no general system of fertilizing; each grower follows his own ideas and applies fertilizer as he thinks his crop needs it.

Such heavy fertilization produces a tremendous yield. After a crop is cut over until there are no marketable fronds or sprays left, the crop is mowed off and a new crop is allowed to come on. This procedure continues year after year. The ferneries are never plowed and reset. It normally takes about 40,000 plants to set an acre 9 x 10 inches apart and leave rows to walk in.

The most difficult problem is to keep down long bare sprouts called "stringers," which are of no com-

(*Turn to page 52*)

This picture was taken in an old and well-established *Asparagus plumosus* fernery.

# Intermediate Credit

*By Edwy B. Reid*

Washington, D. C.

FARMERS have long known that their need for credit is not the same as that of merchants, manufacturers or, in fact, any other group of individuals. Proof of this is found in the steady growth and use of the Intermediate Credit as supplied by the 12 Federal Intermediate Credit Banks through local lending institutions such as agricultural credit corporations, livestock loan companies, and commercial banks.

The farmer's turnover is slow, much slower than that of the ordinary commercial business, and his need for credit which will accommodate this slower turnover is great. This kind of credit frequently has been extended to him by country banks, but very many of them have decided that they would rather an agricultural credit corporation extend this sort of credit. In fact, many bankers have joined in the formation of such corporations in the last year or so. They reasoned that, by this action, they will keep their banks more liquid, that they can lend more for commercial purposes for short periods, and that they will be in a better position to meet the demands of their depositors whenever such a demand should arise. At the same time, the credit corporations, in many of which the bankers personally own stock, bring to their respective communities a new flow of money. As a matter of fact, these credit corporations, discounting farmers' notes with the Federal Intermediate Credit Bank, tend to reverse the flow of money from the country to the city, for the Intermediate Credit Bank obtains its funds to lend, aside from its capital, by the sale of debentures in the large money markets.

Farmers borrowing from an agricultural credit corporation pay cash for the goods which they buy. This money is usually spent at home and it circulates through several hands in the community before its initial effect is completely exhausted. Most of the farmers' notes discounted by local institutions are classified as livestock paper, the second big classification is for agricultural production purposes, and the third, general agricultural paper. In 1930, approximately $70,000,000 worth of such paper was discounted by the banks against about $60,000,000 the previous year. The paper discounted by agricultural credit corporations in 1930 amounted to approximately $41,000,000 while that of livestock loan companies totaled about $26,000,000, the balance of the business being done with state and national banks.

### *Credit Organizations Increase*

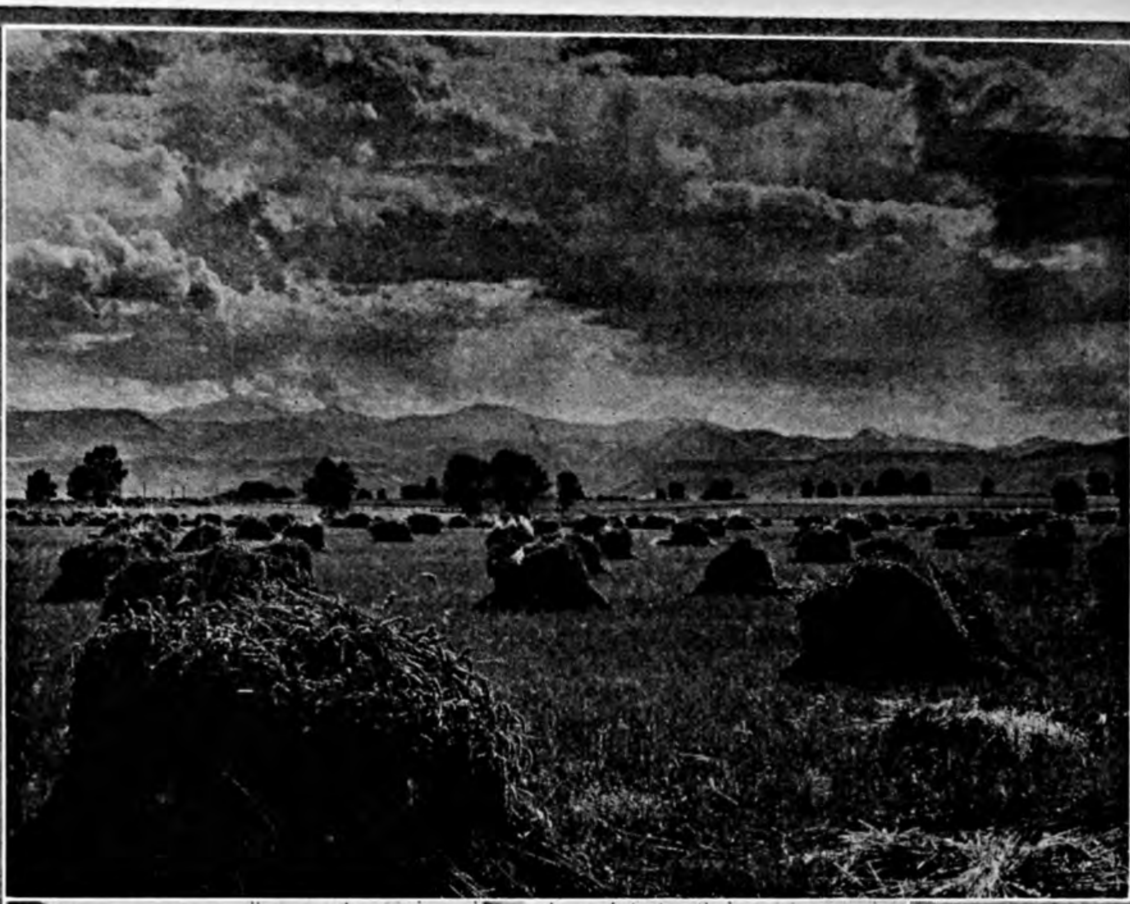
According to the Federal Farm Loan Board's annual report at the turn of the year, there were 475 agricultural credit corporations, 107 livestock loan companies, 196 state banks, and 14 national banks, making a total of 792 local institutions which have discounted paper with the banks since their organization in 1923. The paper handled represents loans to approximately 162,000 farmers. Discounts, including renewals, during 1930 totaled approximately $109,000,000.

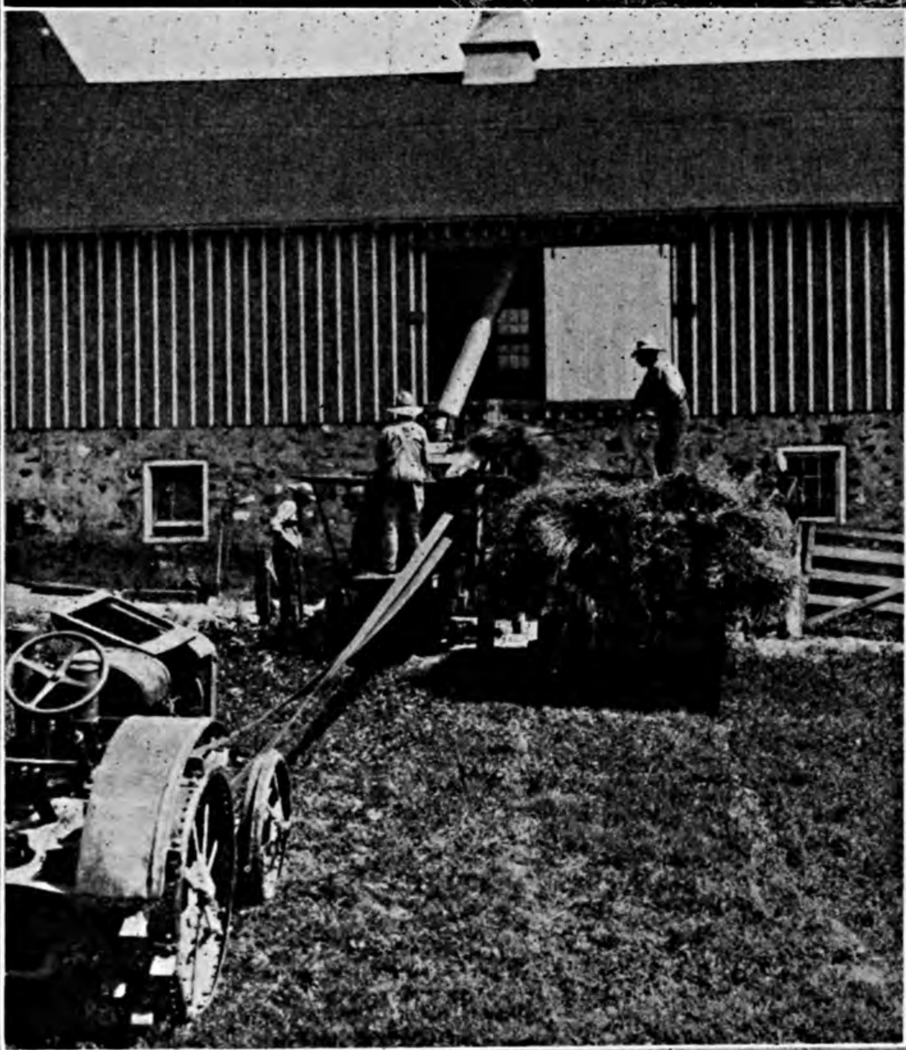
Since January, 1931, a rather large number of credit corporations and livestock loan companies have been

(*Turn to page* 51)

ONE JOB THAT LASTS THE YEAR ROUND.

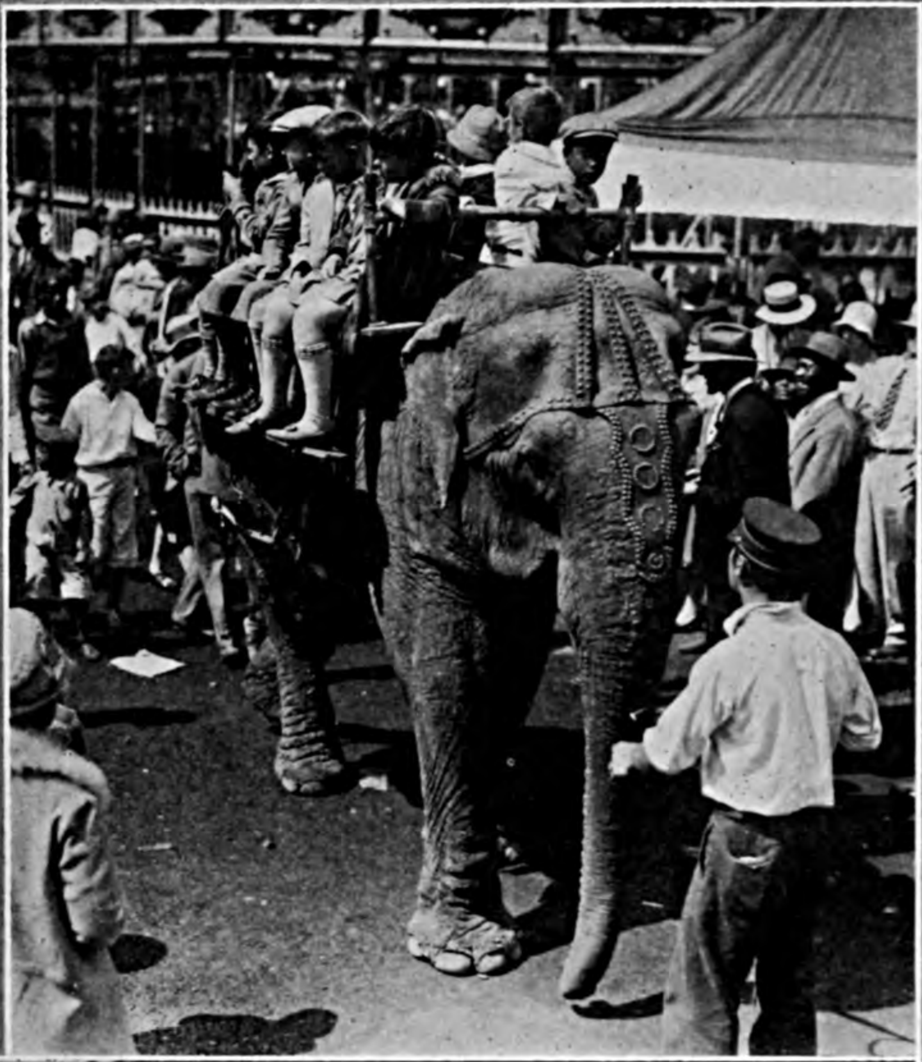
# PICTORIAL



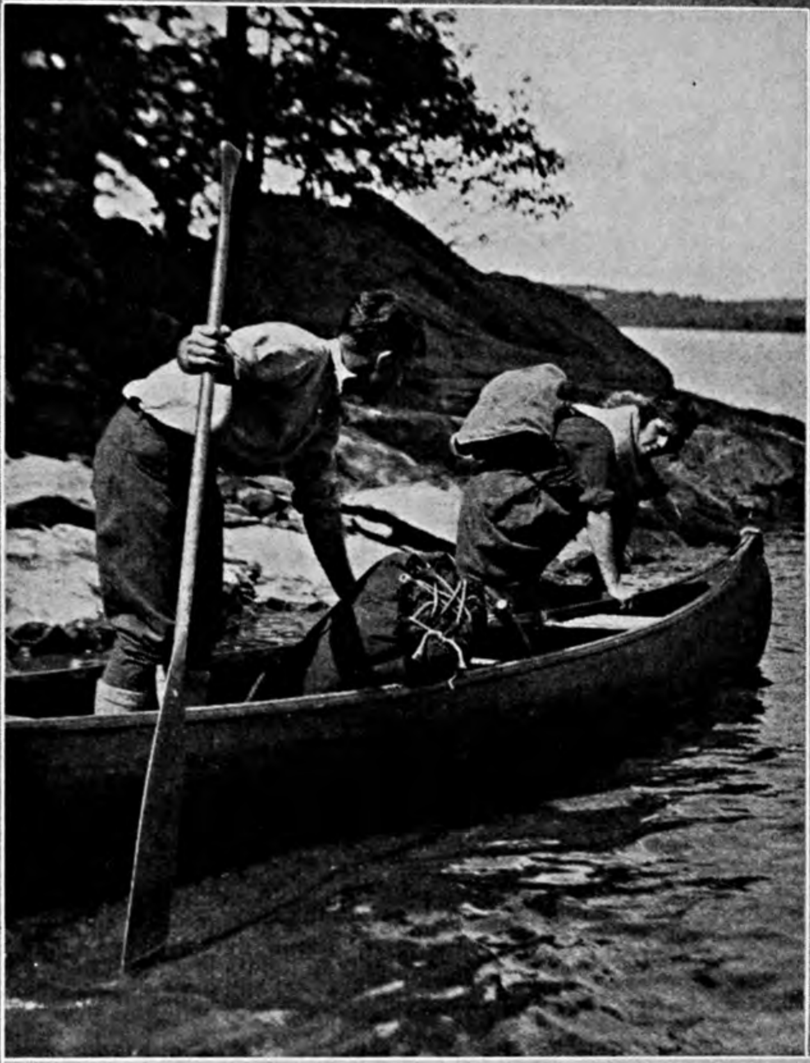


© *Ewing Galloway, N. Y.*

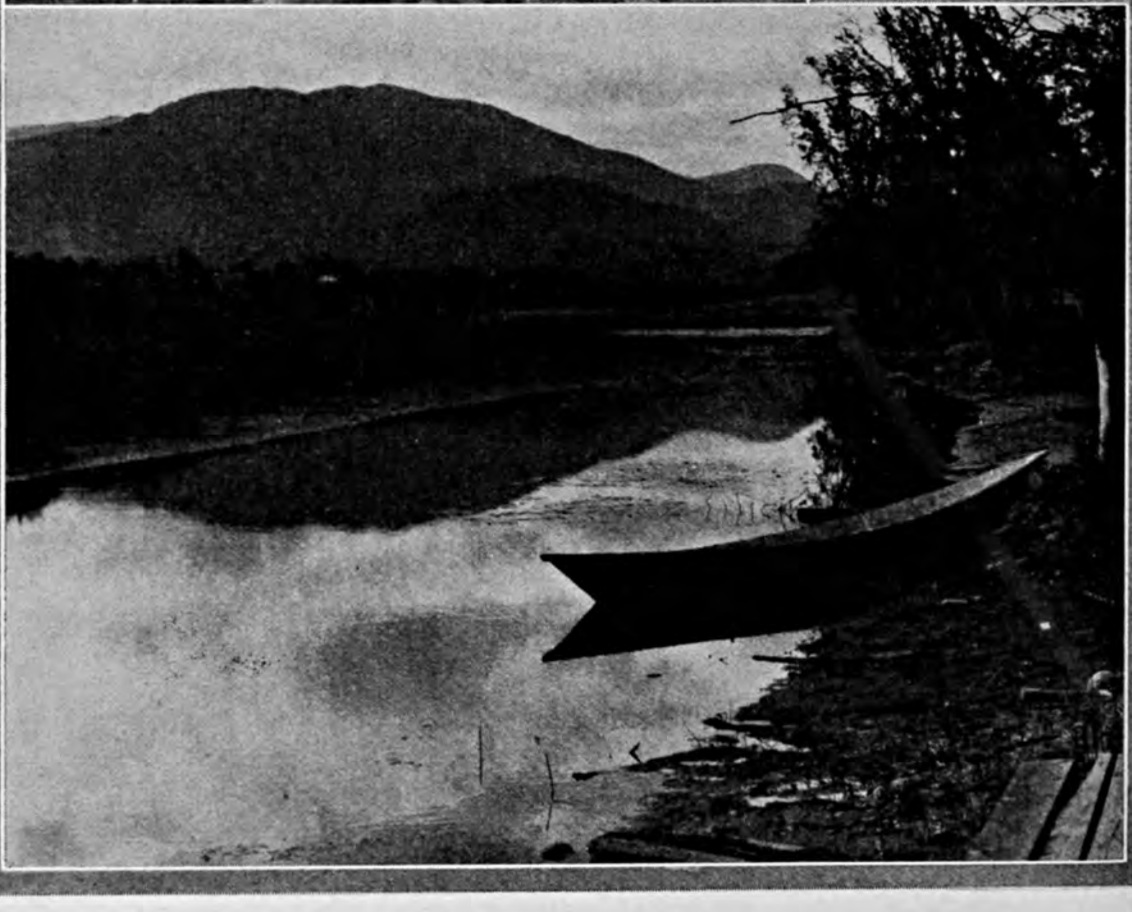
**The month of August in the country brings hints of fall—**



Whereas August near the cities is still mid-summer.



Left: Ready to leave the cares and worries of civilization behind.

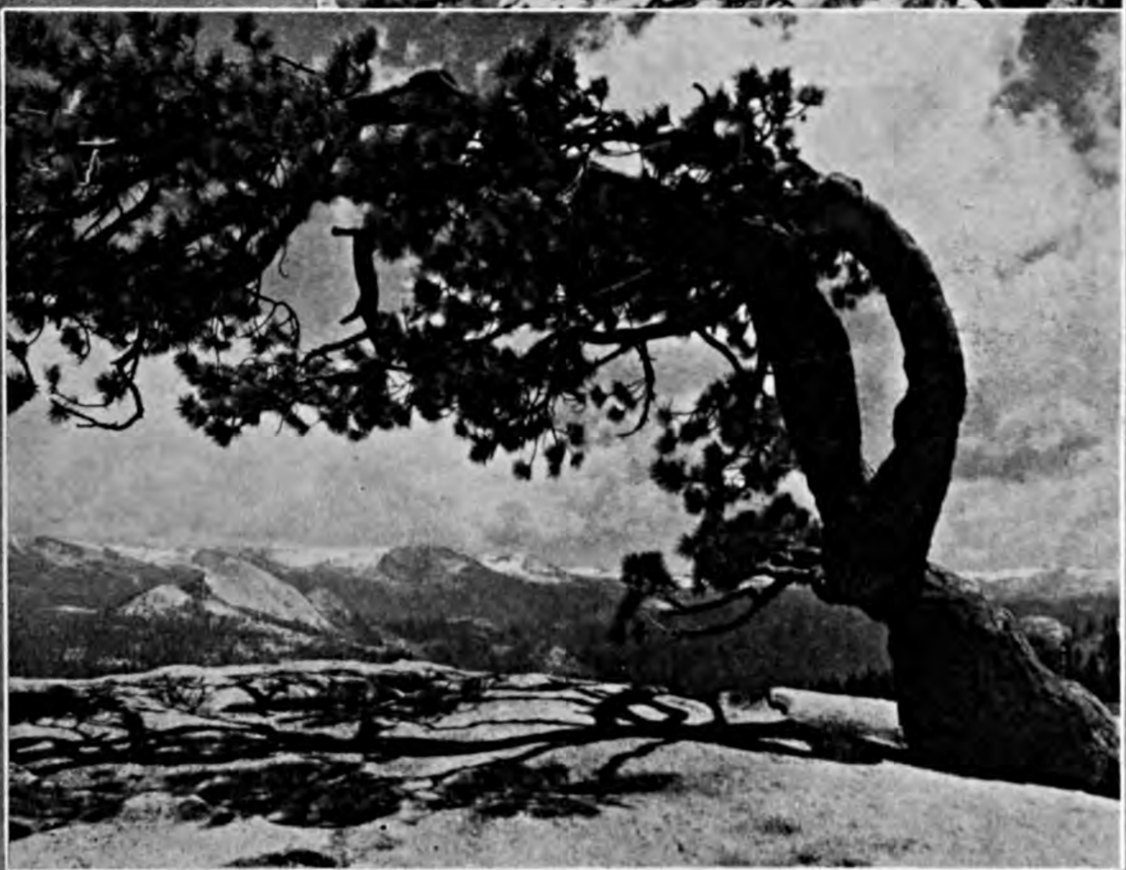


Below: A quiet twilight on the Ausable river, New York.

Right: Thousands of gannets find a sanctuary on the Gaspe Coast, New Brunswick.

Below: A battered veteran of the high Sierras in Yosemite National Park.

© *Ewing Galloway, N. Y.*



Left: A farmer living near Indianapolis refused $1,600 for this fine walnut tree in his barn lot. The stump alone, according to estimates of woodmen, is worth $500 for manufacturing and veneering. The tree is nearly five feet in diameter and is said to be one of the largest walnuts to remain standing in the Midwest.

Below: The depression among farmers has caused many of them to go back to old methods of conservation. This farm wife is manufacturing soap from the scraps of waste fat saved during the year.

# The Editors Talk

## Researcher's English

The muse must be cultivated even by scientists. Possibly scientists will yet write poetry, not for the sake of the poetry but for the sake of expressing the idea. For young scientists lack English, says Dr. W. W. Stockberger, Director of Personnel and Business Administration of the Department of Agriculture, as reported in a recent issue of "The Official Record." He points out that a glaring defect in the education of many applicants for professional positions in the government service is an inability to express themselves freely and clearly.

"If a modicum of the time now devoted to the training of students to undertake research work were devoted to training in the art of presenting in suitable form the results of investigation, a marked improvement in the clearness in the writings of students so trained would become evident," according to Dr. Stockberger.

The urgent necessity for the presentation of the results of scientific work in simple and clear language is undoubtedly just as important as undertaking the scientific work itself. Especially is a good presentation necessary if the result of such work is ever to have any influence for the social good.

But between the need and remedy there is a long gap, for everybody with any experience in writing up the results of research work, or for that matter writing up ideas of any sort, for presentation to a reader public knows the difficulty of presentation. Often is it relatively easy to do the work, but presenting the picture resulting from the investigation is quite a different matter. "A modicum" of time spent on English during the period of training might be helpful; certainly a good service will be rendered if leaders in fields of administration point out and emphasize the need for such training in English.

But after all, is it entirely a matter of training in English? Is there not an equal need for cultivating a broad viewpoint? Is not the zeal for specialization in narrow fields of work and the limitation of knowledge to that field partly to blame? Exact knowledge of the narrow field is only of any real value to society when seen against the broad background of human relationships and activity. And probably the present difficulty is to be attributed just as much to a lack of knowledge or even a lack of interest in this broad background, as to a lack of the knowledge of how to use the English language.

Then again, is not our modern tendency to worship unrelated facts partly to blame? Knowledge is not facts alone. Yet only too often are mere facts presented without any relation to a "presiding idea" which the reader can take away. Thus, a marked improvement in scientific writings probably depends not only on a better training in English, but in the cultivation of a broader and more sympathetic viewpoint.

# W. J. Spillman Dies

We deeply regret to note that Dr. W. J. Spillman, Principal Agricultural Economist, Division of Farm Management and Costs, Bureau of Agricultural Economics, died suddenly on July 11, following an operation at Garfield Hospital, Washington, D. C. He is survived by his wife and one son, Dr. Ramsay Spillman.

Dr. Spillman was a native of Missouri. In his long career he was Professor of Agriculture at Washington State College, Pullman, from 1894 to 1901. Following this service he was Agrostologist in Charge of Grass and Forage Plant Investigations, Bureau of Plant Industry. When in 1915 the Office of Farm Management was transferred from the Bureau of Plant Industry to the Office of the Secretary, he was placed in charge of it, a position which he held until 1918 when he resigned to become editor of the *Farm Journal*. In 1921, Dr. Spillman re-entered the Department as Consulting Specialist in the Bureau of Markets and Crop Estimates. In 1924 he was designated as Agricultural Economist in the Bureau of Agricultural Economics and in 1928 as Principal Agricultural Economist.

His chief work was in the field of farm management for which he received world-wide recognition. In 1920, he discovered the mathematical form of the law of diminishing returns with relation to results of the use of fertilizers on farms. Just before his death he had completed a means of solving arithmetically for several variables the exponential yield curve or law of biological growth.

In commenting on Dr. Spillman's death, C. W. Kitchen, Acting Chief of the Bureau of Agricultural Economics, said: "Doctor Spillman's death is a real loss to this bureau. He will be remembered and esteemed for a long time, not only as a pioneer in agricultural economics and particularly in farm management, but also as an inspiring friend and able counselor to many of our research workers. His pioneering did not end when the field to which he contributed so much in its beginning became one of the major fields of agricultural research. He never lost the faculty of taking up new problems with the enthusiasm of youth and of the pioneer. He did this with a rare combination of ability for mathematical exactness and for vivid illustration of his thoughts in writing and on the platform. Some of his work was left unfinished. Fortunately, however, he was able to bring his recent investigations so near to completion that it probably will be possible to publish the more important results substantially in the form in which he left them."

The field of agricultural economics has lost a faithful and far-seeing leader.

# The Wheat Situation

In a period of gloom everybody is apt to see the agricultural picture through the eyes of wheat. So much publicity has been given to the wheat situation, so much political activity has centered around wheat that the so-called wheat situation is apt to loom up as a very big part of the agricultural problem.

Undoubtedly wheat is a very important crop and the wheat situation is bad, as bad as it has been for many years. Wheat prices are now at about the level of the '90s, but the situation is worse than this because actually the prices paid to growers are the lowest in history, because production, transportation, and marketing costs are all higher than they were 40 years ago. Everything possible should be done for the wheat farmer.

At the same time, as pointed out by the Corn Belt Farm Dailies, "It is a serious mistake to judge American agriculture in terms of wheat. Only six to eight per cent of the total value of farm production is wheat. The other 92 to 94 per cent of production is making a better return—some of it a much better return."

About 70 per cent of all farm products find their way to market in the form of livestock and livestock products. Along with this the last decade added 16,000,000 people to the population of the United States. It is estimated that during the coming decade there will be an addition of 13,500,000. The demand for food products will, therefore, slowly but inevitably increase.

The farmer's dollar has already been deflated very considerably. A great deal of quiet but effective reorganization has been accomplished on the individual farms of our land. Though a serious situation still exists, our national agriculture is on a much sounder and more profitable basis than the exponents of wheat relief would always have us admit.

## The Use of Fertilizer

Farmers use fertilizers because they hope to make a profit. There is no other argument which is sufficient to insure their long continued use. As R. E. Stephenson, Soil Specialist of the Oregon Experiment Station, points out, "Fertilizers may improve the soil, but unless crop increases and bankable returns are reasonably sure at the same time, few will continue to fertilize simply for soil improvement."

A great deal of reliable data has been published in one place or another showing the returns from the use of fertilizers. But this alone is not sufficient. The production of the whole crop must be made at a profit.

The practical question arises in times of depression—Shall a farmer cut down or eliminate entirely the use of commercial fertilizers? The answer as pointed out by Mr. Stephenson is found in the past. Seldom has anyone lost money by producing big yields and almost never has one profited much from low yields. "It may be desirable to cut down the acreage, but never the acre yields."

As agricultural economists point out, there is one rule to which there is no exception. If a farmer is to make a profit, he must get higher than average yields. It is a hard but fast rule that in spite of overproduction any hope of profit depends upon the highest yield at the lowest cost per unit of production. Therefore, cutting down acreage may be desirable and necessary, but cutting down the use of fertilizers is out of the question for any progressive farmer who can use fertilizers at all in his crop production system. In times of depression the question of the right fertilizers to use and how to use them becomes vastly more important than in times of relative prosperity. It is for these reasons that there are evidences on every hand of an intensified interest in fertility problems.

It is doubly the duty of agricultural advisors and industries selling fertilizers to not only make such materials available to the farmer at the lowest price, but to agree as quickly as possible before the next fertilizer season starts regarding a fertilizer program best calculated to give profitable returns under the present conditions. Such a program suited to the different crop regions should be given every support and broad publicity.

## Changing Soils

Soil is a living thing subject to change. It has Youth and Old Age, a process of development and a process of decay.

To tell how old a soil is, look at its face—but in the case of a soil its face is the profile. We used to think that soil was an inert body, the final product, as it were, of long processes of soil-making. But due to recent investigations of soil science, ideas are changing.

What processes modify soils?

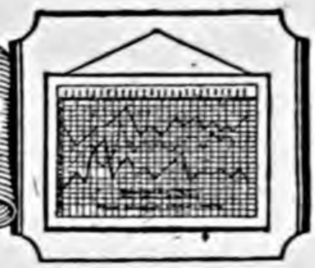
According to Dr. A. G. McCall, Chief of the Soil Investigations Unit of the United States Department of Agriculture, environment is the all-important factor in developing the characteristics of soils and in determining whether they shall be good or bad, fertile or unproductive.

Dr. McCall pointed out to members of the Agricultural Historical Society that the chief stumbling block to our knowledge of soils and to the development of soil science has been the persistent assumption by scientists that soils were chiefly the product of heredity. Continuing, Dr. McCall said: "In the light of progressive scientific discoveries we find it impossible to believe that the 'death' of a soil is necessarily anything more than a stage of coma or suspended animation. Soil surveys are studies of the relationships of soil environment in which their evolution has occurred. Our faith in science is so profound that we believe in the possibility of resuscitating even a dead soil and who knows but that in the near future we may be able to treat dead soils and start them on a brand-new evolutionary course from youth to old age?"

Thus, soils have many ambitions in common with human nature.

"A GROWING fund of basic facts is just as essential to the progress of agriculture and the farm home as it is to industry and to other lines of endeavor. Without research and the application of its results, agriculture will lag. A retarded agriculture affects the whole foundation of our national life. This applies to production, to distribution, and to marketing, as well as to those factors which relate to the health, the social, and the community life of our rural people."—*M. S. McDowell, Director, Pennsylvania Extension Service.*

# AGRICULTURAL DEVELOPMENTS



## CONCENTRATED FERTILIZERS OFFER ECONOMIES IN FARM PRODUCTION

High-analysis or concentrated fertilizers, if applied effectively, make possible some economies in time and labor which means dollars and cents saved for the farmer. These fertilizers also aid him to decrease his unit cost of production whether it be of a bushel of potatoes, a basket of lettuce, or a crate of cauliflower, Dr. Oswald Schreiner, Chief of the Division of Soil Fertility of the Bureau of Chemistry and Soils, told farmers and fertilizer men at the soil and fertilizer meeting at the Virginia Polytechnic Institute at Blacksburg, Va., July 10.

"The economic advantages of concentrated chemical fertilizers deserve serious consideration," said Doctor Schreiner. "Less handling, hauling, and storage are required at the factory or mixing plant for concentrated fertilizers. Fewer bags are needed. A marked reduction in freight is made possible. After the fertilizer reaches the farmer less handling, hauling, and storage are involved. At planting time fewer trips are required to haul the fertilizer to the field and the bags can be set from two to three times farther apart. Considering the entire range in cost involved, concentrated fertilizers offer a good chance to effect definite economies in crop production."

Doctor Schreiner says that concentrated fertilizers can be delivered to the farmer at less cost per unit of plant food than ordinary-strength fertilizers; can be prepared and delivered to the farmer in good physical condition which makes it possible to apply the fertilizer uniformly and without waste; and, on soils with high water-holding capacity and well-distributed rainfall, will give as satisfactory yields as ordinary-strength fertilizers. He warned, however, that on lighter soils where drought is likely there is greater chance of injury to plants from the more highly concentrated fertilizers.

He announced that triple-strength fertilizer mixtures prepared in the fertilizer house of the Bureau of Chemistry and Soils in Washington were used successfully a month or two later by potato growers in Aroostook county, Maine, with regular potato-planting machinery and standard fertilizer attachments without trouble and with uniform applications.

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## CORRESPONDENCE COURSES PENNSYLVANIA STATE COLLEGE

A new free correspondence course in potato growing prepared by Dr. E. L. Nixon, research plant pathologist at the Pennsylvania State College, will soon be available, the College announces.

The new course will cover seed selection and care, soil preparation and tillage, harvesting and handling the crop for economical potato production.

Various other free home study courses are offered in other subjects. A printed college bulletin containing descriptions of all the courses and other useful information about the work will soon come from the press and be available for free distribution. —*Marketing Activities, July 22, 1931.*

## THE SO-CALLED KALAMATI DISEASE OF SUGAR CANE

**V. J. Koningsberger and T. H. van den Honert Arch. Suikerind. Ned.—Indie Vol. 39, 1931**

THE Kalamati disease of sugar cane is defined by Wilbrink as a stagnation or arrested growth of the young cane plants, leaves with more or less elongated dark red spots. The affected cane may apparently throw off the disease when the rains come, but the yield is low and there is a tendency to early death. Wilbrink showed that the disease did not occur in pot tests where potash was added to the Kalamati soil, and this result was later confirmed by field experiments.

However, certain facts in the case appeared to render doubtful the theory that the phenomenon was due to a simple lack of a particular plant food, in this case potash. The disease appeared to be confined to the Kalamati soil type, which is a laterite with considerable oxide of iron in the upper horizons of the subsoil, where anerobic (reducing) conditions also prevail to some extent. This suggested the possibility of the presence of soluble ferrous salts under certain circumstances. Pot cultures were made in which soluble ferrous salts could be produced from free iron oxide in the presence of ammonium sulphate used as a plant food. Under these conditions young sugar cane plants exhibited the symptoms of the Kalamati disease, but when the same cultures received an addition of potash the phenomena did not appear.

It thus appears that the Kalamati disease is not a nutritional disease, but is a result of iron poisoning, and that the counter action of potash represents a case of physiological antagonism by which the toxic effect of the iron is inhibited.

The Kalamati disease is more apt to be met with in the case of cane that has been fertilized with ammonia sulphate than where sodium nitrate is used. In the former case the sulphate ion may bring iron in solution, which the sodium ion does not do.—*"Facts About Sugar,"* May, 1931.

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## SALT WILL KILL WILD GOURD ROOTS

A pint of ordinary salt poured into a hole cut in the side of the immense roots of wild gourd or man-in-the-ground is a cheap and effective way to rid land of this serious weed pest. A. R. Cadle, farmer of Polk county, Oregon, tried it out on 150 plants of this pest a year ago with almost 100 per cent kill.

First, the dirt is scraped away until the top of the immense root is laid bare. A hole is bored into the top of the root with an ordinary post-hole digger and a pint, more or less, of salt is poured into this hole and is covered up.

According to Mr. Cadle, a man can treat about 75 of these plants a day. Last year they were treated during the latter part of June. The wild gourd has a root on it as big as a wash-tub or a bushel box, and it uses a great deal of moisture and sends out huge, long vines that twine around the ground and makes it difficult to grow a successful crop in the immediate vicinity. Ordinary weed killers are not successful because of the immense storage capacity of this root.

—*J. R. Beck, Dallas, Oregon.*

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## FADING SOIL MEANS FADING OF PROFITS

When the color of a soil begins to change from dark to light, the farmer should look out. A change in the other direction—from light to dark—usually indicates improvement, more organic matter. But a fading soil in most cases means fading crop returns. In central Texas the rolling black lands—uniformly black—have faded in many places to gray, yellow, and even almost white, as if something had drawn the life blood. And erosion has done just that.

Erosion, speeded up by cultivation, has profoundly altered soil conditions in the Texas black lands, the Bureau of Chemistry and Soils of the United States Department of Agriculture has found. This land in a virgin condition produced from ½ to 1 bale of cotton per acre without manure or fertilizer of any kind.

Now the region is a mixed black, gray, yellow, and white area, so rapidly has erosion skinned off the successive layers of soil from black, almost superproductive clay on top, down to white, comparatively unproductive subsoil. This change has occurred in 40 years of cultivation.

This damage has been caused chiefly by sheet erosion, scarcely noticeable as it takes place, but which carries off a portion of the essential topsoil every time there is a rain.

Twenty-three tons of topsoil were removed from each acre by a single rain, measurement on an average slope showed. This single rain affected 3,000,000 acres of Texas land.

Department soil specialists warn that unless vastly more is done in the future to protect the erosive slopes of Texas than has ever been done in the past the rolling areas of this great cotton-producing belt are doomed to destruction.

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## AVOID DROUGHT EFFECTS BY KEEPING PLANTS DRIER

Wet fields and marshy spots are often the first to show the effects of dry weather. A lawn that is sprinkled every day suffers more, if the family goes on vacation and neglects the sprinkling, than a near-by lawn that has had to depend on rain for most of its moisture.

Last year's long drought emphasized this, both in town and country. This results from the general habit of plants to take life easy and to develop along lines of least resistance. In a marsh or a wet field the surface moisture is almost always adequate, and roots develop near the surface because they do not need to seek moisture and plant food in the lower levels. Ordinarily roots do not grow well in water-logged soil. When the surface dries out, the plant may be unable to tap the water in the subsoil. Similarly the well-sprinkled lawn develops a root system just beneath the surface, and if the upper layer of soil dries the lawn may soon look bare and brown.

In the wet or marshy fields the remedy is paradoxically, to fight drought by keeping the fields drier, usually by drainage which will favor a deeper rooting. On the lawn, also, the remedy is to apply less water—less frequently but more water at a time, enough to soak the soil to a depth of several inches. Then, when the surface water evaporates, the roots of the grasses push downward to tap reserves of moisture.

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## TECHNICAL TESTS USED IN GRADING FARM PRODUCTS

Mechanical and chemical tests are rapidly replacing human judgment in measuring the quality of farm products. Ten years ago, says the United States Department of Agriculture, only a few such tests were used successfully. To-day many products are tested chemically or mechanically, by methods that give to particular quality factors a specific value in commodity standards.

One device recently developed measures the moisture content of grain by recording the resistance offered to an electric current passed through it. This method requires only 30 seconds, as compared with the 40 minutes necessary under the old method.

Technical tests are employed in

measuring certain quality factors in fruit. The sugar content of grapes is determined by the saccharimeter. A sugar acid test is used to ascertain the maturity of citrus fruits. A specific gravity test shows the maturity of cantaloupes.

In grading canned fruits and vegetables a pressure gauge indicates the vacuum condition of the can. The density of sirups is tested with hydrometers. Salinometers are used in testing brine solutions, and penetrometers in determining the consistency of such products as canned pumpkin. Mechanical devices measure the maturity of canned corn. A fruit pressure tester has been developed to determine the maturity of plums, apples, and pears. The colorimeter measures color in hay, cotton, and honey, in which product's color is an important quality factor.

Cotton fiber lengths are measured with a high degree of accuracy by an improved cotton fibre sorting machine. The strength of cotton fibers may be ascertained by the bundle fiber test.

Some quality factors, such as flavor and odor, are naturally difficult to measure by technical tests, though means for doing so may some day be developed. Research on this problem is under way. The progress already made in the measurement, by technical means, of specific quality factors suggests that dependence on personal judgment or skill, though still necessary to a considerable degree, may eventually be largely eliminated. This elimination will make grading increasingly uniform throughout all seasons and areas.

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## HARDISTAN ALFALFA

Hardistan is the name of a new variety of alfalfa which recently has been named by the Nebraska Experiment Station at Lincoln. This new variety was found growing on the farm of Arnold Brothers in Dawson county, Nebraska. Its chief value compared to other varieties is that it is extremely winter hardy and resistant to the bacteria which cause alfalfa wilt.

Hardistan is thought to have originated from Turkestan alfalfa. This new variety has been growing on the same field for nearly 20 years. It does not resemble Turkestan alfalfa as much as the Common variety. Experimental work and observation show that the variety gives satisfactory hay and seed yields under Nebraska conditions. The supply of seed is limited, but the Nebraska Crop Growers' Association at Lincoln is planning to grow certified seed of the new variety.

The name Hardistan is a combination of the two words "hardy" and "Turkestan." Of course seed of this variety cannot be distinguished from other varieties of alfalfa. Growers who desire to try the new variety, therefore, should be sure of the source of the seed.—*E. N. Bressman.*

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## A DISEASE-RESISTANT TOMATO

Marglobe is the name of a disease-resistant variety of tomatoes originated by the United States Department of Agriculture by crossing two varieties, Globe and Marvel. The name of the new variety is a combination of the parental names. Marglobe has the best characteristics of its two parents.

This variety is of chief interest to tomato growers in Florida and other Gulf States where Fusarium wilt, nail-head rust, and puffiness cause considerable trouble. It has possibilities as a late tomato in other sections. Marglobe is resistant to these diseases and in addition produces a very smooth, globe-shaped fruit which is free from irregularities.

Marglobe has been readily accepted by tomato buyers. The fruits ripen slowly and uniformly. Also they stand shipping and storing better than many of the older varieties. Of great importance is the availability of seed of Marglobe. Most seed houses are able to furnish seed of this variety.—*E. N. Bressman.*

# 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

A very interesting summary of several years' work with fertilizers on cotton on many soils in Mississippi has been prepared by the Agronomy Department of the Mississippi Agricultural Experiment Station in Bulletin No. 289, entitled "Commercial Fertilizers For Cotton—1925 to 1930." Based on these results, fertilizer recommendations for the various groups of soils in the State are made, which should help growers to select analyses best suited to their conditions. The work is analyzed from a profit as well as from a yield viewpoint, so that the conclusions reached can be applied directly by the farmer.

The proper fertilizers for market garden and other cash crops are discussed in a well-prepared publication by F. L. Musbach and C. J. Chapman, entitled "Fertilizers for Cash Crops," Wisconsin Agricultural Experiment Station Circular 243. Cabbage, onions, potatoes, sugar beets, and canning peas are considered separately, and such analyses as 5-8-7, 6-15-12, 3-12-12, 2-16-8, 3-20-20, 0-20-20, and 0-15-30 are mentioned among others of similar ratios as being suited for the various crops on different soils. Recommended rates of application vary from 300 to 1,200 pounds per acre. A helpful section on fertilization of lawns is added, in which such analyses as 6-15-9 and 5-8-7 at 3 pounds per 100 square feet in the spring and several top-dressings during the summer of 5 pounds of a nitrogen fertilizer dissolved in 20 gallons of water and sprinkled over 1,000 square feet are recommended. This circular is valuable to all interested in growing the crops discussed.

*"Cotton Fertilizer Experiments, 1930—Sources of Nitrogen, Supplements, and Time and Method of Application," Agr. Exp. Sta., Experiment, Ga., Cir. 91, Dec., 1930, G. A. Hale.*

*"Fertilizing Tomatoes, Sweet Corn, and Muskmelons in a Three-Year Rotation," Agr. Exp. Sta., Urbana, Ill., Bul. 364, Jan., 1931, J. W. Lloyd.*

*"The Potassium, Chlorine and Sulfate Content of Kentucky Tobacco as Related to Grade," Agr. Exp. Sta., Lexington, Ky., Bul. 308, July, 1930, O. M. Shedd.*

*"A Preliminary Report of Certain Variety and Fertilizer Tests," Agr. Exp. Sta., Baton Rouge, La., 1930.*

*"Inspection of Commercial Fertilizers for 1930," Agr. Exp. Sta., Durham, N. H., Bul. 254, Dec., 1930, T. G. Phillips, T. O. Smith, and S. J. Fisher.*

*"The Preservation of Manure Under Arid Climatic Conditions," Agr. Exp. Sta., State College, N. M., Bul. 190, Feb., 1931, H. N. Watenpaugh.*

*"Nitrogen and Organic Matter in the Soil," State College of Agr., Ithaca, N. Y., Bul. 201, Dec., 1930, A. F. Gustafson.*

*"Fertilizing Vegetable Crops," Pennsylvania State College, State College, Pa., Cir. 138, Apr., 1931, Jesse M. Huffington.*

*"The Fertilizer Problem in South Carolina," Clemson Agr. College, Clemson, S. C., Cir. 107, Dec., 1930, R. W. Hamilton.*

*"Increasing the Profits from Phosphates for Tennessee Soils," Agr. Exp. Sta., Knoxville, Tenn., Cir. 34, Jan., 1931, C. A. Mooers.*

## Soils

*"A Study of Factors Influenzing Inoculation Experiments with Azotobacter," Agr. Exp. Sta., Manhattan, Kansas, Tech. Bul. 26, Aug., 1930, P. L. Gainey.*

*"Influence of Various Non-nitrogenous Compounds on the Growth of Certain Bacteria in Soils of Low Productivity," N. Y. State Agr. Exp. Sta., Geneva, N. Y., Tech. Bul. 172,*

*Dec., 1930, H. J. Conn and Mary A. Darrow.*

*"Preparation of Soil Profiles for Exhibition and Soil Study,"* N. Y. State Agr. Exp. Sta., Geneva, N. Y., Tech. Bul. 173, Dec., 1930, R. C. Collison and J. D. Harlan.

*"The Effects of Certain Soil Conditions on the Yield and Quality of Burley Tobacco,"* Agr. Exp. Sta., Knoxville, Tenn., Cir. 33, Dec., 1930, C. A. Mooers.

## Crops

Sixteen annual and two biennial reports are to be found listed below. These publications, containing the results of latest experimental work, will receive the keen interest of all who are keeping up with the progress of scientific agriculture.

Four publications dealing with vegetable gardening have also recently come into circulation and are to be found listed below. It would seem that more and more attention is being given the garden as an asset in farm and home budgeting.

An addition to the pasture literature is Michigan Extension Bulletin 114, "Suggestions for Better Pastures in Michigan," by E. L. Anthony, H. C. Rather, and C. E. Millar. The question of fertilization of pastures is well discussed and the statement made, "Experimental results suggest that not less than 300 pounds and preferably 500 to 1,000 pounds per acre of the complete fertilizer should be applied from 4 to 5 weeks before it is desired to turn the stock on the pasture in the spring.

A discussion of the fertilization of orchards, a subject receiving growing interest, is to be found in a new publication, Bulletin No. 73, by J. F. Rosborough, Horticulturist, and issued by The Extension Service of the Agricultural and Mechanical College of Texas. Complete fertilizers are recommend as follows: "In using commercial fertilizer to stimulate growth on one-year trees, ¾ to 1 pound per tree of a 6-12-6 or a 6-9-3; for second and third year trees, 1 to 2 pounds per tree of a 6-12-6 or 6-9-3. When fruit trees come into production, stable manure, to which has been added 100 pounds of superphosphate per wagon load (a ton) applied at the rate of 1 to 10 tons per acre is recommended. Commercial fertilizer mixtures such as 6-12-6 or 6-9-3 applied to each tree at the rate of 1 to 2 pounds per inch diameter of the body of the trees are also recommended.

*"Report of the Agricultural Experiment Station of the University of California, July 1, 1929, to June 30, 1930,"* Univ. of Calif., Berkeley, Calif., 1931.

*"Report of the Director, Year Ending October 31, 1930,"* Agr. Exp. Sta., New Haven, Conn., Bul. 322, Jan., 1931.

*"Chemical Investigations of the Tobacco Plant, I. A Preliminary Study of the Non-Volatile Organic Acids of Tobacco Leaves,"* Agr. Exp. Sta., New Haven, Conn., Bul. 323, Jan., 1931, Hubert Bradford Vickery and George W. Pucher.

*"Chemical Investigations of the Tobacco Plant, II. The Chemical Changes That Occur During the Curing of Connecticut Shade-Grown Tobacco,"* Agr. Exp. Sta., New Haven, Conn., Bul. 324, Jan., 1931, Hubert Bradford Vickery and George W. Pucher.

*"Annual Report of the Director, For Fiscal Year Ending June 30, 1930,"* Agr. Exp. Sta., Newark, Del., Bul. 167, Nov., 1930.

*"Forty-Third Annual Report—1930,"* Agr. Exp. Sta., Experiment, Ga.

*"Cultivated Berries,"* Agr. Exp. Sta., Experiment, Ga., Bul. 166, Jan., 1931, J. G. Woodroof.

*"Tenth Annual Report—1920,"* Georgia Coastal Plain Exp. Sta., Tifton, Ga., Bul. 12, June, 1930.

*"Cotton Production in the Coastal Plain of Georgia,"* Agr. Exp. Sta., Tifton, Ga., Bul. 13, June, 1930, W. J. Davis.

*"Corn Production in the Coastal Plain of Georgia,"* Agr. Exp. Sta., Tifton, Ga., Bul. 14, 1930, W. J. Davis.

*"Agricultural Experiment Station Report for the Fiscal Year Ending June 30, 1930,"* Univ. of Fla., Gainesville, Fla.

*"Crops to Replace Spring Wheat in Northern Idaho,"* Agr. Exp. Sta., Moscow, Idaho, Bul. 177, Feb., 1931, H. W. Hulbert.

*"Grains for the Cut-Over Lands of Northern Idaho,"* Agr. Exp. Sta., Moscow, Idaho, Bul. 178, Jan., 1931, J. H. Christ.

*"Apple Breeding in Idaho,"* Agr. Exp. Sta., Moscow, Idaho, Res. Bul. 8, Nov., 1930, C. C. Vincent and L. E. Longley.

*"Strawberries for Home and Market,"* Agr. Exp. Sta., Lafayette, Ind., Bul. 174, Mar., 1931, Monroe McCown and Clarence E. Baker.

*"Harvesting Cornstalks for Industrial Uses,"* Agr. Exp. Sta., Ames, Iowa, Bul. 274, Nov., 1930, J. Brownlee Davidson and Edgar V. Collins.

*"Fifth Biennial Report of the Director,"*

*Agr. Exp. Sta., Manhattan, Kan., Dec., 1930.*

*"Flower Gardening in Maine," Univ. of Maine, Orono, Me., Bul. 197, Feb., 1931, Roger Clapp and Edna Cobb.*

*"Annual Report of the Maine Extension Service for the Year Ending June 30, 1930," Univ. of Maine, Orono, Me., Bul. 198, Mar., 1931.*

*"The Home Garden," Agr. College, Amherst, Mass., Ext. Leaflet 59, Jan., 1931, P. W. Dempsey, G. B. Snyder, C. L. Thayer, and W. H. Thies.*

*"Black Raspberry Studies," Agr. Exp. Sta., East Lansing, Mich., Tech. Bul. 111, Feb., 1931, Roy E. Marshall.*

*"Agricultural Experiment Station Report Two Years Ended June 30, 1930," Mich. State College, East Lansing, Mich.*

*"A Comparison of Alfalfa Strains and Seed Sources for Michigan," Agr. Exp. Sta., Lansing, Mich., Spec. Bul. 211, Jan., 1931, C. R. Megee.*

*"The Quarterly Bulletin," Agr. Exp. Sta., East Lansing, Mich., No. 4, Vol. XIII, May, 1931.*

*"American Potato Journal," The Potato Association of America, East Lansing, Mich., No. 6, Vol. VIII, June, 1931.*

*"Agricultural Experiment Station, Thirty-Eighth Annual Report, July 1, 1929, to June 30, 1930," Univ. of Minn., St. Paul, Minn.*

*"Mississippi Agricultural Experiment Station Forty-Third Annual Report for the Fiscal Year Ending June 30, 1930," A. and M. College, Miss.*

*"Report of the South Mississippi Branch Experiment Station," A. and M. College, Miss., Bul. 285, Dec., 1930, J. C. Robert, W. W. Welborne, and J. L. Cooley, Jr.*

*"Report of the Raymond Branch Experiment Station," Agr. Exp. Sta., A. and M. College, Miss., Bul. 287, Dec., 1930, H. W. Wallace.*

*"Cotton Variety Summary 1926-1930," Agr. Exp. Sta., A. and M. College, Mich., Bul. 288, Dec., 1930, J. F. O'Kelly and W. W. Hull.*

*"One Year's Progress in Missouri Agriculture," Mo. Col. of Agr., Columbia, Mo., Cir. 269, Feb., 1931, R. R. Thomasson.*

*"Top-Dressing Old Pastures," Agr. Exp. Sta., Durham, N. H., Sta. Cir. 35, Feb., 1931, Ford S. Prince, Paul T. Blood, and G. P. Percival.*

*"Vegetable Gardening in New Hampshire," Ext. Serv., Durham, N. H., Ext. Bul. 25, Mar., 1931, J. R. Hepler.*

*"Forty-First Annual Report Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts," State College, N. M.*

*"Important Considerations in Pear Production," State College of Agriculture, Ithaca, N. Y., Bul. 203, Jan., 1931, G. W. Peck, C. R. Crosby, W. E. Blauvelt, M. F. Barrus, W. D. Mills, and T. E. LaMont.*

*"Emergency Forage Crops—An Outline for Their Protection," State College, Ithaca, N. Y., Bul. 209, Apr., 1931, John H. Barron.*

*"Yields and Practices in the Ohio 10-Acre Corn Project, (1920-1928), State Univ., Wooster, Columbus, O., J. A. Slipher and E. P. Reed.*

*"The Farm Vegetable Garden," State College, Corvallis, Ore., Ext. Bul. 432, Jan., 1931, A. G. B. Bouquet.*

*"Bleaching and Dyeing Royal Ann Cherries for Maraschino or Fruit Salad Use., Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 275, May, 1931, D. E. Bullis and E. H. Wiegand.*

*"Forty-Third Annual Report of the South Carolina Experiment Station of Clemson Agricultural College, Year Ended June 30, 1930," Clemson College, S. C., Dec., 1930.*

*"The South Carolina Agricultural Experiment Station, A Brief History, 1887-1930," Cir. 44, Dec., 1930, G. H. Aull.*

*"The Grade and Staple of South Carolina's 1930 Cotton Crop," Agr. Exp. Sta., Clemson College, S. C., Cir. 47, Apr., 1931, Harry A. White.*

*"The Cotton Contest—1930 For Better Yield and Staple Value," Agr. College, Clemson College, S. C., Cir. 110, Jan., 1931, R. W. Hamilton.*

*"The Sweet Potato Contest, 1930," Agr. College, Clemson College, S. C., Cir. 111, Jan., 1931, L. P. Watson.*

*"Annual Report of the South Dakota Agricultural Experiment Station for Fiscal Year Ending June 30, 1930," State College, Brookings, S. D.*

*"A Decade of Crop Yields from Vivian Farm," Agr. Exp. Sta., Brookings, S. D., Bul. 253, July, 1930, A. N. Hume.*

*"The Tokio Soybean," Agr. Exp. Sta., Knoxville, Tenn., Cir. 35, Feb., 1931, C. A. Mooers.*

*"Tomatoes In Texas," A. and M. College, College Station, Tex., C-62 Apr., 1931, J. F. Rosborough.*

*"Making Good With Pastures," A. and M. College, College Station, Tex., C-79, Mar., 1931, E. A. Miller.*

*"Growing Asparagus," A. and M. College, College Station, Tex., C-82, Feb., 1931, J. F. Rosborough.*

*"Demonstration Outline for Irish Potato Production," A. and M. College, College Station, Tex., C-85, Mar., 1931, R. R. Reppert.*

*"Better Sugar-Beet Culture for Utah," Agr. Exp. Sta., Logan, Utah, Cir. 93, Apr., 1931, George Stewart and D. W. Pittman.*

*"Alfalfa-Seed Production," Agr. Exp. Sta., Logan, Utah, Bul. 226, May, 1931, J. W. Carlson and George Stewart.*

*"A Study of Natural Reproduction in Vermont Forests," Agr. Exp. Sta., Burlington, Vt., Bul. 311, July, 1930, George P. Burns and Wallace E. White.*

*"Topworking the Apple Tree," Agr. Exp. Sta., Morgantown, W. Va., Cir. 57, Nov., 1930, M. B. Hoffman.*

*"Effects of Pruning on Growth and Yield*

*of Cherry Trees," Agr. Exp. Sta., Morgantown, W. Va., Bul. 240, Mar., 1931, H. L. Crane.*

*"Four-H Club Work in West Virginia," Agr. Exp. Sta., Morgantown, W. Va., Bul. 241, Apr., 1931, T. L. Harris.*

*"Fortieth Annual Report of the University of Wyoming Agricultural Experiment Station, 1929-1930," Laramie, Wy.*

*"Home Gardening in the South," U. S. D. A., Washington, D. C., Farmers' Bul. 934, Mar., 1931, H. C. Thompson.*

*"How to Grow an Acre of Potatoes," U. S. D. ,A., Washington, D. C., Farmers' Bul. 1190, Mar., 1931, William Stuart.*

*"Effective Haying Equipment and Practices," U. S. D. A., Washington, D. C., Farmers' Bul. 1525, Mar., 1931, L. A. Reynoldson, and C. D. Kinsman.*

*"Farm Study of the Cotton Plant," U. S. D. A., Washington, D. C., Farmers' Bul. 1661, Mar., 1931, J. W. Hubbard.*

*"Reproduction on Pulpwood Lands in the Northeast," U. S. D. A., Washington, D. C., Tech. Bul. 223, Feb., 1931, Marinus Westveld.*

*"The Time to Harvest Fiber Flax," U. S. D. A., Washington, D. C., Tech. Bul. 236, Apr., 1931, Brittain B. Robinson.*

## Economics

*"Series on California Crops and Prices, Olives," Agr. Exp. Sta., Berkeley, Cal., Bul. 510, Mar., 1931, H. R. Wellman.*

*"Farm Prices of Cotton Related to Quality, Georgia Crop—1928-29," Agr. Exp. Sta., Experiment, Ga., Bul. 165, Sept., 1930, L. D. Howell and W. T. Fullilove.*

*"Some Evidences of Agricultural Progress," Agr. Exp. Sta., Urbana, Ill., Cir. 365, Feb., 1931, H. W. Mumford.*

*"Agricultural Outlook for Illinois, 1931," Agr. Exp. Sta., Urbana, Ill., Cir. 366. Feb. 9, 1931, H. W. Mumford.*

*"Prices of Illinois Farm Products in 1930," Agr. Exp. Sta., Urbana, Ill., Bul. 365, Feb., 1931, L. J. Norton.*

*"Types of Farming in Kansas," Agr. Exp. Sta., Manhattan, Kan., Bul. 251, Aug., 1930, J. A. Hodges, F. F. Elliott, and W. E. Grimes.*

*"The Agricultural Credit Situation in Kentucky," Agr. Exp. Sta., Lexington, Ky., Bul. 311, Dec., 1930, H. B. Price, C. J. Bradley, and E. C. Johnson.*

*"Making Cotton Cheaper—Can Present Production Costs Be Reduced?" Delta Exp. Sta., Stoneville, Miss., Bul. 290, Feb., 1931, M. G. Vaiden, J. O. Smith, and W. E. Ayres.*

*"A Five-Year Economic Study of 125 Farms in Curry and Roosevelt Counties, New Mexico," Agr. Exp. Sta., State College, N. M., Bul. 186, June, 1930, L. H. Hauter, A. L. Walker, and O. V. Wells.*

*"Production Requirements, Costs, and Returns from Dry-Land Farming in Eastern New Mexico," Agr. Exp. Sta., State College, N. M., Bul. 187, June, 1920, L. H. Hauter, A. L. Walker, and O. V. Wells.*

*"Selecting the Most Profitable System of Dry-Land Farming in Eastern New Mexico," Agr. Exp. Sta., State College, N. M., Bul. 188, Jan., 1931, L. H. Hauter, A. L. Walker, and O. V. Wells.*

*"The New York State 1931 Agricultural Outlook," Cornell Univ., Ithaca, N. Y., Bul. 207, Feb., 1931, M. C. Bond, L. M. Vaughan, and L. E. Cruikshank.*

*"Piedmont Farm Management for 1931," Agr. Exp. Sta., Clemson College, S. C., Cir. 46, Feb., 1931, W. C. Jensen and B. A. Russell.*

*"Agricultural Outlook for South Carolina, 1931," Clemson College, S. C., Cir. 108, Dec., 1930.*

*"Pee Dee Farm Management Studies, 1925-30," Agr. Exp. Sta., Clemson College, S. C., Bul. 269, Jan., 1931, W. C. Jensen and B. A. Russell.*

*"Cotton Marketing Studies, 1925-1930, Agr. Exp. Sta., Clemson College, S. C., Bul. 270, Jan., 1931, Ward C. Jensen, Marvin Guin, and Harry A. White.*

*"Marketing Apples Grown in the Cumberland-Shenandoah Region of Pennsylvania, Virginia, and West Virginia," U. S. D. A., Washington, D. C., Tech. Bul. 234, Mar., 1931, Carl R. Swinson, J. J. Vernon, F. F. Lininger, F. P. Weaver, and A. J. Dadisman.*

## Insects

*"Drouth Checks Corn Borer Adance in 1930," Agr. Exp. Sta., Urbana, Ill., Cir. 367, W. P. Flint, W. P. Hayes, G. H. Dungan, and A. L. Young.*

*"European Corn Borer Control-Progress Report, 1931," Agr. Exp. Sta., Lafayette, Ind., Cir. 178, Jan., 1931, H. J. Reed.*

*"Dusting for Boll Weevil Control, Agr. Ext. Serv., Raleigh, N. C., Cir. 186, May, 1931, C. H. Brannon.*

*"Control of the Codling Moth in the Pacific Northwest," U. S. D. A., Washington, D. C. Farmers' Bul. 1326, Mar., 1931, E. J. Newcomer, M. A. Yothers, and W. D. Whitcomb.*

## Diseases

*"The Relation of Some Tobacco Viruses to Potato Degeneration," Agr. Exp. Sta., Lexington, Ky., Bul. 309, July, 1930, W. D. Valleau and E. M. Johnson.*

*"Diseases of Boxwood," "Diseases of Carnations," "Diseases of China Asters," "Diseases of Chrysanthemums," "Diseases of Delphinium or Larkspur," "Diseases of Gladiolus," "Diseases of Hollyhocks," "Diseases of Iris," "Diseases of Laurel," "Diseases of Peonies," "Diseases of Perennial and Annual Phlox," "Diseases of Roses," "Diseases of Snapdragons," "Diseases of Sweet Peas," "Diseases of Tulips," Agr. Exp. Sta., New Brunswick, N. J., Cir. 230 to 244 inclusive, Apr., 1931, Richard P. White.*

*"Cucumber Disease Investigations on Long Island," Agr. Exp. Sta., Geneva, N. Y., Bul.* 590, *Jan.,* 1931, *E. E. Clayton.*

*"Seed Treatment for the Control of Oat Smut," Agr. Exp. Sta., State College, Pa., Cir.* 136, *Mar.,* 1931, *R. S. Kirby.*

*"Profitable Potato Spraying," Agr. Exp. Sta., Div. of Agr. Ext., State College, Pa., Cir.* 137, *May,* 1931, *L. T. Denniston and H. E. Hodgkiss.*

*"Potato and Cabbage Diseases and Their Control," Agr. Ext. Serv., Knoxville, Tenn., Pub.* 167, *Mar.,* 1931, *S. H. Essary.*

*"Sweet Potato Black Rot and Its Control," Agr. Ext. Serv., Knoxville, Tenn., Pub.* 168, *Mar.,* 1931, *C. D. Sherbakoff.*

*"Canker Treatment for Fire-Blight Control," Agr. Exp. Sta., Knoxville, Tenn., Cir.* 36, *Mar.,* 1931, *J. A. McClintock and H. L. Fackler.*

*"Truck Crop Investigations — Further Studies of Truck Crop Aphids," Truck Exp. Sta., Norfolk, Va., Bul.* 71, *Apr.* 1, 1930, *George E. Gould.*

*"Save Black Walnut from Canker," Agr. Exp. Sta., Morgantown, W. Va., Cir.* 58, *Dec.,* 1930, *C. R. Orton and J. M. Ashcroft.*

# Why Raise Food for Bugs

(*From page* 22)

breed up at a rapid rate. Due to international shipping and travel, pests have come in from all over the world. The pink boll-worm, boll-weevil and Mexican bean beetle have just flown across the Mexican border. The other pests have come in on some shipment.

No doubt our failure to protect birds aids materially in the increase of insect pests. This is a problem that should be given serious thought by the entire nation.

The problems are so numerous, the pests breed up so fast that the entire field of insect pest control is peculiarly difficult to attack.

Huxley, the great English genius, estimated that a species of plant lice, (*in the absence of parasites*) in one season would reach the number of 564,087,257,509,154,652. These would weigh 822 million tons or 10 times the weight of the entire population of the earth. It has been found since that Huxley's figures are far short of the actual rate of increase. This impresses upon us the importance of insect enemies.

The Panama Canal has its very foundation laid upon insect control. The French who first started the Canal died like rats and were forced to abandon the project because of the dreaded yellow fever and malaria spread by mosquitoes. Americans first controlled the mosquitoes then built the Canal. The Canal Zone today is a veritable health resort.

Insects are our greatest enemies. They eat what we eat, directly or indirectly. They are all over the face of the earth, they are constantly increasing. It is estimated that there are over 2,000,000 species of insects and only 600,000 of these have been studied. Insects often average more than 15,000,000 per acre of meadow. Forests frequently average over 2,000,000 insects per acre.

All problems are not solved, but there is an efficient, practical control for many pests. Do we intelligently put into practice the controls that we have? The great scourges of the human race have been due to lack of information and failure to apply that which we know. We must stick to the facts. The nation which stays closest to the facts will make the greatest progress in the future. This is true of the individual grower. Surely we should carefully use the effective, economical controls which are known. There is a pest for practically every crop grown. These pests are constantly increasing. Insect pest control, therefore, must be considered as a regular part of the crop system. Why continue to grow any crops for bug food?

# *Successful Potato Marketing*

## *By E. W. Holden*

County Agent, Merrimack County, New Hampshire

A POTATO-MARKETING unit started in 1929 by six Merrimack county, New Hampshire, potato growers has stabilized a marketing condition for growers of this section which appeared to have a dubious future.

This section had gradually developed a substantial commercial potato business which flourished upon a trade with independent stores in the cities of Concord, Franklin, Manchester, and Laconia. However, the increase in chain stores, buying their potatoes out of the State, promised slowly to wipe out this market for local producers.

A contract was made by this group of larger commercial potato men in the fall of 1929 whereby they agreed to furnish one of the three important chain-store companies with all its needs from digging time until the spring months. This involved about 10,000 bushels for stores located in Laconia, Tilton, Franklin, Concord, Manchester, and three smaller towns. They agreed to furnish a high quality potato to the stores as they needed supplies. A price arrangement was made to be based on the Boston market price of one day each week. The company agreed to advertise potatoes received as New Hampshire potatoes.

This plan worked out so satisfactorily to both the producers and the company that another contract was made last fall under more favorable terms to the growers. The arrangement had served in its first year as an outstanding example of orderly marketing, had relieved the markets of 10,000 bushels of out-of-state potatoes, and through competition among stores had created a desire for local-grown potatoes which are of superior eating quality compared to northern-grown potatoes because of a longer maturing season.

The county was faced last fall with the largest crop in years due to a wonderful growing season. New Hampshire's average yield of 215 bushels per acre was second only to Maine in the country. It was somewhat problematical as to whether local growers would be able to market direct to local stores. It was soon found, however, that not only was this one chain store buying native potatoes, but a second large chain had their buyer in the field, and in fact was purchasing nearly all its supplies from local growers. A third chain, which had never purchased locally to any extent, also purchased some potatoes this season. As the season advanced, it was evident that the local markets would absorb all potatoes in farmers' cellars due to this new development.

It appears reasonable to assume that this one small cooperative venture has stabilized the market for growers of the entire section during the 1930-1931 season, and if developed carefully offers a further expansion in potato growing for farmers in this part of the State. This cooperative enterprise has been successful because it met competition with a superior article and has given better service, which we believe is the background for success in any such undertaking.

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He boldly asked her father for his daughter's hand.

"Certainly, my boy," replied Pa, promptly. "Take the one that is always in my pocket."—*Capper's Magazine.*

## TEXAS APPLIES COTTON FARMING METHODS TO ONION PRODUCTION

Large-scale farming operations, common among cotton planters in the territory, are being applied to the growing of onions in the Corpus Christi section of Texas, according to W. D. Googe, field representative of the Federal Bureau of Agricultural Economics.

The onions were planted with seed direct to the fields in three-foot cotton rows. Cotton planters were used in putting out the seed; tractors and other modern machines were used in cultivation; and one farmer is reported to have harvested, graded, sacked, and loaded into cars a 2,500-acre crop in four days.—*Marketing Activities.*

## CANADA BUILDS LARGE CANNERY

A vegetable cannery, which it is reported, will be the largest in the British Empire, is to be established in Essex county, Ontario, at a cost estimated at $1,500,000. The district in which this new cannery is to be built is one of the most productive in North America.

## ILLINOIS REPORTS INCREASED DEMAND FOR BUNCHED VEGETABLES

Ten years ago it wasn't nearly as important to tie vegetables in bunches for market as it is now, says J. P. McCollum, Illinois College of Agriculture. Better grading and better handling have brought the change, he says. Bunching is now practiced with all the early root crops, green onions, asparagus, kohlrabi, rhubarb, parsley, leeks, celery, and sometimes sweet corn and various other products of the garden.—*Marketing Activities.*

## MODERN MARKETING

Some of the California asparagus crop went to northern markets on the Pacific coast in motor-truck loads refrigerated with solid carbon dioxide this season, say reports to the United States Department of Agriculture. For the 900-mile trip from the Sacramento Valley to Seattle the running time was about 36 hours. One of the trucks hauled nearly half as much as is ordinarily shipped in a carload by rail. Two drivers went with each truck, and they drove and slept by turn.

# Intermediate Credit

(*From page* 30)

formed. For instance, 16 have been set up and are functioning in Texas, 3 have been organized recently in the Spokane district, about 25 in the Louisville district, 61 in Arkansas, several new ones in Illinois and Missouri and 2 in the Baltimore district. We find 37 institutions now discounting paper with the bank at Columbia, about 110 with the St. Louis bank, 45 with the one at Houston, 25 with the Spokane bank, 54 with that at St. Paul and so on around the circuit.

Agricultural credit corporations are organized under state laws and should have a minimum paid-in capital of $25,000. There are many, of course, with a capital of $100,000 or more and these larger corporations have more funds with which to hire expert management.

The agricultural credit corporation

receives applications for loans from individual farmers. It looks them over just as carefully as any bank, gets their financial statements and, if they look good and if the farmers have ample collateral in the way of livestock, implements, or sometimes a mortgage or growing crops, the loan is made and the farmers' notes accepted. Such notes are then endorsed by the corporation and sent to the nearest Intermediate Credit Bank for a loan or to be discounted.

Before the Intermediate Credit Bank will do business with a credit corporation it has to approve the latter's financial set-up, management, etc. The corporation usually deposits the value of its stock in government or Federal Land Bank bonds with The Intermediate Credit Bank as a sort of cushion or guarantee of the farmers' notes which it offers for sale or discount. The number of times the amount of the paid-in capital which a credit corporation can discount farmers' notes with The Intermediate Credit Bank depends upon the quality of the security offered and the management of the institution. The credit corporation is permitted to charge as high as 3 per cent, in addition to the rate of interest which is charged it by The Intermediate Credit Bank, on the notes which it discounts with the bank. For instance, the rate which the bank charges now is approximately 4 per cent. This would make it possible for the credit corporation to charge as high as 7 per cent provided that such a rate is legal under state laws.

The Federal Intermediate Credit Banks are located in the same cities as are The Federal Land Banks and are officered by the same individuals. They are willing to indicate to anyone writing to them whether there is a credit corporation doing business in his territory and they are also willing to provide anyone with information concerning the legal steps necessary for the formation of credit corporations under state laws. This is true of livestock loan companies also, there being practically no difference except that the livestock loan company may specialize on livestock paper and not include loans for general agricultural purposes or for production purposes other than livestock. However, some livestock loan companies make general agricultural loans.

# Asparagus Ferns

(*From page* 29)

mercial value. One of the best recognized and most successful methods practised by growers in controlling this undesirable type of growth is by the use of kainit at the rate of a ton or more per acre applied in split applications. Growers have found that by using extra potash in the form of kainit, a saving can be made on icing. The sprays are strong and healthy and present a better appearance when they arrive on the market. "Fern rust" can be controlled by the use of kainit as completely as potash controls rust in cotton. *Asparagus plumosus*, being closely akin to the common table asparagus, seems to respond best to potash in the form of kainit salt.

Most any good, well-drained sandy soil is satisfactory for the production of *Asparagus plumosus*, but a sandy loam of medium texture is to be preferred. On richer soils the stems have a tendency to become too coarse and the fronds too far apart. Irrigation is desirable to insure maximum results.

It is necessary to grow the crop under half shade, similar to that required for shade tobacco. Slats are used and are spaced their width apart far enough overhead to walk under. There are a few ferneries planted in hammocks under large oaks that are filled with Spanish moss.

The fronds are tied 12 to the bunch and are packed in various sized crates. It takes 1,000 fronds to fill a crate 18″ x 18″ x 32″. The crates are lined with newspaper and contain a solid cake of ice wrapped in newspaper.

On account of the heavy expense of installing and keeping up a fernery, the acreage has been kept down to about 1,000 acres, which are located in the central and northern sections of the peninsula proper. Practically all of the fern crop is disposed of in the northern markets, where it is used by florists in making floral designs and in bunches of cut flowers.

# Plant Food and Milk

(*From page* 28)

it is, therefore, not surprising that the consumption of fertilizers in Wisconsin and Iowa is increasing at a rate greater than in any other commonwealths in America. Coincident with a wider use of commercial fertilizers, Wisconsin farmers in 10 years have increased the amount of protein feed grown in the form of legume crops 408 per cent. This is assurance that these farmers will continue to compete in our Nation's supply of milk, butter, cheese, and bacon.

Farmers of the Northwest are becoming convinced that from the plowed layer of soil comes most of everything we eat and wear. It has taken nature thousands of years to produce six inches of surface soil. Man can deplete it of its fertility in less than a generation. On the other hand a sound system of animal husbandry supplemented by judicious use of commercial plant food means a permanently prosperous agriculture.

The time has come when commercial fertilizers must be looked upon as a most important means of farm profit. They are not a substitute for any of the old, sound practices of crop rotation and manuring. They are on the other hand, a means which when properly employed will enable the growth of crops at costs so low that marginal land competitors will cease glutting the market. Furthermore fertilizers will enable a farmer to diversify and get good yields of alfalfa and soybeans which are crops that can be turned into profits because a surplus of them has not existed nor is likely in our lifetime.

Peas are another legume cash and silage crop which dairymen employ to reduce butterfat production costs and increase profits. Note the response to an application of complete fertilizer on the left as compared with the untreated part of the field on the right.

# Chinese Jujubes

(*From page* 24)

meat, pickles, butter, and, in other ways.

Says Mr. Thomas: "To the American people this jujube, (the Chinese variety) so long known in Asia, is at present little more than a name, but when it comes to be properly appreciated as a delicious fruit and a sure crop for sections where ordinarily little fruit is grown, it will become a valuable asset to these regions. The immediate future of the jujube is in its culture as a home fruit. As such it will appeal not only to the farmer, but to the growers and residents generally in many States. A few jujube trees can well be planted in every home orchard, thus contributing to the variety of fruits by adding one that is highly nutritious, delicately flavored, and an abundant and sure producer."

# He Did It This Year

(*From page* 6)

izer tonnage in the 7-7-10 analysis. This happened in 1928, and since that time he has bought nearly 800 tons of the same analysis fertilizer.

In 1927 his average yield per acre on his "Rackety Hall" farm was 73 barrels per acre, and his fertilizer was a 5-7-5 analysis, used at the rate of 3,000 pounds per acre. In 1928, with a 2,200-pound application of 7-7-10 fertilizer, he made 81 barrels of spuds. In 1929 with the same fertilizer application, his average yield jumped to 83 barrels; and in 1930 it went to 87 barrels. This spring (1931) he made the astounding average yield of 101 barrels on every acre on the farm.

"That extra potash did the work," said the Cap'n, "it kept the vines green longer, and gave the plants a better chance to make big potatoes. Lots of little potatoes may weigh more, but it takes the big ones to make full barrels."

In the summer Cap'n Davis grows a tremendous crop of soybeans from which he harvests the seed in the fall. The bushes are plowed under with tractor plows as soon as the seed harvest is over, and in this way he adds tons and tons of organic matter to every acre of his potato land. He has developed quite a soybean seed business as a side-line, and feels that the fertilizer which is left from the potato crop helps him make better than the average bean crop. The tremendous amount of organic matter which is worked into the soil from the soybean vines, gives him the assurance that a good part of his nitrogen is "paid for," and he doesn't worry much on that score. However, by four years' actual experience in doubling the potash, he has proven that "it takes potash, and plenty of it, to make a big crop of potatoes."

"And it's a wonderful tonic for the cabbage crop, too," volunteered Cap'n Charlie. "I was only making average crops while I was using a fertilizer which contained 100 pounds of potash, but since I started using 200 pounds, both the quality and the yield have greatly improved."

# It Makes Me Money

(*From page* 26)

us which was fertilized and which was not, and he was always right too. It seems that the potash works on the starch in the corn, some way, and we know that the starches make sugar, so I guess that is the reason the chemist could tell the difference in the two ears we had given him to test out.

"There are lots of things I do not know about commercial fertilizers, but I do know that phosphate and potash pay us big dividends when we use it on our corn. And yet I wouldn't have known this or at least I wouldn't have believed it, if I had not tried it out myself."

# The Inquiring Mind

(*From page* 20)

ulant is a substance which, while furnishing no plant food, makes insoluble plant-food constituents in the soil available, while it appears to be furnishing plant food, as evidenced by increasing growth of crops, following its application. Gypsum or land-plaster is a typical soil stimulant.

Sodium nitrate is often regarded as a stimulant, in the sense that its use calls for increased amounts of phosphorus and potassium. Prolonged use of sodium nitrate, or other nitrogenous plant food, without providing any available phosphorus or potassium will, sooner or later, reduce the soil supply of one or the other or both of the latter constituents, to a point where the crop demands may not be absolutely met. Long continued and exclusive use of fresh farm manure may bring about a similar condition.

Relative to the need and use of potassium fertilizing elements, Dr. Van Slyke has said, that larger amounts of potassium are called for by leafy crops, root crops, and some others, than by cereals. Light sandy soils are often deficient in available potassium, while muck soils are generally found to respond most favorably to generous applications. Deficiency of potassium, he says, is often indicated by weakness and brittleness in stalks and leaves.

Potassium compounds appear to enable plants to withstand more effectively attacks of fungus diseases. For example, in the absence of sufficient potassium, wheat is liable to rust. In general, crops which do not receive their full supply of potassium are more liable to disease, and in this condition the resisting power is weakened still more, if the plants receive large amounts of available nitrogen.

Dr. Van Slyke has expressed the opinion that the ideal system of using fertilizing elements, all things considered, is that commonly followed by the most progressive German farmers, who do not apply plant food by formulas or mixtures, but as separate materials. In their system of farming, they apply nitrogen, phosphorus, and potassium separately, usually in different seasons, in accordance with their observations and experience. The successful application of such a system demands a close study, not only of crops, but of the science of plant feeding. It has the advantage of enabling the farmer to make the most economical use of all plant-food material in crop growing.

At the time of his retirement from active service, in 1928, it was said that Dr. Van Slyke's attainments in the scientific world place him among the leaders in research in dairy chemistry. It is largely to his work in this field that the New York Agricultural Experiment Station owes the prestige it enjoys. He will, however, be remembered by the farmers of the State chiefly for his organization and supervision of the chemical inspection of fertilizers and feeding stuffs.

### *A Trainer of Chemists*

Many of the leading agricultural chemists of the country have received training and experience in research in Dr. Van Slyke's laboratories. They include E. L. Baker, A. W. Bosworth, Fred D. Fuller, E. B. Hart, A. L. Knisely, the late E. F. Ladd, J. A. LeClerc, C. W. Mudge, A. J. Patten, W. E. Tottingham, and many others. These noted scientists have carried to other institutions the inspiration to careful and thorough scientific investigation they received from their contact with Dr. Van Slyke.

In home and community life the Van Slykes are said to have been "widely known as lovers of flowers, music, and art, and ambitious for every thing that is high and holy in human life." Dr. Van Slyke is an elder in the First Presbyterian Church of Geneva, superintendent of the

Sunday School, a director of the Y. M. C. A., and is identified with every movement for the civic and moral betterment of the city.

Despite the fact that, to some, he may have appeared somewhat austere, like Shakespeare's Justice who had "eyes severe, and a beard of formal cut," there is a genial side to Dr. Van Slyke's nature. Although intense and emphatic in his likes and dislikes, he has been accounted "courteous, patient, and of a kindly, good-natured tolerance of youthful enthusiasm which has long been appreciated. His highly developed sense of humor and keen wit have often brought relief to intense situations." We have been told that it was one of his sources of pleasure, in earlier years, to join the young men of the staff in playing tennis on the court maintained by them, and there he always was a good sportsman. Further, he sings bass well and has been active in community and church singing.

### *An Inspiration to His Associates*

Dr. Thatcher wrote that when, years ago, he consulted Dr. Van Slyke relative to insecticides and fungicides, his kindly suggestions and ready sympathy and advice were a great help. He came away from the interview "with the impression that research on economic problems ought to be based on sound understanding of the scientific principles involved," and his association with the Doctor in recent years has confirmed his earlier impressions that he represents the true scientist in the service of agricultural and industrial development.

During his 38 years of active service, Dr. Van Slyke kept himself "fit" by regular physical exercise by working in his flower and vegetable gardens. In 1925 he was said to be "as strong and active as he was 20 years ago," and it was hard to realize that the time was nearing when the State retirement regulations would force him to drop his active connection with the chemical research work of the Geneva station. "We know," said Dr. Thatcher, "that when that time comes there will be no one who can do just what he has done, and that his influence will be felt long after his active work is finished. Devotion to chemistry for its scientific value, as well as for its industrial applications, has marked his whole lifework, and his happiness in it, through these later years of service, is a constant inspiration to the younger members of the staff."

That Dr. Van Slyke has been able perfectly, on occasion, to throw off the serious and dignified mien of the scientist, and engage heartily in the social doings of the community, is well evidenced by a pleasing episode recounted, in 1925, by Dr. Thatcher. He tells us that the annual Christmas party for members of the families of the staff of the New York State Agricultural Experiment Station was in progress. From behind the Christmas tree came the jingle of sleigh-bells. Out popped a plump jolly Santa Claus with a natural gray beard which the older members of the faculty recognized. But the children gazed in fascination while Santa proceeded to dance a gay jig in time with the music from a hidden Victrola, and then in astonishment as the gray-bearded saint executed in rapid succession all of the "daily dozen" stunts which keep one's body vigorous and nimble, in spite of advancing years. Finally his peaked cap slipped a little to one side and one of the children cried "Why! It's Dr. Van Slyke!"

That was the Doctor, when 65 years "young," as his friends at the Experiment Station know him.

Versatile Van Slyke! Stern scientist of the laboratory, pious pillar of the church, kindly leader of the Sunday School, jovial center of the Yuletide festivities, harmonious singer of songs, admiring lover of nature! He is taking things a bit easier now, and richly deserves a rest. May the sunset days of his purposeful life be blessed with happiness and health.

# Taking Time Out for Recreation

(From page 15)

of farm boys are being built in new movements, for instance, in Wisconsin where the Junior Forest Rangers have adopted the saying, "Let Boys and Trees Grow Up Together."

Growing up in the shadows of tall pines and stately oaks gives the farm boy no smaller ability for appreciation of the clouded splendor of our city's skyscrapers, but it does build up within him a lifelong love of what is basic in the existence of the entire country, the soil and what she nurtures.

Kilmer said,

"I think that I shall never see
A poem lovely as a tree . . ."

He might have included a lot of other things in addition to a poem. Sometimes we forget, but seldom doubt, the truth of such a statement, and when we do, why not abide by the thoughts of ex-president Coolidge and take a vacation, give the mind a chance to dwell on other things—out among the trees, streams, and lakes, out where the farmer and his cane pole may show the county agent and his shining new tackle a few old tricks in the art glorified by Izaak Walton.

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# Getting Ready for the Fair

(From page 17)

rent season. There are some exceptions in fairs which are held real early in the season before certain crops are matured and ready for showing.

There are certain exhibits which have particular requirements. For example, potato exhibits should never be washed or brushed so as to make blemishes on the skin. Most judges will rule out any exhibit of potatoes which has been washed. Most fairs have two classes for potatoes, one for seed stock and the other for table stock. This latter should be larger than the seed potatoes. In general, a potato for table stock should be from 8 to 10 ounces in size, while the seed stock should be about 4 to 6 ounces. Potatoes which do not conform to the requirements of the No. 1 Federal grade should not receive a ribbon at a fair.

A desirable sheaf of oats.

The requirements for No. 1 potatoes may be obtained from any agricultural college or the United States Department of Agriculture.

Maybe the most skill in the exhibiting of crop material comes in the preparation of sheaf samples. These sheaf samples go a long way in the making of a beautiful showing for crop exhibits. Many very fine sheaf samples have some minor defect, such as a slight mixture of varieties or a small amount of disease which lowers their standing. It is important in a sheaf sample to have large heads of good quality and clean straw. Many times the beauty of a sheaf is marred by broken, discolored straw.

In general there are two classes of sheaf material, one is the grain sheaf and the other is the grass or forage sheaf. Grain sheaves are usually 4 inches in diameter and tied in three places. The shape of the heads is not important and may be round like a ball, acorn, or oval in shape. It is important that all of the leaves be removed and that the string holding the grain together be covered with one-inch ribbon.

Forage sheaves such as the various grasses, alfalfa or clover, require more skill to make than grain sheaves. It is very important that the forage sheaves have a good, dark green color and that all of the leaves are present.

Growers should collect their material early, store it in the proper place, and not let it become tangled if they hope to get good sheaves.

# Fertilizing the Apple Orchard

(*From page* 12)

mercial fertilizers, commonly a 4-8-10, and still others a combination of these two methods, that is, our fruit growers were fertilizing their orchards much the same as they were fertilizing their field crops. Now that it is understood that an apple tree requires less phosphoric acid and potash and relatively larger amounts of nitrogen than farm crops, the limiting factor then in our system of orchard fertilization was nitrogen.

Again, as previous to 1914 we were applying phosphoric acid and potash, and these elements are non-leaching from our soil (about the only way they can be removed is by means of plant roots), a large reserve of these important elements had been built up in our orchard soils. Hence, when the nitrogen-only system of orchard fertilization was adopted, a correct balance was obtained between the nitrogen applied annually and whatever amounts of phosphoric acid and potash that were needed to balance it from the accumulated phosphoric acid and potassium we had previously built up in the soil, and an increased production of fruit resulted.

This system of nitrogen-only fertilization has now prevailed for some time without any applications of phosphoric acid or potash to add to the reserve of these materials that were built up in pre-war years, hence it is likely that these reserves of phosphoric acid and potash have become, or are fast becoming, depleted and that the amounts rendered available from the natural unavailable stores in the soil are too small to balance the large quantities of nitrogen that are now annually applied to our orchard soils. Therefore, perhaps now or in the near future, these substances will be the limiting factor in orchard fertilization.

Again let us look at the results obtained when an approximate 4-8-10 fertilizer was applied in varying amounts of 400, 600, and 800 pounds per acre. (See Table III.)

TABLE III. — EFFECTS OF COMPLETE FERTILIZER ON APPLE TREE PRODUCTIVENESS, VARIETIES, GRAVENSTEIN AND WAGNER. EIGHTEEN YEARS' RESULTS.

| Plot | How Fertilized | Average yield per tree since planting: Gravenstein | Average yield per tree since planting: Wagner | Av. yield two varieties since planting | Total yield per acre since planting | Av. annual yield per acre since planting | Total cost of fertilizer since planting | Value of apples at $2 per bbl. tree run | Value of apples, less fertilizer |
|---|---|---|---|---|---|---|---|---|---|
| | | bbls. | bbls. | bbls. | bbls. | bbls. | $ | $ | $ |
| 6, 11, 14, 26 | None | 8.55 | 4.03 | 6.29 | 339.66 | 18.87 | ..... | 678.32 | 679.32 |
| 7 | 400 lbs. 4-8-10 | 8.62 | 11.00 | 9.81 | 529.74 | 29.43 | 107.33 | 1059.48 | 925.15 |
| 8 | 600 lbs. 4-8-10 | 12.73 | 5.50 | 9.12 | 492.48 | 27.36 | 160.99 | 984.96 | 813.97 |
| 12 | 800 lbs. 4-8-10 | 15.48 | 8.58 | 12.03 | 647.62 | 35.98 | 214.66 | 1295.24 | 1080.58 |

400 lbs. 4-8-10 = 92.3 nitrate of soda; 215.4 superphosphate; 92.3 muriate of potash
600 lbs. 4-8-10 = 138.5 nitrate of soda; 323.0 superphosphate; 138.5 muriate of potash
800 lbs. 4-8-10 = 184.6 nitrate of soda; 430.8 superphosphate; 184.6 muriate of potash

TABLE IV.—COMPLETE FERTILIZERS INCREASED THE YIELD OF WEALTHY AND FAMEUSE IN ORCHARD OF A. W. BUZZELL, ABBOTSFORD, QUEBEC. TREES 25 YEARS OLD AT BEGINNING.

| Fertilizer applied, pounds per tree. | Annual yield per tree 1925 bus. | 1926 bus. | 1927 bus. | 1928 bus. | 1929 bus. | 1930 bus. | Av. bus. |
|---|---|---|---|---|---|---|---|
| Nine trees Wealthy— | | | | | | | |
| Nitrate of soda, 6 | ... | 8.60 | 1.54 | 6.61 | 4.55 | 5.75 | 5.41 |
| Nitrate of soda, 6; superphosphate, 5 | ... | 6.23 | 4.51 | 6.83 | 8.28 | 3.58 | 5.87 |
| Nitrate of soda, 6; superphosphate, 5; muriate of potash, 1 | ... | 9.67 | 2.71 | 10.28 | 9.28 | 6.17 | 7.62 |
| Twelve trees Fameuse— | | | | | | | |
| Nitrate of soda, 6 | 1.12 | 13.97 | 0.04 | 12.04 | 0.37 | 13.62 | 6.86 |
| Nitrate of soda, 6; superphosphate, 5 | 2.45 | 12.41 | 2.10 | 13.75 | 3.50 | 12.50 | 7.78 |
| Nitrate of soda, 6; superphosphate, 5; muriate of potash, 1 | 0.87 | 16.02 | 0.21 | 16.46 | 1.08 | 16.90 | 8.59 |

### *Complete Fertilizers Complete Yield*

It will be noted that as the application of this 4-8-10 fertilizer was increased from 400 to 600 to 800 pounds per acre the yield of the Gravenstein variety increased in proportion to the amount of fertilizer used. The Wagner yields were variable owing to the wide range in vigor and productiveness of the individual trees even under identical treatment. However, in taking the average of the two varieties it will be seen that wherever the fertilizer was used an increased yield was obtained over the non-fertilized plots. I may say that the results of this experiment check with an experiment conducted in a sod orchard at Abbotsford, Quebec, the results of which are shown in Table IV. In this orchard the soil upon analysis prior to the beginning of the test gave 0.77 per cent of nitrogen, 0.32 per cent of phosphoric acid and 1.98 per cent of potassium, and although this soil was relatively high in the essential minerals the highest yields were obtained where a complete fertilizer was used.

### *Dates of Application of Orchard Fertilizer*

To determine by experimental tests the proper time in the spring in which to apply orchard fertilizers, a test was started in the spring of 1924. Three rows of 9-year-old MacIntosh with Wagner fillers were selected for uniformity of soil and growth. The soil where this orchard is growing is above average fertility, as will be later shown by the records from the unfertilized plot. The first row was put down to sod or grass mulch; in the second row a sod strip was maintained on either side. The third row was cleanly cultivated to July 1 and a cover crop allowed to grow from then to late autumn.

Each of these three rows was then divided into 4 plots of 5 trees each, number 1 being check, number 2 fertilized on April 25, number 3 fertilized on May 17, and number 4 fertilized on June 8. The fertilizer mixture from 1924 to 1928 inclusive was 150 lbs. nitrate of soda, 300 lbs. superphosphate, and 50 lbs. potash, applied at the rate of 5 lbs. per tree each year.

During 1929 and 1930 the mixture was our regular orchard mixture of fertilizer of 200 lbs. nitrate of soda, 200 lbs. sulphate of ammonia, 300 lbs. superphosphate, and 100 lbs. muriate of potash. This mixture was applied at the rate of 8 lbs. per tree each year. Table V records the data secured from this test during the past seven years.

It will be observed from the table that the best average results were from the June-8 application. Why is this? My explanation would be as follows: April 25, this application is made usually while the soil is still saturated with surface water which when it eventually drains away leaches a large proportion of the available nitrogen with it from the soil; then again, it is applied usually before the growth of the tiny hair fibre feeding roots have developed sufficiently to absorb and store up any of this plant food from the rapidly disappearing surface drainage.

TABLE V.—DATES OF APPLICATION OF FERTILIZERS, 1921-1930. VARIETY, McINTOSH, 7-YEAR AV. PER TREE IN BBLS.

| Orchard Culture | No Fertilizer | Fertilizer applied April 25 | May 17 | June 8 | Av. yield per tree | Av. annual Yield |
|---|---|---|---|---|---|---|
| | bbls. | bbls. | bbls. | bbls. | bbls. | per acre |
| Grass Mulch | 8.31 | 11.11 | 12.55 | 14.68 | 11.66 | 44.97 |
| Sod Strip | 11.98 | 15.03 | 13.45 | 19.76 | 15.05 | 58.05 |
| Clean Cultivation | 13.47 | 11.63 | 11.94 | 12.10 | 12.28 | 47.37 |
| Average | 11.25 | 12.59 | 12.65 | 15.48 | | |

The May-17 application is applied at a time when the tree is bursting forth in full vigor, shoving out its new terminal growth, developing its leaves and flower buds, in fact its every department is working to capacity and each department requires abundance of plant food. It is not probable that in this struggle for development the trees may use up all the nitrogen applied on May 17 before the fruit buds attain their maximum development, and before nitrification within the soil becomes really effective. Then it is reasonable to suppose that in the orchard receiving the June-8 application, with the trees usually at the full-bloom stage at this date, the nitrate of soda in the mixture applied, being immediately available when once dissolved in the soil moisture, would be quickly taken up to the rapidly developing embryos of the tiny apples and give them the pep necessary to stimulate the set after which the balance of the fertilizer and the nitrification of the slowly available forms of nitrogenous substance would carry the crop along to maturity.

It will be noticed also from this table that the average annual yields per acre are in favor of, first: sod strip; second, clean cultivation; and third, grass mulch.

It is an accepted fact or belief that a sod orchard soil is richer in total nitrogen than a cultivated soil, but this nitrogen is in a comparatively unavailable form until soil bacteria and chemical changes render it available, which is as I have stated after the soil becomes warmed up and bacterial life becomes active.

The early cultivation of the soil outside of this sod strip aerates and warms it up, thereby aiding in nitrification of unavailable forms of nitrogen and rendering possible other chemical changes that may be necessary to make phosphoric acid and potash quickly available to the growing tree.

These now available forms of plant food, particularly nitrogen, are quickly taken up by the tree and utilized in developing the various phases of tree growth, particularly the fruit buds. Then this reserve of nitrogen in the sod strip, becoming gradually available, gives the "follow through" effect and larger yields.

The clean cultivation method falls down in yield and in two different ways: theoretically by a burning up or depleting of the humus content of the soil by frequent cultivation, thus destroying the most efficient agent for storing or holding in reserve for future use the plant food and moisture of the soil. But in practise the clean cultivation method has given us lower yields because of the fact that to practise clean cultivation it is necessary to head trees higher, and in so doing, the removal of the low branches reduces the size of trees below that which gives the largest, well-exposed bearing surface per acre.

Be it understood that in these three methods the trees were all fertilized alike. Had the grass mulch plot received an increased quantity of quickly available nitrogen, as is recommended for grass mulch orchards, the results might have been different. However, let it be understood that there is a vast difference between a sod mulch and a sod orchard. Remember that a sod mulch orchard, if practiced, to be profitable must be sod mulch culture, with all that those words imply, not "sod neglect" as is too often the case. The grass mulch or sod orchard is not recommended in our Annapolis Valley, excepting in a few very favored locations, but sod mulch orchards are giving very good accounts of themselves in many localities. A sod mulch must, to be successful, be sufficient to suppress all growth of grass or weeds under the trees, when it will be sufficient to effect control of soil moisture.

Mulching material necessary is 200 lbs. of mulch material per tree or from 2½ to 5 tons per acre, with an additional 100 lbs. per tree once in every 3 years.

### *The Fertilizer Used at Kentville*

The orchard fertilizer mixture used at the Kentville Experiment Station during the last few years is composed of the following mixture:

200 pounds nitrate of soda, 15% nitrogen,

200 pounds sulphate of ammonia, 20% nitrogen,

300 pounds superphosphate, 16% phosphoric acid,

100 pounds muriate of potash, 50% potash;

analyzing 8.77 per cent nitrogen, 6 per cent phosphoric acid and 6.2 per cent potash.

These chemicals are thoroughly mixed and then applied at the rate of 450 to 600 pounds per acre according to age and productivity of the tree. The fertilizer is largely sown by hand at the rate of 8 to 10 pounds, carefully distributed about the tree to slightly beyond the spread of the tree's branches. The fertilizer is applied about mid-May or when the trees are just showing a tinge of green from the newly formed leaves. In this mixture it will be seen that the nitrogen is applied in two forms, nitrate of soda and sulphate of ammonia. The former being quickly available aids in the development of the various tree activities at the start while the latter carries on after the nitrate of soda has been used up.

To those orchardists who like to experiment, particularly those adopting sod culture, it would seem advisable to apply their complete fertilizers to their orchards as early as the soil conditions will permit, that is, after all surface water has drained away and the soil is dried out and firm in the spring. Then later when the trees are at the pink-blossom stage to apply a top-dressing of from 100 to 150 pounds of nitrate of soda per acre to aid in fruit setting.

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# Sacred Cows

(*From page* 4)

opened their eyes a trifle wider when Mr. Legge first assumed rural economic prominence, and followed hard after him sowing tares in the wheat fields he wanted to limit in size for temporary relief.

These herdsmen of the sacred cows are vigorous as ever, and by their very impudence and bitter-ender attitude they give the aid and comfort to the opponents of agricultural solidarity in nearly every State where cooperation has reached any magnitude. It is in the State departments of marketing and cooperative organization where the sniping is going on at a terrific rate, with these old wheelhorses doing the dog-in-the-manger.

Let anyone venture to suggest certain advisable changes in legal set-up or business practice for one of these sacred cow locals, that would tend to hinge them to the door of greater opportuntiy through national farm control, and see what comes of it!

In a Midwestern State there is a cooperative built up by a valiant farm leader who died in the harness. For ten years this farmers' agency has posed as a marketing company for a few hundred locals in two States, when in reality it is nothing more than an assembling unit of rather loose power. Reams of stilted praise, verbal fireworks, and undeserved tribute have been spilled in behalf of this time-marking group. When a well-informed writer who had followed the history of this group on the farm side for a decade decided that a little stimulation would be good medicine for this sacred cow, he approached a few of the leading local officers of one of its branch divisions. He asked if a little judicious and well-meant criticism of a constructive kind might not pry up the lid of the feed-box on which the herdsmen of this sacrosanct beast were seated.

Up went the hands of the hearers in horror. "*Lèse majesté!*" Such a broadside of criticism would undo the campaigns of many months over bad roads and give the rival independents a stranglehold on the business. "Do this and you lose caste as a respected farm journalist," was their final warning, accompanied by fluent gestures and weighty frowns. And so it is in this way that the hands of those who have a real unbiased perspective of co-operation are tied fast to their sides with a straight-jacket made of provincial strands.

IN this same territory and embracing two of the largest creamery States are two or more federations of farmer-owned plants. It is quite within their scope and power to unite across the State lines and dovetail into the Farm Board program for the first step in dairy stability and independence. But for nearly eight years the rival clans, led by mossy local patriarchs, have clung to predigested opinions and obtruded small reasons why "self-determination" is the best road to destiny.

Evidence of the ability of farmers in adjacent counties or the next State to erect a national dairy sales company of sterling worth and market power only inflames the embers of their smoldering animosity. It is out in these by-paths that the missionaries of farm salvation through federations and contracts must spread their gospel tents and provide their mourners' benches.

Not content with Gandhi's passive resistance theory, some of the sacred cow jockeys in the above daily dilemma used their pull and prejudice among the members of the legislature in 1931, trying to unseat the commissioners and bureau heads who had been working with the Farm Board on a little larger line of action than the provincials desired.

As a consequence of this hesitancy to let go of old traditions of doing business, there has grown up a rather baffling complex of legal business, induced by contract breaking on the part of members who signed up in some campaign and have since listened to the ancient prophets and remorseless objectors.

SO we have a few legal specialists taking on the business of sewing and suing. They help to sew up the members in contracts and sue them for breaking them. Indeed some of these talented lawyers have found the agricultural problem a richer stew than any judicial pot that ever boiled over.

Here is one lawyer of ability leading a cooperative sales company and getting judgments against individual members who yield to the wiles of independent buyers for selling goods outside of the pool. Just as quickly he cracks the whip in the opposite direction, and sues and secures judgment on a large farmers' cooperative which fails to render acceptable service on an iron-clad contract with individual members.

Therein he probably renders all a lesson, albeit a costly one. He shows them that there is no magical open sesame to this business of banding together to sell a common product of graded quality for a going price. He teaches them that a guarantee to deliver and a contract to accept and sell is more vital than a mere membership agreement in some hectic society of agricultural protest.

This harks us back along an old, moss-grown, verbally decorated trail.

The sweaty spellbinders and the open-mouthed auditors at schoolhouse rallies talked vehemently and to some pioneer purpose on the value of getting the tillers of the soil as well healed as the tellers of the gold. Their era was the torchlight epoch in agricultural unity. They called the men with too much log-cabin individualism into a realization of modern industrial cohesion.

These were the chaps who set the prairie fires and woke the backwoods clearings to the movement which finally enthroned these latter-day saints of the stand-pat order. They organized almost too well, with the result that in a few years the mails were flooded with manifestos and appeals from several rival State and national farm societies, and Washington, D. C., became the great jousting place for knights-errant from every agricultural bush-league in forty-eight States.

Right now in many States no serious State-wide conference may be called for a uniform farm movement unless notices are carefully sent to a score of rival leaders, who come in with eyes bent inward and ears fanned outward. They will not consider much of anything that divorces them from a coign of vantage or reduces their own membership by any threat of alienation or of secondary position. They shake hands all around, listen to a few speeches and thrice-told tales of agonized agriculture, pass a few meaningless resolutions, and return home to spread the seeds of sedition again.

Therefore, whoever bemoans the fact that farmers are not organized and will not stay organized has only nibbled at the crust of the problem. He doesn't know the half of it. Agriculture is so mighty well organized on the wrong plan and bulldozed by so many ingrowing thinkers that any varnish put on the upper surface of the job will peel off until the pits and scales are removed from below. That's why the Farm Board can't tame the "thundering herd." There are so many sacred cows driven by rural "rustlers."

We have no disposition to claim that any and all overhead schemes offered to the rank and file are absolutely sound. But as long as the argument runs rife and the teams that we depend upon to pull the load are yanking and fretting in the harness, it will be next to impossible for *any* plan to be tried for any length of time.

My friend Robin Hood, of the national cooperative council, always glad to carry the ensign afield, says that large-scale cooperatives have increased their volume of business over 28 per cent since the establishment of the Farm Board. They also click up an added membership of 33 per cent despite a drop in farm morale. Furthermore, he finds that in the face of a decline of 18 per cent in commodity prices on farm goods, the value of the produce sold by these same larger cooperatives has increased nearly 5 per cent since the Farm Board's administration.

ALL this is mighty encouraging and speaks well for the hired employes of the various federations and pools, whose main job has been to bushwhack hard against the feudalists out in the sticks, always gunning for the spirit of unity against the prejudice of provincialism. But to many of the old bewhiskered jehus aforementioned, those added dollars secured a mile off from home look small beside the nickels tinkling in their overall pockets. They reply that the intervening costs of operation and overhead eat up all the paper profits. They refer to deal with some old-timer they know, although they are aware he is abusing their confidence at every turn.

We insist that a frank clinic for sacred cows would mend matters in a few distressing particulars. Some of them have economic t. b. so bad the stockyards would send them to the tank. Others suffer from bloat and lie supinely in distress. Yet more of them actually have cooperative abortion in a mild form. The stables in which these critters are kept require whitewashing and disinfection. The ration is unbalanced and the hay is moldy. If a vet is required, he is often of the quack variety with nostrums and cure-alls that send the victim still further down in the musty straw.

'Tis true that the main herd of purebreds kept on the main thoroughfare is well housed and fed, with fairly good caretakers graduated from approved institutions. Cooperation in those herds yields a full pail of nutritious liquid, not too frothy.

Cooperation itself, then, faces the same test exactly as faces animal husbandry. We have only a small percentage of tested cows and purebred animals, and a lower supply of proven sires. The best ones go on the fair circuit and win ribbons, while the "average" herd is still pretty much a mongrel outfit, taking the nation over.

Our chief consolation is that "things are better than they used to be." Maybe that hope will gain momentum with the rise of the youth movement, trained to work in closer harmony and follow a little more daring paths.

It is still true and probably shall so remain that one cannot force any movement ram-rod down the necks of a harrassed people. But if perchance the people study sword-swallowing as a profession and get in tune with the times by natural choice, it will be possible to accomplish this without a giraffe-necked race.

SPEED and inertia are opposite elements of force, I presume. You and I shall not live to observe the wholesale union of all farmers in one glorious ensemble. Yet one by one some of the old leaders are leaving the field, giving place to younger and speedier ones. While this in itself is no absolute guaranty that the new leaders will all see things alike, they will doubtless have less to disagree upon in minor ways.

Our hope is that this gradual improvement of personnel will set a higher standard in our cooperative herds. The butterfat test of cooperation, as well as the acidity and sediment tests, ought to go up a notch under a more general adoption of better management.

But best of all therein, there will be fewer sacred cows kept on the premises for sentimental reasons.

# A Few Whinnies


### VERY CONSIDERATE

"Yous a liah," said Cal.

"Say dat again," said Wash, "and I'll bust yore jaw."

"Considah it said again."

"Considah yore jaw busted."

---

First Charlady: "You know, dear; what do you call those drawings that are all scratched?"

Second Charlady: "You mean itchings, don't you, dearie?"—*Tit-Bits (London)*.

---

Here's one about a census-taker. He pushed his way through a crowd of children and began asking the colored lady questions.

"What's your husband's occupation?" he asked.

"He ain't got no occupation. He's dead. He passed away fo'teen yeahs ago, suh."

"Then who do all these children belong to?"

"Deys mine, suh."

"Why, I thought you said your husband was dead?"

"He is, but Ah ain't."

---

### ONE FOR EACH

A firm of solicitors rang up a stockbroker, and the following conversation took place:

"Good morning, are you Mr. Denman?"

"Yes, who is this?"

"This is Hullett, Crafting, Studge, Minardy, Gowle, and Scarrow."

"Oh, good morning, good morning, good morning, good morning, good morning."

### JUDGED BY TASTE

Mark Twain refused to play golf himself but he once consented to watch a friend play. The friend was rather a duffer. Teeing off, he sent clouds of earth flying in all directions. Then to hide his confusion, he said to his guest:

"What do you think of our links here, Mr. Clemens?"

"Best I ever tasted," said Mark Twain as he wiped the dirt from his lips with his handkerchief.

---

A Negro was pleading his own case to save the price of a lawyer. He called the chief witness to the stand and said, "Joshua, where was I when we stole dose chickens?"

---

Teacher (to new pupil): "What is your father's name, dear?"

New Pupil: "Daddy."

Teacher: "Yes, dear. But what does your mother call him?"

New Pupil: "She don't call him anything. She likes him."

---

A Scot who was a bad sailor was crossing the Channel. He went to the Captain and asked him what he should do to prevent seasickness.

"Have you got a sixpence?" asked the Captain.

"Ay," replied Sandy.

"Well, hold it between your teeth during the trip."—*Boston Transcript*.

---

There is nothing more pathetic than a horse fly perched on an auto radiator.

# Better Crops WITH PLANT FOOD

September 1931 10 Cents


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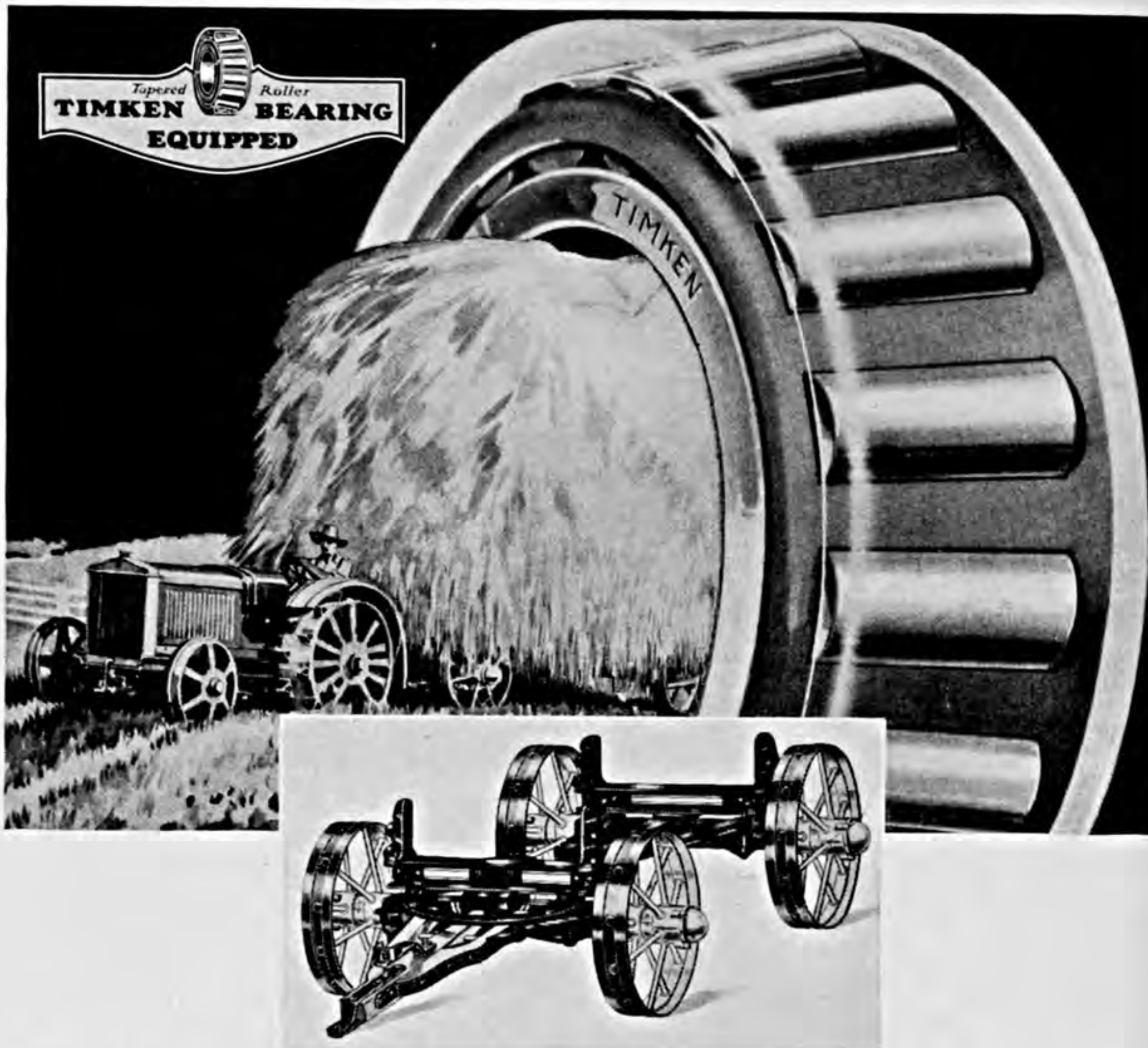


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The Whole Truth—Not Selected Truth

R. H. Stinchfield, *Managing Editor* Sid Noble, *Editor*

*Editorial Offices:* 19 West 44th Street, New York

VOLUME XVII NUMBER THREE

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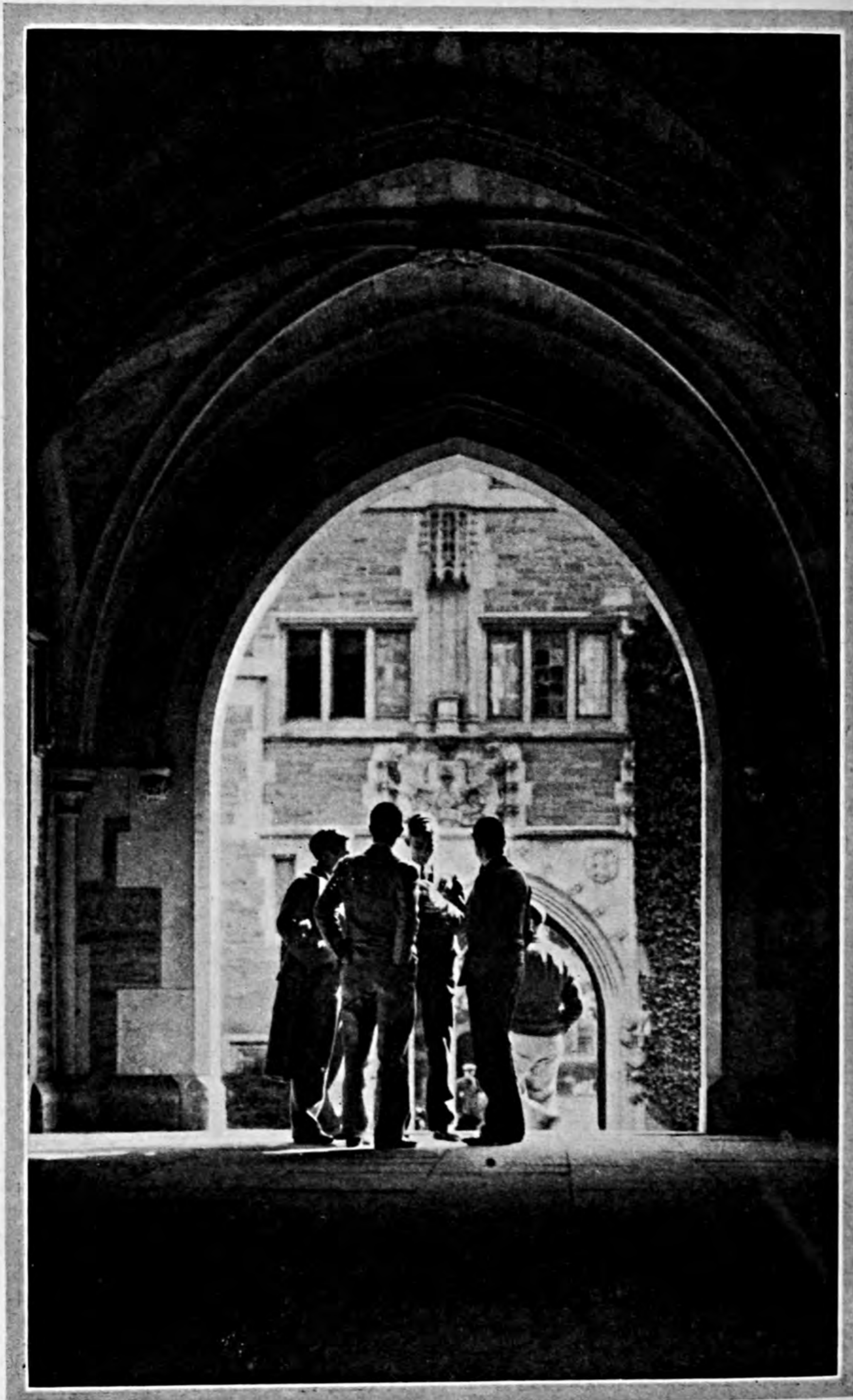

By Ewing Galloway, N. Y.

MANY FARM BOYS WILL CROSS THE THRESHOLDS TO HIGHER EDUCATION THIS FALL.

Better Crops with PLANT FOOD

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# BARKERS *and* Builders

*Have we room for both?*

By Jeff McDermid

HAS the age of the big front, the raucous voice, and the glittering stick-pin come to a temporary halt in the management of the American side-show of marvels?

With the 1929 census of retail sales showing that 52 billion dollars was spent by the public, which was a little better than the national earners' income that year; and with the wild stock market gamble pretty well abandoned, perhaps the sentence we have received to spend a few terms in the economic house of correction may give some encouragement to the quiet and unobtrusive ones.

Foster and Catchings, twin necromancers of economics and socialism, are apparently imbued with the idea that what we need is more new appetites for more things for more jobs for more cash for more goods to make more jobs. To them the super-salesman and all the barker clan of the erstwhile side-show are indispensable elements, like the auto, the radio, and the oil burner—things to which we and our children are meshed and geared forever in the never-ending search for greater creature comforts. To them the only way to get over the sudden gap in the highway of progress in front of us is to step on the gas and jump it. Why bother to detour or build a bridge?

NOW as a matter of sound fact, there are quite some considerable number of us representative American folks who have sort of managed to get along without golf pants, cigar lighters in our Fords, electric clocks, and Fuller brushes. Some of us have bred and reared youngsters who do not scan the pages of the Thursday Torment to find bizarre birthday gifts.

We have found that sound health is largely dependent upon simple lives and larders, and that "nerves" are unstrung and the mind unbalanced by too much yearning and posing. We enjoy seeing the links alive with those who would seldom get grass stains on their pants otherwise, and we let the ones alone who want to imitate Hollywood as the motion picture magazines picture it.

We still use the seats of our breeches or the soles of our shoes to scratch matches and we don't have to have a row of seventeen different brushes to use from rug-beating to tooth-cleaning. We still wind the eight-day clock, push the same old lawn-mower, and shovel in the fuel, all with humble thanks for so much time, such luxuriant grass, and credit from the coal man.

And by the way, if you were to carefully inquire of those who thus eschew the vainglories of super-salesmanship, I am sure that you would find real substance to them; that many of these quiet folks are enrolled in Who's Who, have been achievers in their lines and builders of the future. I am also confident that much of this raucous racket, which I liken to the side-show front, appeals to the hasty-minded, the tyros, and the inexperienced—the folks with come-easy, go-easy attributes.

Neither do I admit that failure to respond to everything that is new and ultra-modern spells decadence or ignorance. Some of the world's wisest men at present are residents of the Orient, wrapped in simplicity and utterly indifferent to the poo-bah panorama. We are so apt, you know, to conflict the meaning of civilization with whatever goods or services we happen to sell.

Personally, I admit that the seller is a vital force in all life. Even the good old gospels had to be sold by a group of traveling men who paid their own expenses—divine drummers who went from East to West and back again through the mighty pages of sacred history. America was settled by many such people, who were a trifle impatient that the redskins did not listen freely to their fervid soul salesmanship. Resistance to sales ideas of this kind has been the goad that lashed all devotees into a fury of purpose, whatever their line might be.

I AM also aware that salesmanship transformed the back-breaking lot of the farmer into the comparative ease that he now enjoys riding the rows behind motive power. But it did not stop there, and all kinds of bunco artists broke down the fences legitimately sold by honest firms to safeguard the premises, and toured the rural routes with ointment and oil. Ask any implement dealer or machinery manufacturer now what the net result of over-selling farmers has been with near non-essentials, and your ears will be filled with brimstone.

Sales and profits supplanted the ideas of good will and confidence so much in American life during the past two decades that we got into the Barnum frame of mind as a public naturally must—namely, that if it is good and

(*Turn to page* 61)

The dairy equipment at the Western Washington Experiment Station is modern.

# BETTER PASTURES *for* Western Washington

*By Maynard S. Grunder*

Agronomist, Western Washington Experiment Station, Puyallup, Washington

THE profitable operation of the dairy farm depends to a great extent upon low cost of production. Since the cost of production is largely dependent upon feed costs, any factor which will lower the cost of feeding will directly influence profit.

Inasmuch as good pastures produce a high yield of valuable forage at a very low cost, they form one of the most effective means of lowering the cost of producing dairy or livestock products. Hence, any knowledge which will enable the farmer to increase the yield, lengthen the productive season, or manage his pastures more efficiently, will be of great value.

Western Washington is very fortunate in having a climate which is particularly well adapted to the growing of pasture crops. The mild winter temperatures and abundant rainfall over most of the year encourage a long growing season and a heavy yield of forage. As a result the farmer may by proper management produce enough pasture to maintain his animals over a large part of the year. These factors, coupled with the nearness to large centers of population which provide a ready market, make this section of the country well suited to the dairy industry.

Of the 1,880,000 acres included in farms in western Washington at the present time, approximately one-half is classed as pasture land. Over 80 per cent of this pasture land, however, is unimproved. In most cases the pasture consists mainly of low-yielding, native grasses which are forced to grow in competition with brush and ferns. Under such conditions, the carrying capacity of the pasture is naturally very low, varying from 60 to 100 cow-days per acre. On improved pastures the carrying capacity is of course much higher, ranging from 150 to 400 or even more cow-days per acre, depending upon the fertility of the soil, the moisture supply, and the kind of pasture.

### *A Long Grazing Season*

On the improved valley lands, a grazing season of seven to eight months is not uncommon. Pasturing is often started early in March and may continue until late in October. Pastures remain green throughout the winter and although the rate of growth is very slow at this time, the material which accumulates during these months provides an abundance of feed for early spring pasturage. On the upland soils, moisture is the chief limiting factor, and the grazing season is generally over by mid-summer.

A common mistake among dairy farmers is that they utilize their best land for cultivated crops, cereal or hay production, and pasture their cows on what is left. As a result their pastures are used up early in the season, and they are forced to resort to barn feeding—a very expensive practice. It would be a much wiser practice to use the best land for pasture and the poorer land for crop production. This would result in far less barn feeding, lower labor costs, and would keep the animals in better condition. Even if smaller crops were produced, less supplementary feed would be required to carry the animals through the season when no pasture is available.

Although the percentage of improved land used as pasture in western Washington is small at the present time, there is an increasing tendency to use this land for grazing purposes. Census reports show that during the last five years there has been an increase of over 35 per cent in the amount of improved land used as pasture. Since it is only on the improved pastures that a high carrying capacity can be secured, this tendency should be encouraged.

The feeding value of a good pasture, properly utilized, is much higher than is ordinarily supposed. It has been aptly said that closely grazed pasture grass more nearly resembles a watered concentrate than a roughage. The research work of various experiment stations has demonstrated that this is true. Agricultural workers have found, in the dry matter of immature pasture grasses, a protein content much higher than that usually found in good alfalfa hay. For comparison, it may be said that Henry & Morrison's "Feeds and Feeding" shows that the average protein content of alfalfa hay is 14.9 per cent while that of wheat bran is 16.0 per cent.

Unpublished data of the Western Washington Experiment Station show that the dry matter of an unfertilized pasture mixture, kept in an immature condition by bi-weekly cuttings, averaged from May through December, more than 25 per cent crude protein. Incidentally, the yield of dry matter per acre secured during this time totaled more than 6,500 pounds. Besides a high protein content and a heavy yield, English investigators found that the dry matter of fresh pasture grass possessed a very high coefficient of digestibility.

### *Immature Grass Is Best*

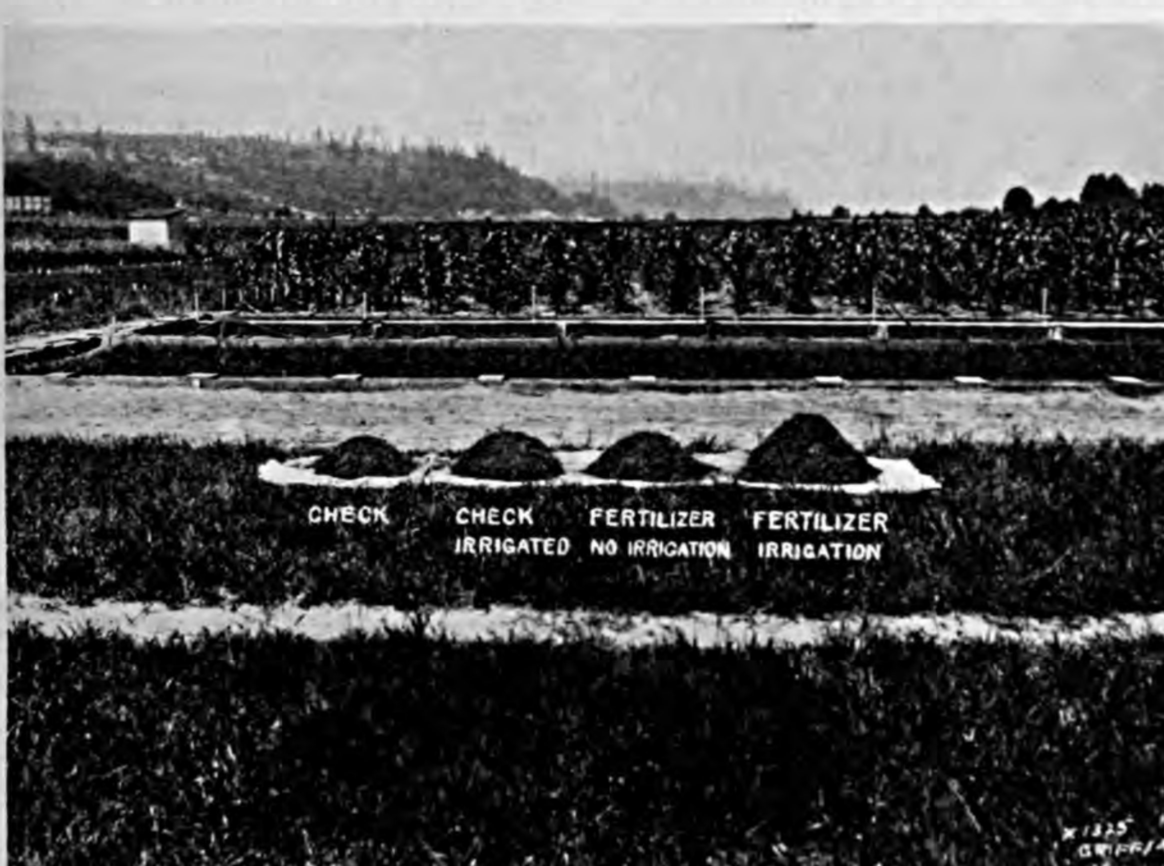
It is, however, a known fact that the feeding value of grass diminishes rapidly as it approaches maturity. Hence, it is evident that the pasture crop, in order to maintain its high feeding value, must be kept in an immature condition. One of the most effective means of keeping pastures in a succulent, immature condition is the system of pasture utilization known as rotation grazing. This system of pasture management originated in Germany as part of the Hohenheim System. The Hohenheim System involves the division of the pasture into a number of smaller units; the intensive fertilization of these units, especially with nitrogenous fertilizers; and the division of the herd for grazing purposes, into three groups, the high producers, the low producers, and the dry and young stock.

Each pasture unit is grazed first by the high producers, then by the low producers, and finally by the dry stock. Thus the high producers are always on the freshest grass while the residue is cleaned up by the other two groups. After the removal of the dry stock, each unit is allowed a period of recovery in preparation for the next grazing period. The basic principle in rotation grazing involves the intensive and thorough grazing of a pasture unit, followed by a period of rest during which the unit is not grazed.

The results obtained under the Hohenheim System of pasture management have been so outstanding that this system has been introduced, in modified form, into various parts of the United States.

Under western Washington conditions the division of the herd into three groups is not considered practical for the small dairyman. Two groups, however, consisting of the milkers and the dry stock, may be used very satisfactorily. The dry stock needs to be handled only when it is being moved from one plot to the next.

The size and number of units to be used in any rotation grazing sys-




**FERTILIZER AND IRRIGATION PLOTS ON PASTURE**

The figures are for cuttings taken on June 12 and represent about two weeks' growth of grass during an exceptionally dry period of weather.

| | |
|---|---|
| Plot without water and fertilizer | 368 lbs. dry matter |
| Plot watered but not fertilized | 594 " " " |
| Plot fertilized but without water | 589 " " " |
| Plot watered and fertilized | 848 " " " |

tem depend upon the size of the herd and the amount of pasture available. The Western Washington Experiment Station recommends the division of the pasture into units of such size that the rate of grazing will be from 10 to 12 cows per acre. For example, a herd of 50 cows would suggest units of 4 to 5 acres. The heavy grazing of small units for short periods enables the dairyman to closely control the grazing of his pastures. Animals are kept on one unit until the pasture is closely grazed, at which time they are moved into the next unit. One of the advantages of this system is that little mature grass remains on the pasture after the grazing period. The pasture is thus left in a condition to produce a growth of fresh, palatable grass of high feeding value.

### *Fertilized Pastures Pay*

The use of fertilizer in connection with the rotation grazing system is of considerable value in increasing the yield and prolonging the growing season. For this purpose a fall application of 300 to 500 pounds of a 2-10-10 complete fertilizer and a spring application of 300 pounds of nitrate of soda per acre, or its equivalent, are recommended. The nitrate of soda may be applied in two lots of 150 pounds each, although an early application of 100 pounds followed by a later application of 200 pounds is very satisfactory.

Liquid manure, when available, is a highly desirable pasture fertilizer and may replace a large part of the commercial fertilizer otherwise necessary. Liquid manure, while rich in nitrogen and potash, is low in phosphorus. For this reason some superphosphate or other form of phosphate fertilizer should be used to reinforce liquid manure.

In addition to increasing the yield and palatability of the pasture crop, there is a possibility that the use of fertilizer may be of practical value in preventing some of the mineral deficiencies of livestock. This possibility is suggested by the fact that the calcium and phosphorus content of the pasture crop may be increased by the use of fertilizer, especially when these elements are deficient in the soil.

The Western Washington Experiment Station has for a number of years been engaged in experimental work dealing with various phases of the pasture problem. As early as 1923, a project was started to compare various cultural treatments on established pasture. This experiment, which was carried on for seven years, showed very effectively that an annual scarification and reseeding on an established sod was not effective in improving the pasture. In fact the average carrying capacity of the scarified pasture was 5.5 per cent lower than that of the check plot. Furthermore, the trend of production of the scarified area (as plotted by the method of least squares) was decidedly downward while the check plot showed an almost imperceptible downward trend.

In order to determine the yielding ability of various grasses, and the rate of growth of different seasons of the year, duplicate series of grasses were seeded in 1/100-acre plots on a sandy loam bottom land soil early in March, 1930. One series of plots received before seeding, an application of fertilizer consisting of 300 pounds of nitrate of soda, 500 pounds superphosphate, 200 pounds muriate of potash and 2,000 pounds hydrated lime per acre. The other series received no fertilizer treatment. Cuts taken at bi-weekly intervals from the middle of May up to the end of October gave the following total yields of dry matter.

| | *Fertilized* | *Unfertilized* |
|---|---|---|
| Italian Rye | 7582 | 5827 |
| Bottom Land Mixture | 7343 | 6328 |
| Ladino Clover | 7298 | 6955 |
| Orchard Grass | 5281 | 4434 |
| White Clover | 6649 | 5355 |
| Meadow Fescue | 5380 | 4132 |

These dairy cows are grazing on a 1-acre plot fertilized with 500 lbs. 2-10-10 complete fertilizer and 300 lbs. nitrate of soda per acre. Up to July 15, the yield of pasture dry matter per acre on this plot was 7,058.3 lbs. as compared with 5,243.3 lbs. on the plot without fertilizer.

The highest yields were secured during May and June followed by a constant drop in the rate of production as the season advanced. For example, the monthly production of dry matter per acre of unfertilized Italian Rye grass was as follows:

| | | |
|---|---|---|
| June | 1692 | pounds |
| July | 1421 | " |
| August | 847 | " |
| September | 495 | " |
| October | 320 | " |

This rapid decrease in the rate of growth during the summer and early fall is due to a large extent to the low rainfall during these months. Rainfall records for the past five years (1926-1930) show an average of .82 inches for June; .13 inches for July; .59 inches for August; and 1.33 inches for September.

The experiment above, showing the great drop in production as the season advanced, led the Experiment Station to inaugurate this year an experiment to determine the extent to which supplementary irrigation, aided by fertilization, would maintain a high production through the summer and fall months. While this work is still in its early stages, the data secured so far indicate that the application of water and fertilizer during the summer months will be of great value in lowering the cost of summer feeding. As a matter of fact, a few progressive farmers are already turning to irrigation as an economical means of increasing summer pasture yields. The abundance of water and cheap power available make this practice a very effective means of lowering production costs.

Some of the earlier work of the Western Washington Experiment Station was that of formulating suitable mixtures for various types of locations. Observations have shown that the best results have been secured from mixtures containing some of the tall bunch grasses, some clover, and some low - growing, sod - forming grasses. Such a mixture is palatable and nutritious; covers the ground to the best advantage; withstands trampling well; and produces a heavy yield of forage over a long period. Based on their performance under our conditions, various grasses and clovers were selected to make up the mixtures to be recommended by the Western Washington Experiment Station. Various changes in the original recommendations have been found advisable, but the same principle is still being followed. At the present time the following pasture mixtures and grasses are recommended by the Western Washington Experiment Station:

*For Rich Moist Bottom Land Soils*

| | | |
|---|---|---|
| Italian Rye Grass | 3 | lbs. |
| English Rye Grass | 3 | " |
| Meadow Fescue | 4 | " |
| Orchard Grass | 4 | " |
| Creeping Bent | 2 | " |
| White Clover | 4 | " |
| Red Clover | 2 | " |
| Alsike Clover | 1 | " |
| | — | |
| For one acre | 23 | " |

*For Sandy Bottom Land Soils; Inclined To Be Droughty*

| | | |
|---|---|---|
| Italian Rye Grass | 3 | lbs. |
| English Rye Grass | 2 | " |
| Tall Meadow Oat Grass | 4 | " |
| Orchard Grass | 4 | " |
| Kentucky Bluegrass | 4 | " |
| White Clover | 4 | " |
| Red Clover | 2 | " |
| Alsike Clover | 1 | " |
| | — | |
| For one acre | 24 | " |

*For Upland Clay Loam or Sandy Loam Soils*

| | | |
|---|---|---|
| Italian Rye Grass | 4 | lbs. |
| Tall Meadow Oat Grass | 5 | " |
| Orchard Grass | 3 | " |
| Kentucky Bluegrass | 2 | " |
| Meadow Fescue | 2 | " |
| White Clover | 3 | " |
| Red Clover | 2 | " |
| Alsike Clover | 2 | " |
| | — | |
| For one acre | 23 | " |

Reed Canary Grass (*Phalaris arundinaceae*) is recommended for land which is flooded for a considerable period during the winter. Because of its ability to thrive under conditions of excessive moisture, Reed Canary Grass has been instrumental in bringing into production hundreds of acres of otherwise worthless land. Its high yielding ability and long productive season make this grass a most valuable addition to the pasture crops of the dairyman of the Northwestern States.

***Annual Fertilizer Applications?***

In the fall of 1929 a grazing experiment was started to determine the extent to which the carrying capacity of a pasture might be increased by the annual application of a complete fertilizer. The area selected for this purpose consisted of three acres of an old bluegrass sod located on a rather droughty sandy loam soil. This area was divided into three one-acre plots, two of which were fertilized while the third received no fertilizer. The fertilizer program included a fall application of a 2-10-10 complete fertilizer and two spring applications of nitrate of soda, the two nitrate applications totaling 300 pounds.

An average of 176 ten-hour grazing days per acre was secured the first season from the fertilized plots as compared to 139.5 for the unfertilized plot, an increase of 36.5 days per acre. The three plots were grazed in rotation, the same animals being used on all the plots.

From the data secured so far this year, and from the appearance of the plots, it is expected that the difference in yield between the fertilized and the unfertilized plots will be even greater than during the first year of experiment. Up to the middle of July, 1931, the average yield of the fertilized plots was 7,058.3 pounds of dry matter per acre as compared to 5,243.3 pounds for the check plot. The grazing yield during the same period was 210.6 ten-hour grazing

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# Marketing Quality Vegetables

*By M. D. Butler*
County Agent, Marion, Indiana

THE market gardens and retail and wholesale business of Clarence Moore and Dave Reynolds at Jonesboro, Indiana, are made more conspicuous by being located in a section that regularly imports from 75 to 80 per cent of its fresh fruits and vegetables. In way of contrast, this community ships in less than 10 per cent of its pork and beef requirements.

In other words one driving into Marion, Indiana, any time of the year will be conscious of the fact that he is in the corn belt and in one of the largest hog-producing counties of that section. On the banks of the Mississinewa at a certain bend in the Muncie Pike one suddenly approaches a 20-acre tract of sandy loam "upper bottom" this being the producing end of the business of Moore and Reynolds, producing from May 1 to December 1 an average of three truck-loads of fresh produce daily.

One retail establishment is maintained in Marion by Reynolds, and both his and Moore's trucks make three or four daily deliveries of fresh products to this store as well as to 80 per cent of the stores in Marion. Crops in surplus quantities are easily marketed in Hartford City and Kokomo. Frequent deliveries permit the use of their slogan "fresh produce direct to the consumer," and in the opinion of Reynolds is the reason for the fact that of the vegetables shipped to Marion most of the shipments consist of out-of-season produce and potatoes.

Other local growers use Reynolds as an agent in retailing. Joe Shane, a large greenhouse grower and producer of early out-door crops, makes regular deliveries to Reynolds' store. Shane lately has developed his biggest early income from a trade in vegetable and flower plants, the latter out-selling the former.

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Clarence Moore's crop of early cabbage was fertilized with 3-8-10 complete fertilizer.

Acting on his newly-found knowledge, Mr. Robinson (left) this year grew wheat, as described by admiring neighbors, "as was wheat." The stalks were almost as tall as he, and he is a very tall man. The yield was 50 bushels to the acre.

# A Fallacy Uncovered


*By Kope Elias*

Farm Agent, Mecklenburg County, Charlotte, North Carolina


FOR many years it was thought that the red clay soils of the Piedmont region did not need potash. Unfortunately this idea is still prevalent with a great many farmers.

For many years Joe H. Robinson believed this fallacy because he had been taught to believe it. He followed it faithfully, and by dint of otherwise good farming he always made more wheat, by several bushels an acre, than the average wheat yield of his section. Six years ago he made 30 bushels of wheat an acre, when the average yield of an average year in his home county of Mecklenburg, North Carolina, was 14 bushels an acre.

But Mr. Robinson has an inquiring mind and is not inclined to accept as true rules of agriculture without personally proving them to be true. His curiosity about the old rule concerning potash on red clay land, together with a systematic plan of soil improvement, this year delivered him 50 bushels an acre of wheat—an all-time county wheat record which nearly quadrupled the county's average wheat yield.

This farmer for a long time pondered the question as to why the local soil limited wheat production to an average of from 10 to 20 bushels per acre. He believed that but for some undiscovered deterrent, the yield should be more than twice that figure.

Because he was convinced of that, he set about on a selected 10-acre tract to prove to himself that more wheat than had ever been raised on Mecklenburg county soil was a reasonable possibility. The history of his adventure in progressive farming sets him apart as a master at soil building and as one with an innate understanding of what a growing crop should have.

His program covered a period of six years, with the unchanging purpose in view of determining how much wheat under reasonable conditions his soil would produce.

Before 1925 he had made good average yields. That year, with good cultivation and fertilization according to the accepted rules of wheat growing, he made 30 bushels an acre. That was better than the average, but he was not satisfied. Some further obstruction, unknown to him at the time, was yet to be discovered.

He sowed red clover on top of that crop of wheat and after one cutting turned it under for soil improvement. For six years, in that manner, he alternated wheat and red clover. The year 1926, therefore, was a red clover year, given to hay gathering and soil building, so far as that 10-acre tract was concerned. That fall he planted wheat again.

In 1927 his wheat yield was 35 bushels an acre on his 10-acre experiment, five bushels more than his previous wheat harvest. That year he again sowed red clover.

By the next spring, 1928, he had begun to form ideas as to how he would proceed with his experimentation. In August he turned in his clover, limed his field, and began experimenting with fertilizer. To an acre he distributed 700 pounds of 10-0-4 (PNK) fertilizer, discarding nitrogen since his legume crops had furnished that. On one half of this field he put 50 pounds of potash to the acre, placing no potash on the other half of the field except such as was contained in the commercial fertilizer.

It is notable that in 1929, when he harvested the crop, his yield was 40 bushels an acre on the section where there was less potash, and on those acres where he had distributed his additional bit of potash the yield was 42 2/3 bushels an acre—nearly three bushels difference for 50 pounds of potash, and that on red clay land once supposedly abounding in potash.

It was not necessary for him to plant clover that year, the volunteer crop being sufficient. This, in due course in 1930, was mowed and later turned under. And that leads up to the sow-

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**In this field in 1929, Mr. Robinson (right) demonstrated the fallacy of an old theory that red clay needs no potash. The yield was 42 2/3 bushels to the acre.**

and was its president in 1903.

Dr. Frear was also a Fellow of the American Association for the Advancement of Science, a member of the American Chemical Society, the Academy of Political and Social Science, Franklin Institute, Philadelphia, and the Washington Academy of Science. He was, likewise, a member of the following fraternities: Phi Kappa Phi, Alpha Zeta, Phi Kappa Psi, and Alpha Chi Sigma, and of the Cosmos Club of Washington. In Masonry, he served as Master of Bellefonte Lodge, No. 268, in 1907, and was Past Commander of Constans Commandery. He was also a member of the Consistory of Williamsport and, for a number of years, a member of Victor Grange at Oak Hall Station.

### *An Authority on Fertilizers*

As an Institute worker, Dr. Frear was regarded as an authority on fertilizers and of chemistry in general. As a food expert, he had no superior. He was often called as a witness in court, and was never confused in his testimony. Always, he was an active crusader against food adulteration.

At the time of the establishment of the Pennsylvania Agricultural Experiment Station, under the Hatch Act, June 30, 1887, Dr. Armsby was elected Director, and Dr. Frear Vice-Director and Chemist. Until Dr. Armsby reached the College, about January 1, 1888, Dr. Frear acted as Director. He wrote practically all of the Annual Report of the Experiment Station for 1887, and continued to carry on the experimental work with one assistant.

In 1887, the Weather Observations, which had been started by Professor Waring about 1857, were transferred to the Department of Agricultural Chemistry in charge of Dr. Frear, to connect them closer with the agricultural experiments. His special study of meteorology made him an authority on the climate of State College. He was keenly interested in meteorology and taught the subject during all his active teaching career. In addition to teaching practically all of the agricultural chemistry until 1908, and supervising all agricultural analyses, he had time to give much personal attention to the Experiment Station work, and particularly to new projects. As Chairman of the Committee on Research, of the Experiment Station, it was his duty to criticize and pass upon the outlines and plans of all proposed projects. "He always took a great interest in the men that worked under him, encouraging them to advance, giving them all the assistance possible. He regarded the advancement of his men as a particular part of his work." (Mairs).

Dr. Frear not only wrote the first published Report of the State College, for 1885 and 1886, but conducted all the experiments on which it was based. Besides having charge of the general fertilizer plots which had been planned and laid out by Professor Jordan in 1881 on what was then known as the Central Experimental Farm, he conducted a number of variety tests, germination tests, trials with new forage crops, plow tests, feeding experiments, fertilizer analyses, and milk tests. He also directed the work of the Eastern Experimental Farm. The sixteen agricultural bulletins, published prior to the establishment of the State Experiment Station, were collected by Dr. Frear and reprinted in the Annual Report of the College, for 1886.

### *Issued Pennsylvania Bulletin No. 1*

Bulletin No. 1 of the Experiment Station, issued October 1887, was written by Dr. Frear, and was chiefly devoted to "Studies upon the Composition and Development of Soiling Crops." It also contained an historical sketch of the agricultural experiments conducted by the Pennsylvania State College from 1857 to 1887. Dr. Frear closed the historical sketch with the following remarks: "An examination of the lists of experiments re-

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# Fertility *and* The Black Spot of Roses

*By C. T. Gregory*

Pathologist, Purdue University Agricultural Extension Department

TO some florists the black spot disease of roses is much dreaded. They are not able to hold it in check without a continual battle. Others are quite unconcerned about the disease, not because it is not present but because they feel that if it should appear they can control it at will.

Black spot is a disease of the leaves and has been found to be due to the fungus, *Diplocarpon rosae*. One or more spots on the leaf quickly turn the tissues yellow and cause defoliation. In the garden this disease has been controlled by dusting with sulfur. The fungus lives over winter in the fallen leaves and the destruction of these dead leaves is an important step in controlling the trouble.

In the greenhouses the problem of control is much more difficult. The conditions favorable to the spread of the disease may be sustained over a long period. The frequent syringing of the plants to control red spider may keep the leaves wet for a considerable time if great care is not taken in ventilation and in the time of day when the plants are syringed. The plants are close together, greatly facilitating the spread of the fungus.

Most of the expert rose growers in Indiana's largest greenhouses have expressed the same idea relative to the control of this disease. Their various-

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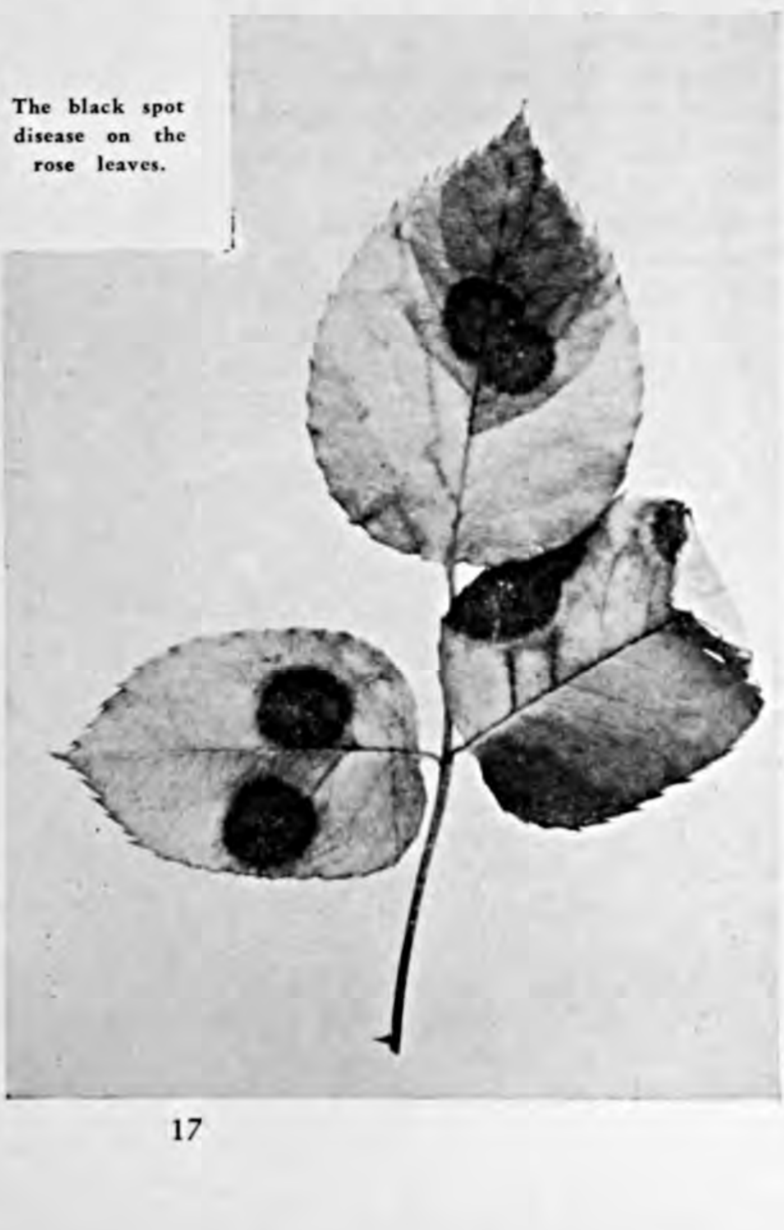

The black spot disease on the rose leaves.

# Potash Needs of Illinois "Alkali" Soils

*By Jerome J. Henry*

Chicago, Illinois

"ALKALI," when we hear the word it often brings to mind what we've read in story-books, stories of the alkali plains of our spacious West, areas which are so devoid of rainfall that soluble salts remain at the surface of the soil undissolved. Some of us have seen these areas first-hand since the days of modern travel, but few of us realize that "alkali" reactions are the limiting factor in soils in the fertile regions of the Midwest, the country's most productive section.

Many acres of more or less unproductive soil known as "alkali" and located in the northern half of Illinois, in an area which as a whole is very productive, may be greatly improved for crop production by the application of potash salts, according to O. H. Sears of the University of Illinois experiment station.

### *Needs Were Recognized Long Ago*

As far back as 1912 the need for potash on these soils was recognized. Similarly, on other soils in the southern third of the Prairie State, famous as the center of the corn and hog belt of the country, the need for potash seems to be developing and is usually associated with the repeated growth of sweet clover on the field.

Studies carried on by University of Illinois soil scientists reveal that two factors contribute to the unproductiveness of these soils: first, a deficiency of available potassium; and second, an excessive accumulation of nitrate nitrogen. The first is connected with the presence of high lime content in a large percentage of cases, and in other instances with a low amount of potassium in the soil.

The second is the result of conditions favorable for nitrate formation especially in the presence of calcium carbonate and an abundance of readily nitrifiable matter.

A number of experiments were planned in Illinois to find the cause of the unfavorable conditions on these soils. The "alkali" soils occur in tracts of varying size,—some a few rods square, others containing many acres. They are usually found in connection with swamp land that has been reclaimed by drainage and brought under cultivation.

The corn crop is affected by the unfavorable conditions most seriously. It germinates well and makes normal growth during the first few weeks, then ceases to grow, turns yellow, and finally presents an appearance of being badly diseased. Small grains produce an abundant vegetation, but lodge badly and a low yield follows. Sweet clover, according to the experimenters, makes a splendid growth.

"After drainage has been obtained, the capacity for crop production on the soils is greatly increased by the application of potash salts and the use of straw, corn-cobs, or manure, particularly horse manure. With these treatments the soil often surpasses yields on fertile soils surrounding them.

"A whitish deposit on the surface of these soils, when dry, is a characteristic which led to the general adoption of the word 'alkali' for the designation of the unproductive areas. Although it is generally recognized that the alkali differs from the black alkali of the arid regions, opinion differs as to the cause of the unproductiveness of the soil."

But the investigations reveal some interesting facts arrived at by intensive and extensive research in the greenhouse and field.

### *The Benefits from Potash*

Under greenhouse conditions using deep peat soil from Cass county, Illinois, it was found possible to increase the growth of corn as much as 224 per cent by treating the soil with a combination of potash and straw mulch. Potash alone accounted for a gain of 126 per cent, and straw alone approximately the same increase.

Commenting on these results, the investigators point out that the value of straw for the improvement of these soils was not confined to the potassium it contained. A beneficial influence was exerted through a lowered nitrate nitrogen content as a result of micro-organic activity.

On the other hand, sweet clover makes an excellent growth on Illinois alkali soils. A peculiar fact observed is that the poorest corn in the field was found in the area where the largest amount of sweet clover was plowed down. This condition might have been attributed to a moisture effect, the scientists suggest, were it not for the fact that splendid corn was grown under the same conditions when potash was applied. The data indicates that any soil benefit derived from an increased availability of potassium brought about by the growing and returning of sweet clover to the field is nullified by the increased nitrate nitrogen which accumulates as a result of the rapid decay of the sweet clover.

In spite of the fact that alfalfa makes a better growth than corn on these alkali soils, it may also be benefited by the same fertilizer treatments,

**In Cass county, Illinois, potash again proves its value. Potash and no potash means the difference between "knee-high" and "man-high" corn.**

In Whiteside county, Illinois, these striking results were obtained. The corn at the left was fertilized with potash; the corn in the center received no potash.

but in a lesser degree. One experiment where soil was treated with potash and straw showed a gain in yield of alfalfa of more than double the untreated plots. Muriate of potash alone increased the gain a similar amount.

Further experiments carried on in McHenry county resulted in some rather astounding results concerning the value of potash treatment. On a brown sandy loam soil, the increase in corn yield was nearly 55 bushels per acre, or 60 bushels compared to 5.75 on untreated soil. The result was obtained by drilling 75 pounds of potash with the corn in the hill. Much less favorable results were obtained by broadcasting 160 pounds of potash per acre. A straw mulch alone gave results about equal to broadcast potash.

### *Potash Availability*

It is believed that the availability of soil potassium is lowered by the presence of calcium carbonate (lime). The soils are well supplied with carbonates, so it appears quite probable that the low crop yield resulted at least in part from a lack of available potassium. Tests were made to determine the availability of potassium in the soils in an attempt to substantiate the belief that the soils lacked in the availability of potash rather than in total content. They disclosed that but little potassium exists in an available or soluble form.

"Although the observations explain the responsiveness of the soils to potash fertilization, they do not furnish the reason for the greater effectiveness of hill-dropped salts, particularly since the acre rate of application was less than one half as high as the broadcast method. There remains the possibility that the same condition that contributes to the low availability of the native soil potassium may also render applied potash unavailable," the experimenters reasoned.

So laboratory experiments were conducted, and they showed that as the amount of potassium added was increased, the percentage of absorption by the lime in the soil, or its unavailability, decreased. This substantiates the observations that hill-dropping was most effective because it concentrated the applications in a smaller effective area around the hungry plants.

### *Summary*

The work of the scientists is summarized briefly as follows:

"The unproductiveness of numerous areas of land in the northern half of Illinois is caused, not by a single condition, but is the resultant of two factors, namely, a low availability of potassium and an excessive amount of nitrate nitrogen.

"The low availability of potassium on most of these soils is due to an alkaline reaction rather than a marked deficiency of this element.

"The value of straw for improving

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# Kainit Kills Moss

*By Thomas H. Blow*

Springfield, Massachusetts

KAINIT (20 per cent potash) at the rate of 600 lbs. per acre has been effectively used to kill moss in the pasture of Harry Neuland, Morrisville, Vermont.

With the kainit applied in the late spring of 1929, the treated area has changed from a mossy sod, providing little or no pasture, to one of clover and grasses with practically a total killing of the moss in 1931. The plot treated with kainit adjoins one of the four-plot pasture tests established in 1929 and now compares very favorably with the sod on the LPK and LNPK plots in this test. The lesser treatments of lime and phosphorus have shown little or no improvement on this pasture.

To make the treatment more effective, it is advisable to apply the kainit when the sod and moss is wet preferably before or immediately after a rain. The addition of clover and grass seed, while omitted in this test, would undoubtedly speed up the reclamation process. Another plot treated at the rate of 400 lbs. per acre did not show as good results as that receiving the heavier application.

*Editor's Note: More information on the use of kainit for killing undesirable plants will be found in the article "The Toxicity of Certain Fertilizers" by Professor A. Bruno on page 41 of this issue.*

Left—Untreated

Right—Treated with 600 lbs. of 20% kainit per acre

Farm of Harry Neuland, Morrisville, Vermont

Note the clover coming through the moss which has been killed on the right.

# High-yielding Ears

## *By E. N. Bressman*

Associate Professor of Farm Crops, Oregon Agricultural College

FOR many years growers have been trying to associate the characteristics of an ear of corn with its yielding ability, and since 1900 many experiment stations have been trying to show by experimental methods which characters, if any, are associated with ability to yield. These tests have shown that most of the so-called score-card characters have no connection with the yielding ability of ears.

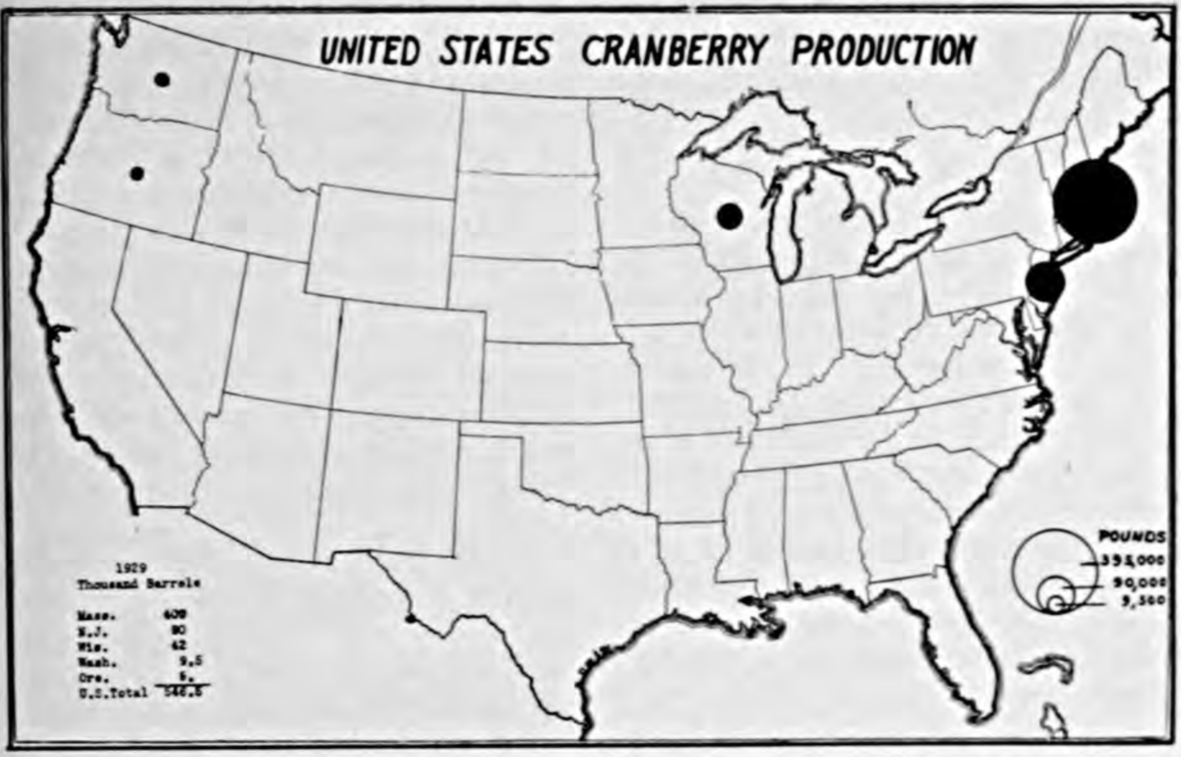
Results at the Iowa Experiment Station are of interest because they show definite relationships between ear and kernel characteristics and yielding ability. In general, they found that with the Reid Yellow Dent strain of corn, the longer and heavier ears gave larger yields. Ears with 16 rows gave larger yields than ears with a greater number of rows. The ears with a medium wide spacing between the rows were better than were those that had a close spacing. The smoother indentations gave higher yields than the rougher ones. A relation between hard, horny kernels and yielding ability was found. The large kernels were much better than the small, shallow, thin kernels. Ears well matured and cured were much better than ears which had blistered kernels and were poorly filled out. They found no relation to exist between the shape of the ear and yield.

The work is not the result of selection over a long period of years, but does give results of comparing all ears produced in a given area regardless of the size or appearance of the ear.

Many growers put too much emphasis on selecting for some unimportant variety characteristics. On the other hand, there are many who believe that nothing can be told about an ear of corn by looking at it. Some selection must be used, however, if progress is to be made, and without a doubt the above characteristics are valuable in selecting in the right direction as far as yielding ability is concerned.

There is no doubt that selection of a particular type and kind of ear will have more influence on other characters of the plant than on yielding ability. For example, growers can shorten the number of days required to mature a variety of corn by selecting the earlier ears. The height of the ear on the stalk can be materially changed by selection. The oil content of the protein content may be changed by selection methods.

These ears are representative of the entry which made the outstanding yield in the open-pollinated class of the Iowa Corn Growers' Yield Test.




# Cranberries

*By W. H. Ebling*

Agricultural Statistician, Madison, Wisconsin

FOR most of us holiday dinners are incomplete without the cranberry. Even the Christmas or Thanksgiving turkey would not be the same without cranberry sauce. While most people seem to be fond of cranberries, many know very little about the crop or where it is grown, largely because of the fact that it is produced commercially in only a few States.

The cranberry is a small, low-growing shrub whose branches are spoken of as vines. It grows mostly in marshy areas and there are a number of varieties. It is a water-loving plant and is associated with regions where much water is available. In nature it is found over wide areas of North and South America, Europe and Asia, but its commercial development, particularly in the United States, is localized.

In the United States commercial cranberry production is largely confined to five States—Massachusetts, New Jersey, Wisconsin, Washington, and Oregon. It will be noted by the map published herewith that there are really three cranberry regions—the East Coast region which consists of the Cape Cod area in Massachusetts and that in New Jersey; the Wisconsin cranberry region; and the West Coast region, which is along the Columbia river in Washington and Oregon. Of the 1930 crop about two-thirds came from Massachusetts; about one-fourth from New Jersey; and the remainder from the Western areas. Wisconsin's production is about 7 per cent of the United States total. The country's production in 1930 was estimated at about 570,000 barrels which is about 24,000 barrels above that in 1929.

### *Culture Is Complex*

As an industry the growing of cranberries is exceedingly complex. In most regions it has many problems quite unknown to other types of agricultural production. In Wisconsin and some of the eastern bogs for example, a much larger land area is required for water storage than is actually used in the growing of cranberries. Sometimes this ratio is as much as ten to one. Thus a cranberry grower may have a large land area and yet have only a small acreage in production.

The vines are usually flooded several times during the year. Commonly they are flooded in the late fall so as to be under water during much of the winter, and again in May or June to control certain insects. In addition, many of the cranberry bogs are developed on peat soils which are likely to catch fire in dry seasons and be virtually destroyed unless there is a water supply available. In the more northern cranberry regions the frost problem in late summer and fall is often serious. Frost damage not infrequently reduces the crop very greatly and flood water is one means of protection against low temperatures.

In the Washington and Oregon areas flooding is not practiced, for there usually is no water supply available. The soil situation here differs quite strikingly from the eastern cranberry regions, and the crop is developed on a dry bog depending upon the water supply in the ground. Under these conditions insect damage is often much more serious than in the eastern areas where flooding is practiced. Spraying is resorted to for insect control and this is expensive.

In the planting of cranberry bogs areas are usually chosen in which the crop grows naturally or where conditions are particularly favorable. Usually sandy or peat marshes are most desirable and the problem of clearing is often a serious one. Before planting of the cranberry crop, the fields are usually cleared completely and leveled so that they can be flooded properly. The plantings are commonly made by cuttings from the vines of other cranberry bogs which are usually planted in rows from six to ten inches apart. These cuttings when planted and kept moist, usually grow quite readily, and make a crop in about three years after planting.

Much work is necessary in maintaining a productive cranberry bog. The problem of weed control is particularly serious, and a large portion of the maintenance cost is in weeding. Covering the bogs with sand is commonly practiced, particularly in the eastern cranberry regions, the sand cover serving several purposes, but more particularly that of weed control. The maintenance of ditches and dykes, as well as reservoirs of water is another important item of cost. The ditches are necessary for two purposes—to provide drainage when needed and to enable the grower to flood his bog when desired.

The cranberry usually blossoms in June, and harvest occurs in September or October, depending somewhat upon the location of the particular bog. The bright red berries are harvested either by hand-picking or by the use of a small tool known as the cranberry rake. While hand-picking is still used extensively, it is less common than formerly, the rake being widely used in the large commercial areas.

### *Marketed as Fresh Fruit*

Most of the crop is disposed of as fresh fruit during the late fall and winter, particularly in connection with the holiday season. Manufacture into cranberry products such as sauces and jellies is common on the part of housewives who desire to have the product of this fruit available throughout the year. In recent years

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# More Food *for* Potatoes

*By R. F. Thomas*

Houlton, Maine

HIGHER rates of application per acre of fertilizer containing more potash are rapidly becoming common practices with the Aroostook county, Maine, potato producers.

Prior to the World War a 4-6-10 was the common analysis in this section and 1,400-1,600 pounds was about the average application per acre. Following the war the 5-8-7 became the standard analysis and the amount applied increased to 1,800-2,000 pounds per acre. It was thought that the application limit had been reached, but there were some of the best farmers who felt that if 1,800-2,000 pounds were better than 1,400-1,600, still more would produce better results.

An expression heard on some of the best farms is—"I notice that 500 pounds above a ton gives them an extra wallop." This initiative has brought about a gradual increase, so that now the best farmers are applying 2,500 pounds per acre of such analyses as 5-8-7, 5-8-10, (125 pounds nitrogen, 200 pounds phosphoric acid, and from 175 to 250 pounds of potash) or the equivalent in such analyses as 6-8-12, 7-10-14, 7-11-10, 10-16-14, 8-13-11, and 10-16-20. The saturation point has not been reached yet, for there are some who are stepping the rate up to 2,800-3,000 pounds per acre, all applied under the crop, with excellent returns.

Even with this high rate of plant food applied, there were some who felt that due to the lack of potash in fertilizers during and immediately following the war, the Aroostook soils had been severely depleted in available pot-

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Below: The tops of these potatoes fertilized with 5-8-10 on the same farm were still green on Sept. 12. The total yield was 155.7 bbls. of which 144.9 bbls. were U. S No. 1's. Extra potash made the difference.

Above: The tops of potatoes fertilized with 5-8-7 on the farm of E. L. Cleveland Co., Houlton, Me., were practically dead on Sept. 12. The plot yielded 123.2 bbls. (total yield) and 108.8 bbls. U. S. No. 1's.

# Winter Weed Hosts

*By O. C. Lee*

Purdue University Agricultural Extension Department

DURING these days of modern farming we are impressed more and more with the fact that after all, successful farming is in reality a battle against pests, many of which make their winter home in waste place weeds. In the roots and dead stalks of weeds insects spend the winter in the form of eggs or pupae, or even in the adult stage.

Take for example our old enemy the chinch bug. Fence-row weeds offer ideal protection for this great crop destroyer during the dead of winter. Burning this vegetation will not only help immeasurably in holding the chinch bug in check, but in addition will do much to keep the weeds themselves under control, since burning destroys many weed seeds that would otherwise cause future trouble.

### *Clean Up the Garden*

We should also consider the garden. How frequently the crop is all but ruined by insects and diseases and by numerous annual weeds, the direct result of neglect in years past! By cleaning up the garden and the vicinity of all crop refuse, particularly the weeds, much will be done to avoid trouble in the season to come. A few stalks of pesky weeds may spread enough weed seeds to infest the entire garden, necessitating continual summer hoeing to save the crop from disaster. A little time spent in the way of cleaning up will be equal to many days of hard labor with the hoe in the hot sun.

The melon aphid is a serious pest on melons, squashes, and cucumbers. This prolific garden pest lays its eggs on the common orpine, or live-forever, where they spend the winter and hatch the following spring into myriads of lice that feed on the production of the gardens. Evidence points to the live-forever as the sole winter host of melon aphids, consequently the extermination of this weedy species will rob the insects of their home and reduce damage to succeeding crops.

The eradication of milkweed is a rather difficult problem as the running roots spread and reproduce each year. Fall plowing in the field so as to turn up the roots and expose them to freezing weather is a means of control. Where cultivation is impractical, hand digging is essential. The pokeroot on

A single plant of wild lettuce growing in the fence-row, if allowed to go to seed, will infest large areas.

The horse nettle, in addition to being a bad perennial weed, is a carrier of mosaic disease.

the other hand is not as prolific a grower and can be eradicated by cutting some few inches below the ground with a spud or spade. In every case the tops and seed pods should be burned to prevent reseeding.

The more we learn of virus diseases of plants, the greater we are impressed with their importance and also their relation to many common weeds. Some time ago a new chain of evidence was unearthed against a common trouble of tomatoes and tobacco known as mosaic, a disease distinguished by a mottled crinkled appearance of the leaves of infected plants and greatly decreased yields. This trouble is also caused by a virus that spends its winters in the creeping perennial roots of ground cherry and bull nettle. The plant lice and leaf-hoppers are effective carriers of the dangerous virus from infected weeds to the crop plants.

The bull nettle is a perennial plant reproducing by running root stalks and besides being a carrier of mosaic is a noxious weed. Extensive cultivation is a practical means of control in fields while the chlorate spray has its place where the plant is found growing in small patches or in waste places where cultivation is impracticable.

The bull nettle can easily be distinguished by its spiny stems and leaves. It grows to a height of from one to two feet and has a yellow fruit in the fall resembling the small tomato. All efforts to eradicate this bull nettle should be made before it becomes wide-spread as it may become a pest equal to that of the well-known Canadian thistle.

Another virus is believed to be the reason why potatoes "run out." There is strong evidence that this particular virus is distributed mainly if not entirely by certain species of plant lice that dwell during the cold months on waste place weeds, particularly on wild roses. Here is another argument for keeping the fence-rows clean, mainly of wild roses, in the vicinity of potato fields. Still another insect enemy of the potato crop that is dependent on weeds is the stalk borer, which utilizes grassy and weedy places for winter hibernation.

Probably the most destructive of all insects is the deadly European corn-borer which winters over mainly on corn-stalks although it is occasionally found hibernating in cockleburs, smartweed, ragweed, and a host of other flashy stemmed weeds. Then there is the plum curculio, the corn-stalk borer, squash bug, and various species of leaf-hoppers, all winter inhabitants of various weeds about the farm.

### *Fall Affords Time*

Nothing is more unsightly nor awards a better breeding place for crop pests than dead vegetation, particularly vegetation of plants that we have learned to know as noxious weeds. It is true that the best time to kill weeds is during the summer, but as a last resort a clean-up should be

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The field at the right is a good sample of what the land was producing before the alfalfa was put on. Picture taken July 28, 1931, at Phillip Sellew's farm.

# A City Man's Alfalfa

## *By G. C. Dunn*

County Agent, Somerset County, Skowhegan, Maine

THAT a man doesn't need to be born on a farm to be a success in farming is admitted by the folks in New Portland, Maine, where Phillip Sellew, formerly a city dweller in southern New England, and his family are now operating a dairy farm.

In a recent interview with County Agent G. C. Dunn and Extension Economist in Farm Management Donald Reed, Mr. Sellew stated, "When I came here five years ago I didn't cut six tons of hay on the whole farm and this year I have put in the barn nearly thirty tons. I have cut two crops of alfalfa off a field seeded in 1928. I have cut one crop off a field I seeded in April this year, secured a wonderful piece of hay from clover seeded last year, and will have another good second crop off that clover."

Mr. Sellew has been able to build up his land and hay crop by the liberal

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Fertilizer high in potash and lime were used to get this stand of clover. Picture taken July 28, 1931, at Phillip Sellew's farm.

# Liming—
# Costs and Benefits

*By M. A. Crosby*

Washington, D. C.

A SPECIALIST from the Michigan State College, who had just delivered a talk on liming acid soils was approached by an elderly woman who remarked:

"I have realized for some time that I must grow more legumes if I expect to realize a profit from farming. Furthermore, I know that in order to grow legumes successfully, my land must be limed. BUT! I haven't the money with which to buy lime!"

This, in a nutshell is a problem that confronts thousands of farmers throughout the eastern two-fifths of the United States. Where acid soils are prevalent farmers generally are sold on the need of liming land for growing legumes, especially alfalfa and sweet clover. They know that a sweet soil means more legumes, and that more legumes mean better yields and reduced production costs for staple crops. But in many sections ground limestone is expensive, and the initial cash outlay for lime is considerable. As a result of this first cost, the use of lime is restricted. Relatively few farmers can afford to lime their entire farms in a single year, or even in one rotation period, hence the majority of those undertaking a liming program are compelled to limit their operations to a few acres a year.

It was formerly thought that in order to grow alfalfa or sweet clover successfully, an application of lime sufficient to neutralize the soil was necessary. Fortunately this is not always the case. In many instances it has been found that satisfactory results can be obtained from the use of comparatively light applications—say from 400 to 500 pounds per acre—of finely-ground limestone drilled in with the seed. This is particularly true in the case of sweet clover. This practice enables the farmer to cut his liming costs in any one year to a minimum, and is resulting in a tendency toward the use of lighter and more frequent applications of lime rather than heavy applications once in several years. A further advantage of this method is that it permits an annual liming of a much larger acreage than is possible if heavy applications are used.

### *The Benefits of Liming*

What are the actual benefits obtained from liming?

Highly satisfactory results in increasing crop yields by the use of lime have been obtained by many of our State Experiment stations. The Agricultural Experiment Station of the University of Illinois probably leads in the matter of experimental work with liming. According to Dr. F. C. Bauer of that Station, "Results obtained from 26 experiment fields show the almost universal need for lime on Illinois farm lands." The results referred to show that on dark-colored Illinois soils an annual application of 952 pounds of lime per acre added $4.67 to the annual acre value of crops in a system of livestock farming, and $5.99 to the acre value of crops in a system of grain farming. On light-colored soils an annual application of 868 pounds of lime per acre increased crop values to the amount of $10.98 per acre in a livestock system, and $8.92 in a system of grain farming

The light-colored soils here referred to are acid, and will not grow sweet clover without lime. Where such land was limed and seeded to sweet clover, and this crop plowed under for corn in a corn, oats wheat, sweet clover rotation, the resulting increased yield per acre was 12 bushels of corn, 11 bushels of oats, and 10 bushels of wheat. Obviously sweet clover was responsible for much of this increase, but without the use of lime no sweet clover could have been grown.

### *Increases Due to Lime*

Farmers who have limed land for growing alfalfa have increased the acreage of this valuable crop by thousands of acres. Those who have limed for the purpose of growing sweet clover in their regular cropping systems report increased yields of 10 to 20 bushels of corn, and 5 to 20 bushels of wheat. Here again the increased yield is largely due to sweet clover but—no lime no sweet clover.

An outstanding example of benefits derived from liming land is the experience of D. O. Belt, one of Missouri's Master Farmers.

After twice failing to get a stand of sweet clover without liming, a 20-acre field was given an application of 2.5 tons of ground limestone per acre. The lime cost $2 per ton and the total cost of liming, including the labor of hauling and spreading was $7.50 per acre.

This field was seeded to winter wheat, and the following spring sweet clover was seeded on the wheat at the rate of 15 pounds per acre. After wheat harvest this 20 acres of sweet clover provided pasture for 16 dairy cows and 135 hogs from July 7 to October 31.

Early the following May the sweet clover was plowed under for corn. Superphosphate at the rate of 200 pounds per acre was applied on part of the field and part was left unfertilized as a check. The unfertilized portion averaged 80.57 bushels of corn to the acre. The three previous crops of corn on this field had averaged 42 bushels to the acre. The increase from the use of lime and sweet clover was 38.57 bushels per acre.

### *The Costs of Liming*

But what about liming costs? Once the farmer is convinced as to the benefits to be obtained from liming his first thought is: How much cash will I have to dig up to lime 10, or 15, or 20 acres?

In a recent study, liming costs were obtained from 31 farms on which a total of 1,018 acres were limed, primarily for the purpose of growing sweet clover. The quantity of lime applied per acre varied from 1 to 3.5 tons, the average application being 2.65 tons. The cost of lime ranged from $1 per ton for low-grade material to $5.25 per ton for high-grade, finely-ground limestone. The cost per acre of lime applied ranged from $2.90 to $7.70. The total cost of liming, including cost of lime and labor used in applying, averaged $6.95 per acre for the 31 farms.

From these figures it will be seen that a farmer planning a liming program must usually figure on a cash outlay of $3 to $8 per acre for lime alone if a quantity sufficient to correct soil acidity is applied at one time. The farmer who is unable to spend this amount in a single year had best try the plan of applying a light application of finely-ground lime drilled in with the seed at seeding time.

Next to the initial cash outlay for lime the farmer is concerned with the length of time an application of lime will be effective. Will this initial expenditure of $3 to $8 per acre have to be repeated in two, or in six, or in 10

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A STUDY IN DISCERNMENT.

# PICTORIAL

An old-fashioned horse-power baler in operation on a Hancock county, Indiana, farm.

*By Ewing Galloway, N. Y.*

Continuing as one of the favorite pets of children, the Shetland pony is still being raised in considerable numbers for that purpose. Here are three "chums" waiting for youthful riders and drivers.

Bushels of dead grasshoppers were result of one Colorado farmer's war on the pests.

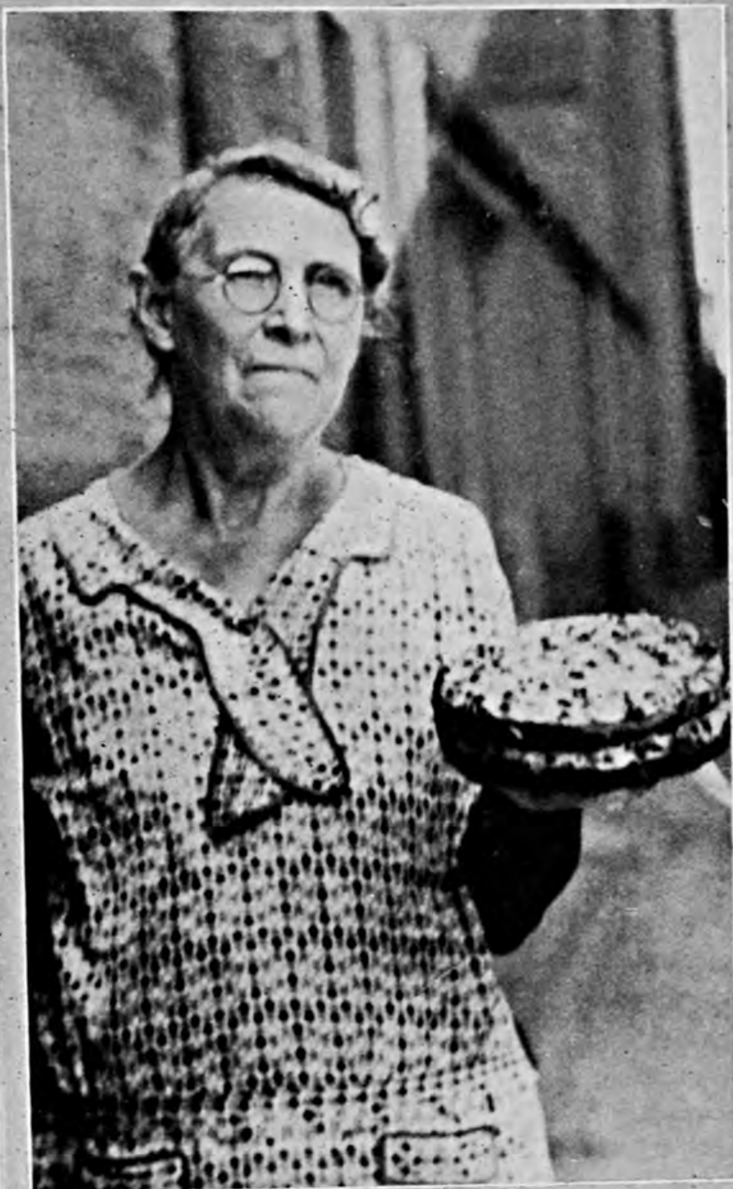
Here is a bear market paying big dividends in laughs. The cubs are shown enjoying their milk on the bear farm operated by H. S. Crowe at Wayne, New Jersey.

An old salt of the clipper days.

The sentinel of a storm-swept coast.

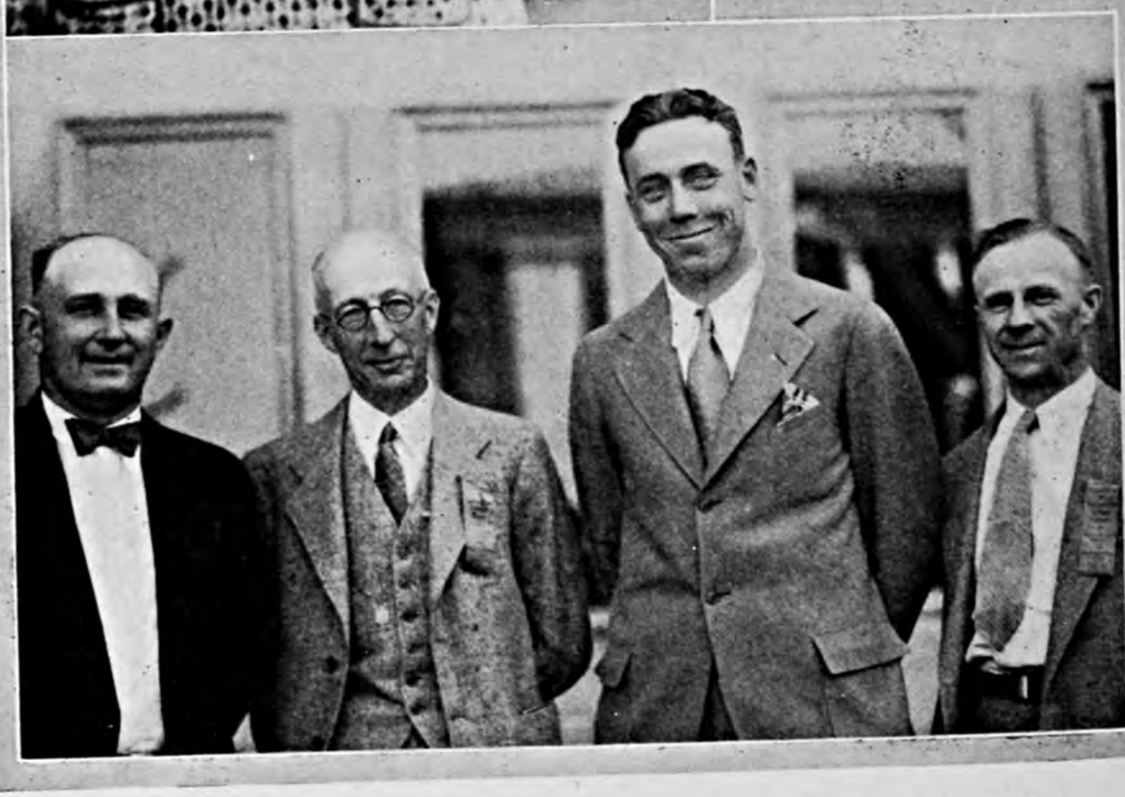
Cotton prices don't worry him.

The inspiration for many popular songs.



Mrs. O. M. Edrington, Hamilton county farm wife, has added $10,000 to the income of their farm during the last six years by operating a farm market each Saturday in Noblesville, Indiana, the county seat of her county. She sells home-baked pastries, butter, cottage cheese, and poultry products. The picture shows her holding a prune cake which is one of her specialties. Although sixty-four years old, she has not missed a single Saturday during the six years.

The new officers of the American Association of Agricultural College Editors elected at the recent national convention at Oregon State College are: (left to right) Charles D. Byrne, Oregon, President; W. P. Kirkwood, Minnesota, member executive committee; R. M. Soule, Georgia, vice-president; W. C. Schnopp, West Virginia, secretary - treasurer. Roger DeBaun of New Jersey, not shown in the picture, was also elected executive committeeman.



# The Editors Talk

## Farming on a Business Basis

With so much attention being directed to the plight of the Southern farmer because of the cotton situation, it is very interesting to find in a recent issue of "Manufacturers Record" an account of South Carolina farmers who are maintaining their agricultural practices on a sound basis of prosperity. The instances given are taken from specific examples of Southern farmers who not only know their crops but their markets, which examples are being gathered by the agricultural committee of the South Carolina Bankers Association. The significant facts growing out of this survey are that in this cotton belt of the Southeast, some successful farmers have practically abandoned the growing of cotton and through adequate diversification are pointing the way out.

L. A. Danzler, a young farmer who has rapidly expanded his operations near Eutawville in Orangeburg county, is quoted as saying: "A fault with much farmer thinking, and some other kinds, is that it does not take in enough. I never adjudge a year's operations by a single product or those with a single product by a single year's results. I consider results from all and make decisions as to one by, as a rule, five-year averages." Mr. Danzler dropped the growing of tobacco deciding that it was too risky, because he made a profit on it for two years, lost money on it two years, and broke even on one. He is now holding to the growing of Irish potatoes, though his returns have varied widely. Yet he finds that during a period of five years, all told, he has made some money on potatoes. He is expanding his truck-growing operations, especially sweet potato production.

E. W. King is a large scale producer of vegetables in Charleston county. Mr. King says: "I am holding on to my land. I propose to keep it and work it. Nature is not making any more land of this sort and there is increasing consumption of the kinds of products for which our rich soil and climate are best suited."

Variety is the keynote of the farming of A. D. Atkinson and his son Frank, about half-way between Aiken and Augusta. The Atkinsons keep in the vanguard of variety farming and produce practically everything in the way of food and feedstuffs that is consumed on their place. They were virtually the first to grow grapes for market in this section. Their vineyard is on rather light soil which calls for liberal use of fertilizers. They find farming an intellectually zestful as well as an invariably profitable vocation. Whatever they undertake is carefully thought out and planned in accord with scientific and economic developments.

There is an old saying to the effect that "It's an ill wind that blows nobody good." It is very gratifying in these days of depression to find these instances where careful planning and foresight are placing agriculture on a sound business basis.

# Fertilizer Placement

It is expected that many thousands of dollars may be saved farmers as the result of a series of field experiments in the distribution and placement of fertilizers inaugurated this year to determine the most effective methods of fertilizing potatoes with fertilizer distributing machines. The work is being carried on by the Bureau of Chemistry and Soils, U. S. Department of Agriculture, in cooperation with the Bureau of Public Roads, agricultural experiment stations of New Jersey, Ohio, and Michigan, and the soil improvement committee of the National Fertilizer Association. Bailey E. Brown, senior biochemist of the division of soil fertility, is supervising the work for the Department of Agriculture.

"Because of the very large amount of fertilizer required to produce profitable crops of potatoes, this problem is particularly important for potato growers," says Mr. Brown, who further says that until the department undertook the investigations very little information was available as to the relative merits of the American types of fertilizer distributing machines.

Recent investigations by fertilizer specialists of the Bureau of Chemistry and Soils and engineers of the Bureau of Public Roads have shown that a tremendous annual waste of expensive plant food can result from faulty application of fertilizers by some types of machinery in common use on American farms.

# Education vs. Propaganda

Rightly has M. S. Eisenhower, Director of Information for the United States Department of Agriculture, taken a definite stand against scattered criticism of the publicity activities in Washington.

In an address at Corvallis, Oregon, before the Association of Agricultural College Editors, Mr. Eisenhower outlined the educational aim of information service, his remarks being in part a reply to several recent magazine articles criticizing "press agentry," "ballyhoo," and "publicity" activities in Washington.

"For the benefit of those who may still be in doubt about the matter," said Mr. Eisenhower, "I say vigorously and unqualifiedly that the information people of the department are in no wise publicity agents in the malodorous sense of that term. We are not interested in acquiring prestige for ourselves, for the institution as a whole, or for any of its head officials, nor to 'sell' the department to the public, nor to advertise the achievements of department workers, nor to make it possible for the institution to obtain larger appropriations, but to make public the results of the department's manifold activities and to give facts the widest possible distribution."

Tracing the haphazard growth of education and pointing out that most institutions had centered on matriculated students, the director said adult education has been all but neglected. "Today," he observed, "no other institutions or group of institutions anywhere play so vital and effective a role in adult education as do the State agricultural colleges and the United States Department of Agriculture. Our efforts in the field of adult education are very young. Being young, unbound by shackling traditions, we are not afraid to use every means developed by science to reach our objective.

"In agriculture there was never a time when adult education was so imperative as it is now. We may suffer some delay in teaching better breeding practices or improved fertilizer practices, but if economic information is to be of any value at all it must have almost instantaneous and widespread distribution. Our plan, consequently, is not to decrease our press and radio efforts but to increase them with the whole-hearted cooperation of more than 50 per cent of America's radio stations and practically all of America's newspapers, farm papers, and trade journals."

"Government," Mr. Eisenhower continued, "rightfully leaving to business nearly everything it has the profit-incentive to undertake, performs those socially desirable functions that otherwise are being or would be neglected. That was the fundamental that prompted George Washington in 1796 to propose Government aid to agriculture, and it was the fundamental upon which Congress and Abraham Lincoln established the Department of Agriculture in 1862." From the beginning, he pointed out, Congress placed informational work on a par with research and in the organic act directed the department "to acquire and diffuse useful information on subjects connected with agriculture in the most general and comprehensive sense."

## Fertilization and the Surplus

In connection with improved practices in fertilization, we sometimes hear the query on the part of the grower—Why should I spend money for fertilizers to produce greater yields when there already is a surplus?

One of the most logical answers to this query recently appeared in an editorial in the *Wisconsin Agriculturist and Farmer* and reprinted in full herewith.

"A Columbia county subscriber takes exception to the following statement, which appeared in an editorial of our March 14 issue: 'Results show that for every dollar spent for fertilizers, properly applied to corn, for example, one obtains a sufficient increase in yield to bring three dollars larger returns.'

" 'This I do not believe to be correct,' writes our correspondent. 'You should have said one receives more bushels per acre after fertilizing the land. Do you know that your statement is a direct contradiction of one made by a member of the Federal Farm Board during recent Farm and Home Week at University of Wisconsin? Fertilizers used by an individual bring an increase in yield, but when a million other farmers do the same thing it certainly does not result in more money for the farmer. I agree that when prices are good the use of fertilizer is advantageous, but at present prices, why should a farmer produce more than can be sold?'

"Our correspondent is right in claiming that it is a detriment to the farmer to produce more products than his market will absorb. That, however, is no reason why he should not use fertilizers. If by feeding his soil liberally he can produce corn or oats at a lower cost per bushel, there is even more reason for feeding it liberally when corn or oat prices are low than when they are high. The trouble with our correspondent's way of looking at his business is that he labors under the erroneous conception that efficient production necessarily means the production of a surplus.

"One might as well say that since butterfat prices are low high producing cows are not as desirable as low producers. Or that one should cut down the amount of high protein feed in the ration of a dairy cow when milk prices are low. That sort of reasoning is not likely to lead to profits. If a man wants to raise 2,000 bushels of corn, he will obtain a larger profit if he grows that amount on 40 acres than if he devotes 50 acres to the project. If by the use of fertilizer he can raise the required amount of corn on 20 per cent less ground and do it at a lower cost per bushel, why should he not be anxious to do that? Let him use the land saved by this system for pasture or for some other crop, of which there is no present surplus—alfalfa hay, for example. Few Wisconsin farmers have too much pasture or too much legume hay.

"Our correspondent quotes Mr. Denman, Federal Farm Board member, as having said: 'I am not interested in how much I produce, but how much I get for what I do produce.' That statement, taken away from other supporting statements which the speaker undoubtedly made, only gives part of the truth. For the farmer is, or should be, interested in more than price; production cost is equally important. Cost of production can to a certain extent be controlled by the individual farmer; price never.

"Let us as farmers never lose sight of the fact that whenever we cut the cost of producing our products we take a step toward larger profits. Let us keep the surplus problem distinct from unit cost of production."

# Our County Agent

A county agent and his job are often discussed. They are criticized and praised. It seems to us that Albert Hines of Bedford county, Tennessee, in a letter published in the Extension Division News of the Virginia Polytechnic Institute has set forth some sound replies to unfounded criticisms.

Mr. Hines says:

"Our County Agent—

Is simply our hired man, yet to hear some folks talk one would think he is our boss.

Is not a magician, he cannot, by waving a wand, raise the price of corn.

Does not claim to know it all.

Has no cure-all for farm ills.

Is always on the job.

Cannot make any farmer prosperous over night.

Cannot help if you do not give him a chance.

Does not come on the farm to tell you what to do, but to discuss your problems.

Wears a collar and tie, because it is standard equipment. How would he look in overalls, hickory shirt, and brogan shoes?

Has an orderly, well-arranged office where the farmers can meet and discuss their problems.

Welcomes sincere criticism.

Is a human being. After doing his best he does not like to be kicked.

Hauls his moving picture machine about over the country, showing us interesting pictures of farm life.

Promotes boys' and girls' clubs, and thus keeps them interested in farming. This alone is worth what he costs us.

Has to have a salary, else how could he live?

Cannot give lectures that will keep the weeds down, or the fences up.

Believes in a better agriculture."

Foreign and International Agriculture

# The Toxicity *of* Certain Fertilizers


*By Professor A. Bruno*

Formerly Director of Agronomic Stations, Paris, France

Translation by H. E. LeFevre, Montreal, Canada


IT has long been known that certain fertilizers are likely to have a toxic action on plants at the time of application.

This toxicity can be due to the product itself or else be caused by a small variable proportion of highly toxic components as sulfo-cyanides in some cyano derivatives of calcium cyanamide. This has made it necessary to exercise a very strict chemical control of nitrate of soda, which must be practically, if not absolutely, free from perchlorides, chlorates, and periodates. It is likewise necessary to watch closely the purification of potassium salts extracted from salt lakes on account of their borax content.

Toxicity can be practically permanent, disappearing only slightly through leaching. It can be temporary and more or less rapidly destroyed by contact with the soil through bacterial or chemical actions: oxidations, reductions, neutralizations, precipitations. One of the most interesting of bacterial actions is the destruction of phenolic components.

Finely ground kainit killed the charlock (wild mustard) at the right in this field of barley in France.

It is obvious that the poisoning effect depends upon the concentration. When in a very weak solution toxic products can prove beneficial, and on the contrary when too concentrated, the best fertilizing salts can kill plants.

Without going into great detail as to the mechanism of toxicity, it is necessary to point out that very often death results from the suspension of some essential biological function. The destruction of matter through chemical reaction is not necessary, and very often injury results from a plasmolytic action or from dessication of the superficial cells.

### *Plant Resistance Varies*

Plant resistance to toxic products varies greatly according to species, variety, and age; for instance, young seedlings just after germination are particularly sensitive to all kinds of toxicity. This is why it is possible to top-dress well-started crops with nitrate of soda or muriate of potash with very good results, while a top-dressing with the same materials at planting time or immediately after germination would have detrimental effects.

Physical features of plants are no less important. Whether leaves are carried horizontally or almost vertically; whether aerial organs are more or less hairy or quite smooth; whether the epidermis is thin and absorbs moisture easily or on the contrary is thick and almost impervious due to a waxy cuticle; all these are most obvious and generally recognized reasons why the same treatment will seriously injure certain plants without proving detrimental to other species in the same plot.

A careful observation of a certain crop will show in the course of its development an uneven aptitude to be moistened by a given solution. For instance, plants of the squash family have flowers very sensitive to chemical reagents which greatly contrast with their rough, coarse foliage. Therefore, considerations of a strictly chemical order are often not sufficient to the understanding of the mechanism of some selective actions, and many times it is in the morphology of the plants and the physical processes of the action that the explanation is to be found.

It is clear that if a drop of a toxic solution strongly adheres to a leaf and spreads there, it will have the maximum action, while on the contrary the same drop keeping a spheric shape and in some way rolling on the surface of the plant will fall to the ground at the slightest wind practically without having any detrimental effect. This consideration is essential in the preparation of all chemical solutions used to fight the diseases or parasites of plants.

In vineyard sections much attention has been devoted to the possibility of improving the moistening and adhering qualities of copper mixtures; this is mostly a question of surface tension.

### *Practical Results Obtained*

The deep knowledge which we have of such detrimental effects enables us to obtain very interesting results. It is possible, through the proper treatment of a mixed planted area, to destroy certain species and spare those that are useful. An example of this is the destruction in grain fields of wild mustard and other weeds by sulphuric acid, according to Mr. Rabate's well-known method. It is also well known that kainit solutions or finely ground kainit are used for the same purpose in grain or beet fields.

This finely ground kainit, applied early in the morning at the rate of 800 to 1,000 lbs. per acre on a grain field infested with wild mustard, charlock, and wild vetch, gives remarkable results, destroying most of the noxious species, while increasing the vigor of the oats or wheat. Likewise copper sulphate is used to destroy weeds in potato fields.

Compound mixtures have been used that contain a toxic product, chlorate, perchlorate, or copper salt, mixed with

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# AGRICULTURAL DEVELOPMENTS

## RICH SOIL PROTECTS CORN AGAINST FROSTS

Just as a well-fed man is better able to withstand the rigors of cold weather, so corn which has received an abundance of plant food is better able than poorly nourished corn to withstand frost attacks, both in the late spring and early fall, agronomists of the United States Department of Agriculture have found.

Department plant breeders studied the question at Bloomington, Ill., in the Corn Belt during the last three years. They produced frost with a portable refrigeration plant which was used in different parts of the corn plots.

The results of the experiments suggest that farmers may minimize or avoid frost danger to their corn by growing it in fields that have been fertilized or are naturally rich in plant food.

Corn was planted in 1930 on land plowed from virgin sod in the fall of 1929 and also on soil which had been plowed from virgin sod in 1921 and cropped continuously since. Corn grown on the "new" ground was much more resistant to the frost than that grown on the older land.

While testing corn on cropped and on new soil, the agronomists also experimented with fertilizer in varying amounts on the old soil. Plants growing in fertilized soil showed more resistance to frost than those growing in untreated soil. Young plants of a cold-susceptible strain in untreated soil were killed in a few minutes at a temperature of 33 deg. to 34 deg. F. whereas plants of the same strain grown in a fertilized hill showed no ill effect from four hours of exposure to a 30 deg. temperature.

Fall tests gave much the same results. In one instance, approximately 50 plants were subjected to a temperature of 26 deg. to 27 deg. for two hours. Half of them were on fair soil and the remainder on soil capable of producing 15 bushels more to the acre. The test was made about the middle of September when the kernels were about four-fifths matured. Following exposure to the cold, neither set of plants showed any noticeable injury. When the crop was ripe, however the corn on the poorer soil had failed to mature completely, while that on the richer soil had matured naturally and fully.

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## DEPARTMENT'S SOYBEANS TURNED UNDER TO PREPARE FOR NEW LAWN

The soybeans which made a luxuriant growth in front of the main building of the U. S. Department of Agriculture, Washington, D. C., from May until August were disked into the soil the first week in August, about a month before the pods would naturally appear. The ground is now being plowed and will be thoroughly disked and harrowed, thus bringing to a close the second stage of a new lawn which, running from Twelfth to Fourteenth Street SW. will cover the site of the old buildings demolished last year. The strip between the wings and the new road is being prepared by being heavily fertilized with manure from the Beltsville, Md. experiment farms. The manure is to be thoroughly disked into the soil, after which the entire area will be harrowed and rolled into good condition for seeding. A further application of fertilizer—850 pounds of superphosphate, 250 pounds of muriate of potash, and 125 pounds of nitrate of soda per acre—will be applied to the entire area just in advance of seeding. There are approximately 4 acres in the area to be seeded this fall.

A mixture of 90 pounds of Kentucky bluegrass, 90 pounds of Chewing fescue, and 20 pounds of Colonial bent grass per acre will be sown early in September.—*The Official Record, August* 15, 1931.

## WHAT IS NATION'S MOST IMPORTANT CASH CROP?

Probably many people believe that wheat is the most important cash crop grown in the United States. They will be surprised to know that wheat takes the place down the line when cash crops are ranked in the order of their importance.

Cotton is king; milk ranks second; hogs third; then come cattle and calves, eggs and chickens, and finally, wheat.

## "HAND - RAISED" PARASITES TO DESTROY RANGE PESTS

Millions of small wasplike insects are now being liberated on the cattle ranges of the Southwest to destroy the eggs of the range caterpillar, a pest which, after having been comparatively inactive there for 10 years, threatens to eat up all the range grass over a wide area.

In the 1914 outbreak nature provided the parasites to control the range pest. This year entomologists of the United States Department of Agriculture are providing them to help nature renew the supply that has almost entirely disappeared from the region.

To be ready for the coming of the caterpillars, Government entomologists through the winter produced the parasites at the rate of 60,000 a day and placed them in cold storage at the Temple, Arizona, field station. The vast insect army is now being deployed over the grazing grounds where the range caterpillar is present in the egg stage in large numbers. The tiny parasites will at once attack the caterpillar eggs and, it is hoped, quickly reduce the number of caterpillars to normal.

Similar parasites are being tried out against many insect pests, including the alfalfa weevil, coddling moth, oriental fruit worm, and the corn borer, but this is the first time they have been tried on a large scale against the range caterpillar.

"Range caterpillars," says Dr. W. H. Larrimer, in charge of the Department of Agriculture's work on cereal and forage insects, "are such greedy and wasteful feeders that sometimes they seem to eat from habit rather than from hunger. They destroy the range not only by chewing the grass down to the roots, but also by covering any uneaten blades with shed skins and poisonous spines, thus spoiling the pasture for the stock. Recently this pest, long familiar on ranges and pastures, has added cultivated crops to its diet."

## JUST WHAT IS A FARM

Ottawa, Canada.—There may be many persons in Canada who are farmers according to the Canadian Government's official definition as to what constitutes a farm for the purpose of the census and don't know it. The census officials define a farm as "a tract of land of one acre or over which produced in 1930 crops of any kind to the value of $50 or more, or which is in crop or being used for pasture during the present year."

Just how many farmers there are in Canada on this basis remains to be disclosed by the figures collected when the decennial census was taken last June, but they will probably number close to one million. Ten years ago the total was 711,090 and this figure does not include over 30,000 units of land less than one acre producing crops of some value.

# 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

To commemorate the "Fiftieth Anniversary of the General Fertilizer Tests" at the Pennsylvania Station, Bulletin 264 of that name has been prepared by C. F. Noll, F. D. Gardner, and C. J. Irwin. In this, 49 years' results with various plots continuously treated over this period were summarized. It is natural in experiments continued over so long a period of time that many interesting facts should develop. The soil on which these plots are located is naturally fertile and rather heavy. Plots that have not received any fertilizer or other treatment for 50 years are still producing 19 bushels of corn, 7 bushels of wheat, and 1,200 lbs. of hay to the acre, which speaks well for the natural fertility of the soil. The experiment is planned in such a way as to show the value of manure, lime, various kinds and amounts of nitrogen and phosphoric acid carriers, and the use of potash, singly and in combination.

The results show that none of the materials alone were as profitable as combinations of them. The most profitable treatments were those combining lime, nitrogen, phosphoric acid, and potash; or lime, phosphoric acid, and potash; or manure and lime. The experiment brings out clearly that just as high yields can be obtained without as with manure if proper lime and fertilizer treatments are used, even over a long period of time. Work of this nature is very important in showing farmers the best systems of soil management to be followed in maintaining a permanent agriculture.

A number of fertilizer control reports issued recently show interesting trends in the analysis and price of fertilizers. In Bulletin 517 of the New Jersey Agricultural Experiment Station by C. H. Cathcart, entitled "Analysis of Commercial Fertilizers and Ground Bone; Analysis of Agricultural Lime, 1930," the author shows that the average analysis of complete fertilizers sold in New Jersey in 1921 was 2.46-8.49-4.26 (NPK) with an average price of $54.10 per ton. In 1930 the average analysis was 3.53-8.81-6.65, with an average price of $35.50 per ton. Thus the average fertilizer contained 3.78 units more plant food and sold for $18.60 per ton less.

Bulletin 320 of the Vermont Station by L. S. Walker and E. F. Boyce, "Commercial Fertilizers" gives a table showing that in 1921 the average composition of fertilizers sold in Vermont was about 2.2-8.2-3.2 with an average price of $48 per ton while in 1930 it was 3.8-10-6.8 with an average price of $44 per ton. Here again an increased amount of plant food sold for less money.

Other interesting data are contained in the 1930 Report of the Ohio Department of Agriculture, Division of Feeds and Fertilizers by B. D. Leis. Here it is shown that the amount of plant food in fertilizer has increased markedly in Ohio from 1924 to 1930.

It is encouraging to note the increased interest in the trends in fertilizer usage as shown by the summaries included in many State control reports. Instead of being a mere collection of analyses many reports now analyze the data and compile tables summarizing the analyses. This work greatly increases the value of the control reports and is of great use to all interested in fertilizers. This practice is most highly to be commended.

The interesting possibilities of fertilizer control reports, which may look rather dull and uninteresting on the surface, have been recognized by Director J. L. Hills and he has prepared a bulletin discussing fertilizer control work, "A Half Century of Fertilizer Control in Vermont," Vermont Agricultural Experiment Station, Bulletin 323. In this the author says a few words regarding the early history of fertilizers in the United States and the beginnings of fertilizer control work. Changes in usage, trade practices, analyses, brand names, and costs are discussed and appropriate tables and examples are used to illustrate the points under consideration. Altogether the bulletin makes highly instructive and interesting reading.

*"Commercial Fertilizers," Ga. Dept. of Agr., Atlanta, Ga., Serial No. 118, Dec., 1930.*

*"Fertilizer Grades and Formulas," N. H. Ext. Service, Durham, N. H., Ext. Cir. 123, Mar., 1931, F. W. Taylor.*

*"Investigations Relative to the Use of Nitrogenous Plant-Foods, 1913-1927," Agr. Exp. Sta., New Brunswick, N. J., Bul. 519, Mar., 1931, J. G. Lipman, A. W. Blair, and A. L. Prince.*

*"Report of Analyses of Commercial Fertilizers Sold in New York State July 1, 1929, to June 30, 1930," Dept. of Agr., Albany, N. Y., Bul. 247, Feb., 1931.*

*"Fertilizer Tests of Several Soil Types," Agr. Exp. Sta., Ithaca, N. Y., Bul. 520, Apr., 1931, T. L. Lyon.*

*"Report of Analyses of Samples of Lime Materials Used For Agricultural Purposes Sold in New York State July 1, 1929, to June 30, 1930," Dept. of Agr., Albany, N. Y., Bul. 246, Jan., 1931.*

**Soils**

The drainage or lysimeter tanks at Cornell University have become justly famous both from their age and from the valuable information they have furnished. Rather heavy soils have been placed carefully in these tanks as nearly as possible in their original condition and variously cropped and fertilized. The crops are measured both by yields and analysis and all drainage water is collected and analyzed. A report of this work has just been published in Cornell University Memoir 134, entitled Lysimeter Experiments—III by T. L. Lyon, J. A. Bizzell, B. D. Wilson, and E. W. Leland. It is possible here to give only a general idea of the many relationships discussed in this bulletin.

Two rotations of corn, oats, wheat, and hay were used, one with legumes and one without. The rotation including legumes gave the highest total yields. Liming increased the yields in the legume rotation but tended to decrease yields in the non-legume rotation. When the soil was not cropped about two-thirds of the rainfall percolated through the soil while only one-half percolated through the cropped soil. Liming had little influence on percolation. Lime was lost from the soil by leaching more than any other substance although relatively small amounts were removed in the crops. Liming the soil had little influence on the lime removed in crops or drainage water. Magnesium was removed from the soil by leaching and crops in much smaller quantities than lime.

Phosphorus was not leached to any practical extent, total removal being in the crops. The crop removal ranged from a little less than 11 to almost 20 lbs. per acre per year on the average, depending on the crops grown. The rotation including legumes removed more phosphorus than the rotation without legumes. Liming tended to increase the phosphorus removed by crops.

Potash leached in only moderate quantities from the soil, more being removed by the crop than by drainage. The total amount of actual potash removed by crops and drainage averaged around 150 lbs. per acre per year. Liming had little influence on potash removal but apparently tended to reduce it if anything. Adding potash to the soil did not greatly influence the amount removed by crops or drainage.

Sulphur was lost from the soil mainly by drainage, comparatively small amounts being contained in the crop.

Nitrogen was continually being lost from the soil in the crop and drainage water. The smallest loss was where grass was grown and the largest where a legume rotation was grown or no crop at all. Since the legume probably obtained considerable nitrogen from the air, the uncropped soils probably suffered the greatest actual loss of nitrogen.

Cropping the soil reduced the leaching of all nutrients and in some cases the combined removal of a substance by both crop and drainage was less than the leaching on the fallow soil. This shows very strikingly the importance of cover crops in humid sections.

While this bulletin is technical in its nature many important and highly practical conclusions on soil management can be drawn from the material contained in it.

*"Crop Yields From Illinois Soil Experiment Fields in 1930," Agr. Exp. Sta., Urbana, Ill., Bul. 370, May, 1931, F. C. Bauer.*

*"Soils of Hill County," Agr. Exp. Sta., Bozeman, Mont., Bul. 246, May, 1931, L. F. Gieseker.*

*"Land Survey of the Town of Durham, New Hampshire," Agr. Exp. Sta., Durham, N. H., Bul. 255, Mar., 1931, C. E. Walker.*

*"Report of the Division of Soils and Crops for the Year Ending June 30, 1930," Agr. Exp. Sta., New Brunswick, N. J., Jacob G. Lipman, Augustine W. Blair, and Howard B. Sprague.*

*"Alkali Soils and Their Management," Agr. Ext. Service, State College, N. M., Ext. Cir. 105, Feb., 1931, Albert S. Curry.*

*"Determination of Soil Moisture by the Method of Multiple Electrodes," Agr. Exp. Sta., College Station, Tex., Bul. 426, Apr., 1931, W. H. McCorkle.*

*"Soil Survey of Lyon County, Iowa," U. S. D. A., Washington, D. C., Series 1927, No. 11, A. M. O'Neal, D. S. Gray, H. M. Smith, and R. E. Devereux.*

*"Soil Survey of Crawford County, Kansas," U. S. D. A., Washington, D. C., Series 1928, No. 3, M. H. Layton, J. A. Kerr, E. W. Knobel, H. W. Higbee, and R. W. O'Hara.*

*"Soil Survey of St. Lawrence County, New York," U. S. D. A., Washington, D. C., Series 1925, No. 34, Clarence Lounsbury, H. G. Lewis, F. B. Howe, and Salvador Diadato.*

## Crops

The very important influence that fertilizers may have upon the quality of a crop is very strongly brought out in a new technical bulletin, No. 176, "Factors Affecting the Quality of Commercial Canning Peas," published by the New York State Agricultural Experiment Station, Geneva, N. Y. The authors, C. B. Sayre, J. J. Willaman, and Z. I. Kertesz, report in concise manner the experiments conducted to determine what chemical changes in peas are associated with quality of the canned product. Tenderness was the principal quality factor studied and in this connection the authors sought to determine the particular effect of fertilizers upon this quality.

Among the interesting facts brought out by the experiments is that as the potassium content of peas increases the calcium content decreases. Higher calcium content is always associated with tougher peas. The harder peas had a higher lime content of the skins. Another surprising fact developed was that while an abundant supply of potassium in the fertilizer made thicker skins on the peas, these peas were more tender than in cases where a deficiency of potassium caused thinner skins. The thicker seed coats were not tougher, but actually had a lower puncture value than the thinner skins.

In drawing their conclusions the authors make the following statements:

"With a soil and climate generally suited to peas, the grower can fertilize for quantity, and the quality will take care of itself. However, from the standpoint of quality, it would be a safe precaution to have abundant available potassium present, as this would tend to lessen the absorption of calcium. No difference could be detected between the chloride and the sulfate in potassium fertilizers in their effect on quality peas, but the chloride form of calcium distinctly made harder peas."

*"The Peanut Crop in Arkansas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 263, June, 1931, C. K. McClelland.*

*"Preliminary report on Cultural and Fertilizer Experiments with Rice in Arkansas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 264, June, 1931, Martin Nelson.*

*"The Control of Weeds," Agr. Exp. Sta., Berkeley, Cal., Cir. 54, June, 1931, W. S. Ball, B. A. Madson, and W. W. Robbins.*

*"Monthly Bulletin of the Department of Agriculture," Sacramento, Cal., Vol. XX, No. 5, May, 1931.*

*"Monthly Bulletin of the Department of Agriculture," Sacramento, Cal., Vol. XX, No. 6, June, 1931.*

*"Citrus Propagation," Agr. Exp. Sta., Gainesville, Fla., Bul. 227, Apr., 1931, A. F. Camp.*

*"More and Better Potatoes," Purdue Univ., Lafayette, Ind., Ext. Bul. 89, May, 1931, W. B. Ward, C. T. Gregory, and H. K. Riley.*

*"The Effect of Various Containers on the Growth of Vegetable Plants," Agr. Exp Sta., Ames, Iowa, Bul. 279, May, 1931, E. S. Haber.*

*"The Vegetable Garden," Univ. of Ky., Lexington, Ky., Cir., 243, March, 1931, John S. Gardner.*

*"Agricultural and Rural Home Program for Maryland—1931-1936," Univ. of Md., College Park, Md., Cir. 86, April, 1931.*

*"A Production and Economic Survey of the Black Raspberry Industry of Washington County, Maryland," Univ. of Md., College Park, Md., Bul. 322, August, 1930, Hugh Ross and E. C. Auchter.*

*"Maryland Grasses," Univ. of Md., College Park, Md., Bul. 323, Sept., 1930, J. B. S. Norton.*

*"The Forty-Third Annual Report of the University of Maryland, 1929-1930," Agr. Exp. Sta., College Park, Md.*

*"Facts on Lawn Management," Massachusetts Agricultural College, Amherst, Mass., Ext. Leaf. 85, April, 1931, L. S. Dickinson.*

*"How to Grow Sweet Corn," Massachusetts State College, Amherst, Mass., Ext. Leaf. 102, April, 1931, Paul W. Dempsey.*

*"The New Ten Year Program for Massachusetts Fruitmen," Mass. State College, Amherst, Mass., Ext. Leaf. 114, April, 1931.*

*"The Identification of Apple Varieties from Non-Bearing Trees," Agr. Exp. Sta., Amherst, Mass., Bul. 274, April, 1931, J. K. Shaw and A. P. French.*

*"Producing Beans in Michigan," State College of Agr., East Lansing, Mich., Ext. Bul. 116, April, 1931, H. R. Pettigrove and C. R. Oviatt.*

*"Emergency Hay and Pasture Crops, Agr. Exp. Sta., East Lansing, Mich., Special Bul. 150, March, 1931, C. R. Megee.*

*"American Potato Journal," The Potato Association of America, East Lansing, Mich., Vol. VIII, No. 7, July, 1931.*

*"American Potato Journal," The Potato Association of America, East Lansing, Mich., Vol. VIII, No. 8, August, 1931.*

*"Cotton Production in Missouri," Agr. Exp. Sta., Columbia, Mo., Bul. 299, March, 1931, B. M. King.*

*"Irrigated Alfalfa in Montana," Agr. Exp. Sta., Bozeman, Mont., Bul. 245, May, 1931, J. E. Norton.*

*"The Northern New Hampshire Farm Woodlot," Univ. of New Hampshire, Durham, N. H., Ext. Bul. 37, Dec., 1930, C. S. Herr.*

*"Extension Work, 1930," Univ. of New Hampshire, Durham, N. H., Ext. Bul. 38, March, 1931, J. C. Kendall.*

*"Agricultural Research in New Hampshire," Univ. of New Hampshire, Durham, N. H., Bul. 256, April, 1931, J. C. Kendall.*

*"New Jersey Canhouse Tomato Production—Recommendations for 1931," Agr. Exp. Sta., New Brunswick, N. J., Ext. Bul. 86, March, 1931, Charles H. Nissley.*

*"Blueberry Culture," Agr. Exp. Sta., New Brunswick, N. J., Cir. 229, April, 1931, Charles S. Beckwith and Stanley Coville.*

*"Winter Injury of Evergreens," Agr. Exp. Sta., New Brunswick, N. J., Cir. 245, April, 1931, Richard P. White.*

*"Cranberry Growing in New Jersey," Agr. Exp. Sta., New Brunswick, N. J., Cir. 246, March, 1931, Charles S. Beckwith.*

*"Premature Heading of Cauliflower as Associated with the Chemical Composition of the Plant," Agr. Exp. Sta., New Brunswick, N. J., Bul. 509, Jan., 1931, W. R. Robbins, G. T. Nightingale, and L. G. Schermerhorn.*

*"Length of the Fruit Development Period of the Elberta and Some Other Varieties of Peaches," Agr. Exp. Sta., New Brunswick, N. J., Bul. 511, Oct., 1930, M. A. Blake.*

*"Early Grano Onion Culture," Agr. Exp. Sta., State College, N. M., Bul. 193, April, 1931, Fabian Garcia and A. B. Fite.*

*"Seventy-Six Clover Questions Answered," State College of Agriculture, Ithaca, N. Y., Bul. 210, April, 1931, H. B. Hartwig.*

*"Celery Production on the Muck Soils of New York," Agr. Exp. Sta., Ithaca, N. Y., Bul. 517, March, 1931, J. E. Knott.*

*"Cultivation Experiments with Certain Vegetable Crops on Long Island," Agr. Exp. Sta., Ithaca, N. Y., Bul. 521, April 1931, H. C. Thompson, P. H. Wessels, and H. S. Mills.*

*"A Gene in Maize for Supernumerary Cell Divisions Following Meiosis," Agr. Exp. Sta., Ithaca, N. Y., Memoir 135, March, 1931, G. W. Beadle.*

*"Winter Hay Crops," State College of Agr., Raleigh, N. C., Ext. Cir. 187, June, 1931, E. C. Blair.*

*"Crop Rotations for Piedmont North Carolina," State College of Agr., Raleigh, N. C., Ext. Cir. 188, June, 1931, E. C. Blair.*

*"Lumber Production in Ohio," Agr. Exp. Sta., Wooster, O., Bul. 478, June, 1931, R. R. Paton and J. S. Houser.*

"*The Bimonthly Bulletin*," *Agr. Exp. Sta., Wooster, O., No.* 151, *July-Aug.*, 1931.

"*Preliminary Report on Effect of Irrigation on Major Berry Crops in the Willamette Valley*," *Agr. Exp. Sta., Corvallis, Ore., Bul.* 277, *May*, 1931, *C. E. Schuster, R. S. Besse, G. L. Rygg, and W. L. Powers.*

"*The 'Frozen-Pack' Method of Preserving Berries*," *Agr. Exp. Sta., Corvallis, Ore., Bul.* 278, *May*, 1931, *Ernest T. Wiegand.*

"*A Method for Studying Water Conduction in Plants in Relation to Pruning, Grafting, and Other Horticultural Practices*,' *Agr. Exp. Sta., Corvallis, Ore., Bul.* 279, *May*, 1931, *E. M. Harvey.*

"*A Preliminary Report on the Vegetative Growth of Okra (Hibiscus esculentus Linn.) in Relation to the Production of Varying Amounts of Reproductive Tissue*," *Agr. Exp. Sta., Corvallis, Ore., Bul.* 284, *June*, 1931, *E. M. Harvey.*

"*Oats Production in Western Oregon*," *Agr. Exp. Sta., Corvallis, Ore., Bul.* 285, *June*, 1931, *D. D. Hill.*

"*Spinach in Texas*," *A. and M. College, College Station, Tex., Cir.* 84, *April*, 1931, *J. F. Rosborough.*

"*Watermelon Demonstration*," *A. and M. College, College Station, Tex., Cir.* 87, *March*, 1931, *R. R. Reppert.*

"*Twenty Years of Rotation and Manuring Experiments at Logan, Utah*," *Agr. Exp. Sta., Logan, Utah, Bul.* 228, *June*, 1931, *George Stewart and D. W. Pittman.*

"*San Juan County Experimental Farm Progress Report*, 1925-30, *Inclusive*," *Agr. Exp. Sta., Logan, Utah, Bul.* 230, *June*, 1931, *James H. Eagar and A. F. Bracken.*

"*Forty-Third Annual Report*, 1929-1930," *Agr. Exp. Sta., Burlington, Vt., Bul.* 319, *July*, 1930, *J. L. Hills.*

"*Agricultural Seed*," "*Fifteen Years of Agricultural Seed Inspection*," *Agr. Exp. Sta., Burlington, Vt., Bul.* 322, *Nov.*, 1930, *Anna S. Lutman and J. L. Hills.*

"*Department of Agriculture Immigation*," *Richmond, Va., Bul.* 283, *July*, 1931.

"*Moss Peat, Its Uses and Distribution in the United States*," *U. S. D. A., Washington, D. C., Cir.* 167, *June*, 1931, *A. P. Dachnowski-Stokes.*

## Economics

A new bulletin of very timely interest is "Influence of Yield on Cost and Income in Agricultural Production," Bulletin 297 of the Missouri Agricultural Experiment Station. The author, Economist Ben H. Frame, introduces his subject by saying:

"Prices of many farm products at the present time are lower than they have been for many years. Apparently there is a larger supply of these than the consuming public is willing or able to buy at prices which are remunerative to many of the growers. At the time that the prices of farm products are so low, millions of people in our cities and in foreign countries are hungry. In view of such conditions many farmers are wondering how best to meet the situation."

In his discussion which follows he offers the opinion that the colleges of agriculture and extension agents, by making knowledge of more efficient practices of production and marketing available to all, are offering the best solution of the farmers' problems. While he recognizes that the lower the price of the product, the lower is the intensive margin of production, a point closely associated with the law of diminishing returns, he points out that the law of diminishing returns operates only after a certain point has been reached. He believes that on many Missouri farms the point of diminishing returns has not yet been reached. If this is true, the surest and quickest way of individual farmers to increase their efficiency of production and improve their financial status is to increase their yield per acre and per animal.

Many other phases of the present situation are discussed in this bulletin, which should find a wide range of interest at this time.

"*Three-Year Study of Farm Management and Incomes in a Typical Upland Section of Arkansas*," *Agr. Exp. Sta., Fayetteville, Ark., Bul.* 262, *May*, 1931, *J. A. Dickey.*

"*Economic Digest*," *Conn. Agr. College, Storrs, Conn., Bul.* 24, *June*, 1931, *G. B. Clarke.*

"*Retail Credit in Iowa Farmers' Elevators*," *Agr. Exp. Sta., Ames, Iowa, Bul.* 283, *June*, 1931, *Frank Robotka.*

"*Factors Affecting Sweet Potato Prices in Missouri*," *Agr. Exp. Sta., Columbia, Mo., Bul.* 302, *Apr.*, 1931, *F. L. Thomsen and W. R. Fankhanel.*

"*Variations in Local Prices for Farm Products and Supplies in Missouri*," *Agr. Exp. Sta., Columbia, Mo., Res. Bul.* 151, *Nov.*, 1930, *F. L. Thomsen.*

"*A Statistical Study of Milk Production for the New York Market*," *Agr. Exp. Sta., Ithaca, N. Y., Bul.* 518, *Apr.*, 1931, *M. P. Catherwood.*

*"Farm Economics," State College of Agr., Ithaca, N. Y., No. 71, June, 1931, E. G. Misner.*

*"The North Dakota Farm Outlook," N. D. Agr. College, Fargo, N. D., Vol. VI, No. 10, July 22, 1931, Rex E. Willard and F. H. Turner.*

*"Type of Farming Areas in Texas," Agr. Exp. Sta., College Station, Tex., Bul. 427, May, 1931, C. A. Bonnen and F. F. Elliott.*

*"Virginia Farm Statistics, 1930," Va. Dept. of Agr., Richmond, Va., John A. Hicks.*

*"Directors of Farm Cooperatives—Their Duties and Responsibilities," College of Agr., Madison, Wis., Cir. 245, June, 1931, H. H. Bakken.*

*"Iowa Monthly Crop Report, June 1, 1931," Iowa Dept. of Agr., Ames, Iowa.*

## Diseases

*"Diseases of Watermelons in Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 225, Feb., 1931, M. N. Walker and George F. Weber.*

*"A Preliminary Report on Anjou Scald and Its Control," Agr. Exp. Sta., Corvallis, Ore., Bul. 280, June, 1931, Henry Hartman.*

*"Varietal Resistance, Physiologic Specialization, and Inheritance Studies in Bunt of Wheat" Agr. Exp. Sta., Corvallis, Ore., Bul. 281, June, 1931, E. N. Bressman.*

*"The Rots of Washington Apples in Cold Storage," Agr. Exp. Sta., Pullman, Wash., Bul. 253, May, 1931, F. D. Heald and G. D. Ruehle.*

*The Dutch Elm Disease, U. S. D. A., Washington, D. C., Cir. 170, May, 1931, Curtis May and G. F. Gravatt.*

## Insects

*"1931 Spray Schedule for Peaches," Agr. Exp. Sta., New Brunswick, N. J., Cir. 222, Feb., 1931, T. J. Headlee, W. H. Martin, and A. J. Farley.*

*"1931 Spray Schedule for Pears," Agr. Exp. Sta., New Brunswick, N. J., Cir. 223, Feb., 1931.*

*"1931 Spray Schedule for Grapes," Agr. Exp. Sta., New Brunswick, N. J., Cir. 224, Feb., 1931.*

*"1931 Spraying Recommendations for Apples," Agr. Exp. Sta., New Brunswick, N. J., Cir. 227, Feb., 1931.*

*"1931 Spray Schedule for Plums and Cherries," Agr. Exp. Sta., Cir. 228, Feb., 1931.*

*"Spraying and Dusting Experiments with Potatoes on Long Island," Agr. Exp. Sta., Geneva, N. Y., Bul. 592, Feb., 1931, H. C. Huckett.*

*"Oil Sprays for Summer Use," Agr. Exp. Sta., Pullman, Wash., Bul. 252, May, 1931. Anthony Spuler, F. L. Overley, and E. L. Green.*

*"Fig Insects in California," U. S. D. A., Washington, D. C., Cir. 157, Apr., 1931, Perez Simmons, W. D. Reed, and E. A. M'Gregor.*

*"Conserving Corn from Weevils," U. S. D. A., Washington, D. C., Bul. 1029, May, 1931, E. A. Black.*

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# Liming Costs and Benefits

(*From page* 30)

years? While but little authentic information on this subject is available, several instances of actual farm experience tend to throw some light on the matter. Take for instance the following example

In 1917 Mack Bradley, a Missouri farmer, limed a field for alfalfa, using 2.5 tons of ground limestone per acre. This field was in alfalfa for six years. It was then plowed up and cropped with corn for three years, and then seeded to alfalfa again. At the end of 12 years soil from spots where the alfalfa was failing was tested and showed a lime requirement of 1.5 tons per acre. In this case that land was in alfalfa—a heavy lime consuming crop —for nine out of 12 years, and there was every indication that the soil was still "sweet" when the field was sown to alfalfa the second time, nine years after liming.

In Bradley's case the cost of lime applied was $5 per acre. Assuming that this application of 2.5 tons per acre had a maximum effectiveness for six years, his prorated annual cost was but 84 cents per care. On the same basis the 31 farms from which liming costs were obtained had annual costs ranging from about 50 cents to $1.30 per acre.

These costs are rather insignificant when the benefits received are considered.

# Waste By-Products Become Dairy Feed After University of California Trials

Davis, Aug. 20.—By-products that have not only been wasted but which have caused losses because of the cost of disposing of them have been turned to profit as dairy feed following trials made by the University of California animal husbandry division at the Branch of the College of Agriculture here. A specific example is given by Prof. W. M. Regan in orange pulp, which formerly cost growers about $2 a ton to destroy; now it is worth from $40— to $60 a ton as feed for dairy cows.

Other feeds that have been found to have a value as stock feed are pineapple pulp, raisin pulp, stemmer pulp from raisins, sesame meal, artichoke silage, waste spinach, etc. Studies of such feeds are made as money becomes available, under the direction of Arthur Folger, supervisor of advanced registry tests for California.

"The use of these by-products as feed not only opens a source of revenue for the producers of crops, but also makes available valuable feeds for the dairyman at costs usually lower than others in use. At any rate, the tests made in this division, both of nutritive values, digestibility and palatability, give data upon which prices can be made with fairness to both producer and user of the feed."

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# More Food for Potatoes

(*From page 25*)

ash and that the ratio of potash to nitrogen and phosphoric acid in a 5-8-7 analysis was not suitable for the best results.

More recently the Maine Experiment Station showed that in cropping a section of a field with hay for seven consecutive years so as to get all plots on a uniform fertility basis, potash had been depleted more than nitrogen and phosphoric acid.

Foremost among the farmers who held this contention were Arthur A. Ginn and Edgar Russ, of Caribou, Maine, prominent growers and shippers of potatoes. Mr. Ginn stated that "one couldn't see the difference from the road, but when one got into them, invariably the tops were more stalky, remained green longer, and dug measured from 15 to 20 barrels more to the acre when grown on 5-8-10 then when grown on 5-8-7." The rate of application was 2,400 pounds per acre.

Mr. Russ asserted, "I do not remember ever checking the yield differences, but I have never felt that I could sell as many potatoes grown on 5-8-7 as when grown on 5-8-10," meaning that they graded better.

Thirteen farm tests have been made during the past three seasons to check these opinions, and the average results showed a difference of 16.3 barrels (44 bushels) increase in yield per acre from the use of 10 per cent potash over 7 per cent potash with the rate of application of fertilizers being the same—2,300 pounds. On a graded U. S. Number 1 basis the difference in yield was 20.4 barrels (56 bushels). This is a gain of 4.1 barrels per acre over the total yield difference per acre, all of which lends strength to Mr. Ginn's and Mr. Russ' assertions. Invariably the tubers were more blocky in shape, of better type, and there were fewer pointed-tipped ones noticed when grown on the high potash fertilizer.

An indication of the trend towards

higher potash fertilizers is revealed by the change in analyses sold now and two years ago. One of the concentrated dry mixers sold 98 per cent of his fertilizer in the form of 10-16-14 then. In 1931 he estimated that it would run 80 per cent 10-16-20 and his total tonnage is increasing each year. One of the old-line companies' output was practically all 5-8-7 two years ago. In 1931 it was figured to run close to 50 per cent 5-8-10. Equally as abrupt changes are being made by other fertilizer companies.

It is the big yields of high quality, merchantable potatoes that determine profit in any competing potato section. High rate of application of fertilizers carrying an abundance of potash appears to be playing an important role in Aroostook county in accomplishing this.

# Better Pastures for Western Washington

(*From page* 10)

days for the fertilized plots and 181.6 for the check plot, or a difference of 29 days in favor of the fertilized plots.

An interesting observation in connection with this experiment was the apparently greater palatability of the fertilized plots. This was shown by the fact that the grass along the lane in the fertilized plots was kept closely grazed where the cows reached through the fence, while the grass in the check plot was almost untouched.

It is evident from these results and the results of experimental work in other States that pastures form one of the most valuable, as well as the cheapest, sources of feed for dairy cows or other livestock. Western Washington dairymen, with their mild climate and high yielding pastures, should be particularly interested in securing from these pastures the highest degree of productivity. This is best accomplished by the use of good land, good pasture grasses, intensive fertilization, supplementary irrigation when necessary, and careful grazing.

# A City Man's Alfalfa

(*From page* 28)

use of lime, manure, fertilizer, and perspiration. No poorer piece of ground could be found to start alfalfa on than the one that Mr. Sellew picked out. It had several advantages, however. The land was so poor that there was no witch grass, and it was well drained.

Here is the procedure he followed to secure the stand, now four years old, of alfalfa which is as near 100 per cent perfect as could be asked for: 3½ tons of lime to the acre, 500 lbs. of 4-6-10, and 20 lbs. of alfalfa seed were put on in 1928. In the spring of 1929, when the alfalfa first started, he again applied 500 lbs. of 4-6-10 fertilizer to the acre and that fall another 100 lbs. In 1930 two excellent crops were cut. It was top-dressed with manure and superphosphate and 200 lbs. of 4-6-10 put on to the acre between the first and second cutting.

With all these applications a value over cost of $120 to the acre has been produced. "Nothing can live and do well without feed," says Mr. Sellew.

# Cranberries

(*From page* 24)

the development of the canning of cranberries has also made it possible to have cranberries throughout the year. With the localized production of the cranberry together with the fact that the market lies almost wholly in the large population centers at some distance from the points of production, the marketing is an important problem. Organizations within the States, as well as for the country as a whole, have been developed to market the United States production, and in general it may be said that the marketing of the cranberry crop is done very efficiently and that the quality of the product is maintained at a high level by the organizations of the growers.

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# Potash Needs of Illinois "Alkali" Soils

(*From page* 20)

the crop producing capacity of the soils is attributed in part to the potassium it contains. In addition the crop is favored by a lowering of the nitrate nitrogen content resulting from the straw application.

"For the same reason, horse manure is most valuable on these soils, whereas cow manure is most valuable on soils in which a deficiency of available nitrogen is a limiting factor.

"A favorable physiological balance in the soil is desirable, particularly with respect to potassium and nitrate nitrogen."

Many of the experiments revealed that straw and potassium applications produced about equal results, combinations of the two, better results, and that potash drilled in with corn was extremely beneficial.

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# Marketing Quality Vegetables

(*From page* 11)

As growers, Reynolds and Moore are experts. Their produce is of the best quality and is produced for the demand of the market and season. Soil fertility is not only maintained but is built up by their system of crops of rye and vetch and the use of lime and fertilizer. Of the latter, purchases are made in car lots. For intensive cropping 1,500 pounds per acre of a 4-8-6 is the most common fertilizer rate and analysis with side-dressings of nitrate of soda as the crops require. For sweet corn, late tomatoes, and similar crops the rate used is 300 to 500 pounds per acre. Main season and late crops follow early vegetables on the same ground in the system these men follow, sometimes requiring a ton of fertilizer per acre per season.

Quality, care in seed trials, quick growth, intensive cropping, and fresh deliveries have maintained this business for more than 30 years on the same site, unusual in its location but comparable to similar businesses near much larger cities.

# Seed Council Points Out the Value of Good Seed

## *By P. H. Stewart*

Extension Agronomist, University of Nebraska

FOR some time the Seed Council of North America has been making a study of the weed problems of the United States. The increasing importance of weeds to American Agriculture has made this study an important undertaking.

Seedsmen complain that it is becoming more and more difficult to purchase lots of seed which are suitable for recleaning into high-class merchandise. This year, for instance, the prevalence of dodder and buckhorn in red clover is a very serious problem in many States.

Farmers likewise complain that new and often noxious weeds extremely hard to eradicate are getting a foothold on their farms, which makes it more difficult and expensive to raise a satisfactory crop and which in some cases may even lower land values greatly. The bindweed, for instance, in certain sections of the country has become so serious that farm loan companies will loan only one-half the usual rate on infested farms and in some cases they refuse to loan at all.

### *Who Is to Blame?*

Just what is the solution to the weed problem, if there is one, and on whom does the responsibility for good seed rest? A recent study by the Seed Council of North America on State seed laws and their enforcement showed the surprising fact that very few States are actually enforcing their seed laws in a way that the public is protected when buying seed. Yet farmers in States with seed laws have the impression that since they have a law any lot of seed offered them is satisfactory.

Too much seed is sold on the basis of price with little attention paid to its quality, particularly to its freedom from serious weed pests. So-called "bargain lots" of seed are perhaps the worst offenders in this regard.

On the other hand, our good seedsmen often refuse to buy lots of seed badly infested with serious weed seeds. Such seed is consequently sold from farm to farm, thereby sowing down new seed producing fields which in turn produce undesirable seed crops.

### *Cooperation Is Needed*

The responsibility of providing good seed does not rest with any single industry. Seedsmen point out that they themselves do not raise the seed which they sell, but must merchandise what is offered them. Farmers complain that some seedsmen sell foul lots of seed. The foundation for improvement in the production, sale, and use of good seed rests on the knowledge of what is good seed, an appreciation of its value, and the realization of the danger and folly of sowing seed which may contain serious weed pests, which once established take years to eradicate. The Seed Council, through its program, is attempting to help agriculture by working out a cooperative program involving farmers, seedsmen, seed law enforcement departments, the U. S. Department of Agriculture, and Colleges of Agriculture for combating weeds, and to assist in creating a more general sentiment for good seed.

# The Inquiring Mind

(From page 16)

veals a surprising number and range of investigations, unequalled by any other similar institution in the United States. It is true that, owing to existing conditions, many of the experiments were necessarily incomplete; but, on the other hand, it will be noted that there has been a constant effort to remedy this defect, and, in consequence, the College may justly claim that in the unity, continuity and control of the principal investigations conducted here within the past decade or two she has no equal among similar institutions. It may also be noted that this College was one of the first to issue bulletins—as distinguished from the fuller reports—for free distribution, showing in brief the results obtained in the course of the experiment."

It is pleasing to note, in this early report, the pride Dr. Frear took in the Institution employing his services, and for which he worked so faithfully and well until 1922. His was a loyalty of purpose and practice which may, today, well be emulated by all the young research men of our agricultural experiment stations.

### *Remembered for Liming Work*

C. A. Brown, Chief of the Bureau of Chemistry of the U. S. Department of Agriculture, said, in Prof. Mair's book: "In agricultural chemical research Dr. Frear will probably be longest remembered for his publications upon liming of soils, a subject in which he was interested during the whole of his career. His most conservative work, however, was unquestionably the pioneer service which he gave to the establishment of food standards and pure-food legislation. To this work he gave untiring energy, even after symptoms of his fatal illness were fastening upon him. In his devotion to high ideals and to public service in every worthy cause, the memory of Dr. Frear will be a constant inspiration to all who knew him, whether as a scientist, teacher, friend or citizen."

Professor Mairs has reported that when Dr. Frear arrived at the Pennsylvania State College, two years before the establishment of the Experiment Station, his previous work with the U. S. Department of Agriculture greatly assisted him in his new sphere of action. His broad general training and interest put him in contact easily with all departments of the College. The experiments which he had been conducting, and which were continued by him, established a continuity of activities in agricultural investigation on which the Experiment Station could be established more easily. Thus, there was no break or radical change of program, but rather a gradual mergence and expansion. His importance as a connecting link between the old and the new at that time is hard to estimate.

### *Gained National Recognition*

Dr. Frear's ability and scholarship were recognized throughout the State and Nation. He was looked up to as an authority on all questions involving food chemistry, fertilizers, lime, and tobacco. As a chemist of the Dairy and Food Commission, he was most active in the framing of laws for the protection of the public. "Officials everywhere placed great reliance upon his knowledge of scientific matters, and the results of his investigations in field and laboratory. For these reasons his services were in constant demand in organizations not connected with the College."

Harry Hayward, another friend of Dr. Frear called him a "good mixer, with a sympathetic and pleasing personality; self-confident and self-reliant; a willing and conscientious worker; a leading authority in the practical aspects of agricultural chemistry." His services as a speaker before chemical and agricultural meetings were in demand. He also took an active interest in local community affairs and did much to build up the village of State College. Among other things, he helped to promote and build the University Inn, was director of the first bank in State College, and helped to organize the first building and loan association, the State College Water Company, the Hillside Ice Company, the first electric light company, and aided in establishing a transportation company which materially improved the facilities for traveling to and from the College. While he would be considered a successful business man, he often seemed to have the welfare of the community as much in mind as his own financial interests.

Aside from his eminence as a scientist, Dr. Frear was admired for his many other good traits. Dean A. L. Watts said of him, in La Vie, of 1922, "His splendid Christian character and fine human qualities left an indelible impression upon the lives of all those who knew him, and upon thousands of people who counted him as a friend. His home life was beautiful, and he was most devoted to his wife and four children. He possessed to a remarkable degree the admirable qualities of kindness, cheerfulness, patience, and thoughtfulness. No one ever was associated with him in any capacity who was not helped in some way."

What more could be said to the credit of a man? Dr. Frear set an example few will be able perfectly to equal, but which all would do well to regard and follow.

# Fertility and the Black Spot of Roses

(*From page* 17)

ly expressed opinions may be summed up in this way, "Keep the plants growing vigorously and steadily by the liberal use of fertilizers and copious watering." The grower of one of the largest rose houses said, "When black spot gets bad in any house I simply stop watering for a week or more. This usually makes the plants look worse with the disease but I syringe and knock off all the diseased leaves and then start the treatment. First I make a heavy application of cow manure with a sprinkling of superphosphate beneath it. Then the beds are watered heavily and in a short time the plants break into a heavy growth and the black spot will not appear on this new growth."

Keep the plants growing vigorously is the slogan and to do this they apply truly amazing amounts of fertilizer. A pound of fertilizer on each 20 square feet is over a ton to the acre, but when this amount is applied every three weeks to 25 days the amounts become astonishing. A commercial fertilizer is not always applied each time. In many cases they alternate this with heavy applications of cow manure. With this fertility goes extremely heavy watering at least once a week and sometimes more often.

The exact formulas used are rather variable. A 5-8-7 or a 4-12-6 are rather popular but in every case potash is included and they tend to the higher analyses of potash. One Ft. Wayne rose grower made the assertion that potash makes the rose stems stiffer and the flowers keep better. I know from personal observation that potash is quite essential on carnations to stiffen the stem. I have seen two greenhouses in the same locality, indeed, across the road from one another. In one where a fertilizer high in potash was used the sets of flowers and stiffness of stem was quite remarkable. In the neighboring house where such fertilizers were not used the stems were slender and were almost bent double with the weight of the flower.

Be the explanation what it may, I am not trying to recommend fertilizer practices for roses or carnations. I only know that these expert rose growers can demonstrate to anyone's satisfaction their ability to control the black spot disease.

Quite naturally their other cultural practices play an important part. Some growers make it a practice to remove all the fallen leaves from the beds after syringing. But, others simply cover them with the heavy mulch of cow manure. It seems to have the same effect.

Ventilation plays its important part also. These men say that they like to "carry a crack of air on the houses at all times" and when conditions are more favorable the ventilators are opened more fully. They often go to the expense of carrying heat in the house when the outdoor conditions would not seem to warrant it. Their idea is simply to be able to ventilate and dry out the air.

Dusting sulfur is the recommended specific against the black spot disease. Many growers have used this control with success as an added precaution against the disease. However, others are rather afraid to use this because they claim it may stain or burn the petals. I have had some very good and successful growers tell me that they are not interested in any dust or spray against this disease.

We should not gather from this that the use of sulfur dust against black spot is needless. It has been too often proven that this is not true, especially for the outdoor gardens. This statement merely reflects the faith these men have in properly feeding the plants to control the disease. And, we cannot disregard their opinions because they are based on actual experiences that have proven commercially successful.

The slogan of these rose growers, "Plenty of feed and plenty of water to make the plants grow vigorously will hold the black spot in check" needs careful consideration. This should be a subject of research to determine why these men are right.

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# The Toxicity of Certain Fertilizers

(*From page* 42)

a fertilizing material. The idea is to obtain first a selective destructive action, immediately followed by a fertilizing action favorable to the species spared.

The main features of toxicity being known, it becomes possible not only to avoid its bad effects, but even to take advantage of them. Toxic effects can be used against parasites of all kinds, bacterial, vegetal, or animal.

It must be observed that for a long time industries based on bacterial actions have known how to use the effect of such compounds as fluorides (in distillery) or sulphurous acid (in winery) to provoke the selective action used in the fermentation.

In some cases it is desired to permanently check spontaneous plant growth, as in the case of park and garden avenues and pathways. The proper use of chemical compounds saves labor and keeps such places clean for several months without any need

This close-up shows a thick infestation of charlock in a field in Alsace before an application of finely ground kainit.

of raking. For such purposes, the materials used are either highly and permanently toxic ones, like chlorates, or slightly toxic but cheap ones, like waste sodium chloride and calcium chloride. Such applications, however, are used not so much in agriculture proper as in cities and industrial areas.

### *New Results Obtained*

We have already indicated an agricultural application, the selective action of some chemical treatments destroying weeds in grain, beets, potatoes. Lime nitrogen is ordinarily used more than a month before planting time, mainly to avoid its possible toxic effect at planting time, but also to obtain a partial sterilization and cleaning of the soil before it acts as a fertilizer.

A good farmer of the Somme told us that he had obtained a very good and clean stand of flax on land infested with buttercups by applying the necessary nitrogen as lime nitrogen only ten days before sowing, adding that he knew very well that such an application would have been very dangerous if he had been sowing wheat instead of flax. The generalization of such a practice cannot yet be advocated owing to considerable differences in the analysis of two samples of lime nitrogen, even with the same nitrogen content. However, the experiment is worthy of note and certainly deserves further investigation.

Mr. Lévêque, Director of Agricultural Services for the Sarthe, applied 1,800 lbs. of lime nitrogen per acre, thus destroying wild oats and twitch grass in land that four months later had gone back to a satisfactory state of fertility.

In the North of France the use of heavy kainit dressings on loess soils immediately after the harvest helps to clean the soil and also avoids any bad physical effect of the fertilizer on the soil if the kainit was used after ploughing only.

Reports recently received confirm the possibility of destroying dodder by heavy local applications; a few months later alfalfa enjoys the double advantage of the cleansing and fertilization.

A picture of the same field shortly after an application of kainit shows the charlock leaves curled and dying.

Heavy applications of kainit prevent June-bug grubs from damaging pastures. Wire worms also are affected by such applications.

Although the details of the treatment are not determined, heavily concentrated solutions of kainit applied in winter to the bark of fruit trees help in fighting parasites and disease germs.

In the last given examples, the toxicity of concentrated solutions is eliminated by simple dilution. It is not an impossibility to foresee the development of agricultural practices based on a temporary toxicity automatically followed by the fertilizing action of the material used.

Besides such obvious actions, there is also a certain partial sterilization modifying the microorganic population of the soil. Instead of obtaining this modification by the use of antiseptic products properly speaking, would it not be better to obtain it through a side action of fertilizers?

The results obtained are very encouraging and permit hopes for a solution of a problem recently set by Mr. Schribaux, to wit, the chemical cleaning of summer fallows. It is only necessary to obtain at a reasonable price products highly but temporarily toxic eventually decomposing into fertilizing materials.

### *Progress Still to Be Made*

The increase in the cost of labor and the impossibility for machinery to do a perfect cleaning job, even in the case of crops planted in rows, give this problem an economic aspect. The possibility of killing two birds with one stone, in other words, of cleaning and fertilizing at the same time, is important.

To develop the selective action of which we spoke in connection with soils and finely ground materials, it is necessary to have numerous observations classifying plants according to their relative resistance in given biological and meteorological conditions. The practical limit between affected and spared plants can probably be changed not only through varying concentrations but also through a modification of the surface tension of the solutions used.

### *Summary*

It is a well-known fact that certain fertilizing materials have a more or less marked toxic effect at the time of application. In some cases this action is detrimental, but it is also possible to take advantage of it.

Toxicity can be permanent or temporary. In the latter case the toxic action may be followed by a fertilizing action.

The possibility of destroying certain species and developing other species growing together has already been used to a large extent.

Economic results are obtained particularly with lime nitrogen and potash salts which clean the land and fertilize it at the same time.

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# Winter Weed Hosts

(*From page* 27)

made in the fall. With the rush of spring and summer work farmers in many cases have a good excuse for not keeping all weeds under control. When the rush work is over, a few days spent in cleaning up weeds on the farm may prove exceedingly valuable and be a step towards the ideal crop conditions for which we should always strive.

Cultivation of fields to induce the germination of weed seeds, clipping, digging, spraying, and burning of weeds now will not only reduce the weed stand for the coming season but will destroy the winter sanctuaries of many profit-eating pests.

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# A Fallacy Uncovered

(*From page* 13)

ing of this year's wheat crop last October. For fertilizer he renewed his application of 10-0-4, and added to each acre 700 pounds of ground rock phosphate.

The result was the fruition of his six years of planning. He was not greatly surprised, but his neighbors were. His yield was 50 bushels an acre.

His belief was that while potash may be present in abundant quantity in red clay lands, in many instances certainly it is not in a form available to crops planted on that land. Pending the time when some one discovers a means of liberating that store of potash inherent in the soil, he is now assured that many farmers will find it profitable to add a sufficient supply of potash to meet the needs of their growing crops.

Another one of our Mecklenburg county farmers suspected that his wheat was suffering from a want of potash. When several years ago he bought the farm, he was disappointed with its infertility. He knew the soil was poor, but he was amazed when the field peas he sowed attained only a maximum height of six inches.

For three years in succession he planted lespedeza and turned that crop under in an effort to build up the soil. That his efforts were in the right direction came to light the next year when he planted cotton. He limed his soil and put on 800 pounds of 10-4-4 fertilizer to the acre. By this time the soil was showing signs of fertility, but ven he was surprised when it produced bale of lint cotton to the acre. That s a very good yield of cotton under he best of conditions in this territory.

In the fall of 1930 he decided to plant wheat on a 3½-acre strip of that farm. He put in 200 pounds of superphosphate to the acre of 40 pounds of muriate of potash. This spring he applied 75 pounds of nitrate of soda an acre.

While the average wheat yield this year in this section was below 20 bushels an acre, he made 42 bushels an acre on his well-prepared, well-fertilized wheat field.

# Barkers and Builders

(*From page* 4)

enjoyable for us to be swindled, let's throw everything else aside and make a pastime of it. Hence we tolerated an army of porch-climbers such as no nation ever before assembled and endured, and we thought we had to treat them freely after each raucous serenade.

Sometimes America reminds me of one of those boom-town real estate projects with which we are familiar. When times were kiting and suckers were biting, the boomers sent a steam calliope all over town, hung flags and signs all over the lot, held hot auctions, grabbed any kind of collateral, and pocketed the profits. But as for real preparedness and constructive planning, sanitation and building restrictions, why they weren't part of the glowing idea at all. Leave *that* to the quiet and unobtrusive fellows who held the deeds. Let *them* arrange transportation, drainage, and mosquito eradication. Sales resistance, not stability, was the objective for which the salesmen were trained.

Of late the mental muscles of the professional rapid-fire salesman have been fatigued unwontedly by meeting a unique kind of sales resistance. It was just a game and a mighty sport for the go-getter gods to break down this S. R. bogy before the recent period of unpleasantness. If you couldn't sell a fellow a harmonica, maybe you could sell him a saxophone. It was only a relative thing. If he wouldn't bite on worms, try a casting fly.

However, since folks have sort of sobered down, there is something besides sales resistance and stubborn opinion to consider. Now it is the fundamental, the wear-ever, the lasting and the sincere and truthful appeal. When selling things now, it is not effective to talk out of the wry corner of the mouth or to slap people on the backs, or take them over where the suds is sloshing on the sly. Expense accounts may go up a little on the mileage between customers, but the inexplicable and mysterious "overhead" for prostituted good-will is getting less of a burden in red ink for the good old firm. The froth is blown off, the big wind is becalmed, the air is clear, and maybe the tired world is waiting for the sunrise without fear of a headache.

One of my good friends, who has suffered with the rest of us from being regarded as just so much clay to be molded, turns to me and asks, "Need we pay more for things and services because they are cellophane wrapped?" He has bought six bunches of radishes for ten cents that cost six cents to raise, and they were not wrapped in cellophane. At another counter he purchased 15 cents worth of fags that cost two cents to produce, and 25 cents worth of chewy candy that cost five cents to make, and behold they were wrapped in the scintillating tissue that keeps out all foreign flavors and delights the eye. He goes to a dentist and a lawyer and finds them also wrapped in cellophane. So he quietly goes to his home, attaches a string from his molar to the door-knob and reaches for his Handy Home Attorney booklet. After he shuts the door and shuts the book, his problems will be solved without paying tribute to the flare in commercialism. The only alternative for this independent way out is to search long and patiently for professional men who do not value their worth on false or intrinsic standards.

I ATTENDED the funeral last month of one of the world's most successful salesmen, if you would include in that list a man who revolutionized an entire industry's business system. He lived in a quiet house on a shady street, wanted no monuments and shunned all pageantry, cultivated a few friends and some hollyhocks, and passed away with all the public honors a State and Nation could bestow. This was my friend, Dr. S. M. Babcock. Without ever writing a single line about his great invention, without publishing a catalog or brandishing a sales talk to bust somebody's resistance, Dr. Babcock lived to see his test used around the world and his original ideas soundly verified. If he had the human urge for self-expression, he achieved it without help of radio or raucous campaigning. And what is better still, after achieving a world-wide voice, the echo of it will reverberate long after the cat-calls of the lesser species are forgotten.

Do not confuse my suggestion here with the worn-out adage about the man who invented a mouse-trap and the beaten path to the wilderness, etc. There is a great distinction between a hermitage and a home of humility. There is a difference between a crass go-getter and a simple man who has the goods.

Competition probably caused a great amount of salve and gusto in the methods of selling. We must honestly recognize this in order to make some excuse for the schools of thought that were trained in the past decade to plunder and pluck the unwary. Many a salesman started out on his morning grind with a bad taste in his mouth acquired the day before. It wasn't his fault that the morsel he chewed was unsavory, for the family had to live and he was the provider.

But there is ample room for clean competition and of a kind that is based on something besides splurge. This is the sort of competition which the public may soon welcome as an antidote for previous poison.

ONE of my unhappiest recollections is a visit paid to a national sales convention done up in feverish style by one of the largest mechanical concerns in America. Everybody was tagged with the dollar sign. The overture was played by a mighty orchestra at the public's expense, the silken curtain parted so that we of the pit might see the vision behind it. Seated in a gaudy row on imitation gilded thrones along the footlight margin were a dozen pompous fellows from the back-country, men who were rated among the best sellers in the sticks.

Up rose the major-domo of the panorama of progress. He bore to the front a dozen bags of gold coins, bowed low before the court of commerce, and presented these tokens of hustle to the twelve apostles of gas and gall. I gritted my bicuspids and almost swallowed my cud. For right there in the line sat our local behemoth, the fellow who sold more machines and caused more dissatisfaction in his wake than any peddler known to the constables. I had more personal complaints about his work and more cussing of his company through him than any man I knew. Yet here he was, the pride of the clan!

I wonder which party sinned the more against the other, the manufacturing company that exerted every inuence to speed its gross sales under ny terms, or the district manager vho misrepresented goods and blackned what merit the product had by isregard of complaints. It may be dded that in two years after this ncident the "crown prince" of the lollar drama got his walking papers rom the same concern that coronated im. He simply couldn't find any nore suckers. It's a feast or a famine vith the rabid boys. But the system hat made them racketeers is due ooner or later for an overhauling.

AFTER I graduated from high school numerous years ago, a job pened for me in the local Palladium of liberty, consisting mostly for six months of sweeping up copy and cigar butts and dodging the "type lice" used to initiate the typographical tyro. In due time I was promoted to the case and allowed to "throw in" the hand-set rows of type taken from broken and dead job forms. The printers who composed the type in sticks for the forms were repaid on the positive basis, while those who merely distributed it got the negative end of the wage scale. One element represented the quick and the other represented the dead. The former were catered to by the boss, while the latter were just tolerated as unavoidable appendages.

Later when entering the sanctum as a scribe I tasted fleeting visions of glory. Finally I learned that in the front office there was also some real class distinction. The chaps who negotiated the paid advertising were regarded as supporters of the whole journalistic clan, while the fellows who wrote stuff for the spaces left after the advertising was inserted were similar to the type tossers of the rear room. They merely had to be tolerated because few people would subscribe to a sheet consisting only of paid insertions.

With some few exceptions this line of sub-conscious demarcation seems to exist between the copy men and the contact live-wires in a majority of publications. Unless a writer is shrewd enough to blast himself a niche in some syndicated commercialized series, he must content himself to be the clown of the parade while the advertising galaxy ride in the band wagon behind the ring-master. Lest somebody suspect a touch of malignity in this, I hasten to say vehemently that there are plenty of compensations coming to the one who writes chatter instead of checks. And there are here and elsewhere many publications that "sell" their editorial power and defend it in a highly intelligent and courageous way. In such association of mutual interest it has been a privilege to serve, and the success of such

periodicals presages the advent of more.

In this aspect it must not be forgotten that to some degree the publishers have been as helpless to remedy conditions as the disgusted salesmen were under the lash of financial furies. It was all part of the old side-show aforementioned. Graft and the world grafts with you, be square and you won't get a loan.

WITH humanity molded as it is, no doubt for some time there will be required many arts of promotion before confidence is acquired through public experience. Promoters are needful to demonstrate virtues and values and instill normal desires. Nothing will entirely sell itself. Even a meal of victuals is often preceded by aromas arising from the lifting of pots and stew-pan lids, through which the gastric nerves get their hunch that all is well with the menu.

But when our investments are made on the midway at the call of the barker instead of being placed in some relatively slow but substantial venture, we emerge with neither cash nor confidence.

"Caveat emptor," let the buyer be Scotch, has slowed up purchases and dulled the market. In the meantime things are wearing out and getting old-fashioned. In due time a resumption of trade will mend matters, whereupon we are to decide whether to buy by bywords or to be customers on confidence.

This will not be an easy decision to make owing to the fact that our herd is corralled in a country of rustlers, where a stampede is always iminent regardless of the plentiful pastures where we are grazing.

But they remind us that the trail behind is closed and it is un-American to turn back after we have the herd started straight for market. Old simplicities of life lie under moss-grown tombstones. The State motto is "Forward." The youngsters are trotting on our heels, pressing us ahead, sometimes outrunning our spavined hoofs. We might just as well be prepared to go on full rations as before, and get our dressing percentage up so that the packers will welcome us at the abattoir.

Pause as we may to spend a little philosophy in lieu of cash on the economic environment, most of us realize how futile it all becomes. Goods made to sell and desires tuned to respond have become habits with us. Even the stuff I purvey might be dispensed with. But variety, vim, novelty, excitement, newness, sugar-coated with slogans and color, combine to make it tough sledding for the fundamentals. In fact, I sometimes doubt if we have any fundamentals left in stock to show you, mister! And maybe you wouldn't know how to use a fundamental if you had one, saith the salesman.

Yet as I said before, a few of us cling to our antiques. They possess no current market values perchance, but there is a kind of restraining rebuke in their solidity and simplicity which may be a talisman to ward off another attack of the "got-to-get-ems."

The "gimmes" and the "got-to-get-ems" will persist as trade-marks of American progress, prosperity, and achievement. If they are incurable maladies and not malignant, we must be prepared to live with them. Let us resolve to patronize practitioners who prescribe carefully rather than to dose our systems with the nostrums of the barker.

ERE long we shall again be swimming in the same old pool of optimism, from which the septic taint of pessimism has been distilled. Dancing along the spring-board in the latest sun-tan suits, with never a cloud on the horizon, we throw all caution to the winds and leap off the end in a frenzy of foam. Back again in our natural element with the fish, ready to rise to the bait and swallow the spoon.


## CLINGING VINES

Mother (to little daughter returning from Sunday school): "Well, what was your lesson about this morning?"

Little Daughter: "A man named Solomon."

Mother: "And what did you learn about Solomon?"

Little Daughter: "The teacher said he had 300 wives and 700 cucumber vines."—*Textileathergram.*

---

"Oh, would I were a bird," she sang,
  And each disgusted one
Who listened, to himself did say—
  "Oh, would I were a gun!"

---

## GRANNY WAS WISE

The girl friend collects antiques, and recently she acquired a horsehair chair, whereupon she discovered immediately why grandmother always wore six petticoats.

---

Grocer Jim—My wife explored my pockets last night.

Friend Tom—What did she get?

Grocer Jim—About the same as any other explorer—enough material for a lecture.

---

## MATCHED

The teacher was testing the knowledge of the kindergarten class. Slapping a half dollar on the desk, she said sharply, "What is that?" Instantly, a voice from the back row said, "Tails."

## PLEASE REPORT

When the colored couple were being married by the clergyman and the words, "Love, honor, and obey" were spoken, the bridegroom interrupted:

"Read that again, suh. Read it once mo' so's de lady kin ketch de full solemnity ob de meanin'. I'se been married befoh."—*Exchange.*

---

Mistress (who had sent Swedish maid to the theater): "Why, Olga, you're back early—it's only 10 o'clock. Wasn't the show good?"

Olga: "It was all right."

Mistress: "But why didn't you stay for the last act?"

Olga: "What for? The program said, 'Act III same as Act I.' "

---

Lawyer: "Can you tell me if the defendant was expensively garbed?"

Negro Witness: "Deed she was, sah. Ah knows expensive garbage when ah sees it."—*Tit-Bits (London)*

---

Very few big jobs are held by men who honk and honk in a traffic jam.—*The Atlantic Log.*

---

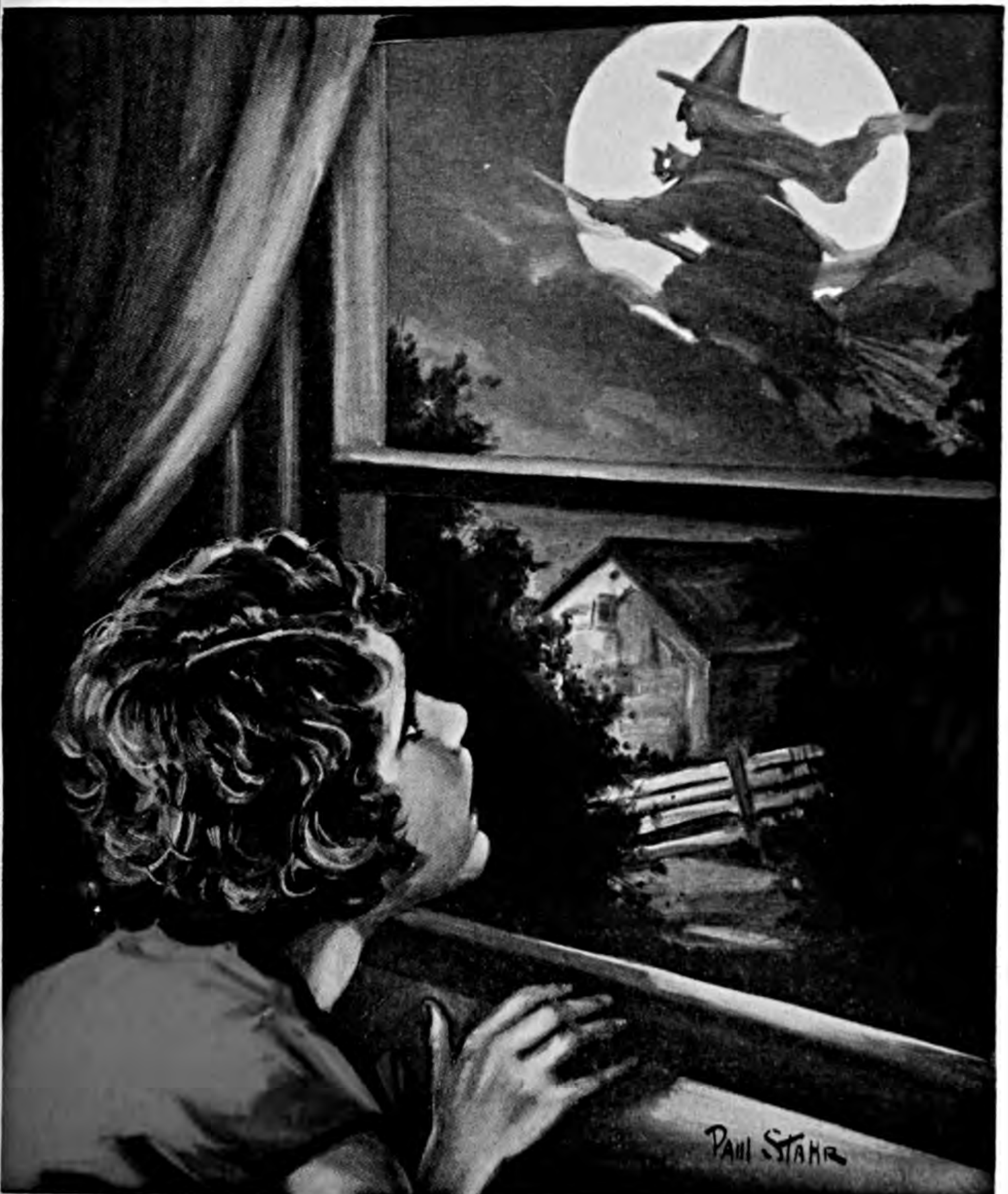
## EXPLAINED

"You say that you have driven a car for ten years and never had a back-seat driver?" inquired the weak-chinned gentleman.

"Yeah," asserted the sad-faced man. "I drive a hearse."

# Better Crops with PLANT FOOD

Oct.-Nov. 1931 10 Cents




The Pocket Book of Agriculture

# Better Crops *with* PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. Stinchfield, *Managing Editor* Sid Noble, *Editor*

*Editorial Offices:* 19 West 44th Street, New York

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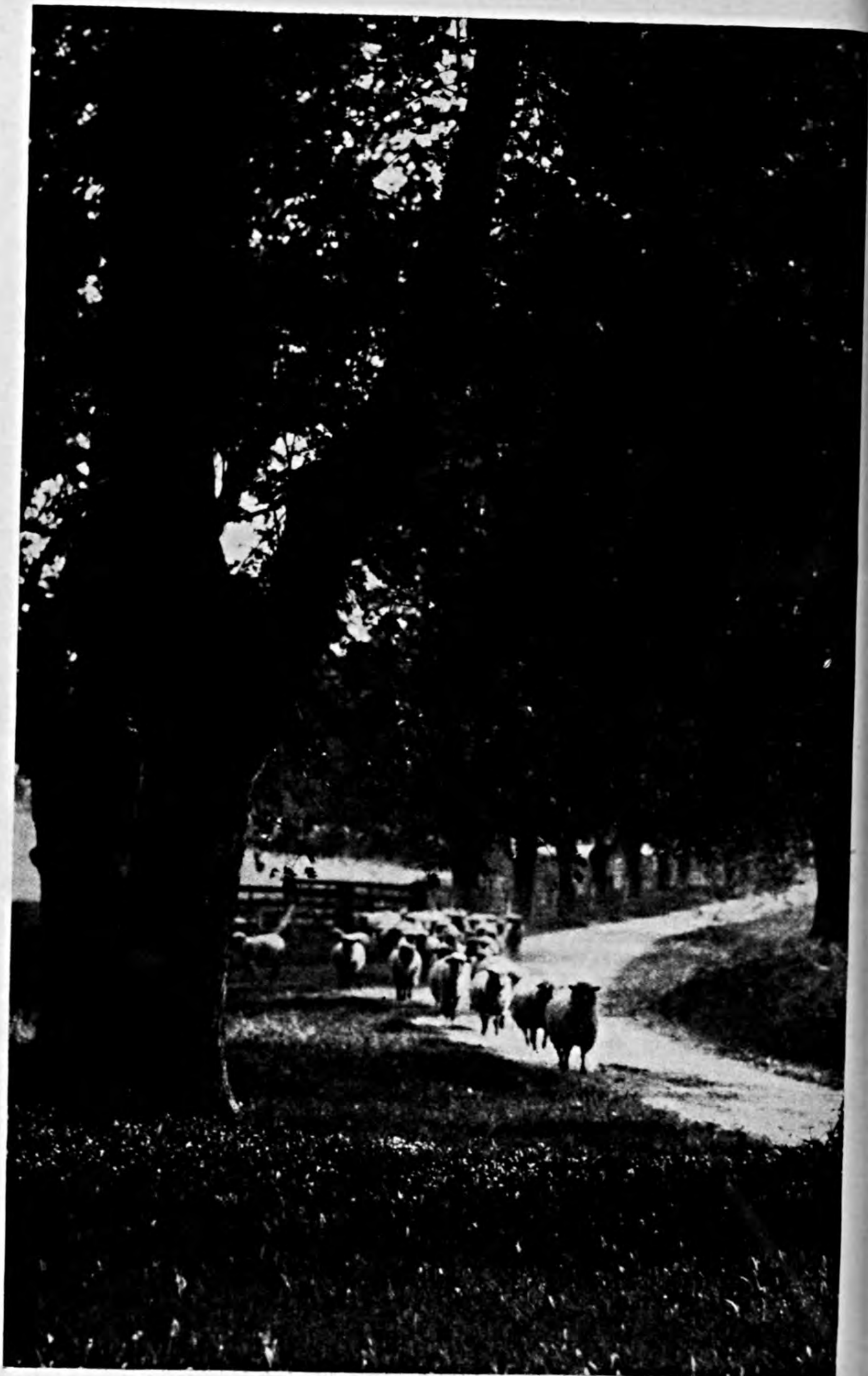

SUNDOWN AND THE CHILL OF FALL NIGHTS FIND FARM FLOCKS READY FOR THE FOLD.

Better Crops with PLANT FOOD

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*There is no depression in—*

# New Altitudes

By Jeff McDermid

ROCKY MOUNTAIN scenery has become a passion for some of our farmer friends, who humbly make hay in the lowland meadows of the Midlands, and who find time between harvest and fall plowing for a geographical jaunt.

Our transcontinental railroads have discovered at last that the farmer is interested in passenger fares and dining-car delicacies, whereas they thought for years that the grouchy granger was concerned only with bulky and bothersome freight tariffs.

Travel literature seldom reached the rural routes, and reduced fare proposals were not advertised in the farm press until a couple of years ago. Suddenly somebody in the railway and steamship service collided with the idea that *some* farmers had money laid by for a sunny spell, as well as for the oft-repeated day of deluge. They began to think perhaps the farmer was a Mahomet and might safely and profitably be toted to the mountain, the reverse process being impossible.

Approaching a few progressive farm journals, they timidly made inquiry as to whether American farmers had the wanderlust as well as the blues. They thought that farmers traveled only in second-hand flivvers or took homeseekers' tourist tickets when there wasn't enough land on the level to go around at home.

Would they spend anything for scenery, or did they prefer to save for another silo? Could there be found enough peregrinating producers in one State to fill a Pullman, and would they be modern enough to tip the porters?

Since that time more than three thousand farmers have gone on excursions to the Pacific coast and Canada, to Cuba and New Orleans, to the Yellowstone, and even to Europe. Each farmer who returns is good for two more passengers within a short time. Good news travels faster by fence-corner routes than by some forms of advertising.

Saving for travel is becoming more appealing than thrift for the sake of land accumulation. Land is indeed an asset, but behind it lies more machinery costs and greater surplus, to say nothing of weeds and taxes. Travel is a distinction and a lure. The old sock and the savings bank yield money for meandering when it stays tight on some other supposed luxuries.

AND pray why not? Is it better to skimp and hoard for ten or fifteen more uncertain years, with rheumatism and inertia just around the bend in the road; or is it not a more human, zestful economy to tie up what you have in the old bandanna and go sightseeing while you can still respond to a thrill and marvel at a mountain?

Fortune favored me one August day in the doldrums of 1931, when I was booked for a passage with two-score traveling farmers on an all-expense western tour. They wanted to see glaciers, but they first got assurance about the groceries. These the diner provided in harvest-time bounty.

Your hard-working outdoor man combines constant physical exercise with a hearty appetite and fair to middlin' metabolism. Our railway purser who marshalled the eatables aboard at St. Paul tried to make the menus a rare and teasing blend of bucolic staying qualities with a dash of metropolitan variety and spice. He introduced compotes, canapes and consommes, filets of sole and ragout of halibut, and even salmon "steak" in plain English.

Undismayed by glittering napery and obsequious darky acolytes, the hungry pastoral pilgrims did swift justice to the titbits in the car cafe. For one or two days you had to be alert to beat them from the sleepers to the diner when the steward gave the starting signal. But after riding without much interruption for forty-eight hours with no long stops at prairie towns for a work-out, the zest of the crowd for lunching on schedule began to wane. It was soon thereafter that my small stock of homeopathic regulating remedies got into rapid circulation. I plead guilty to practice without a license.

However, the ozone of Montana and the alpine spirit of "excelsior" on steep mountain sides soon set the blood coursing once more through arteries accustomed to daily activity. I laid aside my rectifiers and brought out the bandages and the liniment. To be the foremost atop the glassy glacier at risk of sudden backward somersaults became a stronger passion than sampling the salmon.

Yet the glory of those marvelous victuals will be long treasured after the last energy waves they produced have been utilized in fall plowing and house cleaning. Farm folks are used to good foods of a certain substantial kind, and in the present winter they will grow fat while some in other places skimp and starve. Yet the manner in which the meals were served and the foresight, taste, and novelty displayed in the diner and at large hotels en route gave our friends a "newer knowledge of nutrition."

OUR "mascot matron" was a chatty little hausfrau of seventy years that rested lightly bound on her first long vacation from the constant duties of a large farm family. Her first meal aboard the train she relished with pangs of remorse because she had

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# Community and Industrial Gardens

*Promote Industry—*
*Save Taxes—*
*Benefit Everybody*

By H. E. Young

Purdue University Agricultural Extension

WITH a growing surplus of labor, and increased demands for public relief in the way of food supplies for the unemployed, many industries and industrial communities in Indiana are turning to the old-fashioned vegetable garden as an important means of meeting an emergency situation.

Not since "war garden" times has there been such an abundant crop of common vegetables grown throughout the Hoosier State. Back in 1918, it was from a patriotic demand for more food for the boys in France. This year, it has been not alone a need for food but also a need for jobs—jobs and food for an army of unemployed at home, instead of a fighting army abroad.

And here again, the old-fashioned garden is making good — this time in the form of community, industrial or employment gardens in which industry and labor are cooperating.

These community and industrial gardens have this year provided jobs for thousands of unemployed industrial workers in Indiana. They have also provided a large amount of wholesome, healthful food for the families of the unemployed—food which these families would not have otherwise been able to obtain except possibly as "dole" through public relief agencies.

As a practical means of providing employment for those out of work, or on a part-time labor schedule; as a means of encouraging independence and eliminating any chance of a dole system; and as an effective method of reducing public relief expenditures, community and industrial gardens are resulting in remarkable and untold possibilities. Their value extends to the general public, and everybody in the community benefits, which is not


Unemployed men cut the seed at the community tool house.

only true in periods of business depression but in normal times as well.

The present labor surplus is likely to continue, even as times become more normal. Many industries have been developed by expansion and mechanization, until labor for regular employees is no longer available on a full-time basis. The five-day week is already in effect in many industrial institutions, and even a four or three-day week seems well within the realm of industrial possibilities. Unless some practical and workable plan to utilize, at least in part, this growing surplus of industrial labor is developed, the public faces a rapidly increasing charity load, and society a weakened citizenship.

An intensive demonstration of a plan for family food production in connection with industrial unemployment, to add and encourage industry in efforts already begun along these lines, is recommended and sponsored by the President's Committee for Employment. The movement recommends itself as an important and worthy part of every industrial community welfare endeavor. It has no conflict with commercial vegetable production, as the families benefiting from this subsistence gardening are not now customers in the regular markets, and when properly understood commands united community cooperation.

The community owes no man a living. It does owe every man an opportunity to work for a living. Community and industrial gardens provide this opportunity.

### *The "Muncie Plan"*

From the standpoint of community organization set-up together with splendid functioning and remarkable results in efficient operation, the community gardens at Muncie, Indiana, are probably the most outstanding example of the kind, not alone in Hoosierland, but throughout the entire country.

These gardens were planned as a community benefit enterprise, having three main objectives: first, to provide employment whereby the unemployed could work for the family food; second, to eliminate the "dole" from the public relief system; and third, to provide surplus food for winter relief needs. Their organization on this basis has proven intensely practical, and the farsighted vision of the public-spirited community leaders in Muncie has been more than justified by actual results in many community benefits. In fact, the movement has resulted in vastly more benefits than those originally anticipated. A number of constructive community activities have followed as a direct outgrowth of this community garden work.

As a means of accomplishing these desirable results, a Community Garden Association was formed, with six active committees—executive, finance, publicity, supervisory and seed, a prize committee, and a contact committee. These committees have functioned throughout the season, and without exception have received united community cooperation from the industries, the chamber of commerce, the civic clubs, the social service agencies, the relief organizations, the Township Trustee, the schools and churches, organized labor, employment associations, and the county agricultural agent. The local newspapers also contributed valuable service. Purdue University Horticultural Department assisted in planning the gardens, supplying the detail specifications for seed and fertilizer.

The plan involved a 35-acre community garden, and more than a thousand individual home gardens located on vacant lots throughout the city. The home garden plots were 40 x 50 feet in size, and were all assigned to families of unemployed. Seed and fertilizers were supplied on this basis. Cash prizes were awarded for the best home gardens in each of 14 school districts, and additional prizes were given

Twenty-five tons of 2-12-6 fertilizer were used on the home gardens at the rate of 50 pounds per garden, and the same mixture was used on the community garden at the rate of 500 pounds per acre.

for the best display of canned vegetables. A variety of vegetables, including corn, beans, lettuce, radishes, turnips, squash, onions, peas, parsnips, cabbage, and tomatoes, were grown in these home gardens.

A full-time garden supervisor was employed to organize and direct the work in the home gardens and to superintend the unemployed labor used in the community garden.

The financing of this intensive and comprehensive community garden plan was provided by Mrs. Edmond Burke Ball, whose personal interest and support made possible its worthy inception and splendid execution. The use of the 35-acre community garden tract was donated by the Warner Gear Company, and the local real estate board supplied much of the land devoted to the home garden plots.

### *Seed and Fertilizer*

The community garden was devoted entirely to vegetables which could be stored and canned for winter use. There were 15 acres of potatoes, 11 acres of tomatoes, 2 acres of navy beans, 1 acre of winter squash, 4 acres of late cabbage, one-half acre of carrots, one-half acre of parsnips, one-quarter acre of beets, and one-half acre of onions. The seed and plants for both the community and home gardens were purchased of local seed dealers, costing approximately $1,000.

Twenty-five tons of high-grade commercial fertilizer, analyzing 2 per cent nitrogen, 12 per cent phosphoric acid and 6 per cent potash, were used on the home gardens, at the rate of 50 pounds per garden. The same kind of mixture was used on the community garden at the rate of 500 pounds per acre.

All of the produce from the community garden will be stored for winter food relief purposes, except the tomatoes which were contracted with a local canning factory. The money received from the sale of the tomatoes will be used to purchase potatoes and other foods more easily stored. Thus the value of the entire community garden product, which may be conservatively estimated at 200 bushels of parsnips, 150 bushels of onions, 150 bushels of beets, 300 bushels of carrots, 30 bushels of navy beans, 4 tons of squash, 36 tons of cabbage, and 1,800 bushels of potatoes, will be available for winter food use.

Surely, this, together with the several hundred bushels of additional potatoes, or their equivalent in other food, to be purchased with the money from the tomato crop, will go a long ways in supplying food relief needs in Muncie this winter.

The value of the products produced on this community garden amounts to several hundred dollars more than the cost of its operation. It shows a fine profit from a dollars and cents standpoint, to say nothing about its even greater value to the community in supplying needed jobs for the unemployed, and the accompanying benefits in giving the workers a worth while feeling of independence.

### *No Work—No Food*

An important feature of the Muncie community garden plan is the big saving in public relief funds. This saving is directly reflected in the reduction of tax-money expenditures by the Township Trustee. Unemployed men applying for food, or other relief, are required to work out the amount of their relief orders. They are given work slips, and are assigned work at the community garden, for which they are credited at the rate of 50 cents per hour. For a $3 food order, they have to work six hours. Assignments are also made for work on the city streets, in the public parks, school grounds, etc., at a similar rate.

These work slips must be "O.K.'ed" by the community garden supervisor or superintendent of other work, showing that the work was satisfactorily performed, before any further relief food orders are given by the Township Trustee. "No work—no food" has been the rule in Muncie since the community garden movement was inaugurated.

This same system applies to other forms of public relief, such as fuel orders, medical or hospital service, etc. The plan has worked wonders in reducing the amount of public relief applied for at the office of the Township Trustee and Social Service Bureau. It has been the means of placing the dispensation of relief on an economic and efficient basis, and at the same time has eliminated any semblance of a dole system.

A further outgrowth of the com-

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The unemployed men did not lack in their care in cultivating and weeding the community gardens.

# Potash *and* Plant Nutrition

## *By R. E. Stephenson*

Associate Professor of Soils, Oregon State Agricultural College

Reprinted from the California Cultivator

NINETY PER CENT of the green weight of plants is water, and nearly 50 per cent of the dry weight is carbon which comes from the air while the ash or mineral portion represents only one or two per cent of the dry weight. Yet the ash components of the plant are at least 90 per cent significant in determining crop yields. Several minerals (many more than at one time thought) are important, and in fact absolutely essential for normal plant growth. Among those best known is potassium, commonly designated simply as potash.

As a boy I was taught that potatoes and other starchy crops should be fertilized with potash. The sugar crops likewise, including sugar beets and sugar cane, have been pointed out as strong potash feeders. But no farm crop can grow to maturity and give a satisfactory yield unless the soil in which it grows supplies potash in adequate amounts.

Certain crops are, however, affected more undesirably than others where potash deficiency is present. It has been shown experimentally that sweet potatoes grown under conditions of potash deficiency are long and stringy instead of short, thick, and meaty as desired. Likewise sugar beets will grow in long, thin strings that are very undesirable to the sugar manufacturer, when subjected to potash hunger.

The explanation of the undesirable growth where potash is lacking lies in the fact that under conditions of deficiency the plant will translocate what potash is available to the most actively growing parts of the plant. It is the growing tips of the roots and stems, therefore, that get the limited amount of potash available. Consequently both the stems and the roots have a tendency to elongate and to produce a slender growth, instead of filling out properly to form a thick, plump tissue. If the potash deficiency is severe enough, growth will stop entirely, and even death may occur.

### *Necessary for Cell Division*

Growth normally occurs in two ways, by increase in size of the individual plant cells and by division of the cells to produce two where only one grew before. Without potash, cell division cannot occur and growth is not possible. It is the plant nature to make an effort to continue growth as long as possible. This it does by constantly moving the potash from old tissue into the new, so that the new parts may develop. The old leaves, robbed of their potash then die. This process may be carried to the extreme in fruiting plants. In producing fruit, the fruit being the last new tissue to develop, the foliage or leaf system is robbed, with the consequent result that the entire plant dies prematurely.

But potash deficiency is not often great enough to manifest itself in any such violent manner as this. The other extreme may sometimes be present and the plant will take up an excess of potash, usually described as "luxury consumption." Luxury potash is simply that portion in solution in the plant sap which is not needed, and consequently does not take part in any growth processes. Of course what seems unessential and a surplus at one stage in the growth of the plant, may prove to be quite necessary at some later stage. Plants take up from the soil and store, in the sap or organic tissue, practically all mineral nutrients needed for complete maturity, before blossoms appear. When blooming starts, all energy is directed to the movement of essential minerals from the leaf and stem into the seed where it becomes permanently builded into the germ of a new plant, a provision for the next generation.

### *Important in Sugar Manufacture*

The leaves are the manufacturing organs of the plant. It is in the leaves that sugar is manufactured. Sugar is too soluble to be permanently stored and must be translocated to the stem and roots where it is changed to the insoluble storage form recognized as starch. Potash is credited with an important part in the manufacture of sugar. It helps also in changing sugar to starch and vice versa. The process of translocation or moving about of the soluble sugar is also dependent upon potash. Since starch is not soluble, a change back again into sugar must precede any movement. The starch and sugar together are known as carbohydrates. Though there is potash in the seed as a storage food, the function of facilitating the storage processes seems especially dependent upon potash. More or less according to its need, the plant can convert starch to sugar and move it to whatever point there is need for it, lastly to the seed and germ.

Plants produce not only carbohydrates but protein materials as well. Proteins are substances rich in nitrogen. In fact an important use for the carbohydrates is to serve in part as raw material out of which protein may be made. Here again potash is credited with serving in an important way. An adequate supply is therefore necessary for the proper assimilation of nitrate. Nitrates taken in from the soil by the plant, supply the nitrogen necessary for protein manufacture. Perhaps it is their close association in vital processes that has led to the belief that potash and nitrate enter the plant system best together.

Nature has supplied many of our soils with a relative abundance of potash. There are soils, however, which are deficient, and good management is necessary to conserve the supply, and to keep it readily available. Farm manure, straw, and other farm products returned to the land carry considerable potash. Complete fertilizers likewise carry potash. And potash is often supplied in the form of muriate or sulphate.

### *Does Not Leach from Soil*

Potash is not lost from the soil as readily as nitrate. A soluble potash fertilizer when applied to the land is absorbed by the soil and held for future use. The amount of potash in the plant is some indication of the supply in the soil. When the soil contains liberal amounts of available potash, more is taken up by the plant. Whether too much may be taken up is perhaps dependent upon the available supply of other essential nutrients. One seldom hears of potash injury. When normal soils are properly managed and fertilized there appears little danger from over-feeding on potash.

On the other hand with a limited supply of potash available, the plant may be compelled to use the material over and over again. This it can do by moving the potash from the old mature leaves into the young growing parts. When the supply is so limited that it is not sufficient even when

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Longleaf the first year out of the grass on a Southern right of way after 49 years of annual burning and annual cutting by section crews. Note that the stand stops at the hog-proof fence which was erected eight or ten years ago.

# Burning the Woods

*By E. B. Ferris*

Jackson, Mississippi

HAVING lived many years in South Mississippi in a strictly long-leaf pine region, we became accustomed to the annual firing of the forests and thought little about it. Then came the time when foresters began to agitate methods of complete fire protection which some felt were not always entirely practical in their application. Those who have had most experience evidently believe there is some virtue in burning the woods at some time during the year, otherwise the practice would never have become so general. The opinions of large numbers of people are nearly always worth considering, and certainly it may be said that the average South Mississippian believes that burning the woods makes the grass better for his cattle and sheep.

Some nine years ago, the Coastal Plain Experiment Station at McNeil began an experiment to determine the effects of burning the woods, both on the reproduction of long-leaf pine trees and the growing of grass for cattle. The land used, about half a section, was so divided as to compare burned and unburned areas that were pastured with similar lands unpastured. Not having seen the experiment for a number of years, we were pleased to look it over recently, after the effects had accumulated for almost a decade.

One thing was apparent to the eye. Unburned areas not pastured had, during this time, accumulated such a mass of roughage under the young timber that a fire by accident or design would have destroyed practically every young

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# Weed Control Visualized

*By O. C. Lee*

Purdue University Agricultural Extension

THE Purdue weed exhibit at the Indiana State Fair this year featured the control of weeds in lawns and pastures. This subject was chosen in answer to the demand for lawn beautification and to create interest in better pastures.

It can be said that many pastures of Indiana, as well as those of other States, have been sadly neglected. Grass is often looked upon as a free product of Mother Nature that needs no care or attention. Contrary to this idea, experimental work has brought out the fact that pastures respond to fertilization, clipping, and proper management to a surprising extent. The basis on which weed control in lawns and pastures is founded is the idea that weeds will not compete with grasses where conditions are ideal for the growth of the latter. Weeds often represent the result of poor seed and lack of fertility, coupled with neglect in management.

The exhibit consisted of a sign entitled "Control Weeds in Lawns and Pastures." The sub-heading gave the three essentials of weed control—"Clipping," "Pure Seed," and "Fertilizers." Under the sub-heading "Clipping" were shown pictures of a weedy pasture, a mowing machine clipping weeds, and a weedy fence row. The illustration of a weedy fence row was included to emphasize the importance of cleaning up weeds along fence rows, roadways, and waste places to prevent the spread of weed seeds from such areas to near-by fields and pastures. Beneath on a table were two flats showing a weedy and a clipped pasture.

Under the sub-heading "Pure Seed," were shown diagrams of two lots of seed. One diagram entitled "Seed that is costly at any price" showed the percentage of noxious weed seeds contained. The other diagram entitled "Good seed is cheapest in the long run" showed a sample of good seed containing only a small percentage of foreign matter.

On the right side of the exhibit pictures of a weed-free lawn, a fertilizer drill in action, and a weed-free pasture were shown. A sign beneath the picture made the statement "Fertilizing will encourage grass growth and crowd out the weeds." On a table below were flats of grass illustrating a good lawn and a weedy, mismanaged lawn.

The middle portion of the exhibit was utilized by potted weeds for identification work together with an electrically driven manikin. The manikin drew the attention of the crowd and showed cards giving detailed facts about the exhibit.

Numerous questions were asked in regard to control of weeds in lawns. The reply to such questions in most cases suggested developing a weed-free turf by starting with good clean seed and fertilizing the grass. Hand weeding rarely destroys the pesky weeds since most of them, particularly dandelions and plantain, have the habit of sprouting after cutting.

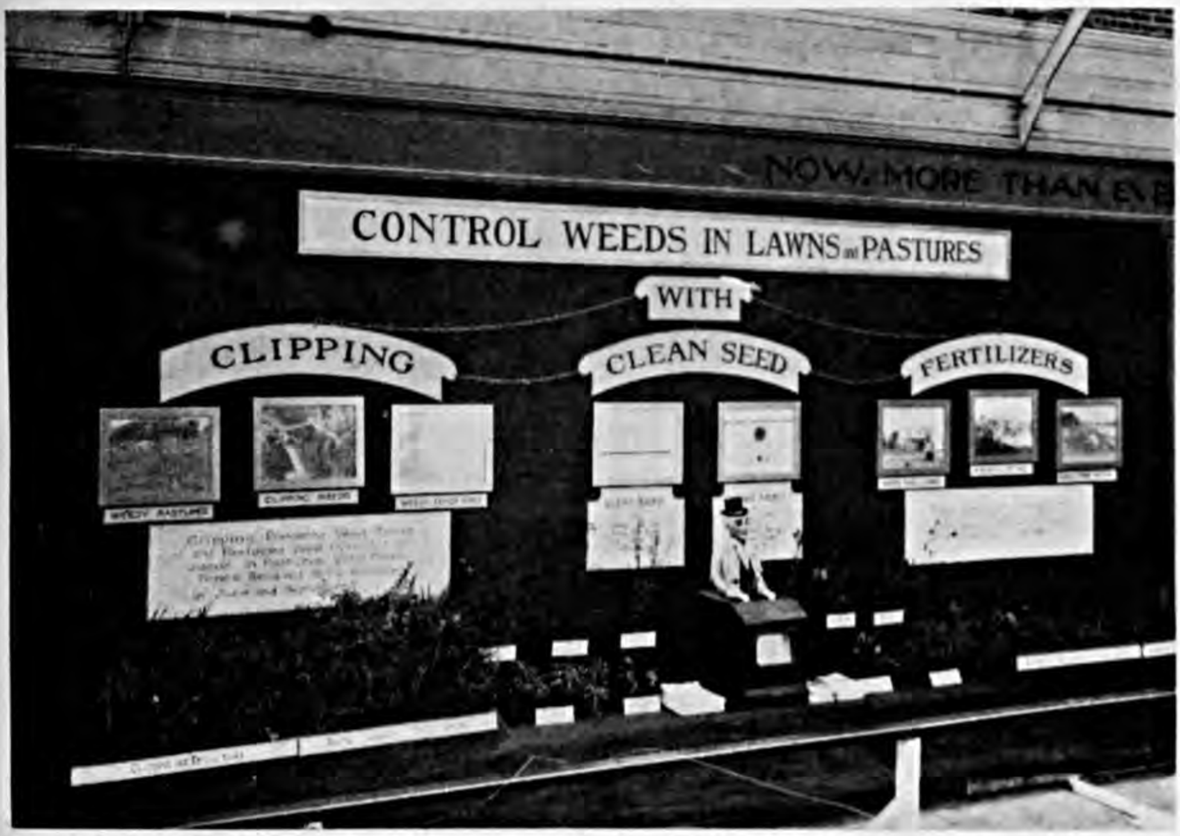
The first step in making a weed-free lawn is to make certain that the soil is in shape to grow a decent crop of grass. Too often the fundamental cause of a weed-ridden lawn is attempting to grow grass on the old clayey subsoil and building trash that accumulated when the house foundations were built. Only by the addition of good topsoil and composted manure can such a situation be remedied. When a home is built, the topsoil should be saved and used for top-dressing on the lawn.

The proper time to sow lawn grass is in the fall, for Indiana preferably during September. Fall seeding gives the grass a chance to establish itself and start growth early in the spring. On the other hand, grass sown in the spring places the tender young grass in direct competition with weeds that normally make their growth at that time.

For the average home lawn a mixture of two parts of Kentucky bluegrass and one part redtop should be used. Care should be taken to get pure seed. It is often wise to purchase bluegrass and redtop from bulk and practice home-mixing, as ready mixed seeds are often undesirable and contain large percentages of weed seeds. For shady places in the lawn add rough stalked meadow grass (*Poa trivialis*) making the mixture equal parts of bluegrass, redtop, and *Poa trivialis*.

### *Fertilizers Are Essential*

Fertilizing the lawn is essential. A good lawn fertilizer should be high in nitrogen content. The use of a 10-6-4 has proved to be highly desirable. When a 10-6-4 cannot be obtained, a mixture of equal parts of a 2-12-6 and ammonium sulfate makes a good lawn fertilizer. Apply the fertilizer in early spring at the rate of 10 pounds per thousand square feet of lawn. A second application may be made to advantage during early fall or immediately after the hot summer days.




**The Purdue weed exhibit at the Indiana State Fair this year featured the control of weeds in lawns and in pastures.**

Lime should not be used on lawns. Dandelions, plantain, and a number of other lawn weeds are especially benefited by lime, but are intolerant of an acid soil condition such as is brought about by the use of ammonium sulfate. Most grasses will tolerate an acid condition. Most of our city water contains large amounts of lime, and the usual sprinkling of lawns will supply all the lime needed for plant growth.

### *Many Pasture Questions Answered*

One of the prominent questions asked by farmers was, "Why are pastures becoming more weedy year by year?" The answer is that weeds are taking possession of the lands where conditions are no longer ideal for grass growth. Nature uses weeds as a means of covering up the bare spots. In many cases pastures have been robbed of fertility by continual grazing. Tons of milk and meat have been taken to market, all of which came from the soil. Some weeds are natural inhabitants of poor soil, others have the ability to root deeply and draw on an untouched supply of plant food elements. Numerous weed seeds from near-by fence rows, roadways, and waste places have blown into the pasture and lie waiting for a chance to grow. The depletion of the soil fertility thins out the grass, allowing room for the weeds, hence the change from good grass pasture to an unsightly mass of weeds is evident.

It is necessary to do away with the cause in order to bring the weedy pasture back to its former state of productivity. In order to do this it will be necessary to apply fertilizer. Again and again demonstrations and experiments as well as the experience of many farmers point to this fact. Tests have shown that the addition of a few hundred pounds of a complete fertilizer and a few tons of ground limestone per acre on poor, weedy pastures, has in many instances doubled and even tripled the carrying capacity.

Lime, fertilizer, and scientific pasturing do not tell the whole story. In addition to these means of producing a weed-free pasture, the mowing machine has its place. Clipping will not only prevent obnoxious plants from forming seed but will keep them in check by reducing their leaf surface.

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This pasture could be improved by clipping and fertilizing.

# *The* Inquiring Mind *and the* Seeing Eye


## *By Dr. A. S. Alexander*

University of Wisconsin


A WONDERFULLY wise, good, and great man was the late Dr. E. W. Hilgard, organizer of the Agricultural Department of the University of California, and founder of the University Agricultural Experiment Station, in 1875. He was also a bold battler for what he considered the right; and what a long, nerve-racking fight he waged to establish the changes in the methods of agricultural education he deemed best!

We are told that, in this contention, he was arraigned before four bars of public opinion, the farming population, the faculty of the university, the regents of the university, and the legislature of the State. But he pleaded soundly, patiently, and successfully, and finally secured not only the consent but the enthusiastic support of all of them in the pursuit of his undertakings. His greatest victories, however, were won, not by fighting, but by the personal sincerity, ability, and capacity which he displayed. Victories, when he attained them for his contentions, were not by the arts of war, but by the attributes of peace. In his first report, for the year 1877, Dr. Hilgard clearly announced the principles upon which his instruction would be developed, and today they are considered fundamentally sound. He said:

"A knowledge of facts and principles, and not the achievement of manual dexterity, must be the leading object of a truly useful course of instruction in agriculture. Object teaching should be made the preeminent method of instruction in natural, and more especially in technical, science. Manual exercise should be made the adjunct of the instruction in principles."

### *Undaunted by Opposition*

In an address at the memorial services in honor of Dr. Hilgard, held at the University of California, January 30, 1916, Professor E. J. Wickson, of the faculty, stated that their lamented friend was always pushing, praying, and crying out for the attainment of what he saw to be educationally true and good for mankind. But no opposition daunted him. When a distinguished logician declared once that agriculture was only handicraft and should have no place in university instruction, his comment was in kind and to the effect that speculative philosophy never arrived; it was mental gymnastics—always indulged in with the danger of being thrown from the parallel bars of knowledge and faith, and breaking one's spiritual neck.

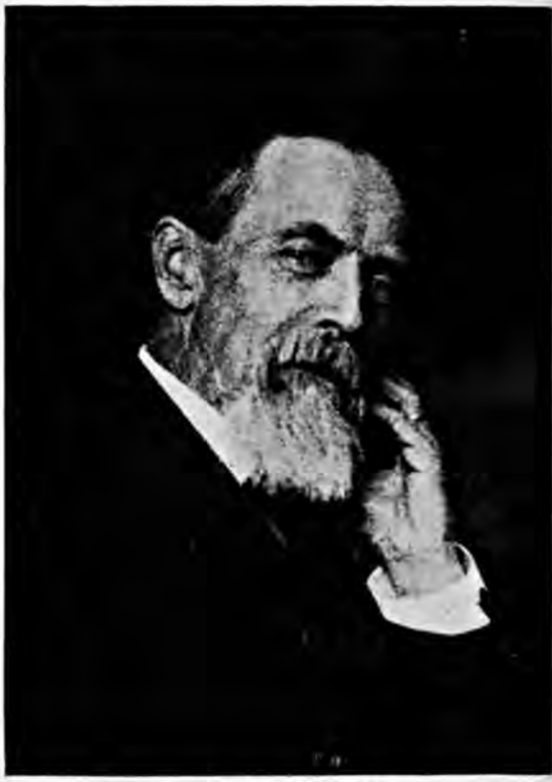
Such outbursts, however, were no indication of Hilgard's habitual attitude toward other branches of learning. He was not only charitable and tolerant, but genuinely interested and fair. However, to be told that agriculture was only handicraft seemed insulting to a man who had lighted his torch at the fires of Liebig and set himself the task of demonstrating that agriculture is the greatest of the natural sciences, because it requires the fullest work of all of them to reach its own greatest development.

The proper relation of agricultural practice to agricultural science, as factors in educational effort; the educational distinction between labor performed for enlightenment, and labor prescribed to beget a liking for labor; the place of both art and science of agriculture in a university of higher learning, when both are handled ably for instructional purposes—these were among the fundamental contentions Dr. Hilgard presented in his early reports, and supported in many controversies, until a victory came in their almost universal inclusion in the curricula of the leading institutions of learning.

Professor Wickson further stated that Dr. Hilgard bravely went on writing, speaking, and fervently praying, as he was a godly man, for the initial recognition of educational truth, which is now all-pervading. He went on contending for the recognition of agricultural science, adequately known and properly taught, as a respectable branch of higher learning and inferior to none other in the line of pedagogic material and in relation to preparedness for life. Yet Hilgard always was broader than his own science—a real man and a true educational philosopher.

### *Educated in the "Old Country"*

Eugene Woldemar Hilgard was born January 5, 1833, at Zweibrücken, in Rhenish Bavaria. His father, Theodore Erasmus Hilgard, who was Chief Justice of the Court of Appeals of the province in which he lived, became dissatisfied with political conditions there and in 1836 emigrated to America with his family and settled on a farm at Belleville, Illinois. There young Hilgard grew up, worked on the farm, and for a time attended the public schools of the district. As schooling was in a primitive condition, however, Judge Hilgard soon took charge of his son's education and efficiently prepared him to enter a university. Under his father's direction he studied mathematics and languages, but found time also for botanizing and insect collecting. During a period of ill health, he read works on chemistry and botany.



DR. E. W. HILGARD

At the age of sixteen, his eyesight failed, and for a change, he was sent to Washington, D. C., to visit his brother Julius, then assistant in the U. S. Coast Survey. Attending lectures on chemistry in the Homeopathic Medical College and the Franklin Institute of Philadelphia, he soon became lecture assistant in the former. The young man now being ripe for higher education, his father naturally thought of the good quality of the German schools, and sent his son to the "Old Country" in 1849. There he entered the University of Heidelberg and specialized in chemistry and geology.

On account of political troubles then existing, he soon left Heidelberg and went to the University of Zürich.

Later, he completed his studies in mining and metallurgy, in the Royal Mining School of Freiberg, Saxony, and then returned to Heidelberg. There in 1853, he graduated with honors and the degree of Ph.D., at the age of twenty. That honor was reissued to him in 1903 as a "golden degree" in recognition of half a century of good work in science.

Dr. R. H. Loughbridge, Professor Emeritus, of Agriculture in the University of California, stated in his address at the memorial services that Dr. Hilgard in his graduating thesis, was the first to distinguish and define the four parts of the candle flame and the processes occurring in each. He had intended making the practice of medicine his life profession, but after a two-year course of lectures, gave up the plan and turned to chemistry, geology, and botany as giving a broader, more accurate, and more interesting field for investigation and research.

On account of ill health after concluding his university studies, he went to the coast of Spain and spent two years in geological observations. There he met Miss J. Alexandrina Bello, daughter of Colonel Bello of the Spanish army, whom he married several years later. Returning to Washington, D. C., in 1855, he fitted up a small chemical laboratory in the Smithsonian Institution, but very soon accepted the position of Assistant State Geologist of Mississippi.

### *Early Work in Mississippi*

When Dr. Hilgard went to Mississippi, at the age of twenty-two years, he was well trained in the natural sciences, especially in chemistry, geology, botany, and physics. With a keen mind, quickness and accuracy in his observations, and with a remarkable memory, he began his work as a geological surveyor with enthusiasm, although the field seemed very unpromising from a geologist's standpoint. With a traveling outfit consisting of an old ambulance, two mules, and a negro driver who also was cook, he explored portions of the State, making observations and collecting material for study. In 1857, the survey was suspended by the legislature, and Hilgard returned to Washington as chemist in the laboratory of the Smithsonian Institution and lecturer on chemistry in the National Medical College.

In 1858, he was appointed state geologist of Mississippi and resumed his detailed investigations on the geology, botany, agriculture, and other economic features of the State. His field notes, taken on his trips, have been preserved and are interesting reading.

During the Civil War the exercises of the university were suspended, and Hilgard, as state geologist, was placed by the Governor in charge of the library and equipment. When the university was reorganized in 1866, he was appointed Professor of Chemistry, which title in 1871 was changed to that of Professor of Experimental and Agricultural Chemistry.

### *Returned to Research*

In 1873, Dr. Hilgard was appointed Professor of Geology and Natural History in the University of Michigan, where his associations were delightful; but finding no opportunity for reresearch work in his entrancing soil studies in 1874 he accepted a call from the regents of the University of California to deliver a course of lectures and to assume the professorship of agriculture in that institution. The more congenial climate of California appealed to him, as his health was rather poor, and he saw there a splendid opportunity for fresh achievements in a new field of study. He delivered the course of lectures and moved to Berkeley early in 1875. His first results were published in 1877.

Soon after going to California, he directed the agricultural division of the Northern Transcontinental Survey. From 1879 to 1883, in connection with his university work, he assumed charge of the cotton investigation of the Census of 1889, which he projected and carried out on a broader plan than ever before had been undertaken.

In 1892, he revisited Europe and was received with distinguished honor by his colleagues in science in the German universities and experiment stations. He delivered many public addresses on the subjects in which he had made his world-wide reputation.

From 1910, Dr. Hilgard's advanced age rendered him unequal to strenuous tasks; but he maintained his membership in several scientific societies. Although much reduced in vitality as the result of an injury, his interest and desire for serving in the cause of agriculture were keen and virile, and his great regret, daily expressed to the last, lay in his inability to pursue further his studies of soil and other problems. He passed away January 8, 1916.

In 1889 Dr. Hilgard had lost his only son, while his devoted wife died in 1893; but his two daughters were to him a source of great joy and delightful companions during his declining years.

### *Mississippi Work Notable*

Dr. Hilgard's work in Mississippi was notable. In 1860, he finished and printed his report on the geology and agriculture of that State, in an octavo volume of 391 pages, which gave in detail his observations on the geological and agricultural features, and many analyses of the important soils. It included a geological and agricultural map. The work is still regarded as a standard authority on the subjects it covered. In 1867, Dr. Hilgard, at the request of the Smithsonian Institution, made an examination of the Mississippi River Delta, the rock-salt deposit of Petit Anse Island, Louisiana, and the cause of the formation of the great "mud-lumps" that form in the Passes near the mouth of the river and interfere with navigation. He later made a geological reconnaissance of Louisiana for the New Orleans Academy of Science.

The Cotton Culture reports of the Tenth Census (1880), prepared under the direction of Dr. Hilgard, did much to correlate the scattered accounts of the geology of the Southern States. They not only contained a general discussion of cotton production in the United States, but included soil investigations, matter pertaining to the cottonseed industries, and measurements of cotton fibers. He also wrote the special descriptions of Mississippi, Louisiana, and California. The Cotton Culture Reports were republished as State Geological Survey Reports in Alabama and South Carolina, have been thoroughly appreciated, and have furnished topics for numerous subsequent handbooks.

### *California Work Enduring*

Of Dr. Hilgard's work in California, it has been written: "The results of his labors are the warp of California's first half century of intellectual and industrial life, and upon such enduring work as he achieved will be spread the splendid fabric of our coming State advancement and development."

He served as Professor of Agriculture and Director of the University Experiment Station from 1875 to 1905, and was Professor of Agriculture Emeritus from 1905 to the time of his death in 1916. Upon him fell the task of giving the College of Agriculture form and plan, and of gradually building for it a confidence and support, which made possible its later advancement to a proud position among the leading institutions of its kind.

Professor Wickson stated that Dr. Hilgard "stands as the founder of American Institutional research in agriculture, including both laboratory and field work." He opened his labor-

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# Potash Prevents a "Run on the Bank"

## *By G. E. Langdon*

Wisconsin College of Agriculture

SOILS, like banks, may have "frozen assets."

That is the opinion of C. J. Chapman, extension specialist in soils at the College of Agriculture of the University of Wisconsin, who has had years of experience in helping farmers solve their soil fertility problems.

He explains that although theoretically there is enough potash in many of our soils to meet the requirements of most crops for at least 200 years yet, in many soils it is not becoming available fast enough to satisfy the needs of our growing crops. In other words, he maintains that "our potash supply is a 'frozen asset' and yields only a small interest on the total supply."

C. T. CHAPMAN

If we could be sure of one-half of one per cent a year, Mr. Chapman claims, it would come close to meeting the requirements of our crops, but unfortunately we do not get even that much out of many of the soils of the State. Some authorities put it at one-fourth of one per cent.

Therefore, he maintains that the lack of potash on many farms is just as much responsible for poor yields as is the lack of lime or phosphate. We have only started in the use of potash fertilizers.

There are three definite times when we need to use potash, according to this authority: *First,* on soils naturally very deficient in this element; *second,* where the supply of manure is limited or on fields that never receive any stable manure; and *third,* for crops which make heavy demands on the potash supply of the soil. Of course, there may easily be a combination of these conditions which may further increase the need for this fertilizer.

In explaining the first need Mr. Chapman points out that all of the peat and muck soils of Wisconsin are very low in their reserves of available potash; in fact most of the black bottom lands need fertilizers high in potash. The sands come next, and we are finding that practically all of these sandy soils of the State are low in their reserves of both total and available potash; the black fine sands and sandy loams are especially so.

"The presence of plenty of lime in these black bottom soils is almost sure proof that they need potash," Chapman says. "Perhaps you have seen small snail shells or fossils in these black bottoms. To me this is a sure sign that potash is needed. In fact, high land fields which have been heavily limed are more apt to need potash, although the immediate effect of liming may be to increase the available supply of this element."

### *Signs of Starvation*

Some signs of the need for potash, according to Chapman, are fields of corn on these black bottom lands where the growth is ragged and uneven, stunted and scrubby looking with a reddish tinge to the leaves. It may also show a striping of the leaves or a burning or fringing—almost sure proof of potash starvation.

### *If the Farm Is Sandy*

Mr. Chapman's suggestions for sandy soil farmers are as follows: "The amounts of commercial fertilizers needed to establish alfalfa or clovers successfully will be greater in the early stages of building up run-down sandy soils than will be required after a livestock system of farming has been established. On unmanured fields, where alfalfa is being established, from 200 to 300 pounds per acre of muriate of potash or their equivalent in the phosphate-potash mixtures, are required every two years.

"In addition to potash some phosphate will be needed—at least 100 pounds of 20 per cent each two years or their equivalent. Such mixtures as the 0-9-27 or 0-8-32 can be used at rates up to 500 or 600 pounds an acre in the first application in fitting fields for growing alfalfa.

"On soils that are in a somewhat better state of fertility, where manure has been used in the rotation, mixtures such as the 0-15-30 or even 0-20-20 are giving excellent results, at rates up to 400 pounds an acre."

A lack of potash is not altogether confined to the black bottom lands, muck soils, or even sandy soils, Chapman says. Some of the higher clay loams and silt loams are also deficient in potash, and this leads to the second condition under which potash is needed.

"It's 40 years since some fields on certain farms have seen a forkful of manure," Chapman explains. "Many back forties, isolated tracts a long way from the buildings, ridge fields, and plateau fields where it has been nearly impossible to haul manure, fall in this class, and here on these heavier soils potash is needed.

"Our soils are becoming more and more depleted in their reserves of available potash," he says. "This is especially true on the dairy farms where a good deal of potash is being lost through leaching of manure and also through the actual loss of the liquid portion which carries about 80 per cent of all the potash."

### *Truck Crops Need Potash*

Most all truck crops are heavy feeders on the element potassium. Potatoes, cabbage, sugar beets, tobacco, peas—in fact all legumes—are rank feeders on potash, according to Chapman. Truck crops as a class, moreover, do not have extensive rooting systems and, therefore, lack foraging ability in getting food. Then, too, a healthy, vigorous growing plant is less subject to the ravages of disease and insects.

F. L. Musbach, soils specialist at the Marshfield Branch Station, points out that the chemical composition of certain of these crops is also interesting for it shows that some of them are rather heavy feeders on potash. For example the average composition of certain truck crops are as follows:

Best results were obtained from a combination of potash and phosphate rather than phosphate alone on this as well as other fields in Ozaukee county, Wisconsin.

| | nitrogen | phosphoric acid | potash |
|---|---|---|---|
| 200 bushels potatoes | 40 lbs. | 18 lbs. | 62 lbs. |
| 10 tons cabbage | 70 " | 14 " | 58 " |
| 1 ton tobacco | 88 " | 9 " | 114 " |
| 10 tons sugar beets | 52 " | 16 " | 64 " |
| 1 ton canning peas | 23 " | 6 " | 10 " |

### *Needs of Potatoes*

Potatoes respond decidedly to fertilizers well supplied with potash. The crop is not a strong feeder and it is, therefore, essential to provide plenty of available plant food. The lack of potash is shown in a rather crinkly condition of the foliage and, in later stages of growth, a bronzing of the leaves occurs. Mr. Chapman has found that invariably a lighter colored vine growth is produced where the crop is well supplied with potash. On the heavy silt loam and sandy loams of Wisconsin, growers are finding that mixtures similar to the 3-10-10, 3-12-12, 3-9-18, or 3-20-20 are giving good results. Where potatoes are grown on sandy soil, successful growers aim to plant on sod land plowed rather late in the spring. Manure is used in moderate amounts supplemented by commercial fertilizer applied in the rows by an attachment to the corn cultivator immediately after the crop is planted. Such mixtures as 3-10-10 or 3-9-18 are recommended to be applied in the row at the rate of 400 to 500 pounds an acre.

Mr. Chapman has the following suggestions for the use of potash on other crops:

### *Cabbage and Beets Use Potash*

"Cabbage is also a rather strong feeder on potash which may be secured from liberal amounts of stable manure or from fertilizers containing potash. The mixture should also contain phosphate in order to balance up the available supply of plant food so necessary for best crop yields. Where the crop is grown for market the smaller head is given preference since the trade is willing to pay a higher price for cabbage with small solid heads. The fertilizer used should contain plenty of potash which tends to make the crop head up.

"In the growing of sugar beets, Wisconsin farmers have found that even where considerable manure is used, commercial fertilizers may be

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# The Importance of Pastures and Mineral Matter in Feed

*By J. A. Fries*

Pennsylvania State College

AGES ago the poet made mention of "the cattle upon a thousand hills," the artist on his canvas has immortalized the dairy herd grazing contentedly in the well-watered meadow, and pastures have always figured prominently in connection with dairy cattle. But, although pastures are still extensively used, relatively little attention has been paid, or is being paid, to the improvement and upkeep of our old pastures, or the development of new pastures for dairy cattle. There may be various reasons for this apparent neglect, and one very likely is that the large amount of feed which a well cared for pasture is capable of producing has not been fully appreciated. Of course, as to the beneficial effect of sunshine and exercise upon cattle, whether grazing or not, every farmer can speak from personal experience.

### *Pastures Are Rich in Minerals*

Lately, a prominent foreign investigator has emphasized the value of pasture by calling attention to another of its inherent virtues. It has namely been found that good pastures composed of a variety of plants of which clover should be one, can, because of the vitamins and richness of mineral matter in the tender growth, quickly correct in farm animals the bad effects resulting from a faulty mineral supply in the feed.

The mineral requirement of the various domestic animals is one of the most difficult and important present-day nutrition problems. Already a large amount of experimental data is at hand, but these have not yet been thoroughly sifted and reduced to practical standards.

It is well understood that the mineral requirements vary with the different species of animals and the purpose of feeding. Besides the mineral ingredients needed for the normal functioning of the complex body organism, the young growing animal stores up mineral matter, chiefly in its skeleton, and the cow and the hen require large amounts of minerals for the production of milk and eggs. Thus a Leghorn hen will, in 250 eggs, deliver the equivalent of about her own weight of mineral matter in egg contents and shell. A 900-lb. cow, milking 20 kg. a day, would in 250 days deliver the equivalent of about 10 per cent of her own body weight in minerals through the milk. Hence the quantity and kind of mineral matter available in the feed is an important nutritional problem.

Fortunately, these necessary elements are usually present in sufficient quantities in the natural normal feeds for the different species of animals. But there are exceptions to this general rule, and abnormal feeding condi-

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P. A. Delano shows the difference in yields which 10 per cent additional potash in the fertilizer made. Left, fertilized with 1,000 pounds per acre of 5-12-5; right, 1,000 pounds of 5-12-15. The yields shown are the second pickings from 1/4 acres made on July 7, 1931. Left, 18 1/2 baskets; right 30 baskets.

# Delano Likes Potash

*By W. L. Myers*

Richmond, Virginia

*The Northern Neck section of Virginia is famous for its fine clover crops and clover seed raised for sale, for the largest average yield of wheat in the State, and as a canning tomato section. On looking into the reasons for these things, one is struck by the fact that nine out of ten farmers will tell you that in recent years better clover and more potash in the wheat fertilizer have gone hand in hand.*

P. A. DELANO, near Heathsville, Va., is one of those farmers who are always on the lookout for chances to improve their practices. He has been building up his farm in organic matter, that great and fundamental necessity for keeping the soil "in good heart." His rotation is good corn, wheat, clover, and back to corn or tomatoes. He realizes more than the average man the importance of proper fertilization, not of a single crop in a course, but of the whole series of crops grown in the rotation.

Some years ago the rule was to use mostly 16 per cent superphosphate or a 2-9-2 fertilizer on most of the crops grown. This kind of feeding brought wheat yields of about 25 bushels per acre. When 500 lbs. of 2-16-8 were used, a 6 to 10-bushel increase was produced. But this is only a part of the story.

A better stand and growth of clover were noticed after the wheat crop was off and even during the early part of the season before the wheat was cut, than had been seen before on this farm. The wheat weighed more, and was plumper. Furthermore, it did not lodge, in the low parts of the field especially, as had been the case when lower analysis fertilizers had been applied. With more potash in the fertilizer, bedding was eliminated and the wheat had time to fully mature and fill out well.

In the fall of 1929, Mr. Delano seeded two acres of wheat in the field in front of his house where lodging had been bad in previous years. These two acres averaged that year 44 bushels per acre by measure. The increased weight caused this wheat to yield 8 bushels more by weight than by measure, and a sample shown at the Kilmarnock Fair brought home first prize.

This year Mr. Delano was persuaded to try more potash on his early or "green wrap" tomatoes as a demonstration. Three plots were used in which the amounts of plant foods applied were as follows: 50 lbs. ammonia; 120 lbs. phosphoric acid; and 50, 100, and 150 lbs. potash, each plot receiving the same amounts of ammonia and phosphoric acid with the potash varied as stated. In the case of the 150 lbs. of potash, 50 lbs. were contained in the fertilizer as a 1,000-lb. application of 5-12-5 and 100 lbs. of potash were applied as a broadcast application several weeks before the plants were set in the field.

The accompanying picture shows the yields from the second picking of the 5 per cent potash plot contrasted with the 15 per cent potash plot. For convenience one-half of the yield was shown from each plot, and as the plots were one-half acre in size, the acre yields are four times what is shown in the picture.

Final yields were: for the 5 per cent potash plot, 89 crates per acre; for the 10 per cent potash plot, 95 crates; and for the 15 per cent potash plot, 146 crates. A marked difference in the per cent of high quality fruit could also be seen, and as there was a difference of 40 cents in the two grades marketed, this is well worth noting.

On cutting soybeans for hay off the

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**An even greater difference in yields due to the 10 per cent additional potash was seen in the first picking of Mr. Delano's tomatoes. Left, 7 baskets from ½ acre; right, 16 baskets from ½ acre.**

# Market Gardening

*By E. R. Lancashire*

Vegetable Specialist, Ohio State College of Agriculture

A MARKET gardener is in many ways like a home gardener doing business on a big scale. He produces large quantities of a great variety of the standard vegetables to supply a local market.

A successful market gardener understands how to produce bumper crops of high quality even better than does a successful home gardener. The methods used in producing high quality vegetables in abundance are the basis of this story.

There are many factors involved in the operation of a successful market garden. To make this report brief and at the same time effective, these many factors will be narrowed down to three items; namely, the planting methods, the cultivation systems, and the soil-building program.

There are many other phases of the market gardener's job which if neglected will ruin the most promising of market gardens. Insects and diseases, too much or too little rainfall, violent storms, hail, too early or too late frost injury, and too much competition or over-production, coupled with the poor salesmanship or marketing powers of the gardener will sometimes result in failure even for experienced men who thoroughly understand the most practical of planting methods, the most efficient of cultivation systems, and the best of soil-building plans.

Chief among the market gardener's problems in connection with practical planting methods is that of labor saving. Labor-saving devices which will at the same time make even more certain the many different vegetables being planted exactly on time are highly important. Any delay in the time of planting or any reduction in the amount of vegetables planted at a certain time is always likely to prove costly.

Perhaps the most outstanding story of how to get a job done on time and in a hurry was told at a recent convention of the Ohio State Vegetable Growers Association by Gilbert S. Watts, one of Pennsylvania's most successful market gardeners and roadside market operators. Mr. Watts is very firm in his belief that everything should be overhauled, inspected, and made ready during the winter months. He does this in order to prevent needless breakdowns during the planting operations.

### *Methods Proved Efficient*

A few years ago the efficiency of his methods was thoroughly tested and found faultless. He explained to the convention that there was no surer way to kill valuable time and to get behind at the start of the season than to fool around with work animals that are out of condition or with tractors that are too light or in bad repair.

He illustrated his statement by relating an actual happening in which he plowed, disced, cultipacked, fertilized, and dragged a 16-acre field and then planted an acre each of spinach and radishes in 9-inch rows, an acre each of beets and carrots in 18-inch rows, nearly two acres of peas in 27-inch rows, set out a sizeable planting of lettuce and a nice block of cabbage.

This work was begun at 4:00 P.M. of one day and was halted 43 hours later by a soaking rain. Incidentally this rain prevented any further work in the garden for several days thereafter, and Mr. Watts was just that many days ahead of the race against time, which is always so important in the early spring with spinach, lettuce, cabbage, radishes, beets, carrots, peas, and other early crops.

This crowding of several days' work into almost a single day was made possible by employing a powerful tractor, a double-acting, heavy disc, a wide cultipacker, a plank drag, an 8-foot fertilizer distributor, a multiple-row marker, a multiple-row seeder, an efficient transplanting machine, two small mules, an old horse, a work team, a truck, and a crew of men and boys.

It will be noted that Mr. Watts uses row spacings which are all multiples of 9, for example, 9-inch rows for spinach, 18-inch rows for beets, and 27-inch rows for peas. The same multiple-row planter can thus serve for all row crops by removing or replacing the units of the seeder outfit.

Smooth, level soil is necessary for the successful operation of both this multiple-row seeder and the multiple-row cultivator, but given this condition and the necessary experience in handling multiple-row machinery, the large-scale market gardener will find less and less use for the older and slower wheel-hoe outfit.

Both the market gardener and the home gardener wage a continual fight against the weed. For some reason or other the market gardener appears to be a better fighter than the home gardener, judging by a comparison of an equal number of each. Perhaps that is the reason why some home gardeners enlarge their plantings until they finally become market gardeners.

### *Neglect Weeds—Lose Crop*

Success in the production of vegetables high in quality and yields per acre certainly depends upon the grower's ability to get the best of the weeds. Neglect the weed and lose the crop is usually a sad but true statement.

The modern market gardener kills the weeds before they are born in so far as that is possible. Weeds are not allowed to go to seed on a real market garden. If nature blows a few million seeds in from the neighbor's fields, these are killed if possible before the planting of vegetables begins the following season. This is accomplished by thorough and frequent discing of the seedbed before planting begins. The most economical time to kill weeds is before the vegetables are planted.

Once the row of vegetables is planted, all competition from weeds is eliminated by the frequent use of shallow, soil-stirring tools such as "sweeps" or "knife blade" types of cultivators and by hand weeding. The deep shovel types of cultivators are not only harder to

Profit in market garden depends upon intensive culture.

push or pull, but they cut off more roots and they cannot be safely used as close to the rows as can the "knife blade" type of shovel.

Well-planned gardens have no waste space.

It is no longer thought necessary to maintain a dust mulch. The main object in cultivating is that of water conservation through weed destruction, breaking up soil crusts, and filling in soil cracks. With the market garden soil these three things can be accomplished efficiently and economically with the "knife blade" type of cultivator.

Where multiple-row planters are used, it is only common sense to employ multiple-row cultivators. Level fields of course are essential to success in each case.

And then comes the last and perhaps the most important factor included in this report. Skillful handling of poor, run-down soil may go a long way toward staving off an ultimate defeat but in the end there can only be one answer to a soil-robbing and neglecting program.

### *Maintaining High Fertility*

There was a time when the grower could move westward if the soil played out on him. But it is too late for such a practice now unless there are islands in the Pacific which can be added to the territory of this country. It is now a necessity to rebuild the soil to a point where it will again be possible to produce bumper crops. This can best be done through the use of soil-building crops which are liberally supplied with fertilizer and which are grown on soil which is well drained and of the correct acidity for the crop to be grown.

A market gardener once resorted to manure for maintaining the fertility of his soil. Upwards of 40 tons per acre were applied annually. That is still a popular plan where manure is available.

The area operated by a market gardener is small and his ideas of crop rotation run largely to following root crops with leafy or vine crops, oftentimes in the same season. By so doing it is possible to grow two or more crops per season on the same area. To date there have been few attempts to use a part of the acreage for the purpose of growing soil-building crops.

Yet a soil-building program is essential. Where manure is not available, the grower of high quality and large quantity will find some other way of maintaining his soil fertility. Such a program may even require that the market gardener trade in his high-priced city farm and move farther out where acreage is cheaper.

The market gardener has long been the most intensive user of fertilizer in this country. In the interests of economy in the application of large amounts of fertilizer, the market gardener might well adopt the methods used in some of the largest greenhouses. First the organic content of the soil is replenished and then 1,000 pounds each of superphosphate and potash are applied per acre. This can be done the fall before the plot is to be planted with vegetable crops. There will be plenty of time to thoroughly work the fertilizers and the organic matter well down into the soil. Nitrogen is applied as a top-dressing in this plan and is put on as needed after the crops have established themselves.

### *Plant Food Must Be Available*

Successful use of commercial fertilizers is becoming more and more a matter of having plenty of superphosphate and potash available in the soil and then applying nitrogen as needed by the plants. The superphosphates and the potash are worked well down into the surface soil where the root systems of the vegetable crops can best find and utilize them. These fertilizers move very slowly once they are applied to the soil, and so there is little danger of their leaching away. Usually superphosphates and potash salts will remain above the furrow sole. Very little penetration beneath the level of the plow depth is normally expected even when a ton or more of the potash and superphosphate is applied at one time. The nitrogen is a much more elusive fertilizer but if it is applied in amounts of 200 to 300 pounds per acre when the crops are established and growing, very little of it will be wasted. The nitrogen is much more likely to be taken up through the roots of the growing plants than it is to be washed out with the drainage water. Only under unusual conditions of water surplus combined with very porous surface soil and subsoil would any appreciable amount of the water-soluble nitrogen be lost to the growing plants.

The efficient use of fertilizing materials by vegetable crops depends not only upon the ratio of the materials and the methods of application, but also upon the drainage, soil reaction (i.e. acidity), and the organic matter content of the soil. More than one type of soil is often found in a field; again, soil elements may be present in a form which is unavailable to the plant. Each gardener must utilize his information concerning the growth of crops on specific soils in order to determine more accurately what fertilizer analysis to use.

Soil tests may be of some value in determining the amounts of nitrogen and phosphorus present in the soil. The nitrogen test is especially useful in determining when to make surface applications of nitrogenous fertilizers. Fertilizers containing phosphorus and potassium should be applied to a depth of from two to four inches. Complete fertilizers should be applied immediately prior to the planting of the crops in order to prevent the loss of nitrogen. Supplementary applications of complete fertilizers which are well worked into the soil are frequently profitable for perennial crops such as asparagus and rhubarb, and occasionally profitable for annuals.

More effective and more economical use of the fertilizer is often secured if part or all of it is applied in the row. If machinery having efficient fertilizer attachments is not available for use in planting, the fertilizer may be distributed in the row with grain drills which may be adjusted so that the fertilizer is distributed as desired. The potato planter is also an efficient machine for making row applications, especially for such crops as cabbage and tomatoes. If row applications are made, there must be some soil between the fertilizer and the seed or the roots of the transplanted crops in order to prevent injury which the fertilizer might cause if it came in direct contact with the seedling plants or with the roots of newly transplanted crops.

### *Side-dressings of Value*

Nitrogen side-dressings are of special value during cool, wet periods in the spring, especially for leafy vegetables like spinach, cabbage, celery, and cauliflower, or late in the season to supplement the supply in the soil to complete the growth of the crop. Ap-

(*Turn to page 56*)

Potato culture is especially adapted to peat land. The cool soil produces high quality yields under proper fertilizer treatment.

# Productive Peat Farming

*By C. A. LeClair*

St. Paul, Minnesota

TURNING natural handicaps into advantages is enabling many farmers of the northeastern part of the United States and Canada to now produce high quality crops on peat soils which were once considered as waste landscape.

There are about 15,000,000 acres of peat and muck soil in this part of the United States and an even larger acreage to the north in Canada. The State of Minnesota has nearly 7,000,000 acres of peat soil within its borders. More than half of the farms of Wisconsin include more or less of this type of land. It is estimated that there are approximately 2,000,000 acres of peat land in the State of Michigan. Somewhat lesser acreages of this type of low-lying organic soil exist in every State from the Dakotas to the Atlantic and north of a line intersecting the southern boundary of Iowa and the northern boundary of New Jersey.

Originally the peat lands of this country were either clothed in marsh grasses or timbered with spruce, hemlock, tamarack, and alders. Almost invariably these organic soils are in need of drainage. However, in many cases the installation of a comparatively inexpensive system of open ditches and lateral tile drains serves to remove the excess moisture and hold the water table at the proper level.

Although as early as the sixteenth century farmers of Holland began to farm peat lands, it was not until about a half a century ago that a real scientific study of the management of such soils was undertaken in

Germany. Only in the past decade have farmers of America exhibited marked activity in the utilization of their low-lying peat and muck soils.

Drained peat and muck soils are relatively easy to prepare for crops. In many instances the original vegetation has been burned over and the remaining stumps are rotted to such a degree that they can be uprooted by the plow. Not infrequently newly broken peat can be put in crops in the season that the clearing is undertaken.

Now just as the excess moisture prior to draining made such lands unattractive, its control after the soil is subdued assures the harvest of profitable crops even in years when drought takes its toll on the highland crops. In dry seasons the peatland farmer impounds the flow of water in his ditches when his crop requires moisture or he brings the moisture from the lower levels by rolling his fields.

Peat and muck soils because of their moisture, texture, and color are relatively cool soils. This condition makes them ideally adapted for the production of such crops as potatoes, celery, lettuce, and other truck crops. To be sure corn, grain, and grasses may also be grown successfully on peat, but the potato and truck crop acreage is gradually becoming more extensive.

Because it is not possible to cultivate peat land as early in the spring as is the case with upland soils in the same vicinity, fall plowing when required is preferable. Since a firm seedbed is most desirable in the case of this type of soil, plowing is only advisable in the rotation when stubble or sod crops must be turned under. In other cases a good discing is all that is required to prepare the ground for planting.

On few other types of soil does the depth of planting affect the rapidity of growth to the extent evidenced in the case of peat land. Except in the case of the small vegetable seeds, relatively shallower planting is, therefore, practiced on peat lands than on mineral soils. Sometimes the surface soil of peat is worked up into a seedbed and planting done when frost still remains in the subsoil. In the case of hoed crops, most growers practice hill cultivation but there are some who maintain that nearly level culture does best.

### *Special Handling Necessary*

Peat soils require special handling if results are to be obtained. If allowed to get too dry, they are subject to blowing. Through the use of windbreaks, alternating strips of hoed crops with grain or sod crops, and by rough surface cultivation of hoed crops, damage by wind is prevented.

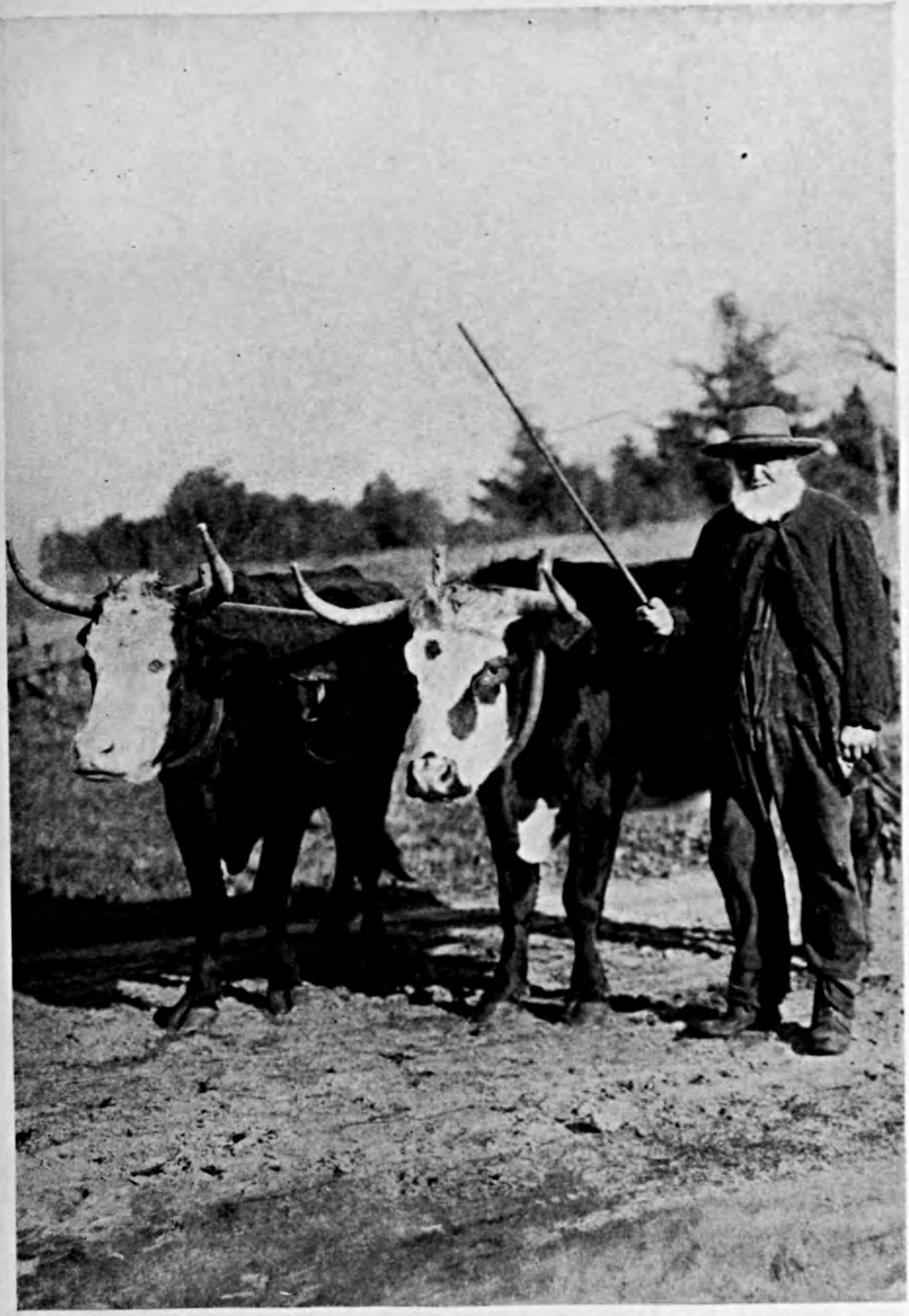
The frost hazard is another characteristic of peat soils. Crops grown on these black lowlands are more apt to be injured by early and late frost than is the case on higher mineral soils in the same neighborhood.

Finally peat soils always require special fertilizer treatment in order to make them productive of profit.

Notwithstanding the special characteristics of peat soils, the science of their management is rapidly becoming disseminated. For example, as previously mentioned the control of moisture on this type of soil can be managed with almost the degree of effect as an irrigation system would provide.

Likewise by proper management the frost hazard can be greatly minimized. As previously stated, crops known to be resistant to freezing should preferably constitute the rotation. Farmers have observed that areas are less subject to frost after the land has been thoroughly subdued than is the case when first reclaimed. By cultural methods which keep the bog in a compact and moist condition, heat conductivity from lower layers to the surface is increased with corresponding prevention of injury to the crops by freezing. The use of smudges to

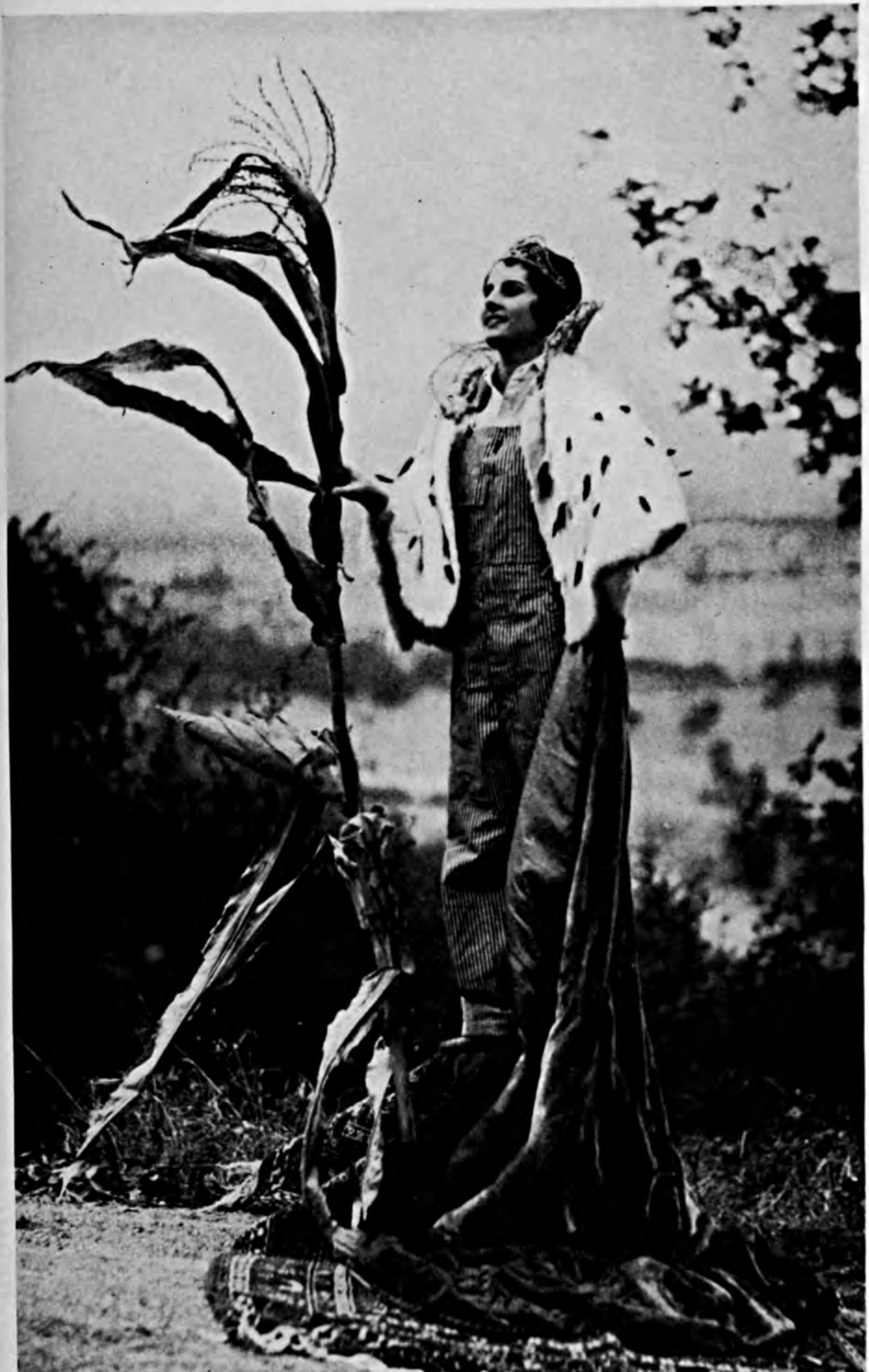
(*Turn to page 53*)



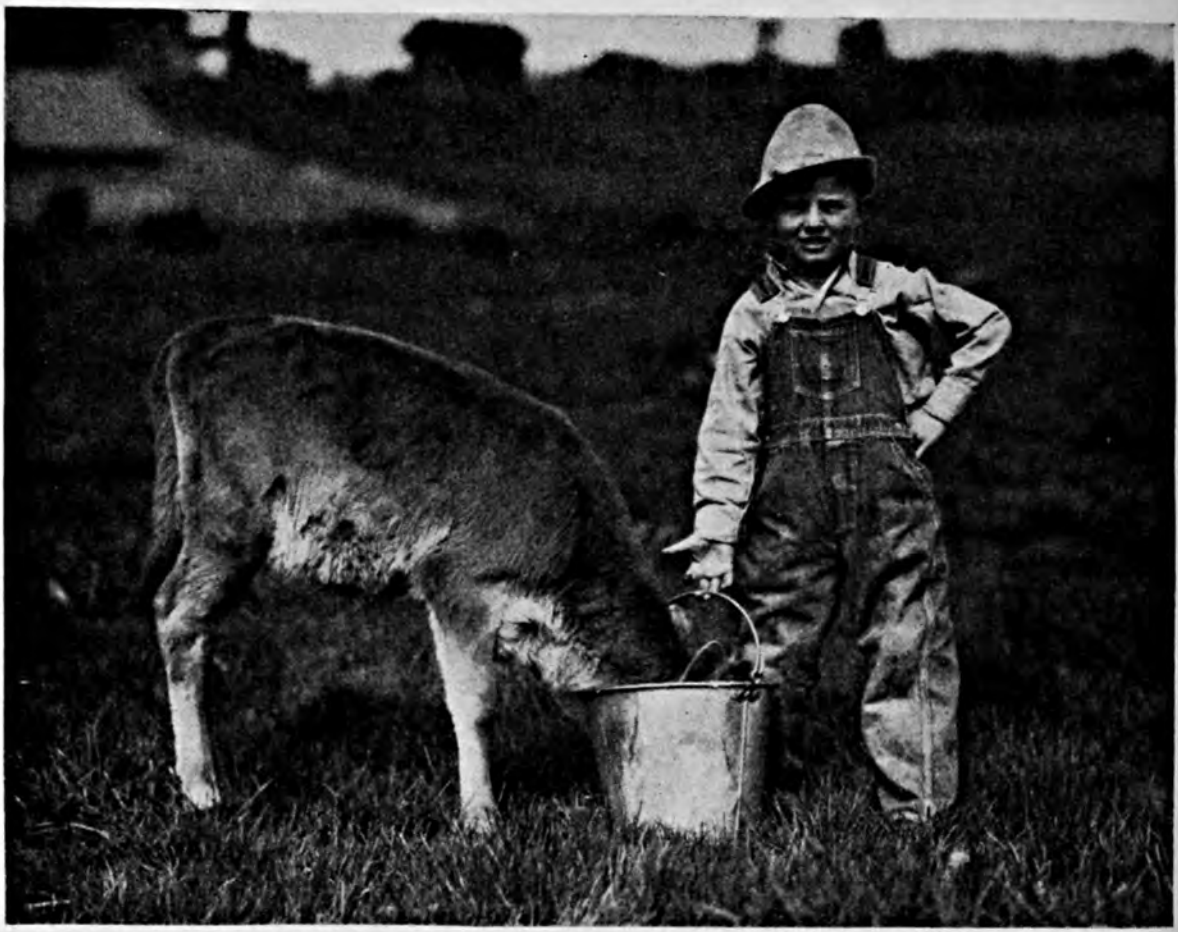
A TRIO, STILL TO BE SEEN IN SOME OF THE OLDER AGRICULTURAL SECTIONS OF NORTH AMERICA.

# PICTORIAL

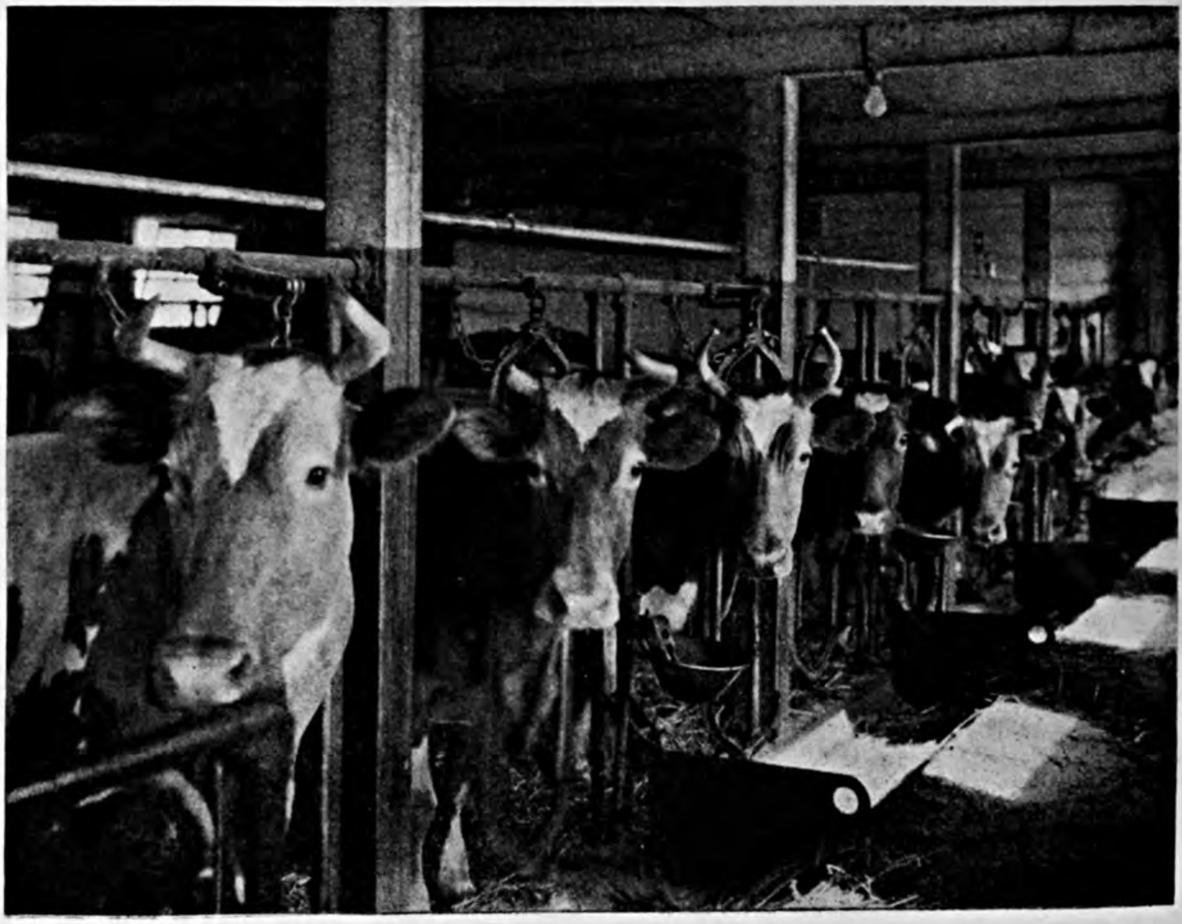

Above: Mr. and Mrs. Raymond Thompson of Bentonville, Indiana, paid for their admission to the 1931 Indiana State Fair with two bushels of wheat. Below: Lacking funds, Donald Rodabaugh, freshman at the Westminster College at Fulton, Missouri, took his cows to college with him and will pay his way by providing milk for all college demands.

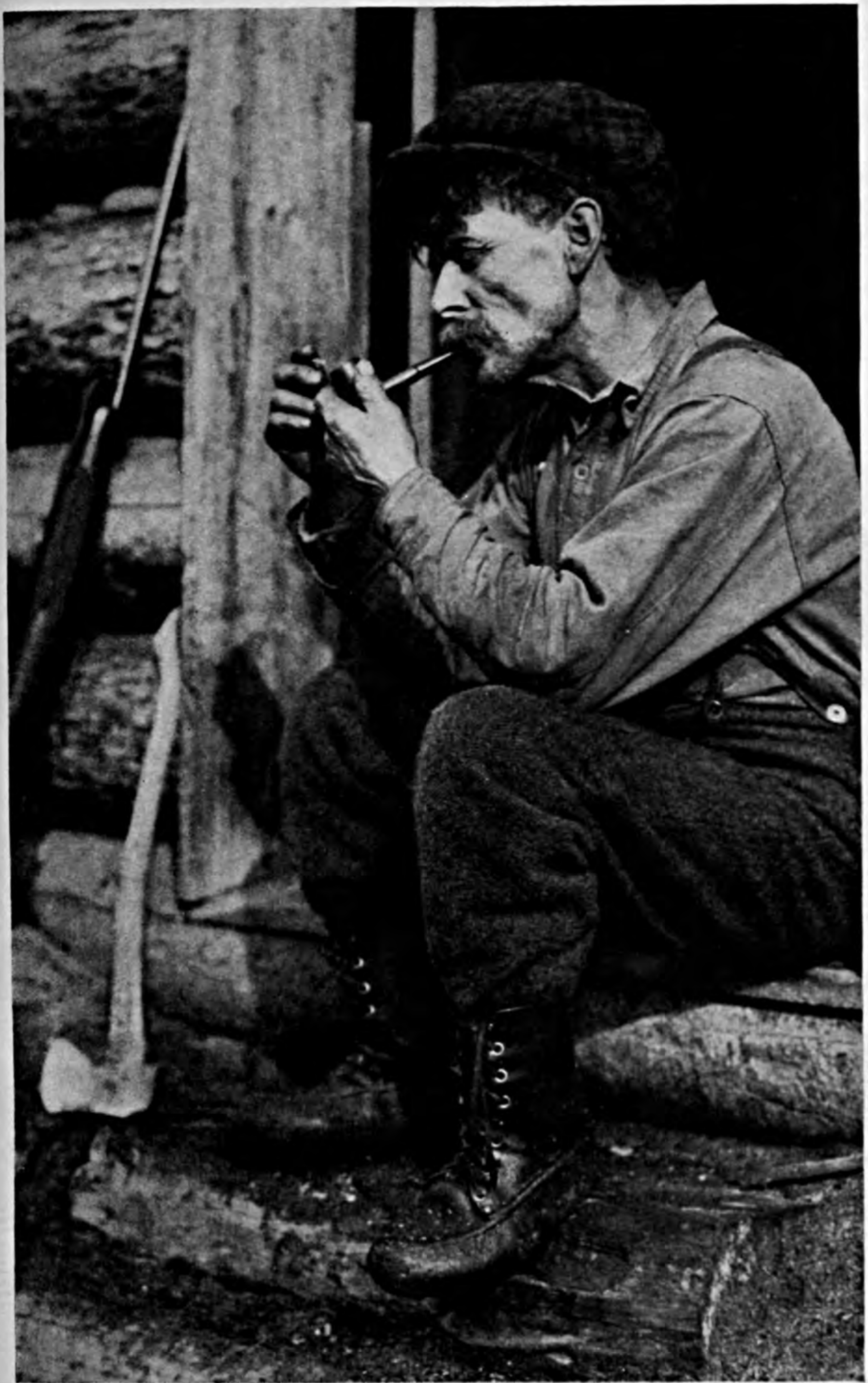


The overalls of a champion farm girl were covered by the royal ermine of a queen when Miss Lucille Gates, in her capacity as defending American Farm Girl Champion, officiated over the Court of Agriculture at the Los Angeles County Fair.

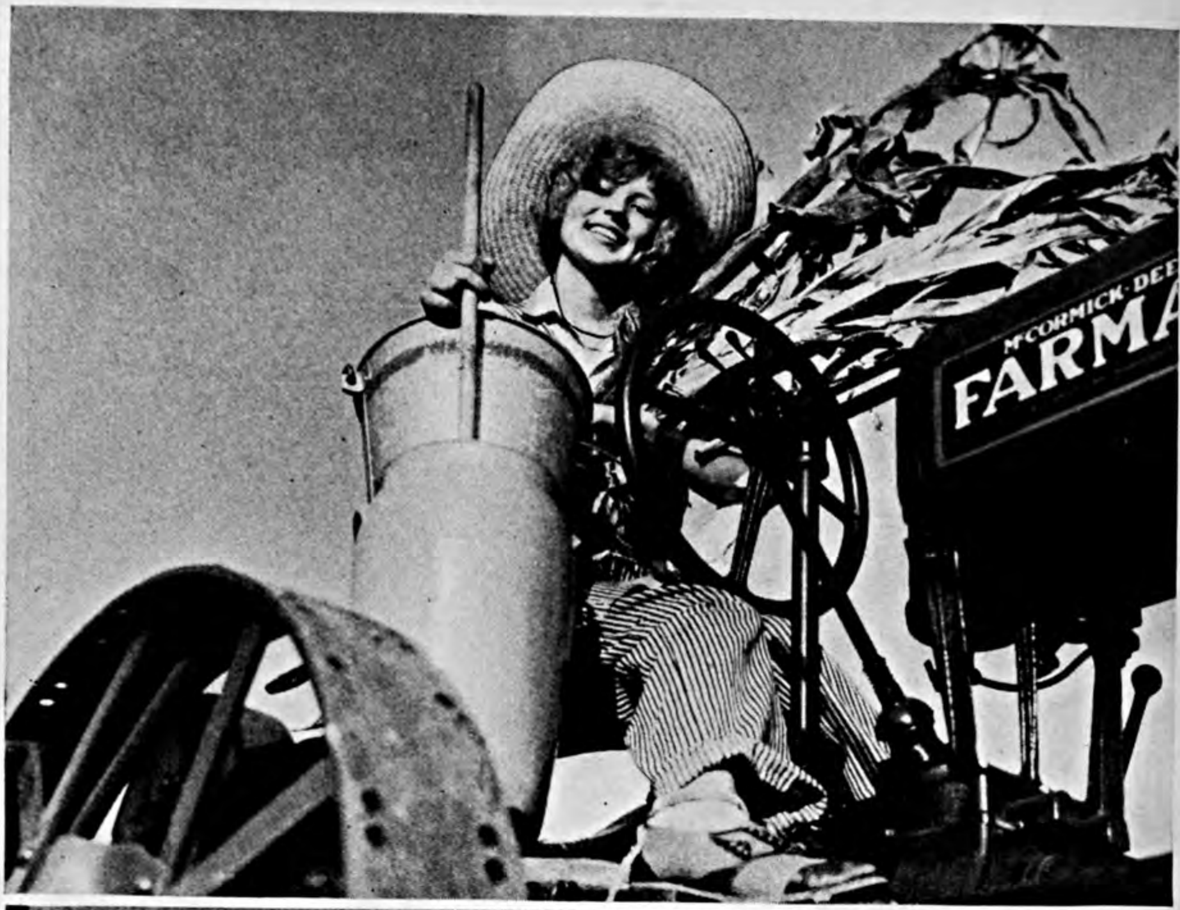


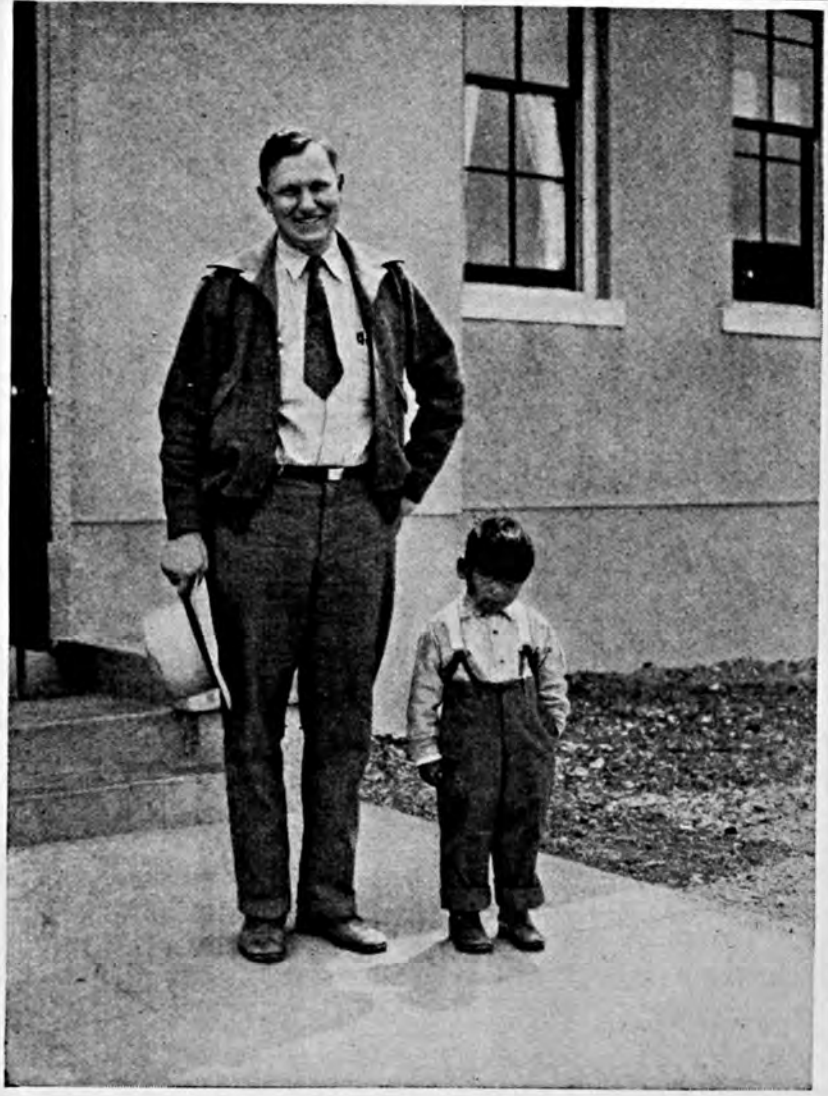
Above: Young William Gilmore, is an ardent dairyman and finds plenty of work for the time which he can spare from play. He is shown feeding a Jersey calf on the dairy farm of W. E. Gilmore & Son, Jeffersonville, Indiana. Below: A fine row of Guernseys in the modern dairy barn of the Bankable Guernsey Farm, Colburn, Indiana.





The "moose call" or the "duck call" is probably no stronger than the "call to the heart of the hunter" of a picture like this published at this time of the year.



Above: By demonstrating her expert ability with the various farm implements that are grouped about her, Miss Maurine Hamann, former Omaha girl, succeeded in winning the national Farm Girl Championship at the recently held Los Angeles County Fair. Miss Lucille Gates, pictured on another page, defended the title against a large field of skilled contenders. Miss Hamann is shown with tractor, milk pail, and churn, as well as some real American corn.

Left: Pals, are these two, A. F. Hoffman, Jr., county extension agent, Montezuma county, Colorado, and Martin Chischilla, one of his 4-H Club boys. Martin is a Navajo boy and attends the Southern Ute Mountain Indian School. Mr. Hoffman is 6'4" tall and weighs 230 lbs. Martin's height and weight are —well, figure them out for yourself.

# The Editors Talk

## The Art of Living Together

The world is in conference. Nearly every day the daily newspapers record the comings and goings from one country to another and within each country of statesmen, bankers, public men, and reformers, all to meet together to talk things over. Possibly never before in the history of the world has there been so much time spent by leading men in conference on world problems, looked at from the world viewpoint, to secure the peace and prosperity of all peoples.

Much of what is discussed is difficult for us to understand. It has to do with gold standards and quantities of gold quite beyond our comprehension, with financial systems, trade, and invisible balances, wages, and unemployment in disquieting numbers. The most that many of us can clearly comprehend is a rise in taxes and a reduction in benefits, which all too often are promptly resisted in one form or another.

But stripped of all technicalities and reduced to simplest terms, are not the peoples of the world slowly learning to take two or three steps in furthering the art of living together? For living together is an art, much as the observance of economic facts and laws must be the fundamental base of its achievement. What is the world trying to do? Broadly and inclusively, the people of the world are trying to take two steps: first, to superimpose the larger world viewpoint on the older national view so that the nations of the world may trade together and sustain a decent living standard in an atmosphere of world peace and security. The second step is a shift in emphasis to the recognition of human values in comparison with the older sacredness of property values. Thus, labor of all classes and in all forms of organization is having a great deal to say and is being given a hearing. Ultimately the world will be a much better place to live in. More people will have more of the world's goods and of leisure. Human life will express itself in a greater variety of more profitable and happier terms, but in the meantime this ultimate achievement requires sacrifice.

Fortunately, the art of living together is not only a world problem, but an individual and community problem, and more fortunately still, all of us, even in the humblest spheres, can contribute something towards this art, which lies at the base of all happiness.

## Taxation

No subject today is of more vital interest to American people than that of taxation. During the past 15 years of fair business, taxes have increased out of all proportion to net incomes and now that the worst depression the present generation has ever experienced is upon us, mass meetings of citizens protesting against high taxes are the rule rather than the exception.

The situation is best illustrated by a recent statement from the governor-elect of a Southern State who tells his people that the total ad valorem tax of this State amounts to more than one-third of its total bank deposits and this in fact of the State's raw materials, on which she derives her principal revenue, selling below the cost of production. In fact, an analysis of the figures will show that the State's money crop, cotton, will not pay at present prices her tax bill by several millions of dollars.

If this were confined to a single State, it might not be so bad, but the fact is that the same condition applies to practically every other purely agricultural State of the Union. As this governor-elect points out, the trouble is not caused so much by taxes collected by the State itself, as it is by taxes of the local taxing districts within the State, the total of which amounts to from five to ten times as much as the State tax. Consequently, the principal cure must come from the counties and smaller taxing units within them.

It has long been evident that the power to assess taxes has been delegated to too many agencies, many of which are in no way qualified to exercise the privilege, and that the right to vote bond issues has been too freely given to those who have no property by which said bonds are secured. School boards, drainage district boards, levee boards, road district boards, municipal boards, and boards of supervisors have all exercised such power under the laxity of the laws governing bond issues that the people who pay the taxes and do not share as jobholders or the recipients of contracts have all but come to ruin in a time like this.

If the present depression does no more than awaken the sleeping public to the evils of the tax situation and the correction of them, it may prove a blessing in disguise. The trouble is, it has gone on so long that it possibly can never be stopped before many who thought they had accumulated a competency will find their savings in land, houses, mortgages, stocks and bonds practically wiped out, directly or indirectly attributable to the huge tax that serves as a first lien against them.

*Sweet are the uses of adversity,*
*Which, like the toad, ugly and venomous,*
*Wears yet a precious jewel in his head.*—SHAKESPEARE.

## Adversity

So sung the poet of long ago, yet we find this philosophy quite in keeping with the present time, especially when this philosophy is applied to the cotton crisis.

Editors, leaders, statesmen, and farmers realize, and have pointed out, that the whole economic, financial, and social well-being of the South depends too largely on cotton. By increasing cotton production above 15 million bales this year Southern farmers have ridden the good horse cotton to a point where it has become a broken and spiritless nag. The best of horses fail when ridden incessantly, and thus we find the cotton horse not only failing, but leaving the rider in a more or less helpless plight. But we cannot blame the horse, for cotton has brought more money into the South and contributed more to our favorable balance of trade than any other crop.

The South once had a world monopoly on cotton which she has gradually lost to a point where she now only produces 52 per cent of the world's cotton supply. While the South enjoyed this monopoly she learned to lean on it heavily even to the extent of neglecting her other agricultural resources.

Time after time leaders have pointed out that the South was growing too much cotton, but the farmers, being unorganized, were unable to take any definite action regarding reduction. Then it would seem that the best remedy would be to envoke the first law of nature. The law of self preservation is the first law of nature. Southern farmers can and will, during the coming years, make themselves less dependent upon cotton. Thus "adversity, ugly and venomous," may yet prove to be a "precious jewel" that will turn the South toward a more self sustained agriculture.

"The darkest hour is just before the dawn" and so is the present plight of the Southern farmer anything but bright, but the South has risen from adversity many times before, emerging each time a bigger and better Dixie, and she will do it again. This time, with all her wealth and added resources, she undoubtedly will recover to a greater prosperity.

## Dr. L. L. Van Slyke

With the passing of Dr. L. L. Van Slyke, American agriculture has lost one of its outstanding figures. Dr. Van Slyke died at his home in Geneva, N. Y., on September 30, following a brief illness.

A true son of the Empire State, having been born in Centerville, Alleghany County, New York, in 1859, and having spent most of his active years in the service of the State, he nevertheless had attained world-wide recognition as an authority in agricultural chemistry. For nearly 40 years he had worked at the same desk at the New York Station, keeping fit by regular work in his flower and vegetable gardens, but from his personality and his research work emanated an influence, through his writings and the scientists trained under his supervision, which has won him an unforgettable place in the advancement of scientific agriculture.

In the August issue of BETTER CROPS WITH PLANT FOOD we were pleased to publish Dr. A. S. Alexander's tribute to Dr. Van Slyke and his contributions to agriculture. With the sincerity and modesty which characterized the activities of this eminent scientist, Dr. Van Slyke wrote us in acknowledgment:

> "I wish I were more worthy of the gracious
> statements made by Dr. Alexander."

Dr. Van Slyke's book "Fertilizers and Crops" has, since its publication in 1912, been recognized as a standard text. He was writing and was soon to publish a new book to be called "The Use of Fertilizers and Crop Production." We hope that the book may still appear, that the added years of his experience and research work may still further benefit our understanding of these subjects.

## Cotton Abroad

As showing how much one country depends on another for the maintenance of its prosperity, it is interesting, if not a little disquieting, to read in a reputable business journal published in England, the effect on their cotton trade of the recent drop in cotton prices in America, which have, of course, declined from a farm price of 16c per pound in December, 1929, to 5.9c per pound last month.

Discussing conditions in the English cotton market, the journal points out that of more immediate importance was the sharp drop in raw material values following the publication of an official estimate of American cotton production, greatly in excess of the largest of the private forecasts. The journal continues that "previous purchases at once became relatively dear, involving heavy losses for the holders, and buyers, losing all confidence in prices, would not commit themselves beyond their most urgent needs. . . . A vital consideration from the point of view of British producers is that the decline of raw material prices increases the proportion of wages and other production costs to the price of the finished article, making British goods dearer than ever in comparison with those of our competitors."

The conclusion is drawn that a hardening movement in raw cotton prices is essential before any trade revival can be expected. "The world is undoubtedly too poor at present to buy its normal quantities of cotton fabrics."

Thus, what is possibly worse than a low price is a declining price. It is very much to be hoped that present prices of cotton will stabilize, even though they should remain at a low level. The end of the growing season and the actual number of bales finally produced will be awaited with keen interest, both here and abroad.

## Better Crops With Plant Food

Commencing with this number, BETTER CROPS WITH PLANT FOOD will be issued bi-monthly. The same standards will be maintained as in the past and we hope that we may continue to merit the warm support of our readers and contributors that they have so kindly accorded us heretofore.

It is the purpose of the magazine to present in simple, non-technical language an accurate picture of problems relating to better crop production. While the agricultural industry is now suffering in sympathy with the depression of world industrial conditions, the very fact that the achievement of a profitable crop production is now more difficult, makes a study of the problems involved all the more inviting and necessary. Thus, emphasis will be laid on articles showing how present problems of crop production are being met in different parts of the country—not only what is the farmer doing, but also what farm advisers say about it.

Discussing all phases of the problem of crop production from the agronomic, economic, and social viewpoints, especial attention will continue to be given to the profitable maintenance of soil fertility. An important phase of soil fertility problems is the profitable use of commercial fertilizers. Interest in plant nutrition is growing. The use of fertilizers is increasing. There is now no fertilizer frontier. Farmers, extension forces, and others in every State are interested in some phase of the fertilizer problem. New materials are coming on the market. The fertilizer industry is rapidly changing from an industry with mixing relatively simple materials to a chemical industry, with all the problems of production, utilization, and distribution that this change involves. Thus, the various aspects of activity in this field are a vital matter to both the farmer and agricultural advisers.

Finally, may we accord a word of appreciation to our contributors who have worked so faithfully since the magazine was inaugurated to present in clear and simple language, facts and experiences of vital interest along these lines. As in the past, the magazine will always be glad to receive such articles and to render all the service within its power in disseminating sound information on a profitable crop production in our national agriculture.

The Hastys, father and sons, know how to grow corn. In the order pictured above, their official yields in 1930 were: left, Palmer Hasty, 106.7 bus. per acre; George Hasty, 96.4 bus. per acre; and right, Wilson Hasty, 104 bus. per acre.

# The Hastys Grow Corn

## *By M. D. Butler*

County Agent, Marion, Indiana

CONSTANT study of corn growing, as prompted by competing in the five-acre corn contest sponsored by the Indiana Corn Growers Association, was begun in 1928 by George Hasty and his sons, Wilson and Palmer, jointly operating a 220-acre Grant county farm in Indiana.

In 1928, the Hastys produced an official yield of 82 bushels per acre on a measured five-acre field. The records of the association credit Palmer with this yield, for which he was awarded a bronze medal. The following year he increased his yield to the silver medal class, having used more care in seed selection and using 200 pounds of a 2-12-12 fertilizer per acre.

Although this was an increase and an improvement in both yield and costs over former years and a creditable yield for that locality, it was not enough for the Hastys. Wilson, a younger brother, thought he could "do most as well," and so sons and father all competed in 1930, like the golfers trying to beat their own score. They used more than usual care in seed selection and testing that year, set the planter wheels into 32 inches, and omitted the nitrogen in their fertilizer, applying an 0-10-10 mixture with the planter at the rate of 150 pounds per acre.

### *Sons Beat Father*

The results of the 1930 official check-up by the county agent and judge are as follows: George Hasty, 96.4 bushels per acre; Wilson Hasty, 104; and Palmer Hasty 106.7 bushels per acre, winning for them two gold and one silver medals and the honor of being the boy champion for Palmer.

In addition to being the best boy grower in his county during 1930, Palmer also won sweepstakes 10 ears at the county corn show at Van Buren, Indiana, in a class of more than 300 entries. At the district show at Muncie he was recognized as having the second highest official yield in the district, being exceeded only by John Scott, Grant County Master Farmer, who produced a yield of 110 bushels per acre.

# Sweet Clover or Alfalfa

*By E. N. Bressman*

Oregon Agricultural College

YOUNG plants of sweet clover and alfalfa are extremely difficult to distinguish. It is true that typical plants of either crop have some outstanding characteristics, but there are plants which hardly can be placed as alfalfa or sweet clover.

One of the common methods of determining sweet clover plants is to determine if there is an odor of cumarin present. Cumarin is a chemical which has a vanilla-like flavor and is characteristic of sweet clover. In very young plants this odor has not developed to any great extent, however, and cannot always be used as a guide. In addition, if the cumarin gets on the hands, the odor will stay a long time.

Each leaf of these crops is made up of three small leaflets. In sweet clover these leaflets are rather thick and full of moisture. The alfalfa leaflets are usually a darker green color, rather hairy and thin. These differences appear to be about the safest guides as to the differences between young plants of these two crops.

Some observers are of the opinion that there is a difference in the length of the small stems which bear the leaflets. The examination of a large number of plants, however, shows that there is considerable variation in regard to this point and it cannot be relied upon as a constant difference between the two crops.

Of course, when the plants are large there is considerable difference in growth. Sweet clover usually grows coarse and rank, while alfalfa tends to have a much smaller and finer plant. The flowers of sweet clover are on a long spike and are either yellow or white in color. On the other hand, the alfalfa flowers are usually purple or variegated, that is, of various colors, mostly smoky shades of purple.

The seeds of the two crops are rather similar in appearances, but seed analysts readily distinguish one from the other. The sweet clover seed is characterized by a prominent thumb. Sweet clover seed is usually borne singly in a pod and the seed is very smooth and uniform in appearance. Alfalfa seed pods are curled and usually contain several seeds. The seeds, therefore, of alfalfa tend to be rather irregular in shape.

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Jones: "How do you spend your income?"

Smith: "About 30 per cent for shelter, 30 per cent for clothing, 40 per cent for food and 20 per cent for amusement."

Jones: "But that adds up to 120 per cent."

Smith: "That's right."

# AGRICULTURAL DEVELOPMENTS

## RAIN, NOT 1930 DROUGHT, CAUSE OF ABNORMAL CROPS

Farmers who believe that last year's drought affected soil chemically to improve it for this year's crop are mistaken, according to J. B. Kincer, of the U. S. Weather Bureau.

"Abnormal crop growth this year is due entirely to contemporary weather conditions," he said, "and in no way may be attributed to improvement of soil conditions."

The summer, particularly the month of July, has been unusually warm, and rainfall has been above normal in Atlantic seaboard and southern States, it was explained. Under such conditions, all vegetable matter grows rapidly.

The facts that disprove the theory that soil is chemically changed may be brought out by comparing eastern and southern State crop conditions to those in the corn belt, through the north and northwest.

In the belt the drought was just as severe as in the east, yet subnormal rainfall has caused crops to be considerably below normal.

Plenty of heat, coupled with constant moisture due to opportune rainfall, are the causes for abnormal crop growth.—*Science News Letter, September* 5, 1931.

## A SYSTEM FOR FIELD RECORDS

A system for keeping field records, which he has found to be thorough, definite, flexible, convenient, and compact, has been worked out by W. L. Funkhouser, county agricultural agent in Cheshire county, N. H.

The records are kept on 6¾ by 10½ inch loose-leaf sheets which are folded twice so that they may be kept in a pocket-sized notebook. Lines are ruled to allow for names and addresses on the side margin and projects across the top of the page. Each sheet is made out for the people in one community. Any information concerning an individual is placed opposite his name and under the project or item to which it relates.

By making all of the entries for the people in a community or section on one sheet, Mr. Funkhouser has found that he has a convenient and complete list of all the extension service cooperators in his county by communities and that at a glance he can determine just what to take up with each person, what material to carry with him when visiting any community, and just how his itinerary should be planned to keep travel at a minimum and avoid retracing his steps.

Where the records cover several years, trends can be seen at a glance. At the end of the year much of the statistical material for the annual report is already assembled and quickly and easily summarized from these records, Mr. Funkhouser reports.—*Extension Service Review*.

## FEDERAL CHEMISTS MAKE NEW FROZEN FRUIT PULP

A new and delicious type of frozen fruit product has been developed by experiments in the United States Department of Agriculture and offers new possibilities for the utilization of various fruits, according to Dr. F. C. Blanck, in charge of the food research division of the Bureau of Chemistry and Soils.

Experiments at the bureau's laboratory of fruit and vegetable chemistry in Los Angeles, Calif., states Doctor Blanck, have included peaches, apricots, plums, cherries, pears, raspberries, and strawberries.

"By pulping the pitted fruit, adding a sugar sirup of proper concentration, mixing it thoroughly, and then freezing it at very low temperatures, department chemists have developed a frozen fruit product with a remarkably smooth texture and with the full retention of the original flavor which makes it suitable and acceptable for direct consumption," says Doctor Blanck.

"If the results measure up to their present promise," he says, "this new type of frozen product will offer a new outlet for the fruit grower and packer, besides furnishing the ice-cream manufacturer and soda-fountain operator with a new and highly desirable fruit base, as well as a new frozen fruit product for direct consumption in the frozen state."

## POTASH AND FRUIT TREES

It is time to clear up and burn the garden rubbish. I dislike doing this, because such light soil needs to have every possible bit of vegetable matter worked into it. But burning upsets the hibernating arrangements of many garden pests, and incidentally puts a little potash where it will come in handy. A friend has a theory about potash that is interesting. He says it is the pack horse that carries the nitrogen and phosphoric acid about in their journey through the plants, and that, when it is not on hand in soluble form, these other ingredients do not get where they should be at the time they ought to be there. This may not have much of a scientific sound, but his arguments are based on what he feels that he has seen in plant growth results, when available potash was on the spot and when it was not. Perhaps science may O. K. or disprove this idea some time.

I have seen too many plants make wonderful response to complete fertilizers containing quickly available potash to put dependence on the old notion that, because some soils have considerable potash somewhere in their depths, the roots of plants and trees can search it out and help themselves. That is considerably like making a hog root for a living. Perhaps he will live if he is that kind of razorback type. Our farm crops have not been bred and brought up to shift for themselves like that.

I find a growing feeling among apple men that potash has often been neglected in the apple tree program, and a disposition to remedy this lack. Apple trees, both in growth and fruitage have a way of telling their needs to those who have eyes to see, and a disposition to analyze the result of their observation. Such an interpretation of the trees' needs may not be based on elaborate figures and graphs, and yet contain truth that fits accurately and quickly into farm plans. Picking up truth as we go along is a logical part of farm work, recognized by the majority of farmers.—*W. W. Higgins, Rural New Yorker.*

## LOSING CORN BELT SOIL

It takes only about seven years under continuous corn cultivation in northern Missouri and southern Iowa for one inch of an important type of rolling Corn Belt soil to wash off land of gentle slope, says the United States Department of Agriculture. On steeper land, that having an 8-foot drop for every 100 feet, soil washes off at the rate of an inch a year. This means that with the prevailing system of corn production in this region, the most productive part of the land, the 7 inches of topsoil, is being washed away within 7 to 49 years. This as virgin soil produced 75 bushels of corn to the acre in good years; the exposed subsoil produces about 20 bushels.

# 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, and Crops. 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

The growing importance of potash fertilizers in maintaining crop production, especially in certain crop systems, adds a fundamental character to various problems of potash fertilization, among which the rate of absorption of potash by plants is prominent. A new bulletin recently released by the Arkansas College of Agriculture as No. 265 is entitled "The Rate of Absorption of Potassium by Plants and Its Possible Effect Upon the Amount of Potassium Remaining in Soils from Applications of Potassium Fertilizers." The authors, R. P. Bartholomew and George Janssen, designed the work to answer four questions:

(1) How rapidly can plants absorb potassium from solution?
(2) How rapidly does fixation of potassium by the soil take place?
(3) Does fixation by the soil remove potassium from the influence of plant feeding?
(4) What is the effect of cropping upon the amount of potassium remaining from the fertilizer application at the end of the season?

The plan of experiment included four crops—corn, soybeans, Sudan grass, and cowpeas. The crops were grown in culture solutions and in soils.

The chief thesis resulting from this work is that plants absorb potassium very rapidly during the early stages of growth so that the soil is relatively depleted of available potassium. Thus in the later stages of growth, plants translocate and re-utilize the potassium previously taken up in order to maintain growth during the later stages of development.

It was also shown that plants rapidly readjusted themselves to various concentrations of potassium in solution and absorbed potassium even from small concentrations.

The fixation of potassium by soils in which no plants were growing and in soils seeded to crops is discussed. The bulletin is an excellent study of certain principles of the action of potassium in relation to both soils and crops.

The marked influence of soil and plant variation on responses to fertilizers is brought out by Professor N. L. Partridge and J. O. Veatch in Michigan Agricultural Experiment Station Technical Bulletin 114, "Fertilizers and Soils in Relation to Concord Grapes in Southwestern Michigan." Soil variation, especially with respect to organic matter in the surface soil, exerted an appreciable influence on plant growth, which effect tended to be reduced but not obviated by the use of fertilizers. The initial vigor of the vine was also noticeable in its influence throughout the period of the experiment. The weak plants never caught up to the stronger plants, in spite of fertilization. However, fertilizers materially aided these weak plants and, in fact, had more relative influence on them than on the stronger plants. Fertilizers were noticeably effective in helping yields in the "off" years. The authors conclude from the work that fertilizers tend to reduce the effects of soil and plant variation on yield, but not entirely to overcome them.

An interesting and handy summarization of recommendations on the use of fertilizers for the principal crops grown in Pennsylvania has been prepared by Professor J. B. R. Dickey. The three primary fertilizer nutrients, nitrogen, phosphoric acid, and potash are briefly considered and suggestions on fertilizer analyses and ratios for individual crops on different soils under various farming systems are given. "Fertilizing Farm Crops," Pennsylvania Agricultural Extension Leaflet 26, should be very helpful to those interested in these questions in this State.

*"Commercial Fertilizer Law," Dept. of Agr., Tallahassee, Fla., Nathan Mayo.*

*"Commercial Fertilizers, Commercial Feeds and Agricultural Liming Material," State Inspect. Serv., College Park, Md., Control Series, No. 140, July, 1931.*

*"Nitrate Fertilization and Keeping Quality of Apple Fruits," Agr. Exp. Sta., Wooster, Ohio, Bul. 479, June, 1931, J. H. Gourley and E. F. Hopkins.*

*"Care, Use, and Economic Value of Farm Manure," Agr. Exp. Sta., Corvallis, Ore., Sta. Cir. 105, June, 1931, W. L. Powers and C. V. Ruzek.*

*"Fertilizer Report, 1930," Dept. of Agr., Harrisburg, Pa., Gen. Bul. 504, July 1, 1931, James W. Kellogg.*

*"Inspection of Fertilizers," Agr. Exp. Sta., Kingston, R. I., Ann. Fert. Cir., Sept., 1930, W. L. Adams and F. S. Schlenker.*

*"The Fertilizing Value of Greensand," Agr. Exp. Sta., Col. Sta., Tex., Bul. 428, June, 1931, G. S. Fraps.*

*"Potash in 1930," U. S. D. C., Washington, D. C., II:4, Aug., 1931, A. T. Coons.*

## Soils

The influence of fertilizer analysis and soil on the yield of sugar cane and sugar in Louisiana is reported by A. M. O'Neal and S. J. Breaux, Jr., in Louisiana Agricultural Experiment Station Bulletin 222, entitled "Soil Fertility Investigations, Sugar Cane District of Louisiana." The results of one year's fertilization work with nitrogen, phosphoric acid, and potash alone and in combinations based on the Schreiner triangle scheme are given for each of the soils studied. The responses to the several fertilizers varied with different soils, but in general, complete fertilizers usually were among the highest-yielding treatments. As this work is continued, valuable information should be furnished with respect to the question as to the best fertilizers for sugar cane in Louisiana.

The Soil Survey Reports of the Illinois Agricultural Experiment Station form a most instructive and interesting series of publications. In addition to the cartographic and soil descriptive sections, general principles of soil management are discussed and suggestions for the profitable handling of each individual soil are given. These recommendations and suggestions are based on actual field trials, as well as general knowledge. As a result, each survey report is a brief, but highly valuable and practical compendium of the soils of the county. Soil Report No. 49, "Wayne County Soils," by E. A. Norton, R. S. Smith, E. E. De Turk, F. C. Bauer, and L. H. Smith, is a worthy addition to this series.

*"Soil Survey of The Clear Lake Area, California," U. S. D. A., Washington, D. C., Series 1927, No. 13, E. J. Carpenter, R. Earl Storie, and Stanley W. Cosby.*

*"A Soil Management Program for Grundy Silt Loam," Agr. Exp. Sta., Ames, Iowa, Bul. 280, June, 1931, W. H. Stevenson, P. E. Brown, L. W. Forman, H. R. Meldrum, A. J. Engleborn, and R. E. Bennett.*

*"The Measurement of the Degree of Saturation of Soils with Bases," Agr. Exp. Sta., Ames, Iowa, Res. Bul. 139, May, 1931, R. H. Walker, B. J. Firkins, and P. E. Brown.*

*"Increasing Soil Acidity as a Means of Controlling Black Root-rot of Tobacco," Agr. Exp. Sta., Amherst, Mass., Bul. 276, June, 1931, Wm. L. Doran.*

*"Soil Survey of Lincoln County, Nebraska," U. S. D. A., Washington, D. C., Series 1926, No. 35, A. W. Goke, E. A. Nieschmidt, and R. C. Roberts.*

*"Studies on the Reaction of Greenhouse Soils to the Growth of Plants," Agr. Exp. Sta., Wooster, Ohio, Bul. 484, Aug., 1931, W. W. Wiggin and J. H. Gourley.*

*"Soil Survey of Butler County, Ohio." U. S. D. A., Washington, D. C., Series 1927, No. 12, Earl D. Fowler and T. C. Green.*

*"Drainage and Improvement of Wet Land," Agr. Exp. Sta., Corvallis, Ore., Sta. Cir. 102, Jan., 1931, W. L. Powers.*

*"Soil Survey of Manitowoc County, Wis-*

*consin," U. S. D. A., Washington, D. C., Series 1926, No. 34, A. C. Anderson, W. J. Geib, M. J. Edwards, H. H. Hull, and Merritt Whitson.*

*"Forest Types in the Southwest as Determined by Climate and Soil," U. S. D. A., Washington, D. C., Tech. Bul. 247, Aug., 1931, G. A. Pearson.*

*"Irrigation Districts, Their Organization, Operation, and Financing," U. S. D. A., Washington, D. C., Tech. Bul. 254, June, 1931, Wells A. Hutchins.*

## Crops

Among the references to experimental work done on the fertilization of various crops in the many publications received this month, several results showing the effect of fertilization on quality of crops are to be found. With quality of produce playing such a role in our present competitive markets, this work assumes unusual interest. For instance, the recently issued annual reports of the New Jersey State Agricultural Experiment Station and the New Jersey Agricultural College Experiment Station contain some striking photographs from work done to determine the effect of potassium deficiency on the growth of the beet. The investigations show that when the beet is grown with a deficiency of potassium, most of the potassium is localized in the root tip and the tips increase in length but very little in diameter. The beet responds anatomically and externally in essentially the same manner as the sweet potato and tomato with respect to a deficiency of potassium.

Further evidence that the fertilizer frontier is pushing farther and farther westward into the arid region where an adequate supply of water was once considered the prime factor in profitable crop production, is found in the annual report ending June 30, 1930, of the Nevada Agricultural Experiment Station. Experimental work in the well irrigated Las Vegas Valley of southern Nevada is being directed in an effort to advance a clear knowledge of the actual chemical nature and physical properties of these soils to secure improvement in their productive capacity by the use of manures and commercial fertilizers.

Tests of commercial fertilizers on vegetables, alfalfa, and orchard fruits were continued in 1929-30. Orchard fruits showed marked improvement in both quantity and quality of yields under treatment with potash and phosphorus. No increases in yield were traceable to the effect of commercial fertilizers on either asparagus or cantaloupes. However, carrots and onions gave marked increases following applications of potassium sulphate, although the soils in which they were grown appeared to be well supplied with potash. This raised a question whether previous increases in yields on vegetable plots treated with complete fertilizer might not have been due to the potash instead of to the nitrogen or the phosphorus in the fertilizer. In the present year's tests, neither nitrogen nor phosphorus gave any increases in yields.

*"Some Factors Which Influence Growth and Fruiting of the Tomato," Agr. Exp. Sta., Fayetteville, Ark., Bul. 267, June, 1931, Victor M. Watts.*

*"Home Floriculture in California," Agr. Ext. Service, Berkeley, Cal., Cir. 53, June, 1931, H. M. Butterfield.*

*"Growing and Handling Sweet Potatoes in California," Agr. Ext. Service, Berkeley, Cal., Cir. 55, June, 1931, D. R. Porter.*

*"Effects of Clover and Alfalfa in Rotation, Part III," Agr. Exp. Sta., Fort Collins, Colo., Bul. 363, Dec., 1930, Wm. P. Headden.*

*"Effects of Different Systems of Grazing by Cattle Upon a Western Wheat-Grass Type of Range, near Fort Collins, Colorado," Agr. Exp. Sta., Fort Collins, Colo., Bul. 377, July, 1931, Herbert C. Hanson, L. Dudley Love, and M. S. Morris.*

*"Native and Exotic Palms of Florida," Agr. Exp. Sta., Gainesville, Fla., Bul. 228, May, 1931, Harold Mowry.*

*"1930 Cooperative Extension Work in Agriculture and Home Economics," Agr. Ext. Service, Gainesville, Fla., Wilmon Newell.*

*"Georgia Mountain Experiment Station," Ga. Exp. Sta., Experiment, Ga., Cir. 92, June, 1931, H. P. Stuckey.*

*"An Investigation of the Quality of Illinois Grown Wheat," Agr. Exp. Sta., Urbana, Ill., Bul. 371, June, 1931, Robert W. Stark.*

*"A Gene Influencing the Composition of the Culm in Maize," Agr. Exp. Sta., Ames, Iowa, Res. Bul. 138, May, 1931, Merle T. Jenkins and Fisk Gerhardt.*

*"Genetic Tests for Linkage Between Row*

*Number Genes and Certain Qualitative Genes in Maize," Agr. Exp. Sta., Ames, Iowa, Res. Bul. 142, June, 1931, E. W. Lindstrom.*

*"Abstracts of Papers Not Included in Bulletins, Finances, Meteorology, Index," Agr. Exp. Sta., Orono, Me., Bul. 357, Dec., 1930.*

*"More Vegetables from the Home Garden," Ext. Serv. Univ. of Md., College Park, Md., Bul. 34, Rev. April, 1931, Fred W. Geise and V. R. Boswell.*

*"Peach Rejuvenation Studies in Maryland," Agr. Exp. Sta., College Park, Md., Bul. 327, May, 1931, A. Lee Schrader and E. C. Auchter.*

*"The Quarterly Bulletin," Agr. Exp. Sta., East Lansing, Mich., Vol. XIV, No. 1, Aug., 1931.*

*"More Alfalfa for Michigan," Mich. State Col., East Lansing, Mich., Ext. Bul. 23 (Rev.), Feb., 1931, R. E. Decker.*

*"Residual Effects of Fruit Thinning with the Lombard Plum," Agr. Exp. Sta., East Lansing, Mich., Tech. Bul. 112, May, 1931, J. H. Waring.*

*"The Fruiting Habit of the Peach as Influenced by Pruning Practices," Agr. Exp. Sta., East Lansing, Mich., Tech. Bul. 116, May, 1931, Roy E. Marshall.*

*"Spring Wheat in Minnesota," Univ. of Minn., St. Paul, Minn., Spec. Bul. 133, Dec., 1930, H. K. Wilson and R. S. Dunham.*

*"Grow More Soybeans in Minnesota," Univ. of Minn., St. Paul, Minn., Spec. Bul. 134, Dec., 1930, A. C. Arny and R. E. Hodgson.*

*"Barley in Minnesota," Univ. of Minn., St. Paul, Minn., Spec. Bul. 135, Oct., 1930, F. J. Stevenson, R. O. Bridgford, and R. F. Crim.*

*"Reed Canary Grass for Meadows and Pastures," Univ. of Minn., St. Paul, Minn., Spec. Bul. 137, Mar., 1931, A. C. Arny and R. E. Hodgson.*

*"The Home Vegetable Garden," Ext. Serv., Univ. of Mo., Columbia, Mo., Cir. 270, Mar., 1931, J. W. C. Anderson.*

*"Dairy Pastures," Ext. Serv., Univ. of Mo., Columbia, Mo., Cir. 271, Mar., 1931, J. E. Crosby, M. J. Regan, and C. E. Carter.*

*"Sudan Grass Production in Missouri," Univ. of Mo., Columbia, Mo., Cir. 276, June, 1931, C. A. Helm.*

*"Forty-fourth Annual Report of the Agricultural Experiment Station of Nebraska," Agr. Exp. Sta., Lincoln, Neb., Feb. 1, 1931.*

*"Dry-Farming Investigations in Northeastern New Mexico," Agr. Exp. Sta., State Col., N. M., Bul. 191, Mar., 1931, John Carter, Jr.*

*"Grape Culture," Agr. Exp. Sta., State Col., N. M., Bul. 192, Mar., 1931, A. B. Fite and A. S. Curry.*

*"Peach Growing in New York," N. Y. State Col. of Agr., Ithaca, N. Y., Bul. 208, Apr., 1931, G. W. Peck.*

*"Strawberry Culture," N. Y. State Col. of Agr., Ithaca, N. Y., Bul. 211, June, 1931, G. W. Peck.*

*"Studies of the Genus Delphinium," Agr. Exp. Sta., Ithaca, N. Y., Bul. 519, Apr., 1931, Earle I. Wilde.*

*"Outline of Agronomy Work Being Conducted in North Carolina," Agr. Exp. Sta., State Col. Sta., Raleigh, N. C., Agron. Inform. Cir. 62, Aug., 1931.*

*"Williston Substation Report, Apr. 1, 1930, to Mar. 31, 1931," Agr. Exp. Sta., Fargo, N. D., Bul. 248, May, 1931, E. G. Schollander.*

*"Emergency Pasture and Hay Crops," Agr. Ext. Div., Agr. Exp. Sta., Fargo, N. D., Cir. 100, Apr., 1931, T. E. Stoa and E. G. Booth.*

*"Selecting Show Corn in North Dakota," Agr. Ext. Div., Agr. Exp. Sta., Fargo, N. D., Cir. 105, Aug. 1931, P. J. Olson and E. G. Booth.*

*"Factors Affecting Fruit Setting I. Stayman Winesap," Agr. Exp. Sta., Wooster, Ohio, Bul. 483, Aug., 1931, Freeman S. Howlett.*

*"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, No. 152, Sept.-Oct., 1931.*

*"Austrian Winter Field Peas in Oregon," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 286, June, 1931, H. A. Schoth.*

*"Factors for Consideration in Standardization of Oregon Dried Prunes," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 291, June, 1931, Ernest H. Wiegand and D. E. Bullis.*

*"A Study of Tree Stocks in Relation to Winter Injury and Its Prevention," Agr. Exp. Sta., Corvallis, Ore., Sta. Cir. 103, May, 1931, Leroy Childs and Gordon G. Brown.*

*"Forty-third Annual Report of the Director of the Agricultural Experiment Station," Agr. Exp. Sta., Kingston, R. I., Contribution No. 406.*

*"Barley Production in South Dakota," Agr. Exp. Sta., Brookings, S. D., Bul. 256, Dec., 1930, K. H. Klages.*

*"Forty-third Annual Report, 1930," Univ. of Tenn., Agr. Exp. Sta., Knoxville, Tenn., Jan. 1, 1931.*

*"Sweet Clover Pasture," Agr. Ext. Serv., Univ. of Tenn., Knoxville, Tenn., Pub. 169 (Cir. 4—Rev.), May, 1931, J. C. McAmis.*

*"Forty-third Annual Report, 1930," Agr. Exp. Sta., Col. Sta., Tex.*

*"Citrus Culture in the Lower Rio Grande Valley of Texas," Ext. Serv., A. & M. Col. of Texas, Col. Sta., Texas, B-66,, June, 1927.*

*"Gardening," Ext. Serv., A. & M. Col. of Tex., Col. Sta., Tex., B.-70, Feb., 1931, J. F. Rosborough and Frank S. Jamison.*

*"Radishes," Ext. Serv., A. & M. Col. of Tex., Col. Sta., Tex., C-83, Jan., 1931, J. F. Rosborough.*

*"Annual Summary of Publications, July 1, 1930, to June 30, 1931," Agr. Exp. Sta., Logan, Utah, Cir. 95, July, 1931, Blanche Condit Pittman.*

*"Fifteenth Annual Report of Cooperative Extension Work in Agriculture and Home Economics," Agr. Ext. Serv., Burlington, Vt., Ext. Bul. 15, June, 1930, J. E. Carrigan.*

*"Wheat Varieties of Washington in 1929," Agr. Exp. Sta., Pullman, Wash., Bul. 256, July, 1931, E. F. Gaines and E. G. Shafer.*

*"Ladino Clover," Ext. Serv., State Col. of Wash., Pullman, Wash., Cir. 17, Aug., 1931, Leonard Hegnauer.*

*"Northern and Native-Grown Potato Seed Stock," Agr. Exp. Sta., Morgantown, W. Va., Bul. 242, June, 1931, K. C. Westover.*

*"Our Worst Weeds," Ext. Serv., Col. of Agr., Madison, Wis., Radio Circular, Aug., 1931.*

*"How Shall We Control Weeds?" Ext. Serv., Col. of Agr., Madison, Wis., Radio Circular, Aug., 1931.*

*"Making the Most of Oneida County Land," Ext. Serv., Col. of Agr., Madison, Wis., Spec. Cir., Apr., 1931, K. L. Hatch and H. M. Knipfel.*

*"Shelterbelts and Fruits," Agr. Exp. Sta., Laramie, Wyo., Bul. 179, May, 1931, A. L. Nelson.*

*"Report on The Agricultural Experiment Station, 1930," U. S. Dept. of Agr., Washington, D. C., July, 1931, W. H. Beal and H. M. Steece.*

*"Plant Material Introduced by the Division of Foreign Plant Introduction, Bureau of Plant Industry, October 1 to December 31, 1929," U. S. D. A., Washington, D. C., Inventory No. 101, June, 1931.*

*"A Simple Chemical Test for Predetermining the Culinary Quality of Potatoes as Affected by the Accumulation of Soluble Sugars," U. S. D. A., Washington, D. C., Cir. 158, Mar., 1931, Walter M. Peacock and Byron C. Brunstetter.*

*"Weeds—How to Control Them," U. S. D. A., Washington, D. C., Farmers' Bul. 660 (Rev.), June, 1931, H. R. Cox.*

*"Tomatoes as a Truck Crop," U. S. D. A., Washington, D. C., Farmers' Bul. 1338 (Rev.), July, 1931, W. R. Beattie.*

*"Glossary of Botanical Terms Commonly Used in Range Research," U. S. D. A., Washington, D. C., Misc. Pub. 110, July, 1931, W. A. Dayton.*

*"The Weather Bureau," U. S. D. A., Washington, D. C., Misc. Pub. 114, July, 1931, E. B. Calvert.*

*"Government Forest Work," U. S. D. A., Washington, D. C., Dept. Cir. 211 (Rev.), June, 1931.*

*"Harvesting Small Grain, Soybeans, and Clover in the Corn Belt with Combines and Binders," U. S. D. A., Washington, D. C., Tech. Bul. 244, May, 1931, L. A. Reynoldson, W. R. Humphries, and J. H. Martin.*

## Economics

Cost of production is a matter of serious consideration among all growers at the present time, and in figuring these costs, a usable system of keeping farm business accounts is necessary. To encourage the keeping of systematic accounts, the Agricultural Experiment Station of North Carolina has issued Bulletin 278 entitled, "The Farm Business Accounts." In it, G. W. Forster, Agricultural Economist, has outlined for the farm a workable system of keeping inventories and arriving at statements which will give a clear picture of farm assets and liabilities upon which to work. The bulletin will undoubtedly have a wide range of interest among producers and extension men.

*"Cost of Producing Rice in Arkansas in 1927," Agr. Exp. Sta., Fayetteville, Ark., Bul. 266, June, 1931, Orville J. Hall.*

*"Labor Efficiency in Planting and Harvesting on Eastern Connecticut Dairy Farms," Agr. Exp. Sta., Storrs, Conn., Bul. 172, Apr., 1931, Donald O. Hammerberg, I. G. Davis, Cecil G. Tilton, and Albert E. Waugh.*

*"Florida Truck Crop Competition," Agr. Exp. Sta., Gainesville, Fla., Bul. 224, Feb., 1931, C. V. Noble and Marvin A. Brooker*

*"A Market Research Bibliography," Univ. of Ill., Urbana, Ill., Bul. 38, Sept., 1931.*

*"The Trend of Corn Prices," Agr. Exp. Sta., Ames, Iowa, Bul. 284, July, 1931, G. S. Shepherd.*

*"Planning the Farm Business on Three Dairy-Fruit Farms in Massachusetts," Agr. Exp. Sta., Amherst, Mass., Bul. 275, June, 1931. R. L. Mighell.*

*"Planning the Farm Business," Agr. Exp. Sta., State Col. Sta., Raleigh, N. C., Bul. 277, June, 1931, G. W. Forster.*

*"Some Factors Causing Variations in Crop Production Costs in Putnam County," Agr. Exp. Sta., Wooster, Ohio, Bul. 481, July, 1931, John F. Dowler.*

*"An Economic Study of the Hop Industry in Oregon," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 288, June, 1931, George L. Sulerud.*

*"Cost of Wheat Production by Power Methods of Farming, 1919-1929," Agr. Exp. Sta., Pullman, Wash., Bul. 255, June, 1931, J. G. Klemgard and G. F. Cadisch.*

*"The Fall 1931 Agricultural Outlook," State Col. of Wash., Pullman, Wash., Timely Economic Information for Washington Farmers, No. 1, Sept., 1931.*

*"A Method of Determining the Volume and Tonnage of Haystacks," U. S. D. A., Washington, D. C., Tech. Bul. 239, June, 1931, W. H. Hosterman.*

*"Hedging in Grain Futures," U. S. D. A., Washington, D. C., Cir. 151, June, 1931, J. M. Mehl.*

*"Revised Regulations for Cotton Warehouses," U. S. D. A., Washington, D. C., Serv. & Reg. Announcement No. 126, June, 1931.*

*"Regulations for Warehousemen Storing Grain," U. S. D. A., Washington, D. C., Serv. & Reg. Announcement No. 127, June, 1931.*

*"Regulations for Warehousemen Storing Tobacco," U. S. D. A., Washington, D. C., Serv. & Reg. Announcement No. 129, July, 1931.*

## NEW VEGETABLE PEST IS SPREADING IN SOUTH

Add another to the worries of the truck grower.

The vegetable weevil, a new hardy, strong flying insect which has a healthy appetite for a wide variety of common garden crops is spreading in the Southern States and is known to occur in California, the United States Department of Agriculture reports.

This weevil is a small, grayish-brown beetle, about a third of an inch long. It was first found in Stone county, in Mississippi, in 1922. Since then it has spread to many counties in that State as well as to Louisiana, Alabama, and Florida, and in 1926 was discovered in the vicinity of San Jose, California.

The pest is a hardy flyer, and this makes it difficult to control its spread. Some of the plants which it attacks are turnip, cabbage, collard, carrot, mustard, spinach, beet, chard, radish, potato, tomato, lettuce, onion, parsley, parsnip, chickweed, mallow, pigweed, dock, and milk thistle.

Arsenical poisons will control the insect, but in such crops as lettuce the use of poison involves an element of danger. Poisoned bran bait as used for cutworms is partially effective during May and June.

## NOT ALL WHEAT

Winnipeg, Man.—The western provinces of Canada do not depend for their prosperity only on wheat. The magnitude of the wheat crop has tended to overshadow other branches of farm production which, by themselves, are quite important. Saskatchewan ranks second only to Ontario as a poultry province with an estimated production last year of 30,000,000 dozen eggs. The total value of poultry products to the farmers in 1930 is estimated by provincial authorities at $30,000,000.

Manitoba alone produces one-third of the annual honey crop of Canada. Last year this province produced 10,110,128 pounds of honey, ranking second only to Ontario in this respect. The extensive growing of sweet clover has made such a record possible. In Alberta and Saskatchewan production is increasing and reached 2½ million pounds last year.

Truck farming and market gardening around the towns and cities is a large industry employing thousands of families. In the summer season the local demand for fresh vegetables is fully met. Small fruits are being grown in increasing amounts and a considerable range of hardy tree fruits has been developed. Some local districts have gone in extensively for strawberry growing. A factor in small fruit growing on farms is the shelter belt. Over 100,000,000 trees have been sent out by the Dominion Forestry Stations for planting on prairie homesteads since they were established.

Of specialized crops perhaps the most important is sugar beets, now grown extensively on irrigated land in Southern Alberta. The sugar beet factory at Raymond is now the largest in Canada. It turned out 25,000,000 pounds of refined sugar from last year's sugar beet crop.

## NEW POP-CORN VARIETY POPS TO GREATER SIZE

Pop-corn specialists have surpassed the record of two blades of grass for one. Through selection, they have produced a new strain which pops to 26 times its volume.

The new strain, a yellow pearl popcorn named Sunburst, was produced during a 7-year period by agronomists of the United States Department of Agriculture in cooperation with the Kansas Agricultural Experiment Station.

They produced the new strain by testing ears of pop-corn and retaining for seed the ones which gave the greatest volume of popped corn. The test consisted of popping a sample of the seed from each of the selected ears and measuring the volume of the resulting popped corn. Each sample was also tasted for flavor and texture. The remainder of the seed on the good ears was kept and planted the following year. The process was then repeated.

Although the testing was a long job, it proved worth the effort in producing better popping corn. It took one man a day to test from 60 to 75 ears of corn. However, the new strain showed an average of 26 times the volume of the seed when popped, while Queen Golden, the variety from which Sunburst was developed, gives slightly more than 19 times the volume of the grain.

Such careful selection of seed, while not practical for the small grower, has possibilities for the commercial grower of pop-corn seed, declare the agronomists who made the Kansas tests.

## MAINTAIN FERTILITY

One of the most significant results of experiments carried on for the past 50 years on the soil fertility plots at the Pennsylvania State College is the convincing evidence that the fertility of the soil may be maintained by the use of commercial fertilizers and lime, without the use of manure, declared Dr. S. W. Fletcher, director of agricultural research, in a recent radio address. There is no good reason, he said, why the farm lands of the United States should not be fully as productive 2,000 years from now as they were when first brought under the plow.

## SPORES IN UPPER AIR

Scouting trips with airplanes show that spores of certain plant diseases are often found at heights of 10,000 feet in the upper air. This is one explanation for the spread of such diseases as black stem rust of small grains, say specialists of the United States Department of Agriculture.

Investigators working with white pine blister rust have found that spores of that disease falling in a perfectly still atmosphere from a height of 1 mile require 55 hours to reach the earth. Such experiments make it clear that plant disease may be blown for long distances unless brought down by rain or some other agency.

## WASHINGTON SAYS FARM ECONOMIES BEING EFFECTED IN STATE

R. M. Turner, Washington State College extension economist, reports that "Washington dairymen are cutting feed costs by growing more high quality home-grown feeds and permanent pastures. The wheat farmer is allowing his less productive acres to go uncultivated or turning them into pasture. Profitable substitute crops are being sought in growing peas, sweet clover, vetch, flax, beans, Australian winter field peas, and other seed crops. More livestock feeds are being grown. A change to more hogs and beef cattle in eastern Washington is being brought about mainly as a result of the favorable feed-livestock ration. Poultrymen are studying their farm records and management problems more closely. The quality of the chicks and pullets reared is improving. Orchardists are planning to study cost records closely, apply as much fertilizer as necessary, and give particular care to their cover crops.

"Marketing adjustments," says Mr. Turner, "involve a more direct marketing wherever feasible, and an increased interest in public markets. The bulk handling of grain, strengthening of cooperative marketing in certain fields, marketing less bulky and more concentrated products, offering highly graded products to create a market demand, establishment of canneries to utilize more truck crops and fruits, and the producing of what the consumer wants are some of the answers to the marketing problems."—*U. S. D. A. Marketing Activities.*

# Potash Starvation of Cotton

*By R. A. Wasson*

Extension Agronomist, Louisiana State University

WORD having been received by the College of Agriculture regarding the seriousness of the cotton situation in the Prairie Belt of Southwest Louisiana, a tour of this section was made on August 17th and 18th by Dean J. G. Lee, Jr., of the College of Agriculture, Dr. A. H. Meyer of the Experiment Station, Mr. R. A. Wasson, Extension Agronomist, and Mr. A. C. Morris of the N. V. Potash Export My., Inc. We found thousands of acres of cotton all the way from knee to waist high literally dead in the field with bolls cracked open and rotting on the stalks and a bad infestation of cotton rust in practically every case where no effective means of control had been used.

However, as serious as the situation is for this season, there is no reason why it cannot be brought under complete control in the future. I say this because we observed ample evidence that an application of 72 pounds of soluble potash obtained from a mixture of 600 pounds of a 4-12-12 fertilizer apparently had this diseased or adverse condition under almost perfect control with very little evidence of rust on areas fertilized with this mixture and a good yield of high quality cotton assured.

It is possible that an even larger application of potash might be very advantageous and Dean Lee said that he would urge tests of this kind to be included in the investigations of the Experiment Station. Dr. Meyer states that the chief source of trouble is "Potash Starvation" and we further observed that large applications of nitrogen and phosphate without potash had very little if any effect in preventing the dying of the cotton or increasing the yields.

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# The Importance of Pastures and Mineral Matter in Feed

(*From page* 22)

tions also exist. From the experimental data available at the present time, relative to the supplementary mineral feeding, Professor Nils Hansson, in an address before the Royal Academy of Agriculture, Sweden, concludes that the question of supplementary mineral feeding to farm animals is a local, or sectional, one within each particular country.

Experiments have demonstrated that under certain conditions mineral supplements added to a feed can be beneficial, but unscrupulous persons have seized upon that fact and tried to apply it to feeding universally, in order to swindle the farmer, selling him mineral mixtures at fabulous prices. Hansson mentioned by name one mixture which sold at about 59 dollars per hundredweight. Should in practice really a mineral deficiency exist in a cow's feed, common bonemeal, or even a cheaper mineral supplement if tried, might possibly be found to answer the purpose as well or better than the fabulously high priced mineral mixture.

Hansson cited some instances of how, in certain localities in Sweden, animals habitually got sick, went down in production, and often failed to reproduce, and that such cases got better when given hay from other localities. Thus the trouble could be traced down to a local deficiency of available minerals in the soil upon which the feed was grown. A permanent remedy for the trouble with the cows here suggests itself, namely: to improve the soil and to it apply the needed elements. Both plants and animals will then become normal.

It has frequently been observed in various places, that a general run-down condition of milking cows exists after long periods of stable feeding, notably in the springtime. Such a condition can now often be ascribed to faulty mineral supply in the feed used. From such a condition the animal recovers quickly, regains its vigor, and obtains mineral supply for its full capacity milk production, when turned out upon good pasture.

A good pasture is, therefore, for dairy cattle especially as repeatedly emphasized by Hansson, a most excellent remedy whereby the bad effects of mineral deficiency in the feed can quickly and satisfactorily be counteracted, and the animal be prepared better to withstand periods of scarcity, by the storing up to capacity a reserve supply, so to speak, of mineral matter. In this then is found an additional reason why it would be worth while to keep up the old pastures or to prepare new ones.

# Delano Likes Potash

(*From page* 24)

3-acre field which was in tomatoes and of which one-half was used for the three half-acre demonstration plots, it was very striking to notice the increase in soybean hay on the high-potash part of the field. Four loads were taken off the 1½ acres which were fertilized with 4-12-4, and 6 loads from that part where 5, 10, and 15 per cent potash were used.

Mr. Delano has about 100 turkeys which are thriving on 23 acres of good clover resulting from his fertilizer practices.

# Productive Peat Farming

(*From page* 30)

protect crops from frost on peat areas has not been found successful.

Probably the most effective means of insuring peat land crops against injury from early or late frost is by the use of commercial fertilizer. Properly nourished crops have been observed to withstand several degrees lower temperature than crops not adequately fertilized. The Michigan Agricultural Experiment Station authorities attribute the resistance of fertilized crops to frost both to the greater growth of the foliage attained and also to the increased concentration of the plant juices which fertilizers produce. Of course, as pointed out by A. R. Alberts of the Wisconsin Agricultural Experiment Station, no method of soil treatment can prevent crop injury when the temperature falls considerably below the freezing point.

While it is sometimes temporarily possible to grow fair crops on upland mineral soils by depending solely on the natural fertility of the land, it is not possible to get similar results on peat or muck soils. This is because they are by reason of their origin out of balance plant-food-wise. Being largely organic in nature, all peat lands are deficient in the mineral elements and these must be supplied in the form of commercial fertilizers if profitable crops are to be harvested. In most cases lime, available phosphoric acid, and potash are the main peat soil plant-food deficiencies. Nearly all peat soils whether acid or sweet respond to potash treatment with available phosphoric acid ranking as the second requirement.

For grass the most popular mixed fertilizer ratios in use by peat land farmers in the northwest are 0-10-20 or 0-15-30 mixtures. In the case of potatoes a mixture such as an 0-9-27, and on the older farmed soils a complete fertilizer as for example 2-9-27 or 3-9-18, are commonly used. When growing truck crops like onions, carrots, cabbage, and celery more available phosphoric acid and less potash is favored. The most commonly used fertilizers for these crops is an 0-14-14 or a 2-14-14.

Regardless of the crops grown, most of the commercial fertilizer applied to peat soils is broadcast. However, there is evidence accumulating that for hoed crops such as potatoes and corn, hill fertilization or at least a combination of drill and broadcast treatments is best.

### *Unique Practices*

There are a number of practices followed by peat-land growers which are unique. For instance they prefer to plant potato seed that has been grown on mineral soil. Conversely the smooth, well-shaped tubers that well-fertilized peat soil produces are always in demand as seed by mineral soil growers.

In the Northwest at the present time there are undoubtedly more acres of peat or muck soils being cleared and put under the plow than any other type of soil. This is probably because where marsh lands constitute a part of the farm, its culture assures good yields of hay, corn, and grain in seasons when upland crops are likely to suffer from drought. Then, too, by feeding crops produced on the low lands and using the manure for applications to the mineral soils, the maintenance of productive acres over the entire farm is simplified.

No soils respond more markedly to fertilizer treatment than peat and muck soils. In fact, the Wisconsin Agricultural Experiment Station authorities advise farmers to depend entirely on the use of commercial fertilizers to make the

Although most farmers apply commercial fertilizer broadcast on peat soils, planters for distributing plant food in the row for cultivated crops are rapidly coming into favor.

Fertilized barley at the left and right clearly shows how good yields of grain can be secured on peat land with a small investment in commercial plant food.

most of their low lands. By actual test it has been found that whereas 15 tons of manure valued at $22.50 produced 10.5 tons of silage corn on peat soil, an application of only $10 worth of fertilizer yielded nearly 14 tons. Furthermore, the residual effect of the fertilizer was much greater than that of the manure on succeeding crops. For this reason farmers are advised to apply commercial fertilizers to their peat lands, and use the manure produced on their uplands.

Utilization of the low peat and muck land, which has heretofore caused irregular fields, entailed tax burdens without adequate return, and generally increased the cost of operating the farm, is a type of land improvement many farmers of the northern part of this country are now accomplishing. A Minnesota farmer, who recently developed a strip of this kind of land, remarked, "Talk about black magic—well the way those peat acres produce is miraculous. A few sacks of fertilizer to the acre and the most inexpensive kind of cultivation have transformed my waste acres into the most profitable field on my farm."

Successful peat land farming is a relatively new art, but the trail has been blazed and the wide-awake are following it with success.

# Potash and Plant Nutrition

(*From page* 10)

it is used in this very economical way, damage occurs and growth is seriously curtailed and yields cut down.

Crops may suffer potash hunger more prevalently on certain types of soil. Peat soils are commonly in need of potash, because they are low in those minerals from which available potash originates. Even soils abundantly supplied do not always give it up readily. Poorly drained or waterlogged soils do not readily give up potash nor other minerals to most farm crops.

Potash is a very important factor in determining the quality of certain types of crops. Tobacco grown for smoking either in the pipe or in the most expensive cigar must be liberally potash fed. This is essential to give the tobacco the best burning qualities. The carbonate of potash, or even the ash from good tobacco, if well rubbed into "mineral free" cellulose filter paper, will cause the paper to burn with a similar glow as a good cigar. This indicates the great influence of potash on burning qualities.

Edible fleshy foods are more succulent and delectable when potash is abundantly available for the growth processes. Potash hunger on the other hand results in a stiff and woody tissue that matures and ripens before proper development occurs. But during the early stages of growth, if potash hunger can be detected, recovery is rapid when a soluble form is applied to the soil about the plant.

As soils become exhausted by continuous cropping and it becomes necessary to use more and more of fertilizers in general, it likewise becomes necessary to give more attention to the use of potash. When stable manure and wood ashes were in common use, both supplied potash in a very available form for crop production. With the passing of farm manure (a complete fertilizer, and yet perhaps not a "sufficient" fertilizer) potash will of necessity come in for more attention.

# Market Gardening

(*From page* 28)

ply 150 to 300 pounds per acre of quickly available nitrogen-carrying fertilizers.

And so the story goes. There are certain things which one man can do and does and which another man neglects to do. The one grower is successful and the other succeeds also, but to a lesser degree. Chief among these things are the matters of planting efficiency, cultivation efficiency, and soil-building efficiency. The latter requires the most attention because it has been the most neglected in the past. Labor-saving, timeliness in planting, weed destruction, moisture conservation, additions to the soil's supply of organic matter, and the use of balanced complete fertilizers or the use of incomplete fertilizers plus additions of nitrogen as side-dressings are all factors in the present-day, gardening operations, which require knowledge and skill and which go into the success of a market gardener.

# Potash Prevents a "Run On the Bank"

(*From page* 21)

applied to good advantage. Phosphate and potash are essential and in a good many cases some nitrate may be used profitably.

"A mixture known as the 3-18-9 is commonly used, but others carrying more potash will probably be better, such as a 3-12-12, 3-15-12, or 3-20-20. On muck soils a phosphate-potash fertilizer, as an 0-20-20 or an 0-15-30, may be used instead of complete mixtures, although a small amount of nitrogen is frequently desirable on these soils.

"The pea crop is handicapped in having a rather small root system with only a limited capacity for extracting plant food. Then, too, the crop has a growing period of only 60 to 70 days, so that a fertile soil is essential. An 0-16-8, 0-21-9, or 0-30-15 are mixtures well balanced for peas.

"It is commonly believed that an application of 800 to 1,000 pounds per acre of commercial fertilizer should be more commonly used on tobacco. A 2-12-6 formula is usually recommended, though there are good reasons for using more concentrated fertilizers. Sulphate of potash should be the predominating form of potash used in the fertilizer. It is believed that one-third of the total potash may be present as muriate of potash thus getting the beneficial effect on yield, without any harmful effect on the quality of Wisconsin tobacco.

"Melons, cucumbers, tomatoes, and other truck crops can be grown successfully on the sandy soils, but they should be included in a rotation including legumes. Commercial fertilizers for these crops should contain liberal amounts of potash; and for melons, cucumbers, and tomatoes it may often be necessary to side-dress during the growing season with some quickly available nitrogen fertilizer."

Mr. Chapman also believes that a lack of potash is often responsible for many failures with alfalfa and clover. He points out that we all know how well alfalfa or clover grows in spots where brush piles have been burned or where straw stacks or crop residues have been burned, and that this condition is due largely to the fact that there is considerable potash in the ashes left behind.

The lack of potash has been accentuated in soils, Mr. Chapman believes, because farmers have been using fertilizers relatively high in phosphates, in many cases using the straight phosphate fertilizers. This means that there has been a heavy draft on the reserve of potash all the time due to the stimulation in growth where the phosphate has been used. Such potash deficiencies may result in lodging of grain, weak, spindly corn and other crops, white speckling or fringing of alfalfa leaves, the bronzing of sugar beet leaves, and even root rot and other diseases.

# Burning the Woods

(*From page* 11)

tree, especially if it happened when conditions were favorable to its rapid spread. In fact, small areas had recently been purposely burned as a part of the experiment, under controlled and uncontrolled conditions, and when this burning had been done without control, fully 80 per cent of all timber had been killed outright. When the time of burning had been less favorable to making a hot fire, as when the roughage was slightly damp, no saplings of any size were killed and there was no damage apparent to remaining saplings. Annual burnings under controlled conditions, where cattle had grazed at the rate of one animal to ten acres, had destroyed practically no timber, for the simple reason that there had been too small an accumulation of roughage to make a hot fire.

Casual observations in looking over this experiment would certainly convince the non-expert that the best plan for reforestation under existing circumstances is in grazing the land as much as possible so as to keep down any great surplus of grass, then, if advisable, burning the yearly accumulation of grass and straw at such time as to do the least harm to the young trees. In fact, after observing the small long-leaf pines present on burned and unburned areas, we found no material difference in stands. On similar areas that had been pastured, the effect of annual fires was still less apparent on the young long-leaf pines. Whether the same thing would be true in growing other varieties of pine, we are not prepared to say.

M. D. Tate, an adjoining landowner to the experiment station, has been guided by this experiment and has placed cattle on a section of land wellstocked with young long-leaf saplings. Where fire from the railroad had formerly been a constant menace in the heavy rough of unburned grasses, the cattle, after two years grazing, have reduced the rough to a point where no serious fire could occur, and the pine straw could now be burned off without danger of the loss of trees.

Preliminary figures covering several years, giving results of grazing cattle on burned and unburned areas in this experiment, show that much better gains were made from the burned portion, possibly due more to the fact that grazing was made easier where there was less rough and dead grass to interfere. At any rate, even pine timber grows slowly, and if reforestation is to be practiced by individuals rather than by the State, such annual income as may be had from the grazing of cattle seems imperative. Annual taxation and loss of income from invested capital makes the cost of timber mount high when there is no annual offset such as may be had from the grazing of cattle.

So, this experiment would indicate that the average South Mississippian has had some reason back of the general practice of firing the woods and his insistence on grazing cattle and sheep on the ranges, granting he may have abused the privilege by failing to adopt some systematic method of setting these fires when they would do the least harm to growing timber.

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# Community and Industrial Gardens

(*From page* 8)

munity garden work in Muncie has been the development of a strictly business system in all public relief, social welfare, and employment work. As administrator of the public poor fund, the Township Trustee advertised for sealed bids on his winter requirements of coal for poor relief, and the contract was awarded at a price which will actually save the taxpayers $23,000 on a tonnage similar to that used last winter. If more is purchased, the saving will be greater.

The Trustee also buys his requirements of shoes in the same way, and thereby saves the taxpayers $1.45 per pair. Much of the clothing needs of the Trustees are supplied by the purchase of materials which are turned over to the home economics classes in the schools for the making of the garments required. One school in the city acquired a barber's outfit and cobbler's tools, and the Trustee assigns unemployed barbers and shoemakers to cut the hair and repair the shoes of the children of the unemployed in that school district.

The food orders of the Township Trustee are now redeemable at any grocery which follows instructions and cooperates in avoiding impositions, and are not simply passed out to a selected few as political favors. The Trustee has removed all doctors from the township payroll, and substituted a medical plan which renders efficient service at a uniform and economical cost. Nursing service is rendered families unable to pay for nursing care.

While the Muncie Community Gardens, because of the intensive and effective community organization set-up, deserve detailed mention, other Indiana cities have by no means been idle in community garden activities. However, we can only list a few:—Wabash has some 600 unemployment gardens and five acres of community gardens; Jeffersonville, 27 acres of community gardens, operated by unemployed labor, and 16 acres divided into family employment gardens; Kokomo, 10 acres of community gardens for unemployed and 2,000 supervised home gardens; Gary, over 500 unemployment gardens and several acres of community gardens tended by unemployed workers; Richmond, over 400 employment gardens and 7 acres of community gardens. Some creditable work has also been conducted in Anderson, Hammond, South Bend, and Marion.

Wherever the community and industrial garden has been made a part of the unemployment relief-aid work, with the interest and active cooperation of the Township Trustee, a material saving of public funds has resulted, surplus labor has been advantageously utilized, the family food supply of the unemployed has been increased, taxes have been saved, and everybody in the community has been benefited.

# Weed Control Visualized

(*From page* 14)

Most broad leaf plants, particularly those with leafy stems, do not withstand frequent cutting. The leaf is the manufacturing center of the plant and without the green leaf surface the plant cannot live and grow.

Mowing should be done twice a year. The first cutting should be made in June at which time the sickle bar should be held up to cut the plants high, some six inches from the ground. A single mowing, however, is of little avail against such weeds as chicory, wild carrot, and white top, because these species have a habit of stooling and producing seed so close to the ground as to be out of reach of the sickle. By making this first cutting high, the plants have a tendency to obtain greater height. As soon as the second crop is in blossom, the mowing should be close to the ground and the chances are that a third crop cannot set seed before frost.

Where pastures are infested with scattered specimens of heavy-rooted plants as ironweed, dock, mullen, and burdock, digging with a spade or spud is a practical means of control. The spud is a chisel-shaped implement that is very convenient for this purpose. At first sight digging weeds in the pasture may seem like an endless job, but upon trial surprisingly fast progress can be made. Plants of this type make a colorful appearance due to the large leaves, while in reality they may only be few in number.

Does it pay to reseed pastures and lawns each year to thicken the stand of grass? The answer is "No." If there is a semblance of bluegrass, money spent for fertilizer will give greater returns than that spent for

It is a sad mistake to put lime on the lawn in spring or any other time.

seed to be used in annual seedings. On the other hand, if the lawn or pasture is a mat of weeds and undesirable grass, the result of poor seed, it will be necessary to plow up the sod and start over again.

In summarizing we can say there are three essentials to weed control in grassland areas. First, start the lawn or pasture out by sowing good clean seed, purchased from a reliable seed firm. Second, weeds should be clipped to prevent seed formation and reduce their leaf surface. It is not sufficient to cut weeds in the immediate field but to clean up such weed nurseries in fence rows, roadways, and waste places where millions of weed seeds can be produced each year. Last, but not least, fertilizing the grass will keep it growing and crowd out the weeds. Make conditions ideal for its growth and much of the weed problem will take care of itself.

# The Inquiring Mind

(*From page* 18)

atory in the spring of 1875, while Professor Atwater of Connecticut opened his in October 1875. Professor Wickson added: "His priority is 'not so deep as a well, nor as wide as a church,' but 'tis enough."

Dr. Hilgard began his experimental work on an appropriation of $250; then the legislature of 1877 gave him $5,000 for two years; and that of 1879, an additional $5,000 for two years. But indomitable Hilgard kept working away, and in time appropriations were made liberal and sufficient. The United States Government also gave him not less than $25,000 to spend in his cotton work, one wide-reaching result of which, it has been said, "was that it made California famous."

Prior to 1890, Dr. Hilgard established several outlying substations for the study of soil and culture problems. Among his California activities, his studies on humid and arid soils stand out prominently. He was the first to point out the differences in depth and in physical and chemical characteristics, and to explain endurance of drouth by cultivated crops in arid soils, and why sandy soils are among the most productive in the arid region and the least so in the humid. He, likewise, made important researches into the cause and occurrence of alkali salts, their effect on vegetation, and especially the methods to be used in their neutralization and the reclamation of the land in which they occur.

Dr. Hilgard for many years tried to secure funds to prosecute a soil survey of California, and his failure was a great disappointment. From information obtained through numerous short trips, from Farmers' Institutes, and from other sources, a large map was prepared, showing in colors the chief agricultural regions of the State and thus excellently fulfilling the purpose. It was exhibited at the Paris, Chicago, and St. Louis expositions.

It is said that Dr. Hilgard was the first to interpret the results of analyses of soils in their relation to plant life and productiveness, and also the first to maintain that the physical properties of a soil are equal in importance to the chemical in determining the cultural value. (Prof. R. H. Loughbridge)

In addition to his many other accomplishments, Dr. Hilgard could converse fluently in German, Spanish, English, and French, and could easily read Sanskrit, Greek, Latin, and Portuguese. He was also a prolific writer and an intense lover of music. In addition to formal reports and memoirs, he wrote much for agricultural and scientific periodicals. His greatest book is *Soils of the Arid and Humid Regions.* The simple form of this work is *Agriculture for Schools of the Pacific Slope,* written in collaboration with Professor Osterhout, formerly of the University of California.

His masterly achievements brought Dr. Hilgard wide recognition and many honors. Mississippi, Columbia, and Michigan Universities, as well as the University of California, bestowed upon him the degree of Doctor of Laws. The Academy of Science of Munich presented him with the Liebig medal, and the International Exposition at Paris in 1900 gave him a gold medal as a collaborator in the same research. He was, at one time, invited to accept appointment as U. S. Secretary of Agriculture, but he preferred to remain in the service of the State and institution to which he had given the best part of his life.

It has been recorded that the last years of Dr. Hilgard's administration were his best years; his position of leadership was unquestioned; his physical strength seemed greater than during his earlier periods; the demands for instruction and the opportunities for research were multiplied. He labored like one who was realizing the results he had long desired, and his heart was light as his time for greater achievement had come. In the fullest warmth of popular appreciation, and with the truest loyalty and devotion from scores of associates, whom he had chosen for particular purposes, he did his best work for agriculture in the University of California, by making the greatness of its future secure.

Professor Eugene A. Smith of the University of Alabama accounted him one of the most lovable of men. His extraordinary fund of general information along with his cheerfulness and vivacity, notwithstanding the handicap of a rather frail constitution, made him a delightful companion, and his letters, even on technical or scientific matters, were always enlivened by humorous and witty remarks, so that they were truly good reading.

And, withal, he was a cultured Christian gentleman. At the time of his passing, his associates scarcely could bring themselves to believe that he had really departed to that "undiscovered country from whose bourn no traveller returns." "To me," said Prof. Wickson, "he is still here, loving and revering his God, laboring for the good of his fellowmen, enjoying the companionship of his friends and loved ones—still here, alert, tireless in work, full of strength and grace in thought and speech, cordial, considerate, and delightful in associated effort." Now these friends are reunited, for on July 16, 1923, Wickson, too, entered upon his eternal rest.

Surely it is well for us to recall, remember, again record, and ever cherish the memory of inspirational leaders, such as Dr. E. W. Hilgard.

He fought a good fight; he finished his course; he kept the faith!

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# New Altitudes

*(From page 4)*

once charged some lime-crushers a dollar a day for plain provender, served table d'hote.

"I used to think I could cook pretty good, but dear me, I'll never think so again!" she remarked, dipping her stubby calloused fingers in the silver bowl at the meal's end.

After a week of absolute idleness, except for her knitting, and being served and catered to by bowing masculine waiters, this observing lady astounded the staff of a Seattle hotel with the shrill remark, "I just can't get used to having men waiting on us at meals and pouring and handing things around so nice. Why, back home our menfolks won't even carry a coffee pot from the kitchen to the breakfast table."

You know back home we have shiners, perch, and small bass for an occasional finny treat. Aboard the cars and at coast caravansaries they served us juicy steaks of halibut, salmon, and kindred dainties largely unknown to the Midwestern Waltonite. On her way home this determined grandma bought fifteen pounds of cured salmon and thrust it hodgepodge among her lingerie in the somewhat battered suitcase under the berth. Some fastidious person casually inquired if she didn't think the rancid odor might permanently pervade her clothes.

"Why, bless you, I have a good electric washer in my basement; and believe me, I want to fetch home enough ocean fish to give those silo-fillers a treat." Ere this was written a lusty band of corn harvesters sampled something edible from the Pacific ocean that didn't come in tins.

I HAVE gone on quite a few pretentious excursions, mostly with folks who were "terribly used" to travel and who sought relief from boredom in divers worthless pastimes. Next to one memorable trip east with a party of rural pupils, this one I am telling about provides the most delicious memories.

Gazing across the mighty Columbia from a point northeast of Portland, a work-weary farmer said to me, "So that land across there is Washington State. I remember in district school how I used to draw colored maps and trace the Columbia river boundary between these two great States; but I never thought I should see it myself. Pinch me!"

Going through the long Cascade tunnel that strips more than thirty winding upland miles from the empire express route, another man smiled and said, "I heard all about this on my radio last winter. They used to say a fellow could change his shirt in an ordinary tunnel, but I think we might shift off our B. V. D.'s in here before daylight."

First nights in the sleeper carried their share of novelty for many who were not used to "sleeping in a hammock." I doubt if there is another anecdote to match our incident of the farmer friend who boarded the train at midnight, and asked the porter for a ladder to climb aloft to an upper berth. The ladder could not be found. As they discussed its absence, a head peered out of a near-by top-loft, and a sleepy voice exclaimed, "That's all right, brother, if you can't locate your ladder you can borrow this one," and he shoved the end of the missing accessory out between the curtains of his bunk. "I'm used to getting up at four o'clock and having an early breakfast," he stated.

BUT the joyful part of this fortnight lay rather in the candor and frank appreciation with which our rural tourists received impressions of the journey. There was none of your make-believe sophistication. As I sat one day amid the vistas of delectable mountains, crashing over rushing caverns foaming with angry waters, glimpsing leagues of fir and pine soaring to the heavens, I carefully watched a brother and sister in an adjacent seat.

Neither of them was ever talkative, and they were single. Oblivious of anything but the panorama before them, I noticed their relaxed faces and saw the brother reach over and clasp his sister's rough hand with mist gathering in his eyes. This was what they had dreamed about through long winters around the fireside. He had told me previously that his father made the transcontinental trip with a team of horses during the gold rush of 1849, and that it took three months. Doubtless they were thinking of the weary Oregon trail and the little lonely campfires that once marked the patient journey of their sire through the same glorious country so long ago.

Then there was friend Oscar, a widower who got his own meals early and late between hard hours afield, and who confided in me that the trip would have been utter perfection had his helpmeet lived to share it with him. This was his first vacation of any kind, he having been bound out for farm apprenticeship as a boy of seven, homesick all week for the few hours vouchsafed to him on Sundays at home; and later obliged to carve out a farm for himself after spending ten years of young manhood getting his father out of debt. As he scrambled out of the sleeper at the end of the jubilee, I saw him standing on the crazy little home-town platform looking rather wistfully after the observation car as it departed, carrying with it memories of his only fling at freedom.

ONE of the points about our party which the trainmen noticed was that none of the women smoked cigarettes and they all chose to play five hundred at cards instead of bridge. Despite that modern handicap, these people seemed to enjoy a certain rainy day spent in the ultra-modish living room of a popular mountain resort, where a few lorgnettes were leveled at them by curious newly-rich bored with hotel bears, pony rides, and golf.

Our party was perhaps thus made conspicuous to the best-paying guests because of the clothes that they did *not* assume rather than the ones they wore as best they could. That is, there were no plus-fours, swanky outing jackets, rakish caps, or modish skirts in our ensemble. Each person left home fitted for a very special occasion, which meant wearing the store clothes ordinarily kept for weddings, funerals, or church service.

We had a good time although we may not have been outfitted in the mode of the seasoned resorter. I doubt if we could have escaped this very readily. For if the farmer goes afield for freedom and ease he wears overalls and calico, no necktie, and a straw hat. To have insisted, therefore, upon native freedom en route would have suggested the caste of the Old Homestead.

Possibly at some future time when lands are owned and worked by baronial overlords again it will be feasible to invite agricultural tourists to don outing duds like brokers and bootleggers. But under the present system on the farm you are either dressed to "swill" or dressed to "kill." There is no half-way lounging outfit, designed strictly and solely for idleness on the farm. Rural America hasn't raised its living standard quite that far as yet.

BE not deceived, however, and think for a moment that one iota of the joy on this excursion may have been marred by the winks of the onlookers. Our aforesaid matron of advanced years and lively spirit would have broached the subject of polo ponies with the Prince of Wales, H. R. H., had she discovered him on some divan within reach of her inquiring mind. As it turned out, she cornered two wealthy dowagers by the fireplace and asked them pointblank what they thought her gingham dress, trimmed in red braid, cost her laid down. She made them swallow their fags pronto at mention of "less than two dollars," and before they got their breath again she was relating the success of a niece who graduated from the business college.

And the way these folks made friends and discovered old acquaintances all the way from Grand Forks to Portland! Your blasé traveler seldom does this because he is engrossed in self and anticipates no friendships.

Perhaps the climax of it came when Oscar came into the car with one arm around the shoulder of a grizzled news-butcher, introducing him as "an old school chum of forty years ago." Really these farm folks had the makings of excellent journalists because they never missed a chance to link their own lives with that of strangers in a far land.

LEST I stray too far from the mountains and the high altitudes to which they led us mentally and spiritually, I would mention an unaccountable fact, something that could not have happened on any similar excursion, had it been made up of city people.

It is this: that during two weeks of sojourning together and interchanging farm experiences there was never in any conversation to my knowledge a single reference to the hard times that is echoed on every hand. Possibly they reserved that for the creamery and the cross-roads store, but anyhow the relief was real and deeply appreciated. They did not allow profit and pleasure to get into any jam.

And so when we stared in awe at the ramparts of Heaven's peak from the colorful Garden Wall in Glacier Park, was it not a good time to think a thought or two anent the tabooed subject?

Verily a geologist would have done us a good turn, for he could have reminded us how many countless centuries that awful mass of rock had withstood the tempests and come through unscathed to bathe its palisades in the brilliant sunshine. He could have told us that the mountain lived through the conquests of Saul, Attila, Alexander, Hannibal, Napoleon, Bismarck, Washington, and the great Duce of Rome. He would have said that the petty quarrels of mankind and their peaks and valleys of price chartings and car loadings counted for no more than the squeak of a marmot among the rocks in the valley. He would have suggested that nothing could disturb the mountain except the drying up of its frigid ice fields or the refusal of the sun to rise and set or the earth to move in its orbit.

SO we of the provincial group of soil workers somehow felt akin to the certainty of elemental things, realizing that man is pretty small potatoes in the canyons of the Cascades and that if he can't be happy it is rather because of the things within him instead of the physical world he lives in.

And back homeward we came, with wrinkled linen and plenty of souvenirs, calling each other by our first names and giving a hearty "cheerio" as each member dropped off the train into the waiting flivver drawn up to take the prodigals back to the realm of chores and perplexity.

We ascended some six thousand feet into the higher altitudes from a native heath boasting not quite five hundred above sea level. How much higher each man's spirit was carried it is beyond me to guess, but if you should ask me what form of farm relief is best for rural America I have an answer.

# A Few Whinnies


### PERFECTLY SAFE

Old Lady (to street car motorman): "Please, Mr. Motorman, will I get a shock if I step on the track?"

Motorman: "No, lady. Not unless you put your other foot on the trolley wire."

---

Wife (after dull evening at home) —"Don't sit there like a dud! Say something!"

Husband (brightly)—"Well, well, well. I see Mr. Hoover has had his picture taken."

---

Several Scotchmen were discussing the domestic unhappiness of a mutual friend.

"Aye," said one, "Jock MacDonald has a sair time wi' that wife o' his. They do say they're aye quarrelin'."

"It serves him richt," said another feelingly. "The puir feckless creature marrit after coortin' only eight year. Man, indeed, he had nae chance to ken the wumman in sic a short time. When I was coortin' I was coortin' twenty year."

"And how did it turn out?" inquired a stranger in the party.

"I tell ye, I was coortin' twenty year, an' in that time I kenned what wumman was, and so I didna marry."

---

"And what kind of officer does your uniform signify?" asked the inquisitive old lady.

"I am a naval surgeon, lady."

"Goodness me, how you doctors do specialize in these modern times."

### THE OLD DEAR

Oldest Inhabitant (to district visitor)—"I be ninety-four and I 'aven't got an enemy in the world."

District Visitor—"That is a beautiful thought."

Oldest Inhabitant — "Yes, miss. Thank God, they be all of 'em dead long ago!"

—*Punch.*

---

First Stude (writing home)—"How do you spell 'financially'?"

Second Stude — "F-i-n-a-n-c-i-a-l-l-y, and there are two 'r's' in 'embarrassed'."

—*Pathfinder.*

---

Almost any motorist will give a lady driver half the road gladly, if he can find out which half she wants.

---

"A man usually enters a speakeasy optimistically," comments a reformer. "And comes out misty optically."

—*Passing Show.*

---

The first six months of married life they kissed for affection each night when he came home from work. After that she kissed for investigation.

---

"Would you rather give up wine or women?"

"That depends on the vintage."

---

One man's junk is another man's rare antique. —*Life.*

# Better Crops WITH PLANT FOOD

Dec.-Jan. 1931-1932 10 Cents

The Pocket Book of Agriculture

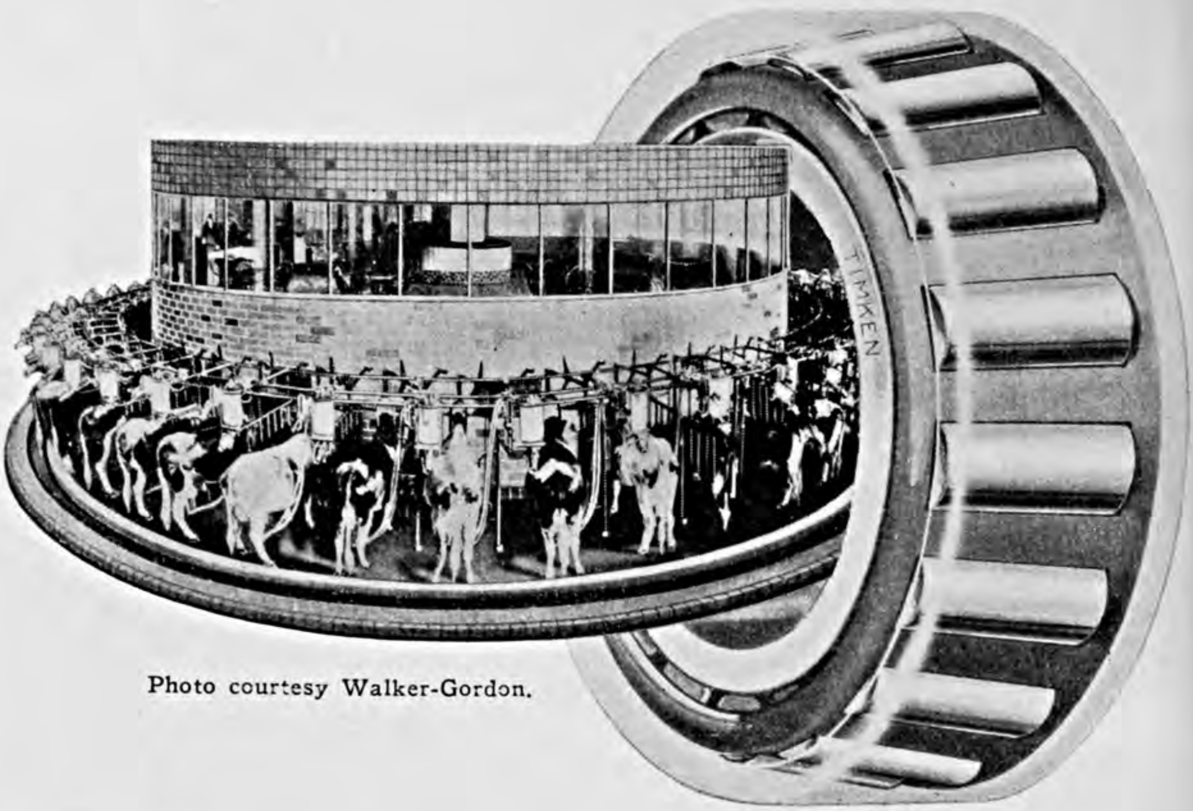

Photo courtesy Walker-Gordon.

# Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. Stinchfield, *Managing Editor* Sid Noble, *Editor*

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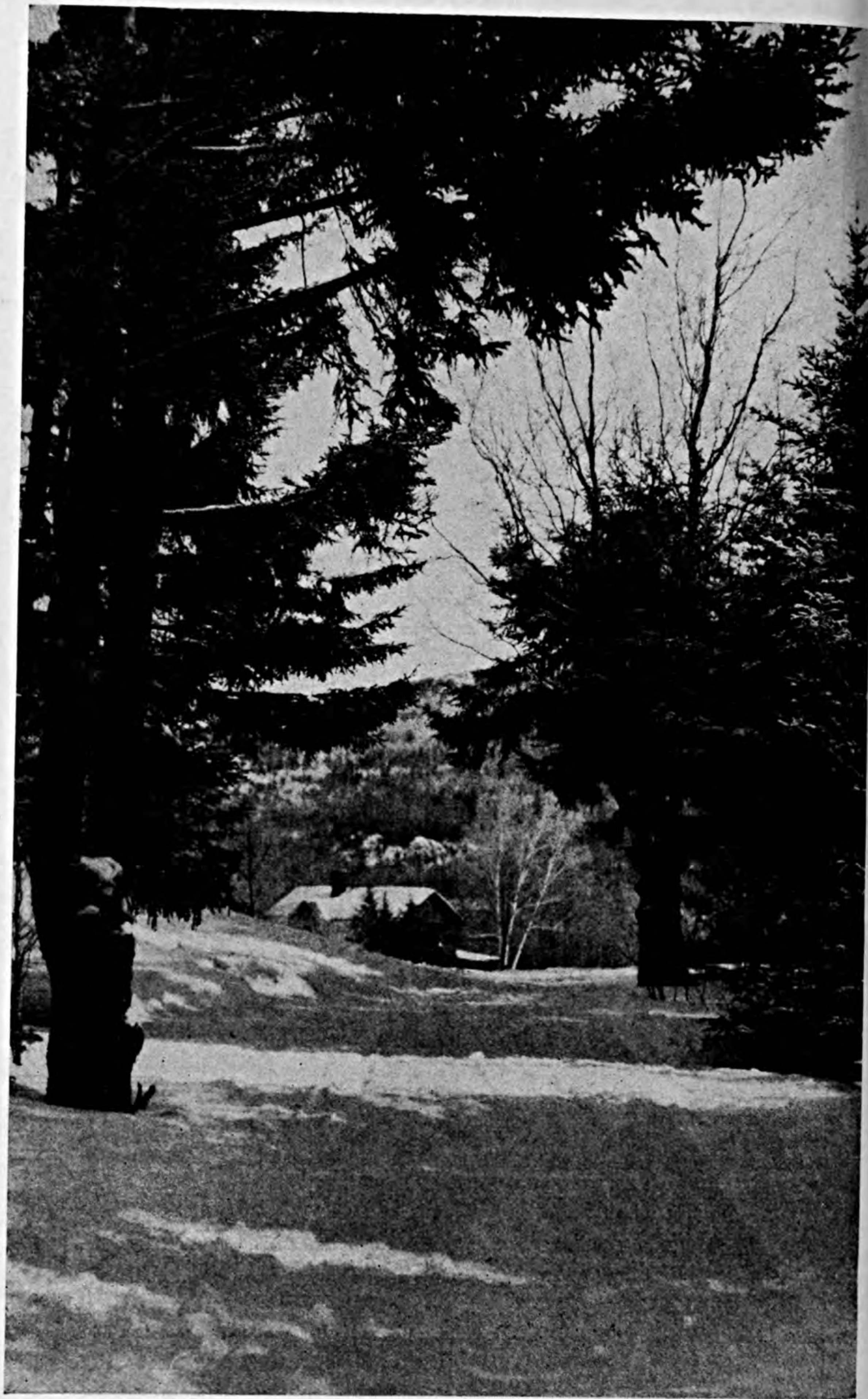

SERENITY

# Better Crops with PLANT FOOD

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*May Christmas bring you—*

# Serenity

By Jeff McDermid

SINCE calmness of spirit is at a premium among many of the folks I meet after the mental pressure incident to the times we survive in, I seek it in one traditional place of peace—the cemetery. I go there to kick through the autumn leaves and read the epitaphs above those who lived in former eras of calamity howling. I come in no morbid mood, however, for there is strength in granite and hope in marble.

Here is serenity indeed. I am unable to recast any elegy that will do justice to the sweet indifference with which the cemetery city is infused. I stumble over a grubby tombstone in memory of an outcast tramp, buried at the town expense back in the days when liquor was flowing in every street. I glimpse a lonely grave under the alders, marking the last haven of a Civil war female spy, who died suddenly after a lecture at our old "opry house." I scan the towering shaft over the mausoleum of a miserly old money lender who owned more good deeds than he ever performed. Just around the bend of the drive is the grave of a widow who died fighting two mortgages and the malaria. Here is the resting place of a veteran who served for thirteen dollars a month and came home convinced that both he and his country got a bargain. Beside him lies his eldest son, shot in Argonne forest so that the world might be safe for something. Then there lies the schoolmate who sought serenity in suicide because he didn't have imagination enough to provide it on this side of Jordan.

When I was a youngster it was my vacation job to rake lawns and help dig an occasional grave for our local sexton. I never shied at cemeteries and never believed in ghosts. In other words, I am right at home in a burying ground. (You may have noticed this trait before if you have followed my rambles across many rules of rhetoric.) So when I want to feel young again and quite serene, I turn aside from the crepe-hanging atmosphere around me and go out among the graves.

THE uncertainty of life itself, the hidden events veiled in the turn of the road, instead of making one dolorous, give me that serenity which I sought as I entered the bronze gate. And this is the reason:

Whereas we know not what destiny has in store for us tomorrow in matters of life and limb, is it not absurd to spend our present domestic hours in economic foreboding over the task or the tithe to come? Americans have apparently forgotten that humanity never knows the future anyhow. They have been reading too many of those optimistic stock-boosting or real-estate circulars, and the almighty dollar obscures both the rising and the setting sun. Always grander tomorrows, never contented todays. Even though I might be on the mountain peak of prosperity, sudden night could overtake me in the midst of my rejoicing. Like a child on the nursery floor, let's try to be happy with the battered toys we possess, for no man can foretell the approach of croup or bellyache.

I got that from a trip to the churchyard. They say the dead never speak—unless you know their lar guage, which is the same as that c the birds, the trees, the witherin flowers, and the pulse of the autum wind. In fact, what the dead say as plain as the books they have written, the children they have begotten and the property they have accumulated and finally found useless:

"Eat" (with moderation) "drink (with discrimination) "and be merry (with Christmas cheer) "for tomorrow you die."

Adjacent to the cemetery, quit handy for my purpose, is a hospital fo crippled children. Casting my eye that way, I recall the brave serenit of its inmates, with their racking pai and deformity. Then is it true tha we must hunt for the lost jewel o heart's ease either in the city of deatl or the wards of despair?

But as I ponder at this state of affairs and search for Christmas comfort, the parish parson comes pacing through the churchyard and sit down upon a mossy slab, chiseled ir honor of a defunct banker wh thought well of memorials but knew nothing at all of moratoriums.

NOT "being encompassed about with a crowd of witnesses," I decide this is a good time and place to confess the blunders of my part of the universe to a sympathetic ear. I had no intention of castigating this generation or predicting utter chaos to come, like H. G. Wells and other disciples of damnation. My folks had been brought up in Free Methodist camp-meetings, so that horrid implications of dismal destiny affect me not. Hell fire and ruin are easy to predict, but some folks have to be scared into sanctity and stampeded into serenity. I still believe that there is room in the world for other than soldiers, capitalists, and economists, so I proceed to confess my simplicity and confirm my serenity beside the sky-pilot seated on the grave of another departed cashier.

"What do you make out of Christ-

(*Turn to page 60*)

Timothy hay: left, fertilized with NPK; right, fertilized with NP only.

# The Response *of* Oats *and* Hay *to* Complete Fertilizers


*By P. O. Ripley*

Dominion Experimental Station, Lennoxville, Quebec


SOME 10,844,640 acres of hay are grown in Canada annually. This represents more than 20 per cent of the total area devoted to farm crops in the Dominion, according to reports of the Dominion Bureau of Statistics. With such a large area devoted to the crop, it assumes a position of sufficient importance to be worthy of a great deal of consideration.

Unfortunately, in the past, too little attention has been paid to the care and management of hay. In recent years, in order to economize in labor, many farmers in Eastern Canada have curtailed the production of such crops as grain, corn, and roots, which require comparatively high labor expenditure, and have allowed their farms to "run" in hay. In this way costs have been reduced, but, unfortunately, cash returns from crops also have been lowered. This lowering of returns has been aggravated by the neglect of the hay crop itself. The average yield of hay in the Dominion is only 1.57 tons per acre, which is unnecessarily low.

This low yield has been brought about by two general factors. In most cases, the hay has been allowed to continue too long before breaking up and reseeding. Furthermore, little if any fertility has been returned to the soil to replace that removed in the crop, and the soil has become depleted of the more essential plant food elements necessary for maximum production.

In 1923, an experiment was started

at the Dominion Experimental Station, Lennoxville, Quebec, with the object of devising some practical method of increasing the fertility of the soil, in order to produce higher yields of hay with as little expenditure of labor and capital as possible.

One-twentieth acre plots were laid out in a four-year rotation of oats, clover, timothy, timothy. One such rotation was treated with a light application of commercial fertilizer applied to the last two years in hay. The fertilizer consisted of 75 pounds of nitrate of soda and 200 pounds of superphosphate. At this time it was thought that potassium was present in the soil in sufficient quantities to meet the requirements of the crop.

A second set of plots received, on the last two years in hay, a heavy application of 150 pounds of nitrate of soda and 400 pounds of superphosphate. On a third series of plots, the same rotation was followed, but the series served as a check and received no fertilizer. Each of these rotations and treatments was carried out in duplicate.

The crop yields for each year from 1923 to 1930, together with the av erage for the period, are shown i table I. The yields are the averag from duplicate plots.

A study of this table reveals sever very interesting and important ob servations. In the first place, ther appeared quite a pronounced increas in the yield of all three hay crops, i the second, third, and fourth year after fertilizer was applied to the tw timothy crops. The increase was onl slightly noticeable in the case o clover. The check plots, receiving n fertilizer, showed a slight increase al so, which would appear to indicat that part of the above increase wa due to more favorable climatic con ditions in these years.

The oat crop showed a decided fall ing off in yield in 1925 and 1926 with a considerable increase in 1927 again falling off in 1928, 1929, and 1930, much below the yield befor fertilizers were used at all. Due to the fact that there was no "catch" of clover in 1930, a mixture of oats and peas was substituted as a hay crop, and is recorded as such in the table.

TABLE I

OATS

| | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 7-year average |
|---|---|---|---|---|---|---|---|---|---|
| Light | | 31.2 | 30.9 | 38.4 | 48.2 | 35.6 | 27.4 | 20.9 | 33.2 |
| Heavy | | 45.3 | 35.9 | 36.4 | 56.0 | 36.9 | 33.6 | 19.4 | 37.6 |
| Check | | 45.9 | 33.5 | 24.7 | 36.8 | 25.2 | 18.2 | 8.8 | 27.6 |

CLOVER

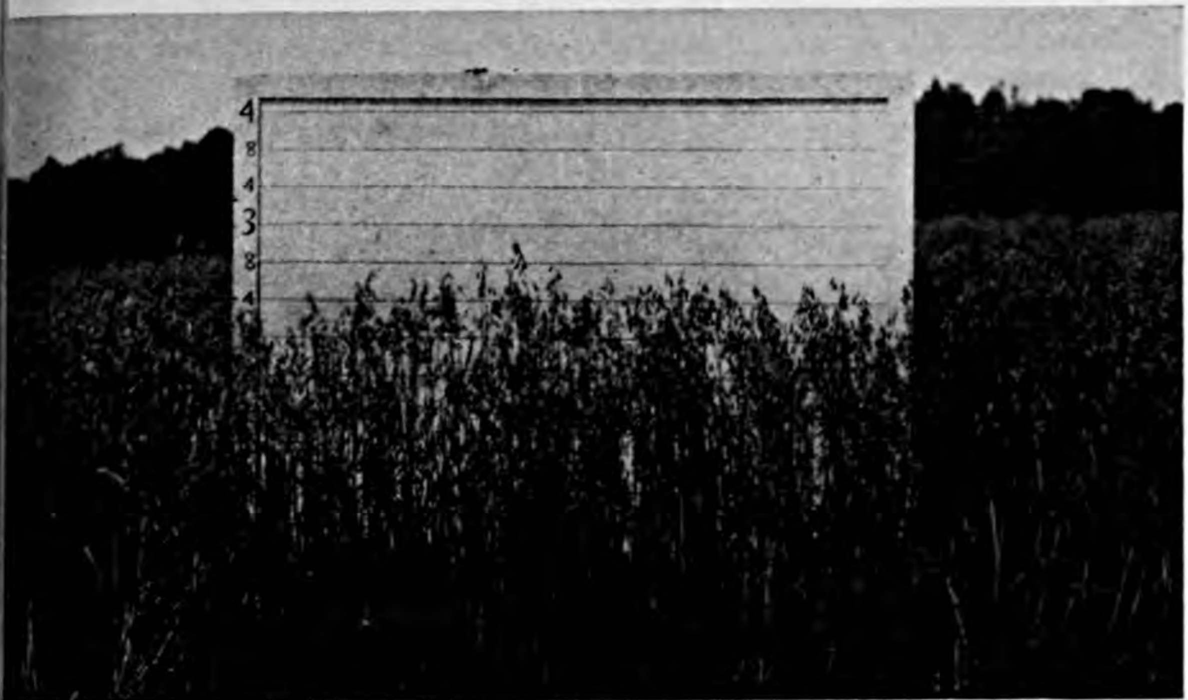
| | | | | | | | | Oats and Peas | 8-year average |
|---|---|---|---|---|---|---|---|---|---|
| Light | .42 | .89 | .92 | .66 | 0.96 | 0.75 | 1.12 | 2.23 | 0.99 |
| Heavy | .42 | 2.01 | 1.56 | .94 | 1.19 | 1.64 | 1.35 | 2.38 | 1.44 |
| Check | .86 | .98 | 1.44 | 1.08 | 1.00 | 1.03 | 1.32 | 2.30 | 1.25 |

TIMOTHY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Light | 0.66 | 1.02 | 1.36 | 1.36 | 1.37 | 1.15 | 1.36 | 0.84 | 1.14 |
| Heavy | 1.01 | 1.78 | 2.33 | 2.13 | 1.79 | 1.81 | 2.14 | 0.99 | 1.75 |
| Check | 1.33 | 1.21 | 1.00 | 1.51 | 1.21 | 1.00 | 1.33 | 1.18 | 1.22 |

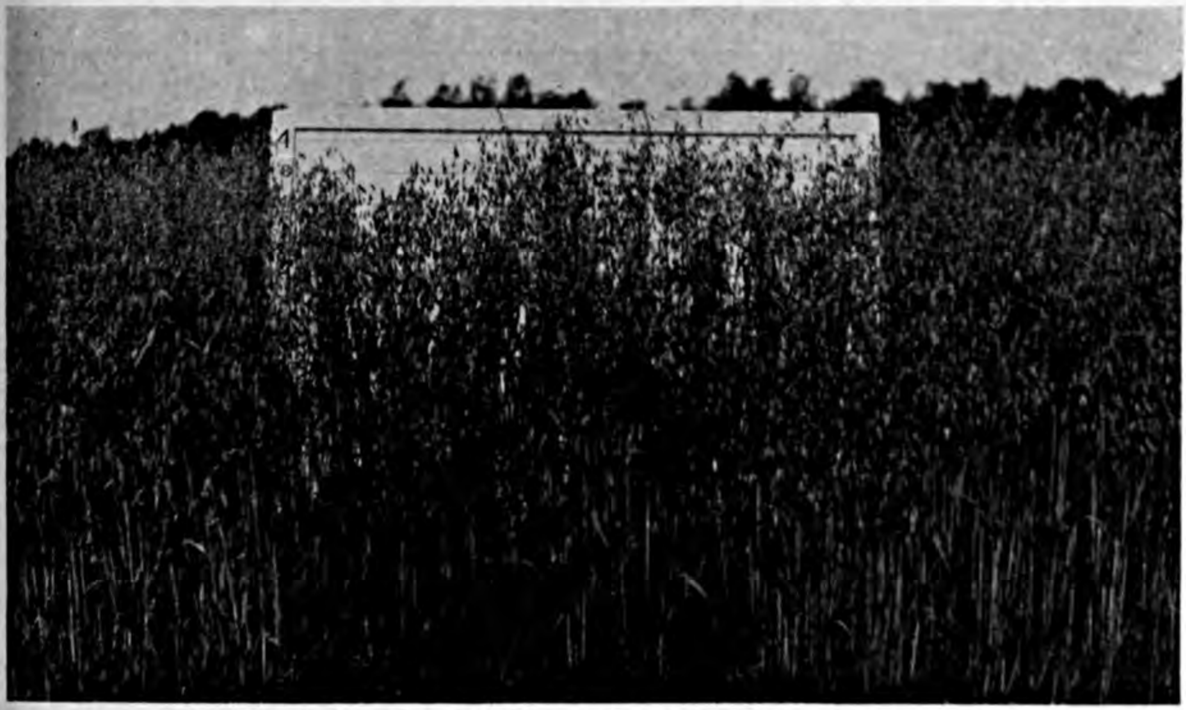
TIMOTHY

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Light | 0.47 | 1.07 | 1.72 | 1.18 | 1.29 | 0.99 | 1.26 | 0.43 | 1.05 |
| Heavy | 0.92 | 1.28 | 2.05 | 2.22 | 2.02 | 1.38 | 1.24 | 1.07 | 1.52 |
| Check | 0.49 | 1.24 | 1.25 | 1.01 | 1.43 | 1.22 | 0.62 | 0.97 | 1.03 |




These oats were fertilized with NP only and the yield was 31.2 bushels per acre.

These variations in yield of the different crops indicate the comparatively low "carry-over" capacity of the commercial fertilizers used. The timothy crops to which the fertilizer was applied showed some response. This is especially true of the heavy application. Oats and clover, one and two years removed from fertilizer applications, showed practically no beneficial effects from the treatments, and in fact produced steadily diminishing yields as the period of the experiment advanced. The "carry-over" of the fertilizer applied to the timothy crops was apparently so slight that, in addition to the low yields of oats and clover each year of the experiment, in 1929 there was not enough fertility in the soil to produce a "catch" of clover for 1930, and hardly a single plant survived after germination. Although timothy showed some response to fertilizer, the increase in yields was



The yield of these oats, fertilized with NPK, was 62.4 bushels per acre.

not high enough to warrant the expenditure for fertilizer used, although, in all cases the heavy application produced yields considerably higher than the check.

After seven years' tests, it was felt that the adopted system of fertilizing was not satisfactory and that it was useless to continue attempting to fertilize the timothy crop, when the seeding earlier in the rotation failed to "catch" and therefore left no hay to fertilize. Accordingly, in the spring of 1930, it was decided to add muriate of potash to the nitrate of soda and superphosphate on one-half the area in each of the fertilized timothy plots, leaving the other half the same as before to serve as a check. Fifty pounds of muriate of potash were added to the so-called light application and 100 pounds to the heavy application.

As the crops directly affected in 1930 were the two timothy crops to which the fertilizers were applied, only the yield of these crops are shown in table II.

The yields on those plots receiving only nitrate of soda and superphosphate were actually lower than the check, except in the case of the heavy application on the second crop of timothy, and even here the increase was only one-tenth of a ton, which is almost negligible. The first year muriate of potash was applied increases in crop yields were recorded, which would seem to suggest that this constituent had apparently been one of the limiting factors in the fertility of the soil.

The light application of complete fertilizer showed an increase in yield, over nitrate of soda and superphosphate only, of 0.33 of a ton on the first timothy crop, and 0.55 of a ton on the second. The heavy application of complete fertilizer showed a

(*Turn to page 57*)

TABLE II

| Plots | Treatment* | Crops and Yields | |
|---|---|---|---|
| | | Timothy | Timothy |
| | | tons | tons |
| 1-A | 75 lbs. N., 200 lbs. P. applied | 0.40 | 0.22 |
| 1-B | to last two years in hay | 1.28 | 0.64 |
| | Average of duplicate plots | 0.84 | 0.43 |
| 2-A | 75 lbs. N., 200 lbs. P., 50 lbs. K. applied | 0.60 | 0.72 |
| 2-B | to last two years in hay | 1.74 | 1.24 |
| | Average of duplicate plots | 1.17 | 0.98 |
| 3-A | 150 lbs. N., 400 lbs. P. applied | 0.64 | 0.86 |
| 3-B | to last two years in hay | 1.34 | 1.28 |
| | Average of duplicate plots | 0.99 | 1.07 |
| 4-A | 100 lbs. N., 400 lbs. P., 100 lbs. K. applied | 1.62 | 1.40 |
| 4-B | to last two years in hay | 1.92 | 2.82 |
| | Average of duplicate plots | 1.77 | 2.11 |
| 5-A | No fertilizer applied | 0.76 | 0.43 |
| 5-B | Check—no fertilizer applied | 1.61 | 1.51 |
| | Average of duplicate plots | 1.18 | 0.97 |

* N = Nitrate of Soda; P = Superphosphate; K = Muriate of Potash.

# Industries Become Garden-minded

*By H. E. Young*

Purdue University Agricultural Extension

A view of the industrial gardens of the Studebaker Corporation at South Bend, Indiana.

SURPLUS labor, brought about by expansion and mechanization, is the bugbear of American industry. The time was when commercial interests thought largely in terms of factory production. Output and sales consumed the entire time and attention of expert executives and their boards of directors.

But not so in modern industry. New problems are now demanding and receiving serious consideration. The interest and welfare of employees, and the obligation of industry to its workers, are being recognized as never before.

Forced to initiate the shorter day and week, far-sighted industries are experiencing a deeper concern for their employees and are extending valuable help and cooperation to supplement the pay envelope. Important among these newer forms of cooperation with industrial workers is the Industrial Garden movement — a movement which is proving remarkably beneficial to both employees and employers.

The industrial garden for company employees is a sensible and logical move. With the income of many industrial workers too small to maintain the usual standards of living, the industrial garden for company employees serves a three-fold purpose. It supplements an inadequate industrial wage, provides a part of an otherwise impossible family food supply, and contributes to the general welfare and independence of the workers—all of which, everyone will agree, are especially desirable in times of business depression.

### *Not a New Project*

Garden-minded industries are not entirely new in Indiana. A number of the leading industries in this State are sponsoring industrial gardens for their employees. We have yet to learn of an instance where such gardens have proved other than beneficial to the employees, and also to the industries which sponsored them.

Nor have they proved successful only in years of depression. Over at Anderson, the Sefton Container Corporation are old-timers in this employment garden business. Back in 1918, they inaugurated some company "war gardens." These gardens were so successful, and the results so satisfactory, that neither the company nor its employees would allow them to pass out with the signing of the Armistice. On the contrary, these industrial gardens were continued, and have been operated every year.

And, not only that. During the years, these gardens have grown considerably in both size and popularity and are now recognized by the industry as a permanent institution. Neither "war times" nor "hard times" are any longer considered a requisite to the success of these company gardens. They flourish all the time, or have for the last 13 years, and are now regarded as a highly valuable and indispensable adjunct to the regular business of the corporation, no matter what may be the trend of business conditions.

These Sefton gardens are on company land, adjacent to the main plant of the company. The soil is ideal for garden crops. Each year the company plows and puts the gardens in shape, and then the ground is surveyed into the required number of plots. The plots are numbered, and tickets with corresponding numbers are mixed in a box for the annual spring garden assignment drawing. This drawing is attended by the employees who thus receive their plot assignment by lot. From then on the gardens are in the hands of the workers. Seed and fertilizer are supplied by the company at cost.

Each year, from 65 to 85 employees, many with no other garden facilities, make the most of this excellent opportunity in growing a family vegetable supply. Much interest is taken in the work, and uniformly productive gardens are the result.

An interesting fact about these gardens is that, while they supply considerable food for the tables of the employees, these same employees are inclined to be better customers of the commercial market gardeners because they know and appreciate the value of more garden food in the home. And, by producing some few vegetables themselves, they are better able to buy additional vegetables for increas-

(*Turn to page 55*)

Part of the 39 acres of International Harvester Company's gardens at Richmond, Indiana.

# Pasture Publicity

*By Thomas D. Cook*

County Agent, Rutland County, Vermont

RUTLAND COUNTY, Vermont, largely a dairy county standing fourth in the State in dairy cow population, has made definite progress in improving its pasture acreage. Two years' work on small pilot pasture tests scattered over the county, under a variety of soil types and with various fertilizer treatments, has given much information relative to the improvement through fertilization. Results published at the close of the 1929 season gave indications that intensive treatments not only increased the yields of pasture grass but decidedly changed the quality, and did it with a good return to the farmer.

Of the total land area in the county, 57 per cent is in farms, and of this amount 44 per cent is in pasture, being divided equally between plowable, woodland, and other pasture land. The county itself lies on the western side of the State, adjoining New York in the Champlain Valley.

The farm pastures of the county have been mined of soil fertility down through the ages, without anything being returned except the few scattered droppings. The result is that the majority of these pastures provide little more than exercise ground.

The following table gives the results on nine farms in 1929 and 1930.

### *Details of the Publicity Program*

On the strength of the decided indications given by the small area treatment, and with the large area results being obtained by many farmers of the county, an intensive program was drawn up for January, 1931.

The campaign centered around publicity and meetings, with the ultimate goal of having a large pasture area treated with fertilizer and having a good number of farmers in the county managing their pasture land as they would any other crop.

(*Turn to page 56*)

TABLE I. PASTURE TREATMENT, INCREASES, AND COSTS

| Treatment per acre | Increase in yield per acre Oven-dried 1929 | 1930 | Cost of treatment per acre | Value of increased yield 1929-30 (protein basis) |
|---|---|---|---|---|
| 600 lbs. superphosphate | 600 lbs. | 756 lbs. | \$6.00 | \$20.34 |
| 600 " "<br>100 " muriate of potash | 1,146 " | 1,579 " | \$8.50 | \$40.88 |
| 600 " superphosphate<br>100 " muriate of potash<br>320 " nitrate of soda | 1,963 " | 1,941 " | \$24.10 | \$58.56 |

All of the fertilizers were applied in 1929. In 1930 an additional 320 lbs. of nitrate of soda per acre were applied to the complete fertilizer plots.

# *The* Inquiring Mind *and the* Seeing Eye


## *By Dr. A. S. Alexander*

University of Wisconsin


"NOGAKU HAKUSHI"—which means "Learned in Agricultural Science"—was the honorary degree conferred by the Department of Education of Japan upon Dr. W. P. Brooks of the Massachusetts Agricultural College in 1919. That was a great honor, well deserved by a man who is also rightly regarded as one of the most able of the pioneers of agricultural education and research.

For twelve years Dr. Brooks rendered eminent service as an agricultural teacher, organizer, and administrator in Japan. In recognition of his successful work he was in 1888 decorated by the Government of that country, with the Fourth Order of the Rising Sun. His sojourn and investigations in the Orient gave him experience and information which later proved useful in his native land. He brought back with him certain agricultural plants which have succeeded and become highly profitable here.

Japanese millet was one of these plants, and included three species which now are known as Barnyard Millet, Japanese Foxtail Millet, and Broom Corn Millet. Of these, we understand, the Barnyard variety has proved best suited for U. S. conditions. When tested by Dr. Brooks at the Massachusetts Agricultural Experiment Station at Amherst, it produced as high as ninety bushels of seed and as much as five to six tons of hay per acre. It was the variety that for a time attracted much attention under the widely advertised trade name of "Billion Dollar Grass."

While in Japan, one of Dr. Brooks' numerous enterprises was to introduce the Ayrshire breed of dairy cattle, and without much difficulty he developed a herd at the Sapporo Agricultural College.

Dr. Brooks was, we believe, the first to introduce into, at least the Northern United States, the soybeans of Japan. One type is today known as the Brooks soybean. These beans produced as high as sixteen tons to the acre on plots at the Massachusetts Station. There, Dr. Brooks did much experimenting with the soybean in comparison with cottonseed meal as a stock food. Today, this valuable source of protein and other needed nutrients is becoming widely popular and has given good results when seeded with the corn crop or planted separately, especially on the lighter type of soils.

### *Native of Massachusetts*

William Penn Brooks was born in South Scituate, Massachusetts, November 19, 1851, and was reared on his father's farm. After a preliminary training in the local schools, he entered Massachusetts Agricultural College, and in 1875 graduated with the Bachelor of Science degree. In 1897, he received from Friedrichs Universität, Halle, Germany, the degree of Doctor of Philosophy, *magna . cum laude.*

The late President W. S. Clark of the Massachusetts Agricultural College, on the invitation of the Japanese government, went to Japan in 1876 to organize the Saporro Agricultural College, the first in that country. The following year Dr. Brooks joined the faculty of that institution, which has now grown into a University with a thousand or more students. It is called the Hohhaido Imperial University.

Dr. William Penn Brooks

There Dr. Brooks served as Professor of Agriculture and Director of the College Farm from 1877 to 1888. He also taught Botany from 1880 to 1888, and was Acting President from 1880 to 1883, and again from 1886 to 1887.

Returning to America, Dr. Brooks was appointed Professor of Agriculture in the Massachusetts Agricultural College (now Massachusetts State College) and Agronomist of the Experiment Station, in which position he served from 1889 to 1918. He was also Acting President of the College from January to April, 1903, and again from January, 1905, to July, 1906. He was Director of the Massachusetts Agricultural Experiment Station from 1906 until 1918, and Consulting Agronomist, 1918-1921, when he retired. He was made Emeritus Professor of Agriculture in 1928.

Dr. Brooks has been a wonderfully active worker throughout his life, yet in addition to his multitudinous and assiduous duties as Professor and Director at the State College and Experiment Station, he found time for membership and executive work in several important scientific associations. He is a Fellow of the American Association for Advancement of Science and has served as Second Vice-President of the American Association of Agricultural Colleges and Experiment Stations and as President of the Hampden-Hampshire Agricultural Society. From 1908 to 1912, he operated a farm, and in 1908, delivered many illuminating lectures regarding soil fertility, in which subject he is recognized as an authority. In addition to his work and travels in Japan, he traveled in Europe and made himself intimately acquainted with agricultural practice and conditions there.

### *Writes for Farmers*

Practical farmers, as well as agricultural scientists, owe enduring gratitude to Dr. Brooks for his many books and bulletins on farm subjects. He wrote them especially for the benefit of farmers, couching them in simple language and pointing out clearly how the fundamental principles of science might readily and profitably be applied to practice on the farm and in the feed lot and poultry yard.

His outstanding writings were, no doubt, three important books entitled *"Soils and How to Treat Them," "Manure and Fertilizers and Farm*

*Crops,"* and *"Animal Husbandry."* The books were published in 1901 as a complete work on agriculture, and were revised in 1903, 1905, and 1911. They will long endure as a monument to the industry and the all-embracing knowledge of the subject possessed by their author.

Dr. Brooks was, we believe, the first American to write books particularly for the edification of farmers and stock-breeders who could not attend college. To his surprise, his publications not only became popular with the practical agriculturist, but were widely used as text-books in schools and even in colleges.

The late Dr. H. W. Collingwood, who became celebrated as editor of the *Rural New Yorker* was a great admirer of the books written by Dr. Brooks. He deplored the fact that many ultra-scientific publications about agriculture were so worded that they could not perfectly be understood by the average farmer. He therefore welcomed those which presented scientific facts and principles in such phraseology that everyone who read them might easily comprehend. These books *stimulated men to think*. That was their author's aim in writing them, and a chief purpose in his life, which was recognized and appreciated by his college associates and readers alike.

### *Advises Poultrymen*

While Dr. Brooks is best known for his useful work relative to fertilizers and farm crops, he is also well informed in livestock and poultry. That is evidenced by his practical book on animal husbandry and by his useful Bulletin No. 122, *"Poultry Keeping for Egg Production,"* which was published under his direction by the Massachusetts Agricultural Experiment Station in 1908. That bulletin was issued as a guide to poultry keeping for egg production. The immediate responsibility for the executive work in the various experiments it summarized was carried successfully by Dr. Brooks' assistants, and he gives especial credit to Messrs. Haskell and Gaskill for help in preparing the bulletin. The experiments mentioned apparently justify the following, among other conclusions:

Regular use of condition powders for poultry means money practically thrown away as it is unnecessary for maintenance of health and will not be likely to increase egg production. Cabbage, given in moderation, is superior to cut clover rowen as a winter feed and increases the number of eggs, but, too freely fed, injures their flavor. Presence of the male bird does not affect the number of eggs produced, but increases the average weight of the egg.

While vegetable substances may contain as great a percentage of protein as animal substances, the latter are greatly superior as sources of that nutrient. Concentrated vegetable foods, such as soybean meal, linseed meal, gluten meals, etc., should not be used to replace all, or even a very large part, of animal meals, beef scraps, cut bone and meat, etc., in the ration for feeding fowls. The dry, prepared animal foods just mentioned, if of good quality, are cheaper and safer feeds than cut fresh meat and bone, and can be so used as to produce an equal egg yield. Feeding the meal in the morning, with care not to give too large a quantity, is preferable to feeding it at night. Corn, judiciously fed, may safely be largely used in rations for laying hens; but must be supplemented by a liberal proportion of animal food. So fed and supplemented, the use chiefly of corn, whole or cracked, and cornmeal rather than much wheat and wheat and corn products, lessens cost per day and per egg, somewhat increases the number of eggs, induces an earlier and better molt, and produces a higher average weight of fowls, and better market quality of birds when dressed. Buckwheat in any large proportion is a less desirable food than corn for laying fowls. The less hard, tough fiber in feed, the better will be the egg product. Oats, barley, buckwheat, and by-products containing the husks of these grains, should be sparingly fed.

### *Studies Fertilizers*

Dr. Brooks did much valuable work with commercial fertilizers at the Massachusetts Agricultural Experiment Station, and was instrumental in having them more generally used by the farmers of the State. His extension work in that connection was notable and was based upon the knowledge he gained from the experiments he conducted at the Station to determine what fertilizers plants need, as well as what fertilizers were required by the soil. By skillful application of fertilizers, he succeeded, among other achievements, in bringing back clover and other hay grasses to fields which had become covered with weeds and twitch grass.

The experiments conducted by Dr. Brooks at the Massachusetts Station led him, in Bulletin No. 134, to advise that when it is desired to bring into good condition land on which manure has been used for previous crops, so that it will produce a hay crop rich in clover, it will usually be best to supplement the manure by means of an application of potash. From 125 to 150 pounds of a high-grade potash salt per acre, applied in connection with manure to the previous crop, will almost invariably largely increase the proportion of clover in the hay crop when the land is seeded. If fertilizers alone are used for the preceding hoed crops, these must be rich in potash, if clover is to thrive when the land is seeded.

For thirteen years, Dr. Brooks applied potash to four experimental plots at the rate of 250 pounds per acre to two plots, and 150 pounds per acre to the other two plots. When this land was seeded, the hay crop where the larger amount of potash was used was considerably larger and contained a much greater proportion of clover than where the smaller quantity of potash was applied. In 1902, the larger application of potash gave a yield at the rate of 6,772 pounds per acre; the smaller application of potash yielded at the rate of 5,252 pounds per acre. The amount of nitrogen applied to the two sets of plots was practically the same; but the plots receiving the lighter application of potash, annually received an application of superphosphate at the rate of about 1,100 pounds per acre, against about 200 pounds per acre for the plots receiving the larger amount of potash.

The fertilizer, applied where the lesser amount of potash was used, was substantially the same in its composition as average corn fertilizers, while

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**Dr. Brooks' home stands as a background for the experimental plots of the Massachusetts Agricultural Experiment Station.**

# *An* Irish Potato Record *for* South Carolina

*By T. H. Seabrook*

County Agent, Beaufort, South Carolina

THE old "Palmetto State" steps out as a leader in Irish potato production, and Ben Bostick, Clemson College graduate, World war Veteran, and farmer par Excellence, leads the big parade.

Two hundred and four barrels of U. S. No. 1 potatoes, eight and six-tenths barrels of U. S. No. 2's, and seven barrels of culls on one acre, during the spring season of 1931, is the record which is one of the most "talked of" accomplishments in the whole of the South Carolina truck-farming belt.

With the inauguration of a State-wide Irish Potato Contest, 10 Beaufort county farmers signified their willingness to compete for the various prizes which were offered for the largest yield of No. 1 potatoes produced on a measured acre. Mr. Bostick, always quiet and unassuming, was one of the first to enter the contest, and I knew right then and there that Beaufort county was going to give the rest of the State a run for their money. Because when this soft-spoken young man makes up his mind to do a thing, he does it right.

Let him tell you the rest of the story in his own words, and you will get a better picture of how our biggest yield of potatoes ever officially recorded was made.

### *Mr. Bostick Explains*

"I selected my plot," says Mr. Bostick, "from a two-acre field, which had been tile-drained in the season of 1925-1926. This field had been a pond up to that time. Since drainage, the land had been limed until the physical condition of soil is almost perfect, no lime having been applied since 1929.

"Corn with soybeans has been grown on the land for the past three years, and nothing was removed except the clean shucked corn. Each year the bean and corn stalks were turned into the land. Since I had to drain this land to plant it, I knew that it had not been robbed of any of its fertility, and I decided never to take from it more than I gave back, so that today

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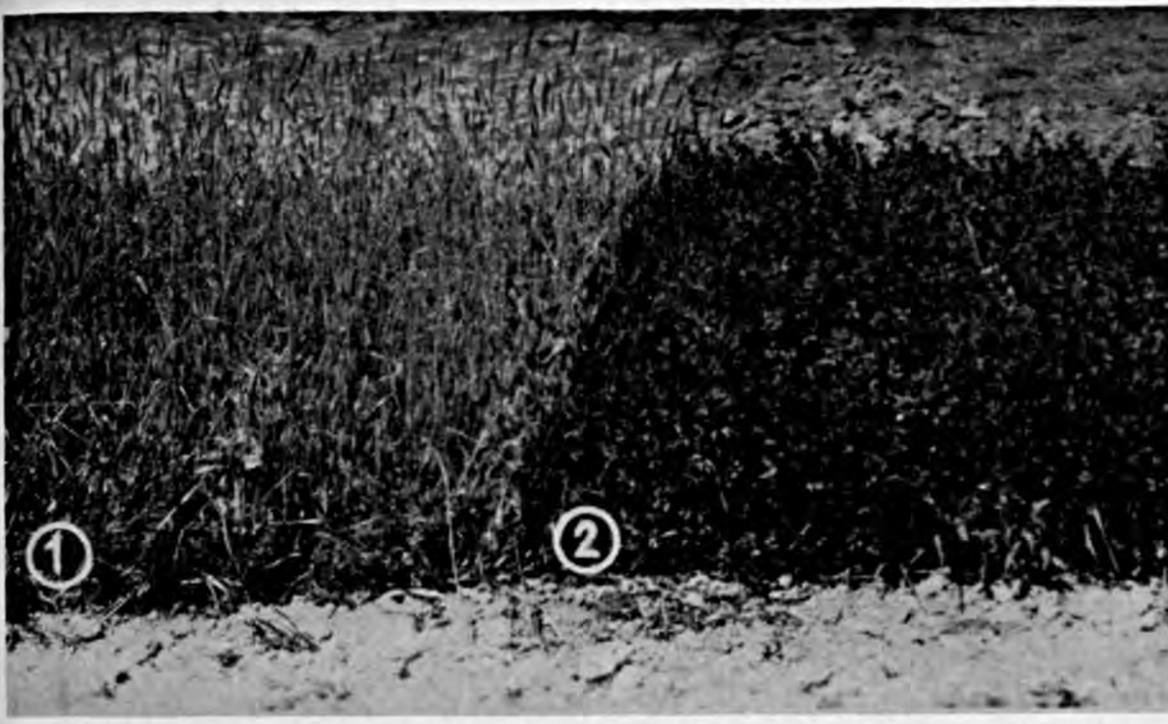
A view of the 600-bushel yield in the field.



Weeds follow frequent cutting of alfalfa. A plot (1) of alfalfa cut three times at succulent stages on May 15, June 7, and June 29, 1922, was followed by a heavy growth of summer weeds, mostly foxtail grasses, while an adjacent plot (2) cut but once in full bloom on June 29, 1922, grew with such vigor that no weeds appeared.

# Cut More Alfalfa *by* Cutting Less


*By G. E. Langdon*

Wisconsin College of Agriculture


TOO frequent cutting of alfalfa may result in "bald" fields. Of course, the farmer, like the barber, may apply the best tonics, but what the alfalfa really needs is a chance to grow.

No matter how favorable the soil and climate may be for the growth of alfalfa, it has been found that early and frequent cutting will eventually cause the death of the plant.

That this is true and why it is true are disclosed by a 5-year study of the subject made at the College of Agriculture of the University of Wisconsin under the direction of Larry F. Graber, professor of agronomy. Mr. Graber has been one of the men responsible for making Wisconsin "alfalfa-conscious."

The increasing importance of alfalfa in the State, as well as in the eastern part of the United States, Mr. Graber explains, made such a study desirable. There have been a great variety of opinions about the proper time for cutting. Years ago, some believed that mowing every two weeks might be necessary with a young stand, although most of the recommendations in the past were to harvest when about one-tenth of the plants were in bloom.

The importance of this question of cutting alfalfa in its relation to the use of commercial fertilizers is an interesting phase of the work. The results indicate that too frequent cutting may offset much of the gain which the plant makes because of its use of these chemical elements in growth. Since too much cutting interferes with normal plant development, a definite loss results. On the other hand, when alfalfa is cut less frequently, there is a much greater and more effective use made of the plant foods supplied.

As Mr. Graber explains: "Although the soil may be abundantly supplied with available nitrogen, phosphorus, potash, and all other requisites of growth, the plant may be deficient in organic materials for the greatest expression of its productive capacity. The productivity with relation to nitrogenous fertilization is dependent not only upon adequate supplies of moisture, phosphorus, potash, and other limiting elements within the soil, but upon the reserve foods within the plant which are also limiting factors of growth."

The reason for this beneficial effect of fewer cuttings is stated by Mr. Graber as follows: "About 90 to 95 per cent of all the dry substances in roots of plants are first made in tops. The roots not only use materials furnished by the tops to increase their spread and extent, but they are places of storage where the plant accumulates a reserve of foods for future top and root development.

"New top growths, especially in the early stages of such plants as alfalfa and other fleshy rooted plants, are developed largely at the expense of this fund of plant reserves in the roots. These reserves are stored chiefly while top growth is maturing and they are used up when the plant is young and succulent. Since the amount of these reserves limits the amount of top and root growth which can occur, it is clear that excessive cutting will kill the plant. The condition of the roots of alfalfa and the amount of top growth are so closely related that in farm practice, the subterranean parts cannot be ignored any more than the matter of quality of the hay may be disregarded.

"Alfalfa is fast becoming a valuable pasture crop for swine and in some

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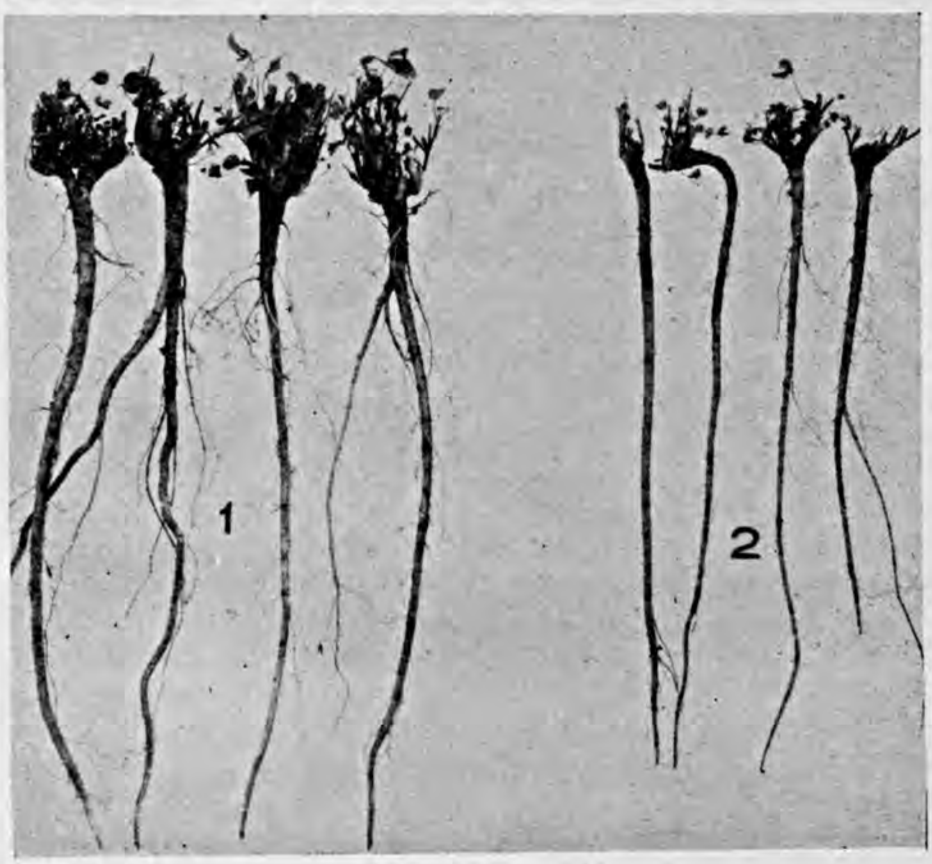
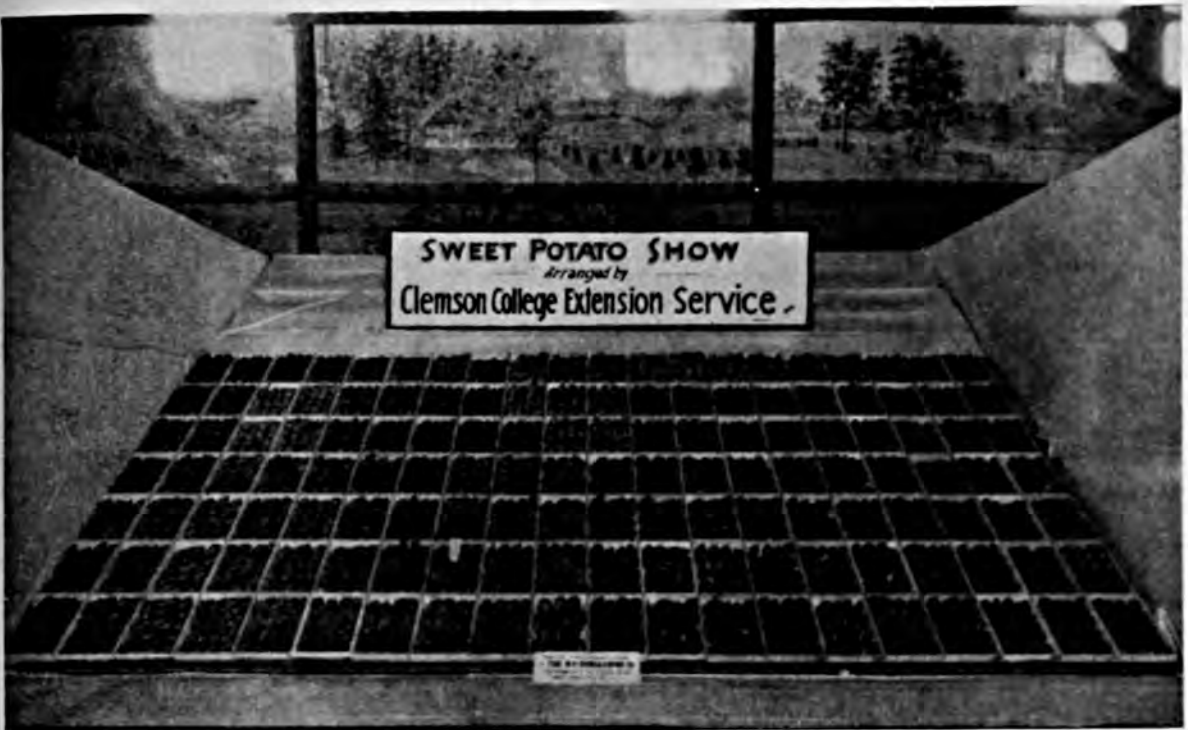



**The root growth of alfalfa is affected by removals of top growth. Roots of Grimm alfalfa (two years old) from plants (1) cut twice in full bloom during 1922, are compared with roots (2) of plants cut three times, in 1922, in an early bud stage of top growth. These plants were dug December 1, 1922. Those with cuttings at mature stages (1) had an average root diameter of 6.9 mm. and an average air dry weight of 1.7 grams, compared with 5 mm. and .9 grams respectively for (2) cut three times at early bud stages of top growth.**




# South Carolina Competes *in* Sweets

*By J. L. Baskin*

Atlanta, Georgia

SOME 15 years ago the United States Department of Agriculture, in cooperation with the State experiment stations, worked out a practical method of curing sweet potatoes. Prior to the discovery of this method, which is based on partial dehydration, sweet potatoes were grown principally for home use and local markets.

Taking the hazard out of "keeping" sweet potatoes made a strong appeal to the farmers, for at the time losses after harvest were so serious that farmers were reluctant to increase their acreage.

Encouraged by the use of the curing process, many farmers planned to grow potatoes for the central markets. Extension workers and agricultural leaders assisted the farmers with plans for building curing houses in accordance with government specifications. These houses served their purpose well, keeping the potatoes until there was a satisfactory market. As soon as a considerable volume of potatoes reached the central markets, growers began to complain that prices were not sufficiently high to justify a continuation of their acreage, much less any expansion.

A survey of the markets proved conclusively that the low prices were the result of poor grading, and in many instances potatoes were being put on the market unsorted. However, the survey showed that well-graded and packed potatoes were still bringing satisfactory prices.

Armed with the information gleaned in this survey of the markets, the United States Bureau of Markets, in cooperation with State extension workers, established standard grades for sweet potatoes. Agricultural leaders assisted growers in grading their potatoes into two grades, known as U. S. No. 1's and U. S. No. 2's. This standardization work proved of great help to the grower, and markets have accepted these grades as standard in quoting prices.

As the years went by, Southern farmers gradually lost their enthusiasm for growing this crop. There could be but one answer—there was no profit to be had growing sweet potatoes under the generally prevailing methods because of low yields.

### *Clemson Leads the Way*

Realizing that the sweet potato industry was on the wane, in spite of the general use of the curing process and the establishment of standard grades, the South Carolina Extension Service decided to study other phases of the sweet potato industry. They found New Jersey growers making an average of 144 bushels per acre, Virginia growers making an average of 116 bushels per acre, while South Carolina growers were averaging only 81 bushels per acre.

While the Extension Service did not have any responsibility for yields beyond the borders of the State, they realized that South Carolina sweet potato growers could never make any money on this crop so long as their average production was only 81 bushels per acre. Feeling that this low average yield of 81 bushels was the chief cause of growers' lack of enthusiasm, the Extension Service decided to attack this miserably low yield that was preventing growers from making a profit.

Crop contests as a method of selling production methods were not new to the South Carolina Extension Service, and this method of elevating sweet potato yields was decided upon. A careful study of New Jersey's and Virginia's methods revealed that sweet potatoes responded wonderfully to heavy applications of fertilizer carrying from 8 to 15 per cent potash.

Every county agent was furnished rules of the contest and entry blanks. The results the first year were phenomenal and showed that yields and quality were greatly increased as the amounts of fertilizer were increased up to 1,200 pounds per acre. The largest yields of No. 1's, as well as the largest percentages of No. 1's, came from fields where fertilization was liberal and the percentage of potash high.

Realizing the splendid results obtained the first year, it was decided to continue and enlarge the contest. The second year more than 500 farmers entered, and 22 farmers produced more than 200 bushels of U. S. No. 1's, which was more than double the State's average when the contest was begun. The average net profit of all contestants reporting during the second year was $76.12 per acre.

So convincingly did the liberal application of high potash fertilizers show up in producing large yields of high quality that the College Extension Service now unqualifiedly recommends from 800 to 1,000 pounds of fertilizer carrying from 8 to 10 per cent potash.

### *Summary of State Contest*

The 209 farmers, using an average of 909 pounds of fertilizer per acre in a State-wide sweet potato contest, reported an average net profit of $76.12 per acre. The four winners making the highest average yields made an average net profit of $231.67. These four winning contestants, making the highest average total yields, averaged 495.4 bushels per acre. They used an average of 1,237 pounds of fertilizer carrying approximately 14 per cent potash. This extra potash gave the plants the extra

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# Cotton Harvesters

*By H. P. Smith*

Chief, Division of Agricultural Engineering, Texas Agricultural Experiment Station

IN spite of the depression and low prices, there is more cotton being harvested mechanically in the Panhandle of Texas, this year, than at any time since 1926. In a recent trip to the vicinity of Lubbock, Texas, it was found that many different types of stripping devices, commonly called sleds were being used. These ranged all the way from the crude home-made sled having several fingers or a single slot for a stripping device to a commercial one-row horse drawn stripper and a tractor mounted and operated combined stripper, cleaner, and hull extractor.

Heretofore, the opinion has been that sledding or stripping was not practical until after a killing frost. This year, however, due to the earlier opening of the cotton, considerable stripping was done before frost had killed the leaves. This shows that there is a tendency among cotton growers to gradually move forward the date to begin stripping their cotton. If harvest is delayed until after frost, a considerable amount of cotton may have fallen on the ground.

There was a lot of cotton on the ground this year in early October, caused by its shedding and by being beat out by rain. In some fields there was as much as one-fifth of a bale to the acre on the ground. When such cotton was pulled by hand and the most of that on the ground picked up, large quantities of dirt were picked up with the cotton, making it necessary to carry around 2,400 pounds of the gathered cotton to the gin in order to get a 500-pound bale of lint. On the other hand, where the machines were being used, there was practically no attempt made by the operators to get the cotton that was on the ground, consequently, less dirt was collected by the machines than where the cotton was pulled by hand.

One farmer figured that he could use a home-made sled, leave all the cotton on the ground, and save money, because when he had paid 35 to 40 cents per hundred to get his cotton pulled and picked up, he would be pay-

Cotton stripper being developed by the Texas Agricultural Experiment Station. This is the 1931 machine at the beginning of the season.

ing for picking up about 400-500 pounds of dirt which was mixed with his pulled cotton. Then, when he figured his cost of hauling and ginning charges on his weight, it would amount to about 55 cents per hundred to pick up that cotton on the ground. He, therefore, used a two-row homemade finger type sled and harvested 14 bales of cotton off of 40 acres in four days with the help of one extra man. The two men with one team harvested around 3½ bales a day at a cost of approximately $1.75 a bale. It would have cost him on an average of $7.50 a bale to have it pulled, consequently, he figured he was saving approximately $5.75 per bale in harvesting these 14 bales of cotton, which saving practically offset what he was losing by leaving that on the ground.

One commercial concern had about 75 machines within the radius of 50 miles of Lubbock. They figured that their machine, which was sold to the farmer at $185, was capable of harvesting 400-500 acres per year and would give five years service. One farmer was using three of these one-row, horse-drawn strippers and harvesting a 400-acre field of cotton which was making around a bale to the acre. These three machines, they claimed, were harvesting 25 bales per day. When the cost of three men and three teams and depreciation was figured and prorated, they figured they were harvesting this cotton at a cost of 50 cents per bale against $7 per bale hand pulling. They also figured that to harvest an equal amount of cotton a day, it would require about 30 men pulling by hand to be able to pull as much as one machine would pull in a day.

At the present price of cotton, some farmers in the Panhandle figure that they can afford to lose the cotton on the ground and harvest their cotton mechanically. They can be independent of having to bother about hunting up a crew of hand pullers and having to be constantly after them, babying them along for fear they will leave him and go pull for neighbors. They do not pick much of the cotton in the Panhandle; they "pull" or "snap" the most of it. That is, they simply pull the burr containing the cotton, placing it all in the sack.

### *Station Sees Possibilities*

When several hundred thousands of bales of cotton were harvested, mechanically, in 1926 in West Texas, the officials of the Experiment Station and A. and M. College, immediately saw the possibilities of harvesting cotton by machinery and the approach of the time when a large part of the cotton crop of the South might be harvested mechanically. They at once began studying the various types of machines being experimented with, and also began working on the development of a machine, which was hoped would ultimately prove a success as a mechanical cotton harvester. As a result of efforts put forth by various individuals, a machine has been developed with which approximately 14 bales of cotton was harvested in 1931. No special effort was made to harvest a large quantity of cotton with the machine, but it was used to harvest all of the cotton on the Agricultural Engineering Farm at College Station, consisting of approximately nine bales. After finishing the cotton at College, it was found desirable to test the machine under western Texas conditions where the practice of harvesting cotton mechanically was already under way. Consequently, the machine was carried out to Lubbock, Texas, and five bales of cotton harvested in about 12 hours, on the Texas Experiment Substation, of which Mr. D. L. Jones is superintendent.

The cultural practices, size of plant, and yield of plant at Lubbock were unlike those at College Station, and a new set of pick-up fingers had to be constructed in order to pick up some of the cotton which had fallen on the ground and to pass under and lift up the low branches and open bolls of cotton resting on the ground. Results secured with the newly constructed fingers were quite satisfactory, since they enabled the machine to collect more of the cotton that was on the ground than was possible with the old type of fingers.

Another phase of the work being

This picture, taken October 21, 1931, is of a type of cotton plant being developed for mechanical harvesting by the Texas Agricultural Experiment Station.

carried on by the Texas Station is that of developing a variety of cotton which will be more suitable to mechanical harvesting than the average variety. As a general rule the varieties of cotton commonly grown have numerous long vegetative branches, making an excessive amount of leaves and foliage which often interfere with the easy operation of a machine. After studying the characteristics of a number of varieties as to their suitability to mechanical harvesting, it was found that a mutant strain of Durango cotton found at the Lubbock Station in 1923 had some very desirable characteristics, and this strain has been used as a parent in numerous crosses on other varieties. This was done in the hope of developing, through hybridization, a type of cotton which would have a more determinate habit of fruiting, earliness of maturity, restricted and compact branching, together with large storm-resistant bolls — characteristics which appear to be essential to the plant from the standpoint of the efficient harvesting by machinery. The fourth generation of these crosses was grown in 1931, and two, Durango X Lankart and Durango X Wacons, although lacking somewhat in uniformity, possessed practically all of the desired characteristics and gave satisfactory results in harvesting tests with the Texas Stripper.

A third problem presents itself when cotton is harvested by machinery, the removal of any extra trash collected by the machine during the harvesting process. This problem is being studied by the Texas Station and had progressed to the point where a special cleaner has been constructed. It is hoped that a type may be developed to clean mechanical harvested cotton to the extent that the grade of lint obtained will not be appreciably lower than that of hand-picked cotton.

### *Future Influence on Cotton*

Since there are a number of experimental cotton harvesting machines being developed with varying degrees of success, the question no doubt has arisen in the minds of many individuals as to what will be the influence of a satisfactory and economical cotton harvesting machine on the South's cotton production methods. Time alone

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One of the contestants in the recently held Ontario Provincial Plowing Match.

# The Art of Plowing

## *By E. K. Hampson*

Hamilton, Ontario

MORE than 100 years ago in the Township of Scarboro on the outskirts of Toronto, then known as "Muddy York," the first plowman's association in Ontario was formed. It has functioned ever since and is still one of the most active in the Province. As the timbered lands were cleared and came under the sovereignty of the plow, many other similar associations were formed. There has always been an axiom in Ontario that a straight, well-plowed furrow is a sure sign of a diligent and careful farmer and moreover is a character index of the plowman himself.

Twenty years ago a Provincial Plowman's Association was formed for the purpose of uniting the 190 local branches throughout the Province. This association has been presided over by J. Lockie Wilson, a figure known throughout the length and breadth of Ontario as a man of character and vision, preaching incessantly the gospel of a better agriculture.

Since that time the Association has grown spectacularly. It is now the largest of its kind in the world. At Stratford last year, 100,000 people attended the Provincial Match; and 288 teams were required for the contestants. Tractor classes had 113 entrants. Multiple horse hitches were demonstrated daily; while industrial firms displayed all that was new in farm machinery and equipment. Colleges and Experimental Stations disseminated new information in cultural methods, in fertilizer practice, and in the marketing of farm produce.

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# Indiana Grows Sweet Potatoes

## *By W. B. Ward*

Horticultural Extension, Purdue University

YOU can farm the way your forefathers did or gamble upon the stock market with equal results, but raising 651 bushels of prime sweet potatoes per acre is a different thing. Henry Quillen, Patoka, Indiana, grew 551 bushels of extra fine quality No. 1's and 100 bushels of No. 2's per acre and topped the growers enrolled in the Gold Medal Sweet Potato Club of Indiana for the 1931 season.

High yields give high quality and quality is what brings in the greatest returns per acre. During the 1930 season, the first year of the club, Mr. Quillen found that extra amounts of fertilizer paid on his demonstration plot, and his yield of 348 bushels of No. 1's ranked second.

Early in the spring of 1931, the whole field of 13 acres was covered with manure at the rate of eight loads per acre, and this was plowed under. The latter part of April, 175 pounds of an 0-8-32, a pre-planting application, was applied to each row and the ridge built over the fertilizer.

Small Stem Yellow Jersey was the variety used and bedded early enough to have good healthy slips ready to plant by the latter part of May. Fifty-two bushels of seed were used, and Mr. Quillen bedded four bushels of his own seed for each acre. The rows were 34 inches apart, and on May 25 the plants were set 14 inches apart in the row. A week later he side-dressed the sweet potato plants with 750 pounds of a 3-9-18, putting the fertilizer down where the plants could use it, and immediately followed with the first cultivation. Cultivation was continued as long as there was no evidence of injury to the vine growth,


Comparative results of various analyses show larger yields and more chunks from high potash fertilizers.

TABLE I.—1-2 RATIO OF PHOSPHORIC ACID TO POTASH PROVES MORE PROFITABLE THAN 2-1 RATIO

| Cooperator 1931 | Fertilizer Treatment | Yields per Acre No. 1's | No. 2's | Total |
|---|---|---|---|---|
| M. L. Lowe | 500 lbs. 2-8-16 | 179.5 bus. | 89.5 bus. | 269.0 bus. |
| Owensville, Ind. | 500 lbs. 3-9-18 | 160.0 " | 61.0 " | 221.0 " |
| | 500 lbs. 2-12-6 | 123.5 " | 64.0 " | 187.5 " |
| | 500 lbs. 2-16-8 | 90.0 " | 57.0 " | 147.0 " |
| C. E. Garret | 800 lbs. 2-8-16 | 176.7 " | 75.8 " | 252.5 " |
| Patoka, Ind. | 800 lbs. 3-9-18 | 170.5 " | 63.1 " | 233.6 " |
| | 800 lbs. 2-12-6 | 151.5 " | 66.3 " | 217.8 " |
| | 800 lbs. 2-16-8 | 151.5 " | 56.8 " | 208.3 " |
| Charles Stevens | 625 lbs. 3-9-18 | 248.5 " | 87.5 " | 336.0 " |
| Oaktown, Ind. | 625 lbs. 2-16-8 | 191.0 " | 94.0 " | 285.0 " |
| | No fertilizer | 90.0 " | 60.0 " | 150.0 " |

and all weeds and grass were kept out.

With less than normal rainfall throughout the season, the crop was harvested on October 23 with very gratifying results, inasmuch as the sweets were quite chunky and of good type. Other growers, neighbors of Mr. Quillen, as well as growers in the adjoining county, also had excellent results, and it was found that high potash fertilizers produced more chunky sweets.

By studying Table I, in the Lowe and Garrett fields, by reversing the ratio of phosphoric acid to potash from a 2-1 as found in the 2-12-6 and the 2-16-8 analyses, to a 1-2 ratio as in a 2-8-16 or 3-9-18, the increase in average yield was 54 bushels or over 28 per cent in the two plots.

The Charles Stevens plot with 1-2 ratio, or 3-9-18, gave a better yield than the 2-1 ratio, or 2-16-8, by 51 bushels. The 3-9-18 fertilizer more than doubled the yield over the non-fertilized check with a 186 bushel increase.

These data, as well as experience from other growers, show that fertilizers carrying phosphoric acid and potash in a 1-2 ratio are the most desirable analyses for this territory.

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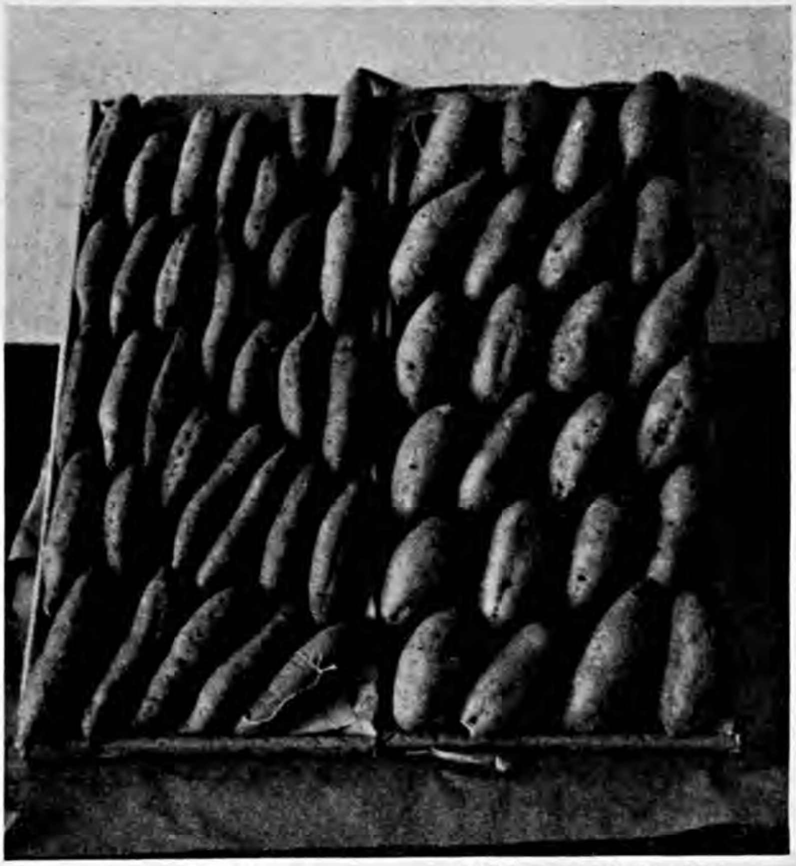


| | Fertilizer | Yield | % No. 1's |
|---|---|---|---|
| Left | 1,000 lbs. 2-12-6 | 348 bus. | 86% |
| Right | 750 lbs. 3-9-18 | 354 bus. | 95% |

Fertilizer demonstrated its value on corn, when two rows across the field were left unfertilized.

# St. Croix County Demonstration Farms

## *By I. J. Mathews*

Winamac, Indiana

AFTER an absence of 10 years, Joe Murphy with sharp analytical eyes surveyed the old Murphy farm and surrounding community, near Hammond, Wisconsin, some 30 miles from St. Paul. Away to the west, across gently rolling acres of deep black loam soil, the ancient St. Croix river meandered aimlessly back and forth across the broad alluvial plain it has been building for centuries.

But since Joe Murphy had been on the old place last, the tenacle-like roots of continuous grain crops had sapped these acres of their ready fertility. Murphy's thick chin protruded as he kicked into the stubborn sod, matted with quackgrass roots.

The big cavernous barn behind him, built in a day when lumber was on every stump, had been gaping for many a year. And inquiry among the neighbors brought the admission that their soil too, had lost its strength and their barns had never been full except for the first few years after they were built.

Joe Murphy was making a frank appraisal. Would it be profitable or possible for him to rout the quack, restore the soil to its pristine productiveness, fill the empty barns, and live in the country?

Could he repossess the old farm and other adjacent acres and on these put into operation principles that would justify the name he would choose for the land—"St. Croix County Demonstration Farms"?

"This is the way it came about," one of the neighbors told Murphy, reciting a bit of history. "At first, we grew clover; every seed came. Later, clover seedings made scant stands; later still, the clover failed in all except the most favored locations—gravel knolls, strips along the road, and parts of fields tucked in behind woods. When clover failed, then grain followed grain, then more grain and so on, always sparser clover and poorer grain. Finally, no clover, little shriveled grain, barns full of . . . local atmosphere!"

From an old lumberman, Murphy pieced out the story of the monopoly of the soil by quackgrass. "When the lumbermen, Paul Bunyan and others, were logging this country off, they bought the cheapest hay they could find for the company teams. Much of this was quackgrass hay, and the teamsters carrying it on the bunks of their sleighs scattered the seed all over the woods. Just as soon as the soil was cleared, the quack was ready."

### *Murphy Decides*

Into this troublesome triangle common to northern United States—no clover and poor grain crops, empty barns, and quack-ridden soil—Joe Murphy, with dogged resolution written into his features, unfurled the standard of proven practices worked out by himself and the College of Agriculture of the University of Wisconsin. From that time on, the story gains interest because of the results which have been obtained.

At present, there are 1,400 acres in the farm, with 400 more under lease with an option to buy. And this year, where but a few years back the quackgrass held undisputed dominion over hundreds of acres, Murphy grew 540 acres of barley, 600 acres of alfalfa and sweet clover, both new and old seeding, and 540 acres of corn. There are 200 acres in permanent pasture.

"The first thing we did was to control the quackgrass," Murphy stated in reviewing the results. "We have tried two methods."

"At first, we plowed the quack sod, later keeping down every green shoot, hoping to wear down the vitality of the roots. This is effective, but requires a large investment to work the field one year before getting any return.

"Lately we have been putting the quackgrass field to corn the first year and hoeing around the hills. And again the second year, corn is planted in the field and kept clean. After the corn for the silo is removed, the soil is thoroughly worked down to keep the quackgrass from getting a new lease again that fall, and the following spring, alfalfa or sweet clover is seeded with the barley."

### *Believes in Quality*

Murphy's reasoning on the quality of crops to raise is sound. "It takes as much plant food to make a bushel of good barley as a bushel of poor stuff," he told me. "And the same applies to corn. A farmer is trafficking in plant food, you can't dodge that, so his best game is to put his plant food into the most efficient grains the plant breeder has perfected."

And this owner acted on the strength of his convictions, for he secured certified seed of smooth-awn Wisconsin No. 38 barley, a strain developed by plant breeders at the University of Wisconsin.

On a field that grew sweet clover in 1929, Murphy harvested 52 bushels of barley per acre in 1930. In 1931, his entire 540 acres of barley averaged 37 bushels per acre, in spite of the fact that upper Wisconsin was afflicted with a severe late spring drought that put a crimp in spring-sown grains generally. The average yield of common barley in the neighborhood was 17 bushels.

I saw some of this year's crop, and cleaner, heavier barley never rolled out of a separator spout. Smooth, long grains with cream colored husks and clear amber kernels! They laid so close together they felt like lead in the hand; the test weight at threshing time was 46 pounds per bushel.

But let us go back a bit. In the spring of 1930, Murphy spread 92 carloads of lime on 1,400 acres of soil. And having the quackgrass under control and lime in the soil, Murphy put sweet clover or alfalfa seed in with all his small grains, which were mainly barley.

### *Believes in Fertilizers*

This operator lays much stress upon commercial fertilizer, because experience has taught him that he can't afford to do without it.

When the seed barley is being dumped into the drill in the spring, Murphy looks ahead to the alfalfa and sweet clover which will piece out the summer, after the barley is harvested, and will continue the following year. And that forward look to the plant food needs of both the barley and legume crop influences him to set the drill to apply 250 pounds of a 3-12-12 fertilizer per acre.

"Nitrogen for the spring," he explained, "phosphoric acid for the barley, and potash for the alfalfa and sweet clover."

After the first cutting of alfalfa hay, he set the fertilizer distributor at 125 pounds per acre and put an 0-20-20 analysis into the hopper. "Keeps the pep in 'er," he observed.

"No sir. No crop goes in without fertilizer on this farm," he said. "If we sow alfalfa alone, we use 250 pounds of 0-20-20. For corn, our practice is to apply 125 pounds per acre of 4-20-10 with the corn."

This owner does not underestimate the tenacity of quackgrass. "It will come in and occupy the ground when it gets so poor nothing else can grow," he admitted "but after you've done a thorough job of quackgrass eradication, if you put fertility in the soil, the alfalfa can stand off the quack." For proof he pointed out a strip of quackgrass in a big field of alfalfa north of the buildings.

"When we sowed barley there," he stated, "we used 200 pounds of 0-20-20 with it. On four drill widths across the field, the fertilizer attachment was shut off."

It did not take a telescope to find this strip. On the unfertilized area, the few struggling roots of quackgrass that had escaped the tillage implements had multiplied into a 100 per cent sod. On the other side of the line, the alfalfa was thick and green and rank. There could be no mistaking the cause. The plant food in the soil, equal parts phosphoric acid and potash, had enabled the alfalfa to more than hold its own against the voracious intruder.

Now when Joe Murphy looks out from the same spot from which he once surveyed the dissipated soil and hungry barns, he has as a background a beautiful country home, the old home repainted and

(*Turn to page* 42)

# Fertilizing Trees

## *By T. H. Blow*

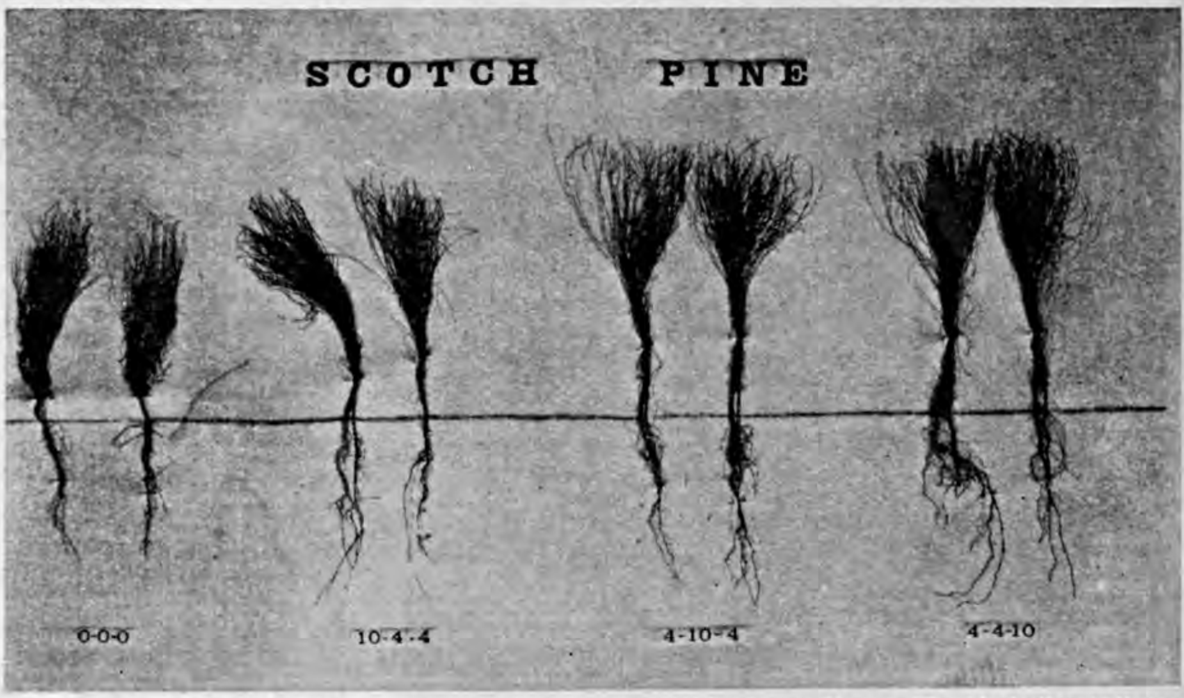
Springfield, Massachusetts

THAT fertilizer applications made to forestry seedbeds materially affect the size and growth of seedlings is shown at the end of two years of plot work at the St. Lawrence University, Canton, New York.

In the spring of 1930, under the direction of F. M. Callward, Professor of Forestry at this institution, series of fertilized plots were laid out on white pine, Norway spruce, red pine, white spruce, Scotch pine, with plots receiving no fertilizer for checks. Basic treatments on all plots were 500 pounds of a 4-4-4 fertilizer. The three elements, nitrogen, phosphorus, and potash, were increased in three series each by 6, 8, and 10 per cent respectively. The soil tested neutral, and seed was sown early in the spring after the fertilizers had been thoroughly mixed into the soil. Germination was poor except on the Norway spruce, Scotch pine, and check plots, but enough young plants survived to allow measurements at the end of two years. The duplicate plots started in the spring of 1931 show a much more even stand due to excellent seed germination of all varieties.

A study of the root systems on the two-year stock showed that the extra nitrogen produced a more slender tap root, going well into the soil; the plots having extra phosphorus tended to be more branching with a good supply of small feeder roots; while the extra potash combined both the long tap root and many branching feeders to make the best of the three root systems. This combination is very desirable for the best tree development. The seedlings on this high-potash plot

(*Turn to page* 42)




**Showing the effect of fertilizer treatments on two-year Scotch pine seedlings. The black line indicates ground line.**

THE SEASON'S GREETINGS

# PICTORIAL

Left: "Milk, vegetables, and fruit," say these 1931 health champions. Registering the highest score ever recorded in a national health contest, Gertrude Heikes, 16, of Dakota county, Nebraska, scored 99.9. William Sanders, 18, of Johnson county, Indiana, scored 99.1. Miss Heikes weighs 137 pounds and is 5′ 4″ tall. Sanders weighs 156 pounds and is 5′ 9″ tall.

Below: These typical American farm boys were selected as trophy winners in the annual National 4-H Club Leadership Contest at the National Congress recently held in Chicago. They are: left, Charles L. Brown of Battle Ground, Indiana, and right, Roscoe E. Owens of Guilford, New York.

Above: There is neither room at the table nor conversation for old man "Hard Times" when the children and grandchildren come home for the holidays. This scene, typical of others in countless American farm homes, was taken in the home of Mr. and Mrs. F. M. Peavey of Clay City, Indiana.

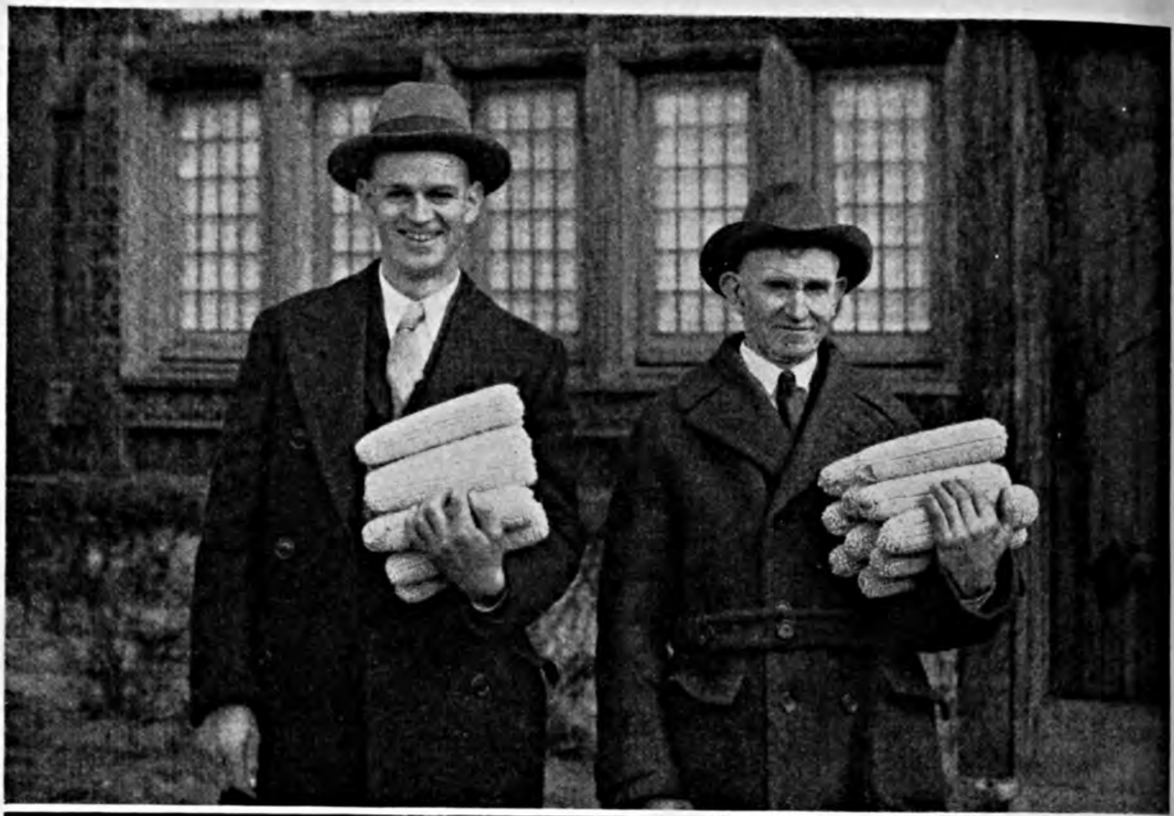
Right: And "When the Day Is Over," there is no better expression for the happiness and content of the family circle than an hour of the old songs in which all can join. It is occasions like these that hold memories to the charm of farm life.

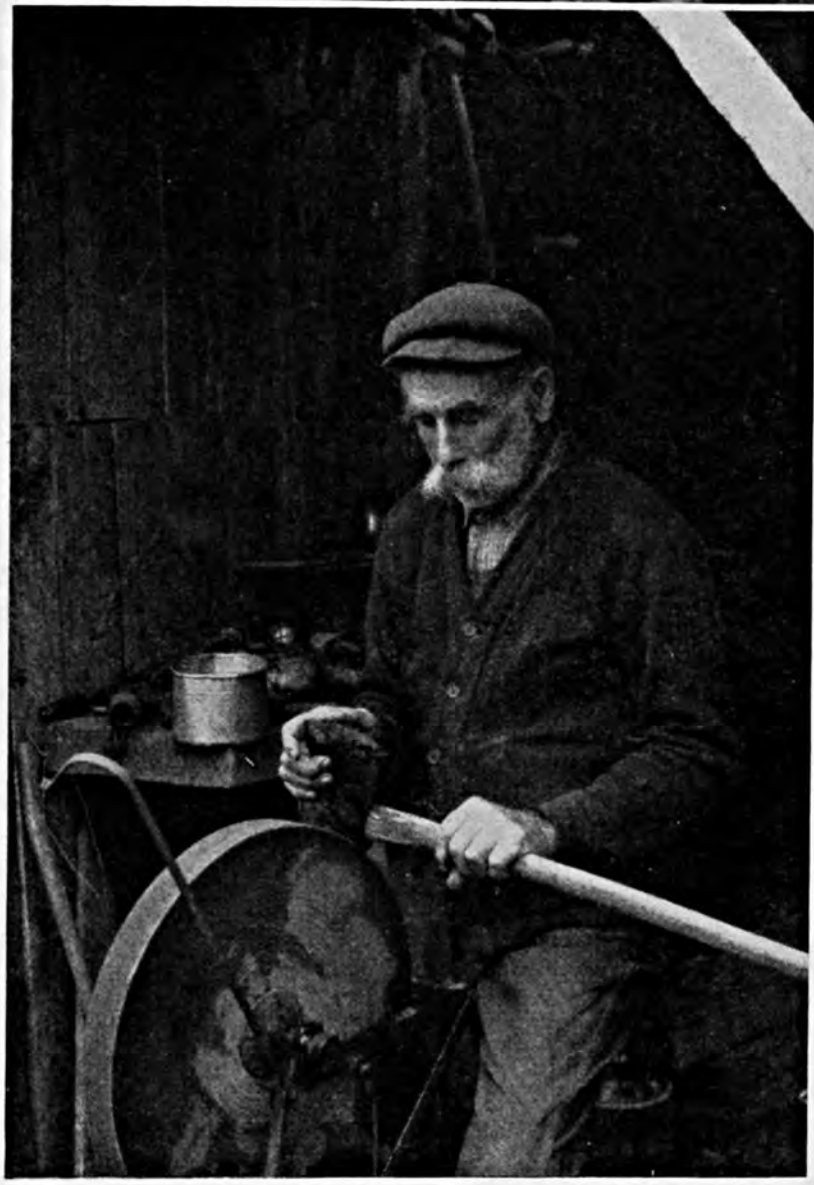
**Above: The whole family helps in packing the choice strawberries near Avignon, in southern France.**

**Below: An old water wheel in Provencal, France.**

Above: A load of fruit and vegetables ready to be taken to the market in Avignon, near Marseilles.

Below: Spreading sulphate of potash for tomatoes in southern France.





Above: Herman Pankop, Indiana winner in the Five-acre Corn Club and possibly world champion with his yield of 156.2 bushels per acre, and his father, Earl Pankop, who won the crown last year with a yield of 129 bushels per acre and placed second this year with a yield of 144.5 bushels per acre. Both men farm in DeKalb county, near Corunna, Indiana. Herman had his corn in a loam and muck soil that was in pasture in 1928, onions in 1929, corn in 1930, and corn again this year. During the past two years he placed 100 tons of manure on the plot and in addition he put 150 lbs. of 2-14-7 commercial fertilizer in the row and broadcast 250 lbs. of 0-12-18 per acre. His father applied 100 tons of manure, 200 lbs. of 2-14-7 drilled in the row, and 200 lbs. of 0-12-18 broadcast.

Left: Providing a valuable asset to farm savings, farm woodlots will receive even more attention this year. Here is a farmer preparing to take advantage of the hours between chores.

# The Editors Talk

## Want Amidst Plenty

The world is in want. Yet the world has, or could have plenty. Why then does the world want and millions suffer for lack of the simple necessities of life? To what end is human thought and activity tending if with all the vaunted help of a scientific age, far-reaching powers of organization, and the experience of the ages behind us, amidst granaries that are over-flowing, humanity cannot yet be assured of a daily loaf of bread?

Of all the problems challenging human thought and character, this problem of want amidst plenty is the saddest and most acute. The more so to the average man unlearned in the higher intricacies of world finance, because to his relatively direct way of looking at things around him, human suffering amidst present facilities for production, both urban and agricultural, seems unnecessary. The growing complications of world trade and finance make this problem difficult to understand.

Complexity is the price demanded for modern civilization. The ancient simple exchange of goods by barter has become more involved by the introduction of other factors, especially by price, the medium through which goods are exchanged and which in turn is related to the gold supply. Methods of financing, credit, the free or restricted flow of goods from one country to another, and other influences also affect the exchange of goods and volumes of trade. Thus, our present civilization is sustained, not by a simple exchange of goods, but by a world system of exchange. When the system works well in all its parts, the product is prosperity; and when it gets out of order, the result is depression.

What explanation do the economists give for the system getting out of order? For of all the people qualified to give an opinion, certainly the economists might be expected to explain and interpret such causes.

There are, of course, schools of economic thought as there are schools of all thought, with resulting differences in emphasis and interpretations. But an explanation of one cause for present conditions which has the virtue of being very clearly presented in every-day language, is one by G. F. Warren and F. A. Pearson in an article "Prices and Gold" recently published in the *Farm Journal*.

This cause is the relation of gold to prices. First, in recent years there has been a greater demand for gold. In order to return to the gold standards following the war, many countries have required more gold. Nations have also required more gold than in prewar days because the world now conducts a larger volume of business. A certain quantity of gold will support a given volume of industrial production. But, as Warren and Pearson point out, "on the prewar basis of gold to prices, the present world gold supply would support a price level of about 83, when prewar is considered as 100. Our price level in 1929 was 141. It is not surprising that prices have fallen." Yet the world's gold supply has not increased in proportion in recent years; in fact, it has declined.

Thus, because a relatively limited supply of gold is in steady demand, people are willing to exchange larger and larger amounts of goods and services for a given quantity of the gold available. This means that as the demand for gold increases, prices have declined. Rapidly declining prices mean deflation and depression. As the authors point out, the law of supply and demand is only half the problem, "the general level of prices is determined by the supply of and demand for money."

But while explanations in broad outline may be comparatively simple, the problem in its closer contacts and necessary adjustments is, of course, extremely difficult and complicated. Certainly it helps to clarify the situation in the mind of the average man when such well-known economists as Warren and Pearson interpret causes in simple every-day language, and both they and the *Farm Journal* are to be congratulated for this service. For the more the essential facts are presented to the public in terms they can understand, the more the public will become educated to the fundamentals of the economic viewpoint and consequently, the less the danger of ill-digested panaceas being advocated and adopted. In fact, one of the most striking phenomena of the present time is the circulation of a more accurate knowledge of the present situation in all its aspects, which is the chief cause possibly for the absence of panics and labor difficulties and on the more positive side, for the organization of voluntary work for the social good.

If the broad interpretation of economists is to be accepted, there is no panacea or short cut. Ultimate recovery is a long road demanding patience and hard work. The best that we, as average citizens, can do possibly is to helpfully adjust our ways of living to our surroundings as best we can. But more than this, we should use all the influence we may have to encourage and support the teachings and plans of honest men who are in a position to know the intricacies of the present situation, both from a world and national viewpoint. By so doing, we will support them in taking whatever measures are necessary so that the machinery of trade may again function to the ultimate end that amidst plenty every man may be assured, both of a day's work and a proper return for his labor.

## Catering to the Public

Agriculture and industry alike must find some method of producing profits other than through mass production alone. With an almost unlimited expansion of the American and foreign markets, industry and agriculture have busied themselves with but one goal, that of increasing production and thereby lowering cost. In order to accomplish this mass production and secure cheap unit cost, standardization has been the order of the day. But the consuming public is made up of individuals whose ideas differ and, therefore, they want merchandise and products of a wide variety—variety of shape, pattern, color, and taste.

Both farm and factory have found standardization and mass production profitable so long as the supply was less than the demand. However, under this highly mechanized and highly standardized program, production now greatly exceeds demand in almost every line. When the markets become glutted or over-supplied, the consuming public finds it a wonderful opportunity to exercise extreme caution and discrimination.

Thoughtful manufacturers of textiles or other products no longer manufacture large quantities of given style, model, or pattern without first securing orders for at least a part of their output. It seems that the day of blind mass production of standardized products is about at an end. Producers can no longer dictate what the consumer will eat, wear, or use. The consumer who pays the price has a right to some consideration, and already some of our most progressive manufacturers and producers of farm products have turned their plants to the production of articles of quality and individuality.

Of course, such changes require additional capital, but why continue producing that which the public does not want? The most prosperous groups of the textile industry are the manufacturers of rayon. Many of these plants formerly produced cotton fabrics, but staked their future on the increasing popularity of rayon.

Many farmers who produced staple products such as cotton, corn, and wheat are now growing small quantities of other products for which there is a limited, but a ready, market. Certainly there is a limited demand for the products of highly specialized farms and factories, but the profits usually go to those who first venture into a field and become recognized and established. It is true that the production of specialties and novelties either in the field of industry or agriculture is hazardous and limited, but how can it be more hazardous than continuing to produce that which the public does not want, or rather is unwilling to buy at a fair price.

## Land Utilization Conference

A land utilization conference, under the joint auspices of Secretary of Agriculture Arthur M. Hyde and the Association of Land Grant Colleges and Universities, recently met in Chicago. More than 350 registered delegates voted on definite recommendations for the better utilization of agricultural lands. As the Secretary of Agriculture pointed out, the need for land utilization "lies in the vast waste of human and material resources now taking place in our rural areas."

Eighteen recommendations were made. They covered a variety of subjects. It was recommended by the conference that the grazing ranges on public land should be organized under a federal agency similar to the organization of the national forests; that lands valuable for watershed protection, even though in different States, should be administered under the supervision of the federal government; that school lands in the Western States should be consolidated; that agricultural credit should be jointly studied by representatives of all organizations dealing with credit; that the agricultural outlook work should be enlarged and organized on a national and local basis; and that an economic inventory of the land resources on the basis of the agricultural value of land be made.

Other recommendations dealt with homestead interest, taxation, the licensing of land development enterprises, the use of marginal land; that the reclamation service confine its efforts to finishing projects already started; that factors affecting regional competition be studied; that steps should be taken to initiate a soil conservation program; that soil survey work and land utilization surveys, particularly in newer territories, should be coordinated.

Of vital interest in our growing industrial age is the recommendation of decentralizing industry and its effect upon land utilization. Finally, regional conferences were recommended, also the creation of two national committees to be known as the National Land Use Planning Committee and the other to be known as the National Advisory and Legislative Committee on Land Use.

The proper use of land on the most efficient basis for the greater social good is certainly a problem that offers wide scope to all the imagination and executive ability that can be given to it.

# Farm Income 1931

The income of the American farmer for 1931 is estimated by Secretary Hyde in his annual report at $7,000,000,000, which is in sharp contrast to an income of $9,347,000,000 for 1930 and $11,911,000,000 for 1929, and represents a decline of approximately $5,000,000,000 in two years.

Even though farmers obtained "some small compensation for price declines in the shape of reduced production costs," the American farmer still faces a grave problem requiring all the adjustments possible, both on the part of Government and by his own individual efforts.

Necessary adjustments include that of wheat acreage, for the report points out that "wheat production, though less this year than it was in 1930, is not sufficiently less to make a large cut in the carry-over." The overproduction of wheat, the report says, is a cumulative and not merely a seasonal condition. In general American agriculture is over-expanded in production for export, and lessened dependence on the export trade is recommended.

The influence of the world depression on the fortunes of agriculture is emphasized by Secretary Hyde. But emphasis is laid on the primary importance of adjusting production within the United States. That the decline in the general level of farm prices which has been practically continuous for more than two years was checked during the period from October 15 to November 15 is encouraging. The index at 71 on November 15 represented a three point rise over the preceding month, which is the most pronounced upward movement the index has shown since August, 1929. It may be that the farm prices, low as they are, are tending to stabilize, which in the case of many of the major crops would be a great help towards increasing consumption.

It is also possible that the prices of commodities which the farmer purchases may continue to decline, so that together with possible stabilization of farm prices, the farmer may not be so badly off next year as the sharp decline in farm income would indicate.

# Christmas 1931

Hard times this Christmas season will compel many of us to examine with care, and possibly with some misgiving, our personal scale of values. In other words, what do we need to make us happy? What do we believe is necessary for joy and happiness at Christmas time?

If happiness requires cars, radios, parties, and the exchange of expensive and striking presents, then are most of us doomed to disappointment and to anything but happiness, for we know only too well that the Christmas spirit this season must bear fruit within the narrow limits of small and careful expenditures.

But why need this be any bar to a happy Christmas, for hard times are a challenge to the spirit; to finding happiness in simple family and neighborhood privileges and pleasures, and in the giving of simple things that may cost but little. And if hard times has in any way turned our minds from the emphasis on expense and display to simple privileges and pleasures, and if any joy has been found in the doing of them, then a Christmas in hard times may yet be the greatest thing that has happened in our generation.

A Happy Christmas to all our readers and contributors and may the New Year carry you along the road to real happiness.

# Indiana Grows Sweet Potatoes

(*From page* 26)

Table II shows that during this past season the early application of muriate of potash was a very important factor in the production of chunky sweets.

TABLE II.—EXTRA EARLY APPLICATIONS OF MURIATE OF POTASH INCREASED TOTAL YIELDS AND BUSHELS OF NO. 1's.

| Cooperator | Pre-season Application of Muriate of Potash | Fertilizer Treatment at Planting | Yields per Acre (Bushels) No. 1's | No. 2's | Total |
|---|---|---|---|---|---|
| *Mervin Holcomb | 250 lbs. 0-0-50 | 375 lbs. 4-16-8 | 253 | 44 | 297 |
| Oaktown, Ind. | Jan. 17 | 375 lbs. 4-16-8 | 193 | 65 | 258 |
| George Shaw | 300 lbs. 0-0-50 | 600 lbs. 4-4-20 | 128.5 | 80.5 | 209 |
| Oaktown, Ind. | Jan. 20 | 600 lbs. 4-4-20 | 64.5 | 36.0 | 100.5 |
| Edward Neal | 500 lbs. 0-0-50 | 500 lbs. 2-12-6 | 284 | 72 | 356 |
| Decker, Ind. | Jan. 26 | 500 lbs. 2-12-6 | 231 | 63 | 294 |
| Irvin Jarding | 500 lbs. 0-0-50 | 550 lbs. 0-12-6 | 262 | 67 | 329 |
| Vincennes, Ind. | Jan. 26 | 550 lbs. 0-12-6 | 190 | 58 | 248 |

* The sweet potatoes exhibited by Mervin Holcomb were awarded first prize at the International Hay and Grain Show, Chicago, 1931. Indiana also won sweepstakes of the show over all other States.

# Cotton Harvesters

(*From page* 23)

will answer this question, but many like to try forecasting and prophesy as to what might be the result. The following are some of the probable changes that may be brought about:

1—The first question that is usually asked regarding the influence of harvesting cotton by machinery is: What are we going to do with labor that machine harvesting will be expected to displace? One answer for this is that the transition from hand harvesting to mechanical harvesting likely will be so gradual that the displaced labor will be able to

This two-row finger type cotton sled is home-made.

adjust itself without any hardships. Then, as time goes on, various methods of financing the production of the crop and different agreements between the landlord and tenant will be worked out.

2—The change from hand harvesting to machine harvesting is now starting in the Panhandles of Texas and Oklahoma and will gradually spread into other sections.

3—The spreading from one section to another will very likely be the result of adapting different types of machines for different sections. For example, stripping might be the method used in the northwest, while probably a picking machine will be the type of machine for other sections.

4—It is already a recognized fact in the Panhandle that those who do harvest their cotton mechanically with the least loss must plant, cultivate, and shape the ground during the last cultivation so that it will be easier for the machines to collect any cotton that might be on the ground.

5—Another important point that must be considered is the selection of a variety of cotton suitable to mechanical harvesting. This may mean the adaptation of new varieties bred especially to suit machine harvesting.

6—Harvesting by machinery will practically make the cotton grower independent of outside help and make cotton production more a family affair, provided, of course, he changes his cultural practices to eliminate chopping and excessive hoeing.

# St. Croix Demonstration Farms

(*From page* 29)

repaired, sheltered by large elms, maples and clusters of evergreens. And instead of bristling quackgrass sods, sparse fields of wheat or struggling corn, Murphy sees thick, golden heads of barley, rolling slopes of blue-green alfalfa, and corn, vigorous from its supply of plant food in the soil.

In the fall, his own barns full of hay, he rents two-thirds of the barn space in six of his neighbors' barns, and besides this, 50-ton hay stacks are scattered about over his own hay fields.

With a satisfied smile he said, "Lime, good seed, and proper fertilizers did it." But to these we take the liberty of adding a fourth factor, "a resolute chin."

# Fertilizing Trees

(*From page* 30)

were more stocky, sturdier, and had a greater top growth than those on either the nitrogen or phosphorus series.

Average measurements made on the two-year Scotch pine for the high treatment of each series were:

| | Check inches | 10-4-4 inches | 4-10-4 inches | 4-4-10 inches |
|---|---|---|---|---|
| Top growth | 5.1 | 5.5 | 5.9 | 6.3 |
| Root growth | 6.0 | 7.5 | 7.0 | 8.0 |

With Norway spruce the 8-4-4, 4-8-4, and 4-4-8 plots showed to the best advantage. In this particular series a slight yellowing effect was noticeable with the higher phosphorus treatments.

On the plots started in 1931, locust and ash were added to the list of varieties. First year growth was very rapid,

(*Turn to page* 44)


## NEW POTATO HARVESTER

To take the backache out of potato harvesting, agricultural engineers of the Pennsylvania State College are developing a new machine. The second model of the implement recently completed a trial on a 12-acre field of potatoes on the college farm.

The new machine is attached behind an ordinary digger. As the potatoes are dug they drop on a slowly moving conveyor table on the harvester. Here the vines are removed by hand and the potatoes are placed by several men on belts which carry them to a wagon elevator or to a crating device. The picking table is about waist high, so that the men can work comfortably.

Two bushels a minute have been handled by the men and the machine. Turns and delays retard the operation so that 75 bushels an hour is the best speed made for an entire day.

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## VITAMINS IN COTTONSEED FLOUR

Cottonseed flour has proved to be a valuable source of vitamins B and G, both needed in diets restricted because of last year's drought or reduced incomes. The Bureau of Home Economics, United States Department of Agriculture, has carried on a number of special vitamin studies during the last year, to supplement its recommendations for low-cost diets and pellagra-preventive foods that are cheap and readily available in the areas where they are most needed.

Cottonseed flour, which is valuable in many ways as a human food, has been on the market for more than 10 years. It is more finely ground and more highly refined than the meal from which it is made. Laboratory tests show that it is a fair source of vitamin B and that it contains from one-half to one-third as much vitamin G as yeast. At its present price of less than 10 cents a pound, cottonseed flour is a relatively cheap source of these vitamins and also contains other nutrients.

Very palatable baked products can be made by using part cottonseed flour, the bureau finds. Bread, muffins, and doughnuts are especially good. As cottonseed flour does not contain the gluten-forming constituents that give bread-making value to wheat flour, it is generally used in combinations with bolted wheat flour. Cottonseed flour was substituted for about one-fifth of the wheat flour in the baked goods made by the bureau. Bread made from this combination has a dark color and a nutty flavor. When used in the proportion suggested, cottonseed flour affords ample amounts of the pellagra-preventive factor for most diets.

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## FARMERS MUST PLACE PRODUCTION BEFORE MARKETING

"I still think that we Pennsylvania potato growers must concern ourselves chiefly with the problems of production in spite of the fact that a great many growers resent discussing such problems at our meetings and instead advocate mainly discussions on marketing," writes a prominent grower and Master Farmer. He continues, "We must market what people want. We cannot grade and market what we have not produced. This year and last year I had to sell all of my potatoes at home, for I had nothing to grade and ship to the large wholesale market because of appearance."

Exactly so! The crux of marketing farm products in Pennsylvania is having products of quality to sell. Good stuff, be it potatoes, apples, dairy cattle, or what not, has a ready market. It is the producer of poor stuff who puts it up in unattractive form that has a severe marketing problem. And that problem grows out of a keen competition coming from the shipment of good products into our state from other areas.—*Miles Horst—Pennsylvania Farmer.*

# Fertilized Trees

(*From page* 42)

and measurements of the top growth on October 22 showed a difference of 10.6 inches for the locust and 4.7 inches for the ash in favor of the completely fertilized plot. These measurements are the average of the various treatments, due to a change in the plot layout.

In forest nursery practice these results to date would indicate that fertilizers could be used to advantage in producing more sturdiness in both root and top growth of seedlings. High potash with reasonably high phosphorus would seem very essential for best results. However, with further work being carried on with a duplicate set of plots more definite recommendations must be left to a later date.

# South Carolina Competes in Sweets

(*From page* 20)

power to make more No. 1's and win the prizes. Of their total yields 70 per cent were No. 1's, while the average for all contestants was only 57 per cent No. 1's.

Potash increases total yield as well as the percentage of No. 1's, thereby adding profit in two ways. The Virginia Truck Experiment Station after nine years testing recommends 1,000 pounds of complete fertilizer carrying 15 per cent potash.

Here is what T. L. Gramling of Orangeburg county, the State champion contest winner who made 579 bushels per acre, says about fertilizing this crop, as reported in South Carolina Extension Circular No. 111: "Use a liberal amount of a well-balanced potato fertilizer analyzing about 8 per cent phosphoric acid, 3 or 4 per cent ammonia, and 15 to 20 per cent potash."

South Carolina did what other States failed to do, she brought all the loose ends of the sweet potato industry together, i.e., production, grading, and marketing. Certainly she has not reached perfection in any of these fields, but with the knowledge gleaned during these two years, South Carolina farmers can now compete with sweet potato growers in any State in the Union.


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, and Crops. 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**

In view of the large number of newer fertilizer materials that has appeared on the market in recent years, the pamphlet, "New Fertilizer Materials," by A. R. Merz is very timely. The author briefly describes most of these new fertilizers in a non-technical manner, giving a brief statement of their composition, preparation, and properties. This publication, issued as Circular No. 185, of the United States Department of Agriculture, will make an excellent reference for those interested in fertilizers.

A handy summary of "Fertilizer Recommendations for Florida" has been prepared by a committee of the University of Florida and is being distributed by the Agricultural Extension Service of that State. For each of the important crops, recommendations are made as to analysis and amount of fertilizer or formula, in case the farmer wishes to make his own fertilizer mixture. Complete fertilizer programs for bearing citrus groves and tobacco are included. Brief discussions of fertilizer ratios and time of fertilizers are also given. Such circulars prove helpful to farmers and advisory groups and are an important type of publication.

The question as to the best place in the soil to put the fertilizer has often been discussed, but usually with little data to substantiate observations and opinions. Lack of data on this important and controversial subject has been due largely to the great difficulty attached to conducting research work on it. Problems of the fertilizer, climate, soil, and crop must be considered. Realizing these difficulties as well as the magnitude and importance of the problem, the United States Department of Agriculture, the fertilizer industry, implement manufacturers, and State experiment stations have cooperated in conducting a research project on fertilizer placement. A progress report on work accomplished in 1930 has just been issued by G. A. Cummings, A. L. Mehring, G. H. Serviss, and W. H. Sachs entitled, "Progress Report on Mechanical Application of Fertilizers to Cotton in South Carolina, 1930," United States Department of Agriculture, Circular No. 192. As the title implies, the results to date of work still under way are given, and conclusions naturally cannot yet be taken as final. It was found that under the conditions of these experiments, fertilizers should not be in contact with the seed. On a heavy soil, fertilizer below or beside this seed was satisfactory. On lighter soils, fertilizer four inches or less under the seed was not satisfactory, but fertilizer beside the seed did not appear to be injurious in any way. Increasing the amount of fertilizer per acre was not injurious if the fertilizer was applied in an appropriate manner as mentioned above.

When stand was injured by fertilizer, the yield was not reduced in proportion to the reduction in stand. The authors believe this may have been due to the fertilizer injuring only the weaker plants that would not yield as well as the other plants even if not injured. They say that "a degree of injury to germination may be desirable if final stand is not seriously impaired." Highest yields were obtained when the fertilizer was placed as closely as possible to the seed without seriously affecting germination. When fertilizer was applied below the seed in large amounts on limed soils, better results were obtained if part of the fertilizer was applied as a side-dressing after chopping instead of putting all of it below the seed at planting time. Irregular distribution of fertilizer decreased the yield of seed cotton.

As mentioned above, these conclusions as yet can be taken to hold only for the conditions of the experiments. Further work now under way is expected to show how broadly the results can be applied. In any case, this important and valuable work in showing the farmer how to apply his fertilizer to get the best results is much needed, and every effort should be made to carry it through to conclusion.

An interesting experiment on strawberries is under way in North Carolina in which problems connected with the fertilization of this important and popular fruit are being investigated. A preliminary report of data so far obtained has been prepared by R. A. Lineberry, J. J. Skinner, H. B. Mann, and C. B. Williams, entitled, "Results of Strawberry Fertilizer and Tillage Experiments," and issued as Agronomy Information Circular No. 64 of the North Carolina Experiment Station. The authors state that 1,500 pounds of a fertilizer analyzing 5 per cent nitrogen, 8 per cent phosphoric acid, and 6 per cent potash has given the best results under the conditions of these experiments considering yield and quality of the fruit. This fertilizer should have nitrogen from both organic and mineral sources, while the muriate seems to be the most satisfactory potash carrier. Double strength or concentrated fertilizers gave better results than ordinary strength fertilizers, using the same amounts of plant food. The addition of the so-called rare elements such as manganese, nickel, copper, and zinc was beneficial in some cases, but the results varied considerably on different soils. Applying all the fertilizer in the late summer or early fall was superior to applying part of it in the summer and part in the winter. The strawberries did best on a slightly acid soil with a pH around 6. With reference to cultivation, the authors found that cultivation given early in the summer favored total yield and earliness next season. This preliminary report will be of interest and value to all who grow strawberries on a commercial scale.

*"Fertilizer and Cottonseed Meal Analyses Report, Season 1930-1931," Dept. of Conservation and Inspection, Little Rock, Ark., Dr. W. F. Manglesdorf and G. W. Roark.*

*"Commercial Fertilizers and Soil Fertility in California," Univ. of Cal., Berkeley, Cal., Ext. Cir. 57, Oct., 1931, P. L. Hibbard.*

*"State Laboratory Fertilizer Report—Seed Report, Jan.-June, 1931," State Bd. of Agr., Dover, Del., Quar. Bul., Vol. 21, No. 2, June 30, 1931.*

*"Commercial Fertilizers," Agr. Exp. Sta., Lafayette, Ind., Cir. 182, May, 1931, H. R. Kraybill, O. S. Roberts, O. W. Ford, L. E. Horat, and M. H. Thornton.*

*"Analyses of Commercial Fertilizers," Agr. Exp. Sta., Lexington, Ky., Bul. 313, Dec., 1930, H. E. Curtis, H. R. Allen, and Lelah Gault.*

*"Effect of Fall Applications of Sodium Nitrate Upon the Color, Keeping Quality, and Nitrogen Content of Apples," Agr. Exp. Sta., College Park, Md., Bul. 326, May, 1931, W. W. Aldrich.*

*"Inspection and Analysis of Commercial Fertilizers; Spring, 1931," Agr. Exp. Sta., Columbia, Mo., Bul. 306, Aug., 1931, F. B. Mumford, M. F. Miller, and L. D. Haigh.*

*"Fertilizers for Vegetable Crops on Ohio Soils," Ohio State Univ., Columbus, O., June, 1931, Department of Horticulture.*

*"Analyses of Commercial Fertilizers," Agr. Exp. Sta., Clemson Coll., S. C., Bul. 276, Aug., 1931, R. N. Brackett and D. H. Henry.*

*"Commercial Fertilizers in 1930-31 and Their Uses," Agr. Exp. Sta., College Station, Tex., Bul. 434, Sept., 1931, G. S. Fraps and S. E. Asbury.*

*"Getting the Most out of Stable Manure," Univ. of Wis., Madison, Wis., Radio Circular, Oct., 1931, C. J. Chapman.*

**Soils**

On reading the 1931 Annual Report of Dr. H. G. Knight, Chief of the Bureau of Chemistry and Soils, United States Department of Agriculture, one cannot help being impressed with the scope, magnitude, and diversity of work being done by that important unit of the Government. The investigations range from the suitability of soils as sites for national monuments to the effect of light on the keeping quality of foods. In addition to the highly important fundamental pure research conducted, a surprisingly large number of projects deal with everyday practical problems. American agriculture is indeed fortunate in being served by such a competent organization.

The importance of lime in conjunction with intelligent cropping and fertilization in building up and maintaining the productivity of soils cannot be over-emphasized. Good cropping systems or fertilizer practices will not solve the productivity problem if lime is lacking, nor will the greatest value of lime be recognized if the other factors are limiting. The secret of a productive soil is largely a matter of a consistent and well-balanced program of soil management.

The liming side of the question is ably and practically presented by C. M. Linsley in Illinois Agricultural Experiment Station Circular No. 375 entitled, "Limestone, the Key to Soil Building and Higher Crop Yields." Results of using lime on farms are given, showing the profitableness of correct liming. Objections to the use of lime are given and answered. Testing soils to determine whether they need lime and the forms of lime to use are briefly considered. The author also discusses fertilizers in connection with soil fertility, recognizing that lime is only part of the problem, as mentioned above.

*"How to Obtain Soil Samples for Analysis," Agr. Coll., Fort Collins, Colo., Ext. Bul. 293-A, Dec., 1930, R. D. Hockensmith.*

*"The Relation of Forest Composition and Rate of Growth to Certain Soil Characters," Agr. Exp. Sta., New Haven, Conn., Bul. 330, July, 1931, H. W. Hicock, M. F. Morgan, H. J. Lutz, Henry Bull, and H. A. Lunt.*

*"The Effect of Soil Reaction on the Growth of Tomatoes and Lettuce and on the Nitrogen, Phosphorus, and Manganese Content of the Soil and Plant," Agr. Exp. Sta., Lexington, Ky., Res. Bul. 314, Mar., 1931, E. M. Emmert.*

*"Improving Garden Soils," Agr. Exp. Sta., New Brunswick, N. J., Ext. Bul. 90, Aug., 1931, H. R. Cox.*

*"Some Nitrogen Relationships in Muck Soils," Agr. Exp. Sta., Ithaca, N. Y., Memoir 137, Aug., 1931, B. D. Wilson and G. R. Townsend.*

*"Report of Proceedings of the Second Southwest Soil and Water Conservation Conference," Agr. Exp. Sta., Stillwater, Okla., Cir. 79, Oct., 1931.*

*"Chemical Composition of Soils of Cameron, Coleman, Dallas, Erath, Harris, Reeves, Rockwall, and Tarrant Counties, Agr. Exp. Sta., College Station, Tex., Bul. 430, July, 1931, G. S. Fraps.*

*"The Soils of Texas," Agr. Exp. Sta., College Station, Tex., Bul. 431, July, 1931, W. T. Carter.*

*"Manganese in Texas Soils and Its Relation to Crops," Agr. Exp. Sta., College Station, Tex., Bul. 432, Aug., 1931, E. C. Carlyle.*

*"Soil Survey of The Gila Bend Area, Ariz.," U. S. D. A., Washington, D. C., Series 1928, No. 4, F. O. Youngs, W. G. Harper, and M. R. Isaacson.*

*"Soil Survey of The Paradise-Verde Area, Ariz., U. S. D. A., Washington, D. C., Series 1928, No. 6, F. O. Youngs, T. W. Glassey, E. N. Poulson, and M. R. Isaacson.*

*"Soil Survey of The Santa Ynez Area, California," U. S. D. A., Washington, D. C., Series 1927, No. 15, E. J. Carpenter, T. W. Glassey, and R. Earl Storie.*

*"Soil Survey of The Arkansas Valley Area, Colorado," U. S. D. A., Washington, D. C., Series 1926, No. 24, A. T. Sweet and Wayne Inman.*

*"Soil Survey of The Jerome Area, Idaho," U. S. D. A., Washington, D. C., Series 1927, No. 16, E. N. Poulson and J. A. Thompson.*

*"Soil Survey of Buchanan County, Iowa," U. S. D. A, Washington, D. C., Series 1926, No. 33, T. H. Benton, M. H. Layton, and J. H. Zentmire.*

*"Soil Survey of Butler County, Iowa," U. S. D. A., Washington, D. C., Series 1928, No. 5, J. Ambrose Elwell and E. N. Poulson.*

*"Soil Survey of Union County, Iowa," U. S. D. A., Washington, D. C., Series 1927, No. 14, J. Ambrose Elwell and W. J. Moran.*

*"Soil Survey of Crawford County, Kansas," U. S. D. A., Washington, D. C., Series 1928, No. 3, M. H. Layton, J. A. Kerr, E. W. Knobel, H W. Higbee, and R. W. O'Hara.*

*"Soil Survey of Custer County, Nebraska,"*

*U. S. D. A., Washington, D. C., Series 1926, No. 36, F. A. Hayes, M. H. Layton, E. A. Nieschmidt, C. H. Hayes, A. N. Huddleston, and S. S. Diedrichs.*

*"Soil Survey of St. Lawrence County, New York," U. S. D. A., Washington, D. C., Series 1925, No. 34, Clarence Lounsbury, H. G. Lewis, F. B. Howe, and Salvador Diadato.*

*"Soil Survey of Williamsburg County, South Carolina," U. S. D. A., Washington, D. C., Series 1928, No. 7, W. J. Latimer, B. H. Hendrickson, F. R. Lesh, A. H. Hasty, W. E. Tharp, and C. S. Simmons.*

## Crops

Of particular interest to our readers and adding to the literature on the nutrition of apple trees, are the results of the research work of A. E. Murneek and E. J. Gildehaus. Reported in Bulletin 300 "Progress in Agricultural Research," the report of the Director of the Missouri Agricultural Experiment Station for the year ending June 30, 1931, the results show:

"A marginal burning of leaves was produced in dwarf apple trees growing in loose soil in tubs by heavy applications of nitrogen fertilizers. This suggested potassium starvation. Apple trees were then grown in sand cultures and fed increasing amounts of nitrogen. The marginal burning of leaves was again produced. By increasing the amounts of potassium the harmful effects of relatively large amounts of nitrogen were obviated."

With fertilization a growing subject of interest among orchardists, the results of this research will undoubtedly reach many sections. This work, is, of course, only one of a great many projects reported in the survey of the activities of the Missouri Experiment Station.

*"Small Grain Crops in Alabama," Agr. Exp. Sta., Auburn, Ala., Cir. 60, Aug., 1931, R. Y. Bailey and J. L. Seal.*

*"Nectar and Pollen Plants of California," Agr. Exp. Sta., Berkeley, Calif., Bul. 517, Oct., 1931, G. H. Vansell.*

*"Girdling Grape Vines," Agr. Exp. Sta., Berkeley, Calif., Ext. Cir. 56, Sept., 1931, H. E. Jacob.*

*"Factors Influencing the Establishment of Irrigated Pastures in Northern Colorado," Colo. Exp. Sta., Fort Collins, Colo., Bul. 378, July, 1931, Herbert C. Hanson.*

*"Report of the Director for the Year Ending June 30, 1930," Agr. Exp. Sta., Storrs, Conn., Bul. 171, Mar., 1931.*

*"Sweet Potatoes," Agr. Ext. Serv., Gainesville, Fla., Bul. 61, Apr., 1931, A. P. Spencer.*

*"Work and Progress of The Agricultural Experiment Station for the Year Ending December 31, 1930," Agr. Exp. Sta., Moscow, Idaho, Bul. 179, June, 1931.*

*"Tomato Color as Related to Quality in the Tomato Canning Industry," Agr. Exp. Sta., Lafayette, Ind., Bul. 350, Apr., 1931, John H. MacGillivray.*

*"Report of Moses Fell Annex Farm, Bedford, Indiana," Agr. Exp. Sta., Lafayette, Ind., Cir. 183, June, 1931, H. J. Reed and H. G. Hall.*

*"Tame Pastures in Kansas," Agr. Exp. Sta., Manhattan, Kan., Bul. 253, Jan., 1931, A. E. Aldous and J. W. Zahnley.*

*"Forty-third Annual Report of the Agricultural Experiment Station of the University of Kentucky for the Year 1930," Univ. of Ky., Lexington, Ky.*

*"Studies on Sugar Cane Roots," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 223, July, 1931, T. C. Ryker and C. W. Edgerton.*

*"Sugarcane Variety Test Fields, Part I, Sugar Cane Variety Report for Season 1930-31, Part II," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 226, July, 1931, C. B. Gouaux and E. C. Simon.*

*"Root Crops for Forage in Michigan," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 216, Aug., 1931, H. C. Moore and E. J. Wheeler.*

*"The Stone Cells of Pear Fruits, Especially the Kieffer Pear," Agr. Exp. Sta., East Lansing, Mich., Tech. Bul. 113, May, 1931, J. W. Crist and L. P. Batjer.*

*"Hard Seeds in Legumes," Agr. Exp. Sta., Bozeman, Mont., Bul. 248, July, 1931, W. O. Whitcomb.*

*"The Cause and Prevention of Mechanical Injuries to Potatoes," Agr. Exp. Sta., Lincoln, Neb., Bul. 260, Aug., 1931, H. O. Werner.*

*"The University Fruit Farm at Union, Nebraska," Agr. Exp. Sta., Lincoln, Neb., Cir. 43, Sept., 1931, C. C. Wiggans.*

*"Peonies in the Garden," Agr. Exp. Sta., New Brunswick, N. J., Cir. 250, Aug., 1931, Charles H. Connors.*

*"Some Effects of Legumes in Relation to Economical Crop Production," Agr. Exp. Sta., Geneva, N. Y., Bul. 596, Aug., 1931, R. C. Collison.*

*"Vegetable Seed Treatment," Agr. Exp. Sta., Geneva, N. Y., Bul. 597, Sept., 1931, E. E. Clayton.*

*"Orchard Management," Agr. Exp. Sta., Geneva, N. Y., Cir. 121, Mar., 1931.*

*"Source and Care of Cotton Planting Seed in Relation to the Length of Staple," Agr. Exp. Sta., State College Sta., Raleigh, N. C., Tech. Bul. 42, Aug., 1931, J. H. Moore and J. A. Shanklin.*

*"Better Lawns in North Carolina," Agr. Ext. Serv., State College Station, Raleigh, N. C., Ext. Cir. 189, Oct., 1931, C. B. Williams.*

*"Rhubarb Culture," Agr. Ext. Serv., Columbus, Ohio, Bul. 109, Dec., 1930, L. M. Montgomery.*

*"Vegetable Forcing in Ohio," Agr. Ext. Serv., Columbus, Ohio, Bul. 110, Nov., 1930, H. D. Brown, I. C. Hoffman, and Alonzo Marion.*

*"Home Gardening," Agr. Ext. Serv.. Columbus, Ohio, Bul. 116, Mar., 1931, E. R. Lancashire.*

*"Onion Culture in Ohio," Agr. Ext. Serv., Columbus, Ohio, Bul. 118, Apr., 1931, H. D. Brown.*

*"The Propagation of Flowers by Cuttings and Seeds," Agr. Exp. Sta., Wooster, Ohio, Bul. 487, Sept., 1931, W. W. Wiggin.*

*"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, No. 153, Nov.-Dec., 1931.*

*"Wheat Varieties on the High Plains of Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Bul. 200, May, 1931, H. H. Finnell.*

*"The Pennsylvania Agricultural Experiment Station 44th Annual Report," Agr. Exp. Sta., State College, Pa., Bul. 266, July, 1931.*

*"Lawns," Agr. Exp. Sta., State College, Pa., Cir. 143, Oct., 1931, Nickolas Schmitz.*

*"Department of Agriculture Immigration of Virginia," Dept. of Agr., Richmond, Va., Bul. 287, Nov., 1931.*

*"The Relation of Air Conditions to Tobacco Curing," Agr. Exp. Sta., Madison, Wis., Res. Bul. 110, July, 1931, James Johnson and W. B. Ogden.*

*"Making the Most of Forest County Land," Ext. Serv., Madison, Wis., Spec. Cir., May, 1931, K. L. Hatch and H. M. Knipfel.*

*"Wheat Growing in the Southeastern States," U. S. D. A., Washington, D. C., Farmers' Bul. 885, (Rev.) July 1, 1931, Clyde E. Leighty.*

*"How to Grow Rice in the Sacramento Valley," U. S. D. A., Washington, D. C., Farmers' Bul. 1240 (Rev.) June, 1931, Jenkin W. Jones.*

*"Plum and Prune Growing in the Pacific States," U. S. D. A., Washington, D. C., Farmers' Bul. 1372 (Rev.) Aug., 1931, C. F. Kinman.*

*"Planting and Care of Lawns," U. S. D. A., Washington, D. C., Farmers' Bul. 1677, Oct., 1931, H. L. Westover and C. R. Enlow.*

*"Factors for Converting Percentages of Nitrogen in Foods and Feeds into Percentages of Proteins," U. S. D. A., Washington, D. C., Cir. 183, Aug., 1931, D. Breese Jones.*

**Economics**

Much has been said about the advantages accruing to farmers who strive for better quality in the produce which they grow. It has often been hard to measure these advantages in dollars and cents. Therefore, two new bulletins based on statistical research on the relation of quality to market prices assume importance.

Alabama Bulletin 235, "The Relation of Quality of Cotton to Prices Paid to Farmers in Alabama," by J. D. Pope and Carl M. Clark, of the Alabama Polytechnic Institute, is the result of a study "undertaken to determine the extent to which differences paid in central markets obtained in farmers markets, and to determine whether or not an economic basis exists for the improvement of the quality of the cotton produced in the State." Among their conclusions the investigators point out that "there was a definite tendency on the part of cotton buyers to pay farmers more for the better grades than for the poorer grades." "The economic reward for high yields per acre was a more important factor influencing the variety of cotton grown by farmers than the reward for staple length." "The payment of staple premiums and discounts for individual bales is necessary before farmers will select varieties on the basis of staple length instead of only on the basis of yield of lint per acre and gin turnout."

Bulletin No. 3 "Maine Potato Quality Related to Market Prices," by Frederick V. Waugh, Charles M. White, and Malcolm R. Hersey, carries among its conclusions the statement that the degree of prosperity enjoyed by the Maine potato industry in the coming years will depend partly on the quality of potatoes offered for sale.

*"Harvesting the Corn Crop in Illinois," Agr. Exp. Sta., Urbana, Ill., Bul. 373, Sept., 1931, P. E. Johnston and K. H. Myers.*

*"The Secular Movement of Corn Prices," Agr. Exp. Sta., Ames, Iowa, Res. Bul. 140, June, 1931, Geoffrey S. Shepherd.*

*"Market Preferences and Premiums for Maine Potatoes," Agr. Exp. Sta., Orono, Me., Bul. No. 2, July, 1930, Frederick V. Waugh, Charles M. White, and Malcolm R. Hersey.*

*"The Onion Situation in the Connecticut Valley," Mass. State College, Amherst, Mass., Ext. Leaflet 138, July, 1931, H. B. Rowe and R. L. Mighell.*

*"Trends in Purchasing Power and Cost of Production of Fruits," Agr. Exp. Sta., East*

*Lansing, Mich., Tech. Bul.* 120, *Aug.*, 1931, *G. N. Motts.*

"*Minnesota Agricultural Indexes of Prices, Quantities, and Cash Incomes,* 1910-1927," *Agr. Exp. Sta., Univ. Farm, St. Paul, Minn., Tech. Bul.* 72, *Dec.*, 1930, *Albert G. Black and Dorothea D. Kittredge.*

"*Studies in Economics of Apple Orcharding,*" *Agr. Exp. Sta., Durham, N. H., Bul.* 257, *May,* 1931, *H. C. Woodworth and G. F. Potter.*

"*Land Utilization in a Southeastern Ohio County,*" *Agr. Exp. Sta., Wooster, Ohio, Bul.* 485, *Aug.*. 1931, *J. H. Sitterly, H. R. Moore, and J. I. Falconer.*

"*Systems of Farming in Oklahoma,*" *Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Bul.* 199, *Apr.*, 1931, *P. H. Stephens and Emil Rauchenstein.*

"*Prices Paid to Producers of South Dakota Farm Products,* 1890-1930," *Agr. Exp. Sta., Brookings, S. D., Bul.* 259, *Apr.*, 1931, *J. L. Orr.*

"*Car Lot Shipments of Fruits and Vegetables from Stations in the United States for the Calendar Years* 1928 *and* 1929," *U. S. D. A., Washington, D. C., Statistical Bul.* 35, *Oct.*, 1931.

"*The Marketing and Distribution of Fruits and Vegetables by Motor Truck,*" *U. S. D. A., Washington, D. C., Tech. Bul.* 272, *Oct.*, 1931, *Brice Edwards and J. W. Park.*

# Cut More Alfalfa by Cutting Less

(*From page* 18)

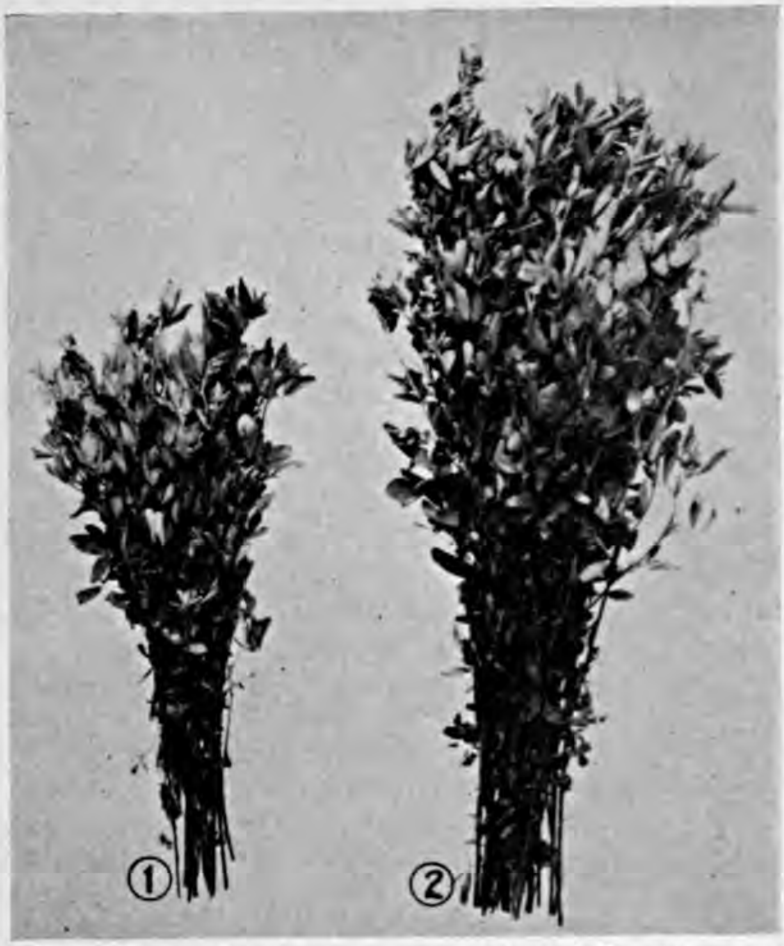
sections for cattle. If the animals are allowed to graze the crop long before it has approached blossoming, the fields will be short-lived. If the tops are allowed to grow out of their succulent, watery condition so that the stems will harden somewhat before grazing begins, the fields will remain in good condition over a number of years. Not only that, there is less danger of bloat in cattle. The greater part of the acreage of alfalfa in Argentina is used for pasture and there the top growths are allowed to approach maturity before grazing is begun."

In general practice Mr. Graber recommends that the harvest be delayed so as to cut as near the full-bloom stage as possible, providing the hay does not become too coarse. This would mean that if the first crop grew very rank and began to lodge, early cutting before blossoming might be necessary. However, if this is not the case, then the crop is cut later and thus allowed to make more root storage. Because the second growth will


**"Yellowing" of Second Growth—Following severe winters, the time of cutting the first growth of alfalfa may cause important variations in the character of subsequent growth. A difference of only four days in the time of cutting the first crop resulted in the above variation in the second growth of alfalfa on August 5, 1922. The hardy Grimm alfalfa in Plot (1) was cut for the first time on June 20, 1922, when well in blossom, while that in Plot (2) was cut four days later on June 24. The previous winter had been very unfavorable. Storage of organic reserves is very rapid during blossoming and apparently four days of such storage resulted in the much greater recuperation of the winter injured tissues in plants of Plot (2) than in Plot (1) where the alfalfa turned yellow and become stunted following the earlier removal of the first growth.**

usually be finer and leafier than the first, it can be cut near the full-bloom stage and still afford a good quality of hay.

"On account of winter injury, fall cutting and pasturing, especially of alfalfa which is in a succulent and rapidly growing condition, should be avoided where the growing season is short and where permanence is desired," he believes. In Wisconsin this plan, of course, means but two cuttings annually and, as the data have shown, larger average yields have been obtained over a period of five years from two crops annually than from three. However, where alfalfa is grown in short rotations and permanence is not essential, cutting may be done earlier in the northern regions.



Early cutting retards subsequent top growth of alfalfa. The second crop (1) of plots of alfalfa which had been cut three times in tenth bloom in 1921 and 1922, grew at the rate of .35 inches daily for the period of June 13 to July 17, 1923, or a total of only 12 inches in 34 days. The second crop of similar plots (2) which had been cut twice annually when in full bloom in 1921 and 1922 grew at the rate of .63 inches daily between June 20 and July 17, 1923, or a total of 17 inches in 27 days. Such greater rapidity of growth was very noticeable in the first and second crops of 1923, 1924, and 1925, the last three years of the trial.

"In climates with long growing seasons and very mild winters, alfalfa is often cut from six to ten times annually. Where such fields are cut continuously before blossoming has begun, the productivity and longevity are greatly reduced.

### *Crowns Are No Guide for Cutting*

"The clipping of the new top growths, which occurs at the crowns of alfalfa plants when delayed cutting is practiced, has not been found harmful as was once thought. This guide to cutting time now has become merely a matter of history rather than a guide in the management of alfalfa fields."

Allowing the plants more time to grow seemed to have a beneficial effect on winter injury. For example: "The amount of winter injury was closely related to the frequency of removal of top growth and the amount of top growth permitted to remain uncut in the fall and winter months. Where Grimm and Common alfalfa were compared, the Grimm variety had a much higher degree of winter hardiness for all cutting treatments than did Common alfalfa.

Too frequent cutting also means that root growth, as well as top growth, is checked. When the root system is small, therefore, the plant suffers more from drought; and also is less able to absorb elements of soil fertility to use in building the plant as a whole.

# The Art of Plowing

(*From page* 24)

Hydro-electric equipment in operation showed the farmer labor-saving methods which might be installed on the farm at reasonable cost. A tented city sprung up over night. Boards of Trade and Municipal Councils, feeling that the farmers' interests were their own, contributed in funds and personal effort to make the occasion a success.

No outside attractions, such as are found on midways, have ever been permitted. The affair is purely an exhibition of the farmer at his best, demonstrating the art of plowing and exhibiting well-trained and well-fitted farm horses.

Notable among consistent winners have been residents of Indian reservations. These men, forsaking the ways of their forebears, have become enthusiastic farmers and expert plowmen.

Briefly, the Association has stimulated a keener desire among the good farmers of the Province to employ more careful methods in cultural practices, to utilize modern and labor-saving equipment, and to assume a broader sphere of usefulness in the national life of the country.

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# An Irish Potato Record

(*From page* 16)

it is capable of producing maximum crop yields under favorable weather conditions.

"During the fall of 1930, this land was thoroughly disced turned, smoothed, re-turned, and smoothed again, so that the residue of previous crops was thoroughly broken up to decompose easily. It was laid off in rows in late January and bedded with an 8-inch middle burster on Feb. 13. On the same date, I applied 2,000 pounds of 5-7-7 (NPK) mixed fertilizer to the acre plot. This fertilizer was a mixture obtained by the United Produce Association for all of its growers. The potash in the mixed goods was derived 50 per cent from muriate of potash and 50 per cent from sulphate of potash.

"Seven and one-fourth 10-peck bags of Prince Edward Island Cobblers were planted on the acre on February 25. They were spaced 11 inches apart on 33-inch rows by means of a planter, and having used a planting machine, a uniform depth of five inches was secured.

"The plot was cultivated four times during the growing season, by means of weeders, subsoil plows, and sweeps. The weeder was run over the beds just before the plants showed themselves above ground on April 2. The subsoil plows followed on April 18, and on the same date, the plot was cultivated with a 16-inch saddle plow. On April 27 the plot was 'laid by' with a 26-inch sweep. No further cultivation was done, but on April 30 the crop was sprayed with Bordeaux mixture for the first and only time, as a precaution against the possibility of an outbreak of disease or insect infestation.

"On the same day that I weeded the crop, I applied a side-dressing of fertilizer made up of 160 pounds of nitrate of soda and 60 pounds of muriate of potash, a side-dressing analysis of approximately 13-0-13 (NPK). This extra fertilization only cost me $7.09, and I feel that it repaid me far more than it cost."

In checking the yields of the contest plots, the County Agents of the various competing counties only were allowed to be interested onlookers, while some one designated by the Clemson College Extension Service did the actual work of checking the yields. Accordingly, L. W. Alford, County Agent for Colleton county recorded Mr. Bostick's yield on June 3, and found the figures which I gave you in the second paragraph of this article—a total of 219.6 barrels of potatoes on one acre. Figuring this out on a bushel basis, we find a total of 602.6 bushels, an almost unheard of figure for Southern potatoes.

Market conditions were extremely poor at the time of Mr. Bostick's harvest, and so only the No. 1 potatoes were marketed. Part of the No. 2's and the culls were fed to the hogs on the farm; and the rest were given away. The total cost of producing and marketing this yield, according to Mr. Bostick's contest record book, was $129.14, and the net value of the potatoes was $235.26, giving him a profit of $106.12 on his one-acre plot.

Beaufort county, nestled among the Sea Islands of the South Carolina Coast, has long been a producer of potatoes. Many farmers have made big yields in the past, but never before has such a record come forth. Weather conditions, growing seasons, and other factors which prevail in the Southeastern potato-producing territory, are not conducive to tremendous yields of potatoes. Seventy-five barrels per acre are a good average yield. Many people have doubted that Mr. Bostick's achievement was possible. I saw the crop, checked and rechecked the figures, and summarize my observations as follows:

The exceedingly thorough fall preparation of the soil helped to conserve the moisture which was so badly needed during the growing season. The use of a combination of sulphate and muriate of potash in the fertilizer instead of just muriate alone, the continued utilization of leguminous cover crops, and the fact that Ben Bostick is one of the coming farmers of the Southeast, all joined in to push the old Palmetto State into the limelight as potato producer.

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# The Inquiring Mind

(*From page* 15)

the other contained far less phosphoric acid and much more potash.

Relative to fertilizers for corn, Dr. Brooks, in Bulletin No. 14, states that his experiments showed that soils differed widely in their requirements. Potash, however, much more often proved beneficial, or proved much more beneficial, than either nitrogen or phosphoric acid. Potash, as a rule, increased to the greatest extent the yield of both grain and stover; but its effect upon stover production was greater than upon grain production. Barnyard manures are, as a rule, relatively deficient in potash, no doubt because of the loss of a large proportion of the urine, which contains about four-fifths of the total potash excretion.

He further concludes that the relative deficiency of potash in many of our soils may be largely accounted for from the following facts:

Manures usually lack this ingredient. Farmers who have used commercial fertilizers as a rule bought phosphates or fertilizers rich in phosphoric acid and containing little or no potash. All fodders, pasture grasses, and hay are rich in potash, and our farmers have devoted a large share of their land to the production of those crops. The relative deficiency of potash in so many soils, shown now by the results of the work of two seasons, justifies the following general advice, in the belief of Dr. Brooks:

In breaking up sod land for crops, particularly that which is in fair condition but which has been under ordinary farm management, if fertilizers only are to be used, apply those which are rich in potash. Use material which will supply 80 to 100 pounds of actual potash, from 25 to 30 pounds of phosphoric acid, and from 15 to 20 pounds of nitrogen per acre. If a special corn fertilizer is to be used, apply only a moderate quantity, say 400 to 500 pounds per acre, and use with it about 125 pounds of muriate of potash. It is believed this combination will produce as good a crop as 800 to 1,000 pounds of corn fertilizer, and it will cost considerably less. For corn, apply about four cords of ordinary barnyard manure and 100 pounds of muriate of potash per acre. For fodder or ensilage corn, use either in fertilizers or with manure, one-fourth more potash than above recommended.

In the Massachusetts experiments, all fertilizers and manures were applied broadcast and harrowed in, which Dr. Brooks considered the best method. (*Mass. Agr. Col. Bul. No.* 14, 1891.)

Dr. Brooks has not only been an indefatigable worker in his profession, but wonderfully interested in subjects other than his specialties. Always, he has kept himself well informed regarding the work of other scientists and has sought to determine for himself the true value of conclusions, which to him appeared doubtful. Like every true naturalist, he is an exceedingly close observer, and often has been able correctly to interpret some of the mysteries of nature that baffled others. He is an admirer of nature in all her moods and aspects, and an accomplished botanist and lover of flowers, plants, and animals. It has been one of his greatest pleasures to work in his garden, where he has produced vegetables, fruits, and flowers of excellent quality.

He is a great reader, not only in his own special subjects, but in the varied fields of politics, biography, and literature. Doing his own thinking, he is ever ready to express a shrewd opinion on current topics. He has proved himself a loyal citizen, taking an active and useful part in town affairs. He also has been an active member and officer of the Unitarian Church with which he is affiliated. Loving his Alma Mater, and deeply interested in her educational policy, he likewise has been a keen student of the entire subject of present-day educational problems.

A strong fraternity man, he was one of the founders of the national Phi Sigma Kappa organization.

### *His Other Side*

His home has ever been the scene of true domestic joy. There, he has spent his happiest hours, with his two children, long since grown to maturity, of whom he is deservedly proud, and with his grandchildren, in whom he takes delight.

Children appeal to his heart, and they respond to his kindliness. It has been his custom for many years to gather them around a resplendent Christmas tree upon his home lawn, and take part in their festivities. Now, though the May of his life is falling into "the sear, the yellow leaf," he continues his happy Yuletide parties, to the delight of the children of the neighborhood.

We trust that this great man—"learned in agricultural science"—may be blessed with good health, and enjoy the genial companionship of his family and friends, until the sun goes down in glory at the close of his distinguished career of inspiration and inestimable service.

# Industries Become Garden-minded

(From page 10)

ing family use.

These Sefton gardens are probably the oldest permanent industrial gardens in Indiana and among the best.

For size, as well as excellence in actual production, the big industrial gardens of the International Harvester Company, at Richmond, equal, if not surpass, anything of the kind in Indiana. While these remarkable gardens are only one year old, they have demonstrated their value both to the company and its employees.

Last spring, under the personal supervision of the General Superintendent, the company acquired, by rental, 39 acres for industrial garden purposes. The land was plowed and well fitted. It then was surveyed and plotted. Approximately 5,000 square feet were allowed to each individual garden plot.

An attractive picnic ground, well supplied with water and shade, was maintained as a part of these gardens.

On these 39 acres, 194 employees of the International Harvester Company had free garden facilities. The plots were numbered and were assigned to employees having inadequate home gardens. Seed and fertilizer were supplied by the company at cost.

These gardens were largely devoted to vegetables for winter use, and the company gave assistance to their employees in canning their own garden products. Company supervision of the gardens extended throughout the season.

While the cost of this splendid industrial garden project was considerable, the company considers it a very small item of expense in comparison to the substantial benefits accruing to their employees. Indirectly, of course, the industry benefits, for anything which contributes to the benefit of the employees is also bound to prove beneficial to the company.

Another industrial garden which deserves mention is that of the Studebaker Corporation, at South Bend. Here, the industrial plots were 40 x 140 feet. They were plowed and staked ready for the employees, who were supplied with seed and fertilizer as needs demanded. The employees welcomed such assistance, and the company is considering the enlargement of these gardens, and also the advantage of fall plowing and more adequate soil fertilization.

At Kokomo, the Dirigold Corporation made it possible for every employee to have a garden. Those who did not have a garden at home were cared for in a company industrial garden. The individual plots were 40 x 130 feet, and mostly were planted in potatoes. The company supplied the land, plowed, and fitted it, and gave other assistance in supplying seed as needed. The employees did the gardening, and were awarded with all the crops their individual plots produced.

### *Industries Cooperate*

Throughout Indiana there are dozens of industries which, in one way or another, are aiding materially in this garden movement. Many industries have interested themselves in the promotion of community garden enterprises. They not only are giving the movement valuable moral support, but in many instances are contributing active aid in supplying funds for inaugurating and conducting the work.

Industries which are sponsoring industrial gardens for their own employees are also actively cooperating with community and home garden projects. This is particularly true in industrial communities where employment gardens are now so successfully being made a part of local relief programs for unemployment. In this connection, only a few of the many cooperating industries can be mentioned, but similar credit is due many others.

The widely-famed Muncie Community Gardens, story of which was told in a previous issue of BETTER CROPS WITH PLANT FOOD, were located on 40 acres donated by the Warner Gear Company. The Ball Bros., Can Company also contributed largely to the outstanding success of these remarkable gardens. The Jeffersonville Community Gardens were made possible by the unstinted cooperation of the American Car and Foundry Company. In Gary, the extensive employment gardens were largley financed by the American Sheet and Tin Company. In Kokomo, the Kokomo Supply Company, through its president, was largely responsible for the fine showing made in the community garden work.

And so it goes. Industrial garden-mindedness is becoming the rule rather than the exception. Cooperation between industrial institutions and their employees, via the industrial garden route, is proving a substantial aid in the improvement of many economic conditions.

# Pasture Publicity

(*From page* 11)

January was known as "Better Pastures Month." To begin with, a combined meeting of selected farmers, representatives of the fertilizer trade, and a few of the county bankers was held on January 5. A total of 50 interested men were present to hear the discussion led by J. B. Abbott of the National Fertilizer Association.

The interest was good and 21 farmers signified their intentions to treat their pastures. Of this number 15 stated they would treat 178 acres. This number represented 1,000 acres of pasture land and 500 cows. Six others stated they would improve some pasture, but stated no definite acreage.

Twice during each week following, extension cards carrying a definite phase of pasture work were sent to the complete mailing list of farmers. A total of eight different cards were mailed out. The same story enlarged upon was published on the following day in the Rutland *Daily Herald*, one of the largest State papers. On January 16 one full page of this same paper was devoted to the pasture campaign. The space was partly taken by six of the county banks which gave a large advertisement along with some pasture message.

To close the campaign, meetings were held in every community in the county. These began on January 26 and continued to February 3, at the rate of two per day. A special film strip showing local phases of pasture improvement was prepared and shown at these meetings. Dr. E. Van Alstine, State Extension Agronomist, was the principal speaker. Questionnaire cards were passed out at these meetings and are tabulated in the following highlights of the campaign.

1. 1,050 county farmers were reached with direct semi-weekly pasture information.

2. The same number and many others were reached with the news stories in the press.

3. The Rutland *Daily Herald* carried one full page devoted almost entirely to pasture information on January 16. This space was provided by the paper and some of the county banks.

4. The series of county meetings brought 105 actual farmers, interested in better pastures, together to discuss what had been done in the county and the instructions given as to how they

might accomplish the same.

5. A definite response on questionnaire cards showed the following results:

| | |
|---|---|
| Total number farmers answering | 90 |
| Acres pasture owned by these men | 5,326 |
| Number of farmers who will fertilize | 63 |
| Acres this number will treat | 506 |
| Total number milk cows represented | 2,353 |
| Number that will fence and rotate | 51 |
| Number wishing a personal visit from the county agent regarding their pasture problems | 66 |

In this summary no attempt has been made to measure the indirect response to this campaign. There undoubtedly were many acres of pasture fertilized by farmers reading of the program in the press, receiving weekly cards, and not attending the meetings.

# The Response of Oats and Hay to NPK

(*From page* 8)

yield of 0.68 of a ton more on first year timothy and 1.04 tons more on the second, than did the heavy application of incomplete fertilizer. While it is quite true one year's results cannot be considered as conclusive, the above increases due to potassium are decidedly significant.

In the spring of 1931, in order to make the other two crops in the rotation more productive and at the same time maintain the increase of yields on timothy, it was decided to again revise the fertilizer treatments. The rotation sequence was left as before. It was thought advisable to apply the nitrate of soda and superphosphate mixture, and also the complete fertilizer mixture, to the first year oats and third year timothy, rather than to third and fourth year timothy. It was felt that the fertilizer applied to the oat crop, would increase the yield of this crop and, also, be more likely to insure a more vigorous catch of clover the following year.

The amount of the fertilizer applied to the two crops was left the same as in the previous arrangement, but an additional 75 and 150 pounds of nitrate of soda were added to the light and heavy set of treatments respectively, on the clover and fourth year timothy.

Table III shows the yield of all four crops on duplicate plots, together with the average yield of the two duplicates.

Clover which was intended to follow oats in the rotation failed to survive in 1931 and so was replaced by a catch crop of oats and peas. This crop was harvested for hay, and received only an application of nitrate of soda in 1931, with no previous treatment since 1929. The increase in yield was largely due, therefore, to the 1931 application, only a small amount being due to the carry-over from fertilizer applied previously. The crop showed an average increase over check of 0.29 of a ton on the plot receiving the light treatment, and 0.62 of a ton on that receiving the heavy application of nitrate of soda.

The fourth year timothy plots received a dressing of 75 and 150 pounds, respectively, of nitrate of soda in 1931. However, in addition to any beneficial effects the nitrate of soda may have had, the yield of the crop in 1931 showed a decided response to the fertilizer applied the previous year.

The two averages marked with an asterisk (*), indicate the yields on those plots which received a light and

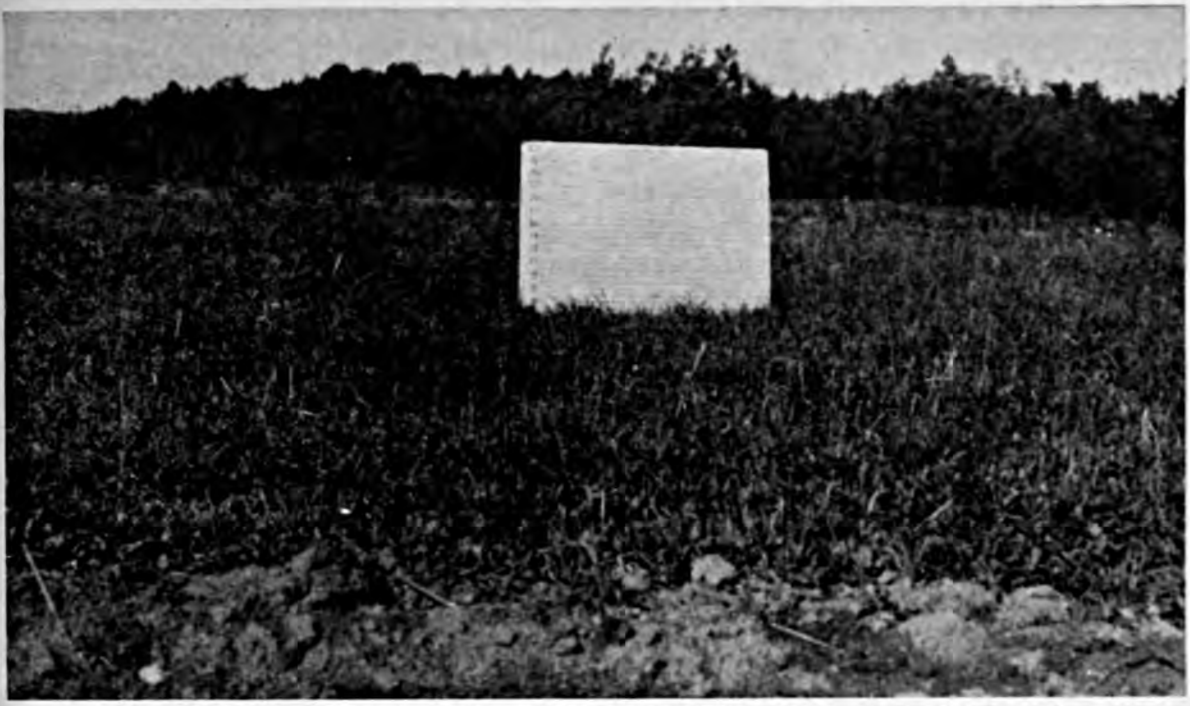
TABLE III 1931

| TREATMENT* | Crops and Yields | | | |
|---|---|---|---|---|
| | Oats | Clover (O.P.) | Timothy (O.P.) | Timothy |
| | bus. | tons | tons | tons |
| 75 lbs. N. & 200 lbs. P. applied to oats & 3rd year timothy | 33.0 | 0.61 | 0.68 | 0.75 |
| 75 lbs. N. to clover and 4th year timothy | 23.6 | 1.20 | 0.84 | 1.46 |
| Average of duplicate plots | 28.3 | 0.90 | 0.76 | (*) 1.10 |
| 75 lbs. N. 200 P. 50 K. applied to oats & 3rd year timothy | 32.4 | 0.61 | 1.10 | 1.06 |
| 75 lbs. N. to clover and 4th year timothy | 43.0 | 1.20 | 1.66 | 2.14 |
| Average of duplicate plots | 37.7 | 0.90 | 1.38 | 1.60 |
| 150 lbs. N., 400 P. applied to oats and 3rd year timothy | 30.6 | 0.78 | 0.74 | 1.24 |
| 150 lbs. N. to clover and 4th year timothy | 31.2 | 1.69 | 1.02 | 1.96 |
| Average of duplicate plots | 30.9 | 1.23 | 0.88 | (*) 1.60 |
| 150 lbs. N., 400 P., 100 K. applied to oats & 3rd year timothy | 44.8 | 0.78 | 1.62 | 1.69 |
| 150 lbs. N. to clover and 4th year timothy | 62.4 | 1.69 | 2.38 | 2.30 |
| Average of duplicate plots | 53.6 | 1.23 | 2.00 | 1.99 |
| No Fertilizer check | 8.8 | 0.37 | 0.66 | 0.83 |
| No Fertilizer check | 24.1 | 0.86 | 0.79 | 1.58 |
| Average of duplicate plots | 16.4 | 0.61 | 0.72 | 1.20 |

* N:—Nitrate of Soda P:—Superphosphate K:—Muriate of Potash

heavy applications of nitrate of soda and superphosphate in 1930, and a light and heavy application of nitrate of soda alone, in 1931. The lower figure refers to the check, and the other two averages represent the yields on plots treated with complete fertilizer in 1930 and nitrate of soda in 1931. On the plots previously treated with nitrate of soda and superphosphate only, the heavy application alone showed a yield higher than the check. The plot which previously received the light application of complete fertilizer showed a yield of 0.50 of a ton, higher than the one treated only with the two constituents, while the heavy application showed a yield of 0.39 of a ton more from the plot treated with complete fertilizer.

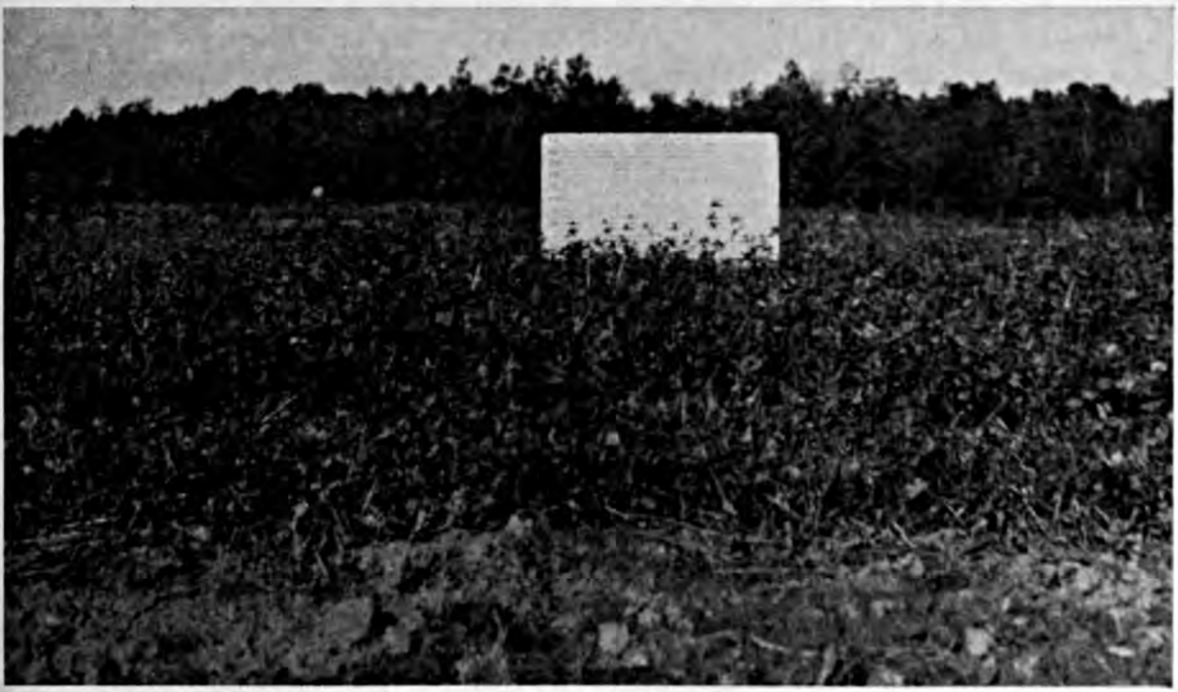
The oat crop, which received light and heavy dressings of complete and incomplete fertilizer in 1931, showed quite a decided response to all the fertilizer treatments, although the difference between the light and heavy dressings of incomplete fertilizer was very slight, only 2.6 bushels. Both, however, were considerably higher than the check. The crop showed a decided response to complete fertilizer. The light application of the mixture containing the three ingredients showed an average increase of 9.4 bushels, over the mixture with no potassium, while the heavy application showed an average difference of 22.7 bushels, and one replication was 31.2



Some clover, but also a lot of sorrel and other weeds, followed oats on the NP-treated area.

bushels higher, exactly double the yield, on the plot treated with complete fertilizer.

As previously stated, clover was "killed out" in the season of 1929 and 1930. This resulted in no provision for a third year crop of timothy in 1931. It was necessary then to substitute the timothy with a crop of oats and peas for hay. This unexpectedly afforded an opportunity to observe the effect of light and heavy dressings of complete and incomplete fertilizer on this crop. The average yields of duplicate plots showed only insignificant increases in yields of the nitrate of soda and superphosphate plots over the check. The plots receiving the light and heavy dressings of complete fertilizer, however, gave increases over the check of 0.66 and 1.28 tons, respectively.



Complete fertilizer brought a luxuriant growth of clover 10 inches high.

A further significant result from the various treatments of fertilizer was brought out in the stand of clover produced after the nurse crop of oats in 1931. On the check plots which received no fertilizer, there was no sign of growth of any plants, with the exception of a few weeds, after the oats were harvested. The bare oat stubble stood out plainly with no growth to cover it.

On the area treated with nitrate of soda and superphosphate, some clover and a good deal of sorrel and other weeds had grown up and partially hid the oat stubble. The stand, however, was far from satisfactory.

On the area treated with complete fertilizer, clover made luxuriant growth and covered the entire area with a strong, healthy stand of clover approximately 10 inches high.

As stated above, definite conclusions cannot be based on one or even two years' results, but the indications point very strongly to the need for fertilization with complete fertilizer under the conditions of this experiment. Certainly the two years' records show that muriate of potash, added to nitrate of soda and superphosphate, very materially increased the yields of the crops under consideration.

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# Serenity

(*From page* 4)

mas in these days when mankind scoffs at things he once cherished and adored, and when confidence is shattered for no sound reason except warped worldliness?" I asked the country parson.

"If you have read Saint Mark, my friend," replied the minister, "you will recall in the ninth chapter these words: 'and he took a little child and set him in the midst of them.' You may also recall that the first Christmas came when the world was dark and the only conception they had of any Diety was a misty being seated on a cloud surrounded by harpers and crowned in awful majesty. Hence the best way God had to get at the hearts of men was to present his spirit among them as an infant—making the Great as Small as possible so that even the shepherds could understand it."

"From this I infer that our race needs simplicity and a rebirth of homespun ideals to reflect the Christmas spirit truly," I remarked, checking his points as he went on.

"Yes, that is behind what I mean," continued the sky-pilot. "Mankind has done so many wonderful things and has become so cock-sure of its ability to achieve human welfare with science minus religion that simple things are lost to our leaders. My parish is made up of quiet, simple folks for the most part, who think of the Christmas caress as a symbol of God at the humble hearthstone. Their sight is dim toward the Creator in terms of astronomy or metaphysics, and they are baffled by too much scientific complexity. A gentle and joyous Divinity, nestling close to their hearts, is the conception they cherish against discouraging odds of skepticism and misery."

Wrapping a fallen leaf around his finger, the parson persisted in his musings.

"You know there is plenty of wisdom that is not wise, many dogmas that are dingy, and creeds that are cloudy. But deep within the heart of every man, no matter how blasé and varnished-over he has become, there is yet a childish spirit tight hold of him, tugging at him all the time, prodding him with memories of other days spent with simpler folks in simpler ways. A child is naturally joyful, trustful, and hopeful, believing all things, loving and free from guile. You remember Wordsworth said a lot of beautiful things about the change taking place in mankind from childhood to maturity, and how fast the little things that are truly great slip away from him and are replaced by hard, dogmatic, material philosophy."

"You're O. K., parson," I commented. "Take the 4-H clubs, for instance. I went to many of their summer camps this year, and I never saw them happier and more hopeful than they were in 1931. I guess if we all suddenly got back our youthful spirit and still had our adult experiences, we might sweep all the gloom away in a jiffy."

"Now I am not impractical," continued the preacher. "I am aware that there are mean kids as well as miserable grown-ups; but kids either inherit most of their meanness or catch it like they do scarlet fever. I am talking about the underlying difference between unspoiled, open-minded youth and the canker of maturity."

"Check again, parson," I said. "Men and women have spoiled more kids than God, including the ones over there in the hospital."

"I read in a book recently that the life of God may be like the heart of an unspoiled child and not like a king on a throne, to whom cringing men bow down," surmised the parson. "And we need not simply yearn to be innocent, for that alone is not sufficient to meet a crisis. It strikes me that the Christmas doctrine brings us, not to the child we once were, but to the child we never yet have been."

"Quite true again," said I. "For we often meet old people who retain all the vivid interest and verve of youth and who refuse to mumble in chimney corners, and again we find young folks who do not know that they possess youth until it is too late to celebrate the fact. The symbol of youth may be converted at will into reality, even defying physical handicaps; but the attitude of youth toward the problems of society touches debatable ground.

"With all our futility, super-cleverness, and spiritual paralysis we have not been able to solve the secret of mortal life or glimpse the vistas beyond," I replied. "As skeptics immersed in a sea of scoffing, it has been fashionable to abandon old beliefs and mores once treasured by the people. But the question is what have we substituted for it that gives us any greater comfort?"

"Quite so, friend," answered the dominie. "Though I speak with the tongues of men and of angels and have not charity—you know the rest. And again remember the words: 'For I am persuaded that neither life nor death nor angels nor principalities nor powers nor things present or things to come may rob me of the love that is in Christ the Lord.' "

I SHIFTED around and reached for my crumpled newspaper. "Having built up material wonders and depended solely upon material things, it isn't any wonder that the newspapers print so many scare-heads about bank failures and falling prices," said I, handing him the latest bogey bulletin.

"Nor is it any wonder that government leaders resort to panaceas of financial kinds to keep us from stuffing old socks with savings instead of Christmas presents," answered my companion.

"One trouble is that people fear humiliation because they do not know the meaning of humility," I ventured. "The two words look alike but they mean different things. Humility is something we ought to pack around with us every day in moderate amounts, while humiliation is a sort of false pride coming after rapid jazzmania."

Rising from his slab, the parson mo-tioned for me to accompany him toward the manse. He took a list of names from his breast pocket and handed them to me, with a naive comment.

"This list constitutes families and heads of families in my parish who require the most help on Christmas day."

Scanning the sheet I noted with surprise that every name represented people of affluence and importance in the parish. What could the little preacher mean? He sensed my perplexity.

"This community has contributed in a perfunctory way to a budget to support the needy, and so the slumming and dole bringing I am obliged to do amounts to little. And furthermore, our charities are in excellent hands, capable and Christianlike, so that those who gain the Christmas dole will feel as though they had entertained angels instead of prying busy-bodies. Nobody will feel insulted, it being dispensed with tact and warmed with old-time faith."

"Well, why this list then?" was my query.

"I am going out to seek those who gave by proxy and in a sense of frigid duty. I shall also call upon a few who dodge the income tax and are teaching their legatees to escape the inheritance tax if they can. I may visit some of the fellows who encouraged extravagance among wage-earners and reaped enormous profits out of mass consumption. I am going to Nebuchadnezzar, not in behalf of Lazarus at the beggar's gate, but to teach boyhood comradeship to those who hoard their marbles. They have been playing skin games at 'keeps' and their draw-strings are fastened tight around bulging bags of moss agates and glass shooters. When they began making rings in the earth with crooked sticks, they played for fun, but they have turned out to be miserly misfits who forget that most marbles are made of clay."

"Going to talk farm relief or unemployment insurance, moratoriums on interest or something like that?" I asked.

"Not by a jugful," hotly replied the preacher, returning the list of Mammonites to his pocket. "Leave that to Congress and the economists, politicians seeking another chance at the tax roll, and high-brow magazines. I am too good a salesman to invite disaster with heavy resistance. I am out to heal hearts that need repair and alignment, not to swipe gasoline or get under steam on somebody else's coal."

"Then I suppose you are not going to try to induce the hoarders to divide their marbles with the fellows who got licked playing keeps?" I smiled.

"No, indeed; but I sincerely hope to get them to return to the game for companionship and play square, so that the old school ground will re-echo again to the tumult of ardor and joy," replied the parson.

AND so it came to pass that in this parish the Christmas time was observed by the people as though they were once more possessed of the serenity and peace of mind which is always the attribute of unspoiled youth. Love drove the ledger away from the Christmas festival, and when men left the factories and offices, they brought no foolish worries home to brood about. Selfish ambition was not allowed to cloud the pleasant reality of life around the happy hearth. And out of it grew a richer meaning of human existence than any that had prevailed before.

That calmness and joy of life that we see in our children arises, we do not deny, from a certain economic security; but the confidence and hope, the morning gladness and the evening contentment that marks all normal children has its source in something far more potent than father's job and the state of the nation.

In the midst of some heated moment or some perplexing business reverie, or at some hasty word of despair uttered in the presence of children, how ashamed we instantly feel. They scan us with a sort of wistful wonderment, as though we elders had broken some charm of childhood, or had violated the sanctity of the precious peace of home.

At once we shake away the lethargy of mundane madness and pick up the thread of some game they are playing, so as to get once more the thrill of Christmas from the standpoint of the child. We suddenly take keen interest in how paper dolls are cut from old magazines, how crude drawings are made on waste paper from the office, and how a fellow ought to sharpen a pair of skates. We peep out at Mother in deft and patient tasks and sniff expectantly at the goodies being prepared for the family dinner. We discuss the songs and games that are so all-important at school and help sister polish up rough places in her Christmas recitation. In a jiffy the air is clear again and we are all children of the Kingdom together, thrusting Fear out into the snow drifts and drawing together in the sense of serenity that means more to family men than its counterpart, responsibility.

And why not, at least for a fortnight, live in full realization of the here and now and those precious things that time alone can rob us of? Someday the childish voices will be only a memory and the toys will be scattered to the realm of oblivion. *This* moment of love and life is what we have earned and the crown of our happiness.

Let us, then, fill the Christmas cup of merriment, quaff it ourselves with a rousing toast to Mother and the kids, pass it on to others if there still be a portion left, and go to sleep at last resolved to be radiant and joyful even if we don't hang up our darned old stockings.


### WHO GOT THE JOB?

A business man advertised in a recent evening paper for an office boy. The next morning, on his arrival at the office, he found at least fifty boys in line.

Just as he was about to start examining the applicants, his stenographer handed him a card, on which was scrawled:

"Don't do anything until you see me. I'm the last kid in the line, but, I'm telling you, I'm there with the goods."

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Colored Mammy: "Ah wants a ticket fo' Vi'ginia."

Ticket Agent: "What part of Virginia?"

Colored Mammy: "Fo' all ov Vi'ginia, o' co'se. Da's huh a-settin' on dat suit case."

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A small boy, leading a donkey, passed by an army camp. A couple of soldiers wanted to have some fun with the lad.

"What are you holding on to your brother so tight for, sonny?" asked one of them.

"So he won't join the army," the youngster replied.

---

### IMMATERIAL TO HIM

A fat woman elbowed her way through the crowd, jabbing first one person and then another. Finally she gave one nearby man an unusually hard thump, and asked: "I say, does it make any difference which car I take to Mount Royal Cemetery?"

"Not to me, madam," was the reply.

### STRANGE NIGGER

The day before she was to be married the old negro servant came to her mistress and entrusted her savings to her keeping.

"Why should I keep it? I thought you were going to get married," said the mistress.

"So I is, Missus, but do you s'pose I'd keep all dis money in de house wid dat strange nigger?"

—*Between Calls.*

---

Teacher "What's the interest on a thousand dollars for one year at two per cent? . . . Ikey, pay attention!"

Ikey: "For two per cent I'm not interested."—*Ohio Motorist.*

---

He was a bit shy, and after she had thrown her arms around him and kissed him for bringing her a bouquet of flowers, he arose and started to leave.

"I am sorry I offended you," she said.

"Oh, I'm not offended," he replied, I'm going for more flowers."

—*Capper's Weekly.*

---

It was announced in one of our leading magazines that "Knee-length skirts had reduced street car accidents fifty per cent."

"Wouldn't it be nice if accidents could be prevented entirely?"

---

### JUST BEFORE THE BATTLE

Mrs. O'Brien (concluding argument): "Every time I looks at you, Mrs. 'Iggins, I feel I'm doin' the government out o' entertainment tax."

# Better Crops WITH PLANT FOOD

Feb.-Mar. 1932 10 Cents

Spring Fertilizer Number

# Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

*Editorial Offices:* 19 West 44th Street, New York

VOLUME XVII NUMBER SIX

TABLE OF CONTENTS, FEB.-MAR., 1932



Agricultural and Scientific Bureau

N. V. POTASH EXPORT MY., INC.

*of Amsterdam, Holland*

*Directors:* J. N. HARPER G. J. CALLISTER

THE FIRST SIGNS OF SPRING

# Better Crops with PLANT FOOD

PUBLISHED BI-MONTHLY BY THE BETTER CROPS PUBLISHING CORPORATION INCORPORATED UNDER THE LAWS OF THE STATE OF NEW YORK, WITH OFFICES AT 19 WEST 44TH STREET, NEW YORK CITY. SUBSCRIPTION, $1.00 FOR 12 ISSUES; 10C PER COPY.



VOL. XVII NEW YORK, FEB.-MAR., 1932 No. 6

*Jeff Compares Men and Soils in—*

# Fertility

*By* Jeff McDermid

AN able bodied man with a spade can turn more ground in a day than a paralytic with a tractor gang plow. But a barren dune of drift sand will not produce the fiftieth part of what the same area properly supplied with organic matter and balanced fertility can supply.

Now put the able bodied man on the drift sand with his spade, and his day of furrow turning will be for naught, and all his personal prowess will count for little more than the fumbling of the paralytic. Yet connect the able bodied man with the fertile soil and the result will be a union of industry and preparedness to the great enrichment of life. Give the paralytic great quantities of fertilizer and he could do nothing, if left to his own devices. But give the normal man his share of plant food to use and he can perform wonders in a barren land.

This teaches us the difference between weak men and weak soils. The weak man is often a helpless piece of junk when beyond maturity, while the weak soil from countless ages of existence may be quickened and made to respond in a sudden burst of productivity.

May we not carry this a bit further

and claim that experience and science when applied by man have been able to do more for the land's sake than for human welfare—at least with greater certainty, less opposition, and more universal adoption?

I think we may be able to prove it. In America there are more redeemed areas of the "great desert" than ever were dreamed of in the fifties, more tons of pedigree grains than scrub arising from the harvest of science over the century, and a larger abundance of soil-born commodities than at any age of history. Yet man, the salt of the earth and the fulness thereof, is shedding briny tears on an empty stomach! He is even hard pressed to earn the right to till his own acreage.

Perhaps that's one reason why we are searching the booking office so hard now to find pilots in whom we can repose confidence. If people with plenty of victuals persist in going hungry, surely the land without men of vision will have a spell of indigestion. And thus we return to our soil analysis.

LAND as old as the earth's crust is easier to change and improve than men who have only passed their half century. Laboratory tests for soils and for men both have been used, but your soil doctor has a cinch beside the job which the mental or spiritual healer tackles.

Land, therefore, is a better fundamental investment, all things being equal, than the vagaries and whims of men. Climate alters the reliability of land values, and cussedness interferes with safety in the plans of men. But the investor can bank on the usual run of climate over a given region of land, while he is out on a limb when it comes to human behavior anywhere.

Your farmer on the land pursues his round of chores and daily business regularly and goes afield each spring with traditional punctuality. Your Wall Street broker, who deals in a realm of vague and changeful values, alternates between fever and ague. The man on the land is the symbol of confidence. The man in the stock and bond market is the embodiment of freakish uncertainty.

ERGO, the thing we must do now to make our investment in mankind secure and progressive on a higher human interest rate is to find out what we have done to land that makes it a sounder thing to depend upon and a calmer element to handle. We of the agrarian school have faith in the fundamental soundness of land, but we surmise that the inhabitants thereof are what makes things risky.

Apparently the economic and social controls or motives to benefit man are about where the chemical controls to improve the land were back in the eighteenth century. In those days Arthur Young demonstrated great care measuring *effects*, but chemistry was not far enough advanced so that he might determine *causes*.

He and other groping enthusiasts spoke of phlogiston, an unknown substance which escaped during the process of combustion. In their vain search for phlogiston (now an almost forgotten word) these men of early times found oxygen, nitrogen, hydrogen, and carbon dioxide. Only by the further delving of a French worker did the world finally learn that phlogiston was not to be found at all. Such was the first prime denouement in land management.

BUT we of today in man management are still looking for phlogiston—some miraculous element of adjustment which will enable us to preserve the human race from extremes of want and waste.

Bear in mind that back in Young's era there were bountiful crops produced, but nobody could exactly answer why or wherefore. Jethro Tull presumed he had the answer in using horse-hoeing husbandry as a substitute

(*Turn to page 61*)

# The Use of Potash Aids In Reducing the Ravages of Diseases *and* in Producing Quality Crops

*By*
*C. B. Williams*
North Carolina State College of Agriculture and Engineering

IN experimental work in North Carolina it has been frequently observed that the intelligent use of potash salts in fertilizers has had a marked influence in materially reducing the prevalence of diseases and the damage to the yield and quality of corn, oats, cotton, tobacco, strawberries, and soybeans grown on different types of soil. Most of the diseases under observation have been due largely or indirectly, to malnutrition. As will be seen below, in many cases, the beneficial results following the use of potash have been quite pronounced.

### *Reduces Root-rot of Corn*

In fertilizer experiments on typical eastern North Carolina muck soil at the Blackland Branch Station farm in Washington county in which a rotation of corn, Irish potatoes, and oats as major crops were grown, it was observed for seven years that the crops of corn and oats were particularly subject to root-rot when grown on certain of the plats of the field, while on other plats with different treatment its occurrence was decidedly less to none at all. The plats of corn and oats showing highest immunity to this disease were those which were treated with 16 pounds of potash per acre in the form of manure salt in the drill at planting as a supplemental application to phosphoric acid, nitrogen, and lime. Whenever the potash was omitted from the applications, the root-rot disease occurrence and damage always ran high, and premature maturity of the crops took place.

The early maturity of the crops apparently was due to the diseased roots failing to function normally, the plants thereby being prevented from taking up adequate supplies of water and plant nutrients from the soil solution to meet the requirements of a normal healthy maturity of the crops. Not only this, but the diseased roots rotted off and thereby lost their power of holding up the laden stalks of corn. As a consequence, the stalks which had not received an application of potash always fell over badly in the field before gathering and gave a much less yield than was secured where this nutrient was supplied at planting time. The percentage of the stalks falling over was much greater, however, with the corn than with the oats. With Irish potatoes, grown in rotation with the corn and oats on this field, evidence of any development of this trouble, either where potash was supplied or where it was left off, was lacking.

### *Confirmed By Other Experiments*

In experiments at the Coastal Plain Branch Station Farm on Norfolk fine sandy loam, where limestone had been added at the rate of 2,000 pounds broadcast every three years, a large percentage of the corn-stalks fell over with the use of lime. An examination of the stalks showed the roots to be practically rotted away and the inside of the stalks for several inches above the ground was rotten. At the nodes there was a reddish discoloration, due to an accumulation of iron which was more marked with the lower nodes and diminished with the nodes going up the stalks. The percentage of the stalks affected in this way varied on the unlimed plats from 5 to 15 per cent, while on the limed plats it ran from 10 to 75 per cent. The 15 per cent of stalks down on the unlimed and the 75 per cent down of the limed plats were both with those plats which had received no potash in the fertilizer mixture.

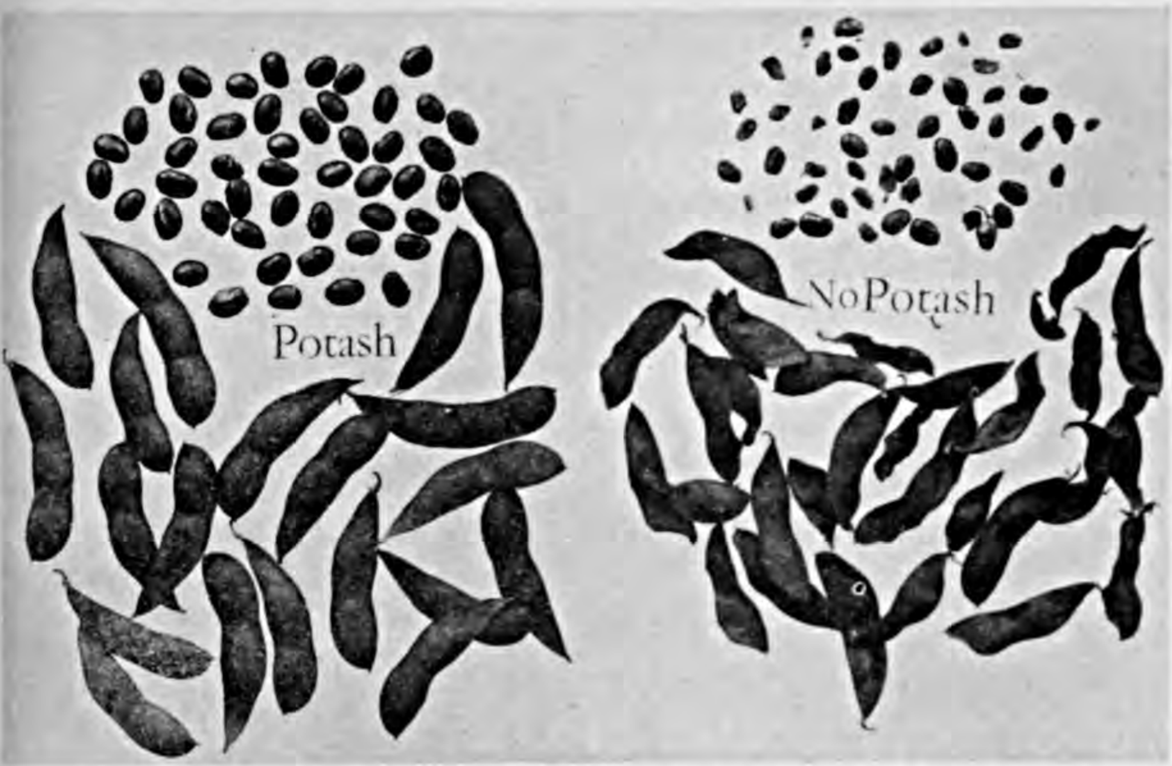
The effects upon the breaking over of the stalks of corn from the use of varying percentages of potash in 300 pounds per acre of a 6-6-0 fertilizer mixture were in 1926 as follows:

| | *Percentage of Stalks Broken Over* | |
|---|---|---|
| | *Unlimed* | *Limed* |
| No potash | 15 | 75 |
| 1 per cent potash | 12 | 65 |
| 2 " " " | 7 | 30 |
| 3 " " " | 5 | 30 |
| 6 " " " | 10 | 10 |

As is seen above, in a general way, the severity of the disease and breaking over of the stalks, for both the limed and unlimed portions of the field, varied indirectly with the percentage of potash contained in the fertilizer mixture.

In an experiment on Iredell silt loam in Davie county with corn, it has been found that by increasing the percentage of potash in a 6-10-2 (NPK) fertilizer mixture to 6 per cent, the yield of corn was increased 2.2 bushels per acre. Increasing the content of potash from 2 to 6 per cent in the same mixture led to an increase in yield of 6.9 bushels per acre. Frenching of the corn on this soil, which is of quite common occurrence, was prevented by an application of 200 pounds of kainit per acre at planting, supplying 4 per cent of potash in 600 pounds of a 6-10-4 mixture, while muriate of potash supplying 4 per cent of potash in the same mixture did not prove nearly so effective in preventing the occurrence of this trouble. The use of 600 pounds per acre of a mixture containing 6 per cent ammonia, 10 per cent available phosphoric acid, and 6 per cent potash increased the yield of corn 21.4 bushels per acre over unfertilized corn which was otherwise treated the same.

In experiments at Scotts in the Piedmont region of North Carolina




An application of 50 pounds of sulphate of potash made this difference in the size and development of pods and seeds of soybeans grown on Norfolk fine sandy loam in Columbus county, North Carolina.

with types of soil on which cotton, following red or sweet clover in rotation, is subject to suffer from what is known by farmers as black rust, the use of heavy applications of potash in complete fertilizers has been found to greatly reduce the percentage of the total area of the plants affected by this malady. On Davidson clay loam in 1931, the use on cotton of 600 pounds per acre of a fertilizer mixture containing 4 per cent nitrogen, 10 per cent available phosphoric acid, and 16 per cent potash (one-half of the potash at planting with the carriers of phosphoric acid and ammonia and the other half as a side-dressing when the cotton was chopped) gave two and one-half times the immunity to this malady given by an application carrying the same amounts of phosphoric acid and nitrogen per acre but no potash. Cotton, to which 8 per cent of potash with the above amounts of nitrogen and phosphoric acid were applied, was almost twice as immune as was cotton grown in the same field with only nitrogen and phosphoric acid.

With the "black jack" soils (Iredell and Mecklenburg loams and sandy and clay loams) of the Piedmont section of North Carolina, farmers are frequently troubled with a disease of cotton which they term rust. This malady, which is probably of a malnutritional nature, affects the leaves of the plants and causes them to drop prematurely in large numbers. With badly affected plants, all the leaves will usually be shed by the middle to the latter part of August, when the plants should be in full vigor in order that they may fully nourish and bring to completed growth the crop of immature bolls on the plants. When the leaves drop, the bolls stop growing, and when these immature bolls open, they do so imperfectly and produce seed and lint of inferior quality and which is very difficult to pick.

### *Find Potash Effective Control*

Where cotton has been affected with this disease, farmers in large numbers are finding that the use of fertilizers high in potash are quite effective in materially reducing the ravages of the disease. Of the potash salts, kainit is decidedly preferred by most farmers.

In an experiment conducted in Cabarrus county for two years on Mecklenburg clay loam, it was found that the use of 600 pounds per acre in the drill at planting time of a fertilizer containing 4 per cent nitrogen, 6 per cent available phosphoric acid, and 4 per cent potash on an average gave a yield of only 750 pounds of seed cotton per acre. By simply doubling the percentage of potash in the mixture, making it 8 per cent, the yield was increased to 1,090 pounds, an increase in yield of 340 pounds of seed cotton per acre from the extra 24 pounds of potash added.

In experiments at the Piedmont Branch Station Farm, it has been observed for some years that with those plats which received no potash or very small applications of it, cotton rusted and corn frenched badly. The diseased condition of both crops has been observed to be much more pronounced on the limed than on the unlimed half of the plats. The results of these and other experiments have shown unmistakably that when a soil of this nature is overlimed, frequently one of the most effective treatments for profitable crop growth is the use of rather heavy applications of potash.

### *Reduces Diseases and Improves Quality of Tobacco*

Experiments in North Carolina have shown that on many soils without the addition of small amounts of soluble magnesia to the soil, tobacco is frequently likely to suffer from a malnutritional malady known as "sand drown." This trouble is much more likely to occur on very sandy soils of both the Coastal Plain and Piedmont regions of the State than with the loamy soils of the two sections. The prevention of this malady can be easily and cheaply effected by adding to the fertilizer mixture to be used at planting time materials carrying soluble magnesia, like Epsom salts or sulphate of potash-magnesia, or by adding finely ground dolomitic limestone to the field some little time before the young tobacco plants are transplanted from the plant beds to the field. Too, when the affected plants are small, cheap soluble salts of magnesia, not carrying high percentages of chlorine, may be used to restore the plants to normal vigor and growth. It is generally recognized that tobacco is of a higher quality and in its growth is much less subject to attack and deterioration from diseases when supplied with an ample supply of available potash.

### *Requirements of Legumes*

With legumes, such as red clover, sweet clover, lespedeza, vetches, soybeans, and cowpeas, it has been found that at least 4 per cent or more of potash in the fertilizer mixture is necessary to be supplied to most Coastal Plain and Piedmont soils to assure most satisfactory growth and yield. Crops like cotton following the legumes in rotation, particularly so if the legumes have been removed for hay, will be in need of liberal applications of this constituent, especially when the crop is grown on "black jack" and closely related soils, if the occurrence of rust is to be materially reduced or prevented.

Experiments with strawberries at Chadbourn in Columbus county, in cooperation with the Federal Bureau of Chemistry and Soils, have been conducted for the past two years. As a result of these, it has been found that the best source of potash for the fertilizer mixtures for this crop grown on Norfolk sandy loam is muriate of potash. Its use has given a higher yield of marketable berries than has either sulphate of potash or kainit. When using 1,500 pounds of fertilizer per acre, the mixture as has been shown should contain 6 per cent of potash with 8 per cent available phosphoric acid and 6 per cent ammonia, if best returns are to be secured. By increasing the per cent of potash in the fertilizer, the yields were not materially, if at all, increased, but there

(*Turn to page* 49)

This legume cover of principally sweet clover on Hillside Orchards, Haydenville, Massachusetts, was sown in 1930. On June 4, 1931, weights showed 9.68 tons of green matter per acre. This block of Baldwins has had complete fertilizer for the past two years. Yields of apples are shown in the accompanying story.

# Complete Fertilizers *for* Orchards

*By T. H. Blow*

Springfield, Massachusetts

IMPROVED foliage and tree vigor, accompanied by increased yield and size of fruit, have resulted from the use of complete fertilizer, high in potash, during the past four years in six typical southern New England orchards. This improvement and increase has been produced at a cost within the reach of every fruit grower.

Fertilizer tests were started in these orchards in 1928 comparing three fertilizer treatments: 1—nitrogen alone; 2—nitrogen and phosphorus; and 3—nitrogen, phosphorus, and potash. All plots were limed to make the soils nearly neutral, as experiments have shown that fertilizers are most effective on soils which are only slightly acid. As much as three tons limestone per acre was needed in some orchards. The average amount of fertilizer used per mature tree was 6 pounds of a 16 per cent nitrogen carrier, 10 pounds of 16 per cent superphosphate, and 10 pounds of muriate of potash. In terms of complete fertilizer and on a basis of 27 trees per acre, the treatments of the three plots were equivalent to 500 pounds per acre of a 5-0-0 on the nitrogen alone plot; 5-9-0 on the nitrogen-phosphorus plot; and 5-9-27 on the nitrogen-

EFFECT ON YIELDS: (Given in both four and two-year averages)

*(Annual Averages, yields in bushels per acre)*

| Fertilizer Treatment | 4 years, 1928-1931 McIntosh* | 4 years, 1928-1931 Baldwin** | 2 years, 1930 & 1931 McIntosh* | 2 years, 1930 & 1931 Baldwin** |
|---|---|---|---|---|
| N | 232 | 375 | 262.5 | 372.8 |
| NP | 261 | 395 | 271.7 | 356.0 |
| NPK | 302 | 447.5 | 330.8 | 573.3 |
| Gain for P | 29 | 20 | 9.2 | —16.8 |
| " " K | 41 | 52.5 | 59.1 | 217.3 |
| " PK over N | 70 | 72.5 | 68.3 | 200.5 |

*McIntosh in 5 orchards; **Baldwin in 1 orchard.

phosphorus-potash, a complete fertilizer, plot.

All fertilizer materials were applied to the soil surface and within the tree circle. Four of the six tests were in grass sod; one was under strip cultivation; and one was changed to a semi-permanent legume sod in 1930. Accurate commercial yields were secured on the plots by either tagging the trees in each block or by having someone record same at picking time.

The effect on yields given in both four and two-year averages is shown in the table above.

The effect on size of fruit was determined from gradings made on the Baldwin test in 1929 and 1931 and on the McIntosh tests in 1930. The increases in the top sizes on the complete (NPK) plot are clearly shown by the accompanying graph and tables:

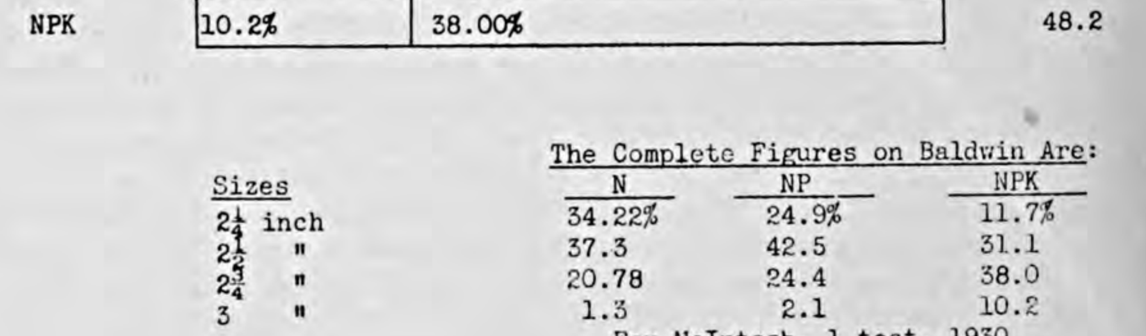
These increases in size, which usually bring a premium for every quarter inch increase, should interest the grower who is looking for maximum returns.

Taking a fair market value for the apples and deducting from this the

EFFECT ON SIZE OF FRUIT:

Baldwins, A & B grades combined, 1929 and 1931 crops.

Graph shows per cent of total yield in 3", $2\frac{3}{4}$" and total of these.




The Complete Figures on Baldwin Are:

| Sizes | N | NP | NPK |
|---|---|---|---|
| $2\frac{1}{4}$ inch | 34.22% | 24.9% | 11.7% |
| $2\frac{1}{2}$ " | 37.3 | 42.5 | 31.1 |
| $2\frac{3}{4}$ " | 20.78 | 24.4 | 38.0 |
| 3 " | 1.3 | 2.1 | 10.2 |
| | For McIntosh, 1 test, 1930 | | |
| $2\frac{1}{4}$ " | 9.1% | 9.55% | 2.2% |
| $2\frac{1}{2}$ " | 31.8 | 38.10 | 25.5 |
| $2\frac{3}{4}$ " | 50.0 | 47.60 | 46.8 |
| 3 " | 9.1 | 4.75 | 25.5 |
| $2\frac{3}{4}$ & 3" | 59.1 | 52.35 | 72.3 |

extra cost of fertilizer, cost of picking the increased yields, and cost of extra containers (boxes or baskets), the records of the past two years show a net gain of \$67.95 per acre per year from the use of potash in complete fertilizer on McIntosh and of \$143.74 per acre annually on Baldwin.

With tree foliage, tree vigor, and color of fruit being measured by observation, at the end of the four-year period there seemed to be a definite trend in favor of the complete treatment, especially with the first two factors. These factors were very prominent on some of the plots and also quite noticeable to the growers during the season. They also seemed to be correlated with those plots giving the greatest difference in yields and also were more noticeable under the poorer cover crop conditions.

The foregoing results check with soil analyses made on these plots in 1930. Neubauer tests on 16 orchard soils (including the six tests) showed that the available phosphorus and potash are much too low for good growth, the only exception being on those soils which had received complete fertilizer for several years. With this test the optimum requirements are that a soil should contain at least 50 pounds of available phosphoric acid and 200 pounds of available potash per acre. A comparison of the three having the NPK treatment and the remainder receiving only nitrogen showed as follows:

| | *Plant Food per Acre* | |
|---|---|---|
| *Fertilizer* | *Phosphorous* | *Potash* |
| Complete | 57.2 lbs. | 250.0 lbs. |
| Nitrogen alone | 12.2 " | 138.8 " |
| Difference | 45.0 lbs. | 111.2 lbs. |

These tests indicate that where nitrogen has been the only fertilizer treatment, the supply of available minerals is very low. This may be the reason why clover and other legumes do not make a satisfactory growth in many orchards. These valuable soil-improving crops need far larger amounts of available phosphoric acid and potash than these soils contain. Acidity tests of these soils showed that the majority of them are low in lime.

(*Turn to page* 44)

The legume sod on Avalon Farms, Bantam, Connecticut, was started in 1931. The seeding consists of alfalfa, sweet clover, red clover, rape, and the grasses. A 16-16-16 fertilizer at about 8-10 lbs. per tree was used in this area. Yields on Baldwins on this farm for the different fertilizer treatments were: N—209 bushels; NP—236 bushels; NPK—274 bushels. The picture was taken September 18, 1931.

# Potato Profits in Arkansas

Left
1,000 lbs. 4-8-12 per A.
Yield—203.6 Bus. No. 1's

Right
1,000 lbs. 4-8-4 per A.
Yield—130 Bus. No. 1's

Farm of C. L. Paschall, Ratcliff, Arkansas.

*By*
*A. G. Thomas*
County Agent, Logan County, Arkansas

LOGAN county, Arkansas, ranked third among the Arkansas counties as a potato-producing county in 1929, according to the 1930 census report. Although this county produced a large crop of potatoes, many of the farmers know little about State certified seed or the proper amounts of commercial fertilizers to be used for potatoes.

In 1931 the price of potatoes was very discouraging and most of the growers preferred to keep their potatoes instead of marketing them. Six carloads were sold cooperatively, through the efforts of the County Agent. The price received for the potatoes that were sold more than paid for the seed and fertilizer, and then enough potatoes were left at home for home use for both food and seed for a second crop.

All potatoes that were marketed were graded very closely and where diseased potatoes were brought in, some observations were made. It was observed that where barnyard manure was used at planting time, the potatoes were invariably diseased. One grower brought in a very nice lot of potatoes and was questioned as to whether he had used barnyard manure. His reply was, "Yes, and this is the worst lot of potatoes that I ever raised. I had to cull out over half of them to get this many good potatoes."

In some cases the growers who had diseased potatoes reported that they had been using the same ground for potatoes for several years, and were observing that the potatoes were getting more diseased every year, in spite of the fact that they were planting certified seed.

The chief cause for diseased potatoes was the planting of diseased potatoes. Some merchants carried a stock of Grower's Certified Seed, which bore a tag with this inscription on it, "These potatoes are practically free from disease and suitable for seed." In examining these potatoes about 20 per cent were found to be diseased. When asked if they had certified seed, they would sell these seed, and in nearly every case the grower produced diseased po-

INCREASED POTASH MEANS INCREASED PROFIT

| 1,000 lbs. Fertilizer per Acre | Yield of U. S. No. 1's per Acre | Cost of* Fertilizer per Acre | Selling** Price per Acre | Fertilizer Profit per Acre | Profit from 4 Units Potash |
|---|---|---|---|---|---|
| No fert. | 90 bus. | | $42.85 | | |
| 4-8-4 | 130.8 bus. | $17.00 | 52.13 | —$7.72 | |
| 4-8-8 | 155.0 bus. | 19.00 | 73.62 | 11.77 | $19.49 |
| 4-8-12 | 203.6 bus. | 21.00 | 96.71 | 32.86 | 21.19 |

*Cost of fertilizer per ton: 4-8-4—$34.00; 4-8-8—$38.00; 4-8-12—$42.00.
**Potatoes sold for 47½c. per bushel.

tatoes. When asked if he had planted certified seed, he would reply that he had and would name the merchant who was selling the grower's certified as State certified seed.

D. F. Wright planted his patch in Nebraska State certified seed on clean ground and used 600 pounds of 4-8-6 fertilizer with no barnyard manure. He brought 1,800 pounds of potatoes to the shed, and these potatoes were run over a Bogg's grader and inspected very closely. Only two potatoes were culled from his entire lot. E. B. Cravens had 5,100 pounds that were planted under similar conditions and turned out about as well.

In order to demonstrate the proper analysis of fertilizer to use for Irish potatoes, a demonstration was conducted on the farm of C. L. Paschall of Ratcliff, Arkansas. One-tenth-acre plots were used and 100 pounds each of the following mixtures were used per plot: 4-8-4, 4-8-8, and 4-8-12. Nebraska State certified seed at the rate of 12 bushels per acre were planted about March 1. The plot where 4-8-12 was used came up to a better stand and also came up earlier than did the other plots, and the 4-8-8 was ahead of the 4-8-4 and the no-fertilizer plots.

The potatoes were dug, graded and sold on June 15, with results as noted above.

This ground was planted back to second crop potatoes, but the fall drought cut the yield to practically nothing. There was no difference in the yield from the different plots, but the potatoes from the 4-8-12 plot were of much better quality than the others.

The DON'TS that are being preached to the potato growers of Logan county are as follows:

1. Don't plant potatoes on the same ground two years in succession.

2. Don't use barnyard manure at the time of planting. If barnyard manure must be used, apply it in the fall and allow plenty of time for it to rot.

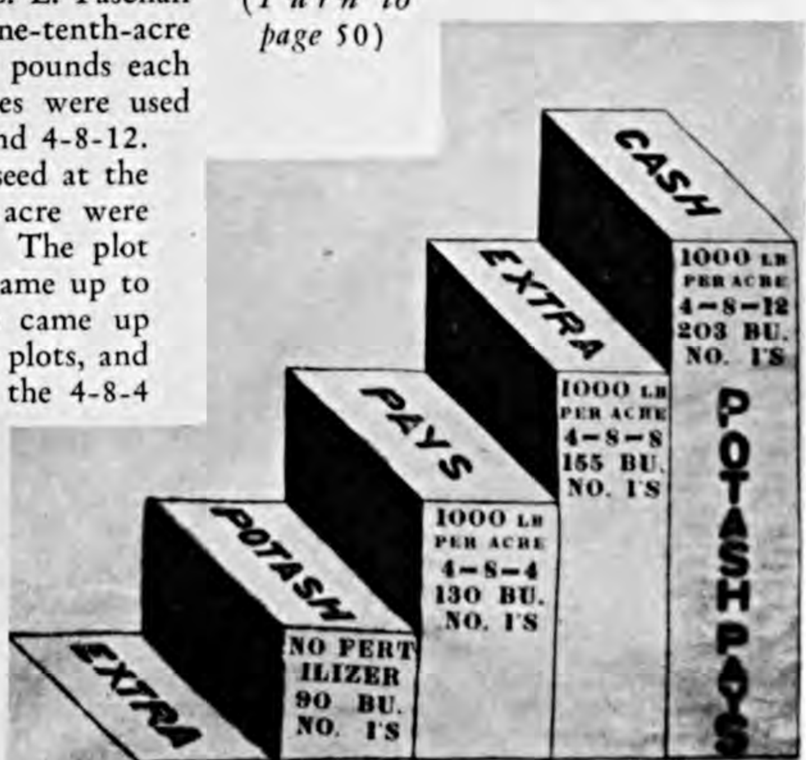
3. Don't plant diseased potatoes.

4. Don't be stingy with seed or cut the potatoes into too small pieces.

The "Do's" are as follows:

1. Plant on fresh ground where potatoes have not been grown for three years.

(*Turn to page 50*)




Another way of presenting the results of this demonstration.

# *The* Inquiring Mind *and the* Seeing Eye

*By Dr. A. S. Alexander*

University of Wisconsin

IT is fitting that we pay tribute here to the memory of James Wilson, of Tama county, Iowa. He worked wonders for agriculture, the farm home, and the people of America, when he served as Secretary of Agriculture under Presidents McKinley, Roosevelt, and Taft.

"Tama Jim," men familiarly called him, and he also earned the title of "Immovable Wilson," in recognition of the 16 consecutive years of his secretaryship. Not a moment of that long term was wasted. A practical farmer himself, he believed in and understood farming in all of its phases. He had also the confidence of the farmers of the land, recognized their problems, difficulties and needs, and therefore devoted his life to the championship of their cause.

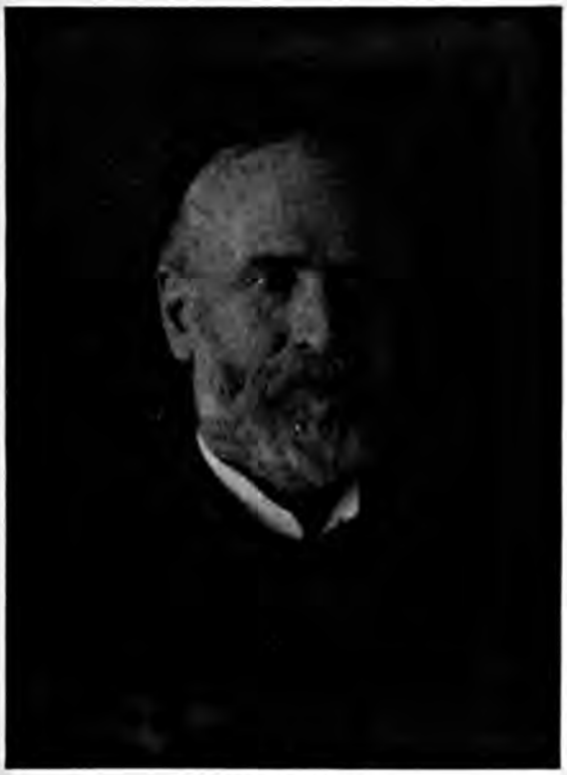
His last annual report was written in 1913, when he was in his seventy-eighth year, and when his final call came, nearly eight years later, the workers of the Department of Agriculture recorded the esteem and affection they bore him in the following words: "His patriotic devotion to the interests of all the people, his vision and his practical wisdom place him high among those who have deserved well of their country. Beloved as a friend, admired and respected as an officer, his example as a man and a statesman is one to which all Americans may turn for inspiration and emulation."

James Wilson was born in 1835 on a farm in Ayrshire, Scotland, near the home of the immortal Bobbie Burns. There he grew up under the stern but kindly disciplinary guidance of his Auld Kirk parents. He was nourished chiefly on oatmeal, milk, and 'taties, and nurtured and admonished according to the tenets of the "Book" and the Shorter Catechism in the way he should go, and was early imbued with knowledge of his duty to God and man.

### *Had Natural Bent for Study*

Thriftiness, too, was inculcated by example, and ability for labor learned by strenuous work in field and byre. Knowledge of the three "R's" was acquired at the district school, where a morose "M.A." pounded his precepts into his scholars with a heavy leathern taws which had been split into thongs and hardened by burning, to "mak them nippy." But Jamie needed little licking. He had a natural bent and aptitude for study. It is recorded that he was able to read at an early age and showed delight in literature. Macaulay's *History of England* was one of his favorite books and, of course, he mastered Burns and loved the tales of Sir Walter Scott. His teacher, John Ross, hammered the rudiments of Latin into his head, with maybe a smattering of Greek, and like all Scottish lads, he was so thoroughly drilled in 'rithmetic that, ever after, he was a canny and capable counter of his bawbees (half-pennies). His intelligent and practical father, John Wilson, endowed him with sound common sense and his mother, gentle Jean McCosh, taught him to read and respect the Holy Bible. In time, he came to know its stories and precepts from cover to cover.

Bertha Ann Reuter, writing in *The Palimpsest* of the State Historical Society of Iowa, tells this story which illustrates how "Tama Jim" was, later in life, recognized as a Biblical authority. "During McKinley's administra-



JAMES WILSON

tion, at the close of stormy Cabinet meetings, the President was accustomed to turn to his Secretary of Agriculture with the question: 'Now, Mr. Wilson, what's the Scripture on that?' Mr. Wilson was ever ready with a pertinent passage—not always from the Bible. In Roosevelt's Cabinet, however, the tables were turned, and the President did his own quoting, often from sources unknown to Wilson."

In 1851, the Wilson family emigrated to the United States, with the hope of doing better in a material way. After spending four years in Connecticut, they joined the Scots settlement on Wolf Creek, in Tama county, Iowa, near the present town of Traer. There James worked on his father's farm, and that of his uncle, West Wilson. Just before the outbreak of the Civil War, James and his brother Peter began farming together. They had carefully hoarded their wages and with the joint sum bought 160 acres. Up to that time James, being the oldest of a family of seven boys and seven girls, had taken the lead in many matters pertaining to the home, church, school, and farm; but when war was declared, the momentous question of "who should go" had to be settled. James, naturally, insisted that he should have the honor of representing the family, but Peter, for once, kicked over the traces, contended that at last the time had come for him to lead, and he won his contention. The two young men agreed that when Peter came marching home again, the lands and livestock of their co-partnership should be equally divided between them. Peter survived his experience at the front, in due course returned home, and in accordance with their agreement, shared equally in the spoils of peace.

During Peter's absence, James had accumulated enough to buy the quarter section of land adjoining their original farm on the south. Buildings were then erected, equal to those on the quarter section they owned jointly before the war, and which had been allotted to James. Peter moved onto the new quarter and there his widow, now over 80 years old, is living today.

Both James and Peter acquired much land and were successful farmers, although James "dabbled into politics probably a little more than was good for his pocketbook," according to his son, Professor James W. Wilson, who is Director of the South Dakota Agricultural Experiment Station at Brookings.

Before his death, James Wilson gave his 1,200 acres or more of good Iowa prairie farm land to the members of his family. The oldest son received the original 160 acres and a forty adjoining. He lives there today. The other children were also given farms, and so far-seeing, canny "Tama Jim" kept the lawyers from getting a slice of the melon.

### *A Lover of Fine Livestock*

Wheat was the cash crop on the Wilson farms in those early days. Oats and corn also were grown and fed to livestock. Many calves were bought and fattened. Gradually, James and Peter built up fine herds of purebred Shorthorn cattle and Berkshire hogs, and sold bulls and boars far and wide. Later, when James Wilson Jr. took care of the records of more than 100 cows in his father's herd, there was in it a bull imported direct from Amos Cruickshank's noted herd in Aberdeenshire, Scotland, and two home-bred bulls of Cruickshank breeding.

The boys of the family loved livestock, and that may account for the fact that two of the brothers, David and West, later became famous in the livestock commission business of the Chicago Union Stock Yards. David died shortly after the firm was established, but West continued the business until the time of his death, a few years ago; then it was carried on by his son, Charles A. Wilson, who is now President of the Chicago Livestock Exchange and in charge of the future buying and selling of hogs. The commission firm has been sold, but it still operates under the name of W. W. Wilson & Company.

As James Wilson was kept busy in his early years running the home farms, he had little opportunity for higher education; but he spent three winters in the public schools, two as a student and one as a teacher, then he studied for a year in Grinnell College, Iowa. He never received an academic degree, but was honored with the LL.D. degree by the University of Edinburgh, Scotland, in 1904. That year the same title was conferred upon him by the University of Wisconsin and by Cornell College, Iowa, and in 1909 McGill College, Canada, honored him in like manner. These supreme honors came to him after years of active and useful political and executive service, but they did not give him what Scots call a "guid conceit o' himsel." He always was modest, though dignified.

Mr. Wilson's public service began when, having gained the esteem and confidence of his neighbors, they elected him to the County Board of Supervisors in 1864. Three years later, his constituency had widened, and he was sent to the State Legislature of Iowa as Representative from Tama county. His first election came in corn-husking time when he was busy all day long in the fields. He was determined, however, to make himself fit for his legislative work and therefore fastened a manual of parliamentary law on the end gate of his wagon and mastered the rules while he husked down the row of corn. You can not keep a good man down! Character is the immortal element in a human life, and it was practical and indomitable in "Tama Jim."

### *Received Many Honors*

Greater honors were still to come to the enterprising farmer from Tama county. He served as a member of the 12th and 13th General Assemblies of Iowa and as Speaker of the House in the 14th Assembly. It has been said of him that he was "the man in whose hand the gavel of the House has, for the first time in the history of the State, been placed by the cordial consent of all the members of his own party." In his work in the Assembly he knew, from practical experience, what the farmers wanted and needed, and he actively strove to help them achieve their desires. Railroad regulation prohibition, suffrage, and revision of the fence laws were the dominant issues, and he had much to do with the

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Left: 1,000 lbs. 0-10-10 per A. Right: 1,000 lbs. 0-10-0 per A.

Note the luxuriant growth of lespedeza on the left as compared to the growth made without potash. The proportion of Dallis grass to lespedeza was about the same in each plot, but note the difference in growth of Dallis grass in the two plots.

# Fertilizing Lespedeza

*By W. L. Myers*

Richmond, Virginia

WE are hearing a lot about that splendid soil-conserving crop, lespedeza. It is being widely recommended as a poor-soil improver, as a good grazing grass, and even for hay. At all of the big agricultural meetings throughout this State, the subject of how to grow and use lespedeza is coming up for discussion.

One of the best things about this crop is its vigorous reseeding capacity which enables it to keep going for some years once it gets a good start. Not needing lime for its best growth as clover and alfalfa do, it is less expensive to prepare for, and also, the seed is cheaper than the seeds of some other legumes.

Very little is said about fertilizing this crop, but the writer tried out a pasture demonstration recently down in good, old Sussex county, in which the predominating grasses were lespedeza and Dallis grass, in order to find out what effect phosphate, potash, and nitrogen would have. Small areas were fenced off the ends of the pastured part of the variously treated plots so that the effect of the fertilizers could be observed.

One of the most interesting effects of the various fertilizer treatments was the change in the grass popula-

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# *A necessary constituent of soils for potatoes is*

# Magnesium

*By Jos. A. Chucka*

Associate Biologist, Maine Agricultural Experiment Station

DURING the past few years a potato disease, indicated by a stunted and chlorotic appearance of the plants, has been observed in the potato growing areas of Maine. In 1929 this disease, or "potato sickness" as it was called by farmers, was so widespread and reduced yields so greatly that the Maine Agricultural Experiment Station began a study of the problem in an attempt to determine its cause. A large number of farms upon which this disease occurred were visited, and a study was made of the symptoms of the disease and the conditions under which it occurred.

These observations indicated that the disease usually appeared in patches or small areas within a field. In extreme cases whole fields were affected but the extent to which the plants were affected varied considerably from one portion of the field to the other.

The dominant symptom of the disease is a characteristic chlorosis of the leaves. Instead of having a normal dark green color, the leaves of the affected plants first have a yellowish green color which gradually changes to yellow and finally brown as the affected tissues die. This loss of green color begins at the tips and margins of the lowermost leaves of the plant and continues between the veins toward the center of the leaves and upward on the plant until in advanced stages nearly the whole area of the leaves is involved and all of the leaves are affected. In such severe cases the plants have a very marked chlorotic and stunted appearance, with some upward rolling of the lower leaves. In mild cases only the lower leaves of the plants are affected, while the new growth appears healthy. These symptoms seem to show up to the best advantage following a warm, dry spell when the potato plants are about 8 to 10 inches high.

Acidity tests of the soils in the affected areas indicated a high correlation between extreme soil acidity and the prevalence of the disease. As a matter of fact, wherever the disease occurred to any great extent, the soils thus far examined usually showed an acidity considerably below pH 5.0.

### *Start Investigations*

These observations indicated that the trouble might be associated with plant nutrition on these acid soils. Consequently in 1930 a fertilizer test consisting of 18 different fertilizer treatments was planned and placed on two farms on which this disease was very pronounced the previous season. One of these treatments resulted in the production of perfectly healthy plants. This treatment consisted of 2,000 pounds of our standard 4-8-7 potato fertilizer plus 300 pounds per acre of magnesium sulfate (Epsom salts). This treatment not only produced healthy plants, but also increased the yield on the two farms by an average of 154 bushels per acre over the same

TABLE I

1930 Results with Magnesium in Potato Fertilizers

| Treatment | Pounds of MgO per Acre | Yield in Bushels per Acre: Daigle Farm | Shaw Farm | Average of Two Farms | Increase Over Check Bus. per Acre |
|---|---|---|---|---|---|
| Check * | 0 | 158.4 | 188.5 | 173.4 | |
| Check + 300 lbs. $MgSO_4 : 7H_2O$ | 51 | 341.0 | 315.2 | 328.1 | 154.7 |

* Check consisted of 2,000 pounds per acre of 4-8-7.

amount of fertilizer without magnesium. These results are presented in table I.

These data strongly indicated that the disease was due to magnesium deficiency and that it could be prevented by the addition of magnesium to potato fertilizers. Following this lead, a test was planned in 1931 in which different amounts of magnesium from three different sources were added to the standard potato fertilizer. The materials used were Epsom salts, double sulfate of potash-magnesia, and hydrated dolomite. This test was placed on three different farms which were chosen to represent typical soil conditions in Aroostook county. Since previous results and observations indicated that the soils in the affected areas were strongly acid, it seemed advisable to determine the effect of neutralizing the acidity in these soils. Thus ground limestone (practically

TABLE II

1931 Results with Magnesium in Potato Fertilizers

| Treatment | Pounds MgO per Acre | Yield in Bushels per Acre: Daigle Farm | Libby Farm | Bradford Farm | Average of Three Farms | Increase Over Check Bus. per Acre |
|---|---|---|---|---|---|---|
| Check * | 0 | 326.2 | 368.8 | 386.1 | 360.4 | |
| Check + 100 lbs. $MgSO_4 : 7H_2O$ | 17 | 345.7 | 399.9 | 405.9 | 383.8 | +23.4 |
| Check + 300 lbs. $MgSO_4 : 7H_2O$ | 51 | 339.9 | 396.8 | 370.7 | 369.1 | + 8.7 |
| Check + 500 lbs. $MgSO_4 : 7H_2O$ | 85 | 326.4 | 391.6 | 379.2 | 365.7 | + 5.3 |
| 2,000 lbs. 4-8-7** | 55 | 342.4 | 426.8 | 405.9 | 391.7 | +31.3 |
| 2,000 lbs. 4-8-10** | 78 | 367.4 | 405.6 | 416.6 | 396.5 | +36.1 |
| Check + lime*** | 0 | 323.4 | 363.6 | 381.4 | 356.1 | |
| Check + 100 lbs. $MgSO_4 : 7H_2O$ + lime | 17 | 358.9 | 397.9 | 391.6 | 382.8 | +26.7 |
| Check + 300 lbs. $MgSO_4 : 7H_2O$ + lime | 51 | 349.8 | 392.2 | 392.4 | 378.1 | +22.0 |
| Check + 500 lbs. $MgSO_4 : 7H_2O$ + lime | 85 | 353.9 | 399.3 | 377.0 | 376.7 | +20.6 |
| Check + 500 lbs. hydrated dolomite | 150 | 346.2 | 379.2 | 377.6 | 367.7 | +11.6 |
| Check + 1,000 lbs hydrated dolomite | 300 | 328.4 | 341.0 | 408.4 | 359.3 | + 3.2 |

* Check consisted of 2,000 pounds per acre of 4-8-7.

** Seven and ten units of potash were made up by using double sulfate of potash-magnesia.

*** Lime refers to ground limestone applied separately in the potato row at the rate of 1,000 pounds per acre.

free of magnesium) was used at the rate of 1,000 pounds per acre in the row in connection with fertilizer with and without magnesium. Field observations during the growing season again indicated that magnesium completely prevented the chlorotic appearance of the potato plants. The yields obtained from the various treatments are presented in table II. All treatments were replicated four times on each farm, and the results presented are averages of the four replications.

In comparing the 1931 results with those of 1930, it must be remembered that the 1930 results were obtained on fields upon which the disease was very pronounced, while the 1931 results were obtained on fields representing typical soil conditions in Aroostook county. It will be noted that all of the plots receiving magnesium gave somewhat higher yields than those which did not receive magnesium. The lower applications seemed to be more effective than the higher applications, indicating that the larger quantities of magnesium may have resulted in some magnesium toxicity. This seems to be substantiated by the fact that when lime was used with magnesium, the higher applications were nearly as effective as the lower applications. The results also seem to indicate that larger quantities of magnesium oxide may be used in the form of the double sulfate of potash-magnesia than in the form of Epsom salts. The comparatively low yields obtained with the use of dolomite may have been due to too large quantities of magnesium oxide. It is also interesting to note that when calcium limestone without magnesium was used with the fertilizer, the yields were slightly lowered. This may have been due to the depressing effect of lime on the solubility of the small quantity of magnesium present in these soils.

In addition to the work done with magnesium in potato fertilizers on our experimental plots, magnesium was used by commercial growers on some 200 acres of potatoes in Aroostook county during this past season. Where comparative yields were taken in these commercial fields between fertilizers with and without magnesium, the results indicated an average increase of approximately 44 bushels per acre in favor of the fertilizer carrying magnesium. Magnesium was also used as a side-dressing on a small area in two commercial fields after the potato plants developed very definite symptoms of the disease. It was applied as Epsom salts to a depth of about two inches between the plants in the row at the rate of 320 pounds to the acre. Observation of these areas during the remainder of the growing season indicated that the chlorotic tissues did not regain their green color but all of the subsequent new growth had a normal dark green color and the plants in the treated areas made a greater total growth than those which did not receive magnesium.

A very marked residual effect of the magnesium used on potatoes in 1930 was observed on the oats and clover this year. The oats and clover on these plots were fully twice as large as the crops on the remainder of the field. This observation indicates that other crops as well as potatoes are suffering from a lack of magnesium on some of the Aroostook soils.

### *The Causes of the Deficiency*

This magnesium deficiency under Aroostook conditions has been brought about by several contributing causes. The large crops of potatoes grown have taken up definite quantities of magnesium. None of this magnesium has been returned to the soils because the tubers are sold, while the potato tops are raked and burned.

The large amounts of fertilizer used (equivalent of 2,000 to 3,000 pounds per acre of 4-8-7) with a high proportion of its nitrogen in the form of ammonia salts have greatly increased the acidity of these soils. This extreme

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# Tomato Production in the Northern Neck of Virginia

*By L. B. Dietrick*

Specialist in Vegetable Gardening, Virginia Agricultural Experiment Station

THE production of tomatoes for cannery in Virginia is an industry returning to the State approximately half a million dollars annually. For the period 1928-1931 the acreage devoted to the crop averaged 11,925 with an average annual production of 32,525 tons, or approximately 2½ per cent of the U. S. production.

This production is rather generally distributed throughout the State. Some 40 counties out of the 100 comprising the State produce tomatoes for canning. Strictly speaking, however, the industry is centralized rather largely in two districts. The first of these might be called the Roanoke District and comprises Bedford, Botetourt, Floyd, Franklin, Montgomery, Pulaski, and Roanoke counties. This district plants slightly less than 40 per cent of the State's acreage. The second area is known as the Northern neck of Virginia. This area comprises Westmoreland, Northumberland, Lancaster, Richmond, and King George counties and plants a little better than 40 per cent of the State's acreage. These two areas, comprising 12 counties, plant approximately 80 per cent of the tomato acreage of the State. The other 20 per cent is handled by the remaining 28 counties. The chief purpose of this article is to discuss tomato production for the cannery in but one of these areas, the Northern Neck of Virginia.

The Northern Neck of Virginia, justly celebrated for its historical contribution to the State, is a comparatively small strip or neck of land in Eastern Virginia approximately 75 miles in length and from 10 to 25 miles in width. The Neck is almost completely surrounded by water. To the north and northeast flows the Potomac River; on the east lies the Chesapeake Bay; and to the south and southwest flows the Rappahannock

A typical tomato plant bed in the Northern Neck.

River. At the upper end of the Neck, King George county connects with Stafford county at a point approximately 10 miles in width. The total area in the Neck is 971 square miles or approximately 2½ per cent of the area of the State.

No railroad lines enter the Neck. Agriculture must depend for transportation primarily on water outlets. Considerable trucking is done from this section, but by far the chief outlet is shipping. Shut off from the transportation lines of the mainland, it was but natural, therefore, that the growers should early turn to certain lines of production which were not particularly perishable. Canned products served this purpose admirably. Small canning factories sprang up throughout this section more or less like mushrooms. Very often the canner himself was also a grower. There has been a tendency in late years for some of the smaller factories to disappear or combine with larger ones. This tendency will, no doubt, become more and more apparent as the years pass. The small factory works at a tremendous disadvantage from the standpoint of overhead and efficiency. Larger units on the average are required for the most economic handling of the pack.

### *Soils Are Sandy*

The soils of the Northern Neck are more or less sandy in nature. Distributed here and there one will find some medium clay loams, but a preponderance of the land is of the sandy loam type. Tomatoes produce well on all the soils of this area provided the land has not been neglected. The higher type of growers attempt to keep up the fertility of their soil through proper rotation and the wise use of cover crops.

Fertilizer practices show a wide variation. Studies have shown a range including the following: 0-12-5, 1¼-9-2, 2-8-2, 2-8-10, 3-8-3, 3-10-6, 3-8-10, 4-8-4, 5-8-5, 5-8-10, 5-10-5, 4-10-10, 4-12-4, and 4-16-12.

The analysis of the fertilizer used has improved considerably during the past few years, due in large part to extension work on the part of the county agents. No longer do you find many growers purchasing their fertilizer on the strength of the brand name or by a picture on the bag. One of the finest compliments that the writer has ever heard paid a county agent was by a fertilizer salesman for a house handling cheap goods. In speaking of a certain county agent in the Northern Neck he stated, "I can't sell any of my goods in that county since he has been there."

### *See Need of More Potash*

The better type of growers use a 5-8-5 or better. Many of the growers in this area are live, up-to-date men and, encouraged by the canners, have done some experimenting with fertilizers themselves. There has been a growing tendency in some sections of the Neck to increase the amount of potash in the tomato fertilizer. Experimental work conducted by the Virginia Truck Experiment Station in this area would seem to indicate the advisability of increasing the potash content above 5 per cent. Extension semi-demonstration plots over a period of years have also seemed to point to increased benefits derived from the use of a higher per cent of potash in the tomato fertilizer. Some growers have been convinced on this point and are now using the higher analysis fertilizers mentioned, such as 5-8-10, 4-10-10, 4-12-10, 4-16-12, etc. It should be noted that where the potash has been increased, there has also been a tendency to step up the phosphorus.

The rate of application also shows a wide variation. Some growers use as little as 500 pounds per acre, while at the other extreme, some few use as much as 1,200 to 1,500 pounds per acre. The better growers approximate around 800 to 1,000 pounds per

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# Common Sense About Cotton

*By J. N. Harper*

Atlanta, Georgia

"WHAT shall I do about cotton? Shall I plant as much this year as usual—or shall I cut my acreage and grow more of other crops? What is the most economical fertilizer for me to use on the cotton I do grow?"

The average Southern farmer is eager to find the best answer to all of these questions. As a result of the general excitement over the low price of cotton, he has heard of South-wide plans to hold over part of the crop and reduce the acreage in 1932. Extensive diversification of crops has been recommended, and better marketing facilities are being developed. He has been told to cut his cotton crop in half and grow more food and feed.

Undoubtedly these are all good ideas and should receive the whole-hearted support of every interested party. The passage of time should bring them to take their place in a stable agricultural program for the entire South. Yet the individual farmer is today more vitally interested in his own particular and immediate problem.

What are the best steps he can take to help his own farm weather this economic cyclone which has apparently swept away the chance to make a profit from his chief cash crop? "What shall I do about cotton on my farm?" he asks.

Perhaps he is disgusted with the crop. Perhaps he has considered growing more sweet potatoes, grain, tobacco, or truck and fruit. No doubt he has thought of putting in a few extra milch cows and some hogs and chickens. Certainly he will grow more food and feed, and a year-round garden has become an absolute necessity.

But inevitably his thoughts come back to cotton. He cannot get around the fact that fundamentally his country is a cotton country. His farm is a cotton farm, his climate is a cotton climate, and his labor is cotton labor. Well, then, what to do about cotton?

Unless he wants to be forced out of his lifetime job by recurring drastic price upsets, there is only one thing he can do under the circumstances. *He must produce the cotton that he grows at the lowest possible cost per pound.*

### *Will He Fertilize?*

How will this be done? Will he plant a large acreage to cotton and cut down on his fertilizer bill by using less fertilizer per acre or fertilizer of a poorer quality? This will simply make a bad situation worse because it results in a poor crop produced at high cost per pound.

How is he to produce good yields of high quality at low costs? Here is how one Southern farmer figured it out a few years ago. For years he had averaged 12 bales of cotton on 30 acres by using three tons of well-balanced fertilizer over the entire 30 acres. Along came a bad year, similar to this, when the price of cotton dropped very low.

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# South Carolina Produces High Quality Asparagus But Yields Are Too Low

*By J. L. Baskin*

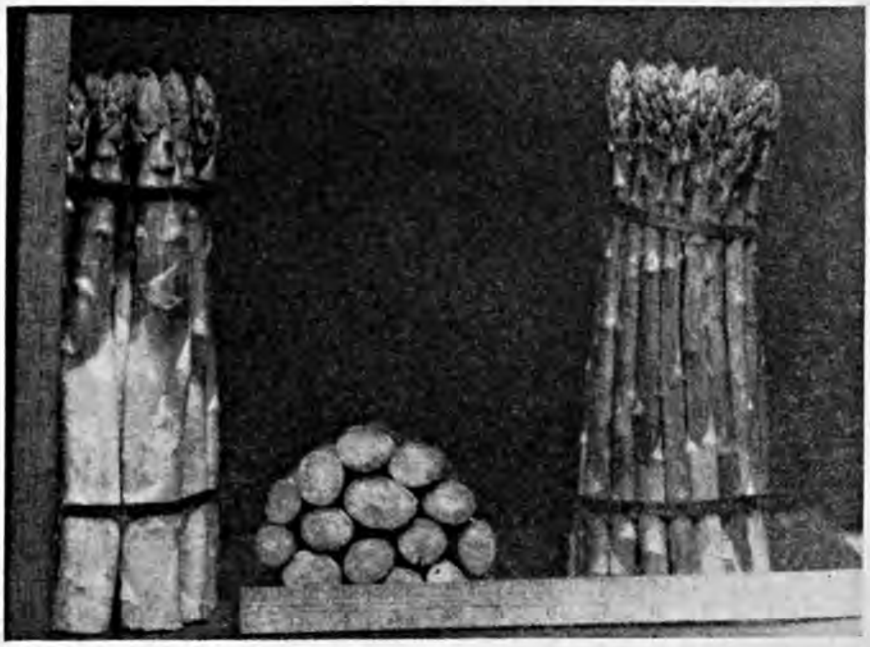
Atlanta, Georgia

SOUTH CAROLINA farmers have been growing asparagus for about a quarter of a century and yet asparagus yields are extremely low, being approximately 40 crates per acre. The only thing that keeps such growers in business is the unusually good prices that they have been able to get for their "grass." South Carolina asparagus usually comes on the market at a time when green spring vegetables are very scarce, and some seasons the only asparagus to be had on the market is from the fields of the old Palmetto State.

Relatively good prices have enabled growers to make a living and some money even with low yields. In spite of low yields South Carolina growers have been able to produce the finest quality asparagus found on the market as gauged by prices paid for it in comparison with asparagus grown in other States.

If California or New Jersey asparagus growers only produced an average of 40 crates per acre and were totally dependent on this crop for a living, they would starve. But if comparisons are to be made, it is only fair to state conditions under which the States of South Carolina, California, and New Jersey, the three leading States, are producing asparagus.

California's claim that they "excel" is fully substantiated when their asparagus yields are compared to those of South Carolina. California produces an average of 179 crates per acre, while South



This asparagus is from the field of Lang Cave, Barnwell, S. C., and was fertilized with one ton of fertilizer carrying 8% $K_2O$ and 500 lbs. muriate of potash, the muriate being applied after the cutting season.

Carolina produces an average of 40. However, California's cutting season, a thing that greatly affects yields, is much longer than South Carolina's. California's cutting season is further lengthened by the fact that canning starts as fresh markets begin to wane. Again, California grows mostly white asparagus, while South Carolina produces green asparagus, the latter taxing the crowns more heavily on account of having to remain "on the hill" an extra day. During the past four years, the average farm price paid to growers was $3.17 per crate in South Carolina and $2.46 per crate in California. Add to this the fact that South Carolina has lower transportation costs and we are better able to understand how South Carolina growers survive with such a low average yield.

A good hill of Colossal "grass." *(Photograph by courtesy of Lewis P. Watson, Extension Horticulturist, Clemson College, S. C.)*

### *Asparagus Is Not a Field Crop*

The conditions under which asparagus is grown in New Jersey and South Carolina are more nearly alike as to rainfall, soil, and spring seasons. In South Carolina, unfortunately, asparagus growing was first introduced in a section that was accustomed to producing field crops such as cotton, corn, velvet beans, and peas. In adopting asparagus the farmers considered it a field crop and proceeded to treat it as such with respect to cultivating, fertilizing, and harvesting practices. However, in the last 10 to 12 years many growers have found that asparagus should be treated as a truck crop in that it requires intensive cultivation, liberal fertilization, strict grading, and careful handling if prices on the market are to be satisfactory.

But custom and habit are strong forces. New asparagus growers, formerly producers of cotton and corn, were accustomed to fertilizing in early spring, which in the asparagus district is February and March. They, therefore, applied fertilizer to asparagus at this season, when there is considerable rainfall. The soil is mostly light and sandy. Couple these facts with the fact that spears are removed the day after they appear, and one can readily understand that there is no great absorbing power by the plant with no top at this season of the year, which means that much of the fertilizer is lost. There is plenty of evidence that the roots are active, but this does not mean that they are in position to assimilate large quantities of fertilizers. Much of their action is the result of stored energy from the previous season's growth.

### *Main Fertilization After Cutting*

No doubt it is advisable to make small applications of fertilizer before the cutting begins, but the main fertilization program should be inaugurated and the rows (beds) well cultivated immediately after the cutting season. It is during this period that the plant is most active. Plants have a full top growth and can "manufacture" and store almost in proportion to the plant food available and the surface of top growth exposed to the sunlight. This does not mean that high nitrogenous fertilizers should be used, for it is the role of potash to transfer starch and the other carbohydrates and store them in the crowns which are forming eyes that later vigorously send forth spears of colossal grade. Many growers now use one ton of complete fertilizer, carrying from 5 to 10 per cent potash, the major portion being applied immediately after the cutting season.

Many growers whose yields and quality are outstanding use, in addition to the fertilizer mentioned above, from 600 to 2,000 pounds of 20 per cent high grade kainit. Asparagus is not only a potash-loving plant, but it takes up and uses large quantities of chlorine which is supplied by the kainit. The trend today among South Carolina asparagus growers is toward better stands, better strains, more liberal fertilization, and keeping up the high standardization that the various South Carolina associations have established for Palmetto Colossal on the market.

### *Is Truck Crop in New Jersey*

In New Jersey, growers consider asparagus a truck crop and treat it accordingly, which means that it gets every necessary care including liberal fertilization to make their average yields stand far ahead of South Carolina's. New Jersey's average yield is 100 crates, but it is only fair to say that on account of their proximity to markets, they can extend their cutting season most years in proportion to the strength of the market, and long after South Carolina cutting becomes unprofitable due to low yields. The only field in which South Carolina growers excel is quality, which is reflected in market prices. The past four years New Jersey received only $2.48 per crate, as compared with South Carolina's four-year average farm price of $3.17 per crate.

There is abundant evidence that South Carolina can produce an average of 100 crates per acre. The growers merely need to follow the example of such men as J. R. Lott of Williston, who is South Carolina's champion asparagus grower and who averages 124 crates per acre on his fields. How does Mr. Lott get such good yields? First of all, he has probably the best and thickest stand of asparagus in South Carolina. Realizing that a thick stand pulls heavily on the soil, Mr. Lott fertilizes liberally, using a ton of complete fertilizer carrying high potash. Soon after the cutting season, he applies a separate application of 20 per cent high-grade kainit to make more of his "grass" grade colossal.

### *Show Improved Yield and Quality*

In 1930 the asparagus growers held their State meeting at Aiken, S. C. Seventy-five per cent of the South Carolina acreage was represented. During this meeting, growers submitted their fertilizer practices and yields. A study of the records turned in showed that those who used 8 per cent potash in their fertilizers averaged 12.7 more crates per acre than those who used 5 per cent.

A similar questionnaire was answered by the growers assembled in Williston, South Carolina, in 1931. A study of these records showed that those using 10 per cent potash were far out in the lead both as to quality and yield.

A splendid example of what growers may expect potash to do for their asparagus fields is found in the record books of Lang Cave of Barnwell, South Carolina, and Paul J. Fulmer of Allendale, South Carolina. Both these men produce asparagus on a commercial scale and have been doing so for years, but they were not satisfied with their yields.

Just after the 1929 cutting season, Mr. Cave fertilized his young asparagus with a complete fertilizer carry-

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# Kainit Controls Weeds


## *Paul A. Fisher*

Manager of Fisher Orchards,
Burlington, Ontario


Where no kainit was applied, there was a thick covering of weeds.

CONTROLLING weeds in asparagus beds is always a great problem. The two methods generally followed in the asparagus-growing region near Burlington, Ontario, are hoeing and the heavy application of salt.

There is considerable controversy among the various growers as to which is the more economical, as the salt has to be applied at the rate of from 1½ to 2 tons per acre, and while it will kill the weeds if applied while they are young, it has no other value. Our salt has been costing us from $10 to $13 per ton. Hoeing usually costs us from $20 to $30 per acre per year, and while it keeps a mulch on the surface of the soil, it does some damage by cutting the young shoots that are just coming up.

In the Spring of 1931, we tried out one-half ton of kainit on one of our patches. We applied it at the rate of 50 lbs. per row, or 1,000 lbs. per acre, on the first three rows; 100 lbs. per row, or 2,000 lbs. per acre, on the second three rows; and 150 lbs. per row, or 3,000 lbs. per acre, on the third three rows. These rows are four feet apart, and the kainit was applied only to a strip about one foot wide where the asparagus was growing and where we could not cultivate, and was applied in exactly the same manner as we have applied the salt.

These applications were made the last week in May, when we were hoeing the patch for the first time. The young weeds were coming up very thickly at the time, particularly pigweed *Amaranthus retroflexus,* Linn., lamb's quarters *Chenopodium album,* Linn., and chickweed *Cerastium arvense,* Linn., the nine rows which received the kainit were not hoed.

It was several days after the application was made before the weeds in these rows began to die, but when we hoed the balance of the patch for the the second time some two weeks later, all the weeds in these nine rows were destroyed except a few lamb's quarters which were quite large at the time of application.

(*Turn to page* 41)

After an application of kainit, weeds were scarce and no hoeing was necessary.

# The Use *of* Potash in Indiana

## *By S. D. Conner*

Research Chemist, Purdue University

THERE are three classes of soils in Indiana that respond in a marked degree to potash fertilization. These three groups are:

Muck and peat soils which are very high in organic matter but low in total and available potash in both surface and subsoil.

Sandy soils which vary in organic matter and which have a medium to high amount of total potash, but are quite low in available potash.

White flat silt loams which are quite low in organic matter, medium to high in total potash, but low in available potash, particularly in the surface layers, but not so low in the subsoil.

The remainder of the soils of Indiana, which include the gently rolling to hilly silt loam and clay soils, are variable in their potash needs depending upon the state of erosion and the length of time and way they have been cropped and manured. Some eroded slopes show practically no need for potash. Many of the overflow lands show no need for potash.

### *Large Amounts of Potash Removed*

Potash is removed by crops in larger amounts than any other mineral element. A two-ton per acre hay crop will remove about 65 pounds of potash. In a corn crop of 50 bushels, 25 pounds of potash will be found in the stalks and only about 15 pounds in the grain. A ton of wheat straw contains from 12 to 20 pounds potash, while 20 bushels of wheat grain that goes with it has only about six pounds of potash.

It may thus be seen that where hay, straw, corn fodder, or silage is removed from the field, there will be a heavy drain on potash. This potash may be returned if these materials are fed and the manure conserved and returned to the land. The potash in crops is water soluble and it will be easily lost if the straw or manure is exposed to rain. A livestock system of farming will be much more exhausting on the potash than a pure grain system if the manure and crop residues are not carefully returned.

### *Subsoils Contain Potash*

While some soils contain large quantities of potash, constant cropping and removal of potash, particularly from the surface layers, will in time bring the available potash level so low that potash fertilization is needed if we wish to continue to grow good crops. Fortunately the subsoils of many Indiana clays and loams contain large quantities of available potash. Unfortunately, however, the roots of corn and other grains often do not penetrate deeply enough for this subsoil potash to be of any benefit. On such soils it is necessary to use potash in liberal amounts in fertilizers to start the crop. Often corn will show signs of potash starvation in the early growth, while later the roots will have penetrated more deeply and the crop will get sufficient potash.

Any condition such as poor drainage, that prevents corn roots from penetrating the subsoil, will cause potash depletion in the surface layer. We may have good, deeply rooted corn near the tile lines, while farther away the roots will penetrate no deeper than the plowed soil and the corn will starve for lack of potash. The attack of insects such as the corn root web worm or a bad case of root rot will often cut off enough roots to prevent the proper assimilation of potash. Potash fertilization will help to grow a normal crop under these adverse conditions.

Much of the beneficial effect of deep rooted crops, like sweet clover, can be attributed to the fact that they penetrate the otherwise impervious subsoil and not only feed deeply but when other crops follow, the decaying roots leave convenient channels for the grain roots to penetrate down into the subsoil where there may be an abundance of potash.

The farmer who has level, poorly drained clay or loam soils whose surfaces are depleted of available potash, may do one of several things to furnish potash to his crop.

He may make a liberal application of farm manure which contains approximately one-half per cent potash; he may increase his tile drainage and thus give the roots a chance to penetrate more deeply into the subsoil; or he can grow sweet clover or alfalfa. Red clover will help some, but it is not as good for this purpose as the more deeply rooted alfalfa or sweet clover. If he has done none of these things, the farmer still has a chance. He may use a fertilizer rich in potash. Rest assured the crops must have potash in liberal amounts, and if the farmer does not care for his land in such a way that the crops may feed on the soil potash, then he must buy potash or fail to grow good crops.

It may be necessary to lime and fertilize the land to get a good stand of sweet clover. In such cases liming

(*Turn to page* 41)

White flat silt loam soil from southeastern Indiana, 17th crop. The left-hand series had various phosphate and nitrogen treatments. The center series has had lime in addition to phosphate and nitrogen. The right-hand series has had potash in all pots in addition to phosphate, nitrogen, and lime. This illustrates how severely the crops had depleted the soil potash.

# Spending *for* Profits

## *By R. E. Stephenson*

Associate Professor of Soils, Oregon State Agricultural College

A LEGITIMATE investment which gives reasonable promise of more than 100 per cent profit in six months to a year is rather rare. Yet this and more have been done by farmers using commercial fertilizers to grow farm crops. Not one but many have testified to the efficacy of fertilizers for bolstering up a "none-too-productive" soil to a profit-yielding basis. No other incentive except a good margin of profit could insure the continued and gradually increased consumption of fertilizers.

A few years ago the National Fertilizer Association after interviewing 48,000 farmers arrived at the conclusion that the return for each dollar invested was about $3.50. This represented the average estimates made by the users who were paying for the fertilizer out of their returns.

A neighbor's son in going over these figures asked this pertinent question: "If fertilizing is so profitable, why is not more used?" A good question all right, and not to be answered without some consideration. These estimates made by the farmers check very well with the records of some 30 or 40 experiment stations, where returns are carefully calculated. The Michigan Station reports returns of $37 to $107 an acre from fertilizing sugar beets. The New Jersey Station reports that tomatoes and vegetables give net returns of $30 to $100 per acre for fertilizers.

A partial answer to the boy's question, however, is found in the observation that not all the return is "velvet"—that is, it costs something besides the fertilizer to produce the crop increase. There are an extra handling cost and other items. Assuming that the fertilizer represents reasonably only one-half the cost of the increase, the profit is still abundant.

"The trouble is," someone has said, "fertilizing has been too profitable and that is part of the reason for the present overproduction."

In a center of specialized agriculture a prominent farmer was asked whether he thought commercial fertilizers would be much used next year. His reply was, "I hope so. We do not need more acres but fewer in crops—fewer acres better farmed to produce yields that are profitable." He further stated, "I am making some profit this year, because I have always fertilized liberally, and my soil is productive beyond paying the cost of production." Said he, "One must eliminate boarder acres just as the dairyman eliminates boarder cows."

### *Fertilizers Go With Intensive Methods*

Thirty-two States use significant amounts of commercial fertilizers. Of this area the centers of most intensive development use most. In New England the potato growers of Maine and the onion and tobacco growers of Connecticut commonly use a ton to the acre. Likewise the truck farmers of the Middle Atlantic States fertilize liberally. Lettuce growers still spend $35 per acre for fertilizers. In the South Atlantic States the celery grower of Florida is finding it profitable to use not pounds but tons of high-grade

(*Turn to page 51*)

HAPPY EASTER

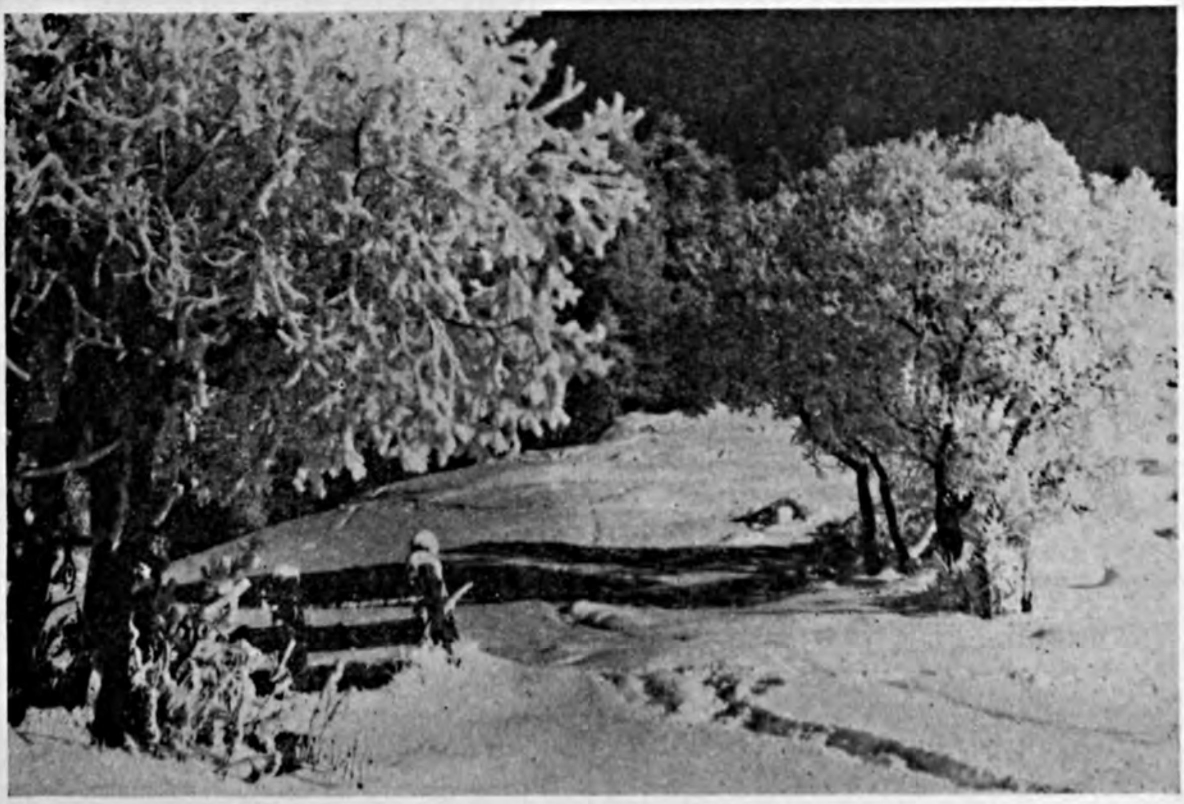
# PICTORIAL

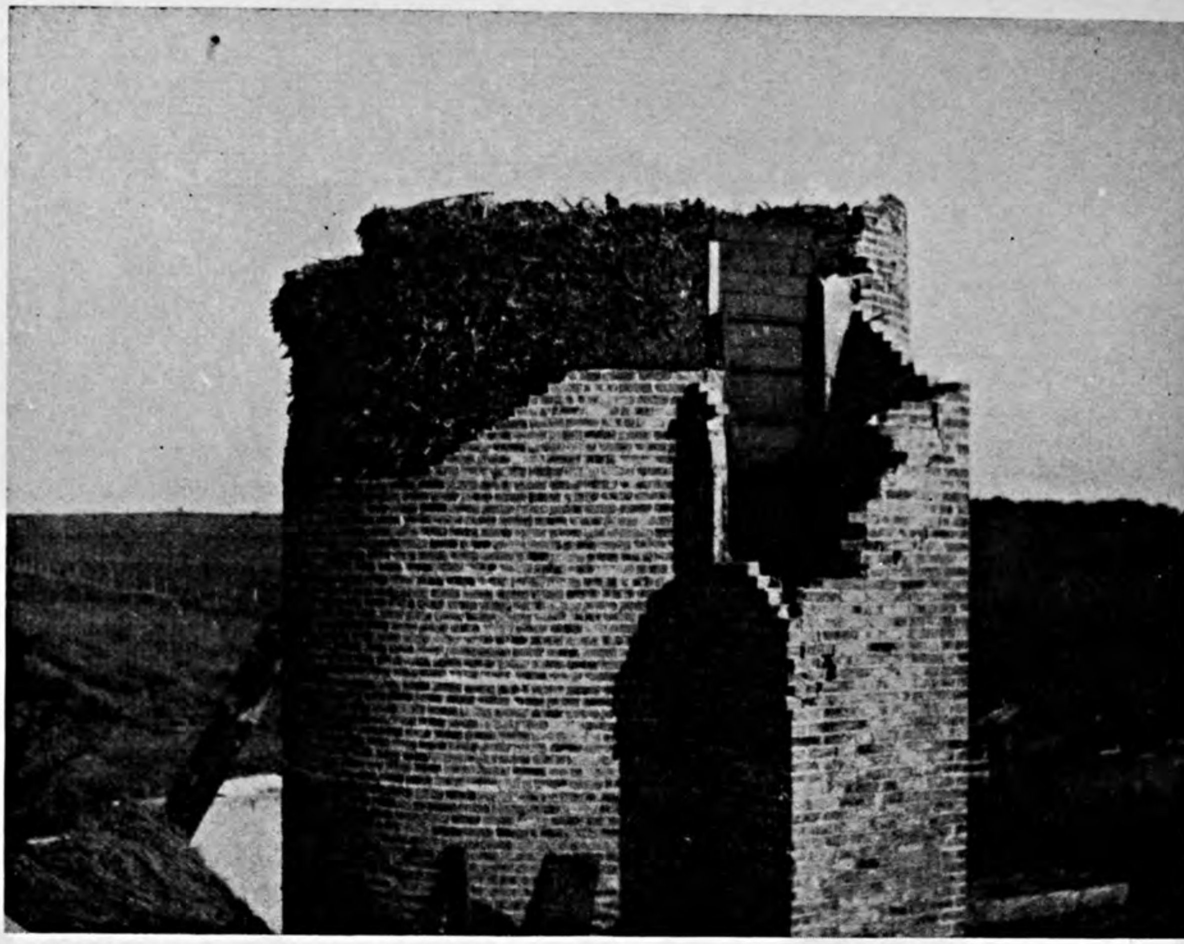
Above: When ice leaves the quiet, little streams, Spring is not far away.

Left: Corn in the shock at this time of the year means cold fingers.

Right: The Coughlin campanile on the South Dakota State College campus is the tallest structure in South Dakota.

Below: On a sizzling day in July, a memory of this spot might prove refreshing.



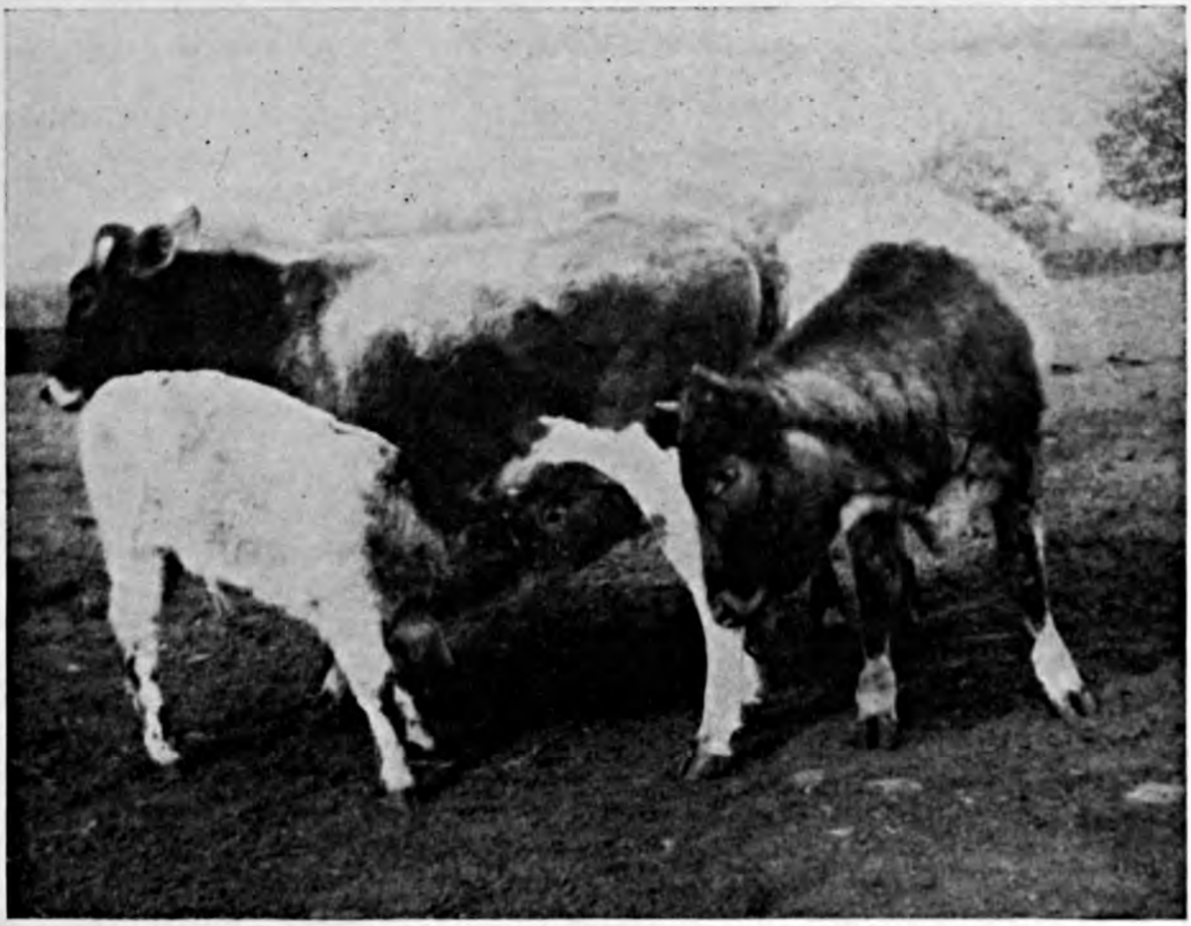


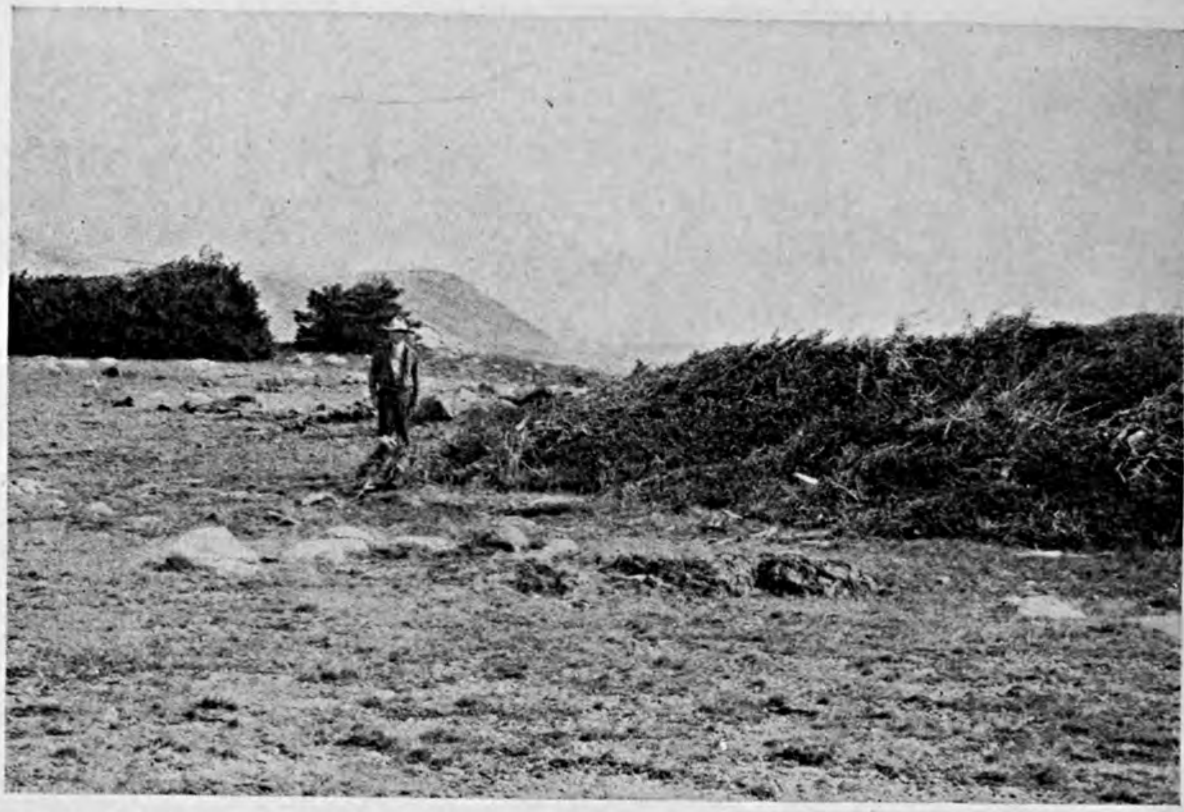
**Above:** A freak trick of a tornado in southeastern Wisconsin tore away the brick wall of this silo, but left the silage intact.

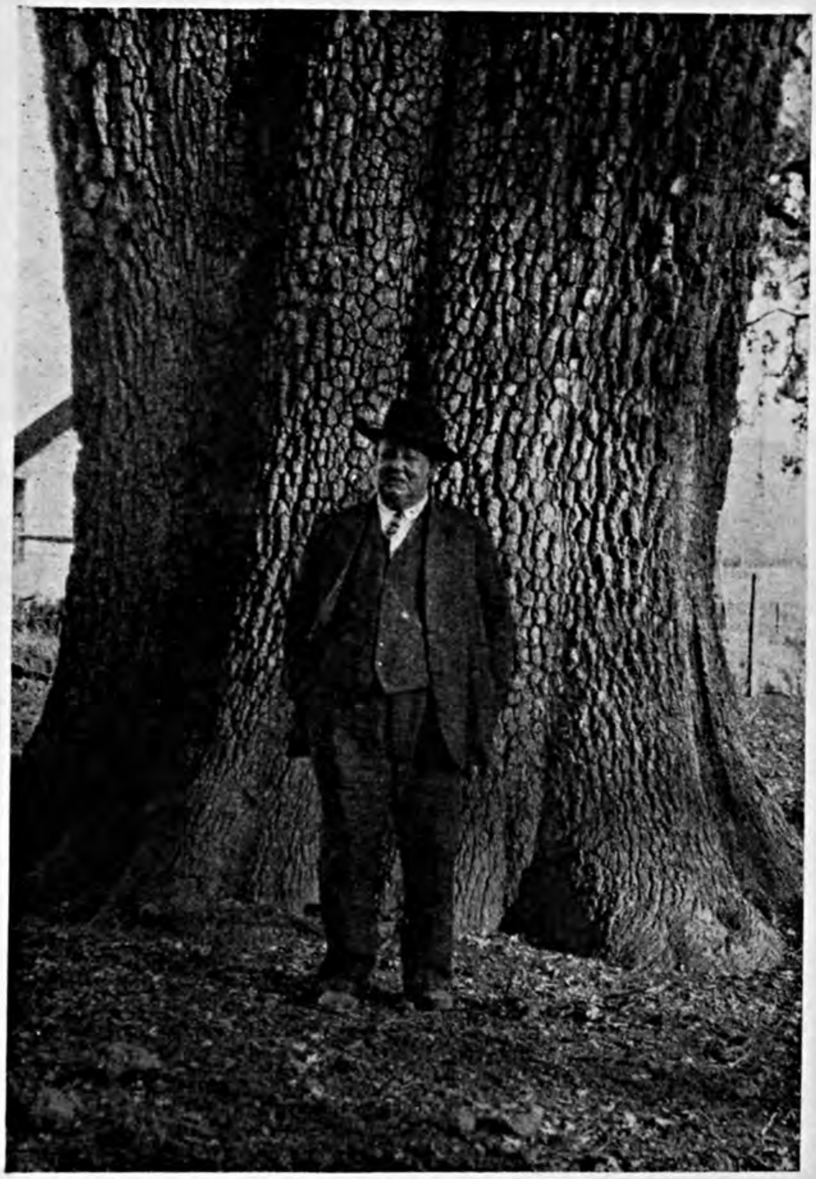
**Below:** The round barn, once a common sight, is becoming a curiosity.

Above: Happily these farm children in Arkansas start for a ride with an improvised conveyance of no great speed or assurance of "getting there."

Below: Still interested. Big Brother is a little too old to partake.







Above: The peculiar shape of these trees at the timber line in the Medicine Bow mountains, Wyoming, (11,000 feet elevation), is due to the strong winds which sweep the range.

Left: In contrast to the peculiar trees pictured above, this big oak is 165 feet high and 14 feet in diameter. It is the largest oak in Round Valley, Mendocino county, California, and is estimated to be 1,450 years old. The man shown is the largest man in Round Valley. He is more than 6 feet tall, weighs 450 pounds, and is a big rancher butcher who works every day in his shop.

# The Editors Talk

## The Agricultural Outlook

Substantial improvement will have to appear in the basic industries, as in the construction, automobile, textile, and iron and steel industries, before farmers will be warranted in counting on a return to prosperous domestic demands for agricultural products in the near future, is the vital part of a 120-page statement of "The Agricultural Outlook for 1932," just published by the Bureau of Agricultural Economics.

In making this annual survey of agricultural conditions at the beginning of each year, the Bureau is assisted by the State agricultural colleges, extension services, and the Federal Farm Board. Its purpose is to face the facts and give such facts for the benefit of farmers and others interested in adjusting agricultural activity to present conditions. And as a large number of competent authorities assist in compiling the material, the outlook presents a well-rounded and detailed study, valuable to anyone interested in knowing just what the present agricultural situation and trends are.

The very severe drop in the price of raw materials and in volume of activity of basic industries is in line with the economic teaching that normally there is usually a greater fluctuation in the price of raw materials than in the price of consumer goods. For instance, the price of wheat often drops much more severely than the price of flour, and the price of flour more than the price of bread. Consequently, as pointed out in the outlook report, recovery in the basic trades must precede a greater domestic demand for agricultural products.

Equally as serious and possibly more so, is the loss of an important part of the foreign market for wheat, pork, tobacco, and to some extent for cotton. Foreign competition and demand occupy several pages and is a section of much importance in the report. That foreign demand for domestic agricultural products has fallen to a very low level is fairly well known, but the report adds rather significantly that "there is very little definite evidence of significant improvement in the near future." The protection of domestic markets abroad by import restrictions is pointed out as an adverse factor. The outlook says: "By and large the past year was one in which import barriers already high in most foreign countries continued to mount." . . . "In scarcely an instance was there any significant abatement."

### *Regarding Cotton*

A more hopeful statement refers to cotton. For "cotton is a notable exception to the general tendency to maintain production in foreign countries. Except for Russia, there appears to be a world-wide tendency towards acreage reduction. This is especially true in the new cotton-growing regions of Africa, such as the Anglo-Egyptian Sudan. In Egypt the government is restricting cotton acreage. In India the cotton acreage in 1931-32 was the smallest since 1922-23." Thus, in a study of the cotton situation it is now clear that the production outside the United States has been materially reduced. And further, as prices of cotton produced in other countries have risen, mills are turning more to American cotton. Therefore, the increases in cotton consumption noted earlier in the season may be of some significance. At the same time, the world's supply of all cotton for 1931-32, estimated to be 41,600,000 bales, is a very important factor in considering the outlook.

As gross farm income from the important fertilizer-consuming crop areas is a most important factor affecting the purchase of fertilizers for the following year, the outlook for certain crops, especially cotton, tobacco, corn, and potatoes, is particularly important. As is well known, the gross income for 1931 was much smaller than in former years; therefore, fertilizer consumption in 1932, for the country as a whole, will also be much smaller. Conditions affecting cotton production have already been noted.

The tobacco situation is characterized by large supplies of leaf and a diminishing rate of consumption of tobacco products, declining exports, and very low prices to growers.

The potato outlook is governed by the apparent intention at this date to make only a slight decrease in acreage in 1932. With fair chances of a better growing season than in the past three years, potato growers in the late producing States face another season of increased supply. Against this probable large supply of potatoes, there are no definite indications that there will be any improvement in demand conditions.

Regarding the corn outlook, the prospective acreage of corn is likely to be large enough so that if only average yields are obtained, corn production in 1932 will be larger than any year since 1923 and near to a record crop. It is possible, however, that owing to a larger livestock population on farms, this prospective larger supply of corn will be used to better advantage than in 1923.

It is encouraging to note that for the first time in seven years there has been a noticeable downward adjustment in wheat production. This applies to all wheat acreage except in Russia and China.

Dairy products are in a relatively more favorable situation than most other farm products; prices the last two years having declined less than the average by some 30 per cent.

There were more cattle in the United States on January 1, 1932, than on the same date a year ago, but fewer cattle on feed for market.

The credit outlook is discussed in detail. The statement points out that deposits at country banks have decreased substantially in recent years and the supply of farm credit available from local sources is considerably less. The primary cause of these declines has been the low prices for agricultural products. The statement concludes that the "extent to which these adverse factors continue to operate during the coming year will be largely dependent on the degree to which confidence is restored in the banking situation." It is noted that many government agencies have been organized to establish confidence.

### *Two Concepts Are Clear*

Out of this detailed survey whatever may be uncertain regarding the future, two concepts are clear.

First, there will be advance notice before there is any substantial recovery in the purchasing power of the farmer sufficient to favorably affect any of the trades catering more specifically to agriculture, as the fertilizer industry. The reason for this is that before the farmer can spend larger amounts of money for his purchases, he must himself have received an increase in farm income or credit, and in turn, before he himself receives an increased income, conditions must improve in industry, particularly in the basic industries, and for foreign demand, market conditions must improve abroad.

The second concept is that the successful farmer, or the successful industry serving the farmer in the immediate future, will be one that can operate under a relatively low price level, which means adjustments to such price levels.

But is this a discouraging picture? No. It is true that the present going is relatively hard, but as the inevitable result is to compel a greater efficiency in agriculture and agricultural industries and as the future will undoubtedly witness substantial recoveries, present conditions may ultimately be productive of more real good than now seems to be the case.

## Crop Diseases

We are always very glad to publish an article from such a well-known agricultural authority as Professor C. B. Williams of North Carolina. His discussion on the prevention of certain crop diseases is both instructive and interesting.

As Professor Williams points out, most of the diseases which are the subjects of his observations in this paper have been due directly or indirectly to malnutrition. Root-rot of oats and corn, the too early maturity of these two crops, the accumulation of iron in the nodes of corn-stalks, frenching of corn, the "black rust" of cotton, "sand drown" of tobacco, the marketing quality and spoilage of strawberries, and the quality of soybeans are some of the important topics discussed in this article. The information is of great value, not only to the farmers of North Carolina in which State the experimental work on which the observations are based was conducted, but to all growers of these crops anywhere.

## What Shall We Believe?

In these days of world complexity and over-production, sound beliefs, not goods, are at a premium. For no seer is needed to tell us that the present age is one of profound world change; 1931 marking another milestone in the present period of social change.

And as in the days of old, the handwriting is again on the wall. But in that ancient day, the handwriting was interpreted for the troubled king; today who can so interpret it? With all the contending viewpoints on world monetary standards, over-production and quotas, inflation and deflation, debts and moratoriums, unemployment and its relief, falling prices, the speeding up of life by scientific effort, and other complexities—all demanding interpretation and solution—who are the false prophets and who are the true?

Confusion and instability of thought are dominant. The established social and industrial rhythm has gone; the new is not yet established. Often we are inclined to feel that anything we know may yet be worth but little; that everything we have accomplished may yet prove ineffectual. We weary of the constant analysis of changing phenomena; of the search for exact fact and proof; and of the study of conflicting expert evidence, first in support of one view and then another.

Against such a background, man ultimately tends to discard too much quest for further proof and to consolidate his thinking into simply defined beliefs as his motive force; the surest beliefs his knowledge and experience provide. For it has been so in all great periods of social change.

With this very human course of action as an age-long precedent, let us always believe in something; the best we can think of. Let us remember for instance the vital and essential character of the great industry, agriculture, with which we are associated; the very necessary character of industries that serve agriculture; that agriculture and the industries serving it must continue; and that even in these days of depression there are at work economic and social forces which will ultimately compel a much fairer distribution of the farm and city dollar and a fair return for farm labor. It is undoubtedly true that much of the change now taking place will ultimately be for the best, entailing, as change always does, present sacrifice and adjustment to reach the ultimate goal of a more stabilized and true prosperity.

May we lay hold of some simple and sustaining belief to carry us through.

## Common Sense About Cotton

With the present low prices of cotton and a great deal of talk about reducing the acreage, what is the cotton farmer to do? This is a very important and all-absorbing question, not only to Southern farmers, but to interested groups all over the country, for much general prosperity depends on a prosperous cotton belt. We are, therefore, very glad indeed to publish an article on cotton by J. N. Harper, who for many years was the Director of the Agricultural Experiment Station of South Carolina, and who over a long period has studied the scientific and practical aspects of the cotton crop.

As Mr. Harper points out, there is a great deal of merit in many of the proposed agricultural programs, such as crop diversification, but in the last analysis the natural crop, to which are adjusted all marketing, financial, and labor systems in many parts of the South, is cotton. Therefore, whatever is done about other crops, the problem of the cotton crop still remains. Mr. Harper has given a very interesting and instructive discussion on the answer to this problem.

## They Know What to Keep

County agricultural agents are one of the necessities which Southern farmers will not give up, even in the depression. A north Mississippi report shows that not a single agent will be lost this year out of eighteen in the district. And the reason is found in the further report that counties having agricultural agents are "in the best condition as regards feed and foodstuffs for farmers' home winter supply." The counties which can't afford county agents now are the ones which havon't had them in the past.—*Purdue News Service.*

# The Use of Potash in Indiana

(*From page 29*)

may be a means to the end of aiding the corn to secure soil potash. This seems paradoxical when other evidence indicates that lime in itself tends to make potash less soluble. It would be only on land on which you could get it to root deeply that sweet clover would be helpful in furnishing potash. On some of the flat, deeply acid soils of southern Indiana, sweet clover is itself a shallow rooted crop on account of an impervious or very acid subsoil. On such lands it would merely help to rob the surface soil of its potash. Soybeans on any soil tend to be more shallow rooted than the clovers, and for that reason and also because they remove large amounts of potash, leave the land in a condition so that crops that follow should be rather heavily fertilized with potash.

To summarize, we would say that all crops should be rather heavily fertilized with potash on muck soils and on either dark or light colored sands. The more lime these soils contain, the more they are apt to need potash. The flat white soils also need fairly heavy percentages of potash.

The quantity of potash to use on any soil depends upon the kind of crop to be grown. High money value crops will, of course, return a larger profit from high fertilization than grain or hay crops which are grown in an extensive way. Even on soils which originally had good stores of potash, and which may even yet contain plenty of available potash in the subsoil, potash should be used in fertilizers to start the crop.

Only the rich overflow bottom lands and some yellow clay hillsides require no potash.

Potash is, of course, not the only element that may be needed on the soils we have discussed. Phosphate, nitrogen, and lime are also important. As a matter of fact, potash generally gives greater returns when used in addition to lime and other fertilizer elements than when it is used alone.

# Kainit Controls Weeds

(*From page 27*)

Some three weeks later when we made our third hoeing on the balance of the patch, we again did not have to hoe these nine rows, although there were a few weeds coming up in the three rows which received only the 50 lbs. per row. As the summer went on, a few more weeds grew in these three rows, and an odd one came up in the other six rows, but none of them were hoed at any time and they were the cleanest rows in the patch in the fall. As mentioned before, the hoeing cost us from 30c to 50c per row each time over, or a total of about $30.00 per acre.

If kainit cost us $16 per ton it would be approximately the same as if we had applied salt, for while the kainit cost a little more than the salt, it required a little less per acre to accomplish the same results. The kainit, however, contains 14 per cent available potash and so has a fertilizer value in addition to that of weed-killer. We have been applying a mixed fertilizer, 5-12-8, at the rate of one ton per acre. The potash has been costing us about $1 per unit, and so the total cost of potash has been $8 per acre. On these nine rows to which the kainit was applied, we left out the potash in the fertilizer application. The first three rows received about the same potash application as usual, while the second three received twice as much, and the third three, three times as much. Of course it was not spread over the whole surface of the ground, and so the actual fertilizer value can only be told by further tests.

We realize that this is only a one-year test, but we are so interested in it that we intend to treat six acres of asparagus this year at the rate of one ton per acre.

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# Arrowhead Potato Tests Show Extra Bushels from Potash Cost 7½ cents Each

*By Mark J. Thompson*

Director Northeast Minnesota Experiment Station, Duluth, Minnesota

THE "Arrowhead" designates the western or Minnesota portion of that great conifer area which covers northern Minnesota, Wisconsin, and Michigan and borders the southern and western shores of Lake Superior.

In 1924 the St. Louis County, Minnesota, Club made a cooperative pact with the Northeast Minnesota Experiment Station to conduct crops and soils tests in various parts of the county which, by the way, is almost as large as Massachusetts. The object was to recheck the findings of the Station and determine their application in remote districts. The work has continued through the years and now includes Lake county as well.

We are concerned here with the comparative results obtained during 1931 on 10 St. Louis and Lake county fields where potash fertilizer was used on potatoes. The fields were located as follows: Lind Field, Forbes; Ball Field, Chisholm; Spikberg Field, Grand Lake; Lake County Field, Two Harbors; Carlson Field, Gheen; Mobroten Field, Forbes; Kirschir Field, Forbes; Erickson Field, Gilbert; Sarich Field, Gilbert; and Nelson Field at Cook.

Table I

Acre Yields; St. Louis—Lake County Potato Tests; 1931

| Management | Acre Yields all soils | Hill Yields all soils |
|---|---|---|
| Check | 208.6 bus. | 1.35 lbs. |
| 220 lbs. Sul. Amm. Per. A. | 240.8 " | 1.535 " |
| 220 " (8-16-12) " " | 254.8 " | 1.57 " |
| 220 " Treb. Superphos. " | 259.17 " | 1.71 " |
| 220 " Mur. Potash " " | 272.63 " | 1.83 " |
| 440 " (4-8-6) " " | 235.52 " | 1.68 " |
| 660 " (4-8-6) " " | 262.6 " | 1.82 " |
| 880 " (4-8-6) " " | 257.85 " | 1.81 " |

TABLE II

Potash Studies; Sand and Clay Loam Soils; 1931

| Location | Soil Type | Check | Acre Yields in Bus. 220 lbs. Muriate Potash per Acre | Increase |
|---|---|---|---|---|
| Forbes (1) | Sandy loam | 166. | 253.9 | 87.9 bus. |
| Forbes (2) | " " | 174.3 | 220.1 | 45.8 " |
| Forbes (3) | " " | 215.61 | 279.6 | 64. " |
| Grand Lake | " " | 201.6 | 221.6 | 20. " |
| Gilbert | " " | 301.5 | 421.1 | 119.6 " |
| Two Harbors (4) | Clay loam | 203.2 | 232.2 | 29. " |
| Two Harbors (5) | " " | 165.2 | 285.6 | 120.4 " |
| Gheen | " " | 220.5 | 300.9 | 80.4 " |

(1) Fertilizer placed at bottom of drill row. (2) Fertilizer spread over surface of the soil; (3) Kirschir farm test; (4) Irish Cobblers; (5) Green Mountains.

The data presented in table I show that potash fertilizer made the heaviest average hills and the largest total yield.

### *Potash Proved Profitable on Both Soil Types*

Several additional points of interest are developed when the results from untreated or check plots are compared with those from the potash plots with particular reference to soil type, table II.

### *Average Gain Was 72 Bushels*

Considering all soils and all treatments, the largest average production both per field and per hill was realized when 220 pounds muriate of potash per acre were used, the average gain being 72 bushels per acre over check and ranging from 20 bushels to 120 bushels per acre.

### *Extra Bushels Cost 7½ and 11 Cents*

Just what did these additional bushels cost? Naturally, it varied with the treatment, as we see by the next table.

The cheapest gain on both soil types resulted from applying 220 pounds of muriate of potash; on sandy loam the increased bushels cost 7.49 cents each, while on clay loam, the increased bushels resulting from the potash treatment cost 11.1 cents each.

The fields used were widely scattered and represent prevailing farm types of soil under cultivation in this great area. We expect to repeat and recheck this work during the 1932 growing season.

TABLE III

Acre Increase and Cost per Bushel—All Fertilizer Treatments

| Management | | Sandy Loam Soil | | Clay Loam Soil | |
|---|---|---|---|---|---|
| | | Increase in Acre Yields | Cost per Bushel of Increase | Increase in Acre Yields | Cost per Bushel of Increase |
| 220 lbs. Sul. Amm. | per A. | 47.82 bus. | 8.05c. | 16.59 bus. | 23.2c. |
| 220 lbs. (8-16-12) | " " | 48.20 " | 16.2c. | 44.20 " | 17.7c. |
| 220 lbs. Treb. Superph. | " " | 64.27 " | 8.55c. | 36.88 " | 14.9c. |
| 220 lbs. Mur. Potash | " " | 76.49 " | 7.49c. | 51.58 " | 11.1c. |
| 440 lbs. (4-8-6) | " " | 29.83 " | 29.5c. | 24.02 " | 36.6c. |
| 660 lbs. (4-8-6) | " " | 53.83 " | 24.5c. | 58.28 " | 22.6c. |
| 880 lbs. (4-8-6) | " " | 70.45 " | 24.9c. | 43.43 " | 40.5c. |

# Complete Fertilizers for Orchards

(*From page* 11)

This need for a more adequate orchard mulch, whether it be through a sod system or whether it be supplied through legume or non-legume crops, is one of grave importance to many New England growers as well as to growers in other parts of the country. Past methods of treatment have continued to burn out the supply of organic matter until in many orchards a non-fertile condition exists. Some growers already have sensed the trouble they have been running into and are attempting to overcome the difficulty. They are meeting with success.

Professor A. J. Farley of the New Jersey Agricultural Experiment Station, speaking at Hartford at the Connecticut Pomological meetings recently, stressed the importance of a more suitable orchard soil condition. As an example he pointed out the two fruit-growing counties in New Jersey, Burlington and Monmouth counties. One of them has been following a straight nitrogen program for years; the other has been using complete fertilizer. The nitrogen-alone growers are running into difficulty with a soil that has become very sour, erodes easily, and will barely grow the most meagre of grasses. This condition is also directly affecting the yield and tree vigor. The complete-fertilizer users, on the other hand, are not having this soil difficulty; and while it is costing them more, they will eventually win out over the other group. Soils in both counties are comparable as to general make-up.

Professor R. D. Anthony, at Pennsylvania State College, is also meeting with decided success in his orchard work in showing the value of plenty of organic matter.

In a recent discussion of "Organic Matter in the Orchard" by Dr. E. C. Auchter, Principal Horticulturist of the U. S. Department of Agriculture, we find:

"The important thing is to grow a heavy sod so that the large amounts of organic matter can be cut twice a year and left on the ground to improve the soil. In the case of cultivated orchards, the object should be to plow under heavy cover crops yearly." In both practices, according to Dr. Auchter, "a lime test should be made and lime and fertilizer should be added if these are necessary in order to produce a heavy cover crop. Nitrogen, phosphorus, and potassium will probably all have to be added on many soils to get a heavy growth of cover crops."

As stated previously, those growers in New England, who have seen the handwriting on the wall, are now growing adequate cover crops and are maintaining orchard soil conditions that are sufficient to meet the demands of heavy yields, constant tree feeding, and drought. Whether they are growing heavier sods or whether they are growing legume crops, they are seeing to it that there is a sufficient supply of phosphorus and potash along with the nitrogen. It is believed that the foregoing tests would have shown even greater differences had they been carried out under legume sod conditions.

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## NEW POTATO

Plant beeeders of the United States Department of Agriculture have originated a new variety of potato that resists the disease known as mild mosaic. This new potato is the Katahdin. The department tested it in 100 localities in 20 States last year and it showed no signs of mosaic, although other varieties growing in the same fields became affected with the disease. "Mild" mosaic is not a mild disease but causes severe damage to the potato crop.

# 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, and Crops. 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

Potatoes have such an important place as a food that their quality goes far to determine the quality of the meal of which they are a part. The work of M. Whittemore and B. M. Kuschke in investigating the factors which influence the cooking quality of potatoes is, therefore, of particular importance, especially since comparatively little has been published on this subject. The authors describe their experiments in Bulletin 231 of the Rhode Island Agricultural Experiment Station entitled, "Certain Relationships of Potash Fertilization and Varieties of Potatoes to Table Value."

Over a period of five years, the authors cooked potatoes from plots which received high and low amounts of potash. Potatoes from each plot were boiled, mashed, and baked each year, and members of the station staff judged whether high or low potash lots were superior. In the case of the boiled and baked potatoes, the judgments were overwhelmingly in favor of high-potash potatoes. With the mashed potatoes, the high-potash lots always received more first places, but the difference was not so great. The authors believe this may have been due to a combination of circumstances among which is the fact that mashed potatoes have other substances added to them, changing their texture and flavor and making the difference between the potatoes hard to detect.

Starch in the potatoes from the high and low-potash plots was determined and variable results were obtained. There seemed to be no definite correlation in this experiment between the starch content and the mealiness of the potatoes. Nitrogen was slightly but consistently lower in the high-potash treated potatoes.

The influence of variety on cooking quality was also investigated. For this work, Green Mountain, Rural Russet, and Irish Cobbler potatoes were used over a period of three years. There were no outstanding differences among the varieties in either cooking quality or starch content.

Summarizing and analyzing five years' experiments on "Celery Fertilizer Experiments in Ohio," D. Comin finds that the equivalent of at least one ton per acre of 2-8-16 fertilizer should be used to get the most profitable yields. The work was conducted on a recently broken muck soil and the data obtained naturally pertain primarily to similar soils. When 1,000 pounds per acre of 2-8-16 were used, the yield was not as high as when one ton was used. Common salt did not increase the yield. Barnyard manure increased the yield, but the same amount of mineral nutrients applied as a fertilizer gave a higher yield than the manure. Celery growers on muck soil will find these experiments, described in Ohio Agricultural Experiment Station Bulletin 493, to be of value and interest. The work is described in a practical, and to a large extent non-technical, manner that makes the bulletin useful to the practical as well as to the scientific man.

Raspberry growers who are wondering how they ought to fertilize this crop will find excellent help in "The Fertilization of Red Raspberries," by A. E. Stene, Rhode Island Agricultural Experiment Station Bulletin 229. Recommendations of various experiment stations are summarized, followed by the results of three years' experiments conducted by the author. A basic annual treatment of 500 pounds per acre of 4-10-6 was used. Compared with this were three other plots with one of the three fertilizer elements missing on each. Four varieties, the Latham, June, Herbert, and Cuthbert, were grown on each plot. The highest yields were obtained with a complete fertilizer. Leaving out one of the fertilizer elements depressed the yield in each case, the greatest depression occurring when potash was omitted from the fertilizer. These results show that a complete fertilizer was needed for red raspberries under the conditions of this experiment and that in this fertilizer, the potash is the most important constituent. The author feels that the amount of fertilizer used probably was not sufficient to produce the most profitable yields.

Cane growth measurements gave the same relative results as the yields.

Lime was not thoroughly tested, but as used, gave large increases in yield. The author believes that red raspberries do best on a soil that is not very acid. Black raspberries seemed to be less particular in this respect.

Considering the varieties, the Latham outyielded by far the other three varieties. The June variety was earliest and had the second highest yield, but was far behind the Latham in this respect. The Herbert had the lowest yield. The author believes the Latham is an exceptionally good variety, taking all factors into consideration.

*"Commercial Fertilizers, Report for 1931," Agr. Exp. Sta., New Haven, Conn., Bul. 331, Oct., 1931, E. M. Bailey.*

*"Commercial Fertilizers Inspected and Analyzed in the State of Georgia, Year 1931," Ga. Dept. of Agr., Atlanta, Ga., Serial No. 120, Eugene Talmadge.*

*"Report of Analyses of Commercial Fertilizers," La. Dept. of Agr. & Immigration, Baton Rouge, La., Fert. Rept., Season 1930-1931, Harry D. Wilson.*

*"Commercial Fertilizers, 1931," Agr. Exp. Sta., Orono, Me., Off. Inspections 141, James M. Bartlett.*

*"Commercial Fertilizers, Commercial Feeds, and Agricultural Liming Materials," Univ. of Md., Col. Park, Md., Control Series No. 141, Nov., 1931.*

*"Fertilizer Analyses and Registrations, 1931," Dept. of Agr., Dairy and Food, St. Paul, Minn., H. A. Halvorson.*

*"The Use of High Analysis Fertilizers," Agr. Ext. Serv., Col. of Agr., Columbia, Mo., Cir. 278, Aug., 1931, Lloyd M. Turk.*

*"The Use of Ammonia and Nitrate Nitrogen by Certain Crop Plants," Agr. Exp. Sta., New Brunswick, N. J., Bul. 526, Sept., 1931, V. A. Tiedjens and W. R. Robbins.*

*"Report of Analyses of Commercial Fertilizers Sold in New York State, July 1, 1930, to June 30, 1931," Dept. of Agr. & Markets, Albany, N. Y., Agr. Bul. 255, Oct., 1931.*

*"Inspection of Fertilizers," Agr. Exp. Sta., Kingston, R. I., Ann. Fert. Cir., Sept., 1931, W. L. Adams, D. R. Willard, and A. S. Knowles, Jr.*

*"Observations on the Use of Commercial Fertilizers on the Arid Soils of Utah," Agr. Exp. Sta., Logan, Utah, Bul. 233, Jan., 1932, D. W. Pittman and Clarence Burnham.*

*"Fertilizers for Cotton Soils," U. S. D. A., Washington, D. C., Misc. Pub. 126, Nov., 1931, J. J. Skinner.*

## Soils

A further contribution in the search for a short, rapid, and reasonably accurate method for determining the fertilizer needs of a soil has been made by W. G. Sackett and L. C. Stewart. They have adapted a method suggested by Winogradsky in which the relative growth of an organism in the soil is used to measure the soil's fertilizer requirements. The method briefly consists of taking a soil sample, adding starch or sugar and sufficient moisture to make a kind of mud pie, placing it in a warm room for three days and observing the amount of growth made on the surface of the soil by an organism known as Azotobacter. This organism occurs naturally in most soils that are not acid but can easily be added in the laboratory, when it is not present. If a good growth of the organism results, which will give the surface of the soil a fuzzy or "moldy" appearance, it shows that the soil will grow a crop so far as the mineral nutrients are concerned. In case a good growth of the organism does not occur, appropriate lime, phosphate, and potash compounds are added until good growth is obtained. These additions correspond to fertilizer additions necessary to obtain a good crop.

This test is naturally based on the assumption that the mineral nutrient requirements of Azotobacter are similar to those of growing crops. This appears to be the case, since good correlations have been obtained between results with this test and actual field trials. The authors describe their test in detail and show results obtained with it in Bulletin 375 of the Colorado Agricultural Experiment Station entitled, "A Bacteriological Method for Determining Mineral Soil Deficiencies by the Use of the Soil Plaque."

*"Phosphate Solubility Studies on Some Unproductive Calcareous Soils," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 35, Oct. 15, 1931, W. T. McGeorge and J. F. Breazeale.*

*"The Relation of Phosphate Availability, Soil Permeability, and Carbon Dioxide to the Fertility of Calcareous Soils," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 36, Nov. 1, 1931, W. T. McGeorge and J. F. Breazeale.*

*"Effect of Hydrogen-ion Concentration on the Growth of Strawberries in Sand and in Soil," Agr. Exp. Sta., Lexington, Ky., Bul. 321, Sept., 1931, C. S. Waltman.*

*"Estimation of Nitric and Nitrous Nitrogen in Soils," Agr. Exp. Sta., Col. Sta., Tex., Bul. 439, Nov., 1931, G. S. Fraps and A. J. Sterges.*

*"Report of Analyses of Samples of Lime Materials Used for Agricultural Purposes Sold in New York State, July 1, 1930, to June 30, 1931," Dept. of Agr. & Markets, Albany, N. Y., Agr. Bul. 256, Nov., 1931.*

*"Soil Survey of Calvert County, Maryland," U. S. D. A., Washington, D. C., Series 1928, No. 13, S. O. Perkins and Merle Hershberger.*

*"Soil Survey of Mecosta County, Michigan," U. S. D. A., Washington, D. C., Series 1927, No. 18, Robert Wildermuth and J. F. Fonder.*

*"Soil Survey of Jackson County, Mississippi," U. S. D. A., Washington, D. C., Series 1927, No. 19, J. Ambrose Elwell, A. W. Goke, W. J. Moran, E. Malcolm Jones, and E. P. Lowe.*

*"Soil Survey of Pierce County, Nebraska," U. S. D. A., Washington, D. C., Series 1928, No. 9, A. W. Goke and W. H. Buckhannan.*

*"Soil Survey of York County, Nebraska," U. S. D. A., Washington, D. C., Series 1928, No. 10, F. A. Hayes and A. W. Goke.*

*"Soil Survey of Thayer County, Nebraska," U. S. D. A., Washington, D. C., Series 1927, No. 20, E. A. Nieschmidt, R. H. Lovald, R. L. Gemmell, and R. C. Roberts.*

*"Soil Survey of Belmont County, Ohio," U. S. D. A., Washington, D. C., Series 1927, No. 17, S. W. Phillips, Ralph Blaney, George Drewes, Jr., A. H. Paschall, and J. G. Steele.*

## Crops

Eleven annual reports, including the Report of the Secretary of Agriculture for 1931, have come into circulation during the time elapsed since our last issue. These reports, to be found listed below, are certain to prove of special interest to all agriculturists within the respective States and in many instances of interest to workers in various other sections of the country. The annual report of an agricultural college and experiment station is a very valuable summary of the State's agricultural activities and consequently an important reference for any agricultural activity.

*"Forty-second Annual Report, Fiscal Year Ending June 30, 1931," Agr. Exp. Sta., Auburn, Ala., M. J. Funchess.*

*"Studies in Lettuce Seedbed Irrigation Under High Temperature Conditions," Agr. Exp. Sta., Tucson, Ariz., Tech. Bul. 33, Sept. 1, 1931, M. F. Wharton and Charles Hobart.*

*"Forty-third Annual Report, Fiscal Year Ending June 30, 1931," Agr. Exp. Sta., Fayetteville, Ark., Bul. 268, Nov., 1931, Dan T. Gray.*

*"Pruning and Thinning Experiments With Grapes," Agr. Exp. Sta., Berkeley, Cal., Bul. 519, Nov., 1931, A. J. Winkler.*

*"The Forty-fourth Annual Report of the Colorado Agricultural Experiment Station for the Fiscal Year 1930-31," Agr. Exp. Sta., Fort Collins, Colo., C. P. Gillette.*

*"Annual Report of the Director for the Fiscal Year Ending June 30, 1931," Agr. Exp. Sta., Newark, Del., Bul. 172, Nov., 1931, C. A. McCue.*

*"Development of Strains of Cigar Wrapper Tobacco Resistant to Blackshank," Agr. Exp. Sta., Gainesville, Fla., Bul. 226, Mar., 1931, W. B. Tisdale.*

*"A Year's Progress in Solving Farm Problems of Illinois, 1930-31," Agr. Exp. Sta., Urbana, Ill., H. W. Mumford.*

*"Comparison of Apparently Healthy Strains and Tuber Lines of Potatoes," Agr. Exp. Sta.,*

*Orono, Me., Bul. 358, July, 1931, Donald Folsom, F. V. Owen, and Hugh B. Smith.*

*"Corn Silage Production," Agr. Exp. Sta., Col. Park, Md., Bul. 329, Oct., 1931, J. E. Metzger and R. L. Sellman.*

*"Flower Pot Composition and Its Effect on Plant Growth," Agr. Exp. Sta., Amherst, Mass. Bul. 277, Oct., 1931, Linus H. Jones.*

*"The Quarterly Bulletin," Agr. Exp. Sta., East Lansing, Mich., Vol. XIV, No. 2, Nov., 1931.*

*"Planning for the Future of Montana Agriculture," Agr. Exp. Sta., Bozeman, Mont., 37th Ann. Rept., July 1, 1929, to June 30, 1930, F. B. Linfield.*

*"Development and Ripening of Peaches as Correlated with Physical Characteristics, Chemical Composition, and Histological Structure of the Fruit Flesh: I. Physical Measurements of Growth and Flesh Texture in Relation to the Market and Edible Qualities of the Fruit," Agr. Exp. Sta., New Brunswick, N. J., Bul. 525, Sept., 1931, M. A. Blake, O. W. Davidson, R. M. Addoms, and G. T. Nightingale.*

*"Fiftieth Annual Report for the Fiscal Year Ended June 30, 1931," Agr. Exp. Sta., Geneva, N. Y., U. P. Hedrick.*

*"Correlation Studies of the Growth of Apple and Cherry Trees in the Nursery from the Seedling to the Two-year Budded Tree," Agr. Exp. Sta., Geneva, N. Y., Tech. Bul. 185, Oct., 1931, H. B. Tukey and Karl D. Brase.*

*"Approved Practices for Irish Potato Growers," Agr. Exp. Sta., State Col. Sta., Raleigh, N. C., Bul. 279, Jan., 1932, B. F. Fulton, H. B. Mann, R. F. Poole, and R. Schmidt.*

*"North Carolina Farm Program—Eastern Section," Agr. Ext. Serv., State Col. Sta., Raleigh, N. C., Ext. Cir. 190, Jan., 1932.*

*"North Carolina Farm Program—Western Section," Agr. Ext. Serv., State Col. Sta., Raleigh, N. C., Ext. Cir. 191, Jan., 1932.*

*"Flax Production in Argentina," Agr. Exp. Sta., Fargo, N. D., Bul. 253, Dec., 1931, H. L. Bolley.*

*"Life History and Composition of the Soybean Plant," Agr. Exp. Sta., Wooster, Ohio, Bul. 494, Nov., 1931, H. L. Borst and L. E. Thatcher.*

*"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, No. 154, Jan.-Feb., 1932.*

*"Forty-fourth Annual Report of the South Carolina Experiment Station of Clemson Agricultural College for the Year Ended June 30, 1931," Clemson Agr. Col., Clemson Col., S. C., Dec., 1931, H. W. Barre.*

*"Annual Report of the Virginia Polytechnic Institute, Agricultural Experiment Station, for the Period July 1, 1927, to June 30, 1931," Agr. Exp. Sta., Blacksburg, Va., A. W. Drinkard, Jr.*

*"Virginia Department of Agriculture and Immigration," Richmond, Va., Bul. 289, Jan., 1932.*

*"Department of Agriculture and Immigration of Virginia," Richmond, Va., Bul. 288, Dec., 1931.*

*"Soybean Culture and Varieties," Agr. Exp. Sta., Morgantown, W. Va., Bul. 243, Sept., 1931, M. M. Hoover, T. C. McIlvaine, and R. J. Garber.*

*"Report of the West Virginia Agricultural Experiment Station for the Biennium Ending June 30, 1930," Agr. Exp. Sta., Morgantown, W. Va., Bul. 244, Nov., 1931, F. D. Fromme.*

*"Report of the Secretary of Agriculture, 1931," U. S. D. A., Washington, D. C.*

*"Report of the Chief of the Bureau of Plant Industry," U. S. D. A., Washington, D. C., Wm. A. Taylor.*

*"Shortleaf Pine," U. S. D. A., Washington, D. C., Farmers' Bul. 1671, Sept., 1931, Wilbur R. Mattoon.*

*"The Farm Garden," U. S. D. A., Washington, D. C., Farmers' Bul. 1673, Oct., 1931, J. H. Beattie and W. R. Beattie.*

*"Pop Corn," U. S. D. A., Washington, D. C., Farmers' Bul. 1679, Oct., 1931, Arthur M. Brunson and Carl W. Bower.*

*"Methods of Crop Production at the Colby, Kans., Branch Experiment Station, 1915 to 1929," U. S. D. A., Washington, D. C., Cir. 184, Sept., 1931, Joseph B. Kuska.*

*"Sisal and Henequen, Plants Yielding Fiber for Binder Twine," U. S. D. A., Washington, D. C., Cir. 186, Oct., 1931, Lyster H. Dewey.*

*"Time of Planting as Affecting Yields of Rural New Yorker and Triumph Potatoes in the Greeley, Colo., District," U. S. D. A., Washington, D. C., Cir. 191, Oct., 1931, W. C. Edmundson.*

## Economics

For the large number of our readers who like to have their facts supported by figures and graphs, "A Graphic Summary of American Agriculture Based Largely on the Census," compiled by O. E. Baker, Senior Agricultural Economist, recently put into circulation by the U. S. Department of Agriculture as Miscellaneous Publication No. 105, will prove of great interest. The first sentence of the publication, "The decade since the World War has been in many ways the most extraordinary period in American Agriculture," arrests the reader's attention. Extensive and significant shifts have occurred in the areas of crop and livestock production since the prewar years and even since the World War, the author points out. The serious agricultural situation that has developed since the World War suggests that greater attention be given than heretofore to presenting the more purely economic and social aspects of agriculture. Therefore, considerable space has been devoted to such subjects. The publication should be of especial value to all schools teaching agriculture.

*"Cost of Producing Field Crops in the Salt River Valley, Arizona, 1928," Agr. Exp. Sta., Tucson, Ariz., Bul.* 139, *Oct.* 1, 1931, *S. P. Clark.*

*"Alfalfa," Agr. Exp. Sta., Berkeley, Cal., Bul.* 521, *Dec.,* 1931, *E. W. Braun.*

*"Georgia Agricultural Outlook for* 1932," *Ext. Div., State Col. of Agr., Athens, Ga., Vol. XX, No.* 417, *Dec.,* 1931, *Kenneth Treanor.*

*"Management Factors That Influence Farm Profits in Southwest Illinois," Agr. Exp. Sta., Urbana, Ill., Bul.* 374, *Oct.,* 1931, *R. H. Wilcox, C. W. Crickman, and R. G. Trummel.*

*"Organization and Management Problems of Cooperative Strawberry Marketing Associations in Kentucky," Agr. Exp. Sta., Lexington, Ky., Bul.* 319, *Aug.,* 1931, *C. D. Phillips and D. G. Card.*

*"Consumer Preferences for Potatoes," Agr. Exp. Sta., Durham, N. H., Cir.* 37, *June,* 1931, *E. H. Rinear.*

*"Production of Crops and Livestock on the Newlands Project,* 1930," *Agr. Exp. Sta., Reno, Nev., Bul.* 123, *Sept.,* 1931, *F. B. Headley and Cruz Venstrom.*

*"A Study of the Organization and Management of Rhode Island Farms," Agr. Exp. Sta., Kingston, R. I., Bul.* 230, *Sept.,* 1931, *J. L. Tennant.*

*"Local Rural Leaders in Washington," Agr. Exp. Sta., Pullman, Wash., Bul.* 257, *Sept.,* 1931, *Harvey W. Starling and Fred R. Yoder,*

*"Corn Futures, Volume of Trading, Open Commitments and Prices, from January* 3, 1921, *to December* 31, 1929," *U. S. D. A., Washington, D. C., Stat. Bul.* 34, *Oct.,* 1931.

*"Timely Economic Information for Washington Farmers," State Col. of Wash., Spokane, Wash., No.* 2, *Dec.,* 1931.

*"The Agricultural Outlook for the Southern States,* 1931-32," *U. S. D. A., Washington, D. C., Misc. Pub.* 137, *Dec.,* 1931.

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# The Use of Potash Aids in Reducing Diseases and in Producing Quality Crops

(*From page* 8)

was a marked improvement in the quality of the berries as the percentage of the potash was increased up to 6 per cent in the mixture.

With the strawberry crop of 1931 receiving 1,500 pounds of fertilizer mixture per acre, 750 pounds in November 1930 when the plants were set and 750 pounds in January 1931, the berries which received a mixture containing 4 per cent ammonia, 8 per cent available phosphoric acid, and 6 per cent potash showed 55 per cent of the berries were firm after standing in the crates for three days after picking. Those which had received an application of a mixture containing 4 per cent ammonia, 8 per cent available phosphoric acid, and no potash only had 30 per cent of the berries firm after a 3-day standing interval. In other words, the spoilage in the latter case was 1.56 times what it was where 6 per cent of potash was used in the fertilizer mixture.

In some general field experiments with soybeans on Norfolk sandy loam near Chadbourn in 1931 in cooperation with the Federal Bureau of Chemistry and Soils, it was found that the use of 25 pounds of potash per acre in the form of sulphate of potash had a remarkably favorable effect upon the growth of the beans and the size and filling out of the pods. For the past 20 years this land used in the experiment had been run in corn, soybeans, and cowpeas and had had but little other than nitrate of soda added to it annually. The addition of this 25 pounds of potash, it is estimated, more than tripled the yield of hay and the filling out of the pods and the size of the beans in the pod, as will be seen by the accompanying cut. The untreated beans were small and imperfect in size and very inferior in grade.

# Potato Profits in Arkansas

(*From page 13*)

2. Use 100 pounds of commercial fertilizer, rich in potash to each bushel of seed potatoes planted. Apply the fertilizer in the center furrow, mix well with the dirt, and then cover lightly before planting potatoes.

3. Plant Nebraska State certified seed.

4. Cut the seed into large pieces, the size depending on the cost of the seed. The cheaper the cost of seed, the larger one can afford to cut the seed. Pieces should be cut in from two to four pieces and never smaller.

5. Market through the cooperative marketing association.

# South Carolina Asparagus

(*From page 26*)

ing 160 pounds of actual potash per acre, which was the amount he thought necessary, yet he knew this quantity was not bringing satisfactory yields. In this field he selected a uniform acre with a check on either side. To this acre he applied 500 pounds of 20 per cent high-grade kainit. The following spring Mr. Cave cut 109 more bunches from the acre receiving the kainit than he did from the check acre. He also reported that the percentage of colossal "grass" was much higher than was produced on the field receiving only the complete fertilizer.

The following cutting season Mr. Cave was so enthusiastic about the results he obtained by using potash that he applied 500 pounds of muriate to this same acre in addition to the regular fertilizer. The following cutting season he harvested 196 more bunches from the acre receiving the muriate than he did from the check acres. More than 50 per cent of the "grass" was colossal, which was far above the field average.

Mr. Fulmer's experience was quite similar, except he had a greater handicap in the beginning. Mr. Fulmer purchased a farm on which there was a field of six-year-old asparagus. It had been neglected from the very start and was in poor condition. Mr. Fulmer fertilized his field before the cutting season with 800 pounds of a 3-6-7 (NPK). In the middle of the

At the meeting of the South Carolina asparagus growers at the Aiken County Agricultural Club, 75% of the South Carolina asparagus acreage was represented. The growers found that fertilizer carrying 8% potash gave an average of 12 crates more than fertilizer carrying 5%.

field, he selected a uniform acre to which he added 400 lbs. of muriate and left a check acre on either side. After the cutting season was over, he applied 1,200 pounds of 6-4-5 to the entire field. His harvest records show that he cut 123 more bunches from the potash acre than he did from the check and 59 per cent of the "grass" from this acre graded colossal. The field receiving only the regular fertilizer showed a much smaller percentage of colossal "grass."

The trend toward greater yields of better "grass" is well under way in South Carolina. In a short time growers, by maintaining their high standard of quality and lifting their yields, undoubtedly will place asparagus in the lead as one of South Carolina's most dependable and profitable truck crops.

# Spending for Profits

*(From page 30)*

fertilizer per acre. Cotton is not so much a specialized crop, yet the cotton farmer uses in the aggregate large amounts of fertilizers. In the western half of the United States, comparatively little fertilizer is used. California uses the most, largely on the citrus and other fruit and truck crops. Citrus farmers not uncommonly spend more than $100 per acre to grow the best citrus fruits. In Oregon and Washington fertilizer is largely confined to such centers of fruit production as Hood River and Wenatchee. Most of the arid West uses practically no fertilizer.

Asked why he fertilized so liberally, a citrus grower in California replied, "A high yield of first quality fruit is so important, I cannot afford to do otherwise. I will take no chances on an impoverished soil."

"But isn't there already overproduction of citrus fruits?"

"Yes, of a certain quality," he replied. "Just as is true of many other crops, there are many acres of citrus land that should never have been planted. They are not profitable now and never will be. It is the production of culls and low-grade stuff, grown at a loss, that is causing overproduction, and low markets."

And what is true of citrus is true also of apples, pears, potatoes, cotton, walnuts, and many other crops—too large an acreage, and poor land poorly farmed. Only the exceptional farmer can show a profit under the keenly competitive conditions of the present.

Crops which produce large acre returns will always receive correspondingly large applications of fertilizers. Under normal conditions $30 worth of grain or $300 worth of potatoes are equally reasonable yields. Some crops yield $1,000 and more an acre. A teacher in agriculture used to say that 10 per cent of the expected gross receipts from the crop was all one should spend for fertilizing that crop. Applying this rather crude rule, one could use $30 in fertilizing potatoes as readily as $3 in fertilizing grain.

However, a rigid rule is never followed in fertilizing any crop. Profit in the crop is what the grower wants, whether it takes much or little fertilizer to obtain it. On the average, farmers in this country underfertilize and overexpand acreage. European countries use more fertilizer, and produce bigger crop yields than we do. In proportion to acreage, England uses three times, France four, Germany ten, and Holland twenty times as much fertilizer as is used in this country. European farmers often have a much better system of crop rotation and a better diversification of crops than are found on the average American farm. It is the opinion of those who have given the problem study that much of our poorer land should be devoted to non-competitive crops such as timber, and another portion should be devoted to soil-building crops. Such a crop distribution would help eliminate marginal and submarginal lands and reduce the acreage of crops now overproduced.

Those farmers who are making money, in the face of the present depression, produce large yields and handle their products economically. The largest cost item of producing most farm crops is the labor. A fertile soil and the use of fertilizer to increase crop yields reduce the labor cost. Studies in Ohio showed that in producing 40 bushels of corn per acre, only 2 bushels were left for profit, while the production of 65 bushels an acre left 18 bushels for profit. In Virginia a study of tobacco production showed a yield of 500 pounds an acre without fertilizer and the profit was $12. With 1,400 pounds of complete fertilizer, the yield increased to 934 pounds and the profit to $135. Producing big crops is a poor way to "go broke."

### *Good Soils Respond Best*

As a farm demonstrator recently stated, "it may be easy to show a big percentage increase from the use of fertilizer on the poorest land, but 'darned' hard to show profitable production." Nearly always there is more net profit in fertilizing the best fields on the farm. The Michigan Experiment Station reports that especially do lands well supplied with organic matter respond well. In growing sugar beets it was found that the best lands could be profitably fertilized at 30 to 50 per cent heavier rates or up to 1,000 pounds per acre of high-grade fertilizer. This is a forceful argument for the elimination of the poorer land from the production of highly competitive crops. Better devote the poor land to soil-building legumes and grasses, until such time as it is more urgently needed, and in condition to respond more profitably to cultural treatments.

Poor lands left to grass and legumes automatically increase their supply of organic matter. Whatever grazing may be obtained may be looked upon as so much help toward taxes. When the improvement is sufficient or they are again needed for crops, these lands temporarily withdrawn from tillage may again be brought under cultivation. A preliminary course of liming and leguming may be needed to render the more exhausted lands responsive.

In contrast to the condition of soils too poor to respond well to fertilizer, Thorne, in Ohio, has shown that for those soils that are naturally productive, and where crop rotation is practiced, mineral fertilizers have been more satisfactory than stable manure when used in equivalent amounts. Similar results, covering a period of three-quarters of a century, are reported from Rothamsted, England, indicating that mineral fertilizers on good, well-managed land are continuously profitable and efficient.

### *Use Liberally for Profit*

A mathematically minded agriculturist brings out the fact that it is not per cent increase, or per cent profit, but dollars per acre profit that count. Says he, "it is dollars and not per cent that afford the farmer his living and bankable surplus." A 20 per cent return on $50 per acre invested in fertilizers is better than 100 per cent when only five dollars are invested. A North Carolina study indicated that 200 pounds of fertilizer an acre on cotton gave the highest per cent on the dollar, but 1,000 pounds gave the highest returns per acre.

That liberal fertilization is profitable has been fully demonstrated. The Mississippi Station has shown that 600 pounds per acre on cotton when prices were reasonable produced an annual net profit for three years of more than $32 an acre. Doubling the rate of fertilization increased the net to nearly $50, but trebling the rate increased the net to more than $57 an acre. When the rate was quadrupled, the net was somewhat reduced, indicating that the profitable limit had been reached.

The use of fertilizer is constantly extending to a larger range of crops. It has recently been shown that pastures can be profitably fertilized. At a cost of $10.50 annually for lime and complete fertilizers in Pennsylvania, pasture was made sufficiently productive to take the place of $44 worth of feed per acre.

It is sometimes necessary to fertilize very liberally before any returns are shown. Sugar planters in Hawaii received no benefit from 300 pounds of potash an acre, but with a ton or more, very phenomenal returns were obtained. Past experience indicates that in general it should prove profitable to fertilize both more universally and more liberally than is now common practice.

In times like the present, more than ordinary vigilance is needed to insure a reasonable profit margin. No available means for stimulating better returns can safely be overlooked. The right fertilizer properly used has proved itself in the past. The best profits have always come to those who have been able to produce the largest yields most economically.

# Common Sense About Cotton

(*From page* 23)

This farmer saw that his old methods would not meet the situation. He realized that fewer acres must be made to work harder to produce his crop at lower cost. He picked out his eight best acres of cotton land and concentrated his usual three tons of well-balanced fertilizer on these eight acres. What was the result? He produced his usual 12 bales! With the help of the extra fertilizer, eight acres did the job of thirty.

The total cost of production for the eight acres was about half what it would have been for the thirty acres. The eight acres made a net profit of $249, while under the same conditions the 30 acres would have lost money. The 22 acres that were released from cotton were planted to corn, hay crops, and soybeans. A lot of good feed was produced and the soil was improved.

Throughout the South the thousands of farmers who have withstood the depressed conditions in the strongest manner are those who have adopted methods similar to these.

Others who are progressive enough to follow this course will be taking a big step toward developing a safe business proposition that will be hard to disrupt by a sudden decline in cotton prices. They will concentrate their cotton on their best land and highly fertilize it. They will release their thinner lands to the production of food and feed and to the growth of legumes to add nitrogen and humus to the soil.

How can the average Southern farmer make sure he is producing his 1932 cotton crop at the lowest possible cost per pound? He can purchase as much well-balanced fertilizer as his fertilizer money will buy. He can select his best cotton land and apply this fertilizer to it. Instead of decreasing his usual fertilizer application, he should increase it by at least 100 pounds per acre. When his cotton fertilizer gives out, he should stop planting cotton and put the remainder of his land into other crops.

This is the safest program for the average cotton farmer for 1932. Of course he will not have as many acres in cotton as usual. However, his best cotton land will be working hard for him producing more pounds per acre at a much lower cost per pound. His prize crop will receive more of his personal attention in care and cultivation. He must play safe and insure a good crop, because he cannot hope for a repetition of the perfect weather conditions of 1931.

Thousands of fertilizer tests made by Experiment Stations and leading farmers conclusively prove that as the cotton yield per acre is increased the cost per pound is decreased. These tests show that 600 pounds of well-balanced fertilizer per acre increases the yield 600 to 800 pounds of seed cotton per acre. Well-fertilized cotton holds its own through good years and bad. Good fertilizer takes much of the gamble out of growing cotton.

There are two ways of meeting the demand for any agricultural product—by increasing the number of acres devoted to the crop or by increasing the acre yield. Southern farmers have generally met the demand for cotton by the first method. Twelve years of high cotton prices have caused many acres better suited to grain, legumes, pasture, and timber to be turned to cotton. Low cotton prices will bring these marginal acres back to their old crops and should cause cotton to be produced more efficiently and economically on lands best suited to its growth.

Not only farms but also farmers must meet the keen competition evidenced by low prices. Those willing to adopt progressive and efficient methods will be tempered by adverse conditions and emerge with a more successful and stabilized system. Those who are content with the old methods will find themselves swamped by production costs and will eventually be forced to seek other occupations.

The farmers who will produce the cotton of the future will be those who have learned to grow it at the lowest cost per pound. Progressive farmers, with excellent business foresight that sees beyond 1931, will start today to place themselves within this class.

# Magnesium

(*From page* 20)

acidity naturally means a depletion of soil bases including magnesium. The large amounts of calcium sulfate added in the superphosphate used as a source of phosphorus has helped to increase the solubility of the magnesium compounds and thus favored the removal of magnesium both by cropping and leaching.

In some sections of the country, the lime used to correct soil acidity carries considerable quantities of magnesium, but in the potato growing areas of Maine, the comparatively small amounts of lime that are used happen to be particularly free of magnesium. The only other means of replenishing the magnesium losses has been the small additions of magnesium found as an impurity in fertilizers, especially in potash salts. With the increased use of concentrated fertilizers and the use of much purer potash salts in all brands of fertilizers, this source of supply has been reduced to a minimum.

These facts help to explain why a magnesium deficiency should appear and the results, though preliminary, seem to indicate that some magnesium will have to be added to our soils in the future. Further work needs to be done on this problem before any definite recommendation can be made as to the best source and optimum quantity of magnesium necessary. Until such information is obtained, it would seem advisable to use approximately 20 pounds of magnesium oxide per acre on the fields which have shown any magnesium deficiency symptoms in the past.

# Tomato Production in the Northern Neck

(From page 22)

acre of a fertilizer analyzing from 3 to 5 per cent ammonia, 8 to 12 per cent phosphorus, and 5 to 10 per cent potash.

The chief varieties grown in this area are Stone, Marglobe, Norton, and Greater Baltimore. Since this section is in the wilt area, plantings to the wilt-resistant varieties, particularly Marglobe, are increasing. Most of the seed is purchased by the canners, who in turn dispose of it to the growers. This practice is ideal where the canner is sold on the importance and value of good seed. In some instances where the canner or grower prefers cheap seed to good seed, however, this practice works to the detriment of the growers and canners alike. One study in this area of fields of the Marglobe tomato produced from seed from different sources shows the following results:

| Strain | Per Cent True Marglobe |
|---|---|
| 1 | 98 |
| 2 | 75 |
| 3 | 35 |

The percentage true Marglobe was judged by the trueness to type of the fruit and the resistance of the plant to wilt. The grower using a strain showing only 35 per cent resistance to wilt is seriously handicapped. The extension service, working largely through the canners, has done much to introduce high-grade tomato seed into this area.

By far the majority of the growers produce their plants in the open plant bed. These beds are seeded from early April on. Seed is sown in rows 18 inches apart. Previous to seeding, the beds are given an application of from 500 to 1,000 pounds of a commercial fertilizer. These beds receive on the average four or five cultivations and are dusted from four to six times with a copper-lime-arsenate dust to control pests. Here, too, extension work can take much credit for the increased production of good plants in this area. Previous to plant bed demonstrations in this area, scarcely a pound of copper-lime-arsenate dust found its way into the Neck. With the spread of extension work, however, the sale of insecticides in this section has mounted by leaps and bounds.

Progressive growers determined the best fertilizer practice through farm experiments.

The plants are set in the field by hand from early May until the middle of June. Some few are planted even later. The peak of the planting takes place between May 20 and June 10. Planting distances vary considerably. Distance between rows varies from three to five feet while the distance between plants in the row ranges from two and one-half to four feet. General recommendations for this area are three by five feet.

The best growers in this area cultivate every week or ten days from the time the plants are set in the field until the vines are too large to permit cultivation. From four to eight cultivations on the average are given per season. As a rule shallow cultivation is practiced, although there is still too great a tendency to cultivate deep and thus injure the crop severely. Deep cultivation is usually the result of permitting the grass and other weeds to get a start.

### *Control Diseases in Plant Bed*

Very few pest control measures are practiced in the field. It is generally felt that the most effective pest control measures should be practiced in the plant bed. The growers feel that by starting with good, strong, healthy, vigorous plants their assurance of a crop is sufficient without costly field control measures. Although in general the above is true, yet at times, field spraying or dusting is necessitated by attacks of the tomato worm and tomato aphis.

The entire area is wilt infested. The better growers are intelligently attacking this problem through crop rotation and resistant varieties.

For the most part, the fruit is harvested in five-eighths bushel baskets, and hauled to the canning factory by teams or trucks. The grower's responsibility ends at this point. Two distinct methods of sale are in vogue. Previous to the 1930 season, practically all raw fruit was purchased by the canner on a flat contract price. This price was largely determined by the average of the fruit delivered at the cannery. The grower of poor fruit received exactly the same price per bushel as the grower of high quality fruit. In 1930, however, three canners in the Northern Neck purchased their raw fruit on the basis of U. S. grades. So satisfactory were the results that an extension campaign was put on in cooperation with the State Division of Markets to persuade other canners and growers to adopt this practice.

### *Quality Fruit Makes Quality Pack*

Some experiments were conducted which showed that the canner received on an average 12 more No. 2 cans of tomatoes from a bushel of U. S. No. 1 raw fruit than from a bushel of U. S. No. 2 raw fruit and approximately 13 more cans from a bushel of U. S. No. 2 raw fruit than from a bushel of culls. In addition, the quality of the canned pack increased as the quality of the fruit increased. This is an important consideration to the canner who must sell his pack under the Mapes Amendment. Thus, the canner was convinced that he could afford to pay a considerable premium for high quality fruit. The good grower likewise benefited. He received the price of good fruit. No longer was he penalized by the grower of common stuff. So completely sold were canners and growers that during the 1931 season 28 concerns at 36 different plants purchased their raw fruit on a grade basis. It is expected that practically all canners and growers in this area will transact their purchases and sales in this manner in the 1932 season.

The average yield for the State during the past four years has only been 2.7 tons or 90 bushels per acre. Two bad tomato years have been experienced in Virginia; 1930 was the drought year and in 1931 disease conditions were the worst in years. Some growers in the Northern Neck receive from 200 to 400 bushels per acre. Yields are constantly being increased through improvement in cultural practices. The use of better seed, more intelligent fertilization, adequate pest control measures, and the Mapes Amendment are factors which will have a tendency to increase the yield in this area appreciably within the next few years. The alert growers are paying considerable attention to all of these problems.

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# The Inquiring Mind

(*From page* 16)

enactment of favorable legislation on these subjects.

The improvement of conditions for the Iowa farmer was ever his aim, and he fought and won many a political battle in their behalf. He was popular among his colleagues as, not being bitterly partisan, he was acceptable to all parties. One editor wrote of him at the time he was made Speaker, "Iowa has few men of more worth, none of a better manliness, none more thoroughly representative of the people. He will prove a popular presiding officer." And so he did.

But "Tama Jim" was still to go up higher. He was a member of Congress from 1873 to 1877, and again from 1883 to 1885. From 1879 to 1884 he was a Regent of the Iowa State College, and he served as a member of the Iowa State Railroad Commission from 1877 to 1883. For a number of years he edited the *Traer Star Clipper,* in which paper his articles on farming attracted much attention. From 1890 to 1897 he was Professor of Agriculture in Iowa State College, and Director of the Experiment Station.

It is said that when Mr. Wilson went to the State College, at Ames, J. H. Shepperd, now President of North Dakota Agricultural College at Fargo, was the only agricultural student there; but with the assistance of Professors Curtiss and Kent an agricultural department was soon established. When Mr. Wilson went to the Legislature, he told just what he wanted in the way of appropriations for the College, and was granted his requests. Even after he went to Washington, he fought for appropriations from the State Legislature, to support the Ames institution. It was characteristic of him, through life, to decide definitely what he wanted to further his ends for the public good and then fight strenuously until he got what he asked for. His insistence that agriculture should be taught in the school was accounted his chief achievement while at Ames.

During his service from 1897 to 1913 as Secretary of Agriculture at Washington, he obtained for agriculture the recognition it deserved from the public and the legislators of the land. Through him the Nation came to understand the need for aid to the farming industry and gained confidence in technical investigational research to render such aid. He inculcated the idea of scientific farming, gave illustrations of it a spectacular interest, and impressed upon the people the power of an adequate Federal Department of Agriculture to benefit the farming industry and the home life and welfare of the farmer.

At the outset of his Secretaryship he stated the purpose of his Department, as follows: "The Department of Agriculture was organized to help farmers to a better knowledge of production and its tendencies at home and abroad, so as to enable them to intelligently meet the requirements of home and foreign markets for material that may be profitably grown or manufactured on American farms. It was also intended that the Department should organize a comprehensive system of means by which the sciences that relate to agriculture should become familiar as household words among our farmers."

### *A Good Judge of Men*

"Tama Jim" tackled his new duties with tremendous energy and enthusiasm. His brain teemed with great ideas and projects, most of which in time were successfully consummated. The 16 years of his administration as Secretary showed an unprecedented record of advance and accomplishment. His was a great directing and controlling influence. The necessity of applying science to bring his projects to pass did not baffle or overawe him. Being a good judge of men, he soon put the right man in his right place and then saw to it that he was adequately supplied with funds to carry on his research operations. One of his notable appointees was Mr. Gifford Pinchot, the present Governor of Pennsylvania, who developed his office in the Department into a great Bureau, which did magnificent work in the conservation of our national forests.

By sending an explorer to the Orient to find a variety of rice that would not shatter in the milling process, Secretary Wilson practically revolutionized the rice-growing industry of the South. He also benefited the people by introducing many new foreign varieties of grains, grasses, and useful and ornamental plants, by importing parasites that destroy noxious insects, and beneficial insects that successfully pollinate the fig orchards of California, and by stamping out a dangerous outbreak of contagious foot-and-mouth disease. Another of his most commendable acts was the abolition of the free distribution of seeds by Congressmen and the U. S. Department of Agriculture.

The Experiment Station Record of 1920 informs us that when Secretary Wilson came to the Department of Agriculture, the combined appropriation for its up-keep and transactions was approximately $3,250,000 of which close to $1,000,000 was for State experiment stations, the distribution of seeds, and for special publications ordered by Congress. By 1905, the appropriation had nearly doubled, and two years later it had quadrupled. In consequence of new functions, and the general expansion of the work under Secretary Wilson's direction, the appropriation had reached more than $20,000,000 in 1911, and in 1913, $24,743,044. The working force of the Department numbered less than 2,500 persons in 1907, and in his last year it was nearly 14,000.

The expansion of the working force of the Department was due, in part, to regulatory duties imposed by new laws and the management of the National Forests; but it represented a very large growth in the forces concerned with research and measures for the improvement of agricultural practice.

The printing funds for the Department's publications increased from $116,888 in 1897 to $470,000 at the end of Secretary Wilson's period of service. The number of publications issued was enlarged from a few more than 400 to more than 2,000 a year, and the aggregate edition from 6,500,000 copies to nearly 35,000,000. In 1897 the requests for publications barely exceeded 500 letters a week, while 16 years later such weekly applications averaged more than 52,000. This reflects the extension, under Secretary Wilson, of the Department's contacts with the farmers and other readers of the country.

### *Notable Growth and Achievement*

Secretary Wilson found only the Weather Bureau and the Bureau of Animal Industry in operation when he assumed his duties in 1897. In addition, there were 10 subject matter divisions, and the Office of Experiment Stations. The plant industry work was divided among several independent divisions, giving a lack of coherence in related lines of effort. Ultimately, these divisions were brought together in a large Bureau of Plant Industry, whose scope was rapidly expanded to meet advancing needs. Six of the other divisions were raised to the grade of Bureau as their lines became more numerous, and special laboratories, offices, and boards were provided to care for new features. Agricultural Extension was begun, under the name of the Farmers' Co-operative Demonstration Work, especially as a result of the boll-weevil and the necessity of more diversified farming in meeting its ravages. An insecticide and fungicide board, and a Federal horticultural board were organized, with laboratories and specialists to meet their needs.

The beet sugar industry in this country practically grew up during Secretary Wilson's administration. His Department also undertook the eradication of ticks which carry Texas fever infection to cattle of the Southern States, and succeeded wonderfully in the effort. The effective country-wide campaign for the eradication of bovine tuberculosis also was inaugurated during his administration, and great progress was made in the control of hog cholera by vaccination and sanitary methods.

The Adams Act, supplementing the original Federal appropriation to the State Experiment Stations, had the cordial support of the Department, and following its passage, Secretary Wilson secured the means necessary to put it into effect without delay. Secretary Wilson succeeded in having many buildings erected for the accommodation of the various Bureaus of his Department, and supplied laboratories and equipment for scientific research. The Arlington farm tract, of about 400 acres, was transferred to his Department from the War Department, in 1900, and was improved and developed as a field laboratory. Another farm was purchased and equipped for experiments in animal husbandry and dairying. The Secretary also interested his Department in the establishment of agricultural experiment stations in Alaska, Hawaii, Porto Rico, and Guam.

One of the most notable achievements of Secretary Wilson's administration was the passage of the Food and Drug Act and means for its enforcement. Then came the Meat Inspection Law of 1906, and its beneficent effects for the protection and welfare of the people of the country. Other important accomplishments were the act of 1905 for the suppression of contagious diseases of livestock through quarantine measures, the Plant Quarantine Act to prevent importation of disease or insect-infested nursery stock, and the Lacy Act regulating the importation of destructive animals and controlling commerce between the States in games taken in violation of State laws.

### *Championed Cause of Farm Women*

Secretary Wilson likewise interested himself in creating a profitable foreign market for American butter, and another of his beneficial acts was the sending out of climate and crop reports to all parts of the country. His championship of the cause of the farm women of the land also won him their esteem and gratitude. Relative to this subject he said: "In the great work of helping the women of our land, nearly half of whom are toiling in the homes upon our farms, this Department, it is believed, has a large duty to perform. For whatever will be effective in raising the grade of home life on the farm, in securing the better nourishing of the farmer's family, and in surrounding them with the refinements and attractions of a well-ordered home, will powerfully contribute alike to the material prosperity of the country and the general welfare of the farmers." Later, he carried the idea much further, when he expressed the wish that the Department might extend its assistance to those "who are engaged in the noble task of giving practical training to the future wives and mothers of our farmers, and to the vast army of faithful women who are bearing the heavy burdens of keeping the farmers' homes pure and sweet, and rearing the future masters of our vast agricultural domain."

Secretary Wilson's work in Washington was strenuous at all times; but he felt repaid for all of his labor and lived to see the complete fulfilment of his hopes and endeavors.

His final report closed with this sentence: "Men grow old in service and in years, and cease their labor, but the results of this labor and the children of their brains will live on; and may whatever of worth that is in these be everblooming."

The "power of thought and the majesty of the mind" were the activating forces of James Wilson's life and deeds, and the fame and gratitude they earned for him will endure.

# Fertilizing Lespedeza

(*From page* 17)

tion on three of the five plots. Where phosphate alone was used the lespedeza held its stand in competition with the Dallis grass and gave a fair growth. Where potash was added to the phosphate, the growth was decidedly better, about twice as high. One could tell which plot he was in without reading the signs. On the phosphate-potash plot his shoetops were hidden in lespedeza, which was not true of any other plot.

Where nitrogen was added to the phosphate-potash combination, Dallis grass jumped ahead and nearly killed out the lespedeza. This made a coarser pasturage, which was not grazed so heavily by the cows. This would indicate clearly that for a grass mixture of this type, the fertilizer used should be low in nitrogen and high in potash and phosphoric acid. In this field we used 1,000 pounds per acre of 0-10-10

Left: 1,000 lbs. 0-10-10 per A. Right: 1,000 lbs. 5-10-10 per A.
The growth of lespedeza on the left remained luxuriant, whereas on the plot receiving nitrogen in addition to phosphoric acid and potash, the Dallis grass ran out the lespedeza in 15 months.

Left: No fertilizer. Right: 1,000 lbs. 0-10-10 per A.

The grass from a square yard of the plot receiving no fertilizer was very coarse, while that from a square yard of the fertilized plot was much finer and more succulent.

mixture in the case of phosphate-potash plot and the same rate of 0-10-0 and 5-10-10 on the other plots.

The pictures show very strikingly what happened in 15 months after the stated applications of fertilizer were made. This farm is located near Yale, in Sussex county, Virginia, and is owned by Mr. J. M. Rogers.

# Fertility

(*From page* 4)

for manure. Likewise there were terrific famines on impoverished farms. Again there were many guesses to correct this need, but no real remedies based on truth.

So even while land improvers chased the myth of phlogiston to "subterranean pastures," there were soils that "naturally" bore plentiful crops and others that were consistently barren and bleak.

And in 1932 while man improvers chase the mirage of artificial adjustment through legislative halls and commercial mazes, there are men who naturally produce treasures of hope and achievement, and others who consistently drift and droop.

But our doubt and inertia slows up the parade. Since the empirical days of soil experiment, during the past one hundred years in which the job of land control has outrun the science of man control, the agricultural world has tested and adopted the findings of many brilliant minds. Liebig, Lawes and Gilbert, Boussingalt, Lipman, Winogradsky, Thorne, and countless more savants have unlocked the facts in this greatest of mystery plots. Yet after critical scrutiny had accepted the findings, a long and painful road remained before the soil could benefit from this rain of science.

American farm land was divided among the ambitious and independent sons of men, each expressing his own idea of liberty by sticking to the custom of his fathers, with smug belief that each new generation could move westward to virgin furrows. If the old land played out, there was no use in fooling with it. Move on, and reap where the bison, the buffalo grass, and the red skin had enriched the land simply by living on it and leaving it alone.

At last expansion was mostly over and the farmer of the later age has found himself cornered on the old depleted forty, where he has had to fight back with fertilizers.

In just the same manner have the theorists and philosophers with human welfare at heart met with stubborn, provincial, unreasonable resistance in trying to get beyond the phlogiston stage in the science of social economy.

But like the westward-faring farmers, opportunists have offered everything from expansion and invention to outright government subsidy to find a secure state for mankind in a troubled world. But the exploiters are finally in a corner too, and must turn to the laboratory, like those on the land when the plow no longer turned the virgin sod.

IDLE men and fallow land have certain parallels to ponder. Land is put to fallow in order to rest it or to kill noxious weeds. Land left unseeded agriculturally will soon sprout a mess of undesirable and menacing growth. Hence the farmer keeps up a regular cultivation of the soil during the term of its so-called idleness.

We sometimes think that our social crisis is met when we provide sustenance for idle men and yet make no provision for their stifled ambitions and pent-up energies. Careless breadline charity to man resembles the land which is left unsown and untilled. The value of both rapidly diminish, and the threat of evil and of weeds is carried abroad on every breeze.

Soil biology and psychology tell us that deep in the inner strata of land and men there are a violent turmoil and a pulsing life even when the surface seems bare and unfruitful. Out of the depths of the microscopic studies in soil organisms came the principle of nitrogen fixation and kindred valuable secrets. What are we doing to encourage more intensive research into the mental and spiritual reactions of man under the enforced environment in which his life is spent? Have we called for man analyses as generally as we have made soil tests?

No, on the contrary every time somebody with honest purpose tried to grope his way to a solution of this enigma, we turned his voice off the dial and chose instead the latest shrieking siren of jazzphony. Even some of us who have fully appreciated the arts of land improvement are among those who thought that every social economist was a crank.

The masters of the test tubes have afforded a mighty example to the world which is waiting for the sunrise, but too often they were themselves more engrossed with soil than soul.

Insurance of lives or perishable property has been a sound procedure for ages. The farmer can insure his silos and his sows, but he can't get a premium on a single acre by itself. The only form of land insurance lies in good tilth and rotation plus fertilizers. So the only way we have to insure the soil of a farm is closely wrapped in that oft-repeated saying of the provident Master Farmer: "to leave the land better for the coming generation while earning a living from it today."

WOULD that our philosophy of Americanism had as much promise for the "coming generation" as it contains for the soil which they hope to inherit. Humanity has plenty of insurance against death for the benefit of the survivors, but far too little insurance for the comfort and security of the living.

By this I do not mean more twenty-payment plans or term insurance policies locked in strong boxes, but well-planned national policies that will make panics and hunger forever unknown. Fortunately, the seed that will provide that harvest of happiness is even now sprouting, I believe, in the muck and humus of our present dilemma.

Balanced fertility not only does something good to the land but it has a marked effect on the yield, form, and color of the plant and flower that rises refreshed from the soil cupboard.

It has been said of old that men are known by their fruits. But fruits of the best quality grow only from good stocks in good soil environment. The stocks of mankind are in process of production today. Hence by our human soil management systems, we not only control the formation of sound stocks, but we make the garden of life more colorful and richly satisfying.

WE use land to grow things. We are supposed to raise men for the inspiration or the example they may give to others, for the kindness they may do, or the joy their talents may provide. Land is not just so much silica, carbon, or sodium. Man is not just white or red or black.

Productive power of land depends upon the rate in which the soil elements to feed the plant are liberated. A merchant with a store of goods is successful according to the rapidity of his sales. Education and culture for men are most effective under conditions that afford ample chance to use them.

We often find men of limited knowledge exerting great power for good through their liberal and willing tendencies. It isn't the total stock of wisdom or fertility that one possesses that determines his usefulness. It's the desire to share with others what one may have of interest, love, and sympathy that makes the human harvest so bountiful and nutritious.

Soil fertility's chief goal is to yield new values. Land products are of value according to the nearness of markets and the density of consumers. Here is where so many proud and successful men, like bumper crops, must acknowledge that their worth and wealth depend solely upon the fact that they happen to grow close to a society that affords them an outlet for their powers.

This is more than usually evident in times of stress, when the fortunate ones must sense their obligation to the welfare of the society in which they prosper and become affluent.

Toxic influences often work insidious damage even on soils that give a high chemical test. The American standard of living, modern educational advantages, and general religious progress represent a high testing soil for us to use for the propagation of broader and better lives.

Yet on every hand we are forced to cope with slow and hidden poisons that discolor the roots of life and wilt the seedlings much faster than the raw blasts of adversity. America, with its high ideals, has tried to provide a suitable plant bed, but we have tolerated too many vicious irritants in our society.

Research and extension are to be called upon for man's relief, just as they were drafted to move soil science from the phlogiston stage to the present era of abundance that goes begging. Let's not delay the game any more by pedantic quarrels as to whether we need more new facts to teach or more missionaries to peddle ancient gospels.

Doubtless we need to know more about ourselves as starving plants in an eroded, alkaline land. But we also need to know why good seed on a rich acreage fails to meet justified hopes.

WE are face to face with a fertility that succeeds and a fertility that fails.

Knowing well that science always meets the challenge sooner or later, our belief is that man stands upon the threshold of a darkened room filled with comfort and opportunity. We are merely awaiting the incandescence of inspiration to give us the light we crave.

Taking the fertility we have and the faith we can muster, let us show the world that the ancient craft of husbandry holds true to its motto, "Carry on with courage!"

Remember, the weakest yield comes just before the application!


### SAY IT WITH VIOLETS

"Buy a bunch of violets for your sweetheart, sir?" urged the flower seller.

"Haven't got one," replied the young man.

"Take a bunch home to your wife."

"Sorry, I'm not married."

" 'Ere—buy the bloomin' lot to celebrate your luck!" — *Epworth Herald.*

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"Ah tells yuh, Mose, Ah done found out de diffunce 'tween de men and de women at las'."

"Say what yuh please, it's dis way. A man'll gib $2 foh a $1 thing dat he want, an' a woman'll gib $1 foh a $2 thing dat she don' want."

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"Say, Hilda, that guy I saw you out with last night looked like a flat tire to me."

"Yeah, he was. I'm gonna use him for a spare from now on."

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### CAREFUL

Sandy, who owned a picture theatre in Aberdeen, went to London to get some new ideas for advertising. While in London he noticed a sign over a movie house which said: "All persons over 80 will be admitted free!"

"Just the thing!" he thought to himself.

After his return to Aberdeen he put this notice on his theater box office:

"All persons over 80 years of age will be admitted free—if accompanied by their parents."

### SWEET MYSTERY OF LIFE

A careful driver approached a railroad crossing; he stopped, looked, and listened. All he heard was the car behind him crashing into his gas-tank. —*Santa Fe.*

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"Will you give ten cents to help the Old Ladies' Home?"

"What! Are they out again?"

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Old Lady (to Tommy): "Surely your mother could find pieces of material more like your trousers when she patches them."

Tommy: "That ain't a patch; that's me."

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She was an attractive young widow from New York. Sauntering out on the veranda of her hotel, she seated herself next to a handsome young man. She coughed slightly, but the stranger ignored her. She shot him a flirtatious glance that proved plainly she wanted to get acquainted, but he gave no answering sign. Finally a piece of dainty linen was wafted to the ground at his feet.

"Oh, I've dropped my handkerchief," she murmured softly.

The handsome youth turned a cold and unresponsive eye upon her.

"Madam," he said, "my weakness is liquor."

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### JUST PLAIN DOG

"My good man, does this dog possess a family tree?"

"Oh, no madam—he has no particular tree."

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