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UNITED STATES POTASH COMPANY, INC.
30 Rockefeller Plaza, New York, N. Y.
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Reviews

American Potash Institute, Inc.
Investment Building, Washington, D. C.

J. W. TURRENTINE, President and Treasurer
G. J. CALLISTER, Vice-President and Secretary
A swarthy contestant in action in the alfalfa loading race at the annual Frontier-day Celebration at Lancaster, California.
Folks these days, says Jeff, are—

Gas Gadding

Jeff M. Bermid

If SCADA paid its obligations in midsummer, three farmers out of five in my neighborhood would grab the grants and go gas gadding. Your humble husbandman is no longer a local yokel tied with the apron strings of tradition to his maternal heath. His own outdoors is too small for him. He has to borrow from somebody else. He has a “riding habit” like any lordly feudal squire, habitually acquired on the tractor, the sulky plow, and the manure dispenser; and when he gets calloused riding over bumpy home acreages he shifts to a new six or eight cylinder car and glides immeasurably further beyond the court house and the market square than his father before him dared to venture.

My uncle used to spend hours telling gaping groups about the wonders of Howe’s moving pictures, seen by him for one simoleon at the Berryville lyceum, including the final spectacle of Yosemite falls running backwards. Now his son Jake heads a rural rollers’ club which has collected fake Indian trinkets, ptomaine poison, police tags, and chigger bites in every sizeable canyon between Watkin’s Glen and Logan Pass. They stretch a sheet across one end of the school-house and display their own colortone jerkies of Maw and the kiddies wading in the Walla-Walla or eating hamburgers on the White House steps. That’s why Burton Holmes and the other globe-
trotting spellbinders no longer make the big killings of yesterday in the cow-pasture Chautauquas. And you can blame part of this to the propaganda of the A.A.A.—not the one on skids, but the one on wheels. (Original joke copyrighted.)

WANDERLUST is as much a part of the rural setting as wienerwurst. Time was when no farmer who respected his profession ever recognized there were such words as "leisure" or "recreation." Theirs was a life of utter renunciation, and today the only remnant of that flinty spirit of self-abnegation survives in a rugged township of New Jersey where in May every farmer therein refused to bilk the United States treasury for conservation benefits on grounds of self-reliance, hard work, and soils made perfect by strict attention to home affairs. One doesn't need to bemoan the "lost horizons" of such intrepid folk. They never had any to lose. Save your sobs for those who would like to go somewhere, but can't.

The aforesaid A.A.A. claims that the general touring fever is due entirely to better tires, larger maps, more powerful motors, and keener roadbeds. Granting this as a predominant cause of urban restlessness, it does not completely answer the question concerning the faring forth of farmers. Away in the background I suspect the other A.A.A. had something to do with the new models many of our farmers are tuning up for the big get-away, but this is not my point after all.

The real reason is that farmers are so well equipped with science, machinery, and fertilizers that they are able to raise more than enough for consumers without spending every daylight hour from last frost to first frost trying to coax dinners out of the dirt.

So naturally, hearing quite some chatter about erosion, they go in for a glimpse of it in a big way and nose out overland to the Grand Colorado chasm. Or being in an alfalfa mood, they sputter up the valleys of Idaho to see how it grows under irrigation. Or being weary of the current molehills of politics transformed into mountains by newspaper and radio, they step on the throttle and head for Ranier, Baker, Shuksan, and Hood, where the air is fresher and the obstacles more real than fancied.

Cancel that old wham about getting shut of home's carking cares, so often quoted as the city man's cause of exodus into the ozone. It doesn't fit in the farm flivver parade, because wifey and mother-in-law usuallyumble along, too. They're a great help on traffic signs!

And frequently there is a trailer on behind with room and equipment for all the 4-H handiwork projects that must be completed in time for the county fair. The only drawback to continental passage these days compared to the Forty-niners is that you can't hook on a cow! They don't make roller skates big enough.

RESUMING that most farm sightseers choose a convenient travel period between haying and corn cultivation and the ensuing days of harvest and fall plowing, there remains one ancient argument of the standpatters to settle. Croakers claim that gadding makes one discontented. They say one should not go abroad and covet other people's lands. My experience with farm wanderers is that they sum up their impressions when they tumble out at the journey's end with a rousing phrase: "I wouldn't trade all those places for one acre of good old Minnesconsin."

Had they stayed quietly on their own soil-depleting bases and not made a glorious home-run, would they be more content or less? Probably the latter, if they trusted to real estate literature and alluring prospectuses to inform them of other fields afar. It
takes a heap of seeing to overcome a native's solicitude for the old lanes and hills. Education often consists of learning exactly how well off we are, judged by our own standards and not by the distant preference of somebody else.

Dropping into meter for a change, we hear them say:

'Cause I come back home contented
Do not think I've gone insane,
For the eagle loves the mountain
But the chicken likes the plain.

Then there are also a number of folks in my state who profit by the gas gadding of other people. There are many degrees to this business. Some, who are sort of apprentices, merely knock a piano-box into a roadside stall and set forth rows of bitter cucumbers, droopy apples, squash-like melons, infertile eggs from the incubator, broilers with the blues, and No. 1 throwing tomatoes. Another group of used-to-be farmers turn their homesteads into ramshackle ritzies and mix gasoline, grog, and gravy for the passers to get pizened and pie-eyed.

Talk about the safety of the highway and the crass ugliness of city slums! I can show you spots in our wilderness that would make the Bowery look like fifth avenue. The curse of debauched commercialism is one stench that is hard to stifle, even with oodles of ozone to spare. It's simply the "better business" blot.

Some day the enraged town selectmen in many a vacation zone will get up some morning and vow to do a little night-riding. If ordinance can't blast such sinks of effluvia out of the landscape, then try ordinance!

Yet I am pleased to assure my peregrinating readers that my state still boasts some clean and cozy tourist homes and camp cabins, managed by thrifty farm women who cater to travelers in summer and spend their winters either in Florida or the hospital.

Credit for putting "winged wheels" under the farm population can be summed up thus: (1) Familiarity with machinery acquired through use of complex farm implements and the new leisure afforded thereby, and (2) Gradual abandonment of the farmer's botchy attempts to locate, construct, and maintain local links in the transportation routes of America.

Those who followed the patient ox and used the flail were indolent and conservative as to rates of travel and fearful of intricate machinery. The advent of the horse in farm work and the coming of the McCormick reaper marked the first breaking of the age-old slavery of agriculture to years of toil and utter provincialism.

To me nothing shows the vast pace forward we have established in this century better than the history of about one hundred miles of public highway lane between Chicago and Milwaukee. Just ninety-odd years ago they surveyed the first crude wagon route along that trail, bordered by a few rude clearings cultivated by oxen. Today we see four or five steam railroads, a couple of electric lines, a dozen bus lines, thousands of private cars and trucks, the latter running on broad cement pavements that cost better than fifty thousand dollars a mile; and in the fields are rubber-tired
Chrysanthemums Thrive In Sand Cultures

By H. Hill and M. B. Davis

Central Experimental Farm, Ottawa, Ontario

THE foliage of greenhouse-grown chrysanthemums is extremely sensitive to relatively small disturbances in the nutritional balance, causing mottling or burning of the lower leaves often followed by partial defoliation. Such foliage disfigurement renders the plants unsuitable for show or exhibition purposes and also impairs the efficiency of the plant in the production of number and quality of bloom.

A series of nutritional experiments over a period of several years has resulted in the accumulation of sufficient knowledge to make possible the growing of this plant to perfection in pure sand cultures on a commercial scale. Sand cultures offer certain advantages over regular greenhouse soil composts. The concentration of the different elements available to the plant at a given time can be more easily controlled; this is particularly true of nitrogen.

In a compost, possessing as it does large amounts of organic matter, the liberation of nitrogen may be a rather slow and continuous process and is frequently accompanied by periodic deficiency of the mineral elements. It is easier in sand cultures to use the appearance of the plant as a means of judging fertilizer requirements, since superabundance of plant nutrients can be more readily washed from the growing medium, and deficiencies can more easily be corrected due to the quicker availability of the various elements.

It has been noted that varieties differ in their nutritional requirements, and these may be more easily catered to in sand cultures due to the advantages set forth above. Further, with the increasing cost and difficulty in obtaining manure and fibre for a suitable compost, the sand culture offers a cheaper medium in which to grow the plant. Another factor affecting the cost of production in soil culture is the fact that it has been found necessary to empty and refill the beds after growing one or two crops. It appears reasonable to assume that the same sand can be used for several successive crops, since all nutrient residues and

Fig. 1—The smaller size of this leaf, its yellowish-green color, and reddened veins indicate that it comes from a very low nitrogen plant.
toxic materials can be eliminated by thorough leaching with water.

The chrysanthemum has proved to be a plant fairly well adapted to such treatment, and one which very quickly reflects faulty nutritional practice.

The following plant-symptoms have been found useful in determining the fertilizer requirements of chrysanthemums when growing in either soil or sand. As in many other plants the ratio between nitrogen and potassium is of particular importance in the feeding of the chrysanthemum, which gives an added advantage over a crop like tomatoes, in that high-level feeding of both nitrogen and potassium can be practiced with a greater degree of safety, since there are no fruits which might be affected with physiological disorders. Chrysanthemums receiving an excess of nitrogen will soon commence to indicate the trouble by a faint yellowing on the margins of the lower leaves, which gradually spreads inwards between the veins until a very marked chlorosis of the leaf is noticed. This continues until curling of the leaf takes place, followed rapidly by browning and death.

Whilst many a fairly good bloom has been produced on a chrysanthemum plant with almost one half of its foliage gone from the base upward, there is no reason why such a condition of foliage should exist. The ill effects of high-nitrogen feeding are easily overcome by increasing the amount of potassium fed. As the nitrogen is increased, so should the potassium be increased. Chlorosis of the lower leaves, dropping of the lower leaves, curling, and death all indicate either potassium starvation or nitrogen excess.

Deficient nitrogen, unlike excess of that element, produces leaves which do not burn or show marginal chlorosis. Here the leaves may be somewhat small, pale green to yellowish green, and in extreme cases show reddened veins, but the leaf always remains entire and not mottled or scorched.

Fig. I shows a leaf from a very low nitrogen plant; Fig. II, the early stages of excess nitrogen expressed as a faint marginal chlorosis; and Fig. III, a more advanced stage of excess nitrogen in which the chlorosis has increased and spread inwards.

The chrysanthemum is particularly susceptible to excess phosphorus feed-
Fig. IV—Slight yellowing and the appearance of maroon-red blotches on the margins of the leaf, with the centre remaining a normal green, are evidence of excess phosphorus feeding.

...ing, and peculiarly enough this is an element that many greenhouse men do use to excess in the form of bone meal and superphosphate. To the casual observer excess phosphorus symptoms resemble excess nitrogen symptoms, but there is a very distinct difference noticeable upon close examination. In the case of excess phosphorus feeding the trouble commences around the margins of the leaves in the form of a slight yellowing, as in the case of excess nitrogen feeding. This is very quickly followed by the appearance of maroon-red blotches following the margins rather closely and leaving the center of the leaf a normal green. Fig. IV shows the location of these maroon patches. This symptom is exceedingly valuable in the growing of chrysanthemums and should be carefully studied in contrast to the deficient potassium or excess nitrogen symptoms.

Lack of phosphorus is characterized by a great reduction in vigor, plants spindly, leaves small and sparse with internodes farther apart. In color, the leaves are at first a dull, deep green, with the older leaves becoming a dull reddish purple. The lower leaves which die from phosphorus starvation are reddish purple in color and not yellowish or light brown as in the case of excess nitrogen.

The symptoms described above refer to foliage conditions only, but quantity and quality of bloom are also greatly influenced by feeding practices. The following table gives the number of blossom buds per plant and the average size of bloom of a variety of chrysanthemum grown under varying nutritional conditions.

It will be noticed by examination of the table that the largest number of bloom was secured from the luxury feeding of high nitrogen and high potassium, and that the largest size of bloom was secured from the same treatment. High feeding of phosphorus even in the presence of ample potassium and nitrogen resulted in a marked decrease in the number of blossoms and some decrease in size. As might be expected, deficiency of either phosphorus or potassium brought

(\textit{Turn to page 36})

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Average no. of blossom buds per plant</th>
<th>Average size of bloom in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excess nitrogen</td>
<td>109</td>
<td>2.5</td>
</tr>
<tr>
<td>Low nitrogen</td>
<td>68</td>
<td>2.75</td>
</tr>
<tr>
<td>High nitrogen and high potassium</td>
<td>170</td>
<td>3.25</td>
</tr>
<tr>
<td>Excess phosphorus</td>
<td>61</td>
<td>2.75</td>
</tr>
<tr>
<td>Deficient phosphorus</td>
<td>48</td>
<td>2.25</td>
</tr>
<tr>
<td>Low potassium</td>
<td>56</td>
<td>2.00</td>
</tr>
<tr>
<td>High potassium</td>
<td>129</td>
<td>3.00</td>
</tr>
</tbody>
</table>
Dry-weather Profits
from Garden Irrigation

By W. B. Ward

Extension Horticulturist, Purdue University, Lafayette, Indiana

Many years ago James Whitcomb Riley thought we people in the Hoosier State were getting too much rain and wrote: "When God gives out the weather and sends rain, why—rain's my choice!" For the past several years commercial gardeners in Indiana have found that during the growing season, from April to October, the rainfall has been deficient or so spotted that many of their crops were lost due to the lack of moisture and the exceptionally high temperatures during June and July. The season of 1936 seemingly broke all records for drought duration, as very little rain fell during May, June, July, and up until the middle of August. Those gardeners that were equipped for irrigation to meet such conditions fared very well, as the scarcity of many of the vegetable crops created higher prices. Some few gardeners watched the vegetables burn up, while some few others reversed Riley's saying and hurriedly put in an irrigation system in order to save their crops—and it worked.

It may be a long time before such conditions will again arise, when the extended drought and heat wave damages the vegetables in the Middle West like it did this year, yet the experiences gained were valuable to the gardeners and to neighbors. Each year there will be a period of a week or ten days, or perhaps longer, when there will not be sufficient rainfall for the maturing of certain crops, and a little water at such a time will no doubt be the difference between profit and loss. Water when you need it should be the foremost thought in the minds of our gardeners, as they may easily arrange to carry off the surplus water by tile drainage or raised beds and the open furrow.

Three Workable Systems

Various systems of irrigating have their champions. Some think that the overhead is the better, others like the furrow method, and still some prefer subirrigation. For low-lying fields close to drainage ditches, subirrigation works to a good advantage for smaller areas. Overhead irrigation or the sprinkler system is also limited to smaller acreages, 10 to 30 or 40 acres, and the water is applied the same as rain falling. More equipment and expense is necessary with the overhead system, yet this added expense seemingly has not cut in very deeply on the profits derived.

One grower in northern Indiana has 23 acres of various vegetables under this type of irrigation, using a stationary tractor engine and double centrifugal pumps furnishing 30,000 gallons per hour. Automatic turning equipment is on each line of sprinklers, and the line carries 90 pounds of pressure. The water supply is pumped directly from a small stream into the lines. Ten acres are watered at one time. It was very interesting to note the differences between irrigated and
non-irrigated crops, especially beans. For the past six years a quarter-acre patch has not received the regular applications of water and has depended upon the rainfall. Sometimes there was a crop, and again it was a waste of time in preparing the ground and planting seed. This year this patch was in snap beans, and the difference was that of no crop compared to what may yield six tons or better, as he was still picking beans at the time of our visit, which was the middle of August.

Flooding or furrow irrigation as practiced here is a little different from the open, gravity-fed irrigation ditch of the West. Our open water must be pumped into pipe lines of various kinds and distributed where needed. Most generally four or five-inch metal tubing, in short, medium or 20-foot lengths, with quick fastening connections, or occasionally porous canvas hose is used. The water is piped to the higher spots and then gravity carries the water between every other row. When sufficient water has been applied to a certain area, the supply is cut off and the pipes moved elsewhere if desired. One grower is irrigating 76 acres of potatoes, and the total cost of equipment (pumps, pipe, and engine) was $1,700. What may be the increase in yield on this acreage will not be known until harvest time, but a preliminary estimation places the yield increase at 275 bushels per acre.

Old automobile engines connected directly to centrifugal pumps and run at a speed of 30 miles per hour furnish good power. The engine and chassis are placed close to the water supply and the pump securely fastened to the frame. This type of pump discharges between 20,000 and 25,000 gallons per hour through a four-inch pipe. This method of irrigation seems quite successful in getting the water on in a short time and has proven very economical on cost of equipment and time. An acre inch (27,000 gallons) of water is applied about once a week.

When the water table is close to the surface, 6 to 15 feet, open wells are dug and lined with brick or sand points are driven into the ground. These wells are from 6 to 8 feet in diameter and from 12 to 20 feet deep. They are partially filled, 6 to 10 feet, from the seepage water and may be emptied twice daily, furnishing enough water to run continuously for 4½ to 5 hours’ time. One gardener has a 3 HP electric motor running his pumps and found that only 12 KWH were used in emptying this well 15 times.

In Fig. 2 three sand points were driven into the ground 9 feet, and a good water supply was found. The

(Turn to page 35)
Southern Peaches Need Potash

By E. H. Rawl

Extension Horticulturist, Clemson College, South Carolina

To peach growers of the South, the disease which has developed in their orchards and which is commonly known as "leaf scorch" is nothing but "cotton rust" (potash deficiency) spread to the peach trees. Ten years' treatment with nitrogen only in the Tinsley 14-year-old, 25-acre Elberta peach orchard about two miles from Inman, South Carolina, is responsible for the conclusion. So similar to "cotton rust" are the abnormalities developed in this orchard that lack of potash is being credited with the problem which has been threatening the peach industry of South Carolina.

The Tinsley orchard is in Spartanburg county which is one of three (Spartanburg, Greenville, and Laurens) counties in the Piedmont area—the most important peach section of South Carolina. In July 1934, about two weeks before harvesting, there developed in the Tinsley orchard a serious abnormal condition. This condition was observed very closely by many growers, plant pathologists and physiologists, horticulturists, and others in addition to the writer. Many of the observers were suspicious that the trouble might be due to a virus or other disease. The owner now estimates that in 1934 and 1935 the trouble caused him a net loss of $3,000 and believes that in previous years it reduced the size of fruit and total yield.

The soil on which this orchard is planted is classified as Cecil sandy loam. A small portion of the soil varies somewhat, ranging toward the clays.

During the period October 12 to
19, 1934, representatives of the South Carolina Crop Pest Commission made a survey in certain sections in the state to determine the extent of the abnormal condition in other orchards throughout the state. This survey did not cover all the counties of the state, nor all the orchards within each county; but of the 77 orchards which were inspected 33 per cent showed the abnormal condition. In no case, however, were any orchards affected as seriously as was the Tinsley orchard in Spartanburg county. It was found also that orchards with trees under five years of age, even though they were in some cases planted adjacent to the old trees which were affected, did not show the typical abnormality.

Disease Symptoms

In the early stage of the abnormal condition the leaves first changed to a light, yellowish-green color, later to a very pale yellow, followed by burning or "scorching" of the tips and margins of the leaves. Finally the leaves were considerably curled, showing a bronzing or browning, and eventually resulting in a great scarcity of peach buds. Many of these buds were so weak that at blooming time the majority shed, thereby finally resulting in a very light crop of undersize fruit. This unnatural condition occurred in the orchard in a patchy manner, in some cases trees adjoining abnormal trees appeared perfectly healthy until after harvesting. In 1934 about two weeks previous to the ripening of the fruit, approximately 25 per cent of the trees showed the condition described above, and almost all of these abnormal trees failed to develop their fruit to marketable sizes. The size of the majority of the peaches from these abnormal trees at harvesting was from 1½ to 2 inches in diameter, whereas fruit from healthy trees ranged in size from about 2 to 2½ inches in diameter. On some of the abnormal trees pre-ripening dropping was a pronounced tendency.

It is well at this point to compare these symptoms with the observations of potash deficiency symptoms recorded by various research workers. For instance, M. B. Davis in Quebec Pom. and Fruit Growing Soc. 40th Ann. Rept. 1933 says, "Potash deficiency is first noticed by a very dark leaf, generally lacking lustre; this condition may be overlooked but is soon followed either by a faint chlorosis around the margin or at the tip or sometimes by a slight scorching or burning of the tip of the leaf. In bad cases the scorching is around the entire margin, and when it reaches that stage cannot be mistaken."

Again, in Nova Scotia Fruit Growers' Ass'n Proc. 70th Ann. Rept. 1933, "The first and most marked symptoms were those due to excess nitrogen. Where this element was fed in large amounts the first response was rapid growth, large plants, and very large luxuriant leaves of very dark green coloration. As the feeding of high nitrogen continued, the lower leaves began to get chlorotic, or pale, around the margins, and sometimes along the veins. Later the margins began to turn brown and then scorch, or burn, until in cases where very large amounts of nitrogen were fed the entire leaf area of the lower portions of the plant was out of commission, leaving only the younger foliage in good condition, but even this showed signs of the trouble with slightly pale or yellow margins of the leaves.

"Closely allied to these symptoms were those of the low potassium plants, for it was almost impossible to tell plants fed with potassium from those fed high nitrogen. The two symptoms were the same..."

"The symptoms for high nitrogen and low potassium are similar, viz., a pale yellowing of the leaf margin, followed by a burning or scorching, or in some cases, an immediate scorching of the edge of the leaf, worse on
the older than on the younger leaves of the plant."

W. M. Munson, in Maine Agr. Exp. Sta. Bul. 128 (1906), reports: "In August, when about the size of walnuts, the fruits (apples) began to crack and to drop. Marked indentations, somewhat similar to those made by curculio, were abundant. No evidence of insect work could be discovered, however. When the fruit was opened, the tissue under the indented parts was found to be dry and brown. Most of the fruit ceased to grow, and by the first of September the larger part of it was on the ground; though early in the season all the trees were well loaded. The leaves, however, appeared perfectly healthy. Though a small portion of the fruit was on the trees at harvest time, it dropped so easily that no attempt was made to save it for packing. The slightest jarring of the limbs would cause it to fall...

"It was then observed that the condition existed only on certain trees included in a fertilizer experiment in which an excess of available nitrogen is applied every year. The first tree noticed was in the plat which received nitrate of soda and acid phosphate, and later it was found that every tree on this plat, as also on the adjoining plat which received nitrate only, was affected as described. In one or two instances check trees which adjoined the nitrate plat, and received no direct application of fertilizer, showed a tendency in this direction. None of the other trees in the whole orchard, however, gave the least indication of the trouble. A fertilizer plat on which were muriate of potash and acid phosphate, and another on which was muriate only, separated from the first by only a single row of trees, were entirely free from disease.

"The supposition was therefore made that the trouble was physiological and due to the excessive amount of available nitrogen and the lack of potash."

A. E. Murneek and E. J. Gildehaus in Missouri Agr. Exp. Sta. Bul. 310 (1931) state, "Groups of semi-dwarf apple trees have been planted in quartz sand in loose soil in tubs. These trees have been fertilized with increasing and decreasing amounts of nitrogen and potassium, while the phosphorus content of the fertilizer has been kept constant. When the nitrogen was increased without a corresponding increase in the potassium supply, marginal scorching of leaves was induced. Increasing the potassium content obviated this harmful effect of the fertilizer."

In Mass. Agr. Exp. Sta. Bul. 305 (1934) J. K. Shaw states, "These trees (apple) have not been doing well, and crops have been small. Increasing the supply of nitrogen seemed to injure rather than to improve the condi-

Figs. 2-3—Abnormal foliage affects the production of fruit buds. Note enlarged flowers without pistils, and sepals grown into nearly full-sized leaves. Insert: Peach bud with leaf-like sepals. Photo April 3, 1935.
tion of the trees. . . . Observations suggest that the leaf burn and general poor condition of the trees in this orchard may be due to lack of potash in the soil."

T. Wallace—Journ. Pom. and Hort. Sci. (Eng.) IX (2): 111-21 (1931)—observes, "It has been shown that potassium deficiency in fruit trees is an extremely serious problem in the important fruit areas of this country.

Potassium deficiency usually occurs in the field in a patchy manner, and in examining such cases it has been usual to find that soil differences can be recognized between healthy and 'scorch' areas. . . . A very large number of cases have been investigated and, in every one, it has been found that the healthy trees were high potassium trees and the scorched trees of low potassium content, thus showing the patchy nature of potassium deficiency in the field."

As a result of this deficiency, fruit plants such as the apple, gooseberry, black currant and red currant exhibit the condition known as "leaf scorch," whilst certain varieties of plums, e.g., Purple Pershore, develop a chlorotic appearance in addition to showing the marginal scorching of the foliage. . . .

"Trees on the nitrate of soda plot have been shown to be suffering from potassium deficiency by treating a portion of the plot with sulphate of potash, the potash treatment having produced a marked growth response and resulted in the elimination of leaf scorch in three seasons. . . .

"Potassium deficiency usually occurs in the field in a patchy manner, and in examining such cases it has been usual to find that soil differences can be recognized between healthy and 'scorch' areas. . . . A very large number of cases have been investigated and, in every one, it has been found that the healthy trees were high potassium trees and the scorched trees of low potassium content, thus showing the patchy nature of potassium deficiency in the field."

Coming back to the Tinsley orchard, soon after harvesting the abnormal foliage condition gradually developed throughout the entire orchard, affecting some trees seriously, and others only slightly and very late in the season just before frost. This abnormal condition, of course, seriously affected the production of fruit buds, especially on trees which showed the disorder early in the season, these trees producing only a scant quantity of weak buds.

The trees which were seriously af-
fected in 1934 produced a very light crop of weak fruit buds, and the following spring (1935) the majority of those weak buds failed to set fruit. In some extreme cases not more than one dozen peaches per tree finally matured. Some of the buds and flowers upon affected trees assumed unusual forms. There were abnormal unopened peach buds with leaf-like sepals, enlarged flowers without petals, and sepals grown into nearly full-sized leaves. In no case were these abnormal buds and flowers found on vigorous, healthy trees.

Previous to 1925 the Tinsley orchard was fertilized with 4-8-4 (NPK) fertilizer with additional light applications of sodium nitrate. Since 1924 the orchard has been liberally fertilized with nitrogen, but during this 10-year period has had only 43 pounds of potash (K₂O) and 112 pounds of phosphoric acid (P₂O₅). The reason that phosphorus and potassium were generally omitted was that recommendations (though not of the writer) based on experimental data indicated that nitrogen only was essential in peach-orchard fertilization.

During the 10-year period little limestone or other basic material was applied, but great quantities of acid-forming materials, as ammonium sulphate, were applied annually. A total of 3,240 pounds of ammonium sulphate per acre were used, and it would have required a total of almost two tons of dolomitic limestone per acre to have neutralized the acidity caused by the ammonium sulphate. Yet during this period only 500 pounds of dolomitic limestone were used.

The soil also received annually considerable sulphur from the dormant and summer sulphur sprays that were given the trees for the control of insects and diseases of the trees and fruits. All of these practices had a decided influence in increasing soil acidity.

In late fall (1934) many samples of soil were collected and tested for (Turn to page 39)
Oregon has approximately 7,000 acres devoted to onion bulb raising.

Oregon Onions

By Albert E. Wilkinson

Extension Vegetable Specialist, Agricultural Extension Service, Storrs, Connecticut

When you see some extra fine, large, reddish-brown, globe-shaped onions on our markets, look on the original bag and chances are that you will find that the onions have come from Gervais or Brooks, Oregon. Rightly called Onionville are these two towns, as they are the center of the large, onion production region, the farms of Oregon globe onions. Acres and acres and acres are devoted only to onion raising.

The soil out there where I visited is muck, probably an old lake bed, now drained and cropped. No one that I questioned could really tell me just how many hundreds of thousands of acres there are suitable for onion raising. My friend, John Banick, of Gervais, told me that at least 7,000 acres were used for onion bulb raising. This area is entirely away from the markets. Their best markets, according to several growers, are New York City and adjacent states.

They are, then, forced to ship all the onions raised. The growers also told me that they are very much interested in increasing their eastern shipments, largely because of better prices, but somewhat due to a more steady demand. They are all interested in the Connecticut Valley crop, its condition, and probable extent of sales. Several growers told me they had been East in order to see this area and to weigh its importance.

This soft, black muck is very easy to work, requires only a medium amount of fertilizer, about 1,000 to 1,200 lbs. of a 13-10-20 being used per acre. It’s all located in a mild climate with a long growing season. Planting is mostly in March, and the crop is in the storehouse by the first of November or earlier.
August-September 1936

Storehouses have sprung up all over the area. One large grower in Brooks has five or six 40 by 100-foot houses that I saw loaded with crates of choice onions.

The crop is grown much as it is in the Connecticut Valley, in Wethersfield, or East Hartford. The main difference is that more seed per acre are used, and more or all seedlings are allowed to develop. Thinning or spacing in the row, as practiced in Connecticut, is not needed at all, because in this soft, spongy soil with its high-water table the onions can and do develop and push out, so that each row may be from five to eight onions wide. These come to full size, too.

The onions at harvest are thoroughly dried in the field and then placed in crates and somewhat cured. Later they are brought into the storehouses and held in the crates. Because of the warm climate most of the storage plants have only one wall of boards. A few of the better houses have two layers and paper on the outside layer. Using these storages in Connecticut with our cold winters would mean frozen onions and losses.

At shipping time the onions are run over a topping and grading machine. The dry tops are cut off and the netted bags of uniform size, stamped with the name and address of grower or brand, are filled with onion bulbs quite uniform in size. It does not take long to run through a carload of these large, reddish, globe onions.

In addition, my friend Banick told me that there are about 1,000 acres on higher soil nearby that are used for growing onion seed of the highest quality. Most of this acreage is controlled by one of Connecticut's leading seedsmen. Therefore, we in Connecticut have a finger in the pie out there in Gervais and Brooks, Oreg.

Friend Banick was kind enough to take me to many of these seed growers' farms. One of these places impressed me very much because of the care taken in the work. Much to my surprise I found it was operated and managed by a Japanese woman. She had lost her husband through a runaway horse accident, but she carried on. In one of her fields I found about 100 people working. Rows in this field were more than 2,500 feet

*Turn to page 33*
Mr. Ben Qualifies
As Truck "Planter"

By G. Chalmers McDermid
Charleston, South Carolina

"WHY shouldn't my tomatoes be
good? They were fertilized
with a 4-8-10 fertilizer, and when
they have that much potash under
them, they've got to be good." Such
was the answer this writer received,
when he commented on the beautiful
tomatoes W. B. Seabrook of Mount
Pleasant, South Carolina, was shipping
from his 1935 crop.

"We had a terribly rainy season,"
Mr. Seabrook said, "and to all out-
ward appearances, we should have had
a crop failure. But somehow or other,
the elements let up on us, and we
made the largest crop we have had in
years. I have used a 10 per cent pot-
ash fertilizer for tomatoes for a long
time, and feel that in spite of bad
weather, year in and year out, it rather
equalizes things for the crop. I find
that when I put out this high-potash
analysis I get a smooth-skinned to-
mato, fewer catfaces and splits, and
practically no 'nail-head rust,' the
bane of the tomato grower's existence.
I find that my bushes are healthy from
the start, and keep their thriving condi-
tion all through the growing season.
Potash makes a better shipping to-
mato, the skin is tougher, and the
tomatoes fill out well. They don't
bruise easily, and carry to the markets
in first-class shape."

If this writer had been penning a
testimonial for some fertilizer manu-
facturer just about this time, he could
not have asked for a better break than
Mr. Seabrook's statements given
above; but testimonials do not inter-
est him these days. He was interested
in securing first-hand information on
why Mr. Seabrook always made good
crops, good seasons and bad, wet
weather and dry, year in and year out.

To get this information our con-
versation had to go back to the old
days of sea island cotton on the South
Carolina coast, the days when cotton
farmers were cotton "planters." (And
by the way, many of them rather re-
sented the term "cotton farmer." They
were "cotton planters.") Gentle-
men of the old school, we might
call them, studious of the needs of
their crops, avid readers, conductors of
experiments on their own farms, really
going somewhere with their private
research. There are only a few of
these old-time gentlemen left, and our
good friend, Mr. Ben, a cracking good
farmer who has kept abreast, and even
ahead of the times, is one of them.

Resourceful Farming

Ever since his younger days, he has
had the "yearn to learn." In riding
through his sea island cotton crops, he
noticed certain fields that each year
shed their leaves prematurely. They
looked rusty, bolls didn't fill as they
should. "Something must be wrong
with that piece of land," thought he,
"perhaps it lacks some kind of plant
food. Maybe if I put some of that
'pluff mud' in the rows it will help
it out for another year." Suiting the
action to the thought, the next winter
he had his carts go out into the tough, greasy mud of the near-by salt marshes and bring it into the "rust spots." Next summer he noticed a marked difference in the cotton. It remained healthy all during the growing season. It didn't rust. It made a plumper boll and a silkier staple.

Why was this? He and his friends "recked their brains" and figured it out as salt, but what kind of salt? Common table salt put on the lands would ruin a crop, so what could it be? Hardwood ashes gave similar results on tests run by some of his friends. "Perhaps," he reasoned, "there was some connection between the salt in the ashes and the salt of the 'pluff mud.'"

Then along came a fertilizer salesman with a sample of kainit salt. He told of certain tests that had been made on other crops which had proven that this material had rust-controlling features. Mr. Seabrook easily put two and two together and made four. He tried this kainit salt (as it was then known) on a small plot of sea island cotton and found that he had the same protection against rust that the "pluff mud" gave him, and how much easier it was to spread the kainit than it was to haul cart load after cart load of the mud to his fields.

Naturally he was interested in this radical new departure. He had used the "pluff mud" on sweet potatoes in former years, so he decided also to put "out some kainit for them. A mar-

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Turn to page 35
Fertilization and Care of Peat Soils

By R. E. Stephenson
Oregon State Agricultural College, Corvallis, Oregon

PEAT in the raw represents plant materials more or less embalmed in wax and preserved in humic acid water. The degree of preservation is sometimes so complete in the case of sphagnum moss peats, that the moss when dug and dried is used for packing material as a substitute for excelsior. Such material is not yet peat soil. These peats even after becoming soil require more than average liberal fertilization with potash, lime, nitrogen, and phosphate.

Peat soil represents plant materials in the process of decay. When the water is first removed from raw peat, rotting is slow and several years may be required to make productive soils. The more decomposed the original peat materials, the more quickly productive soils are formed. There are so few micro-organisms in raw peat that inoculation is helpful in speeding up rotting or humification.

Influenced by Vegetation

The type of plant growth from which peat is formed influences the productive value of the peat soil. Sphagnum moss makes poor soil. Sedges, reeds, grasses, with some woody growth make better soils. Presence of woody growth in the peat indicates that at some period in the peat accumulation there has been partial drainage. The aeration afforded by the limited drainage stimulated a certain amount of decomposition, and a peat of higher protein and nitrogen content was formed. There was also during the period of partial drainage a better type of vegetation for making peat soil.

Southern peats, formed under low rainfall and high evaporating conditions, are likely to prove more fertile. They contain more mineral matter. Peat on a lime substrata may be neutral in reaction and is better than the acid, leached peats of the North. The latter are slow to become soil and need a lot of fertilizing to make them productive. High-lime and low-lime peats are sometimes classed as good or poor soils, respectively.

Drainage Essential

In reclaiming peat land the first thing is drainage, to remove excess water, admit air, and promote oxidation. A light application of manure is helpful to introduce micro-organisms. Drainage should not be too deep, or capillary water cannot rise to the roots of crops. Drains placed too shallow are soon within reach of the plow because of the shrinkage of the peat as it dries and decomposes. Shrinkage of a foot or two in a few years is probable.

The drains for common crops should not lower the water table more than two and a half or three feet below the surface after settling. Tiles originally placed four and a half or five feet deep probably will work out about right.

Raw peat at the beginning of decomposition is somewhat comparable
to the raw materials from which compost is made, except that there is usually a greater deficiency of potash. Composting is an aerobic process carried on by micro-organisms in the presence of moisture and nutrients. The nutrients needed by the compost organisms are nitrogen and carbon for protein synthesis, carbon to supply energy by oxidation, and phosphorus, potassium, and other minerals. The organisms require a neutral reaction which necessitates the use of lime on acid peat.

Supply Deficiencies

Raw peats are deficient in minerals for two reasons. Water plants, out of which peat is formed, are naturally low in mineral content. The mosses are especially deficient in minerals. Likewise sedges, rushes, tules, and water grasses are low in minerals. Then since peats accumulate in water, the plant materials of their origin have been extremely leached for ages. Nearly everything that water can dissolve has been removed. Except in the presence of an alkaline substratum, this leaching is bound to produce base deficiency and high acidity. Hence the necessity for liberal liming and mineral fertilization, adding sometimes such rarer elements as copper, manganese, and zinc to the usual formula.

Since peat is mostly organic matter, sometimes ninety per cent or more, casual consideration might lead to the conclusion that nitrogen which is supplied by organic matter would not need consideration in a fertilizer program for peat soils. Such is not the case, at least so far as the raw peats are concerned. The same leaching which removed soluble bases removed also the soluble proteins, and amino acids. The nitrogen of these has long since disappeared as the result of anaerobic decomposition. The nitrogen which remains is in the form of resistant, slowly decomposable products.

Peats normally contain from less than one to perhaps three or four per cent nitrogen. The raw peats contain less nitrogen than those in the more advanced stages of decay. Humus of mineral soils, on the other hand, carries five or six per cent of nitrogen. As peat decomposes or humifies, it becomes more and more of the nature of real humus. The micro-organisms that break it down build new proteins, comparable to those of the humus of mineral soils. In time, most of the peat material is humified, and the nitrogen content, availability, and general properties approach those of real humus.

One requisite of raw peat decomposition, therefore, is a treatment with nitrogen fertilizer, or perhaps a complete fertilizer carrying a goodly content of nitrogen. The nitrogen fertilization is less needed on the better decomposed peats. Ultimately, therefore, nitrogen fertilization may be reduced or perhaps eliminated.

Potash for Quality

Mineral fertilization must always continue on peat soils. Phosphate and potash treatments cannot be eliminated. Liberal use of potash may make the difference between crop failure and good yields. Potash not only increases yields but improves the quality of crops grown on peat soils. Potatoes may blacken at the base in cooking due to lack of potash, this is the result of the accumulation of amino acids which turn black due to the heat of cooking. Liberal mineral fertilization is necessary to assure normal quality of crop products.

Burning is sometimes practiced as a substitute for fertilizer treatments. By burning a few inches of the surface, enough ash, including lime, potash, and phosphate is liberated to produce a crop. Since peats are limited in depth, such a practice is shortsighted and wasteful. A few fires and there is no more peat soil. The valuable peat goes up in smoke. The practice is nearly as senseless as burning stable manure or a compost heap.
A strong feature of peat soil is its favorable moisture condition. Peats hold more water useful to plants than do mineral soils of similar depth. Crops grown on peat do not suffer as soon in drought as on mineral soils. Peat is easily penetrated and permeated by roots of crops which are seeking moisture and nutrients. The combination of high moisture capacity and excellent aeration cannot be duplicated in any other soil. Garden crops grow quickly and continuously, and are tender, juicy, and delectably flavored.

Seed-bed preparation in peat soils is no problem. Clods cannot form. There are no crusts, and no packing and puddling with the rains. Tillage is easy, and the minimum amount is required. New peat is sometimes too loose and must be compacted by heavy rolling. Surface tillage is all that is necessary in any case. No other soils are as well adapted to producing big yields of high quality truck and garden crops. The Delta peats of California are reported to have returned an average of $100 an acre for 10 years over the entire area cultivated (some 225,000 acres). Potato yields of 1,000 bushels an acre are attainable. These are perhaps the most productive peats.

Possibly three fourths of the 100,-000,000 or more acres of peat in this country may sometime be utilized for purposes of agriculture. As yet the greater portion is undrained and unutilized. Some of the area supports a poor growth of timber. Other areas return a little low-grade pasture or swamp hay. Still other areas contribute practically nothing of economic importance except perhaps a home for wild life.

Commercial Future?

Difficulties of drainage, slowness of decomposition of raw peat (in part due to lack of understanding of its fundamental properties), the expense of reclaiming and placing peat under cultivation, all are factors retarding the general program of peat utilization. Climate, markets, and many other things must of course be considered in planning a peat utilization program. Perhaps some day considerable peat will find its way into commercial uses. Ammoniated peat, and perhaps complete fertilizers formed with peat as a carrier of nutrients and a conditioner of the mixture, may sometime become popular on the markets.

At present, however, peat as soil deserves the chief consideration. A peat agriculture is now gradually developing, not only with such specialized crops as mint, celery, and potatoes, but with general farm crops. There are few farm crops that cannot be successfully grown on good peat soils, and with the minimum of physical effort. Even legumes are grown and are needed to supply fresh humus material that is easily decomposed in so large an inert mass.

Peat Will Pay

Successful peat management demands simply a fundamental knowledge of the origin and nature of peat materials and the processes through which raw peat changes to productive peat soils. The almost universal need of peat soils for potash fertilization is easily understood by a common sense consideration of the problem. Potash in plant material is practically the most soluble constituent found. Even the dead leaves of growing plants in the field have their potash more or less leached out by the rains and returned to the soil. Why should not the plant materials of peat, immersed in water for centuries (as they are during the period of accumulation) lose practically all their potash? They do lose most of it.

This argument applies to all other nutrient constituents to the extent of their solubility. The least soluble constituents, lignin, waxes, and cellulose
Above: Disgruntled over the job which kept him from going to the community picnic.

Below: Sea-gulls take to land when rice binders offer an invitation to dine.
Above: Lima beans for winter dinners are harvested near San Diego, California.

Below: Lively music strengthens the patience of any crowd for tedious political harangues.
Good advice tendered from experience and received with discrimination builds progressive farmsteads.
Top Quality on Display

Interspersed with war news, political happenings, and other items of major importance, comes publicity directing attention to the First International Horticultural Exposition at the International Amphitheatre in Chicago, September 12-20. The significance of this exposition is far-reaching. Held on the site of the great International Live Stock Exposition and Hay and Grain Show, inaugurated 36 years ago and now grown into one of the largest agricultural functions in the world, the new exposition marks the growing importance being accorded the "garden" side of agriculture.

We do not have to go back many years to find conceptions of our agricultural wealth defined almost solely in terms of live stock, cotton, wheat, and corn. It will surprise many to know that today the combined value of our fruit and vegetable crops is only slightly less than the combined value of our cotton and wheat crops.

Considering the differences in acreages involved and the increasing distances between production areas and consuming centers, with all the attendant problems of getting a quality product to the consumer, the necessity for improved methods, varieties, etc., as epitomized by the interest culminating in an International Exposition, is seen. Probably in no other line of competitive production does quality play so great a part in the ultimate profit to the grower as it does in the fruit and vegetable industry.

Success in Farming

It has been said that success in farming is dependent upon three primary things—the man, the land, and the market. Each factor is variable, making success a goal, the attainment of which employs the constant search for the optimum balance between the three.

Knowledge and experience are probably the two most valuable assets of the man. A farmer has no more important use for knowledge than in connection with the management of his land. Profitable crops cannot be produced without adequate supplies of plant food, and these cannot be provided without knowledge as to the needs of the various crops and the capability of the soil at hand for providing them. Experience is an efficient teacher, storing up as it will, knowledge from personal experiences and from the experiences of others. A successful man keeps his mind open to any new developments which he can utilize toward his own success.

Well along on the road to success were those growers who started with land in a high state of natural fertility. However, the best of land cannot meet the demands of growing season after growing season and maintain its
level of fertility. Fortunately, years of research work, experimentation, and survey have provided information on the application of fertilizers necessary to keep the land producing profitably. It remains for the individual farmer to adapt this information to his own soil and crop needs.

An intelligent man farming productive land will find a good market. Nearness to market, in these days of varied means of rapid transportation, isn't a limiting factor to the extent it was a few decades ago. The pathway beaten to the maker of the "best mouse-trap" has not only wound around to take in the grower of quality produce, but quality produce reaching large markets in good condition is demanding a premium.

Recent reports of soil-testing trains touring important agricultural sections in the service of the farmer give further credence to the man, land, and market formula for success. In Indiana in August a soil-testing train on the B. & O. railroad, under the direction of the agricultural agent for the railroad and with agronomists from Purdue University doing the testing, was run from the western to the eastern side of the state. During the two-weeks tour nearly 1,300 farmers registered for the lectures and 950 fertility tests and 1,500 lime tests were made. Many soils showed a great need for fertilizer and lime and recommendations for treatment and cropping were given.

The agricultural agent for the railroad said that the railroad was interested in the welfare of the farming populace, as more than 60 per cent of the freight traffic and the welfare of the railroad was directly dependent upon the farming occupation.

Agriculture needs more of such cooperation with other industries. Man, land, and market can well be transcribed into people, countries, and commerce.

The Best Story

Our congratulations go to F. H. Jeter, editor of the North Carolina State College of Agriculture and Engineering for the signal honor bestowed upon him at the 23rd annual convention of the American Association of Agricultural College Editors held recently at Madison, Wisconsin. Among the exhibits in the feature story classification at this convention, Mr. Jeter entered "We Did 'Sumpin' About It," and when the critical committee had completed its judging, the blue ribbon was awarded Mr. Jeter for this story, acclaimed the best written by an agricultural editor this past year.

There were delegates from 36 states, Hawaii, and the District of Columbia at the meetings, and "We Did 'Sumpin' About It" competed with feature stories which had appeared in the Country Gentleman, Progressive Farmer, the Chicago Tribune, and various other farm papers and feature sections of daily papers. Adding to the honor of the blue ribbon, F. R. Beckman, managing editor of "Farmer's Wife," who was chairman of the judging committee, told the Association that the article was a complete feature story.

Mr. Jeter also was awarded second prize for syndicated items to the weekly papers and third prize for brief news items, thus giving North Carolina three ribbons, more than any other college or university won in the contest.

Along with the congratulations which we are according Mr. Jeter, we cannot help but congratulate ourselves a little for the fact that this excellent story was published in BETTER CROPS. It appeared in the May 1936 issue and at the time created such comment that reprints of it were made for wider distribution. It would seem that in some degree we were achieving our constant aim to provide our readers with the best articles possible in our particular field.
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 Fertilizers, Soils, Crops, and Economics. 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

An insight to the typical fertilizer practices employed by the early Market Irish potato growers in Florida is among the many interesting topics discussed in Bulletin 295, "Potato Growing in Florida," by W. M. Fifield of the Florida Agricultural Experiment Station. Since nearly all Florida soils are deficient in nitrogen, phosphoric acid, and potash, an abundant supply of available nutrients is furnished the plants in the form of commercial fertilizer. Muck soils ordinarily contain appreciable amounts of nitrogen but are notably lacking in other essential plant foods, and some muck types situated near Lake Okeechobee are also deficient in manganese and copper. Because manure costs more than resultant yields justify, the author states that only a few growers apply stable manure to their land. In many cases farmers in the leading potato sections plow under soil-building crops to add organic matter and nitrogen to the soil.

Growers in the largest potato area, known as the Hastings district in North Florida, usually apply a fertilizer analyzing 4-7-5 (N-P-K) at the rate of a ton to the acre. Most farmers in this area apply the fertilizer in one application, usually two to six weeks prior to planting. A few growers have found high-analysis inorganic fertilizers give satisfactory results. In the Homestead or South Allapattah district, a 4-8-5 fertilizer with applications of a ton per acre are generally used. Some growers apply about two thirds of the fertilizer at planting time with the planting machine and the rest as a side application four to six weeks later, while others use the total amount when the potatoes are planted. The former practice of dividing the application is considered more efficient during rainy seasons. From 100 to 200 pounds of 65 to 83 per cent manganese sulfate per ton are mixed with the potato fertilizer. For the Everglades soils such standard commercial fertilizers as 0-10-12 and 0-8-16 are commonly applied in one operation at planting time at from 200 to 500 pounds per acre. Most of the fertilizer used in this area also contains manganese sulfate, and the author mentions that 50 to 100 pounds of copper sulfate broadcast over sawgrass land before the initial cultivation have been found beneficial. Fertilizer practices in other areas of the State are quite similar to those of the Hastings and Homestead areas. Fertilizers such as 4-8-5, 3-7-5, 3-10-7, and 6-11-10 analyses are frequently used on the farms of West Florida. Soil preparations, adaptable potato varieties, cultivation requisites, and spraying and dusting include other subjects discussed in the publication.


Soils

"Results of Erosion," Numbers 6-9, Volume 12, issued by the Department of Agricultural Education of the Clemson Agricultural College, S. C., will prove instructive to the farmer and farm boy interested in knowing the different types of erosion and their effects. Edited by W. G. Crandall, T. L. Ayers, J. B. Monroe, B. H. Stribling, and Dorothy Cary, the publication contains excellent material on the subject of soil and water conservation, resulting from the findings of Federal Soil Conservation and state experiment stations, and also valuable contributions from a host of soil and engineering scientists of agricultural colleges and other agencies. According to the editors, this is the first of a series of publications on soil conservation they plan to publish. "It is hoped that this issue of Agricultural Education will stimulate active participation on the part of students of vocational agriculture in determining the degree and extent of erosion on individual farms," the authors declare. Illustrations and data to portray the results of erosion on several types of soils are given.


Crops

The Seventh Report of "Pasture Investigations" of the Storrs, Connecticut, Agricultural Experiment Station in Bulletin 208, by B. A. Brown and
R. I. Munsell, outlines several ideal pasture mixtures that should prove beneficial under varying soil conditions. The authors point out that moderately acid soils dry enough for corn and having a pH of 5.2-6.0, a mixture of red clover, Ladino clover, and either orchard grass or timothy should give good results for five years. If the soil is above pH 6, it is believed alfalfa should be included in the pasture mixture, in which case timothy rather than orchard grass is preferred because, among other reasons, less competition for alfalfa may be expected from timothy. For two-year stands, data indicate red clover and orchard grass or timothy mixture produce superior results on moderately acid soils, while a mixture of biennial white sweet clover and orchard grass or timothy is very satisfactory on slightly acid soils. Land in southern New England is too steep for tillage purposes and hence pastures should be permanent, according to the authors. Seedings for permanent pastures comprising red clover, timothy, Kentucky blue grass, Ladino clover, and wild white clover are recommended. Alsike clover, Ladino clover, and redtop or reed canary grass are better adapted for poorly drained soils. Lime and phosphoric acid are usually deficient on livestock farms, and potash gave a marked response on most species in a field where the soil had been impoverished by many years of mowing for hay. Where one-third or more of the stand is composed of legumes or if manure is available for top-dressing, the authors state nitrogenous fertilizers should not be required.


"Grade and Staple Length of Cotton Produced in Georgia, 1928-31," Agr. Exp. Sta., Experiment, Ga., Cir. 107, Mar. 1936, N. M. Penny.


"Twenty-fourth Annual Report of Purdue University, Department of Agricultural Extension," Purdue University, Lafayette, Ind., J. H. Skinner, Director.


"Plant Propagation by Seedage, Cuttage,
Following the approval of the Spencer region in West Virginia as a soil conservation area, it was felt that a survey of the social and economic conditions existing within the area would be of considerable value in carrying out the work and serve as a basis for formulating measures of improvement as a result of work carried on under the program. A cooperative project was approved between the U. S. Department of the Interior and the West Virginia Experiment Station with the view of carrying out the above objectives.

The results of the study have been summarized by F. D. Cornell, Jr., in Bulletin 269, entitled "A Social and Economic Survey of the Spencer Soil-Conservation Area." The study presents an interesting cross-section picture of the social and economic conditions existing in the agricultural areas of this section of the United States. The Spencer region lies within the Appalachian plateau and the topography is rough and broken, with narrow ridges and V-shaped valleys. For the most part it is subject to erosion.

About 94 per cent of the farms in this area were operated by owners and in the majority of the cases were either secured by inheritance or purchase at the time of marriage. The two steps, farm laborer and tenant operator, which so many farmers go through in other sections of the country before becoming farm owners were practically eliminated in this section.

The number of farms and the total population of the section has decreased since 1900. The roads servicing the territory were mostly dirt and in poor condition. Most of the farms are located on dirt roads and more than one half of the farms were more than five miles from any market. Elementary schools and churches were fairly well distributed throughout the district; however high schools were not so easily accessible. Many of the farms were 10 miles or more from the nearest high school. A very small percentage of the operators and their wives had attended more than elementary school.

Economics

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Few of the farms had modern conveniences, such as running water, bath,
electricity, etc. It was found that only 20 out of 772 farm operators had not been reared on a farm. The average size of the farming area was 134.5 acres with a capital investment per farm of $3,613.06 of which 85 per cent was represented by real estate. Only 18 per cent of the land area in farms was in crops, 59.9 per cent being in pasture and the other 19.9 per cent being in woods. Due to the fact that a large part of the crop production is on steep slopes, the majority of the work was done by hand labor, necessitating only a small amount of farm machinery.

Crop yields for the most part were very low and the average total farm receipts were $387.35, of which 32 per cent came from non-agricultural sources. The average labor income per farm after interest on investment and other expenses had been taken out was a net loss of $9.93. In many cases the income from the farm was not sufficient to furnish subsistence to the family, and 16 per cent of these families had found it necessary to apply for and obtain direct relief. Many others had augmented their income through C.W.A. and P.W.A. work relief.

The writer concludes that "with present incomes it is going to be diffi-
cult for a large number of these farmers to meet mortgage obligations and at the same time provide adequately for their families. . . . Some portions of the area have little prospect of ever yielding much more than subsistence from an agricultural standpoint. . . . Methods that must be employed in much of the area and the returns obtained from farming are not particularly alluring to the younger generation. . . . Farmers in the Spencer area are not now obtaining sufficient income to maintain and conserve soil fertility and enjoy with their families a desirable standard of living."


Oregon Onions

(From page 17)

long. I did not measure them. They were too long. The field was about 75 acres in size. The onion bulbs for seed raising are placed in shallow furrows, four to five inches deep, onions four to five inches apart. It required 100 bushels of bulbs for an acre. Labor used is anyone that wants a job. It's all piece labor, 8 cents a bushel for planting. A good worker earns from $1.60 to $3 a day, and it is a back-breaking job.

At harvest time the heads of the onion stalks are cut off. In these heads are found the seed. The heads are stored and dried in the onion storehouse, and when dry are threshed. The seed is fanned, and in some cases partly water-cleaned. The product obtained as I saw it, felt of it, and tested it in several ways is a heavy, plump, black, choice seed, that seemed to me had much vitality and should give results.
Students of genetics in the United States Department of Agriculture call maize, or Indian corn, "the most completely domesticated grain, quite incapable of maintaining itself without man." None of the Old World cereals such as wheat, barley, or rice has reached this high degree of dependence on human care, says J. H. Kempton, Bureau of Plant Industry.

"How, when, and where corn was domesticated are three questions often asked but never answered," he says. "Though there is corn of primitive people, there is no such thing as primitive corn. The oldest ears known are as highly developed botanically and as completely divorced from wild plants as the best of our varieties.

"The most ancient corn known is that of the pre-Incas of Peru. Well preserved ears in the graves of these people duplicate the varieties grown in the same region today. A thousand or more generations have made no changes. Charred corn from the Mound Builders of the Ohio Valley resembles corn grown by Indians in the Middle West."

The nearest relative to Indian corn known to botanists is the grass generally known by its Aztec name of teosinte. But if corn developed from teosinte, Mr. Kempton says, the manner of development can only be surmised. It is believed, however that the advance of genetic knowledge may unravel the mystery of maize.

Versatile Soybean Makes Tasty Food When Cooked

It all depends upon taste—so soybeans are being cooked and tasted in the United States Department of Agriculture to determine which varieties may be used as edible green beans.

The green beans resemble young, tender lima beans, but they have a richer, more nutty flavor. The pods, too tough to be eaten as food, may be easily shelled after a 3-minute boiling.

About 60 edible varieties were brought from Japan and planted at the Department's experimental farm at Arlington, Va., and at several State experiment stations. Each week, as they ripen, a number of varieties are cooked and tasted.

From 75 to 170 days are required for the green beans to mature. They differ markedly in flavor, ease of cooking, and respond differently to soil and climatic conditions. A number of very promising early, medium, and late vegetable types for regions adapted to the soybean have been found. The Hahto, a medium variety, is the only green vegetable variety handled by growers. The Rokusun, a late type, and two or three early Japanese varieties should be in the hands of growers and seedsmen next season.

Common varieties also may be used as green vegetable beans, but they are smaller, do not cook as easily, and usually lack the distinctive flavor.

As green vegetable beans, soybeans should be picked when they reach full size and are still green and succulent. They may be cooked about the same way as fresh lima beans or green peas. Many persons prefer to boil them in salted water from 20 to 30 minutes.
Fertilization and Care of Peat Soils

(From page 22)

remain—therefore, the inertness of raw peat and the slowness of soil-forming changes after drainage. The fertilizer and management program must give due consideration to these fundamental facts. This done, peat areas that are now more or less waste may gradually become prized crop-producing centers, and the returns from peat lands already under culture may be boosted to higher yields and more profitable production levels.

Dry-weather Profits from Garden Irrigation

(From page 10)

farthest pipe was 1 1/4 inches, next 1 1/2 inches, and nearest the piston-type pump a 2-inch pipe, the discharge was through a 2-inch pipe into 12-ounce porous canvas hose. These three sand points furnished water for 130 hours of continuous pumping, and seemingly the supply was inexhaustible. The power used was the farm tractor. This shows that almost any kind of power used proved very economical.

Growers this year paid for their irrigation outfits from the added profits due to watering when water was needed. What might be the trend for another year is rather hard to say, but the grower should first consider the cost and the crops that he will grow and then weigh the normal profits under ordinary years. Intensive planting of good paying crops should also be included in the garden plan.

Mr. Ben Qualifies as Truck “Planter”

(From page 19)

financially independent growing this silky staple for the French and Belgian lace-makers, were reduced to a state of panic. Their living had been taken away from them by a pesky bug. “What can we get to take the place of our cotton?” was the thought on everyone’s mind. For a year or two they cast about rather hopelessly, but finally settled down to vegetable raising. A great many growers had already shifted to these crops, partially from economic reasons, and partially because their lands were not suited to the culture of sea island cotton.

Mr. Seabrook had considered the probability of the weevil’s relentless march and the possibilities of making some money from green crops, so he joined the parade and went to it. He applied his hard-earned principles of crop feeding to these crops with marked success. Spinach, beans, squash, potatoes, and tomatoes were planted on lands which had formerly grown the “sea island.” Doubts
which arose in his mind as to whether or not the soils were too light for vegetables, vanished after a crop or two, and he settled down to the business of learning all over again.

Leaving the very lightest lands for cowpeas and velvet beans, he planted the others. What fertilizers to use, what soils would suit various crops, what plant foods to use, all these were questions which had to be answered. His neighbors, and he also, had begun using a 5-7-5 analysis mixed fertilizer. Why, they didn’t know, but they were satisfied. They were making good crops, but Mr. Ben figured that good crops could be made better, so he again asked his fields to show him, as they had shown him their needs with the sea island cotton.

He experimented with additional nitrate of soda, kainit, muriate of potash cottonseed meal, and other fertilizing materials. On some crops he found that a mixture of 100 pounds of nitrate of soda worked wonders, on another crop he used the soda and 100 pounds of muriate of potash and found that it was still better. The results from still another crop showed him that 100 pounds of muriate was just “what the doctor had ordered” and he didn’t need the additional soda. So, after several years of try-outs, he made up his mind that no matter what the vegetable crop he planted, he must be long on potash to get “Seabrook Quality” into the harvest baskets.

Today, he is known throughout South Carolina as one of the best tomato growers in the state. His crop gets annually from 1,500 to 2,000 pounds of 4-8-10 fertilizer per acre. His reputation on other crops is likewise an enviable one. Buyers in the big markets know what “Seabrook Quality” is and call for his shipments. His lima beans get a ration of 800 to 1,000 pounds of 3-8-8, his spinach is fed on 1,800 to 2,000 pounds of 8-7-8, and other minor crops are similarly fertilized. These analyses may seem strange to farmer folk in other sections of the country, but in coastal South Carolina many growers are thinking independently and are calling for the plant foods they feel that they need to make quality crops.

W. B. Seabrook, “Planter,” Gentleman of the old South, is still in the game. Instead of being just another truck farmer, his knowledge of plant-food requirements, of soils, and of fertilizer materials has elevated him to the rank of “Truck Planter” par excellence. His fields are always a joy to behold, in growing season or at harvest time, and we trust that some day you who read this will be fortunate enough to make the acquaintance of our good friend “Mr. Ben.”

Chrysanthemums Thrive in Sand Culture

(from page 8)

about a marked reduction in the number and size of bloom.

One of the most outstanding features of these experiments was the effect of the feeding on the color of the bloom. In one variety which should normally produce bloom ochrous orange in color, the feeding of excess nitrogen resulted in the production of bloom Empire yellow in color. The same result was produced by a reduction in the amount of potassium fed or by increasing the amount of phosphorus in the solution. Further increases of potassium intensified the ochrous orange, producing a more deeply pigmented bloom.

This same effect on color-intensity was noted with another variety normally producing pink blossoms. With high nitrogen feeding, blooms almost pure white in color were produced;
the same effect was produced with high phosphorus feeding. On the other hand, increasing the amount of potassium intensified the pink to a much deeper shade. In both varieties the production of a large number of blooms of good size and deep color was made possible by increased feeding of nitrogen accompanied by high feeding of potassium. It would appear that the development of a suitable intensity of bloom-color in chrysanthemums is dependent on an adequate supply of potassium, not only in total amount but in its relative concentration to nitrogen or phosphorus. The amount of nitrogen fed should not exceed twice that of potassium.

Fig. V shows a bed of chrysanthemums grown in river sand and fed nutrients in solution. Before transplanting into sand most of the soil is removed from the roots. Until the plants are about half-grown, nutrient solution is applied at the rate of $\frac{3}{4}$ of a pint per plant or approximately one gallon per square yard once a week. The application of solution is then increased to $1\frac{1}{2}$ pints of solution per plant or approximately two gallons of solution per square yard once a week.

In addition to the nutrients the plants are watered when necessary but do not require any appreciable increase in attention over soil-grown plants. In order that harmful accumulation of salts does not occur, the bed is thoroughly drenched with water at bi-weekly intervals. The frequency of solution applications may be regulated to some extent by weather conditions, being made less frequently during dull, cloudy weather.

The following amounts of salts are dissolved in 50 gallons of water:

- Magnesium sulphate 247.2 grams or approximately 8.7 oz.
- Potassium phosphate (monobasic) 134.5 grams or approximately 4.75 oz.
- Calcium chloride 275 grams or approximately 9.7 ozs.
- Potassium nitrate 300.6 grams or approximately 10.5 oz.
- Ammonium nitrate 675 grams or approximately 23.75 oz.

If a necessity for iron is indicated by the yellowing of the foliage, a few drops of a one per cent solution of ferric chloride applied when watering will supply ample. It will be noticed that this solution does not contain any
of the minor elements, such as boron or manganese. Apparently, enough of these elements for the healthy growth of the chrysanthemum occurs in the sand or as impurities in the salts employed. However, if successive crops are grown on the same sand, deficiencies of these elements might be a factor which would have to be considered. Plants grown by this method were strong and vigorous with excellent flower production, and they were likewise free from foliage mottling and burning.

From a practical or commercial standpoint it was considered that the use of nutrients in solid form might have more appeal. Fig. VI shows a bed of chrysanthemums grown in river sand and fed nutrients in solid form, using sand to spread the fertilizer evenly. Fertilizers applied in the solid form are less quickly available to the plant than when applied in solution, so that it is necessary to make an application of fertilizer some 10 days to two weeks before setting out the plants. During this period the sand is kept moist but not watered to such an extent that leaching of the salts would occur. Before transplanting into sand most of the soil is removed from the roots of the plants. In order that the fertilizer may be applied evenly, it is thoroughly mixed with a liberal quantity of sand. Applications of fertilizer are made every three weeks at the rate of one oz. per two square yards. Watering is given when necessary and is also supplemented by a thorough drenching or leaching before each application of fertilizer.

The following fertilizer formula was used to make up approximately 25 pounds of fertilizer:

- Ammonium nitrate 11 lb. 14 oz. or 19 lb. 13 oz. of ammonium sulphate.
- Magnesium sulphate 5 lb.
- Muriate of potash 4 lb. 14 oz.
- Superphosphate (16%) 3 lb. 3 oz.
- A few drops of a one per cent solution of ferric chloride used occasionally when watering will provide all the iron necessary.

Plants grown in this manner proved entirely satisfactory. They obtained excellent growth and vigor with no foliage disfigurement, and there was a large production of fine quality bloom.

![Fig. VI—Chrysanthemums grown in river sand and fed nutrients in solid form, using sand to spread the fertilizer evenly.](image-url)
Southern Peaches Need Potash

(From page 15)

pH values. The surface soil under the trees where most of the ammonium sulphate was applied and where the sulphur sprays eventually came in contact with the soil tested pH 4.70 to pH 5.30, while the subsoil ranged from pH 4.13 to pH 5.30. The soil reaction of the surface soil from the middle of the rows between the trees ranged from pH 5.70 to pH 6.10, and the subsoil from pH 5.00 to pH 5.30.

Since this orchard had been fertilized with practically nothing but nitrogen, carefully planned demonstrations were set up to demonstrate if possible the influence of nitrogen alone as compared with the combination of nitrogen plus phosphorus, potassium, and dolomitic limestone, and with the combination of nitrogen plus phosphorus, potassium, and basic slag. An area of approximately 2½ acres in the orchard was set aside for these demonstrations in early October 1934, before the leaves were shed.

These demonstration plots were in a section of the orchard where the abnormal condition, as indicated by the foliage, was severe, and the affected trees were fairly uniformly distributed over the three plots.

Detail information on the fertilizer treatments of the three demonstration plots is given in Table I. Plot 1 received nitrogen (total for the season) at the rate of 66.66 pounds per acre. (This is equivalent to 417 pounds of nitrate of soda or 324 pounds of sulphate of ammonia.)

Plot 2 received per acre rates of:
- Nitrogen (N), 42.67 pounds;
- phosphoric acid (P₂O₅), 126.36 pounds;
- potash (K₂O), 116.64 pounds; and,
- dolomitic limestone, 1,080 pounds.

Plot 3 received per acre rates of:

<table>
<thead>
<tr>
<th>Date of Application</th>
<th>Materials and analyses of each</th>
<th>Lbs. nutrients per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Materials and analyses of each</td>
<td>Pounds of materials per tree</td>
</tr>
<tr>
<td></td>
<td>of each</td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar. 14</td>
<td>Sulphate of ammonia 20.5%</td>
<td>25</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Sulphate of ammonia 20.5%</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Plot 2 (101 trees)—Nitrogen plus phosphorus, potassium, and dolomitic limestone:

<table>
<thead>
<tr>
<th>Date of Application</th>
<th>Materials and analyses of each</th>
<th>Lbs. nutrients per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1934</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct. 30</td>
<td>Dolomitic limestone</td>
<td>10</td>
</tr>
<tr>
<td>Oct. 30</td>
<td>Acid phosphate 16%</td>
<td>3</td>
</tr>
<tr>
<td>Oct. 30</td>
<td>Kainit 20%</td>
<td>2</td>
</tr>
<tr>
<td>1935</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan. 11</td>
<td>Kainit 20%</td>
<td>1</td>
</tr>
<tr>
<td>Jan. 11</td>
<td>Nitrate of soda 14.81%</td>
<td>1/2</td>
</tr>
<tr>
<td>Mar. 14</td>
<td>Nitrate of soda 14.81%</td>
<td>1</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Acid phosphate 16%</td>
<td>4</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Muriate of potash 45%</td>
<td>1</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Nitrate of soda 14.81%</td>
<td>1/2</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Sardine meal 9.88-5-0%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Plot 3 (91 trees)—Same as Plot 2, except 756 pounds of basic slag substituted for the dolomitic limestone.
Nitrogen (N), 42.67 pounds; phosphoric acid (P₂O₅), 126.36 pounds; potash (K₂O), 116.64 pounds; and basic slag, 756 pounds. (This is equivalent to: 267 pounds of nitrate

of soda or 208 pounds of sulphate of ammonia, 790 pounds of 16 per cent phosphate, and 233 pounds of muriate of potash.)

On October 30, 1934, all three of these demonstration plots were planted to rye for a cover crop, seeded at the rate of one bushel per acre. This rye was planted after the fertilizer materials in Plots 2 and 3, as shown in Table I, were applied broadcast and disked into the soil. Soon after the planting of the rye, rains aided in bringing the rye up to a good stand.

This cover crop grew very satisfactorily on Plots 2 and 3, whereas on Plot 1, where no phosphoric acid or potash was applied, the rye commenced dying soon after it came up.

The first results secured from these demonstrations were on the growth and yield of rye. There was no appreciable difference in growth in rye on Plots 2 and 3, which indicated that during the first season there was no significant difference between dolomitic limestone and basic slag insofar as these materials influenced the growth of the rye cover crop. Soon after the rye in Plot 1 came up, the effect of the lack of available phosphoric acid and potash was manifested. Most of the rye in this plot died and that which did not die made

very poor growth (see Fig. 7). The yield of green matter from this plot, as determined by sample areas of 100 square feet which were cut and weighed, was 653 pounds per acre on March 25.

On Plots 2 and 3, which had complete fertilizer and lime, an excellent rye cover crop growth was secured (see Fig. 6). The average yield on March 25 (the date of disking down the rye) was 8,076 pounds per acre.

Plots 2 and 3 produced during the growing season of 1935 normal, healthy, and rank foliage on the trees. In these plots not a single tree developed the typical characteristic abnormal foliage symptoms that were so generally displayed on the same trees the previous summer (1934). However, in Plot 1, which was fertilized with nitrogen only, as has been the orchard fertilizer practice for many years, the characteristic symptoms which have been described were reproduced in 1935 in a more acute form. Figure 1 shows representative peach leaves, illustrating small size, unhealthy color, and "scorching" of margin and tip of leaf with nitrogen
fertilization only; and large size and healthy color and no "scorching" with nitrogen plus phosphorus, potassium and dolomitic limestone fertilization. For an excellent illustration of a tree with dense and healthy foliage and no "scorching," see Figure 4. This tree was fertilized with nitrogen, phosphorus, potassium, and dolomitic limestone. Figure 5 shows a tree with an abnormal foliage condition in an advanced stage which illustrates scant, unhealthy foliage, with leaves yellow and badly scorched. This represents a typical tree in Plot 1, which was fertilized with nitrogen only, yet it was given 56 per cent more nitrogen than was the tree shown in Figure 4.

It will be noted by again observing Figures 4 and 5 that cowpeas failed to grow in Plot 1 fertilized with nitrogen only.

These demonstrations, therefore, even though conducted for only one year, do very clearly indicate that nitrogen only is an improper fertilization practice in the Tinsley peach orchard, and that significant responses were obtained from the addition of phosphorus, potassium, dolomitic limestone, and basic slag.

Peach growers appreciate the importance of securing an abundance of healthy leaves for the growth of ample new wood and the development of an abundance of strong fruit buds. Figures 8 and 9, well illustrate the effectiveness of phosphorus, potassium, and limestone in addition to nitrogen in the production of fruit buds, as compared with the nitrogen only fertilization in the Tinsley orchard.

As was to be expected, trees on Plots 2 and 3 produced very satisfactory new wood and fruit buds. Trees of Plot 1 fertilized with nitrogen only produced very inferior new growth and a relatively small number of fruit buds, and these buds apparently were not as large and plump as normal buds should be. The new wood growth on these trees (even though the trees received 56 per cent more nitrogen than did the trees of Plots 2 and 3) was scant and of relatively small diameter measurement.

The development of the fruit was probably the most striking phase of these fertilizer demonstrations. The impressions of hundreds of peach growers and others upon walking through these demonstrations at and just before harvesting of the fruit were that Plots 2 and 3 produced practically 100 per cent of fruit of desirable marketable sizes, as contrasted with almost 100 per cent of fruit of undesirable marketable sizes on Plot 1 fertilized with nitrogen only.

Estimates of the percentage of normal crop for each tree in all three plots were made before harvesting, and variations ran from less than 10 per cent of normal to about normal. These variations were due to the previous condition of the trees in 1934, with its influence upon subsequent development of buds and, finally, the setting of crop in 1935. On account of this variation in number of peaches,
or size of crop per tree, records were not taken in 1935 on the entire production of the trees in each plot. However, accurate records were taken from one representative tree each of Plot 1 and Plot 2 in order to secure some preliminary information on the sizes and yield of fruit. Table II presents the yield records from these trees.

**Table II.—Yield Record from Different Fertilizer Treatments**

<table>
<thead>
<tr>
<th>Size</th>
<th>Nitrogen (1 tree)</th>
<th>Nitrogen, phosphorus, potassium and dolomitic limestone (1 tree)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of peaches</td>
<td>Pounds of peaches</td>
</tr>
<tr>
<td>Under 1 1/4&quot;</td>
<td>255</td>
<td>28.0</td>
</tr>
<tr>
<td>1 1/4 to 2&quot;</td>
<td>277</td>
<td>46.0</td>
</tr>
<tr>
<td>2 to 2 1/4&quot;</td>
<td>97</td>
<td>20.0</td>
</tr>
<tr>
<td>2 1/4 to 2 1/2&quot;</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>2 1/2&quot; and up</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Totals</td>
<td>629</td>
<td>94.0</td>
</tr>
</tbody>
</table>

It may be seen in Table II that the trees in the two plots had practically the same number of peaches—629 in one case and 611 in the other. However, the tree treated with nitrogen only produced 94 pounds of peaches with only 20 pounds that were of 2-inch minimum size, while the tree from Plot 2 which had complete fertilizer and limestone produced 199 1/4 pounds of peaches with 197 1/2 pounds that were of 2-inch minimum size. In other words, the tree receiving the nutrients in addition to nitrogen produced almost 10 times as many peaches of desirable marketable sizes as did the tree treated with nitrogen only.

It is interesting to note that with the nitrogen only treatment 84.6 per cent of the peaches were under two inches in diameter (undesirable marketable sizes), while with nitrogen, phosphorus, potassium, and dolomitic limestone 98.2 per cent of the peaches were two inches or more in diameter, with 49.2 per cent even 2 1/2-inch minimum diameter. Figure 10 strikingly illustrates the greater yield and superior sizes of peaches obtained from the tree fertilized with nutrients in addition to nitrogen.

A comparison between the size and weight of peach and pit under different fertilizer treatments also was made. With nitrogen only the average weights were: Peaches, 2.39 ounces and pits, .25 ounce; while with complete fertilizer and limestone the average weights were: Peaches, 5.21 ounces and pits, .37 ounce. It is evident that there is a relationship between the size of pits and the size of peaches (small pits and small peaches, large pits and large peaches). This is significant when we realize that the pit in the Elberta peach is formed six to eight weeks before the peach is ripe.

Claims were made that the flavor of the peaches from the trees completely fertilized was much superior to the flavor of the peaches from the trees fertilized with nitrogen only. Professor J. H. Mitchell, chemist of the Experiment Station, kindly consented to run some fresh peach analyses. Table III gives the results of these chemical analyses.

These analyses show that the fruit from the completely fertilized trees contained 21.7 per cent more total sugars and 31.7 per cent more sucrose than did the fruit from the trees fertilized with nitrogen only. These samples of fruits were taken from peaches of the trees from which the yield records were secured, and these
**Table III.—Chemical Analysis of Fresh Peaches**

<table>
<thead>
<tr>
<th>Fertilizer treatments</th>
<th>Total sugars</th>
<th>Sucrose</th>
<th>Reducing sugars</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. only</td>
<td>5.30%</td>
<td>1.42%</td>
<td>3.80%</td>
</tr>
<tr>
<td>NPK &amp; limestone</td>
<td>6.45%</td>
<td>1.87%</td>
<td>4.43%</td>
</tr>
</tbody>
</table>

Peaches analyzed were not tree-ripened, but were picked in the "hard ripe" stage, the same as for commercial shipments. Had they been tree-ripened, the percentage of sugar probably would have been higher.

For the proper development of cover crops, and the foliage, twigs, fruit buds, and fruit of trees in the Tinsley orchard, it is clearly apparent that the practice of applying nitrogen alone as a fertilizer is improper. "Leaf scorch" is a deficiency of potash; and since "leaf scorch" has been commonly observed in South Carolina in many orchards, liberal applications of potash should be made regularly by all peach growers.

Until more complete information is available, the following recommendations are made to the peach growers of South Carolina:

Apply the proper amount of dolomitic limestone or basic slag to correct excess soil acidity and to supply calcium and magnesium as plant nutrients. For sandy soils, basic slag is especially desirable because of the minor plant nutrients which it contains in addition to calcium. For satisfactory growth of cover crops and peach trees it is necessary to correct excess soil acidity. Do not apply limestone or basic slag to soils already testing pH 6.0 or above as serious trouble is caused by excess liming.

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Fig. 10—Harvest of one day, July 29, 1935. Left: From one tree fertilized with nitrogen, phosphorus, potassium, and limestone—135 peaches, 42.75 lbs., 5.06 oz. av. wt. per peach, 98.52% of 2-in. minimum size. Right: From one tree fertilized with nitrogen only—86 peaches, 14 lbs., 2.6 oz. av. wt. per peach, 99.74% of 2-in. minimum size.
Plant in bearing and non-bearing orchards each fall a winter crop of rye or Austrian peas; and in non-bearing orchards a summer cover crop of velvet beans or pure brabham peas (or Crotolaria on sandy soils). No discussion will be given here of the many important functions of soil organic matter or humus, that good cover crops would supply orchard soils.

The following fertilizer treatments are recommended:

1. Fall application for bearing and non-bearing trees: 300 pounds of acid phosphate (16%) per acre; 100 pounds of muriate of potash (50%) per acre.

These amounts of materials should be mixed and applied broadcast (from tree to tree in all directions) and disked or plowed thoroughly into the soil during late September or early October before the planting of Austrian peas or rye cover crops. Note: On very poor soils (low in nitrogen) it probably would be desirable to also add about 50 pounds of nitrate of soda (or its equivalent) per acre to the fall mixture shown above.

2. Spring application for bearing trees: 100 pounds of muriate of potash (50%) per acre; 100 pounds of nitrate of soda (19%) per acre (or equivalent amount of nitrogen from other suitable sources).

These materials should be mixed and applied broadcast in late February or early March. If a heavy growth of Austrian peas be produced and disked into the soil, probably no additional nitrogen would be needed. But if rye cover crop be produced, or no cover crop at all, then additional nitrogen should be given as needed. In the past, bearing orchards with no cover crops probably were given on the average the equivalent of three pounds per tree, or 300 pounds per acre, of nitrate of soda.

3. Spring application for young non-bearing trees: The same fertilizers as suggested above for bearing trees are recommended, but the amount should be decreased in proportion to the age of the trees to avoid injury or even killing of trees. The spring applications for young trees should not be broadcast (from tree to tree in all directions) but should be scattered reasonably near the trees, within reach of the roots.

Gas Gadding

(From page 5)

In scanning the history of road-making in America, I detect two ironies worth passing on. First, the farmers once hated and feared the automobile and discredited better roads because of selfish motorists; and second, the steam railroads once boosted for improved highways in every state, and now they find keen competition using routes kept up at public expense. I quote our own state highway engineer of thirty years ago:

"There is a strong prejudice in many parts of the state against the building of good roads, because as soon as such roads are built automobiles drive the
farmers off and compel them to use the back roads. The auto is here to stay, and before long they will be adopted by farmers themselves just as the bicycle has been. But there are unfortunately too many road hogs who think it is a great joke to scare some staid farm horse into jumping the fence and smashing the farmer's rig. Something must be done by the state to protect the farmers so that roads will be safe to travel upon after they are built or we will not have any comprehensive program for highway improvement."

In a report of 1906, a statement appears that "railroads have been so much interested in building of roads that they have sent out experts and trains of machinery to build sample roads in districts along their lines. Good roads would mean an increase in railroad traffic of several hundred per cent." Now the railways get their best business when winter snows blockade the highways. Such is life, with or without virtue of constitutional privilege! In those days three decades ago, railroad magnates had to argue with farmers to get them het up for better roads and farmers wanted every motorist consigned to hell-and-gone. I guess they almost wrote party platforms on those issues, too; but wouldn't they look gosh-awful ornery today? What the people want predominates. You can't talk 'em out of real progress. Maybe some of these summer speeches of 1936 protesters will pan out that way.

The sum total of our local lanes under permanent improvement now constitutes our national trunk lines of super-luxury private travel. Over the painful miles that the old conestoga wagon creaked we now glide smoothly, and we kick if there is a dip that spills our ice-cream cones. But if the states had not grabbed fast hold of the road business we would still be making inches instead of miles, and an entirely revised system of cuss words would be necessary.

New Jersey and Vermont take rank as first states to set up highway departments, offering tentative and feeble aid, amid resentment, to county boards for better roadbeds. By 1900 Massachusetts, New York, Connecticut, and Maryland had come to the pioneer rescue of the traveler, who usually became mired within a mile after he left the wood-block pavements of the city. It was quite a novelty to put engineers to work on county road systems, using "bribery" from state taxes to pay a third of the cost. Most of the counties still stuck to rollicking labor by adjacent farmers in what was regarded as a "picnic mixer" when farm work was slack.
case of snooty interference with personal rights. Road-making cooperatively was probably the first instance where local pride and isolation gradually found it paid in the long run to surrender and become a real portion of an American state. From that starter it was easy to broaden out and get federal aid, but we need not introduce such a painful subject at such a critical juncture when people are making up their minds against November. State highway aid also marks the close of an epoch in our agricultural policies. Before that era farmers adhered to the philosophy of the hobo—that it always paid to "work it out" instead of paying cash for doing it right.

While the farmer road-botchers stuck to section lines or the easiest grades, the railways didn't. The consequence was a number of hairpin turns and dangerous junction points. An Iowa publisher familiar with locations south of Des Moines once showed me several re-located lines of rural highways of that nature where recent state-federal-local funds with competent engineering have taken the crazy, break-neck, hidden hazards out of country journeys. Now, if we could succeed by careful driving in reducing the smashes on straight-away avenues there wouldn't be so many widows and orphans in the wake of peaceful travel.

Before they hasten to economize on auto fuel made with corn alcohol let them find a speedy way to keep the alcohol away from the front seat occupants. This only shows that social control will be of more value to gas gadders than scientific progress. Savings in mileage and motor cost are not so vital as saving of human life.

When the followers of Kit Carson and of Ezra Meeker hit the lonesome, tribal-haunted fastness over unknown paths of peril, history records them as heroes. Yet today countless confident families start overland with demons more cruel and stealthy lurking on the concrete vistas ahead. Danger lies as much or more perhaps in luxury and ease of motion than it once did in trackless wastes and sheer privation. So far lax laws or illustrated horror stories have not reduced the casualties.

About the only handicap to the farmer in this motor age of ours lies in the fact that he cannot tote tons of oats to town for drayhorse consumption and haul back loads of manure from the livery stables. But this is a minor adjustment, after all, and one that is hardly missed by the rising generation on the farm, who prefer shorter hauls for such a pungent commodity.

Thanks to the motorized rural mail, the farmer gets his newspaper as quickly and as regularly as the businessman in town; and it takes him but half a jiffy to jump in his car thereafter and punish the local editor for fancied aspersions. Only he won't use the traditional horse whip any more. It's more apt to be a tire wrench!

The American farmer's only distinguishing mark from that of his city relative these days is in his coat of tan, and even that is being imitated by urban vacationists and in beauty shops. This amalgamation of rural, village, and metropolitan types into the average alert American, with nary a clue for the Hawkshaws, is as much due to gas gadding as to the improvement of educational facilities at school. And it's a college the whole family can attend together if the bus is big enough!

Perhaps when there is more than one car to every five persons as we now boastfully claim, as compared to one car for every thirty in England, we shall be ready to forget state pride and prejudice, and really become residents of the U. S. A.—that is, if we keep our tires repaired, our heads clear, and our brakes working!
MORE POTASH---BIGGER YIELD

Potash Company of America
Mercantile Trust Building
Baltimore, Maryland

Muriate of Potash 50% and 60% Grades -- Manure Salts
A FRIEND INDEED

"Sir, I wonder if you'd help a girl in trouble?"

"Sure, what sort of trouble do you want to get into?"

"I hear that Admiral Byrd took his dogs to the South Pole with him."

"Yes. I understand it was really the dogs that first discovered the pole."

REALISTIC

"Smell anything, grandmother?" asked the youngster who was lying on the floor drawing.

Grandmother assured him she did not.

The young artist gave a few finishing touches and repeated his question. Grandmother sniffed the air, and again declared she smelled nothing.

"Well," said the boy, "you ought to, I have just drawed a skunk!"

Dad's theory of relativity is . . . don't let 'em live with you.

Villager to Editor: "Do you think you boosted circulation by giving a year's subscription for the best peck of potatoes raised in the country?"

Editor: "Maybe not, but at least I got four barrels of samples."

An old lady, while on a vacation in the country, heard somebody say the mails were irregular. "Just like in my young days," she said. "You can't trust none of them."

ON ACCOUNT OF

"John, I bought some sheets, pillow cases and blankets today."

"What about it, dear?"

"Shall I put them down in my budget book as cover charge or overhead?"

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."

NEW ANGLE

A school teacher trying to impress her class with the destructive effect of alcohol, procured two earth-worms, one of which she dropped in a bottle of alcohol and the other into a bottle of water.

Next day the worm in alcohol was dead; the one in water, still alive.

"Now children," she said primly, "you see what happened here. What do you think alcohol does to a man?"

Silence and deep thought—maybe—by children. At last one youngster hazarded.

"Well, he wouldn't have worms, that's sure!"
LEADING citrus growers, constantly striving to improve fruit quality, have found that feeding trees regularly with NV Sulphate of Potash in balanced fertilizer produces fruit of better color, better shape, smoother finish, finer texture, a thinner, tougher rind and more juice of finer flavor and better food value.

The grower who builds better fruit not only reaps the rich reward of bigger yields and better profits, he also helps to build sturdy, healthy bodies for little children who are his big consumers.
Trona on Searles Lake, California

TRONA MURIATE of POTASH

"Potash is the quality element in the fertilizer mixture. It not only increases yields, but gives to fruits and vegetables the finish and keeping quality which bring best market prices. Potash improves the burning quality of tobacco, and the shape and cooking quality of potatoes. It promotes the growth of clover in pastures, and produces better stands of alfalfa."

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