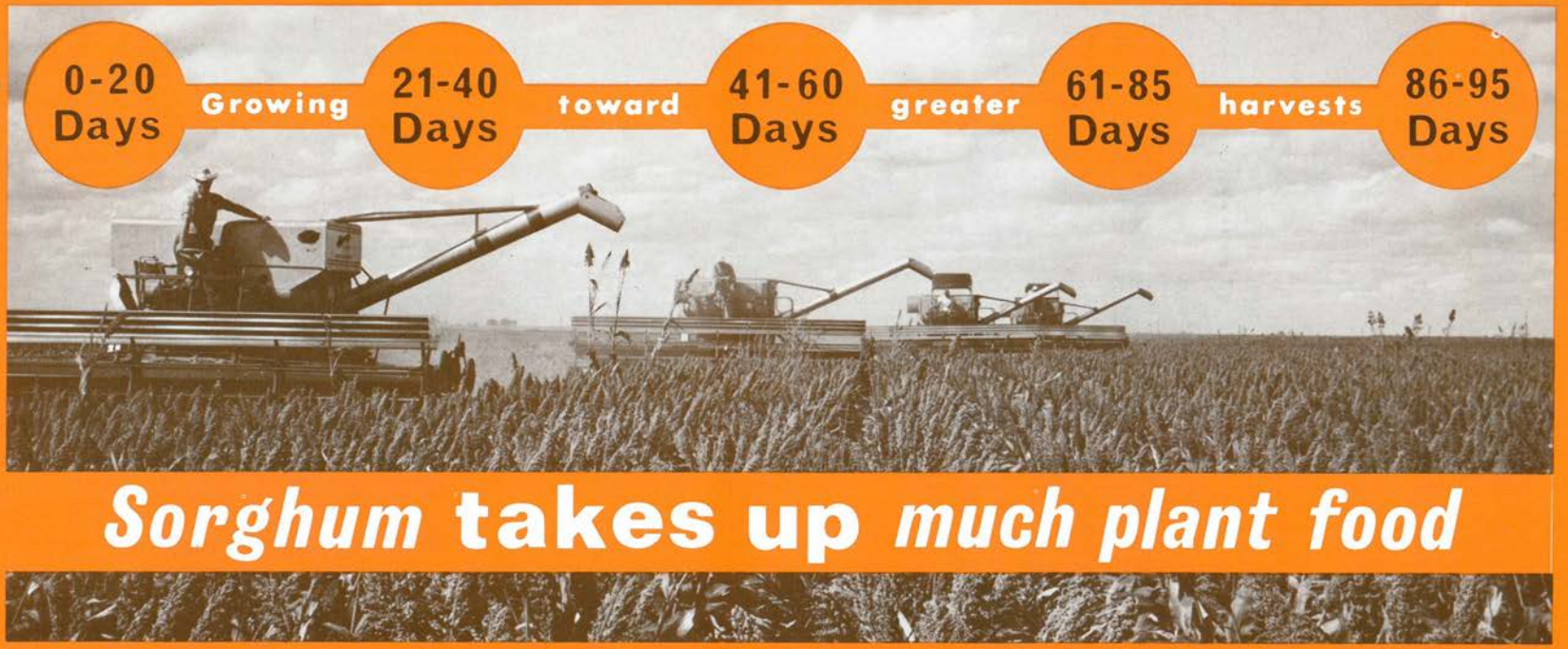
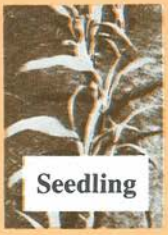
Better Crops
WITH PLANT FOOD

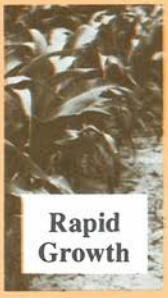
NUMBER 4—1973-74 25 CENTS



Sorghum takes up *much plant food*

Plant Food TAKEN UP By 135 Bu/A SORGHUM

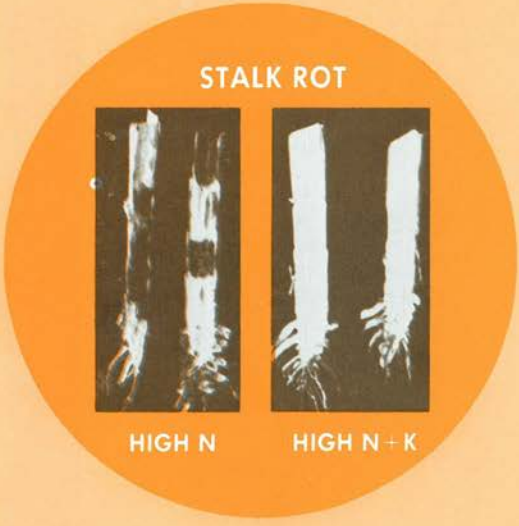


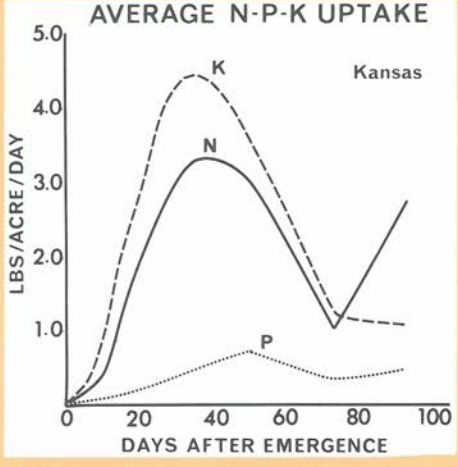


						TOTAL
N	9 Lb	61 Lb	60 Lb	27 Lb	28 Lb	185
P_2O_5	2	18	28	21	11	80
K_2O	18	103	85	39	13	258
D.M.	240	1,800	3,840	3,840	2,280	12,000

Percentage of nutrient taken up during each period

N	5%	33%	32%	15%	15%	100%
P_2O_5	3	23	34	26	14	100
K_2O	7	40	33	15	5	100
D.M.	2	15	32	32	19	100





BASED ON DATA BY R. L. VANDERLIP
DEPARTMENT OF AGRONOMY
KANSAS STATE UNIVERSITY

AS A MAJOR feed grain, sorghum is a very productive crop demanding large amounts of plant food. It responds not only to good nutrient and moisture supply, but also to right planting date, row width, plant population, weed and insect control.

Recent studies show the amounts of nutrients a 135-bushel sorghum crop takes up at 5 growth stages—seedling, rapid growth, early bloom, grain formation, and hard dough-to-maturity. (See color panel to left.) In the mature crop, nutrient uptake is divided between grain and stover:

POUNDS PER ACRE

135 bu Sorghum	N	P_2O_5	K_2O	Mg	Dry Matter	
Grain (135 bu)	107	28	28	9	6,720	56%
Stover	78	52	230	12	5,280	44%
Total	185	80	258	21	12,000	

During peak grain filling periods, dry matter (D.M.) moves into the grain at an average rate of 276 lbs per acre per day. It takes a lot of nutrients to keep sorghum functioning at top capacity:

NITROGEN (N) helps the plant build leaf and plant structures during early growth and is needed to fill grain after pollination. Sorghum takes up nearly 40% of its nitrogen (70 lb N) in the first 40 days, during seedling and early rapid growth. It pulls hardest on nitrogen—**over 3 lbs N per acre each day**—between the 21st and 40th day after emergence. Grain demands over 100 lbs N.

PHOSPHATE (P_2O_5) is vital for early development of young sorghum . . . for exchanging and storing energy in the plant. Sorghum takes up 25% of its total phosphate need (20 lbs P_2O_5) during the first 40 days. It pulls hardest on phosphate—**around 1.4 lb P_2O_5 per acre each day**—at about 55 days of growth during early bloom. Grain requires 28 lb of phosphate (P_2O_5).

POTASH (K_2O) is vital for opening leaf pores (stomates) . . . for producing sugars (photosynthesis) . . . for using nitrogen and phosphate . . . for translocating sugars to form starch in the developing head . . . and sometimes for reducing disease and lodging problems, field tests show. Sorghum takes up nearly 50% of its potash need (121 lbs K_2O) during the first 40 days after emergence. It pulls hardest on potash—**over 5.16 lbs K_2O per acre each day**—between the 21st and 40th day after emergence. Sorghum demands potash over the season much like corn.

Sorghum has a reputation for "toughness" in the face of drouths and other adverse conditions. But it still responds to good management and balanced nutrition like corn and other crops. Sharp farmers take three steps to insure healthy sorghum stalks and top yields:

1—**THEY BUILD UP and maintain** high soil fertility—stress-free fields in which their sorghum can do its best.

2—**THEY BALANCE their fertility** so the crop can get every nutrient it needs when it needs it.

3—**THEY KEEP a close eye on fertility** with sorghum silage because all the nutrients are removed in the crop. **The End**

THIS ARTICLE
Is available in colorful folder form. Featuring the illustrations shown on the front cover and page 2 of this issue.

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CONTENTS

WISE Resolutions Are Ageless . . .

As Suggested by A. B. Bryan, Clemson Agricultural College, Clemson, S. C.

1—Resolved: that I will think beyond the present year in planning and executing my farming business.

2—Resolved: that having planned my work, I will work my plan so that I will not reap merely "a harvest of barren regrets."

3—Resolved: that I follow wise George Washington's advice to "keep an account book and enter therein every farthing of receipts and expenditures."

4—Resolved: that I will not stake everything in one cash crop, whether it be cotton, wheat, corn, or something else.

5—Resolved: that realizing that a worn-out soil means a worn-out man, I will not rob my farm of its fertility.

6—Resolved: that I will raise home supplies to the fullest extent consistent with my land and conditions.

7—Resolved: that I will market as much of my farm produce as possible in the form of livestock.

8—Resolved: that if I swear at all I will swear at scrubs and swear by purebreds.

9—Resolved: that I will not expect other farmers to produce feeds for my livestock.

10—Resolved: that I will buy more farm machinery and make better use of it to enable me to save time for more work and more leisure.

11—Resolved: that I will terrace all of my land that needs terracing and will build up the waste places.

12—Resolved: that I will save money and time by taking better care of my farm machinery, tools, implements, and my livestock.

13—Resolved: that I will fertilize my crops intelligently and liberally for more economical returns from each acre.

14—Resolved: that I will plant more legumes and cover crops to help maintain the fertility of my land.

15—Resolved: that I will read and think more this year and thus learn to help reduce the high cost of ignorant farming.

16—Resolved: that I will provide more conveniences and comforts for the farm and home to make it more livable and more attractive for my family and my friends.

17—Resolved: that I will make the premises more beautiful by paint, shrubbery, trees, and flowers.

18—Resolved: that I will treat my woodland as a "field" and my growing timber as a "crop" and so "farm" it as to get needed timber and fuel by such handling as will improve and not injure the woodland.

19—Resolved: that I will join my neighbors in cooperative marketing to provide orderly sale of my crops and help prevent glutted markets.

20—Resolved: that I will be generous with any good farming ideas which I have by passing them on to my neighbors.

21—Resolved: that I will help to put the unity in community by taking and making opportunities to work with others to improve agricultural, economic, and social conditions.

22—Resolved: that I will take a vacation trip at least once during the year to see how other people farm and live in other parts of the state or country.

23—Resolved: that I will encourage my boys in club work and other progressive activities so that they may become better farmers than I am.

24—Resolved: that even in the fact of discouraging experiences I will keep up my spirit and my faith that the Creator of the land and of all things animate and inanimate with which I work will not forsake the tiller of the soil.

BETTER CROPS, 1937

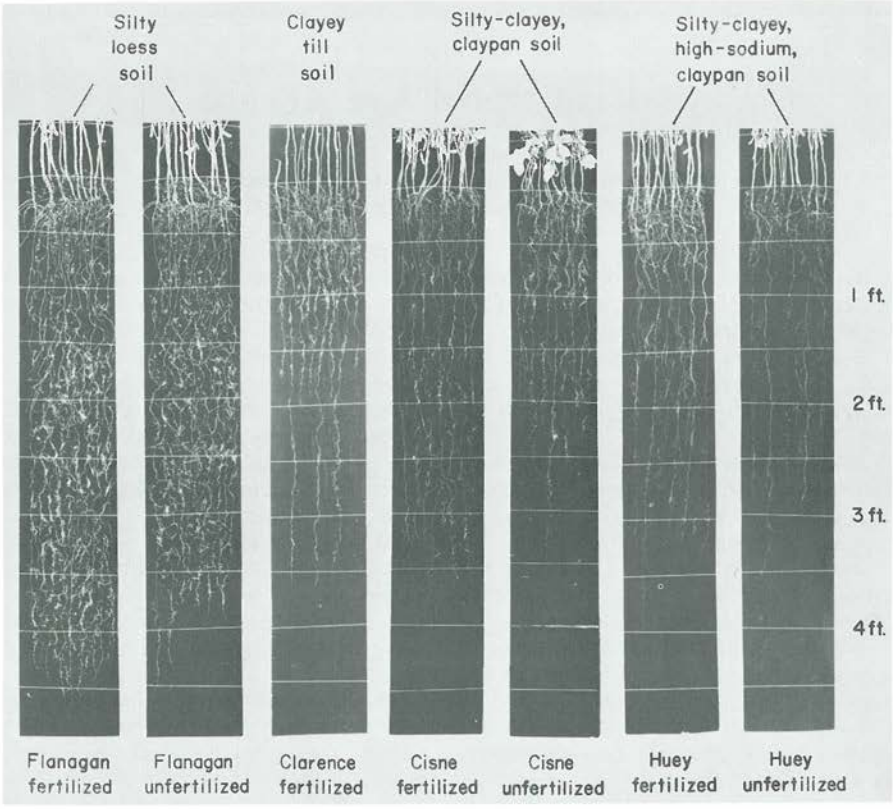


Figure 1. Soil type and fertilizer effect soybean rooting depth and hence, ability of the plant to withstand drouths (J. B. Fehrenbacher, University of Illinois).

You Can Help Beat WATER STRESS On Soybeans . . .

WERNER L. NELSON
LAFAYETTE, INDIANA

IN MOST UNIRRIGATED areas soybeans suffer from lack of water sometime during the growing season. This is particularly harmful during podding.

Soybeans are often planted on the least desirable soils and water supply is usually a part of the problem on these soils. What can we do besides wring our hands? **Any practice which increases yields will increase efficiency of water use!**

There are many principles that apply to soybean production in order to take advantage of the available resources for profitable yields. Soil, water, management practices, competing crops and economics all work together to influence yields and distribution of acreage.

What would you say is the potential on this soil at Oakes, North Dakota? Sprinkler

irrigation was used. Close rows, early planting, and proper variety doubled yields.

	Planting date—2 yr. avg. (bu/A)			
	May 5		June 6	
	30 cm	60 cm	30 cm	60 cm
Anoka	69.3	49.0	35.8	32.6
SRF-100	50.6	48.1	35.5	38.6

(D. A. Whited and R. L. Sletteland, unpublished MS thesis study, NDSU, 1972)

Nature doesn't do well by herself and getting farmers to be serious about good management on soybeans has been a problem. However, the new economics is changing this. Research and farmers have shown that 60-80 bu/A beans can be produced in the South, North, East and West in the United States.

WHAT ABOUT SOILS AND WATER AVAILABILITY? The soil can be looked upon as a rooting medium and as a reservoir to store water and nutrients. Nutrients can be readily added to the plow layer in adequate amounts as needed.

The deeper the roots penetrate the more soil the plant can draw on for water, helping the plant resist droughts more readily. **Figure 1** shows how soil type and fertilization affect rooting depth. Note the deeper rooting in Flanagan as compared to Clarence, as well as the effect of fertilizer in increasing rooting depth in Cisne.

Rooting zone thickness can affect soybean yields, as these 3 Tennessee upland soils show (Tenn. Agr. Ext. Serv. Pub. 664, 1933):

	Thickness of rooting zone	Yield-bu/A (2-yr avg.)
Memphis silt loam	40+ in.	48
Loring silt loam	32 in.	43
Grenada silt loam	24 in.	39

Figure 2 shows how deep cultivation can partially nullify the effect of deep root penetration.

WHAT ABOUT HARDPANS OR COMPACT HORIZONS? Hardpans caused by tilling at the same depth for years limit root penetration. Gradually deeper plowing or chiseling helps to eliminate this barrier to roots. Many farmers in the Corn and Soybean Belt plow after corn and chisel after soybeans.

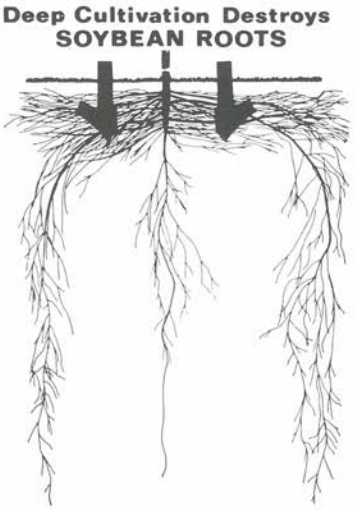


Figure 2. Deep cultivation (4½ inches deep and 6 inches from the row) at first bloom can cut roots, reduce water absorption, and decrease yields 6 to 8 bu per acre (Russell et al., Agron. J. 63: 772, 1971).

Soybeans do not have the ability to penetrate even moderately compacted subsoils. Moderate compaction reduced yields 50% or more than non-compacted subsoils in Alabama.

Breaking up subsoil layers in a South Carolina Coastal Plain soil increased yield 9 bu. Adding lime and phosphate increased yields another 5 bu.

Some drouth-prone soils in the Delta area have high aluminum and/or compact layers. Liming soils testing below 5.5 and annual deep tillage (about 18 inches) is recommended.

In Georgia, subsoiling under the row (about 18 inches), fumigation, and adequate nutrition produced various yields, from 51 to 76 bu per acre.

CHEMICAL CHARACTERISTICS OF SUBSOIL. Subsoils, particularly in eastern and southern U.S., may be acid and high in aluminum. Aluminum reduces water

uptake by plants and is toxic to roots. Liming the plow layer over a long period of time will gradually reduce acidity in lower horizons. Lime and P added to the subsoil increased yields in South Carolina. But varieties with roots more tolerant to aluminum are needed.

In moist years, liming the plow layer increased North Carolina soybean yields 14 bu but gave no response in dry years. It was postulated that in dry years on the lime plots, the roots depended on moisture from the lower horizons and were in the same chemical environment as on the no-lime plots.

POOR DRAINAGE, both internally and externally, is often the No. 1 problem. It often occurs on the alluvial soils of the Mississippi Valley as well as other areas. Prolonged water logging results in death of roots. The plants have difficulty absorbing nutrients. Diseases come in. Planting delays are often serious.

Here is how drainage classes affected West Tennessee bottomland soils:

	Yield-bu/A
Well-drained	54
Moderately well-drained	49
Somewhat poorly-drained	43
Somewhat poorly-drained to poorly drained	41

On a poorly-drained Ohio silty clay loam surface drains gave 43 bu and tile drains 50 bu. In Iowa, soybeans rooted to 6 ft in Clarion loam, only 3 ft in a Nicollet clay loam, waterlogged at 3 ft.

Land grading for surface drainage is certainly a first step and tile drains the second step if the soil is suitable.

SOIL TEXTURE affects the inches of available water per foot. Some representative soils from Illinois show the following:

	Available water in 5 feet
Oquawka sand	5 in.
Ridgeville fine sandy loam	7
Swygert silt loam	9
Muscatine silt loam	12

SLOPE AFFECTS water availability because of amount of water penetration and depth of root penetration. Here is the effect of slope in West Tennessee:

% slope	Yield-bu/A, 2 yr avg.
0 - 2%	47
2 - 5%	43
5 - 8%	40

Excessive drainage because of slope may be a problem but double cropping after small grains helps to provide a mulch to slow down water.

CLIMATE. Moisture deficiency is a problem on soybeans in most years and drouth probabilities have been worked out for various months during the year in many areas. Table 1 shows how important water storage capacity is. With 2-inch water storage, the minimum number of drouth days would be 11 in 2 out of 10 years. With 4-inch storage there would be no drouth days.

In the Corn and Soybean Belt, lower-than-normal temperature and above-average moisture in July and August favors yield—corn as well as soybeans.

With high soybean prices, irrigation is a real possibility in some areas. The critical time is at podding, which comes after the major needs of corn, cotton, and some vegetables—so dual use of irrigation equipment is feasible.

NUTRITION. Adequate fertility helps plants get maximum use of water that is available. While yields were highest with normal rainfall, the less the rainfall the first

Table 1. Minimum number of drought days in the Georgia Coastal Plain in September for five soil water storage capacities and three probabilities.

Probability	1 inch	2 inch	3 inch	4 inch	5 inch
1/10	20	16	12	8	0
2/10	17	11	6	0	0
3/10	14	7	0	0	0

12 weeks after planting the greater the percentage yield response to K. **Figure 3** shows this response. Similar results came from P.

A 50-bu crop of soybeans will remove about 40 lb P_2O_5 and 70 lb K_2O just in the grain. While this plus enough to grow the plant may be applied to the previous crop, it is often difficult to convince the farmer to do this. Hence, an increasing number now fertilize their soybeans directly, either at planting or through broadcast applications.

NEMATODES. Cyst or root knot nematodes are a real problem in some areas. Some Mississippi counties report 80% of the soybean soils infected. Fumigation increased yields 6 bu in New Jersey. However, the extent of distribution of nematodes is relatively unknown in most soybean areas.

Nematodes reduce yield more under low water and low fertility conditions because the roots are less efficient. Resistant varieties, fumigation, and rotation are means of control.

We could also stress how row width, planting date and weed control increase efficiency of water use. But the purpose of this article is to emphasize this point: While we cannot control rainfall, we can still do much to make more efficient use of the water available. Average yields could be increased 50% or more with the water you do get. Examine your soils and crops this summer. **The End**

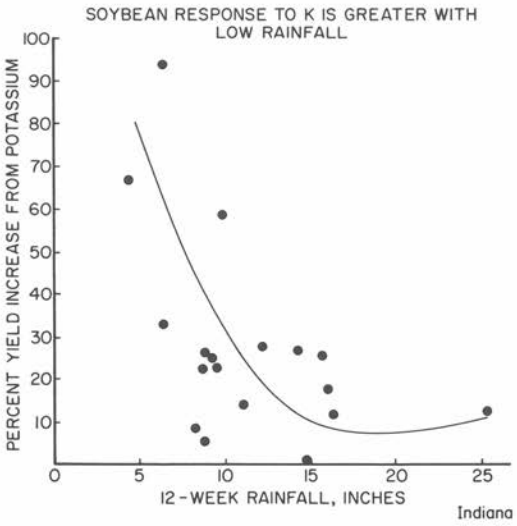


Figure 3. The less the rainfall for 12 weeks after planting, the greater the percentage response of soybeans to added K (S. A. Barber, Purdue University).

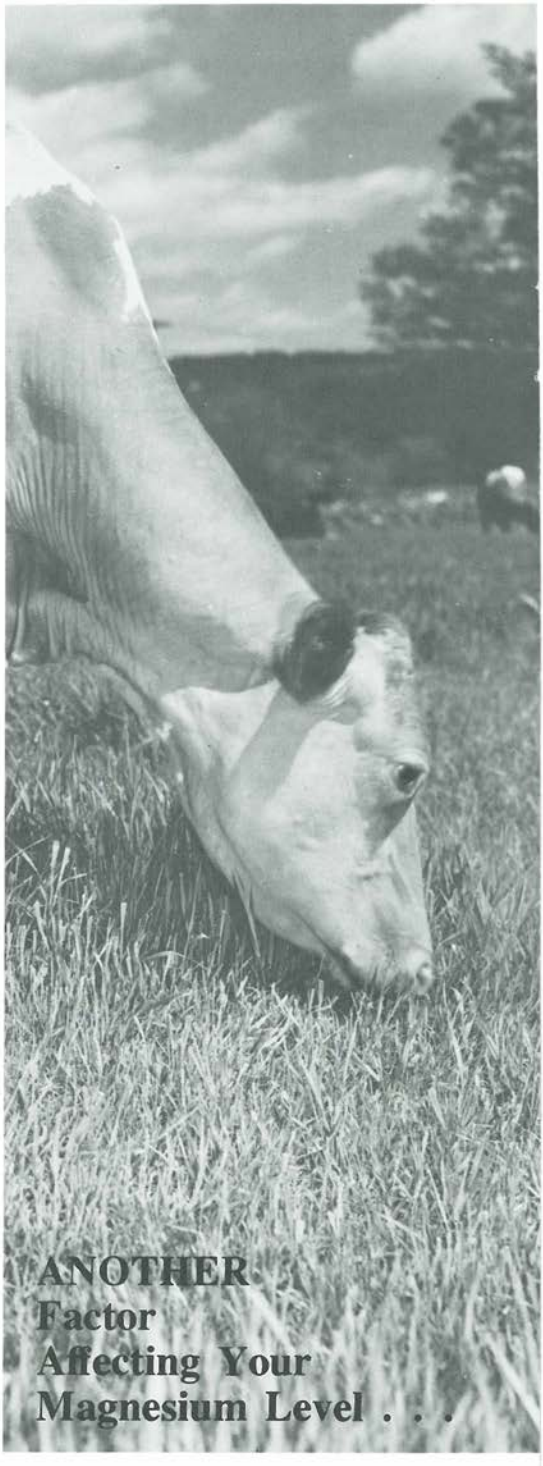
How BIG Is An Acre Of Land?

I ONCE ASKED an old gardener how much land he had and he said with pride that he had one acre. And he added, "It is a wonderful acre; it reaches to the center of the earth in one direction and it takes in the stars in the other." This man's farm included not only the pot of gold at the end of the rainbow, but it contained the entire rainbow.

The size of an acre of land varies directly with the size of the man who manages it. The larger the man, the larger the acre. I do not know that anyone has yet determined how large an acre of land really is; but judging from the size of a plant that a woman grows in a potful of soil, it must exceed all calculations that have yet been made. . . . A man is not the best farmer until his acre grows larger every year, in produce or in serenity or in both.—Dr. Liberty H. Bailey in "The Harvest."

BETTER CROPS, 1929

MARIA ELENA CLAASSEN
G. E. WILCOX
HORTICULTURE DEPARTMENT
PURDUE UNIVERSITY



ANOTHER Factor Affecting Your Magnesium Level . . .

MAINTAINING adequate magnesium in forage plants is receiving more and more attention because low magnesium has been associated with grass tetany or hypomagnesemia in ruminants.

Tetany strikes animals with blood serum contents of 5-10 ppm Mg, while normal animals have 13-20 ppm, Grunes reports.

Grass tetany generally occurs on grasses growing during cool weather, as in spring. It occurs on many perennial grasses and often on wheat and oats used as pasture. Grass tetany seems to hit when Mg concentrations drop **below 0.2% in forage.**

Reports from Holland and elsewhere have indicated high K and N concentrations in forages decreased Mg in the blood serum. Poultry manure, which contains more N than any other manure and much K, has caused problems. Clark and others have shown ammonium nitrogen (NH_4-N) in soils and sand culture positively decreased Mg and Ca in the plants.

So, we set up a greenhouse study to compare nitrate nitrogen (NO_3-N) and ammonium nitrogen (NH_4-N) at three K rates. We used corn as the indicator crop on two soils—Princeton sand and Fincastle silt loam.

		EXCHANGEABLE lb/A			
	pH	P	K	Ca	Mg
Princeton sand	6.3	245	135	591	62
Fincastle silt loam	6.8	9	60	3271	730

Our program included . . .

1—Three K rates equal to 0, 100, and 200 lbs per acre.

2—100 lb nitrogen per acre applied twice—preplant and 15 days after emergence—as $NaNO_3$ or $(NH_4)_2SO_4$ (1 ppm N-Serve).

3—A starter fertilizer, 11-37-0, at seeding.

4—Harvest 33 days after emergence.

FIGURES 1 AND 2 show how ammonium-fed plants contained LESS MAGNESIUM at O potassium (K) than the nitrate-fed plants at the highest K rate of 200 lbs per acre (100 ppm). Potassium rate did not significantly affect magnesium level of plants grown with ammonium nitrogen.

The same trend occurred with calcium: (1) Ammonium-fed plants containing LESS CALCIUM at O potassium (K) than nitrate-fed plants at highest K rate. (2) Potassium did not affect calcium level of ammonium-fed plants.

IN CONCLUSION, the way grass tetany fluctuates by seasons and in short terms implies factors related to brief periods of grass growth:

- **Low soil temperature** in spring could affect ammonification and nitrification processes enough to make ammonium forms of N the major N source for the plant.
- **Poultry manure** steadily releases ammonium nitrogen (NH_4-N) as it decomposes in the soil. This could reduce Mg content of the grass as our experiment did—and increase NON-protein nitrogen in the tissue.
- **Inadequate magnesium absorption** through the rumen may cause tetany, Teel said, complicated by the presence of ammonia or its reaction products. Ruminants have a hard time digesting herbage high in non-protein nitrogen. Proneness to rapid deamination leads to ammonia concentration.

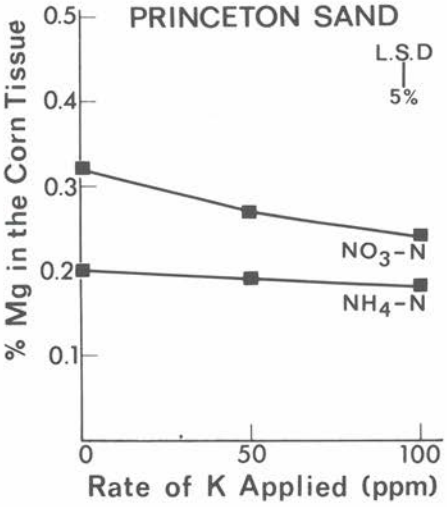


FIGURE 1

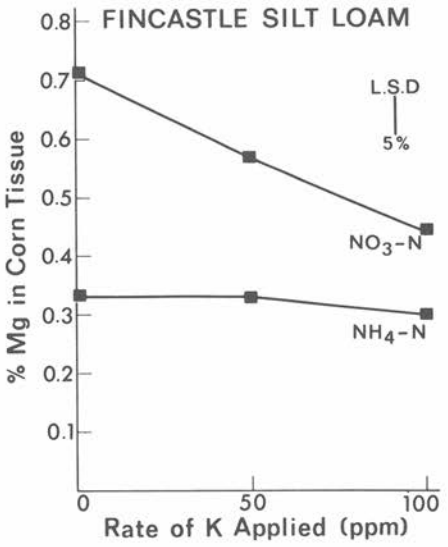


FIGURE 2

NEW
Sorghum Folder
Available

See page 3

THE LETTER was from the editor of a Midwest newspaper.

After approving a little column we had done on two great old retired teachers of agronomic know-how, he said today's young farm generation is not interested in the past.

Let's hope his view is wrong, in this case—because no nation has ever survived indifference to its heritage or its elders.

For this reason, we will observe the 50th birthday of our magazine in a different way . . . by running some memories in each issue of its 51st year. We will do it with pictures that go back decades in our file of freelance purchases and with text that starts in our 1923 issue.

The pictures will not document a thing. They will provide a few insights of a people who lived simpler, less pushy lives.

Lives loaded with chores . . . country stores . . . family reunions . . . special understandings of nature and her seasons and creatures . . . Saturday visits to town . . . spring planting and summer cultivating and fall harvesting . . . the three R's with one bell, one room, one teacher, and one well.

The text will show us why Albert Einstein once said he had conceived **"only two original ideas"** in his life. If that be true of him, then what about . . .? A very humbling thought.

FOR EXAMPLE . . .

Look for a **recent study** on why people leave farms. Does it report the difficulty of getting efficient farm help . . . mechanization reducing labor needs . . . shorter hours, higher wages in town . . . smaller profit margins in farming? If so, then it agrees with a **1923** BETTER CROPS report.

Look for a **recent study** on the need for pasture fertilization. Does it report fertilizer increasing not only feed, but also protein content and length of feeding time? If so, then it agrees with a **1931** BETTER CROPS report.

Look for a **recent study** on the role of potash in helping crops face winter rigors and spring frosts. Does it call potash the "anti-freeze" for such crops? If so, then it agrees with a **1936** BETTER CROPS report that labeled potash "the anti-freeze solution for the sap of the potato vine."

We could cite many reports: How science was improving disease resistance and crop quality (even sweet potato shape) with balanced fertility **in 1925** . . . making soil and plant tests a universal tool to detect nutrient needs **in 1945** . . . proclaiming inadequate pasture fertilization a national neglect **in 1965.**

The point seems clear. Much of what we do today our ancestors either did or tried. You can count original ideas in 1974 on the same fingers you could count them in 1924—and probably come up with Einstein's two.

Maybe that's why we are too busy to look back. The past can be a very frank teacher, assuring us certain conditions haven't changed since the dawn of human nature:

True success comes from persevering, especially the impossible.

Work can be a bigger blessing than leisure. Cemeteries contain many young residents who got there early not from work, but from the dissipations of leisure handed them by well-meaning parents.

Simplicity—of dress, speech, manner, habit—is the truest dignity there is.

Decent character is worth more than anything you can possess. It will always win in the end. Not always at first—but in the end.

Kindness is one of the surest signs of true power, arrogance the surest sign of insecurity and weakness.

Example—the example YOU set—will leave a lasting impression on more people than you can imagine. A chain reaction for good or bad.

Duty is more than a responsibility, but actually an obligation.

Thrift will enable you to feel as independent as any man needs to feel.

Patience is not only a virtue, but also a very healthy trait for stomach, heart, and mind.

Average talent faithfully exercised can become rather special talent.

Don't ask me why—but each of these points jumped out at me during the recent journey back to our 1923 issue. Maybe because they are what 50 years of BETTER CROPS have **really** reported.

Why People LEAVE Farms . . .

AT A RECENT HEARING staged by a Special Industrial Commission appointed by Congress, thousands of farmers, their wives, country bankers and small town merchants from every quarter of the United States were asked to state the reasons for the persistent city-ward trend of farm workers that has been so evident in recent years.

The deductions in order, briefly stated, are as follows:

The productiveness of modern farm labor through improved machinery calls for less human endeavor to produce the world's food supply.

The difficulty of getting efficient help on the farm has caused many farmers to quit and move to the city.

The fact that the farm does not furnish work for all of the sons in large families.

The desire for an exciting social environment leads many young people to leave the farms.

The absence of good roads and good schools, and the long distances children must walk to school.

Higher wages paid in the cities.

Shorter hours of labor in the city—six to eight hours in unionized industries as against sixteen hours a day on the farm.

The greater opportunity for achieving success and distinction in commerce and industry in the city.

The opportunity for young people to advance themselves in the city.

The opportunity for all the members of large families to secure steady employment.

The idea some young rural people entertain that farm work is lowering and degrading.

Some young people have to work so hard on the farm that the farm becomes distasteful to them.

The seclusion and isolation of farm life, particularly during the winter months.

The lack of home comforts on the farm in the way of up-to-date conveniences.

The desire of young people to obtain a high school and college education causes them to go to the cities and subsequently to enter into some profession. (At the Pennsylvania State College last year the great agricultural counties of Lancaster, Berks, Chester and York furnished only one-third as many students in agriculture as Philadelphia and Pittsburgh.) The young people from the country are flocking to professional schools and business positions in the cities.

The desire of some country people to get rich quick and the feeling that all they need to do is to leave the farm and start in business in the city.

The high price of land and the large amount of capital needed to successfully engage in farming keeps many from going into it.

The city offers a greater choice of vocations.

There are more conveniences and church privileges in the city.

The small margin of profit in farming as compared to city vocations.

BETTER CROPS, 1923

No Witchcraft

IN THE PUSH AHEAD for new science in agriculture, how many of us stop to reflect on progress already made—progress which has revolutionized our agriculture within the last century?

We are amazed at some of the great machines constantly being developed to increase efficiency. We marvel at new discoveries. But do we realize what science has meant to our oldest, most important industry?

A good mental picture of this progress was drawn for the 60th convention of the Farm Equipment Institute in Chicago last fall by **Dr. Earl L. Butz, Head of the Department of Agricultural Economics, Purdue University.**

"Let us imagine for a moment," Dr.

Butz said, "that a good Egyptian farmer in the day of Moses could have been brought back to life in the days of the Caesars, some 12 centuries later, and placed on a good farm in Italy, then the most advanced nation of the world. He could have farmed with practically no additional instruction, for the art of agriculture had changed little if any in the intervening 12 centuries.

"Let us now imagine that same farmer brought back to life on a good English farm in the days of Shakespeare, some four centuries ago. He still would have been a pretty good farmer with no additional instruction.

"Now let's bring that same ancient Egyptian farmer to the Eastern shores of America 150 years ago and put him on Thomas Jefferson's farm, one of the advanced farms of that day. He still would not have found the art of farming very different from what he had practiced in Egypt nearly 3,000 years earlier.

"He still would have used the same motive power, the same crude implements, and a large amount of hand labor. He would have known very little about fertilization, improved varieties, high-producing breeds of livestock, and the hundred mechanical and electrical gadgets on our modern farms.

"Now imagine for a moment that same farmer on a modern American farm. He would be completely bewildered. He would not even recognize the working end of the tractor parked in the farm yard. He would probably raise the cry of 'witchcraft' at all the wonderful things performed by mechanical and electrical power. It would require hard years of instruction and apprenticeship for him before he could even begin to operate the modern American farm."

Looking ahead, Dr. Butz sees a future filled with interesting challenges. Science will dominate the next century. Brains will continue to replace brawn in American agriculture. Man will direct power rather than supply it. Production per man will continue to increase.

BETTER CROPS, 1954

"But Never ACRE Yields . . ."

FARMERS USE FERTILIZERS because they hope to make a profit. There is no other argument which is sufficient to insure their long continued use.

As R. E. Stephenson, Soil Specialist of the Oregon Experiment Station, points out, **"Fertilizers may improve the soil, but unless crop increases and bankable returns are reasonably sure at the same time, few will continue to fertilize simply for soil improvement."**

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

The practical question arises in times of depression: **Shall a farmer cut down or eliminate entirely the use of commercial fertilizers?**

The answer as pointed out by Mr. Stephenson is found in the past. Seldom has anyone lost money producing big yields and almost never has one profited much from low yields. He concludes, **"It may be desirable to cut down the acreage, but never the acre yields."**

As agricultural economists point out, there is one rule to which there is no exception. If a farmer is to make a profit, he must get higher than average yields. **It is a hard but fast rule that in spite of overproduction, any hope of profit depends upon the highest yield at the lowest cost per unit of production.**

Therefore, cutting down acreage may be desirable and necessary, but cutting down the use of fertilizers is out of the question for any progressive farmer who can use fertilizers at all in his crop production system. **In times of depression, the question of the right fertilizers to use and how to use them becomes vastly more important than in times of relative prosperity.** It is for these reasons that there are evidences

on every hand of an intensified interest in fertility problems.

BETTER CROPS, 1931

Licking Corn Rheumatism

BY ALBERT A. HANSEN

A SHORT TIME AGO I had the pleasure of hearing a lecture by Dr. E. V. McCollum, discoverer of vitamins and nutrition expert extraordinary.

Among other remarkable statements he declared that over 50 percent of our children suffer from a disease called rickets. Rickets result from faulty nutrition, he said, and the trouble can be avoided or cured by adding a small amount of cod-liver oil to the child's diet.

Unknown to many of us, the plant world also has nutrition diseases with remedies just as simple as the control of rickets. Prominent among the crops that suffer in this wise is corn, but, fortunately, G. N. Hoffer and J. F. Trost have recently discovered how to diagnose and cure nutritional trouble in corn.

Their work with plants is similar in many respects to the work of McCollum with animals. This team of plant nutrition experts is part of the botanical staff of the Purdue University Agricultural Experiment Station and their work is being conducted with the cooperation of the Office of Cereal Investigations at Washington, D. C.

Perhaps the most valuable result of their research is the discovery that **much of the dwarfing and poor yielding of corn is due to faulty nutrition, the same as rickets in children, and they have found a simple method of diagnosis and an equally simple prescription to cure the trouble.**

In the case of corn, however, the seat of the trouble is in the joints, so perhaps we can better call it corn rheumatism instead of corn rickets. And corn rheumatism is a common disease throughout the length and breadth of our land wherever the soil has been overworked with corn.

HAVE YOU EVER experienced trouble in the shape of poor yields from corn plants that seemed to reach normal height, but refused to ripen ears properly?

Next time you have difficulty of this character, slit a few of the corn stems lengthwise and the chances are you will find the interiors of the joint are much darker than the remainder of the stem tissue. The darkened areas are due to an accumulation of iron and other metals that break down the tissues of the joints, thereby wrecking food transportation systems of the corn plants and the backward ears are a direct result.

Now comes the most valuable part of this intersting discovery. According to the results of extensive field and laboratory tests conducted by Hoffer, Trost, and their associates, the nodal accumulation of metals is due purely and simply to a lack of available potash in the soil and the trouble can definitely be prevented by the addition of potash.

In other words, we have here a perfectly simple field test to detect the need of available potash in the soil.

Perhaps in addition to ripening ears slowly (or not at all), the corn in some parts of your county is also considerably stunted and a lengthwise section of the stem reveals the tell-tale darkened joints. Well and good—once more Dr. Hoffer has prescribed the remedy.

In this case, the trouble is clearly due to a lack of both available potash and phosphorus in the soil.

MANY FARMERS and experiments have attributed these common difficulties to sour soils, but extensive field tests have failed to support this theory. On the other hand, the application of potash, either as salts or in manure, to soils that have habitually produced normal-sized, dark-noded, low-yielding corn plants has invariably corrected the trouble.

Potash is the cod-liver oil that cures the "rheumatism" in the joints of corn. Likewise, when the plants are stunted and the interior shows dark-colored joints, numerous field tests have rarely failed to bring the yields back to normal after the application of potash and phosphorus.

As a result of the work of Hoffer and

Trost, the long-looked-for simple field tests to detect the need of potash and phosphorus on corn land have at last been discovered.

Now let the specialist get busy with his knife, slit the stems of dwarfed and poor-yielding corn and examine the interiors for darkened joints. And when the shady joints are found, the potash or potash and phosphorus remedy is there to prescribe.

BETTER CROPS, 1924

Tomorrow's Farmer

BY W. A. FREEHOFF

RECENTLY THE EDITOR of a leading farm paper, who is himself a successful Ohio farmer, predicted that in the very near future a great many large corporations would spring up which would operate on a more extensive scale than is possible for the average farmer.

This statement caused wide-spread comment and was quite enthusiastically assailed from many quarters. Somehow the idea has taken firm root in this country that the ideal farming system is one based upon a foundation of the small land-owning operator, and that centralization is impractical and undesirable.

Students of social and political economics do not believe that the British system of tenant farming is the proper thing for us, but apparently all is not well with the owner-operated farm idea. There is a tremendous political turmoil over the whole agricultural situation, which finds the corn belt in direct political opposition to the commercial East.

Farmers of the Midwest have come to believe that unless they are given systematic political help they will be unable to operate with sufficient profit to make it worth while. Their leaders, when forced to admit that a great many farmers actually have accumulated a great deal of wealth and a large number are able to operate with profit, claim that the biggest material accumulations have been made because of the large rises in the value of land.

Regardless of what land may be worth today, if a farmer paid say half its present value 30 years ago, he is actually confronted with a very much smaller overhead than the man who invests on today's figures. Theoretically, of course, the two have the same overhead because if the man who bought 30 years ago were to sell now and put his money out at interest he would probably be doing better than if he continued farming.

AT THE PRESENT, American farming seems to be undergoing transition from the development period of the day of cheap land, low taxes, and cheap labor to the day of high-priced land, high taxes, and expensive labor. When the transition is fully accomplished, we may well pause to give consideration to what the farmer will then be able to do.

The actual mechanics of farming are different today than they were in the times of our forefathers, and there is a mechanical transition going on which indicates even greater use of mechanical power. Should this be the case, it is quite logical that the farms of tomorrow will be owned and operated by corporations which have money enough to swing such a proposition.

At the present time, however, only a few agricultural corporations have been able to operate at a profit. There are a great many large farms or "estates" scattered in different parts of the nation owned by men who have made their money in other fields and are now gentlemen farmers. Mostly these establishments are a hobby in which profits are subordinated to considerations other than utility.

It is very seldom that a manager may be found who can make such farms pay. There are others, however, which are operated by corporations and where the proposition of "putting on a front" does not enter. The number of such establishments is increasing and more of them are making some money for their stockholders.

IT IS POSSIBLE also that a cooperative system, in which individuals or corporations share the work and the proceeds with the tenants, may soon be more extensively developed. The landlord or owner supplies

the land and sometimes the livestock and machinery.

There are many different types of leases of this kind, but all of them require that the tenant furnish the labor and an agreed-upon percentage of operating costs. In such cases, the landlords are in a position to be of great help to the tenants by being able to supply seed and merchandise at wholesale prices.

I am inclined to think that this system headed by both wealthy individuals and stock corporations holds great promise in the future and will probably develop to as great an extent if not greater, than that of large corporations operating farms by hiring all their own labor.

In spite of the development of these agricultural enterprises, I am not very much concerned over the fear that small owner-operated farms of this country will be done away with. **American farmers are extremely independent and most of them would rather farm and "be their own boss" than to be on the payroll of large corporations.**

The type of man who will fit best into the super-farming operations is probably the man from the city who wants to get away from the hurly-burly of metropolitan life to a quieter, and if you please, saner existence in our rapidly disappearing "wide open spaces."

At the rate which our cities are growing and our industries developing, it stands to reason that they will continue to overlap the country at an increasing pace.

This will make it hard to determine just where the country ends and the city begins. It means that in the immediate neighborhood of large towns there will be a great increase of small farms devoted mostly to market gardening.

SOME INDUSTRIAL LEADERS believe it possible to develop a system whereby factories concentrate on production in the winter months and release at least part of their labor in the summer to the farms. The owner of a small farm can develop a nice home and make a little money off his land and at the same time increase his income by working in the factories.

Just to what extent such development actually will occur is hard to say. It is quite probable that there will be at least a partial development of this system in some industries and in certain localities.

The farmer of the past has been highly individualistic and even today he has not lost all of his clannishness. In fact, at the present time the farmer is a more powerful political unit than at any time in the past. It stands to reason that if there is no radical change in the farming methods or improvement in the financial condition of the rank and file of the farmers that this political cohesion will be intensified in the future.

When all the farmers are making money, they are not going to be worried about who is going to be the next president or whether or not congress will pass relief measures.

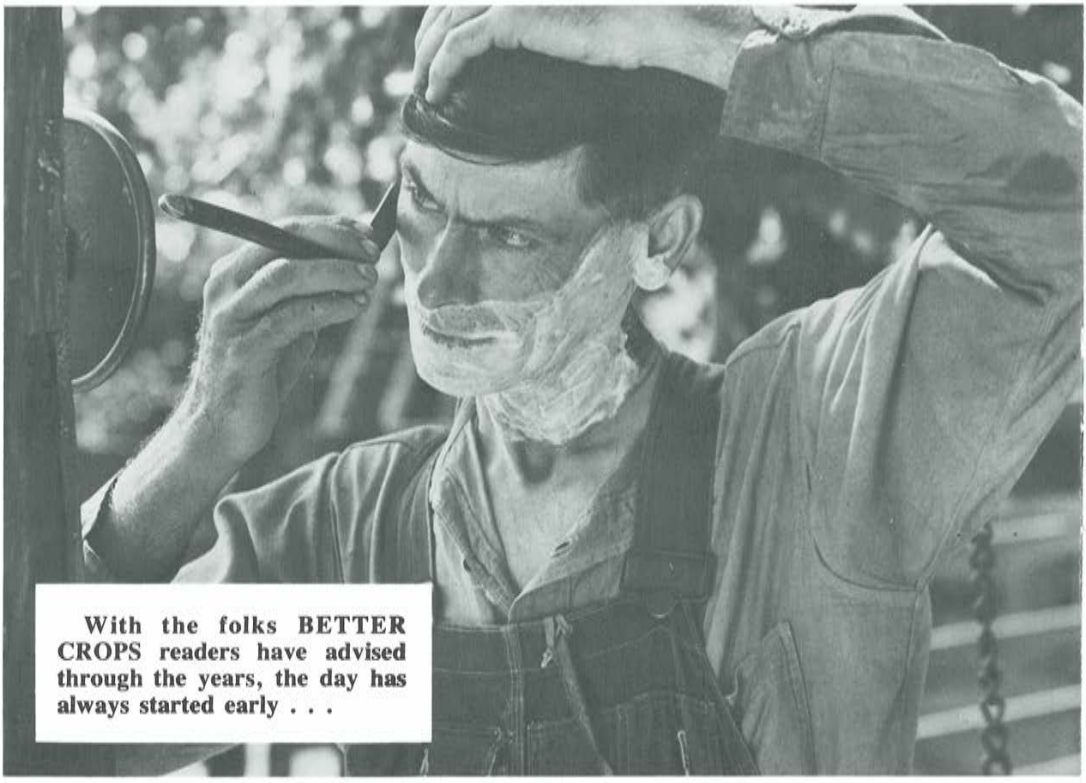
Irrespective of what happens to agriculture along mechanical and organization lines, the social conditions of the future farmer will be vitally different from that of the past. With radios having almost complete possession of the farm, with nearly every farm family having one or more cars which connect their homes with the nearest city by means of quick and easy journeys over improved roads, the farmer cannot help but come to think and act in terms of the city.

BETTER CROPS, 1928

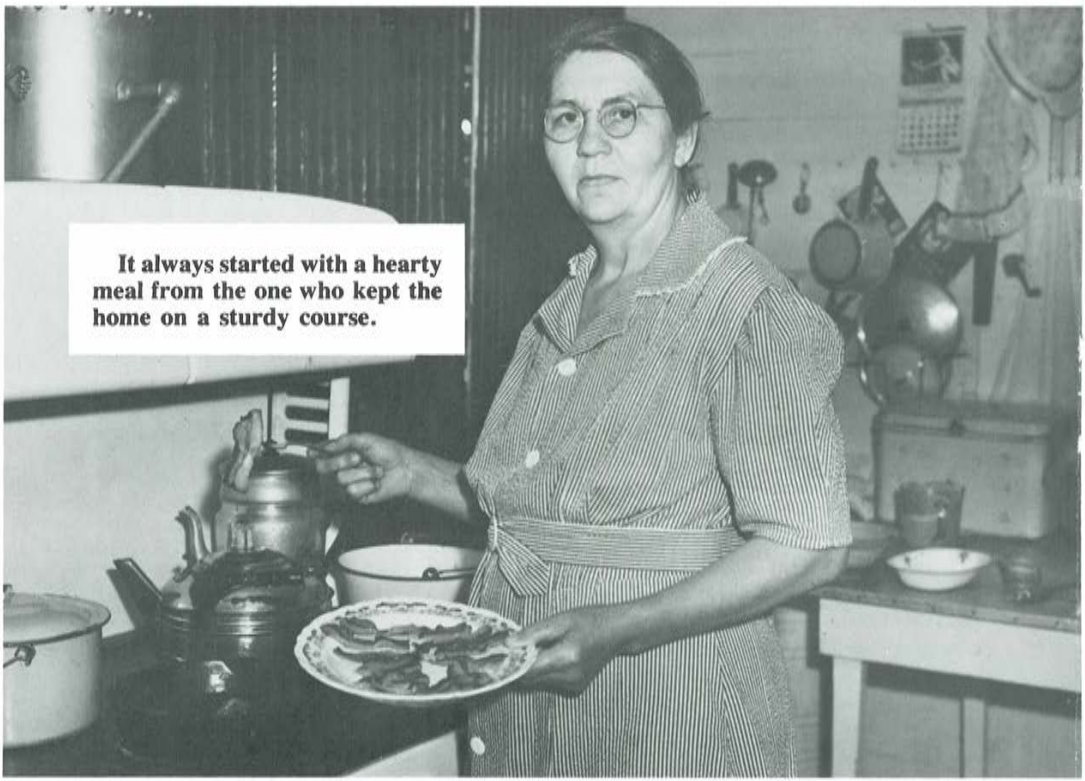
THIS MAGAZINE'S files go back a half century in pictures purchased from early freelancers who submitted regularly to BETTER CROPS, as well as article pictures from official agriculture.

On the next 14 pages, we present a few of these prints in the first pictorial observing this magazine's 50th birthday. We wrote the legends in 1974 to symbolize some of the heritage this journal has served since 1923.

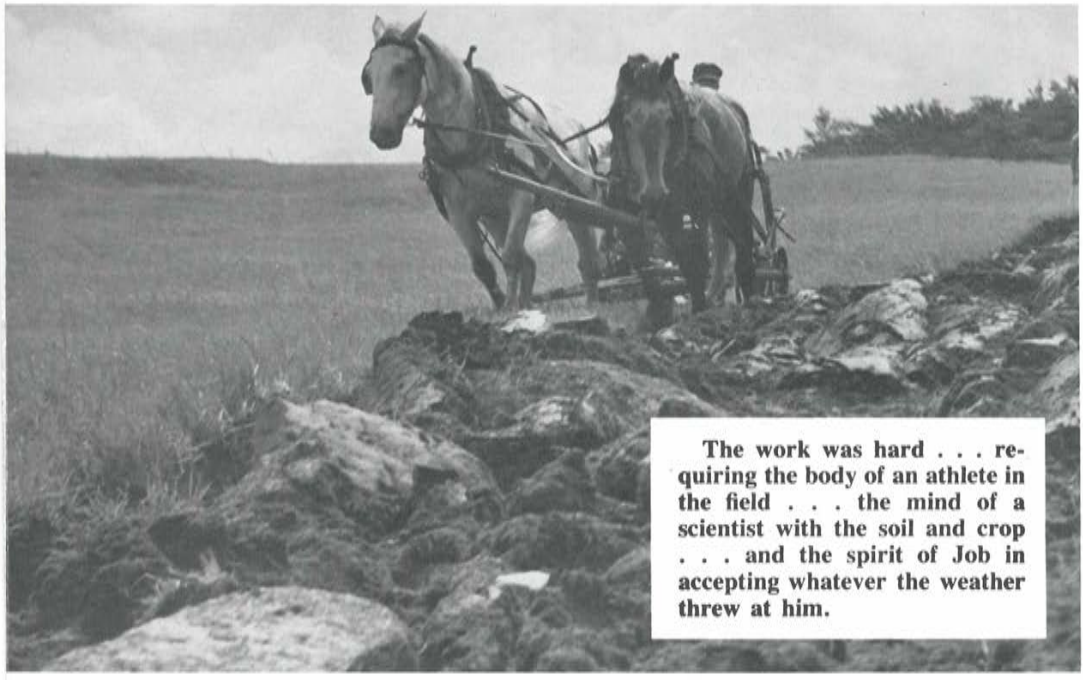
Picture credits by page numbers are: J. C. Allen: Page 18 top, page 23 full, page 24 bottom, page 25 bottom, page 27 top, page 28 full. J. W. McManigal: Page 20 top, page 22 top and bottom, page 26 bottom, page 30 top, page 31 top and bottom. H. Armstrong Roberts: Page 19 top and bottom. Cy La Tour: Page 26 top, page 30 bottom. A. M. Wettach: Page 25 top. H. M. Lambert: Page 21 full. C. B. Sherman: Page 29 top. Dearborn: Page 29 bottom. George Johnson: Page 27 bottom. W. H. Boller: Page 24 top. F. J. Hurst: Page 18 bottom, page 20 bottom.



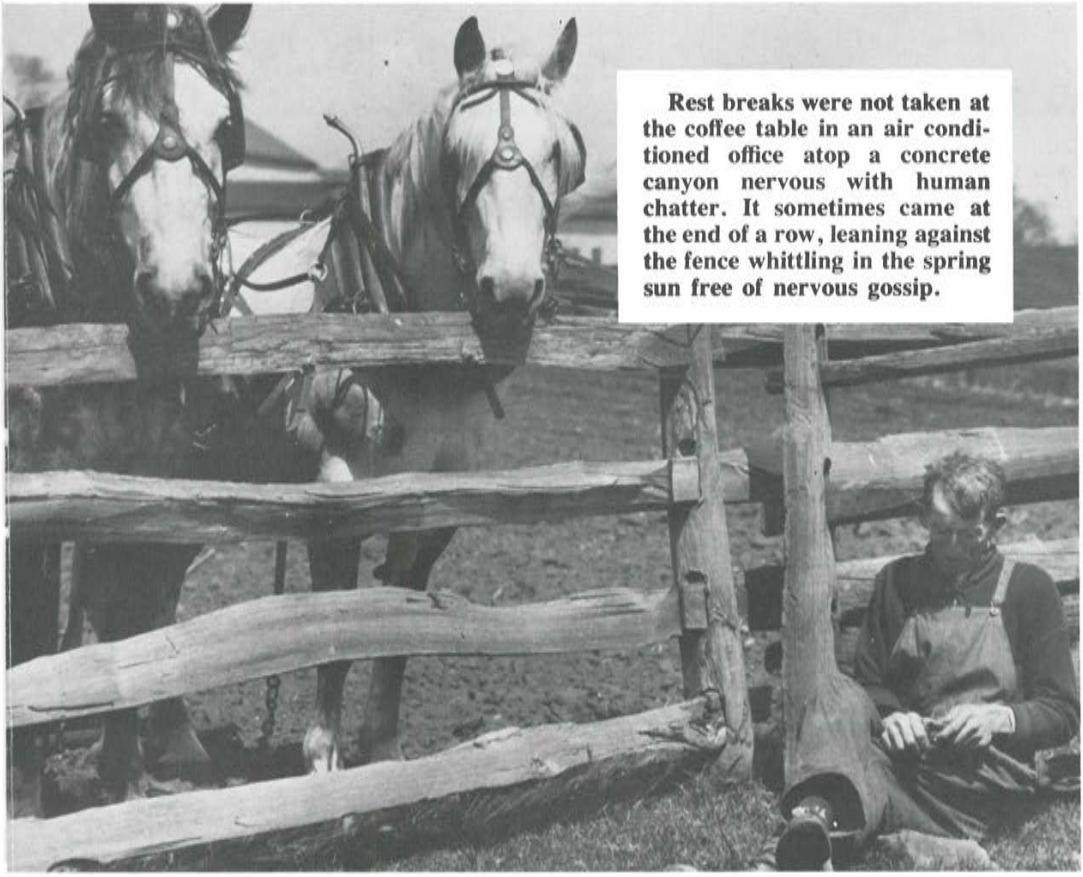
With the folks BETTER CROPS readers have advised through the years, the day has always started early . . .



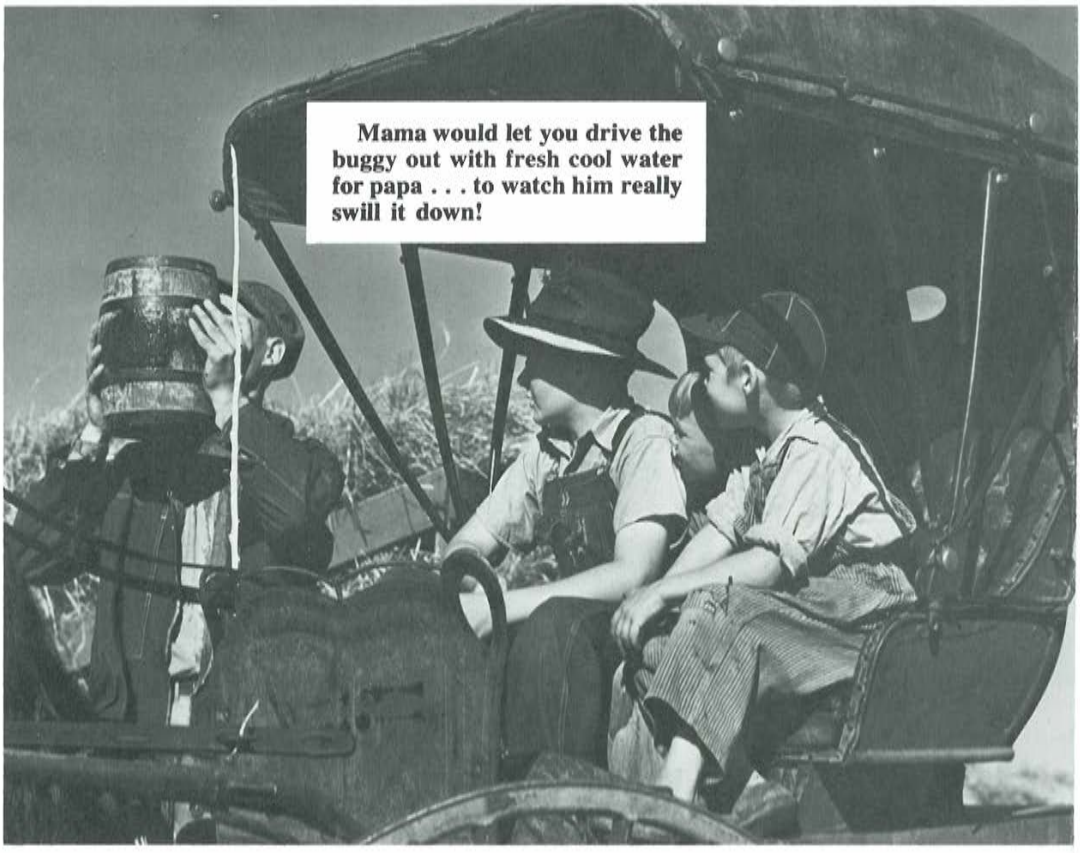
It always started with a hearty meal from the one who kept the home on a sturdy course.

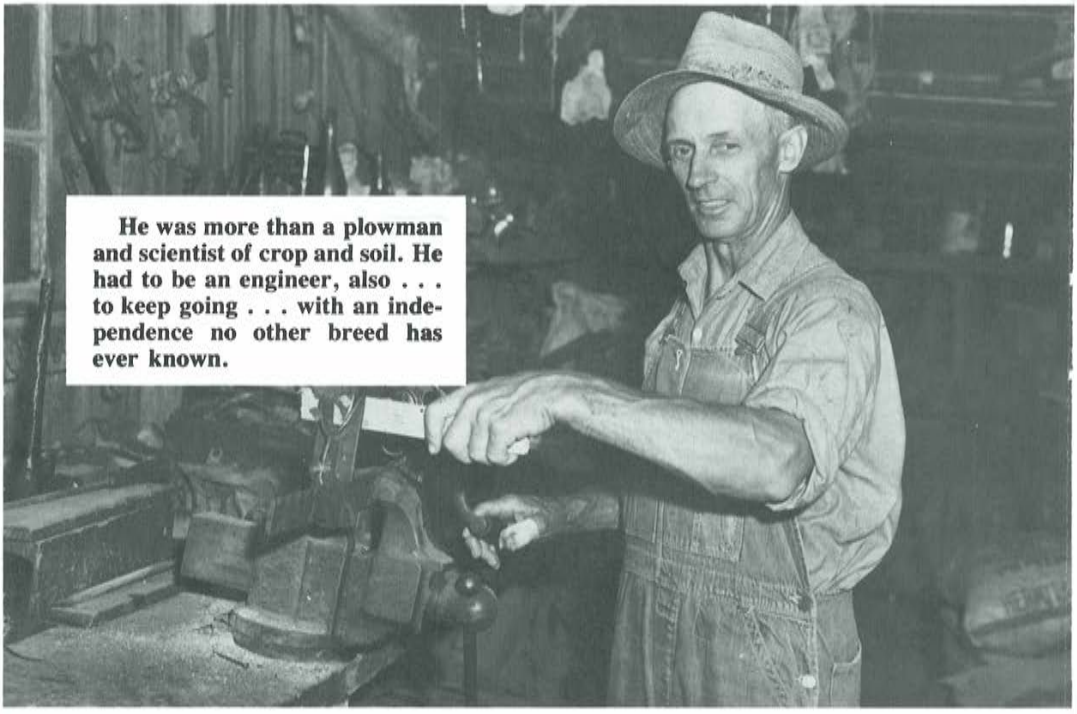


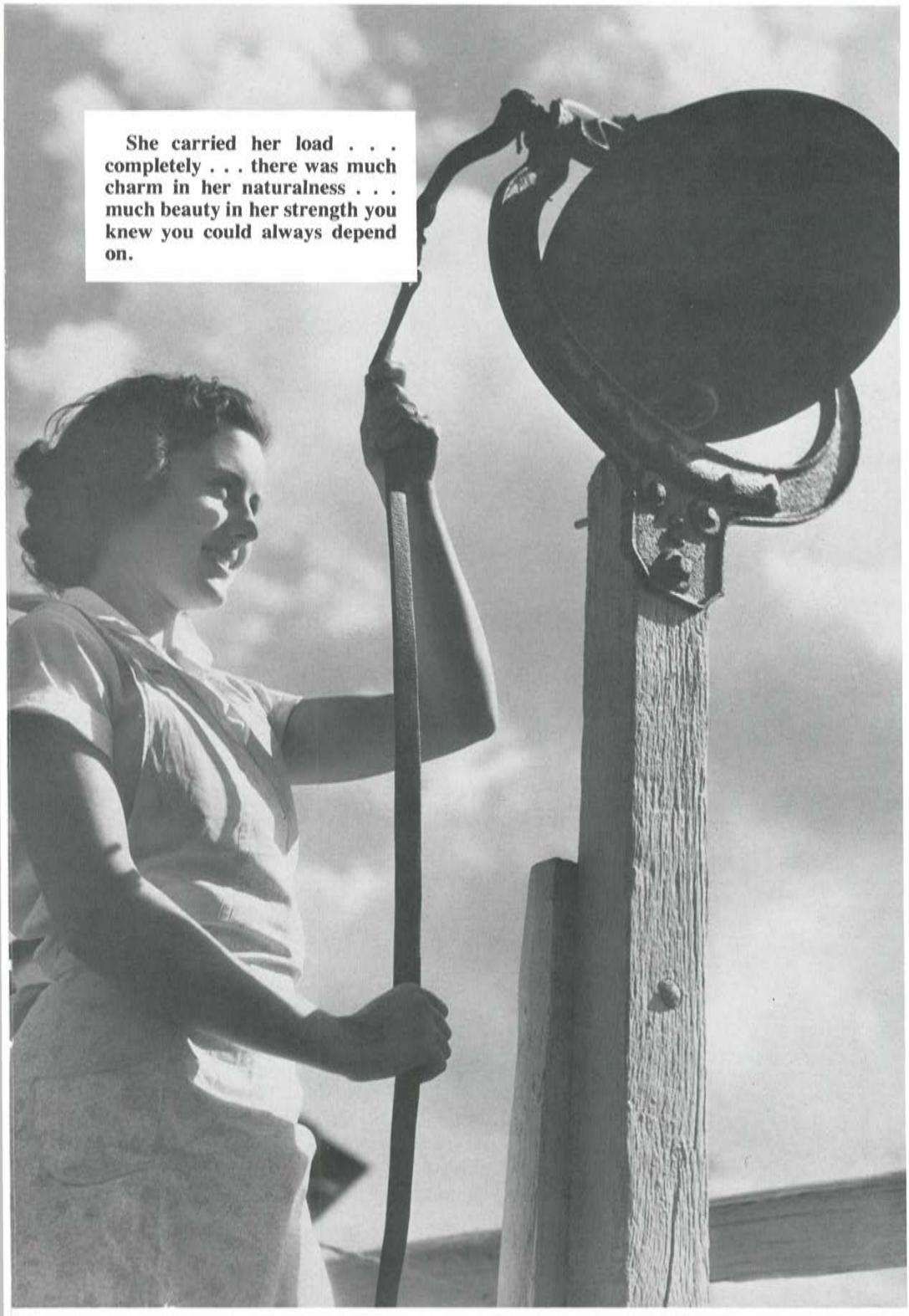
The work was hard . . . requiring the body of an athlete in the field . . . the mind of a scientist with the soil and crop . . . and the spirit of Job in accepting whatever the weather threw at him.



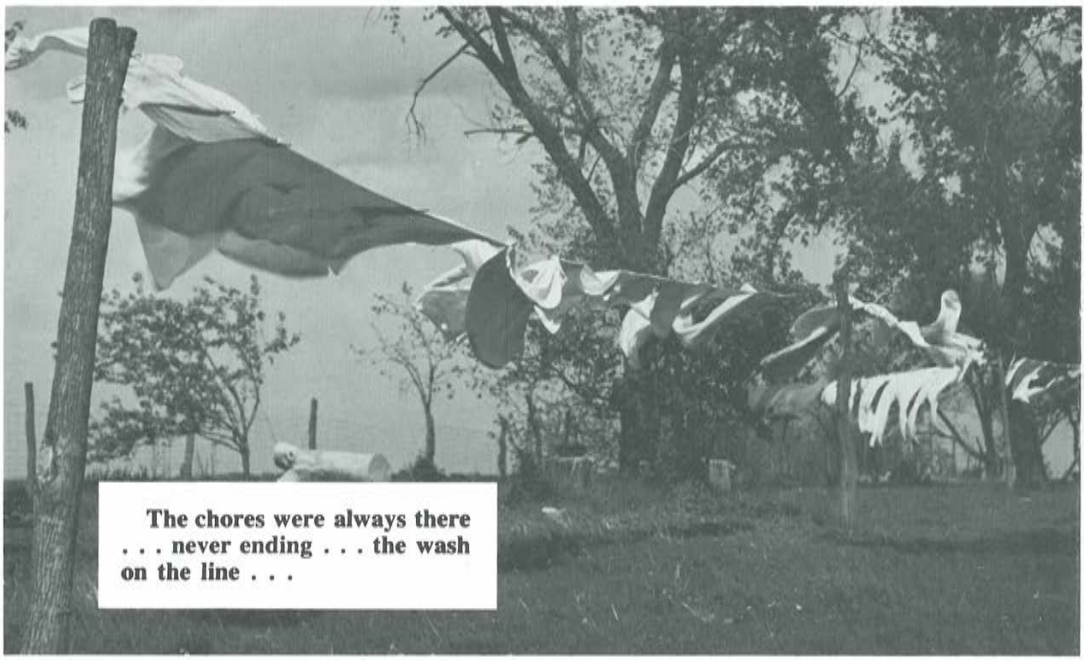
Rest breaks were not taken at the coffee table in an air conditioned office atop a concrete canyon nervous with human chatter. It sometimes came at the end of a row, leaning against the fence whittling in the spring sun free of nervous gossip.


Mama would let you drive the buggy out with fresh cool water for papa . . . to watch him really swill it down!


He was more than a plowman and scientist of crop and soil. He had to be an engineer, also . . . to keep going . . . with an independence no other breed has ever known.

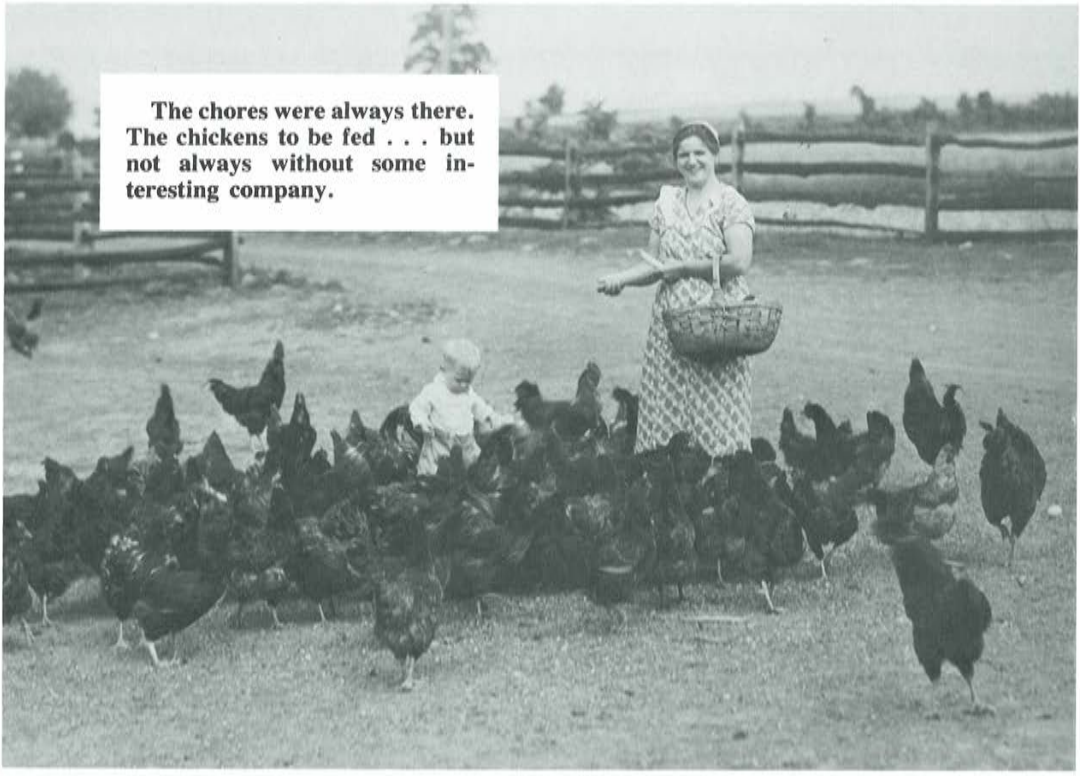

She carried her load . . . completely . . . there was much charm in her naturalness . . . much beauty in her strength you knew you could always depend on.

And on the way to dinner it was washup time . . . sometimes father and son side by side . . . in a life that rarely spoiled a son nor fattened a father.

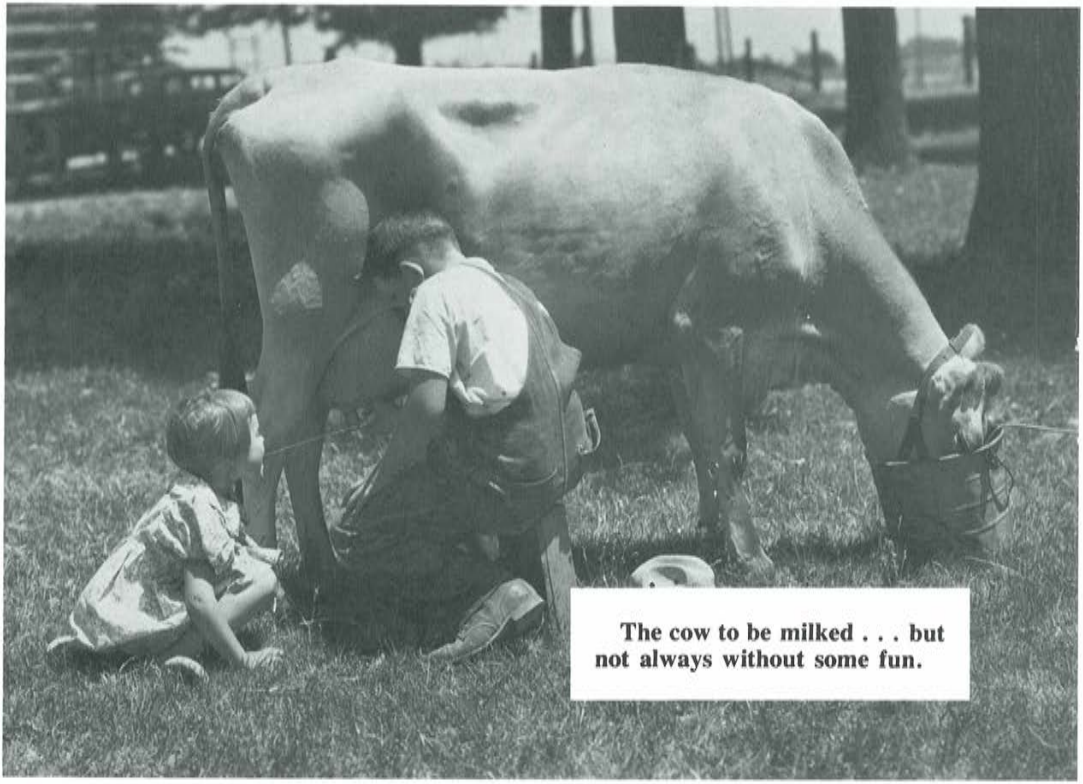


The chores were always there . . . never ending . . . the wash on the line . . .

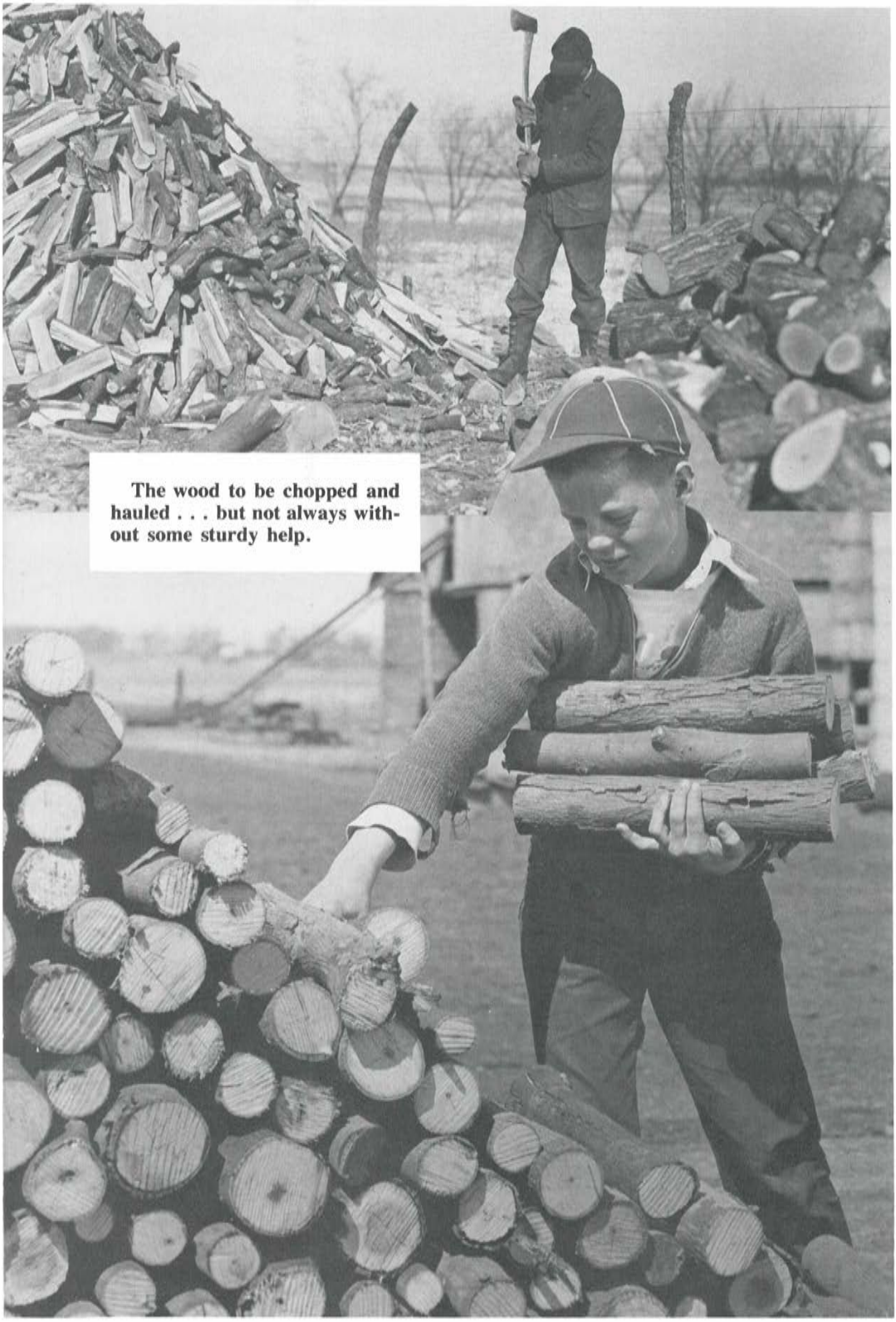
Things weren't often store-made . . . they were mostly mama-made . . . and patched right on the spot when needed. Such young-uns rarely grew up to pay psychiatrists $50 a visit to assure them their mother really did love them—after all.



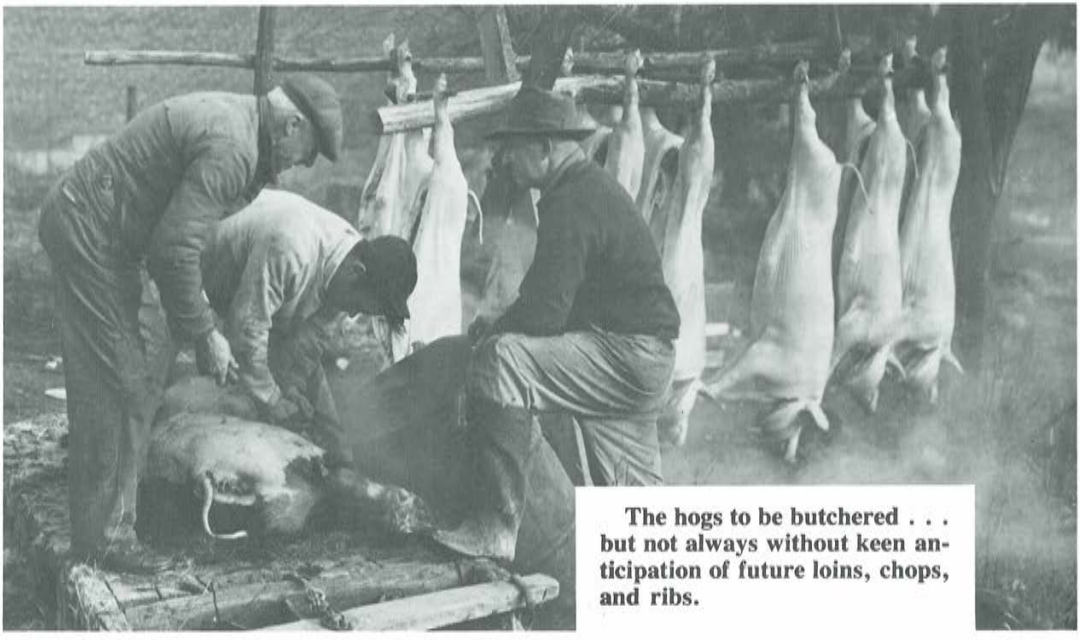
The chores were always there. The chickens to be fed . . . but not always without some interesting company.



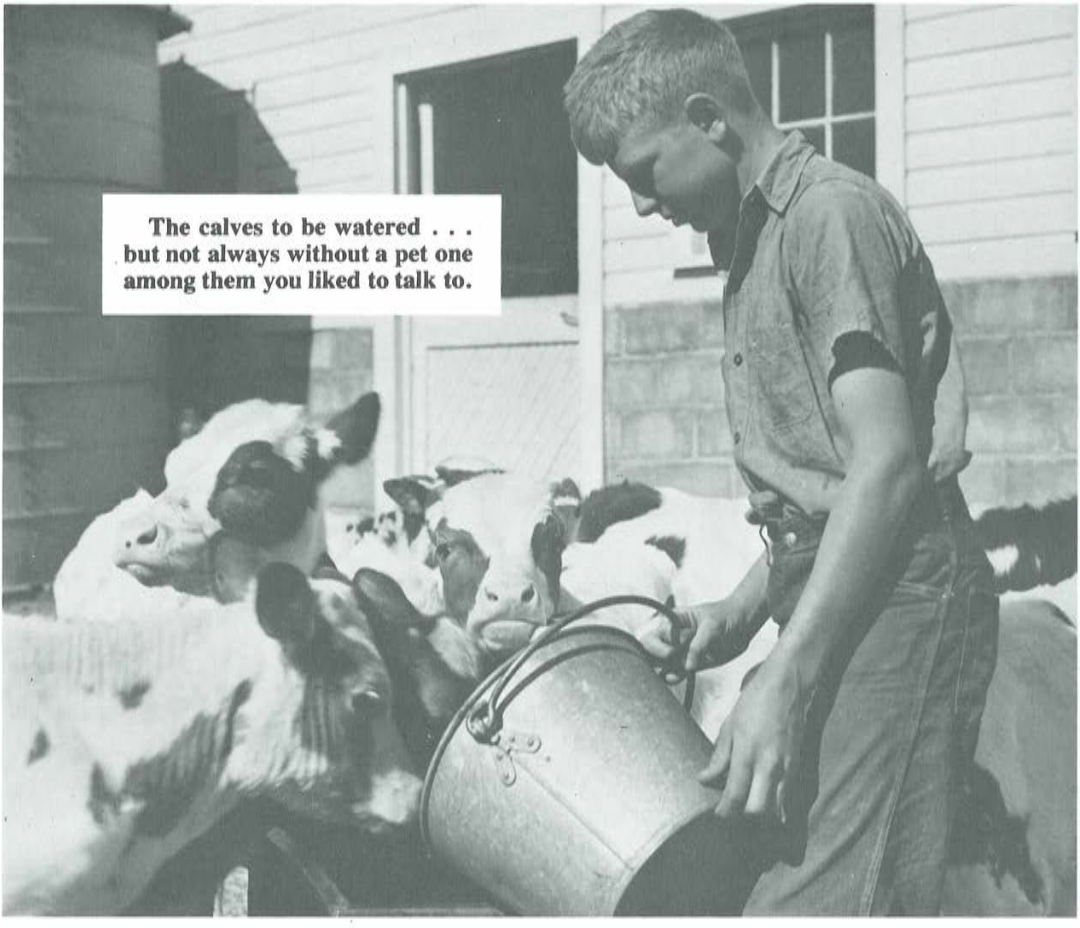
The cow to be milked . . . but not always without some fun.



The wood to be chopped and hauled . . . but not always without some sturdy help.

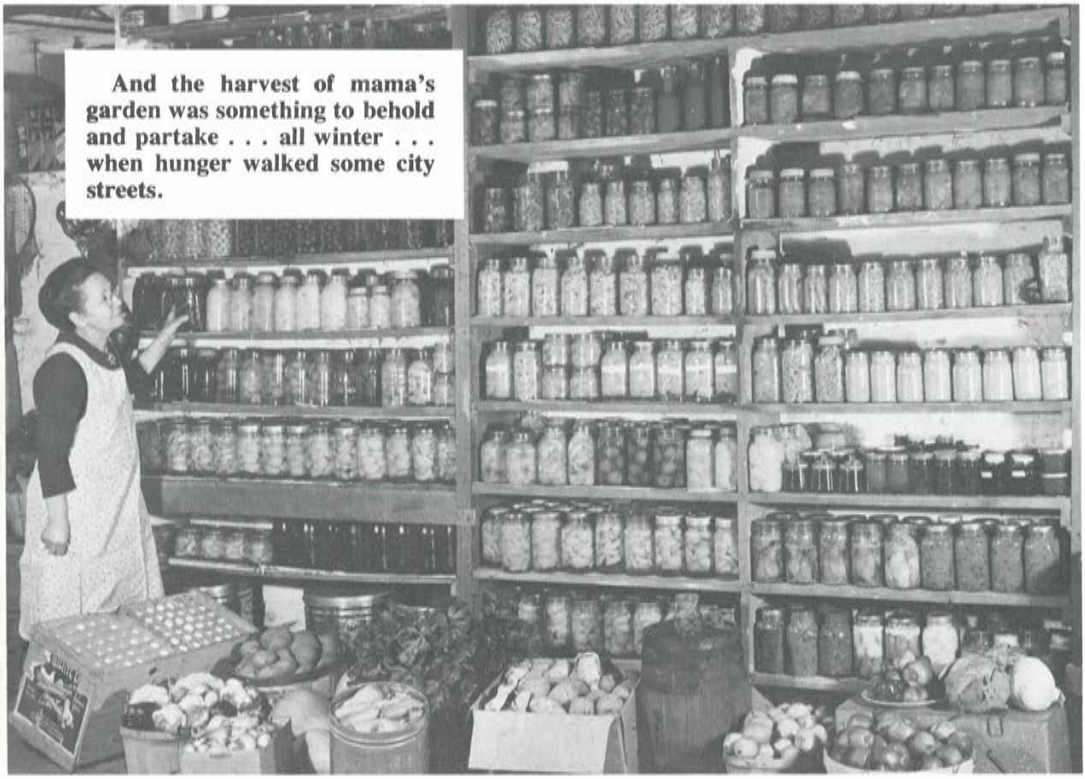


The hogs to be butchered . . . but not always without keen anticipation of future loins, chops, and ribs.

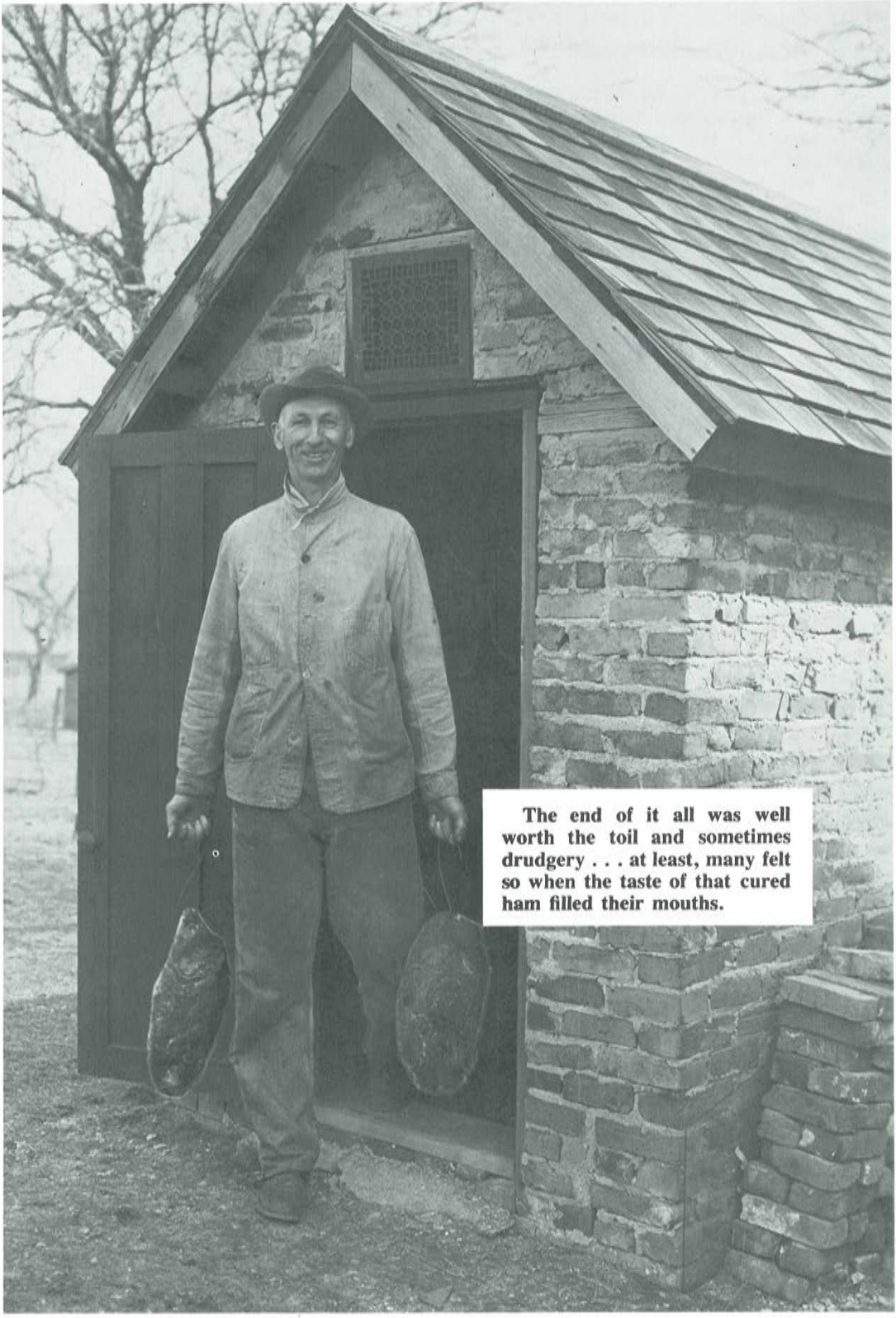


The calves to be watered . . . but not always without a pet one among them you liked to talk to.

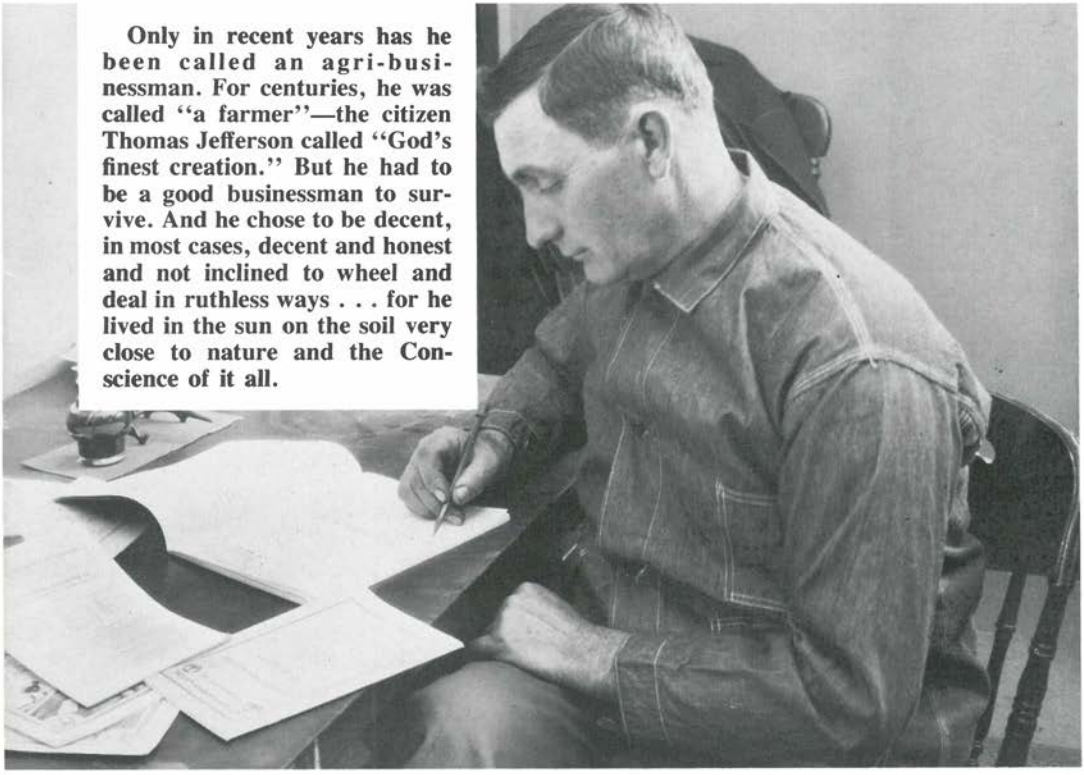
The garden to be tended . . . but not always without some tenders listening for the familiar hum to start about another garden where folks are walked with and talked with and assured they are the Creator's own.



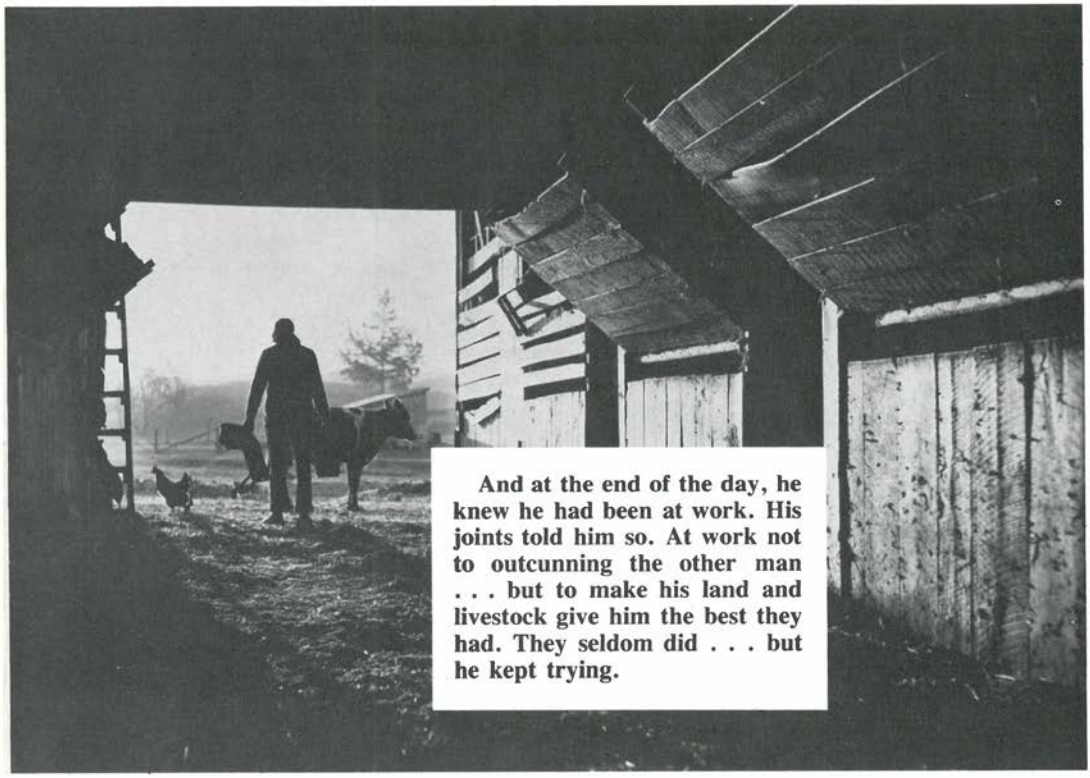
And the harvest of mama's garden was something to behold and partake . . . all winter . . . when hunger walked some city streets.



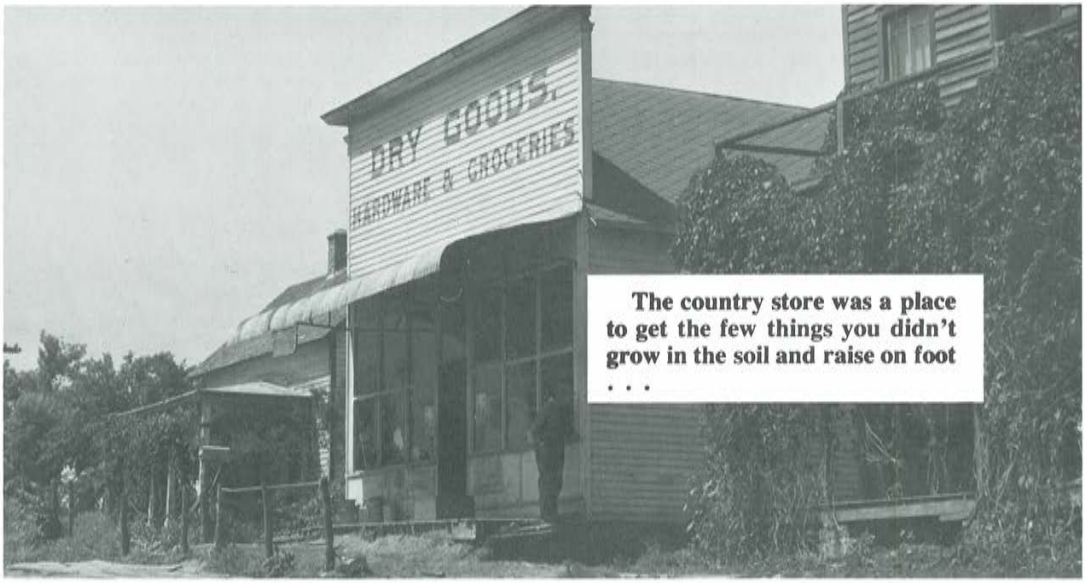
The end of it all was well worth the toil and sometimes drudgery . . . at least, many felt so when the taste of that cured ham filled their mouths.



Only in recent years has he been called an agri-businessman. For centuries, he was called "a farmer"—the citizen Thomas Jefferson called "God's finest creation." But he had to be a good businessman to survive. And he chose to be decent, in most cases, decent and honest and not inclined to wheel and deal in ruthless ways . . . for he lived in the sun on the soil very close to nature and the Conscience of it all.

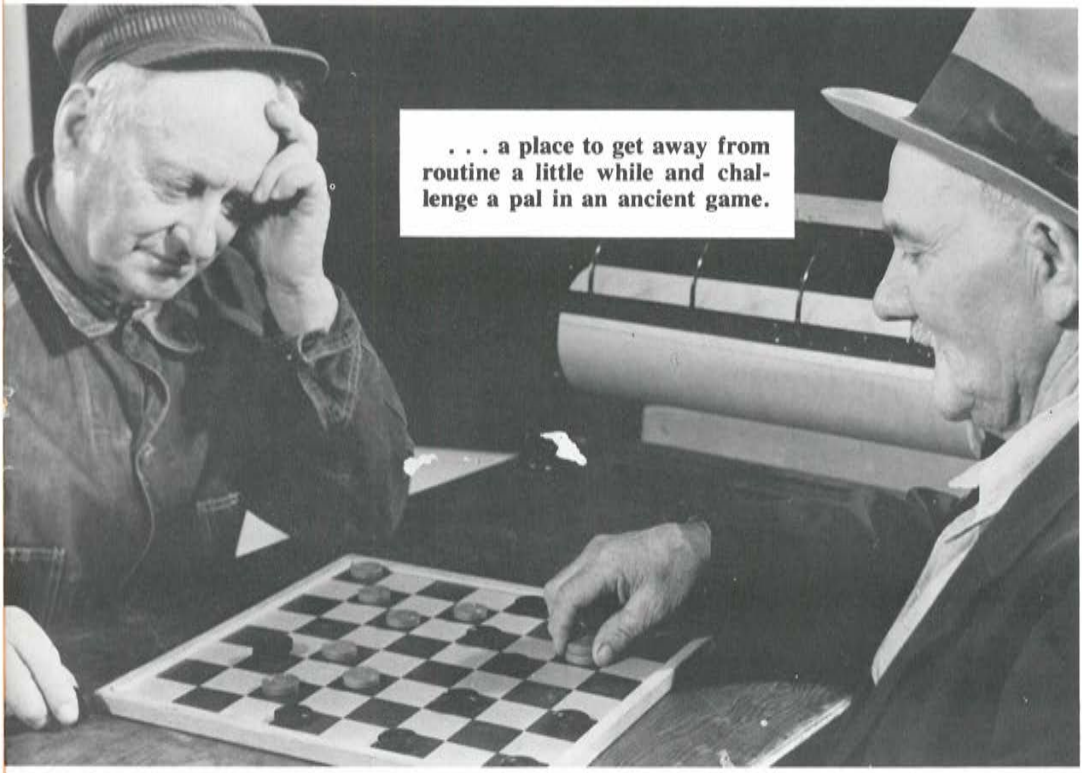


And at the end of the day, he knew he had been at work. His joints told him so. At work not to outcunning the other man . . . but to make his land and livestock give him the best they had. They seldom did . . . but he kept trying.



The country store was a place to get the few things you didn't grow in the soil and raise on foot . . .

. . . a place to figure some sales down to the last pound.


. . . a place to get away from routine a little while and challenge a pal in an ancient game.


. . . and especially a place of assembly for free men . . . to say what they thought about ANYTHING . . . without giving a "hoot in hades" for computer eyes and ears.

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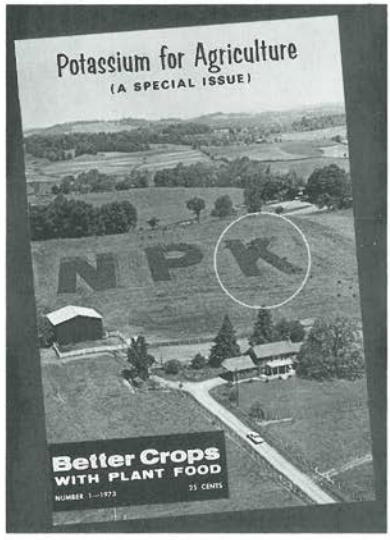
6—How much potassium do our animals need and are they getting it in this high pressure age?



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