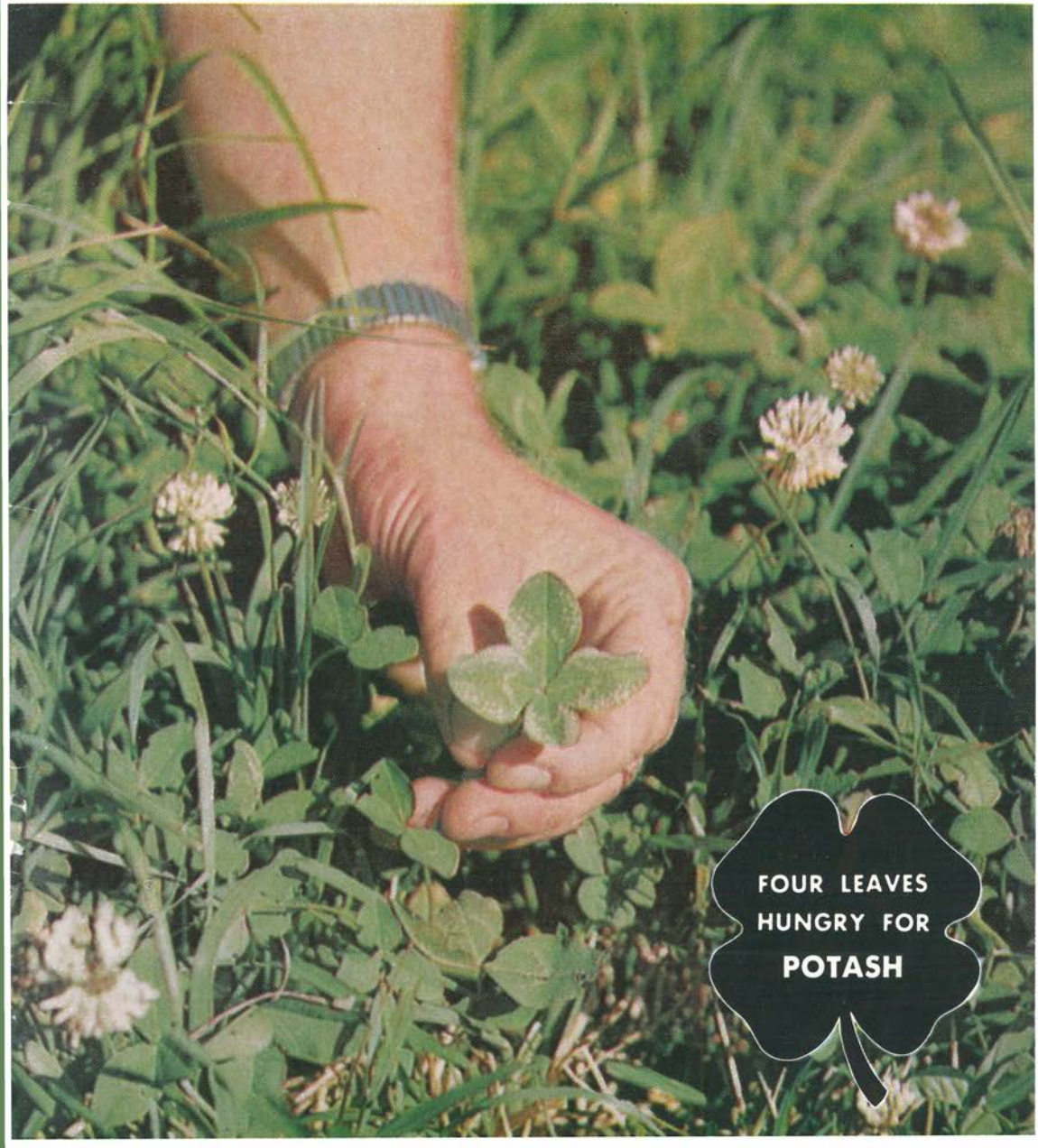
Better Crops

WITH PLANT FOOD

March-April, 1960

20 Cents



Better Crops
WITH PLANT FOOD

The Whole Truth—Not Selected Truth
$1.00 for 6 Issues, 20¢ Per Copy

Vol. XLIV Washington, D. C. No 2

Santford Martin, Editor
Selma Bushman, Assistant Editor
Barbara Ott, Circulation

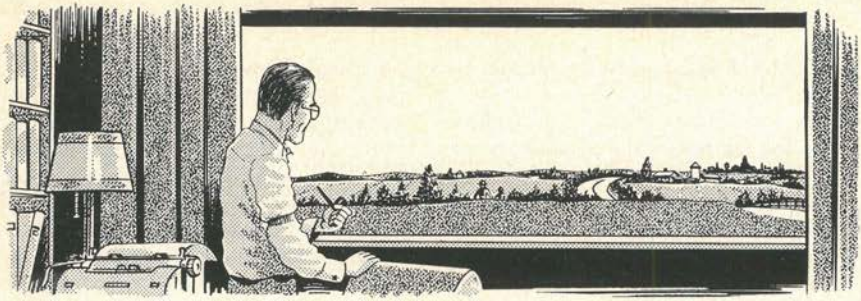
Published bimonthly by

The American Potash Institute Inc.
1102 16th Street, N.W.
Washington 6, D. C.

CONTENTS

ON THE COVER

. . . we see a four leaf clover suffering from potash hunger. The signs are clear. Spots appearing similarly placed, yellowish-brown in color, starting around the border and working toward the center. The surprising thing is that this area had already received about 300 lbs. of 60% muriate of potash annually to replace the potassium removed by the grass-legume crop on the farm of J. M. Appleton of Wallaceburg, Ontario. The field was under fertilization tests (in 1958 when this picture was taken) by the Greenmelk Corporation as part of its grass dehydration program. This field had been cut four times annually, removing the young high protein grass material. The specialists estimated that about 8,000 lbs. dry material was removed annually and analyzed about 2% to 2.5% K_2O. Deficiency showing up after the 300 lbs. application could probably be due to (1) competition from grass crops, (2) soil fixation locking up the potassium, or (3) some drainage losses since the field was under irrigation. (Picture provided by Dr. R. P. Pennington.)



It's kind of nice to be a

FAMILY MAN EMERITUS

Jeff McDermid
(ELWOOD R. McINTYRE)

DURING the first few moons of a year now well under way, memories of an erstwhile "family man" assume particular significance. This is especially true when you are a grandpa without a grandma's sustaining courage, resourcefulness, and ability to cheer and guide you on.

As a family man emeritus, you no longer actually preside over the doings of a brood of your own acquiring. Your normal household duties are over in most respects, and to keep out of the way and accept your change of status with as much grace and good humor as possible is the thing expected of you.

The basic duties of choosing the Thanksgiving turkey and selecting the most symmetrical Christmas tree may or may not be left with you. Yet even if you do assume those notable holiday honors, there will always be a sort of feeble, second-hand enthusiasm attached to a process that was once the happiest, most thrilling and gratifying action of each recurring year. Perhaps that's because the greatest glory of life's pageant usually comes to us but once.

Now in that respect I discover that other fellows of my vintage who are still favored with an attached grandma seem to escape to dullness and indifference often associated with second-hand family administration. Your professional grandmother, by some strange instincts of her post-graduate maternity, has again blossomed forth with all her same old admirable talents and devices—the ones she used of yore battling against hunger, illness and sorrow, or ordinary juvenile fears and misbehavior. To that extent grandma was taken bodily and spiritually into the new family circle. Grandpa sort of shuffled his way in behind her.

But we must acknowledge that there are many exceptions to that rule among our own generation of grandpas. Take the grandpa who led 4-H clubs or boy scouts, or taught grade school somewhere years ago, or is an expert contriver of gadgets for an idle day's amusement or instruction.

Thus equipped and eager to please, such grandfathers have held their places unruffled at the childrens' hour. It is quite evident that what we need for society is a special training center to teach self-centered elders to be more than baby-sitters watching eagerly for the kiddy bedtime period.

This is a good time to trace some of the attributes and surroundings of

the "pater familias" we remember so well.

We remember that old walnut frame for the embroidered wall motto: "God Bless Our Home." It hung over the dining room mantel. Doubtless if any are left they repose in the attic dust. In place of it we often see the engraved professional diploma or a framed membership in the Rotary Club. Mother and the girls have their sorority or 4-H club certificates displayed and Jimmy's athletic prowess is likewise visibly proclaimed.

The Family Man of my boyhood was proud of having a farmer strain in his background and upbringing. So he erected a square frame barn with ornamental eaves and cornices. He placed it about 70 feet behind the house, with hollyhocks and sunflowers around it. Near the street was the usual horse block and "iron boy" hitching post.

In that backyard, the Head of the House took refuge when afflicted with some grouch or household bother. In the shed there were rows of pegs to hang harness and bins of mixed feeds. You could oil and soap the tugs while talking with a neighbor about Bryan, the Populists, or the funny march of Coxey's Army.

The barber shop and the corner saloon were the middle class clubs and places of refuge for family men in search for camaraderie. Literature littering those tonsorial parlors catered to the prize ring, the turf and, the silken thigh. Warm stories told by waiting house-fathers are dim beside the juicy tidbits now gathered by the gals at bridge clubs. Like that dear old pink *Gazette* itself, our era has changed from 40 rounds of John L. to a parlor murder and mayhem session on television.

As spring approached, the family man of old laid out his garden. He seized upon the vernal period to initiate the boys to the duties of soil and sod. His argument was that America sprang from the grass roots and none of us kids could hope to attain perfect manhood without experience of this kind just like his own. If any of us boys preferred the fishing hole, he gave us the well scoured hoe and told us to hunt for worms while cultivating the corn and beans.

Today for the most part mother buys her greens at the grocery and the boys get their workouts at the Y. M. C. A. Besides, distant places beckon in idle hours and why add to the government-stored food surplus anyhow?

In this way, we note the passing of the family leadership which sprang directly from the emigrant campfires, the log cabin in the clearing, and the rude stockade.

We old-timers know that being the family chief these days is no soft job. As America has come of age, the orbit of the family man has moved in wider circles. Unless he has a wealth of experience and understanding to lean upon, his place as counselor and guide is much impaired.

Yet he has within him as true an instinct of pride and as heroic a desire to protect and help as did those back in the age that is gone and never can be ours again. Greater perplexities and outside ruthless forces are his to meet and conquer, if he can.

So, if the present era's family man seems to have lost some of the former dignity and courtly stuffiness—if he seems to be more tolerant and less dogmatic and dictatorial—if he strives to keep abreast of all the costs and responsibilities—then grandpa must be satisfied. He well knows that he couldn't do any better if fate should make him take over the job.

FOR USEFUL MATERIALS

Check convenient coupons on back covers. Easy to order. Ready to use.

DOES grassland farming pay? The farmer, the the banker, the fertilizer representative, and agricultural leaders of three Pacific Northwest communities teamed up to prove that it does. They should know. They used a working forage farm in each state (of Idaho, Oregon, and Washington) to demonstrate how the net income of a farm—and even a community—can be increased by applying proper fertilizer-management practices.

An Over-all Committee of more than 30 Agricultural-Business leaders co-sponsored each project with the Pacific Northwest Plant Food Association. A Technical Committee of specialists—from Idaho State, Oregon State, and Washington State, from government agencies and industry headed by the local county agent—made all recommendations on the three working farms. More than 5,000 visitors have viewed the results. We believe the results are impressive. We submit them here for anyone who wants to know if grassland farming pays.

Grant H. Braun, Chairman
Soil Improvement Committee
Pacific Northwest Plant Food Assn.

DOES FORAGE FERTILIZER MANAGEMENT PAY?

THE NEXT 6 PAGES TELL YOU

"Does fertilizer pay? We wouldn't be on the farm today if it didn't." —*Brad Benedict*

FORAGE FERTILIZER-MANAGEMENT

By LeVern Friemann **County Agent**

A farm with a poor production history *can be* converted into a profitable opportunity—when the farmer follows sound fertilizer-management practices, recommended by official agriculture.

The Brad Benedict farm, near Lynden, Washington, is a striking example. After Brad's farm was adopted for the State of Washington Demonstration Project, amazing things started happening:

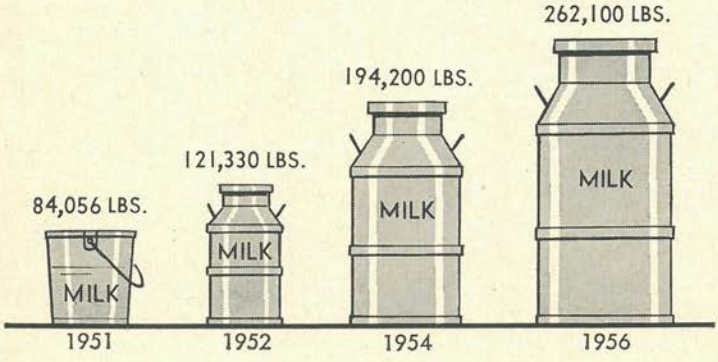
1 His pasture cow days increased six-fold in 4 years—from 1,343 cow days in 1951 to 8,648 cow days in 1955.

2 His total milk in the bucket rose 178,049 lbs. in 5 years—from 84,056 lbs. total milk production in 1951 to 262,100 lbs. in 1956.

3 The butter fat per cow increased 30%.

4 And Brad's roughage bill *decreased* $50.39 per animal.

How improved management—including fertilizer and irrigation—increased the Benedict's milk production.



On 3 Farms In . . . Washington Oregon Idaho

PAYS

Barbara and Brad Benedict who increased all areas of production — milk, hay, pasture cow days, butter fat— when they adopted the improved fertilizer - management practices.

The Benedicts had to make a pit silo to take care of the extra feed.

Whatcom County

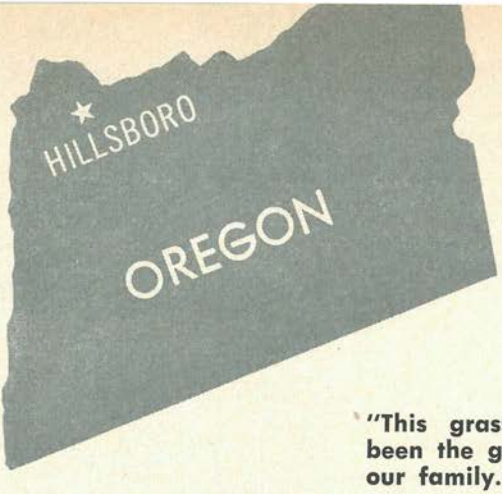
WHAT CAUSED THIS? His fertilizer program was a major factor. At first, the general recommended program for Western Washington: 30 lbs. nitrogen, 60 lbs. phosphate, 60 lbs. potash per acre, supplemented by 30 lbs. nitrogen in summer. But when Washington State College inaugurated the soil testing program, tests showed Brad needed more phosphate and potash. His fertilizer program was stepped up. It benefitted him greatly, he says.

A SURPRISING OLD FIELD. While establishing new pasture seedings on uplands, Brad fertilized 14 acres of old sod on an acid peat soil to produce badly needed forage. The results were amazing. He applied the general 30-60-60, supplemented later by 30 lbs. nitrogen. The old sod ate it up. Five years later this temporary pasture was still producing excellent yields, with the fertilizer program by then including extra potash to keep the clover in the stand.

IRRIGATION HELPS BRAD. Precipitation in the area averages about 34" a year, but only about 1" rainfall in July and August. Natural soil moisture is not there to produce lush crops on these sandy upland soils in peak production months. So he irrigates one acre at a setting, about 8 hours a set, 3 sets a day —less water at a time and more often on *porous sandy upland soils,* plenty of water at one time and less often on the *peat soils.*

FOR OREGON FARM TURN ▶

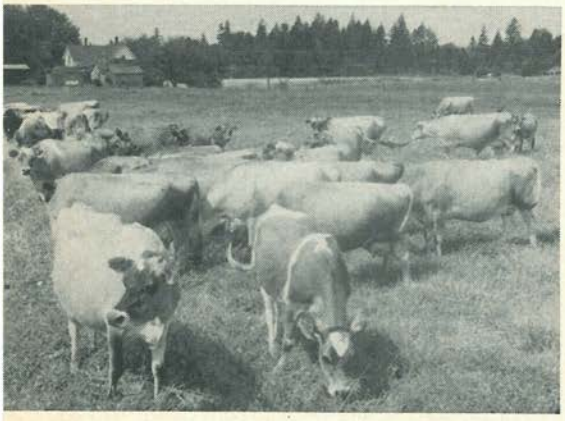
Hundreds came to see for themselves—fields like this which increased many tons yield *after* improved management.



By Palmer Torvend
County Agent
Washington County

"This grassland demonstration program has been the greatest thing that has happened to our family." —*Lennox Blatchford*

Lennox Blatchford here applies fertilizer through sprinkler system. Irrigation has been big help in his production.



By improved practices, Blatchford reduced his herd size while increasing his milk production.

Like most dairymen in Oregon, the Lennox Blatchfords badly needed to increase their *net* return per acre.

Their 60-acre farm differed in one way from the other farms selected for the improved fertilizer-management demonstration: Blatchford was already spending a reasonable amount for fertilizer. *But he wasn't getting the results he should.* Although he invested only $300 more in fertilizer, his net return started rising with the improved fertilizer-management program. Why?

SOIL TEST. He began basing his total fertilizer and lime investments on *soil test results*—not on what the neighbors used. Lennox Blatchford proved to himself—and his community—that it is just as important to know *what* kind of fertilizer to use as it is to know *how much* to use. He had every field soil tested.

NEW FERTILIZER PROGRAM. The soil tests showed that Blatchford needed to change from a one element approach to a balanced program. Two examples point this out:

1 One field—in spring grain so long it was producing only 8 bushels per acre by 1955—was seeded to a grain-legume mixture at the start of the project. Soil tests showed it needed

nitrogen and phosphate, a double shot of potash, plus a ton and half of lime. Today, after 3-year top production, this once worn-out field produces excellent pasture as the result of improved practices each year. This year (1960) another soil test will be made.

2 Another field—an old grass-clover stand that would have been reseeded if forage hadn't been so badly needed—responded so well to the new fertilizer program that it continues to produce good quality feed. Now over 8 years old, the pasture still has a good clover stand. How? By yearly applications of nitrogen, potash, sulfur, and boron. Lime was applied topdress in fall, 1955.

IRRIGATION. Soil moisture measuring equipment installed in all fields helped improve irrigation practices. By 1958, Blatchford had to apply 15" water in 5 irrigations due to very hot summer. Irrigation played a big role in boosting net profits.

SOME OTHER RESULTS.

1. Grain yield increased 330%.
2. Silage production increased 200% on less land because some acres were reseeded to new pasture each year.

By 1957, a silo had been built—with mechanical feed manger—to handle hay.

In *dollars and cents* what happens when you improve your fertilizer-management practices? The Blatchfords of Hillsboro, Oregon, can tell you.

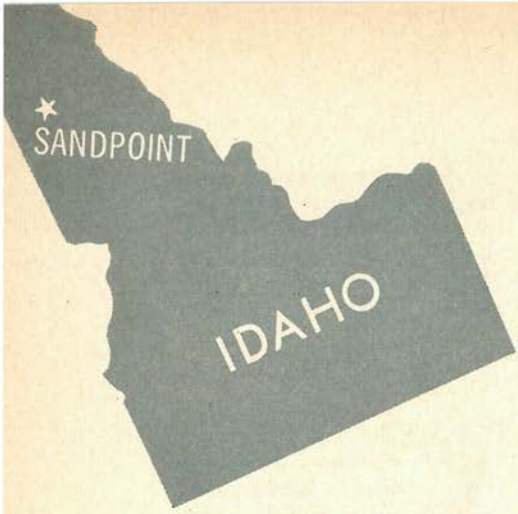
Their pasture production increased from 2,928 cow days to 5,226 cow days.

Within 3 years, they were producing *over $1,000 worth more milk* per year, with a smaller herd.

For each additional dollar they invested in fertilizer their return was $2.57.

FOR IDAHO FARM TURN ▶

They no longer have to buy expensive hay off their farm. They produce enough forage to make their own hay.



By Walt McPherson
County Agent
Bonner County

"The farm was in a very sorry situation before we started on the fertilizer-management program." ***—Blaine Marks***

The Blaine Marks farm, a 70-acre dairy operation at Sandpoint, Idaho, was chosen for the Idaho Demonstration Project because it had a low production history.

BEFORE. Marks was producing 10 to 20 bushels wheat per acre and on one field *only 8 bushels per acre.* A field in clover and grass was averaging about one-half ton per acre.

THE CHANGE. In 1954, soil tests were made, fertilizer applied according to the tests. Good management practices were adopted—rotation grazing, proper irrigation, recommended plant species, good herd management with culling of cows. The fertilizer program from field to field depended on crop and soil test results. For example, a grass-clover pasture received a complete fer-

Outstanding result of improved fertilizer-management: carrying capacity of pastures increased some 400%.

tilizer of nitrogen, phosphate, and potash. Another pasture received complete fertilizer *plus* boron and sulfur. A field of oats and clover received only nitrogen and phosphate.

AFTER. Soon after $1,037 worth of fertilizer and lime had been used in the first year of the 3-year project, results started showing up. For example:

1 Hay production nearly doubled the first year.

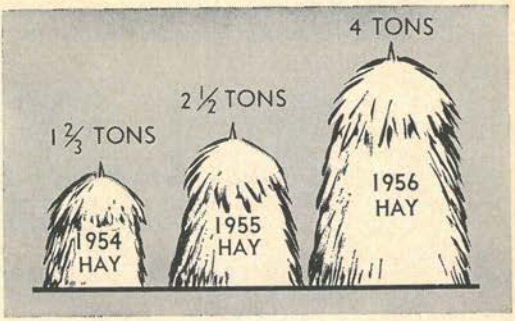
2 Carrying capacity of pastures increased 250% the first year—from 0.56 to 2 head per acre—and to 3 cows per acre by 1956.

3 For each dollar invested in fertilizer, Marks was realizing $2.30 by second year.

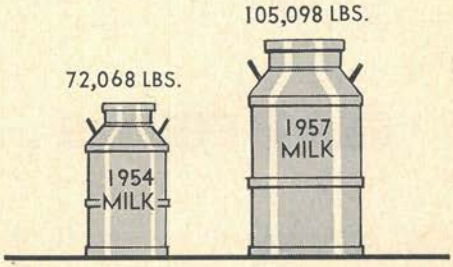
4 Pasture growth was so rapid that 12 acres had to be cut for hay by the third year.

5 And hay quality improved each year.

THE END



After 1955, Farmer Marks did not have to purchase hay off the farm.



By 1957, Farmer Marks was producing 25% more milk.

Farmer Blaine Marks spreads fertilizer—30-40-60—on his pastures.

FLAT FIELDS . . . MUST BE DRAINED

By T. S. Buie

WHEN 50 inches of water falls every year on flat fields only a few feet above sea level, it must have somewhere to go.

The first settlers along the South Atlantic Coast found they had to drain the land if they expected to raise crops. They dug ditches to remove surplus water and took other precautions against water damage even as they planted their newly cleared fields.

Rice was one of the first commercial crops produced in this section. And the early rice planters of the Carolina and Georgia tidewater section developed a comprehensive system of drainage and water management. Trained engineers were brought from Europe to design and construct intricate systems of dikes, one-way water gates, trunks and laterals so salt water could be excluded and fresh water brought in or removed from each field as the rice plants required.

The elevation of fields above tidewater was still low enough to need supplemental drainage. Still further inland the most productive fields were found along the flood plains of the rivers. Even here banks had to be built along the streams to hold back the flood waters or "freshets" that came when heavy rains fell on the hills to the west.

Many of the fields at some distance from the larger streams were flat with numerous sinks and low places that needed drainage.

On the large plantations gangs of slaves dug the canals and built the dikes. But the small operator had no such labor supply. And his land needed drainage just as badly, for his fields were covered with a sheet of water every time it rained hard.

It can discourage a farmer to prepare land, apply fertilizer, and be ready to plant his crop when untimely rains flood his fields. An adequate drainage system would prevent the scene above.

Motors for muscles. Modern equipment has eliminated ditch digging by hand. Local contractors in nearly every community have the latest equipment to drain low-lying fields quickly and at reasonable cost.

Columbia, S. C.

Planter and small operator faced the same problem when the slaves were freed. No longer was it possible to maintain intricate farm drainage systems even on most of the larger plantations. It cost too much to hire men to dig deep ditches and build dikes or even to keep in repair those already constructed.

Such works of improvement declined. Along the coast from Delaware south, abandoned century-old hand-dug ditches can still be found. Much of the land they originally drained has remained unused for decades.

Only recently with the substitution of motors for muscle has rehabilitation of many such areas become possible. Land owners had to await the development of earth-moving equipment designed to operate at low cost before these areas could be put to proper use again.

Technical drainage standards had to be developed, also. In former years drainage was more of an art than a science. I recall one farmer-neighbor in my childhood who drained a field by starting his ditch at the upper side and letting the water flow as he dug. Thus he determined the fall of the ditch by the amount of water in it. It was bad to have to stand in the mud all day but at least he was able to establish the proper grade as he went along.

Developments in recent years have stimulated drainage activities in the Southeast.

One of the most important developments is the advance in soils and engineering research. We now know better what is needed, how close together and how deep ditches should be for proper water management in soils of different characteristics.

. . . OR YOU GET THIS . . . AND THIS

Here farmer June Scott of the Dillon, S. C., Soil Conservation District lost about a tenth-acre of fine tobacco due to low spots with inadequate drainage. Before he drills fertilizer for another crop, he will run a line of tile from the low place to a nearby ditch.

Low, flat areas like this must be drained before it is profitable to spend money on seed and fertilizer to develop permanent pasture. A few well-placed ditches will remove excess water after each rain so the land can be used for profitable production.

Modern drainage systems frequently include adequate water *control* as well as water removal. This is important, for a field which has too much water at one time of the year may need an additional supply only a few months later.

One key to the whole drainage problem in this area is heavy equipment available to meet modern needs. Land owners of virtually every community have access to contractors equipped with the latest types of earth-moving machinery. Therefore, a farmer may have a drag line or trench-digging machine operating on his farm for as short or long a time as he needs it. No longer does the owner of wet land have to depend on human labor to do his ditch digging. He can hire it done at reasonable cost.

Soil conservation districts help farmers work together in solving their drainage and other community problems. Technical assistance in this and other soil and water conservation practices is available from the Soil Conservation Service.

Cost-sharing assistance to help defray the out-of-pocket cost in installing a drainage system on a single farm or in a community is provided through the Agricultural Conservation Program.

And conservation loans can be secured through the Farmers' Home Administration.

Neighbors are learning to work together in solving their wet land problems. This is necessary because few drainage jobs are confined to a single farm. Frequently the main canal must cross a half dozen farms before reaching a natural outlet.

The streams of the lower Atlantic Coastal Plain are usually sluggish and flow at a level only slightly below that of the land they drain. It is necessary to establish adequate outlets where none exist. Often it is beyond the ability of individual farmers or even small groups to provide these outlets.

The usual procedure where farmers are interested in a community drainage problem is for a few of them to "talk it up" with their neighbors. When most of the land owners concerned favor such a project, the leaders go to the local Soil Conservation District and their A. S. C. Committee for help.

If the project appears practical, the cooperating farmers agree to pool their ACP payments to aid in meeting the charges of the earth-moving contractor who is engaged by bid to do the work. Soil Conservation Service technicians assigned to cooperate with the district design the system, lay it out in the field, and generally direct and supervise the work as it progresses.

This is what the owners of 94 farms in the Tupelo Bay area of Florence and Williamsburg Counties, S.C., recently did. A major outlet 7½ miles long was cut with drag lines. Laterals were dug to drain into this main canal, and every month additional farmers dig their own farm ditches to benefit individual fields.

This successful project has created much interest in nearby communities. Dewey Cox, chairman of the Board of Supervisors of the Williamsburg District, said, "Interest is spreading from Tupelo Bay like wildfire. It is just like wind-blown sparks—a new fire is set wherever a spark falls."

He went on to name six or more smaller groups which have conducted similar projects after seeing what their neighbors did in Tupelo Bay.

Open ditches and tile are both popular. Each has its place in modern agriculture. Tile drains have certain advantages over open ditches. No land is wasted nor is maintenance required when tile is properly laid. Heavy field equipment can be used more efficiently, too, since no ditches cut each field into segments.

But open ditches still have their place. For one thing, they cost less. Modern machinery makes it possible to dig ditches faster and easier than ever before.

In the past few years soil conservation district cooperators have dug approximately 8,000 miles of ditches with drag lines, mechanical trenches, and by hand. This total job moved an estimated 34,000,000 cubic yards of earth in order to drain about 750,000 acres.

At the same time farmers cooperating with their local soil conservation districts laid some 600 miles of tile. This drained many more acres.

But little land is being brought into cultivation in this section by drainage. Only isolated areas or edges of fields are being cleared as a consequence of drainage operations.

Proper drainage of crop land is essential *but pastures respond to drainage, too.*

An area subject to periodic flooding several times a year cannot be seeded and fertilized in confidence. But if water remains on such areas no more than a day or so, even in a period of continued rains, it does pay to prepare, seed, and fertilize pastures.

And farmers are doing just that, if the thousands of sleek, well-fed cattle seen on lowland pastures are any barometer.

Interest is developing in the partial drainage of woodland, especially by owners of large tracts. In many wooded areas the water table is too high for pines to do well. In such an environment nothing but unprofitable hardwoods survive. However, if surplus surface water is removed, the better species of pine often become established in a few years by natural seeding from nearby seed trees on slightly higher elevations. Or, after partial drainage, the area may be set to pines.

Just what does this mean?

In the first place, it means that those who depend on harvests from the flat fields and lowland pastures throughout the South do not face the constant danger of reduced yields because of flood damage.

Adequate drainage systems mean that farmers can prepare their land, apply their fertilizer, and plant their seed in confidence. They can operate on a higher level of efficiency when flooding danger is eliminated.

Farmers whose fields are adequately drained can afford to plant higher quality seed, apply more fertilizer of higher analyses, and use better methods of disease and insect control than where there is constant danger of losing 50 percent or more of each crop from unpredictable rains. This is vitally important to the modern farmer whose operations must be maintained at a high level if he is to survive in a highly competitive age.

THE END

"What is all that racket about out there in your barn?" asked a neighbor.

"Ma's trying to set a hen," replied a small boy who was swinging on the gate, "and you know pa's county agent and he's trying to tell her how."

Mr Billerton, the butcher, was a jovial soul. As he was cutting up an order of lamb chops for a lady customer, she asked curiously: "Mr. Billerton, what led you to choose your present occupation?"

"Well, really, I don't know, ma'am," explained Mr. Billerton. "Maybe it was because I have always been fond of animals."

"I don't suppose you keep anything so civilized as dog biscuits in this one-horse, rundown, jay town, do you?" the tourist snarled.

"Oh, yes, stranger," the village merchant responded pleasantly. "Quite a few folks like you come through from the city, and we aim to have everything called for. Have 'em in a bag or eat 'em here?"

A farmer was gazing rapturously at a huge oil painting of a shapely girl dressed only in a few strategically arranged leaves, which was hanging in the museum. The title of the picture was "Spring." Suddenly, from behind him, the voice of his wife snapped, "Well, what are you waiting for—Autumn?"

CORN FROM BAG TO BIN

An effort to "totalize" a program

GROWING corn successfully—and profitably—is not just a matter of proper cultivation or adequate fertilization. Along the road from seed bag to full bin many things happen —many things involving the know-how of many *different* specialists.

A qualified soils specialist is hardly going to tell the farmer how to combat certain insects on his crop. That's a job for the entomologist. Nor is the entomologist going to presume to tell the farmer how to operate his corn harvester for best results. That's a job for the agricultural engineer. But together the agronomist, the ag engineer, and the soils man might help the farmer in establishing proper populations and applying starter fertilizer most effectively.

On some occasions—if we look at the past objectively—close teamwork between certain specialist-groups serving the farmer has been hard to come by. As a result, the farmer has often received fine "fragment programs" but not always a "total program" on some crops and problems.

At this year's Wisconsin Farm and Home Week there was an exhibit which illustrates what Wisconsin's agricultural specialists are doing to "totalize" their advice to the corn farmer. It is called "Corn from Bag to Bin." It represents illustrations prepared by the Departments of Soils, Agronomy, Entomology, and Agricultural Engineering in cooperation with the Exhibits Committee of the College of Agriculture of the University of Wisconsin.

From these departments, specialists have gone out as a team —agronomists, soils men, entomologists, agricultural engineers —to advise the corn farmer in brief, rapid-moving, one-day sessions that run from 10 AM to 3:30 PM. We believe their program (outlined below) and their exhibit (pictured on the next 8 pages) are worth careful consideration by *Better Crops* readers in other areas who might want to "totalize" some of their programs for the benefit of their farmers.

—the editor

TIME SCHEDULE—CORN FROM BAG TO BIN
10:00 AM—3:30 PM 1959

FALL

Setting Yield Goals	Soils	10 min.
Taking Soil Samples	"	" "
Broadcasting Lime and Fertilizer	"	" "
Controlling Quackgrass	Agron.	" "

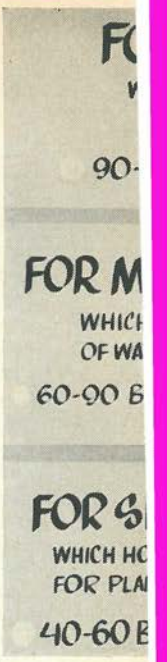
WINTER

General statement on importance of early planning for a successful year	Berge, Fisher	3 min.

CONTINUED ON PAGE 25

STEP 1
Set Yield Goals

STEP 2
Have Soil Tested



Illustrations ad
Entomology, and
culture, University

...R DEEP SOILS

...HICH HOLD LOTS OF WATER FOR PLANTS

...120 BUSHELS PER ACRE

...ODERATELY DEEP SOILS

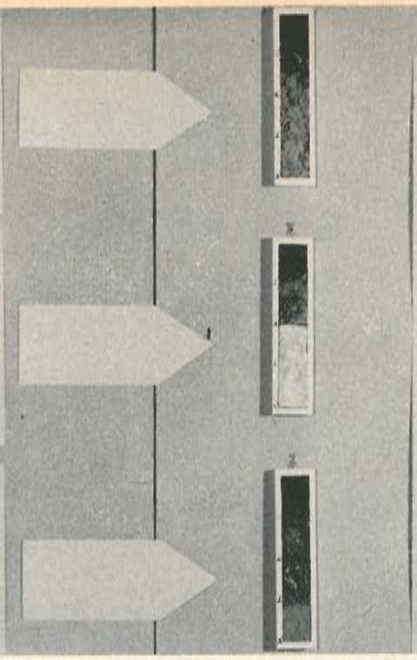
...HOLD MODERATE AMOUNTS ...TER FOR PLANTS

...USHELS PER ACRE

...HALLOW or SANDY SOILS

...LD LITTLE WATER ...NTS

...USHELS PER ACRE



FOR HELP IN SETTING YIELD GOALS FOR YOUR SOILS REFER TO :

- THE SOILS MAP IN YOUR FARM CONSERVATION PLAN
- THE SOIL SURVEY MAP AND REPORT FOR YOUR COUNTY

YOUR COUNTY AGENT AND SCS CONSERVATIONIST CAN HELP YOU GET AND USE THESE MATERIALS

...apted from pictures taken of exhibits prepared by the Departments of Soils, Agronomy, Agricultural Engineering in cooperation with the Exhibits Committee of the College of Agri- of Wisconsin.

...CLEAN TOOLS

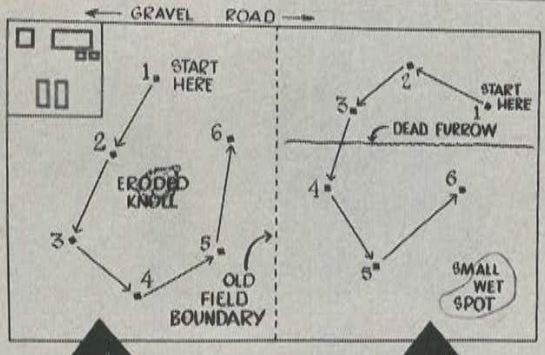
SPADE

...E SOIL IN ...RE-PROOF CONTAINER

BAG

TAKE SAMPLES CAREFULLY

METHOD OF SAMPLING TYPICAL FARM FIELD

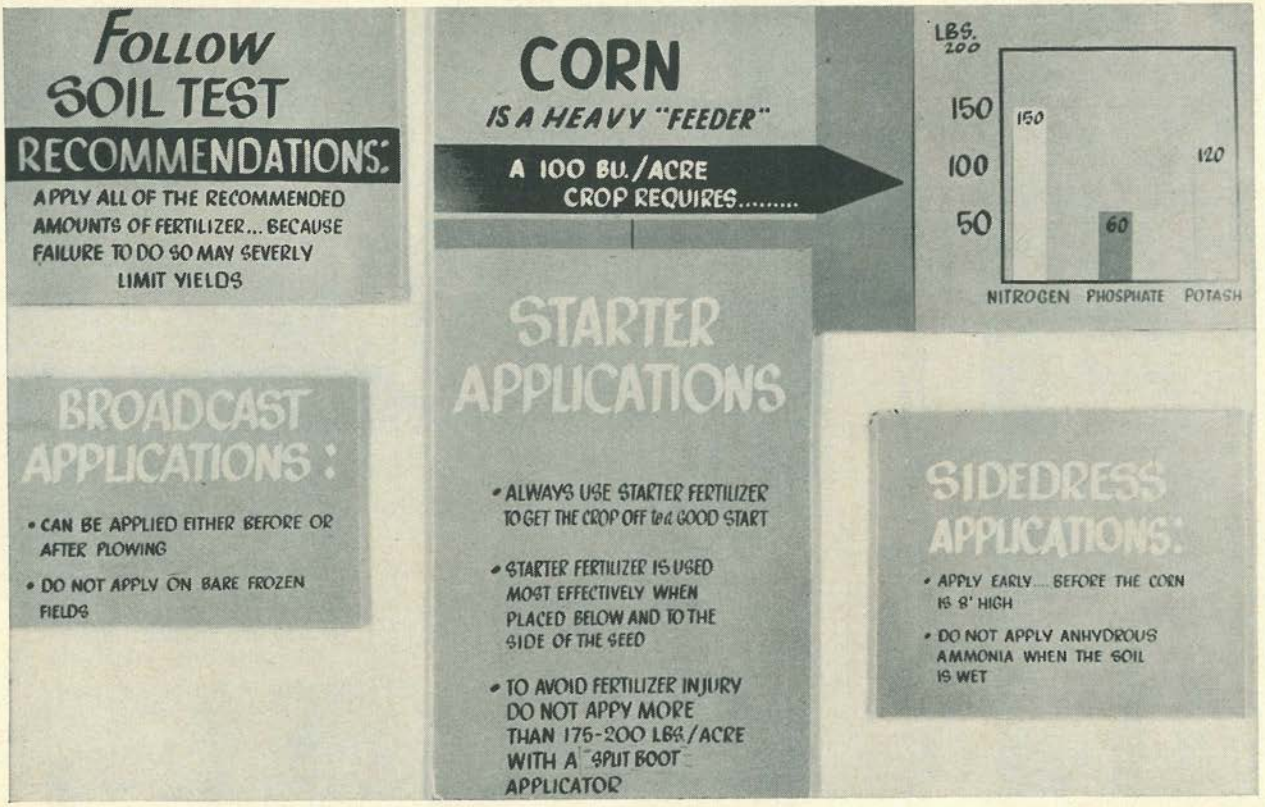


TAKE SAMPLES FROM 6 PLACES IN THIS PART OF FIELD; MIX TOGETHER IN ONE BAG OR BOX FOR TESTING. **DO NOT** Sample Near:

- BUILDINGS
- GRAVEL ROADS
- EDGES OF FIELDS

TAKE SAMPLES FROM 6 PLACES IN THIS PART OF FIELD; MIX TOGETHER IN ONE BAG OR BOX FOR TESTING. **AVOID** Sampling:

- SMALL WET SPOTS
- DEAD FURROWS
- ERODED KNOLLS
- IN FERTILIZER BANDS

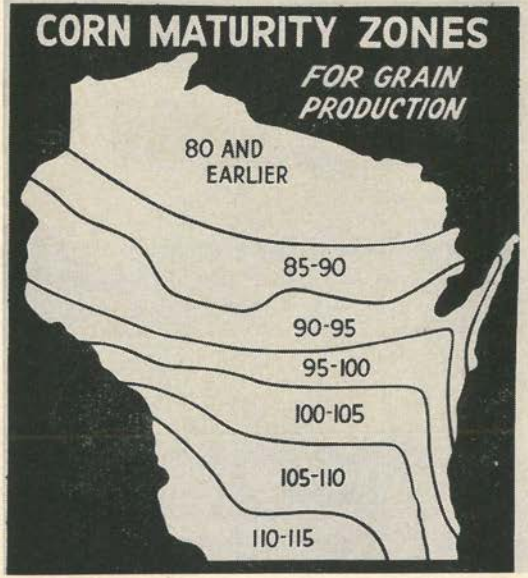


STEP 3

Apply Fertilizer

The right kind
The right amount
The right time
The right place

DOES IT PAY to GAMBLE with LATE CORN



10-YEAR Average YIELDS AT:

	RELATIVE MATURITY.....	BUSHELS PER ACRE....
MADISON PLOTS	100	110
	105	113
	110	115
	115 (100 LATE)	110
RANDOLPH PLOTS	95	96
	100	97
	105	97
	110 (100 LATE)	85
THIENSVILLE PLOTS	90	83
	95	84
	100	84
	105 (100 LATE)	68

LATE MATURITIES
GIVE
LOWER AVERAGES YIELDS

STEP 4

Select Maturity Carefully

PREPARE THE SEEDBED WITH AS LITTLE TILLAGE AS POSSIBLE

...WHEEL TRACK PLANTING

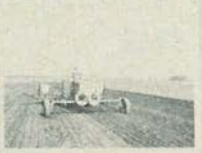
2 ROW

DISC OR DIG SOD
PLOW WITH PLOW PACKER OR DRAG
PLANT

4 ROW

ROW CROP TRACTOR

FRONT WHEELS 120" TREAD
REAR WHEELS 40" TREAD
FOR LEVEL LAND

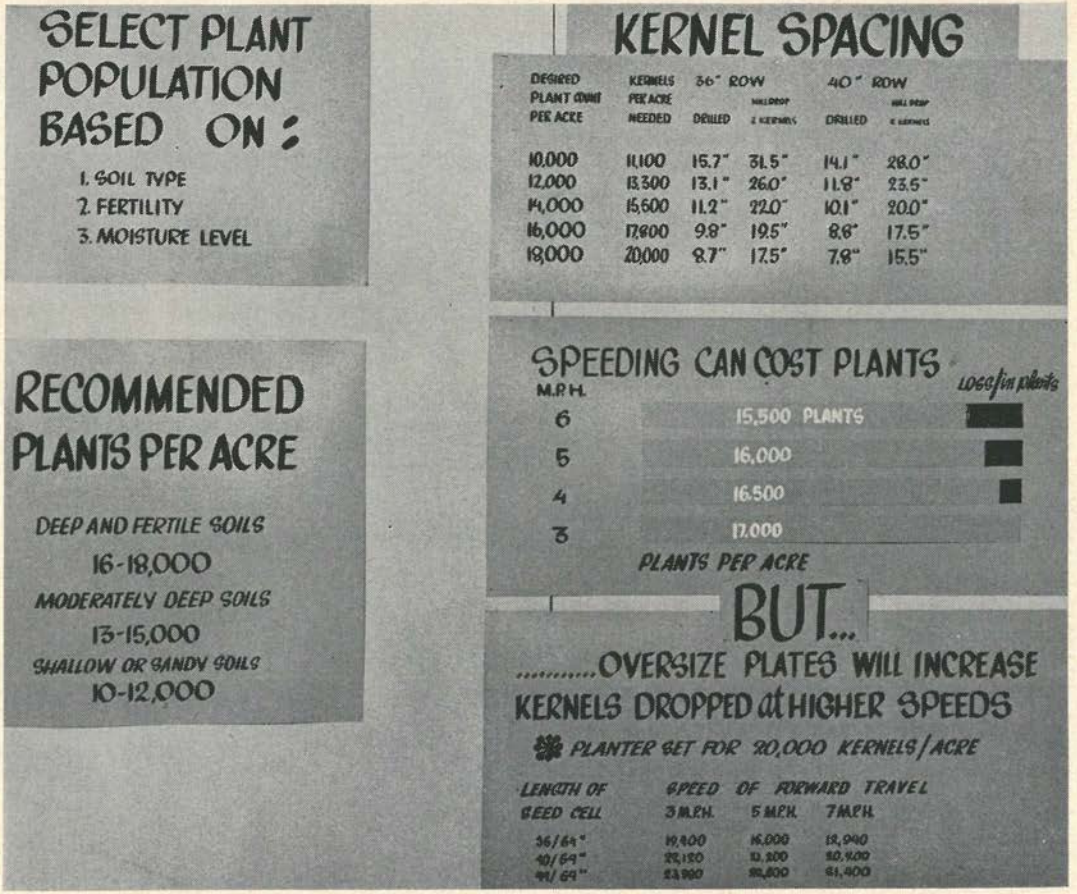


NARROW TRACTOR
WHEELS SET TO 40" TREAD

REAR WHEELS 120" TREAD
FRONT WHEELS 40" TREAD
SAFER ON SLOPING FIELDS

STEP 5

Fit Seedbed

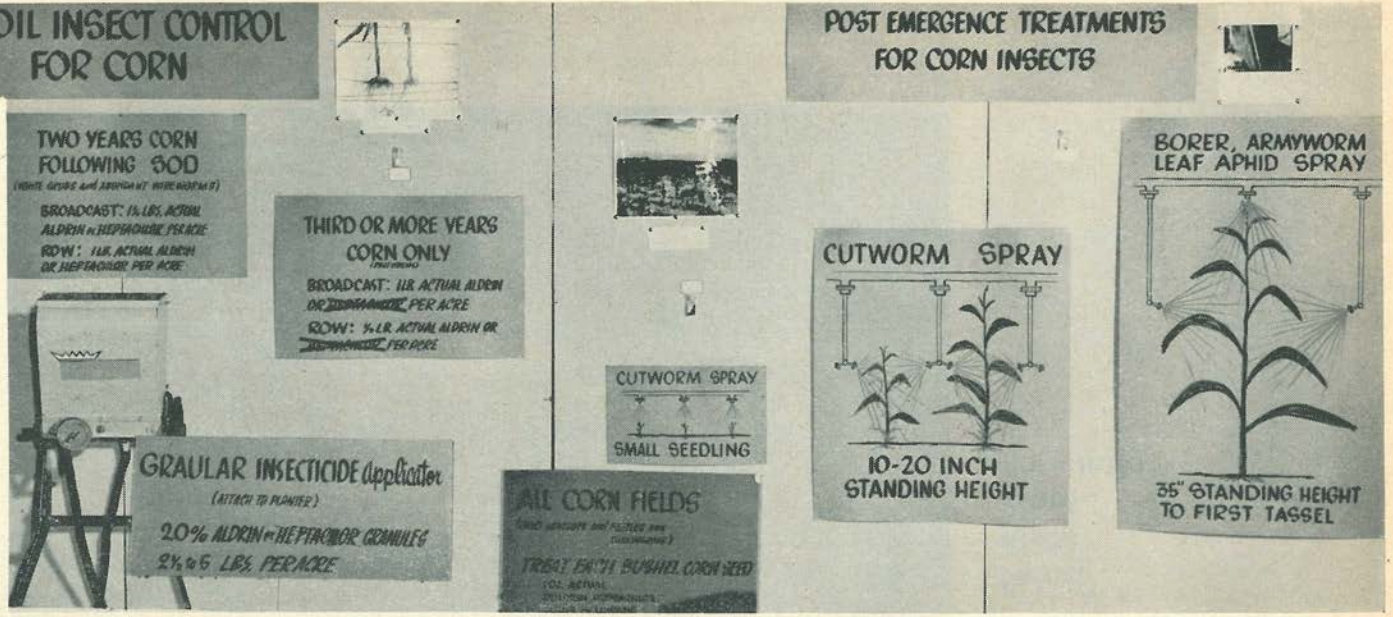


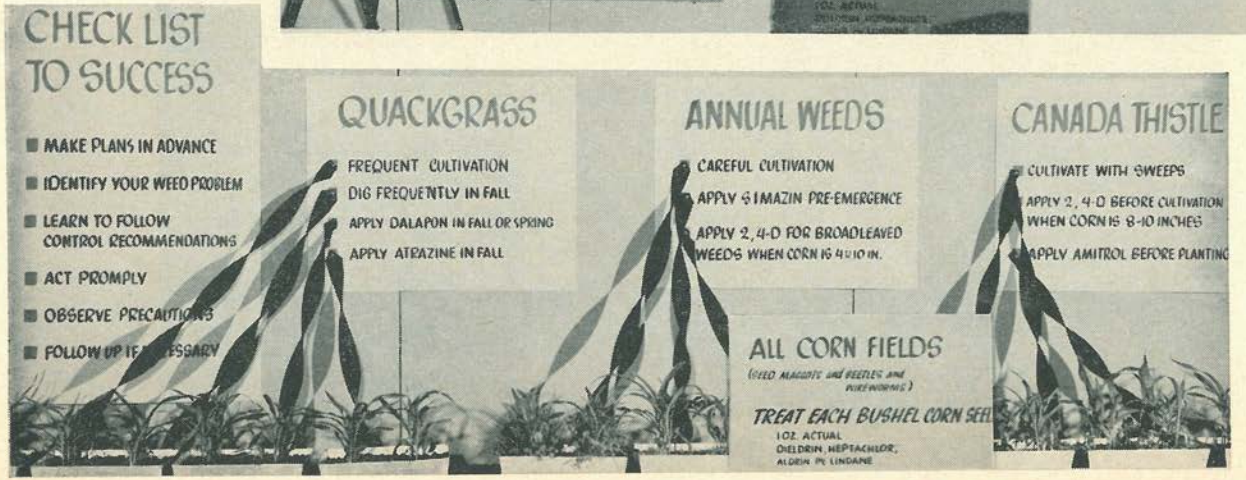
STEP 6

Select Right Plant Population

STEP 7

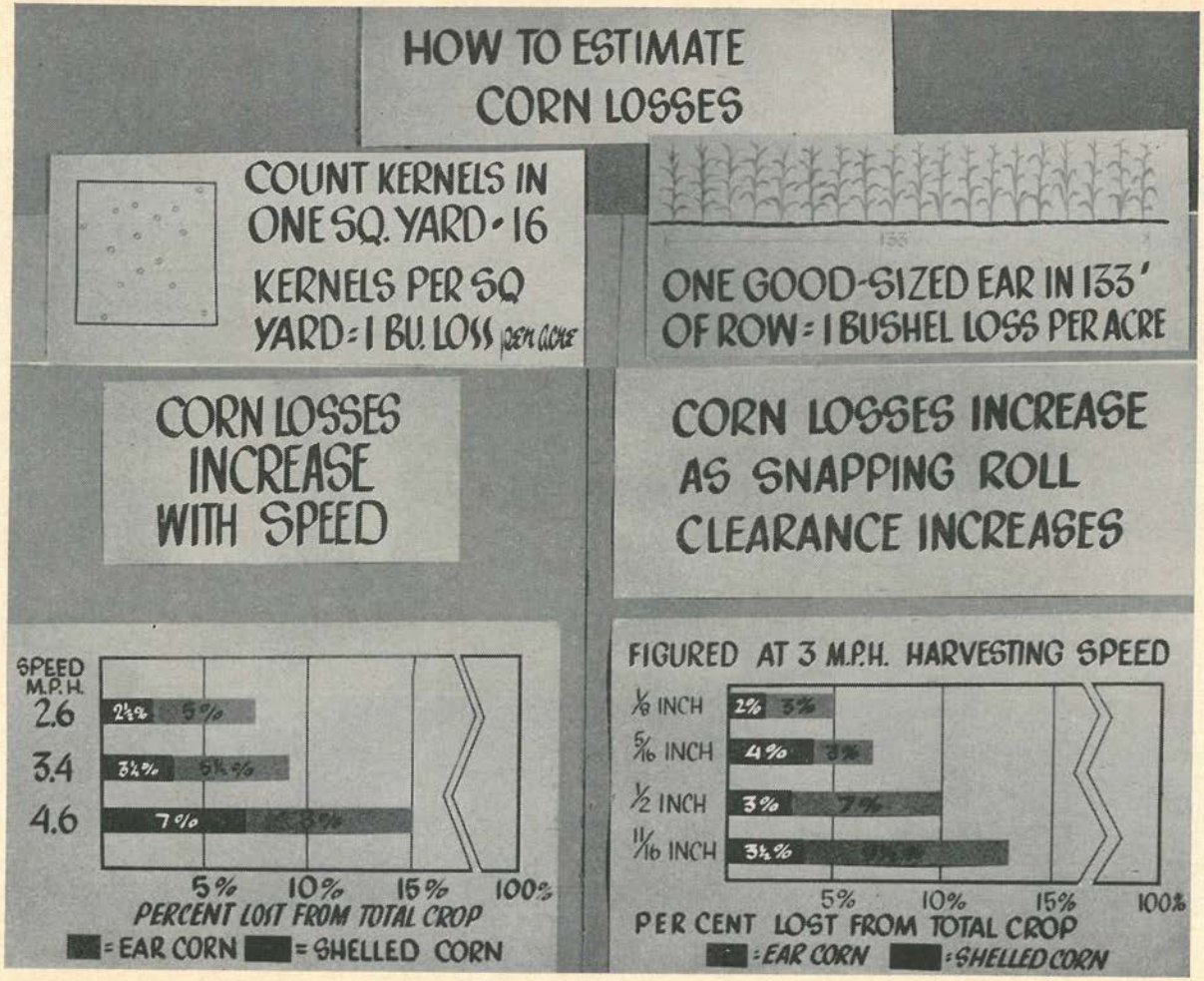
Control Insects





STEP 8

Control Weeds



STEP 9

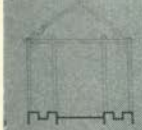
Harvest Carefully

ALTERNATE METHODS of STORING CORN GRAIN

STANDING CORN

- PICKER → CORN CRIB
- PICKER → GRINDER → SILO
- FIELD PICKER SHELLER → GRINDER → SILO
- FIELD PICKER SHELLER → DRYER → BIN

CRIB STORAGE (Ear Corn)



1. 4' TO 6' WIDE IN WISCONSIN
2. PLAN FOR EASY FILLING & EMPTYING
3. LONG AXIS NORTH & SOUTH
4. LOCATE FOR UNOBSTRUCTED NATURAL AIR MOVEMENT
5. AT LEAST 20% OF SIDEWALL OPEN FOR AIR MOVEMENT
6. CRIB WELL ANCHORED AND WELL BRACED
7. 21% OR LESS MOISTURE CONTENT

SILO FOR HIGH MOISTURE CORN

1. 26% TO 35% KERNEL MOISTURE
2. ANY TOWER SILO IN GOOD CONDITION
3. SILO SHOULD BE REINFORCED FOR CORN SILAGE
4. USE PLASTIC COVER IF FEEDING WITH DELAYED
5. SEAL DOORS WITH SOFT GREASE
6. ALLOW 1½ TO 1¾ CU. FT. PER BUSHEL OF SHELLED CORN

BIN STORAGE (dry shelled corn)

1. 1¼ CU. FT. PER BUSHEL of SHELLED CORN
2. PLAN FOR MECHANICAL FILLING AND EMPTYING
3. BUILD A WEATHER-TIGHT, WELL BRACED AND WELL ANCHORED BUILDING
4. CORN COULD BE BATCH DRIED or DRIED STORAGE BIN
5. PLAN FOR AIRATION IN LONG TIME STORAGE
6. 14% MOISTURE OR LESS

HOW MANY BUSHELS DRY SHELLED CORN are there IN A TON OF EAR CORN ?

ONE TON EAR CORN AT:		YIELDS ABOUT
15.5 %	MOISTURE	28.6 BU. DRY SHELLED CORN
18.0	"	27.4 "
20.0	"	26.4 "
22.0	"	25.6 "
24.0	"	24.7 "
26.0	"	23.9 "
28.0	"	23.1 "
30.0	"	22.3 "

When you sell EAR CORN BY THE TON, WHAT are you GETTING PER BUSHEL DRY SHELLED CORN ?

PRICE RECEIVED PER TON	KERNEL MOISTURE 15.5%	20%	24%	28%
	PRICE PER BUSHEL DRY SHELLED CORN *			
$ 28.	$ .98	$ 1.06	$ 1.16	$ 1.21
26.	.94	.98	1.07	1.12
24.	.84	.91	.99	1.04
22.	.77	.83	.91	.96
20.	.70	.76	.83	.88
19.	.63	.68	.76	.79
18.	.56	.60	.66	.69

* PRICES PER BUSHEL ARE APPROXIMATE BASED ON AVERAGE SHELLING PERCENTAGE

STEP 10 **Store Properly**

SPRING

Selecting and treating Seed	Agron.	10	min.
	Ent.	2	"
Controlling Quackgrass	Agron.	5	"
Methods of Seedbed Preparation	Ag. Eng.	30	"
Applying Broadcast Fertilizers	Soils	2	"
Applying Broadcast and Row Insecticides	Ent.	12	"
Establishing Proper Populations	Ag. Eng.	5	"
	Agron.	5	"
Applying Starter Fertilizer	Soils	15	"
Applying Insecticides at Planting Time	Ent.	5	"
Controlling Weeds —Pre-emergence and Post-emergence Methods	Agron.	10	"
Controlling Cutworms	Ent.	2	"
Sidedressing:			
Fertilizers	Soils	10	"
Insecticides	Ent.	1	"
Herbicides	Agron.	1	"

SUMMER

Observations on Growth of Crop, Effects of Diseases, Insects, Lack of Plant Nutrients—General Statement	Fisher	5	min.
Controlling Insects	Ent.	12	"

FALL

Harvesting and Storing Properly	Ag. Eng.	30	min.
Controlling Insects and Rodents in Stored Corn	Ent.	10	"
General Questions and Discussion		30	min.

A CALIFORNIA EXAMPLE

THE FLOWER GROWING INDUSTRY

Here is a soaker hose, popular automatic watering system. The two thin-walled black plastic tubes contain small holes at 4-inch spacings along each side. When water is sent in at one end, small trickles pour out each hole. In 30 to 45 minutes, the soil is usually well irrigated without surface puddling.

By O. A. Matkin
Orange
California

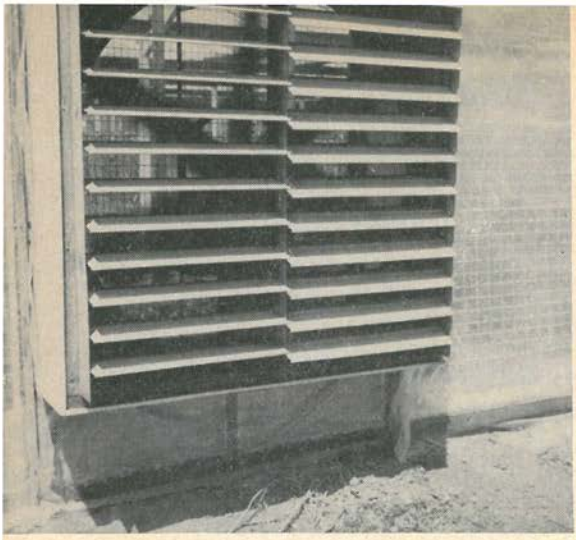
And

R. H. Sciaroni
San Mateo County
California

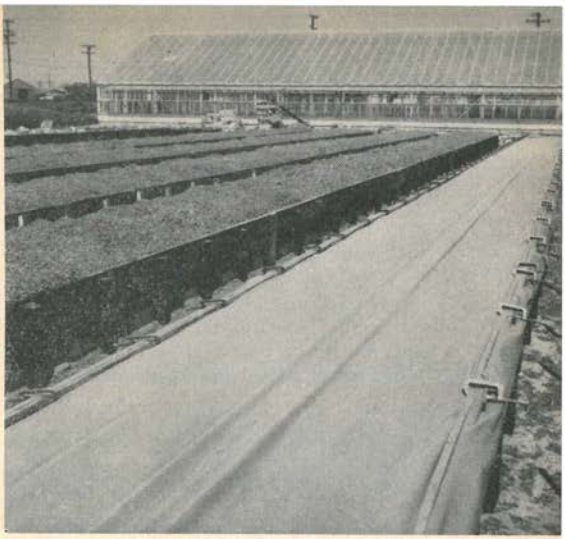
FLOWER production has become a major form of agriculture in the United States. Although this industry is not centered in any one State or region, certain States and specific areas within them have become well-known production centers.

With its variety of climatic conditions favorable to special requirements, California is renowned for its year-round growing.

In 1957 the California ornamental industry alone produced a total crop value of *over $95 million.* Of this, flowers, pot plants, and bulb-cut flowers totaled more than $40 million. Carnation cut flowers alone totaled more than $6 million. These



Many flower growers air condition their greenhouses by placing large (4 foot) fans at one end to pull the air out and a huge aspen pad at the other end through which water is continuously circulated, washing and cooling the incoming air when necessary.



Here a grower steam-sterilizes his soil in raised benches. This bench is covered with an air-tight plastic tarp. The soil is brought to a 180°-212° temperature for half hour or more to kill many soil-borne diseases and organisms.

IN A STATE . . .

. . . where the ornamental flower industry produced an estimated crop value of over $95 million in 1957, according to last survey.

. . . where plant food rates for such cut flower products as carnations include 5 lbs. nitrogen and 3 lbs. potash per 1,000 gallons of water applied at each irrigation.

. . . where a year's normal cut flower carnation production will remove approximately 43 tons fresh plant material per acre of soil.

figures represent a 280% increase for the preceding eight years. Since 1957, there has been a substantial further increase in production in California, but census figures are not yet available.

HEAVY PLANT FOOD USAGE ESSENTIAL

The value of the cut flower or flowering pot plant crop makes it possible to conduct processes that would be too expensive for most field, forage, orchard, or truck crops. The cost of fertilizer is not nearly as important as the production and quality that its use may cause. In fact, *it is essential, in much of the concentrated growing, to use large quantities of plant foods for satisfactory results.* Universities, growers, and private concerns conduct extensive research in nutrition needs and control.

For best results in cut flower crop culture, you must provide ideal plant growing conditions. These include:

1 Disease-free plant material.

2 Clean soil—devoid of undesirable insects, disease organisms, and weeds.

3 Soil of favorable physical structure to provide aeration and drainage as well as moisture and fertilizer retention.

4 Ideal levels of fertility.

5 Ideal environment—temperature, light, humidity, etc.

Of course, for various reasons many growers provide only a portion of these conditions. But to illustrate the "ideal" approach to controlled growing, let's take a typical and major cut flower crop—carnation production.

CLEAN PLANTS INTO CLEAN SOIL

Carnations are grown from rooted cuttings purchased from a specialist propagator who uses modern laboratory methods to detect and eliminate diseased plants. Vegetative reproduction is necessary to insure color and quality suitable for the market. The principal diseases transmitted from mother plants to cuttings are *Fusarium wilt, Bacterial wilt,* and *Fusarium stem rot.*

Rhizoctonia and *water mold root rots* may carry over in the soil to infect carnations. The grower can eliminate this by steam sterilizing or otherwise chemically treating his soil. This will also eliminate such undesirable organisms as nematodes, insects inhabiting the soil, undesirable fungi and bacteria of low-grade pathogenic nature, and weed seed. Following this, you can place clean plants into clean soil.

To prevent re-contamination with undesirable organisms, growers usually build planting beds above ground to separate clean soil from untreated soil. These beds are usually 3 feet wide with a 6 to 8 inch soil depth.

To steam them, the grower lays a perforated pipe on the soil surface, covers the bed with an air-tight tarp, and shoots steam through the pipe. The soil is brought to a 180°-212° temperature for a half hour to insure satisfactory kill. This does not kill *all* organisms, for many non-pathogens survive, others quickly re-inoculate the soil through air-borne spores.

FLOWER PRODUCTION REMOVES TONS OF PLANT FOOD

Before replanting, the grower must recondition the soil in the bed. This usually precedes the decontamination process. The soil may have been used for many years to grow many crops. If not reconditioned, it will soon become very unproductive. *A year's normal cut flower carnation production will remove approximately 43 tons fresh plant material per acre of soil.*

PLANT FOOD MUST BE PUT BACK

Typical additions to the soil, which may be a natural soil or a fine sand mix similar to the type proposed in a recent University of California publication * are shown below.

The phosphate and lime additions mentioned in table 1 will take care of requirements of the crop for 1 to 1½ years without supplementing. *Nitrogen and potash will require regular repeated application.*

Plants are placed in the bench on a 6 x 8-inch spacing. As soon as they are well established, they may be pinched several times before they are allowed to produce stems with flowers. Each stem can produce a single, saleable flower so that pinching at the proper time can cause a heavy crop for a specific holiday.

AUTOMATIC WATERING SYSTEM

After planting, the grower may install an automatic watering system. A well-known one is the "soaker" hose. Two thin-walled black plastic tubes are stretched the length of the bench between rows of plants. The tubing contains small holes at 4-inch spacings along each side.

Black plastic is used since algal growth in clear plastic tubing frequently plugs the holes. When water is sent in one end, small trickles pour out of each hole.

Slowly wetted without surface puddling, the soil is usually well irrigated in 30 to 45 minutes. This prevents a man

MATERIAL APPLIED	AM'T/100 Sq. Ft. OF BED AREA	AM'T/ACRE 6 INCHES (calculated)
Peat moss	1½ inches	200 cubic yards
Double superphosphate	2 pounds	870 pounds
Sulfate or muriate of potash	1½ pounds	650 pounds
Calcium carbonate lime	10 pounds	4350 pounds
Dolomite lime	10 pounds	4350 pounds

dragging a hose up and down the aisles and probably doing a much poorer job.

KEEPING PLANT STEMS STRAIGHT

Next, the grower may install braces for taut wires to be run the length of the bed. A series of 4 to 6 wires is stretched lengthwise about 6 to 8 inches above the soil level.

As the plants grow taller, successive layers of wire are stretched. Each layer is fitted with cross-pieces of bamboo or string at 4-inch intervals.

The result is layer after layer of squares through which plant stems can be trained and kept straight.

HIGH FERTILITY FOR BEST RESULTS

Carnations are "heavy feeders." This means fertility must be kept fairly high for best results. Many growers now use automatic fertilizer injectors which proportion a set amount of liquid fertilizer into the water. Feeding by this method may be conducted on a continuous basis —at every irrigation, for example. A typical rate for this type feeding is:

5# ammonium nitrate (33.5% nitrogen)
3# muriate of potash (60% K_2O)
8# per 1000 gallons as applied

The obvious advantages to this liquid feeding system are (1) *reduced labor,* (2) *minimum chance of burn from excessive application,* (3) *minimum possibility of deficiency during periods between feedings, (4) even coverage as in watering (fertilizer is present only where adequate water is also present), (5) low cost materials of high efficiency and high solubility can be utilized.*

MARKET DEMANDS QUALITY

The cut flower market demands a quality of flower seldom attained in the home garden. Carnations must have long, straight, heavy stems, with a single large bloom of perfect form and true color.

As the terminal flower head is formed, many side shoots also start to grow. These are continually removed by hand. This is known as disbudding. During certain periods there is a tendency for the calyx to split and ruin the form of the flower. At such times, each flower bud may be tied with a paper or plastic covered wire, which, after cutting, must be removed.

TEMPERATURES MUST BE WATCHED

Temperatures must be maintained within reasonable limits (55° F night to 75° F day). In fact, air conditioning the entire greenhouse range is not uncommon. The grower does this by placing large (4 foot) fans at one end to pull the air out. At the other end is a huge aspen pad through which water is continuously circulated, washing and cooling the incoming air.

When temperatures drop below the ideal, heat must be provided, usually through a boiler that delivers steam to pipes in the greenhouses. Sometimes the grower must heat and ventilate the greenhouses at the same time. This dries the air to prevent condensation which can cause Botrytis fungus growth on flower heads. Heating and ventilating at the same time also helps control other foliar fungus diseases, such as rust, fairy ring leafspot, and Alternaria branch rot and leafspot.

INSECTS MUST BE FOUGHT

Insect pests must be controlled at all times. Principal pests are aphids, thrips, and two-spotted spider mites. Spraying or dusting at weekly intervals is not uncommon. Since moisture on the foliage is not good for carnations, most insect and fungus control is done by dusting.

Combination dusts containing an insecticide, acaracide, and fungicide are commonly used. Most growers dust on a regular schedule for preventive treatment rather than treatment *after* infestation. High quality cut flowers free of insect and disease damage require such control.

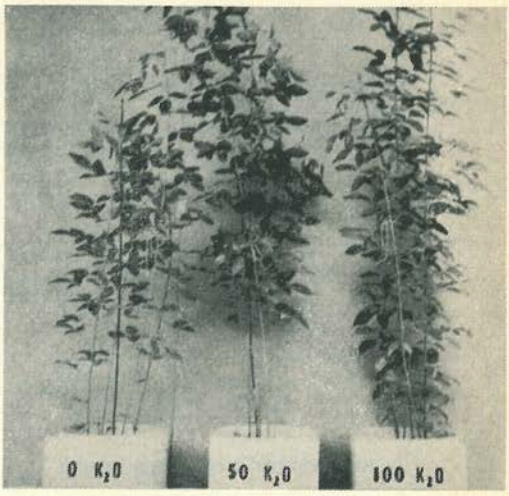
The successful and modern cut flower grower is a specialist whose product is in great demand.

THE END

* *The U. C. System For Producing Healthy Container Grown Plants Manual 23, 1957, obtainable from Agricultural Publications, 22 Giannini Hall, University of California, Berkeley 4, California. Price—$1.00.*

By John Wear
And Arnold Haugen *

RESPONSE OF LESPEDEZA BICOLOR



. . . to potash

Lespedeza bicolor is the species most commonly planted for quail food in Alabama. Observations have shown that when patches planted from seed failed, failures occurred during the first year. Droughty conditions at the time when seedlings had just come up often caused failure of the patches.

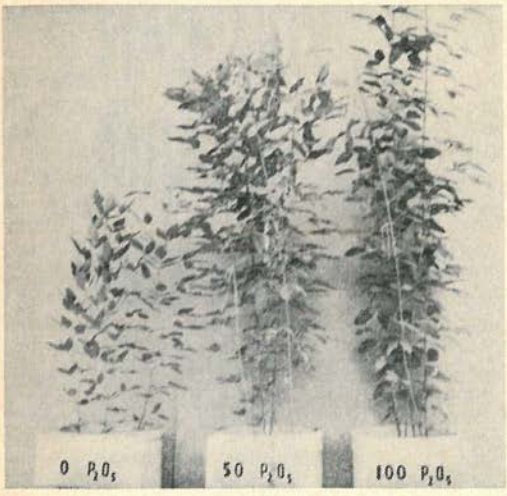
This perennial legume is generally grown on poor or eroded soils in abandoned fields or at the edge of wooded areas where the soil is usually low in phosphate (P_2O_5) and potash (K_2O) and frequently very acid. The object of this test was to determine if applications of lime, P_2O_5, and K_2O would substantially increase first season growth of the plant and thereby speed its establishment and production.

A Norfolk sandy loam was obtained near Hatchechubee, Russell County, in the general area of several large quail

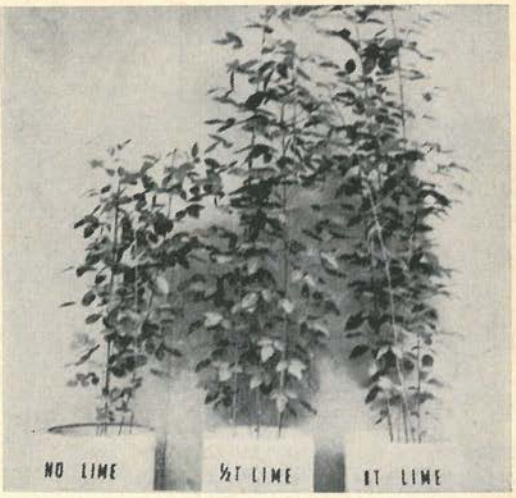
Table 1—Yield of Lespedeza bicolor Plants (Foliage) from rates of Lime, Phosphate and Potash

Number	Treatment (pounds per acre)			Yield [1] dry wt. (gms. per pot)
	Lime	P_2O_5	K_2O	
1	0	100	100	30.6
2	1000	100	100	46.6
3	2000	100	100	56.0
4	4000	100	100	74.6
5	2000	0	100	10.0
6	2000	50	100	41.4
7	2000	100	0	24.0
8	2000	100	50	34.2

[1] Average of 3 replications.



. . . to phosphate



. . . to lime

preserves in southeastern Alabama. The soil was dried, screened, and 16 pounds potted into each of twenty-four 2-gallon glazed pots. Lime and fertilizer were thoroughly mixed with the soil, at the rates shown in Table 1. Inoculated seed was planted and thinned to four plants per pot. All treatments were replicated three times. Vegetative growth was determined by harvesting plants at the flowering stage and reported as dry weight per pot.

The soil used in this experiment was low in P_2O_5, (17 pounds per acre) and K_2O, (62 pounds per acre) and had a pH of 4.9. This is typical of many areas where *Lespedeza bicolor* is grown. Results reported in Table 1 indicate a response to lime up to the maximum treatment of 4,000 lbs. per acre. The response to lime is illustrated above. The pH values for the soil at the end of tests for the three increments of lime were 5.2, 5.7, and 6.5.

Applications of 50 and 100 pounds of P_2O_5 per acre increased yields 310 and 460 per cent respectively, shown above.

Application of 100 pounds of K_2O per acre increased yields 133 per cent, shown above.

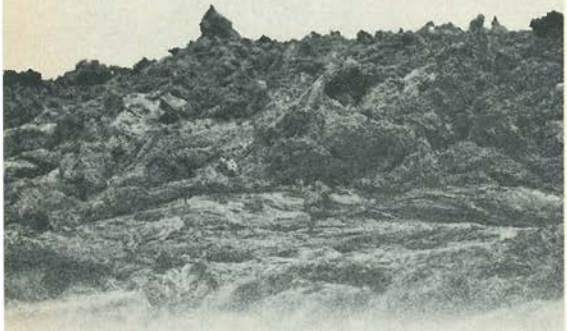
This greenhouse experiment showed that growth of *Lespedeza bicolor* to the flowering stage was *greatly accelerated by applications of lime, phosphate, and potash.* General observations indicate that growth of seedlings when they first emerged from the ground was speeded up considerably. Such response should result in increased and earlier success of patches established from seed, especially in areas where dry periods may cause considerable loss of seedlings, as commonly occurs on the sandier soils in the Southeast.

Since less labor and expense are needed to start a patch from seed than from transplants, these findings may result in more frequent use of seed in establishing patches of bicolor for quail in the South.

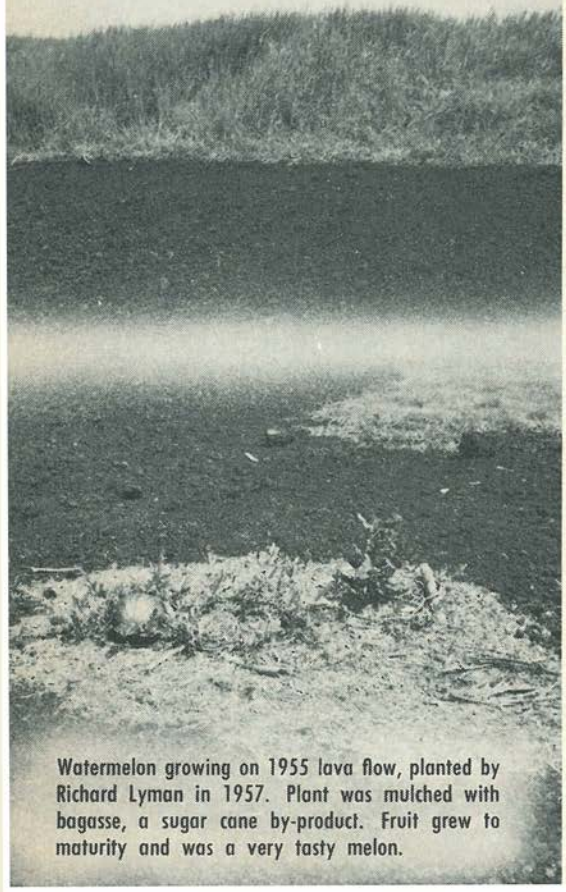
THE END

** From Journal of Wildlife Management, October, 1959. John Wear, Department of Agronomy, Auburn University; Arnold Haugen, Leader Iowa Cooperative Wildlife Research Unit, Iowa State University.*

1955 lava flow just to rear of grass planting below in its natural state before preparation for planting.



Pangola grass growing on 1955 lava flow. Lava was graded down with bulldozer and rolled with 12-ton roller to crush and smooth before planting. Planted in 1956 when lava was less than 2 years old. Grass was planted by Richard Lyman.



Watermelon growing on 1955 lava flow, planted by Richard Lyman in 1957. Plant was mulched with bagasse, a sugar cane by-product. Fruit grew to maturity and was a very tasty melon.

YOU CAN FARM FRESH LAVA

By Roy P. Yonce

SCS Conservationist

Hilo, Hawaii

MOST topsoil farmers in mainland USA would get a real shock if they had to begin growing fruits and vegetables in hardpan and bedrock today. But Hawaiians in our new 50th state have been turning out crops on aa (ah ah)-lava clinkers, and Pahoehoe solid rock long before Captain James Cook landed on their shores in 1778.

On the Island of Hawaii, in the Puna Soil Conservation District where one-third of the farming is done on old lava beds, growing crops isn't easy. But you could set a very tasty and sumptuous table with the products of rock farms.

The fare would include *Macadamia nuts, lush citrus fruits, cocoa nuts, watermelon, papaya, Acerola cherries* and *some vegetables.*

The hitch in this rock-grown Cornucopia is that it takes too long to get old lava flows in production. The way things have been going, several hundred years must pass before organic matter forms and erosion breaks down Kilauea and Mauna Loa lava beds.

We know that Nature is a painstaking, often slow workman, and it takes eons of time to change lava to topsoil and make a place for plants.

Territorial senator, Richard Lyman, agriculturist and a director of the Puna District, believes his lava test plantings show man can get the jump on Nature

by hundreds of years by putting fresh lava in production soon after it cools.

Lyman started his nursery plantings in a small lava patch along the highway between Pahoa and Kapoho on Hawaii a year after Mauna Loa's last eruption in 1955. He used a spike or rooter to loosen aa, bulldozed to flatten and crush the soft, lumpy clinkers, then rolled the patch to pulverize and smooth it down.

In aa, you pick out a foot square, foot deep hole for each planting. If lava isn't broken down enough, add a little soil so roots can take hold. In planting Pahoehoe—a smooth, solid lava—it's usually necessary to set holes with a drill.

Lyman fertilizes each planting with a 10-10-10 fertilizer, applying one pound of plant food for every inch of diameter of the plant. This treatment is a must in rock farming and is repeated four to six times a year to feed plants and offset leaching from the 80 to 100 inch annual rainfall.

The roadside plantings were made in 1956, right after the lava cooled, and included *hala, monkey pod, watermelon, plumeria, Pangola,* and other grasses. As is the practice in rock farming, Lyman spread cane mulch or bagasse around each hole to save moisture.

All of the plantings flourished and the watermelon grew two fruits. A lime tree seedling, which normally takes four to five years to bear, produced fruit in new lava in two years. And a planting of papaya, made in the fall of 1956, was judged commercially successful after a year's growth. Fruit is of normal size but not as soft as papaya produced by commercial growers, which Lyman says enhances its value.

One of his latest experiments with aa farming was a seeding of corn, tomatoes and other garden crops in eight inches of topsoil spread over fresh lava. Results were only fair because of dry weather.

Does fresh lava stimulate plant growth? Lyman thinks not. He says, "Until lava is weathered, eroded, and mixed with organic matter, it doesn't put out enough nitrogen, potash, and phosphate to feed plants.

"Our tests show the secrets of rock farming boil down to flattening and compacting lava clinkers. Lumpy ground with open spaces makes a poor seedbed. Plants grow best in a coarse, smoothed down bed. Other musts are plenty of *complete fertilizer* to make up for the almost total lack of organic matter and lots of moisture which fortunately our climate provides."

Lyman tells visitors to his nursery, "It's too early to say how much production we'll get from fresh lava and we're not sure if it will pay to make large-scale plantings under these conditions.

"We do believe we have proved that farmers don't have to wait for Nature to change lava into topsoil. They can do it well enough with a dozer and roller in a few days to give plants growing room. The books have been telling us to let erosion do the job."

THE END

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