Farm Science
REPORTER
Vol. 5, No. 2
Iowa State College, Ames, Iowa
April, 194

...
The Authors

Jay L. Lush is research professor of animal husbandry, in charge of the Animal Breeding Subsection of the Iowa Agricultural Experiment Station. Dr. Lush came to Iowa State College in 1930 from the Texas Agricultural Experiment Station where he had been in charge of animal breeding investigations for more than 8 years. He was born on a farm in Page County, Iowa, near Shambaugh, where he lived until he was nearly ready for high school. His family then moved to a farm in Kansas where he attended high school, got his first college training at Kansas State College and taught in Kansas high schools for one full year and part of another. He was a second lieutenant in World War I. His graduate work was done afterward at the University of Wisconsin.

Many livestock breeders in Iowa know Dr. Lush. He is frequently found at the ringside at fairs watching and studying type and standards of animal selection.

M. B. Russell is research associate professor of agronomy at the Iowa Station and associate professor of physics at Iowa State College. Dr. Russell is a former Michigan farm boy. His undergraduate work was at Michigan State College, and he holds M.S. and Ph.D. degrees from Iowa State College. He has been at Ames since 1936. Because of the present need of help on the physics teaching staff at Iowa State, Dr. Russell has been helping out there. His work in soil is concerned with soil physics.

P. Mabel Nelson has been head of the Foods and Nutrition Department at Iowa State College for about 20 years. In this capacity, Dr. Nelson has talked to many groups of Iowa farm women at short course and other meetings in the state. At the present time, she is chairman of the State Nutrition Council. Born a Hoosier, Dr. Nelson spent her childhood in California. She earned B.S. and M.S. degrees from the University of California and a Ph.D. from Yale University.

Ruth Seaton Hicks is extension specialist in nutrition at Iowa State College as well as executive secretary of the State Nutrition Council. A graduate of Iowa State College in 1931 (after several years out of college), Mrs. Hicks taught in high schools for 1½ years and served as home demonstration agent in Buena Vista, Pocahontas and Kossuth counties. She grew up on a farm — for the first 10 years in Kansas and then in Iowa. Last summer she took the special course of Dr. Lydia J. Roberts' Nutrition Workshop at the University of Chicago.

Other authors in this issue who have contributed to the Farm Science Reporter in previous issues are: G. M. Browning, project supervisor of research for the Soil Conservation Service; H. D. Hughes, head of farm crops at Iowa State College; C. Y. Cannon, head of dairy husbandry at Iowa State; Harold Gunderson, extension specialist in entomology and zoology at Iowa State College.

About the Cover ---

On the cover of this issue is shown Dr. Jay Lush with a group of gilts from some of the 12 inbred lines of purebred Poland Chinas. This photograph was taken last November when the gilts were being brought in for final selection and separation into the breeding pens. About 200 litters each spring and about 100 litters each fall are produced in the swine breeding project.

Are You Getting the ECONOMIST?

Many of the readers of Farm Science Reporter also receive the Iowa Farm Economist, but to some of you it may be a new publication. It is published monthly by the Extension Service and Experiment Station of Iowa State College and is devoted to the economic phases of farming rather than so much to production. One portion which many farmers value highly is the monthly market and price outlook for farm products.

Thanks for Your Comments

When we revised the mailing list of the Reporter in January we left a place on the card where subscribers might write in any comments or suggestions. We appreciate your interest in filling in remarks and suggestions. One of the "squeaking wheels" that gets greased in this issue as a result of those comments is the homemaker group. There were no home economics articles in the January issue.

Another Story Is "Dusted Off"

Judging by the number of dairymen who ask about the watering of their cows, there is still considerable interest in the work done at the Iowa Station several years ago which showed that if cows had water to drink at will, they would produce more milk and more butterfat.

The results of this experiment were published in a bulletin which has been out of print for several years. Accordingly, we are running in this issue a story which contains the main findings of interest to dairymen. Reprints of this article will be stocked so that for several years this information will be available. This publishing in greatly condensed form the results of experiments of past years (no longer in print) is one of the things farmers asked for in Farm Science Reporter.

CONTENTS

| Are Better Hogs Coming? | 3 |
| Contouring Paid in 1943 | 9 |
| A Look at the Canning Record | 8 |
| Use Best Crop Varieties | 10 |
| Water for the Cows | 14 |
| You Don't Like Moles? | 15 |
| Care for Your Canner | 16 |

FARM SCIENCE REPORTER

Editor: Fred E. Ferguson
Home Economics Editor: Mary A. Burnham
Art Director: Sidney H. Horn (on leave)
Editorial Advisory Board: R. H. Porter, chairman; Pearl P. Swanson; W. G. Gaessler; T. J. Maney; C. H. Van Vlack; Dwight L. Espe.
Published in January, April, July and October by the Iowa Agricultural Experiment Station and the Iowa Agricultural Extension Service. Address all communications to Farm Science Reporter, Ag. Annex, Iowa State College, Ames, Iowa.

Hogs coming?

Inbreeding Experiments Indicate That This May Be a Way to Speed Swine Improvement

By JAY L. LUSH

The results look promising, but they need to be verified and other crosses tried.

Using Inbred Lines in Commercial Production

If strong and vigorous inbred boars can be produced cheaply enough, farmers who sell hogs on the market can use these boars on sows which they have produced. The boar would be from an inbred line which is unrelated to the sows. Gilts from that cross would be saved for next year's sows. An inbred boar from a still different line would be used on them. With as many as four inbred lines which nick well together, this sort of rotation crossing or top-crossing could be continued indefinitely with almost as much vigor and other good results as if it were economically possible to produce the commercial sows by crossing two inbred lines.

If the inbred boars are too deficient in vitality and sex activity to be suitable for general commercial use, the pork producer can buy a boar produced by crossing inbred lines A and B. His next boar would be a cross between inbred lines C and D. The boar after that would be a cross between lines E and F, etc. This procedure would require more inbred lines which nick well with each other than will be necessary if inbred boars good enough for successful use in commercial herds can be produced.

If commercial hog production does go in this direction, crossbreeding probably will be combined with it so that the commercial producer will get whatever extra benefit or kick there is in crossbreeding, besides what he would get from crossing inbred lines belonging to the same breed.

Gilts, separated by lines, during the breeding season at experimental farm.
If the experience in corn breeding is a dependable guide, the boars in such procedure would be crosses between two inbred lines belonging to the same breed (i.e. would be purebreds), but would be used on sows with little blood of that breed.

**Need Purebred Herds**

The production of inbred lines is only pure breeding put into such high gear that the average individual merit (but not the average breeding merit) of the animals is likely to decline and to need restoring by an occasional cross with another line of the same breed.

It seems probable that by this process — making inbred lines, discarding those which perform most poorly in crosses, and then intercrossing the others to restore vigor — the pure breed itself can be improved more rapidly than is being done now. To test and explore this possibility is the major reason the Iowa Station is working with 12 inbred lines of one breed, rather than with a line from each breed or with some intermediate combination, such as three lines each from four breeds.

Under any plan of using inbred lines, many purebred herds would be needed to produce the inbred boars for sale to the commercial user. There will be plenty of need for registration and promotion services such as the breed registry associations provide. Indeed the associations may need to enlarge their activities enough to designate the inbred line or family to which each registered animal belongs and to verify, even more carefully than hitherto, that each pedigree actually is as represented.

The reputation of the breeder will become more important if he keeps the same or nearly the same lines year after year than it is when, as now, most breeders of purebreds use boars which are unrelated or nearly unrelated to the sows on which they are used. Under this present policy the average genetic composition of each herd can be very different today from what it was 3 years ago or will be next year or the year after.

If production and use of inbred lines become commercially profitable, there will be a continuing opportunity for profitable work in making, testing and improving inbred lines within the existing breeds. How many enterprising and venturesome breeders in Iowa can make a good living at this phase of the business when it ultimately reaches equilibrium would be only a wild speculation now.

Because one boar or one sow can produce only a few pigs (as compared with the number of kernels of corn one plant can produce), it seems impossible that public agencies like experiment stations can ever produce more than a small part of the inbred lines needed. The major usefulness of the experiment stations will be in finding and testing the methods by which such lines can best be made.

**First Inbreeding Lessons**

The first inbred line at the Iowa Station was started in 1930 as a four-sire herd. That is, each year we use four boars and about 40 to 50 sows, all of the replacements being selected from pigs born within this herd, just as if this herd were a small pure breed by itself. Each boar is mated to one or more of the sows most closely related to him and to some sows least closely related, in order to get every year some intensely inbred and some mildly inbred pigs by each boar.

If the pigs by one sire are distinctly superior to those by the others, the breeding stock for next year are largely saved from among the pigs by that boar. In years when there is no large difference in the average merit of the progeny from the four different boars, the breeding stock for next year are saved more or less equally from the pigs by each.

The effects of inbreeding were less extreme than was first expected. Seven years of experience with this four-sire closed herd made it seem likely that we were wasting time by inbreeding so slowly. Also it appeared that the progeny of each boar should be mated among themselves, instead of mating them to the sons and daughters of the other three boars, if we wanted to make much use of progeny tests of the boars. Also we had put all our eggs in one basket by making only one inbred line, instead of several lines between which we could select after their merits became known.

Accordingly in 1937 when the United States Department of Agriculture established the Regional Swine Breeding Laboratory under the Bankhead-Jones law and made possible an expansion of the Iowa Station's experiments, four different one-sire herds and one two-sire herd were started. Four one-sire herds and two two-sire herds were started with unrelated stock. The four-sire herd is still being continued in order to verify whether it actually is, as now seems probable, less efficient than the one-sire and two-sire methods for producing inbred lines.

First inbred herd of Danish Landrace pigs was maintained since the spring of 1934. It gives a chance to measure the effects of inbreeding on another
breed, to get more information on crossbreeding and to see how performance of this breed under American conditions is different from its performance in Denmark.

**Measures of Practical Merit**

In the swine breeding work at the Iowa Station the ideal pig is considered to be the one which makes the most profit for its owner. Profit depends of course both on the price the pig brings on the market and on the cost of producing it.

The selection index now used at the Iowa Station for deciding which gilts and young boars are to be saved for breeding is about half determined by the pig's weight-for-age and about half by the productivity of its dam. Weight at 154 days is being used to measure weight-for-age. Productivity of the sow is measured mostly by the number and weight of the pigs she weans. A gilt gets one point for each pig she farrows, plus two points for each pig she weans, plus one point for each 15 pounds the litter weighs at weaning time.

Because the number of pigs a sow farrows and raises varies widely from one litter to another and is much influenced by other things than the sow's own ability, her real productivity is usually much closer to the herd average than her own record is. The more litter she farrows, the more we trust her average record. The most practical general rule is to cull all gilts which perform very badly in their first litter but to hold the mediocre or doubtful cases for a second litter, especially if their dam or full sisters performed well. We save about half of the gilts for a second litter and about one-fifth of them for three or more.

For several years we tried scoring the pigs at market weight for their visible conformity to the market ideal. It turned out that these scores ranked the pigs in so nearly the same order as their weight-for-age that selecting them on that basis would have given us nearly the same pigs. There were a few exceptions. For example, occasionally a pig with very crooked legs or some other serious defect would nevertheless have a heavy weight-for-age.

A pig is given some credit or penalty when the average merit of its "sibs" (its brothers or sisters) is high or low. These "sib credits" play a big part in deciding between pigs when individually they are close to each other. The sib credits are the chief way in which we have been able to make real use of progeny tests.

**Definite Findings Made**

1. **Sow Productivity.** Our present method of measuring productivity of sows is based on findings published in detail in Technical Bulletin No. 836 of the U.S.D.A., October, 1942. About one-sixth of the differences in size or weight of single litters produced by different sows of the same herd and breed are caused by permanent differences between the individual sows themselves. The rest of the differences are caused by temporary circumstances which change from litter to litter even for the same sow. Mature sows will farrow nearly two more pigs than gilts and about one more than sows 18 months old. Mature sows will wean about one more pig than gilts and the total weaning weight of the mature sow's litter will be about 50 pounds heavier.

2. **Differences in Growth Rate** can be measured fairly well by weight at 4 to 6 months. We found some practical advantages in using 154 days instead of 180 days (as was tried first) for the standard age. The pig's weight from birth to weaning is much affected by the nursing ability of its dam. After weaning it is more on its own, and the inheritance it received from its sire and from its dam then becomes more decisive. Individual differences in weight at 4 to 6 months of age have been about 20 to 40 percent hereditary. This means that we get in the average weight of the offspring about 20 to 40 percent as much improvement as we reached for when we selected as parents those which were heaviest in the preceding generation.

3. **Effects of Inbreeding on Individual Merit.** The average merit of the pigs has declined at least a little as the inbreeding proceeded. This decline was irregular and there were many individual exceptions to it. Our pigs at 180 days of age averaged 3/4 pound less in weight for each percent more they were inbred. This amounts to a loss of about 15 or 20 pounds at 6 months of age as the average result of one generation of full brother-sister mating, and half that much for one generation of large brother-sister mating.

Vitality, as measured by percentage which survive to weaning, seems to have fallen even more. The number farrowed per litter has not yet been affected much, but doubtless this depends more on the inbreeding of the dam than of the pig. Defects such as hernia or bad eyesight have occurred in somewhat larger numbers than in outbred stock, but this increase has been large in some lines and has not happened in others.

All the individual selection we can practice during inbreeding can only partially prevent decline in characteristics which are strongly influenced by environment or accidents, or which are...
inherited in a complex manner. Some examples are: Fertility, productivity of sow, vitality in general, and eyesight.

For characteristics of this kind it seems more effective to inbreed intensely and quickly as many lines as possible, accepting some depression as inevitable, but being able then to cull the lines which degenerate most and to intercross the others to restore the merit lost.

4. Selection for Carcass Characteristics. Preference for plump hams, long sides, wide backs, etc., is automatically practiced when we select for weight-for-age. A little more selection for these is exerted when we reject on account of poor conformation some of those whose indexes are high. But many carcass qualities are measurable only after the pig is killed. So we give the living pig sib credits or penalties for the merits or demerits of the carcasses of its brothers and sisters.

When the selection index was first devised we feared that selecting intensely for weight-for-age would choose pigs which would grow to great size quickly but would not finish at handy weights. This has not happened. Instead we have selected more strongly for fineness than we had intended. Two pigs of the same age will usually differ more in the amount of fat than in the amount of lean or bone they contain. A few of the pigs with high indexes seem abnormally and undesirably fat. It appears now that we should emphasize plumpness of muscles and a large amount of lean in the carcass even more than we have been doing. This extra emphasis could come through more sib credits for desirable carcass characteristics of sisters and brothers.

5. Differences Between Lines have become larger and more impressive as the inbreeding has proceeded. Many of the lines have drifted apart in characteristics which earlier had appeared to be largely individual irregularities or accidents. To some of these, such as shape of ear or face, we had given no attention in our selections. Against others, such as white or reddish spotting, swirls, or screw tails, we had selected mildly. Against still others, such as hernia, crooked legs or bad eyesight, we had selected strongly.

There are reasons to think that the main useful effect of inbreeding is to make families distinctly different from each other for economically important but slightly hereditary characteristics and to hold them separate until they can show their real merits unmistakably. Selection between lines is far more effective than selection between individuals, provided the lines really differ much in average merit.

6. Which Inbreeding Intensity Is Best for Making Inbred Lines? The four-sire and two-sire lines give us more freedom to select and to correct mistakes which the progeny prove were made in former selections. But if we inbred mildly we can not make as many inbred lines with the same number of hogs. With 10 sows per boar and 200 sows we could have 20 one-sire lines but only five four-sire lines. Therefore the more intense inbreeding will permit culling a much larger fraction of the lines after they declare their merit unmistakably.

As of now it seems that the one-sire or perhaps the two-sire intensity would be best for making the inbred lines. The four-sire method takes too long and limits too much the number of lines which can be made. The inbreeding degeneration is so slight in the two-sire lines that not much is gained by making it slighter still by using the four-sire method. The one-sire lines degenerate noticeably more than the two-sire lines.

Also the risk of losing a line entirely by accident is greater with the one-sire lines. As compared with the two-sire lines, the real merit of each one-sire line in any one year is known with less certainty, since the number of liters and pigs is smaller and chance and accident can play a larger part. Yet the one-sire method permits forming nearly twice as many lines with the same total number of animals, the same cost and the same labor. The one-sire method increases the inbreeding intensity nearly twice as fast.

Crossbreeding has some distinct advantages for producing pigs for market. Crossbred pigs in our experiments gained about 7 to 9 percent faster than purebreds from weaning time to market weight. The crossbreds had higher vitality, as evidenced by a smaller percentage being born dead, and 65 to 76 percent of the crossbreds born survived to weaning, as compared with 55 to 61 percent of the purebreds.

These advantages are not extreme but they seem large enough to be worth considering by most commercial farmers. The major boost from the crossbreeding is in the vitality of the pigs. Conclusions from the experiments on crossbreeding were reported in the Farm Science Reporter for January, 1941. In general the breeds crossed should be distinctly unrelated and the boar should come from a breed which on the average is strong in those characteristics for which the owner's sow herd needs correction most.

Conclusion

Our results in crossing inbred lines of pigs are promising. In rate and economy of gain and in vitality the line-cross pigs have much exceeded the inbred ones. Whether they will exceed ordinary outbred pigs enough to pay for the cost of producing the inbred lines remains to be learned. Distinct possibilities for more rapid improvement of breeding stock seem to exist down this road, but many questions are yet to be answered.

The rate at which we can travel is necessarily much slower and more expensive than with hybrid corn. A few farmers are buying our extra inbred boars and using them on various kinds of sows. Observations on the results from these boars are part of the information which should be helpful in directing us toward ways to produce hogs which will be still better "mortgage lifters."

http://lib.dr.iastate.edu/farmsciencerporter/vols/iss2/1
Contouring Paid in 1943

Boosted the Yield of Corn, Oats and Soybeans

By G. M. BROWNING
and M. B. RUSSELL

IOWA FARMERS who farmed round their hills — the contour method — in 1943 got more corn, oats and soybeans to the acre than the farmers who farmed up and down their hills. At least this was the conclusion we reached after comparing yields of these crops grown by the two methods side by side in the same fields. We had results from 61 fields of corn, 38 of soybeans and 18 of oats in different parts of Iowa.

The average increase for corn in favor of contouring was 5.6 bushels per acre, for soybeans 2.2 bushels and for oats 5.2 bushels per acre. These values are close to the 6.2 bushel increase for corn and the 3.2 bushel increase for soybeans which we got in our 1942 studies (FARM SCIENCE REPORTER, April, 1943). As a 2-year average contouring increased corn yields 5.7 bushels per acre and soybeans 2.7 bushels.

Our studies in 1943, as in 1942, were conducted in cooperation with farmers in 16 soil conservation districts by the Agricultural Experiment Station, Soil Conservation Service and Extension Service. Fayette, Tama, Haig, Shelby, Marshall, Knox and Carlington soils were represented in the studies.

Areas for the test were selected within each field which had been cropped the same in the past and which were uniform in soil, slope and erosion. A part of each of these uniform test areas was planted and cultivated on the contour.

Results Vary Considerably

We found considerable difference in the results obtained from contouring, depending upon the type of soil, the slope and the type of rainfall. A few hard-driving rains were responsible for most of the damage from washing. In western Iowa, on the Marshall and Knox soils, many of the up-and-down-hill areas were washed out completely, or the stand was severely damaged by heavy rains early in the season. As an example, at the Soil Conservation Experimental Farm at Clarinda it was necessary to replant the corn twice on the up-and-down-hill areas because of washing out during heavy rains.

On the other hand, the contoured areas had a normal stand even though there was some silting in of the lister furrows. Under these conditions the average yield was 83.0 bushels per acre on the contoured and 46.6 bushels per acre on the up-and-down-hill areas, or an increase of 41.4 bushels in favor of contouring! It would certainly be unreasonable to expect average increases from contouring to be so large, but that was the result we got in this one test.

There also was a large difference in the amount of soil lost from these plots during three heavy rains — 3.5 tons per acre from contour and 32.5 tons per acre from the up-and-down-hill areas. Over a period of time this is very important because valuable fertility is lost in the surface soil that is washed away during a few heavy rains.

In a few fields in southeastern Iowa on slowly drained soils the yields on the contoured areas were slightly less than on the up-and-down-hill areas. On these heavy soils there apparently was too much water during the early part of 1943 — a very wet year — and as a result there was some reduction in yield. In most years excessive moisture is not a problem, but for the exceptionally wet season, a small amount of fall in the contour rows will help correct this condition. Good soil management, including legumes and manure regularly in the rotation, will also help overcome damage from too much moisture on poorly drained soils.

7 Million Sloping Acres

Contour farming has increased considerably during the past few years. In 1942, 9,000 farmers contoured about 400,000 acres. In 1943 this was increased to 16,000 farmers and 640,000 acres, or 60 percent. Iowa farmers will plant 6 million acres of sloping land to corn and 1 million acres to soybeans in 1944. How much increase in food and feed production would be obtained by contouring all of this?

If the 7 million acres were contoured and the increase per acre equaled that obtained the last 2 years, the farmers would produce about 30 million more bushels of corn and about 2 million more bushels of soybeans. In addition to saving soil and water and increasing yields, there is a saving of about 10 percent in time and fuel when all operations are carried out on the contour.

There is nothing complicated about contouring. It may require a little more time to begin with, but when you have it started it is just as natural as check-row planting. Anyone with an ordinary level, or other suitable instrument, can lay out a contour line. Bulletins and leaflets are also available* which outline in simple fashion the steps to be followed in contour farming.

*You can obtain these from the county extension director, AAA committees, or representatives of the Soil Conservation Service.
Survey Made of What Happened in 1943 to Point Way for Greater Success This Year

TO HAVE CANNED between 143 million and 160 million quarts of fruits and vegetables in a year is a pretty fair sized job. Iowa homemakers, assisted in some instances by their families, did just that last year, if a survey which we made shows the true picture of what happened in 1943.* The survey was made by Iowa State College and the State Nutrition Council. Obviously we could not ask every single family in the state about their 1943 canning, but we did ask 692 families. The method of gathering the information from these 692 was carefully worked out with the assistance of our statisticians so that every family in the state had a chance to be included. In other words, our interviewers reached farm people, town people, city folks, those of every economic level, every nationality and in every kind of work. The survey was scientifically set up so that we can depend on it giving a reasonably accurate picture.

The survey was a “look” not only at the canning done, but also at the amount of gardening, the amount of foodstuffs preserved by other methods than canning such as drying, brining, freezing, etc., and the amount of food stored in pits, caves and cellars.

The picture looks about like this:

Summary of Iowa’s 1943 Food Preservation and Storage
(Estimated for State)

- 150,000,000 quarts canned
- 2,500,000 quarts frozen
- 5,900,000 bushels stored
- 500,000 pounds dried
- 1,000,000 gallons brined
- 20,000,000 containers jelly, jams, relishes, pickles

Our survey showed that about 83 to 88 families out of every 100 in Iowa had a garden and nearly 95 out of every 100 had canned food. Canning was found to be by far the method most frequently used in preserving food. Storage in pits, caves and cellars came second.

Why Did Canned Food Spoil?

The survey showed that we need to do a better job of canning, for in 1943 about 2 million quarts spoiled. The survey showed 1.43 percent spoiled of the total canned, which may not sound like so much, but when it’s applied to a state with “its sleeves rolled up” and going after canning on such a large scale, it means that food enough for 16,000 persons had to be thrown away because it did not keep. This figure of canned goods for 16,000 allows 125 quarts per person as recommended in the 1943 Iowa canning budget.

Why did the canned food spoil? We put that question to the people interviewed and got their opinions. About 40 out of every hundred families had some food spoil. The amount varied from 1 or 2 cans to 100.

One-third of the women attributed their spoilage to defective lids; one-fourth had no idea. Common reasons given for spoilage were that the food had stood too long before it was canned; it was of poor quality; poor technique had been used; lids or rubber rings were old; new rings were of poor quality; not enough sugar for fruit (an erroneous belief). Miscellaneous reasons which the women gave were under-processing, rubber rings in wrong places, lids or jars not sterile, inexperience, uneven heat in processing, cooling too slowly and jars too full.

Solve Spoilage Problems

What can we do to make sure that less of our 1944 canned goods spoil? Here are our recommendations:

1. Get reliable information about canning methods. The Extension Service has a supply of these publications: “Wartime Canning of Fruits and Vegetables,” and “Home Canning of Fruits, Vegetables and Meats.” (If the Extension Service supply should be exhausted, these can be purchased for 5 and 10 cents, respectively, from the Superintendent of Documents, Washington, D. C.)

Another free booklet, “Take Care of Your Pressure Canners,” may be obtained from the Bureau of Human Nutrition and Home Economics, Washington, D. C. “Canning Fruits and Vegetables” is a pamphlet now being prepared by the Extension Service, and it will be available shortly at your...
inside the kitchen cupboard door may be kept a sheet to record the canning. county extension director's office or from the extension Service at Ames.

The best information concerning canning by the hot water bath that we have been able to assemble from several years of experiments at the Iowa Station is available in FS 69, "Canning Food That Keeps," a reprint from the April, 1943, FARM SCIENCE REPORTER. This may be had for the asking.

2. Have reliable equipment. If you use a pressure cooker have the gauge checked by the manufacturer, the county extension home economist in your county, or send it with 10 cents to Dr. Louise J. Peet, Household Equipment Department, Home Economics Building, Ames.

Make sure your jars are sterilized. Some of the women interviewed thought that scalding the jars was sufficient. The safe method is to boil them and the lids for 15 to 20 minutes.

If you are planning to use glass jars that once held coffee, mayonnaise or something of the sort, get the flat metal discs which are to be used with the original screw caps that came with the jars. The discs may be obtained from the grocer.

Examine all jars which use self-sealing lids for nicks in their tops, because a tiny nick may prevent a perfect seal. Likewise, a tomato seed or a bit of food on the rim will prevent a perfect seal.

Don't use old rubbers. You can, of course, use new rubbers purchased last year which were not needed. Cool the jars well after they are processed before they are stored.

Zinc lids that were removed from jars where there was spoilage are risky to use. It will be safer to throw these away and replace them with new ones. If you must use old zinc lids that were on jars that spoiled, do not use them for non-acid vegetables such as corn, peas and beans. In any case, be sure to boil them 20 minutes in water containing vinegar.

3. Use good canning procedure. Work with small enough quantities so that you can finish the job before you become tired and therefore careless. Another highly important point is to use only perfect fruits and vegetables. A few moldy peas, a spoiled spot in a tomato or an apple may be the cause of many cans of spoiled food. Selection and preparation of food for canning should not be done by children or older people with poor eyesight.

Keep the processing timetables in constant view, pinned to the kitchen curtains, thumbtacked to the wall, fastened to the inside of the cupboard doors with adhesive tape or some such method. If these tables are kept out where you can readily look at them, you'll probably do less guesswork in processing.

Set an alarm clock to tell you when the processing time is up, or write down on a card when the processing should be finished and fasten this card to the kitchen wall, the curtains, or some place handy.

The foregoing suggestions touch only briefly on the main points that may help to avoid some of the canning spoilage loss. But get all of the reliable information that you can as suggested at the beginning of this discussion.

Have a Canning Plan

One of the "slips" in our home canning has been the lack of any plan, our survey showed. Few of those interviewed knew how much they had put up without making a special count. Practically none had a canning plan worked out in relation to the nutritional needs of their families. Many women told the interviewing person that by December all of some foods were gone or that most of the total foods canned had been eaten.

One way to determine what you should put up is to note how many times a week...
"To plant seed of anything other than the best available variety shows careless indifference — certainly not good farming."

THE LARGEST return on the investment in our cropping program can be secured by obtaining and planting the best varieties. We are all looking for varieties which give top yields and have other desirable characters.

The production costs are about the same whether the acre yield is large or small, and we know that with a given soil and season one variety may produce much larger yields than another. To plant seed of anything other than the best available variety shows careless indifference — certainly not good farming.

Where can you find the best varieties? A little booklet is published each year by the Iowa Agricultural Experiment Association, Ames, entitled, "Know the Seed You Plant." This lists sources of certified seed of improved varieties. The booklet may be had for the asking.

We are listing here and briefly describing varieties that are suitable for Iowa.

**Corn Hybrids**

We speak of corn acreage goals, but we all know that it is the total bushels of sound corn that count.

Many well adapted hybrids are available to Iowa farmers from the several hybrid seed corn companies and from individual growers.

It is not possible even to name all of the well adapted, high yielding hybrids available. We have no accurate information on the relative performance of many of these. The performance of a large number of available corn hybrids, however, has been determined and reported from year to year and these may be regarded as establishing certain standards (Iowa Bulletin P58, Iowa Corn Yield Test for 1943).

A brief statement regarding the adaptation and growth habits of some of the more important hybrids from the experiment stations and the U.S.D.A. follows:

- **Iowa Hybrid 939** (L289 x 1205)
- **Indiana Hybrid 608C** (WF9 x Hy) (A x Tr) belongs to the same maturity group as Iowa Hybrid 939 and has a very similar yield record. It is superior to 939, however, in resistance to lodging and ear dropping.

**Iowa Hybrid 4297** (WF9 x 1205) (O420 x Os426) is adapted to north central Iowa. It was one of the first hybrids to be released by the Iowa Station and has yielded well for many years under a wide range of conditions. It is somewhat susceptible to stalk breaking and ear dropping. When dry it does not pick clean with a mechanical harvester.

- **Iowa Hybrid 4316** (L289 x 1205) (WF9 x M14) is one of the new Station hybrids. It is intermediate in maturity between Iowa Hybrids 931 and 939. It is superior to both of these hybrids in resistance to lodging and ear dropping. In the northern section it has consistently outyielded Iowa Hybrid 931 and in the north central section has been slightly superior to Iowa Hybrid 939 in yielding ability.

- **Iowa Hybrid 303** (L289 x 1205) (WF9 x R4) is very similar in most respects to Iowa Hybrid 306. Choice between these two hybrids is largely a matter of personal preference.

- **Illinois Hybrid 751** (WF9 x Hy) (A x 90) is rather similar to Indiana 608C and is adapted to the same general area. Its general performance is satisfactory, and it is well adapted to mechanical picking.

- **Iowa Hybrid 4279** (WF9 x 1205) (187-x M14) is adapted to central Iowa. Its yield and resistance to lodging and ear dropping have been quite
One of the first problems in producing hybrid corn is to inbreed and develop pure lines. Later these are crossed.

satisfactory. It is also well suited to mechanical picking.

U.S. Hybrid 35 (WF9 x 38-11) (Hy x R4) is adapted to the southern half of Iowa and has a good yield record. It has excellent resistance to lodging and husks quite satisfactorily with a mechanical picker.

U.S. Hybrid 13 (WF9 x 38-11) (Hy x L317) is one of the most popular late hybrids throughout the Corn Belt and is recommended for southern Iowa. It is somewhat later than U.S. Hybrid 35 but similar in general performance.

Popcorn

Japanese Hull less was for many years more extensively grown in Iowa than any other variety. It has very short, chunky ears with slender shoe-peg type kernels. It is well adapted to northern but not to southern Iowa.

Yellow Pearl has a medium high popping expansion, is fairly free from coarse hulls, and is early enough to be safe in northern Iowa.

South American, also called Dynamite, TNT and Mushroom, is very popular as a commercial variety. It is late in maturity and crowds the season north of central Iowa.

Tom Thumb, the name applied to several small-eared types, is suited only to the home garden.

Soybeans

Soybeans in Iowa have increased from a few thousand acres to over 2 million in less than 10 years. The average acre yield has steadily increased, and a considerable part of this gain must be credited to better varieties.

Habaro is suitable for planting in extreme northern Iowa on fertile soils. It gives good yields but shatters some if not harvested promptly when ripe. It is not recommended for upland soils and has a lower oil content than most other varieties. It is 6 to 8 days earlier in maturity than Richland.

Earlyyana is a new variety from the Indiana Station not generally available for 1944. It grows somewhat taller than Richland or Habaro so that it is better suited for less fertile soils. It is 4 to 5 days earlier than Richland.

Early Manchu strains are suitable for northern Iowa and are better suited than Habaro or Richland to the less fertile soils because of their taller growth. There is some tendency to lodge on the more fertile soils. Yields are comparable to those of Richland.

Richland is recommended for general planting in northern and north central Iowa on the more fertile soils, where its earliness, unusual resistance to lodging and its high yields have made it a favorite. Planting should not be later than May 20 in northern Iowa. In central Iowa, Richland has equaled Mukden in yield on the more highly productive soils.

Mukden, previous to the introduction of Richland, was the most extensively grown variety throughout central and north central Iowa. It matures 4 to 6 days later than Richland. It is only slightly earlier than the B. H. Manchu generally grown in central Iowa. With the exception of Richland it shows the least lodging of any variety extensively grown in the state.

B. H. Manchu is well suited to north central, central and south central Iowa. For many years this was the most extensively grown variety in the state. It matures a day or two later than Mukden and is not as resistant to lodging. It yields well and is recommended on the medium to less fertile soils.

Lincoln will have an important place in north central, central and southern Iowa. Its maturity is between B. H. Manchu and Illini. It is very similar to Manchu in growth habit but has given significantly better yields than any of the varieties heretofore generally available in the state. The total seed available for 1944 is now in the hands of seed increase growers. Con-

These are Lincoln soybeans, released this year for increased seed production. They are adapted to central and southern Iowa. The acre yield and percentage of oil is superior to other varieties with which they have been compared over a 5-year period in Iowa, Illinois, Ohio, Indiana, Missouri and Nebraska.
siderable quantities should be available for 1945 plantings.

**Dunfield** is recommended for central and southern Iowa. It yields well and matures a day earlier than Illini.

**Illini** probably is the best yielding variety available for general planting in southern Iowa. On fertile soils this variety is likely to vine and lodge more than other varieties generally available.

**Chief** has a limited place in extreme southern Iowa if planted early. It is about 6 days later than Illini and is particularly adapted to medium and poor soils.

**Oats**

The oat crop is the most important small grain on Iowa farms. Iowa farmers are rapidly adopting the new improved varieties. A recent survey predicts that 80 to 85 percent of the 1944 Iowa oat acres will be sown to the new varieties released from the experiment stations within the past 5 years.

Tama, Boone, Control, Cedar, Vikota and Vicland are selections from the cross of Victoria and Richland. In cooperation with the United States Department of Agriculture all of these were selected in early generations at the Iowa Station on the basis of resistance to stem and leaf (crown) rusts and to the smuts. It is superior also in yield, bushel weight and strength of straw. It is well adapted throughout Iowa. It may not grow tall enough on high land of low fertility.

**Boone** is very similar to Tama but has been found susceptible to a leaf spot disease which has somewhat depressed the yield.

**Control** is similar to Boone in all general characters. It has yielded slightly less than Tama.

**Marion** is about 3 days later in maturity and 4 to 5 inches taller than Tama, Boone or Control. This variety has not stood up as well on low land of high fertility as the other recommended varieties. It has shown high resistance to stem rust and the smuts and is moderately resistant to leaf rust. It appears to be better suited to northern than to southern Iowa.

**Barley**

**Wisconsin 38** is a smooth-awned variety now grown more extensively in Iowa than any other. It is too late to give best results in most sections of southern Iowa.

**Glabron** is a smooth-awned variety less likely to lodge than the Wisconsin 38 and may be successfully grown farther south. It is classified on the market as a feed barley.

**Spartan** is a two-rowed barley that has shown marked resistance to lodging. This variety has given excellent results in western and southwestern Iowa. It is a feed and pearling variety.

**Winter Wheat**

**Pawnee** is an early, short, stiff-strawed variety — recently released by the Kansas and Nebraska stations — recommended for southern Iowa.

**Iowin** is resistant to several forms of rust prevalent in the state. Its chief weakness is its tendency to lodge, especially on the more fertile soils of north-
In Iowa practically the entire acreage of rye is grown for pasture or as a cover crop. The relative value of available varieties is dependent, very largely, upon their winter-hardiness, which is in the order of: Dakold, Swedish, Imperial, Rosen, Emerald and Balbo. Balbo, unlike other rye varieties, does not taint the milk when pastured by dairy cows.

**Rye**

The most common cause for oats going flat is rust. The new rust-resistant lines (left) are compared with non-resistant lines (right).

**Alfalfa**

Ladak, over a period of years, has given higher yields than any other variety. It is winter-hardy, somewhat tolerant to bacterial wilt and persists considerably longer than Grimm or Common. Its extremely heavy first crop may be considered a disadvantage.

Cossack has given almost as high yields as Ladak, is winter-hardy, ranks well above Grimm in persistence of stand and recovers rapidly after cutting.

Ranger is a new wilt-resistant variety developed by the United States Department of Agriculture. Its yield has been slightly less than Cossack or Ladak but because of its wilt resistance should be a desirable variety. The supply of seed is limited.

Grimm has been more widely grown than any of the other winter-hardy, variegated varieties. It is susceptible to wilt and is not recommended where alfalfa wilt is serious.

Common northern grown strains are satisfactory for use when stands are not to be left for more than 2 or 3 years.

**Other Forages**

There is considerable interest in improved strains of other small seeded legumes and grasses. Some of these are listed here.

"Southern Type" Bromegrass has been found superior to the northern type in yield, heat and drought resistance and ease of getting stands, particularly in western and southern Iowa. The seed supply of this type is being rapidly increased, but as yet only a limited supply is available. The three recognized strains of this southern type, all of which are very similar in productiveness and character of growth, are Fischer, Lincoln and Achenbach. The supplies of seed for 1944 spring seeding are exhausted but there should be good supplies for 1944 fall seeding and for 1945.

Midland Red Clover is a composite variety developed by combining several superior Corn Belt strains and is recommended for general use.

**Alfalfa**

Ladak, over a period of years, has given higher yields than any other variety. It is winter-hardy, somewhat tolerant to bacterial wilt and persists considerably longer than Grimm or Common. Its extremely heavy first crop may be considered a disadvantage.

Cossack has given almost as high yields as Ladak, is winter-hardy, ranks well above Grimm in persistence of stand and recovers rapidly after cutting.

Ranger is a new wilt-resistant variety developed by the United States Department of Agriculture. Its yield has been slightly less than Cossack or Ladak but because of its wilt resistance should be a desirable variety. The supply of seed is limited.

Grimm has been more widely grown than any of the other winter-hardy, variegated varieties. It is susceptible to wilt and is not recommended where alfalfa wilt is serious.

Common northern grown strains are satisfactory for use when stands are not to be left for more than 2 or 3 years.

**Other Forages**

There is considerable interest in improved strains of other small seeded legumes and grasses. Some of these are listed here.

"Southern Type" Bromegrass has been found superior to the northern type in yield, heat and drought resistance and ease of getting stands, particularly in western and southern Iowa. The seed supply of this type is being rapidly increased, but as yet only a limited supply is available. The three recognized strains of this southern type, all of which are very similar in productiveness and character of growth, are Fischer, Lincoln and Achenbach. The supplies of seed for 1944 spring seeding are exhausted but there should be good supplies for 1944 fall seeding and for 1945.

Midland Red Clover is a composite variety developed by combining several superior Corn Belt strains and is recommended for general use.

**Alfalfa**

Ladak, over a period of years, has given higher yields than any other variety. It is winter-hardy, somewhat tolerant to bacterial wilt and persists considerably longer than Grimm or Common. Its extremely heavy first crop may be considered a disadvantage.

Cossack has given almost as high yields as Ladak, is winter-hardy, ranks well above Grimm in persistence of stand and recovers rapidly after cutting.

Ranger is a new wilt-resistant variety developed by the United States Department of Agriculture. Its yield has been slightly less than Cossack or Ladak but because of its wilt resistance should be a desirable variety. The supply of seed is limited.

Grimm has been more widely grown than any of the other winter-hardy, variegated varieties. It is susceptible to wilt and is not recommended where alfalfa wilt is serious.

Common northern grown strains are satisfactory for use when stands are not to be left for more than 2 or 3 years.

**Other Forages**

There is considerable interest in improved strains of other small seeded legumes and grasses. Some of these are listed here.

"Southern Type" Bromegrass has been found superior to the northern type in yield, heat and drought resistance and ease of getting stands, particularly in western and southern Iowa. The seed supply of this type is being rapidly increased, but as yet only a limited supply is available. The three recognized strains of this southern type, all of which are very similar in productiveness and character of growth, are Fischer, Lincoln and Achenbach. The supplies of seed for 1944 spring seeding are exhausted but there should be good supplies for 1944 fall seeding and for 1945.

Midland Red Clover is a composite variety developed by combining several superior Corn Belt strains and is recommended for general use.

**Alfalfa**

Ladak, over a period of years, has given higher yields than any other variety. It is winter-hardy, somewhat tolerant to bacterial wilt and persists considerably longer than Grimm or Common. Its extremely heavy first crop may be considered a disadvantage.

Cossack has given almost as high yields as Ladak, is winter-hardy, ranks well above Grimm in persistence of stand and recovers rapidly after cutting.

Ranger is a new wilt-resistant variety developed by the United States Department of Agriculture. Its yield has been slightly less than Cossack or Ladak but because of its wilt resistance should be a desirable variety. The supply of seed is limited.

Grimm has been more widely grown than any of the other winter-hardy, variegated varieties. It is susceptible to wilt and is not recommended where alfalfa wilt is serious.

Common northern grown strains are satisfactory for use when stands are not to be left for more than 2 or 3 years.

**Other Forages**

There is considerable interest in improved strains of other small seeded legumes and grasses. Some of these are listed here.

"Southern Type" Bromegrass has been found superior to the northern type in yield, heat and drought resistance and ease of getting stands, particularly in western and southern Iowa. The seed supply of this type is being rapidly increased, but as yet only a limited supply is available. The three recognized strains of this southern type, all of which are very similar in productiveness and character of growth, are Fischer, Lincoln and Achenbach. The supplies of seed for 1944 spring seeding are exhausted but there should be good supplies for 1944 fall seeding and for 1945.

Midland Red Clover is a composite variety developed by combining several superior Corn Belt strains and is recommended for general use.

**Alfalfa**

Ladak, over a period of years, has given higher yields than any other variety. It is winter-hardy, somewhat tolerant to bacterial wilt and persists considerably longer than Grimm or Common. Its extremely heavy first crop may be considered a disadvantage.

Cossack has given almost as high yields as Ladak, is winter-hardy, ranks well above Grimm in persistence of stand and recovers rapidly after cutting.

Ranger is a new wilt-resistant variety developed by the United States Department of Agriculture. Its yield has been slightly less than Cossack or Ladak but because of its wilt resistance should be a desirable variety. The supply of seed is limited.

Grimm has been more widely grown than any of the other winter-hardy, variegated varieties. It is susceptible to wilt and is not recommended where alfalfa wilt is serious.

Common northern grown strains are satisfactory for use when stands are not to be left for more than 2 or 3 years.

**Other Forages**

There is considerable interest in improved strains of other small seeded legumes and grasses. Some of these are listed here.

"Southern Type" Bromegrass has been found superior to the northern type in yield, heat and drought resistance and ease of getting stands, particularly in western and southern Iowa. The seed supply of this type is being rapidly increased, but as yet only a limited supply is available. The three recognized strains of this southern type, all of which are very similar in productiveness and character of growth, are Fischer, Lincoln and Achenbach. The supplies of seed for 1944 spring seeding are exhausted but there should be good supplies for 1944 fall seeding and for 1945.

Midland Red Clover is a composite variety developed by combining several superior Corn Belt strains and is recommended for general use.

**Alfalfa**

Ladak, over a period of years, has given higher yields than any other variety. It is winter-hardy, somewhat tolerant to bacterial wilt and persists considerably longer than Grimm or Common. Its extremely heavy first crop may be considered a disadvantage.

Cossack has given almost as high yields as Ladak, is winter-hardy, ranks well above Grimm in persistence of stand and recovers rapidly after cutting.

Ranger is a new wilt-resistant variety developed by the United States Department of Agriculture. Its yield has been slightly less than Cossack or Ladak but because of its wilt resistance should be a desirable variety. The supply of seed is limited.

Grimm has been more widely grown than any of the other winter-hardy, variegated varieties. It is susceptible to wilt and is not recommended where alfalfa wilt is serious.

Common northern grown strains are satisfactory for use when stands are not to be left for more than 2 or 3 years.
If Cows Can Drink at Will, They Produce More Milk, More Fat. Experiments Reveal

Dairymen whose cows can have a drink of water whenever they want it — night or day — will get more milk and butterfat from the same amount of feed and care than the dairymen who water their cows only a couple of times a day.

This is the conclusion we have drawn here at the Iowa Station from experiments conducted several years ago. Dairymen who are "on their toes" know that the watering of cows is pretty important, for about 87 percent of the milk which a cow gives is made from water. In this war food production period when we are striving for the best possible output from our cows, we may well give watering special attention.

In our tests we used two groups of cows. Those in one group were watered twice a day from an outdoor tank, while those in the other group were getting their water from water bowls beside them in the barn where they might drink at will.

In this test we used 12 cows, divided into two lots of six each. We used the experimental plan known as the double reversal. That is, each group of cows was watered by one method for 28 days while the other group was being watered by the other method. At the end of one of the experimental periods, the method of watering the two groups was reversed, and after a 7-day preliminary period, another 28-day period experiment was run. There were four of these 28-day periods. Thus each group of 6 cows was watered for two periods from the tank and two periods from bowls in the barn.

Results of the Tests

The cows while being watered by means of water bowls drank approximately 18 percent more water and yielded 3.5 percent more milk and 10.7 percent more butterfat than when being watered twice a day at an outside tank.

A man was kept on the job to find out when the cows did their drinking if they had an opportunity to drink at will. We found that the cows drank an average of about 10 times in each 24 hours. About two-thirds of the water consumed in the daytime — between 5 a.m. and 5 p.m. — and the other third during the night.

When the cows were being watered at the outside tank, they frequently drank only once a day. This refusal to drink more than once a day was distributed among all of the 12 cows, though we found that certain cows showed more of a tendency to drink but once per day than others. The inclination to drink but once per day was not consistently associated with the amount of milk produced.

One of the surprising results of these experiments was that the cows when watered by means of water bowls not only yielded more milk, but had a higher fat test. Why this was so we do not know, and we are not sure that it would be repeated in a similar trial, but a test of the data by mathematical procedure showed that there were only about 4 chances out of 100 that it was by accident alone.

In our tests we came to the conclusion that the temperature of the water was not nearly so important as the temperature of the air. In other words, if the cow had to stand outside in near zero weather, she was likely to drink relatively less regardless of the temperature of the water. As one might expect, the cows drank more as the weather became warmer.

Although the cows drank more from water bowls than when they were allowed to drink twice a day at an outside tank, there was less difference in milk production than in water consumption. The amount of water drunk from the bowls was 18 percent more than from the outside tanks, but the milk yield was only 3.5 percent more.

The fact that our experiments were made with water bowls doesn't mean we recommend that every dairyman supply his cows with water bowls. It is almost impossible during the war to obtain water bowls unless they are purchased secondhand.

This doesn't mean that better watering is not possible on many farms. Some farmers have tanks inside their barns where they might be able to water more than twice daily. Our experiments indicate that it is pretty important that the cow have a comfortable atmosphere where she drinks.
When cold wintry winds are wheezing around her, the cow is not likely to drink as much as she will if she can drink in a comfortable place. Though the air temperature in which the cow stands is important, she will drink more if she doesn’t have to sip her needed water out of an icy tank.

The Iowa Station has shown that the type of ration which the cow is fed greatly influences the amount of water which she drinks. This same result has been shown in other experiments also. If the cow is getting silage or green feed with a lot of moisture in it, the cow will drink proportionately less than she will if she is entirely on dry feed. There is a tendency to balance up the total amount of water in the feed and that drunk. If the feed has more moisture in it, then the cow drinks that much less.

Do Calves Need Water?

Do young calves on skim milk need water? Some light on the answer to this question is given by an experiment conducted by the Idaho Station. There, a record was kept of the amount of water 26 Holstein calves drank, in addition to that which was in the milk they were fed. The amount of free water consumed weekly per calf was 1.3 pounds at 6 weeks of age, 29 pounds at 9 weeks, 48 pounds at 12 weeks, 62 pounds at 15 weeks, 88 pounds at 18 weeks, 146 pounds at 21 weeks and 234 pounds at 26 weeks of age.

These figures indicate that the very young calf does not need water in addition to the milk which it drinks. When the calf reaches the age of about 6 weeks, providing it with water then becomes essential. The amount which is needed increases rapidly as the calf gets older. Unless water is provided then and in amounts needed, the calves will not grow properly, nor will they maintain their best health.

Adequate watering of our dairy herds is just as important as the feeding. We need to make sure that it is properly done.

**You Don’t Like MOLES?**

*....Then Kill Them With Gas or Traps....*

**Because of its food habits, the common mole is actually an extremely beneficial animal, but the average gardener is hard to convince of this after his lawn has been wrecked, his flower beds disturbed and his potatoes disturbed by one of these burrowing animals.**

Moles feed primarily on earthworms, insects and insect larvae such as white grubs, wireworms, cutworms and other soil-infesting forms. The mole daily eats his own weight in insects. From this standpoint the animal is beneficial, but in its search for food, a single mole may construct as much as 75 yards of tunnel in a single night.

The raised runways and occasional mounds of earth are unsightly in lawns and detrimental to flower beds and vegetable gardens. Frequently a mole will burrow right down a row of flowers or vegetables, disturbing the roots and opening cracks in the soil which cause the plants to dry out and die.

Moles are sometimes accused of eating flower bulbs and tubers, but in most cases they are not responsible for this damage. Their runways are used by pocket gophers, mice, shrews, rats and other animals. These trespassers feed on the roots and are usually responsible for injuries to cultivated plants.

By Harold Gunderson

Raised runways and occasional mounds of earth are unsightly in lawns and detrimental to gardens and flower beds.

Moles can be controlled, although perseverance, close observation and skill are needed to eradicate them from a lawn or garden. Only the most important control measures will be discussed here, although other methods have proved effective under certain conditions.

**How to Use Traps**

A number of different mole traps are available. Since they all differ in design, it is best to follow the manufacturer’s directions closely in using any trap. The following procedure may be used successfully with most mole traps:

1. Locate the main runway by rolling or tramping down all of the raised runways. Watch carefully at hourly intervals to determine which one is raised first. This is probably the main runway and is the one over which the trap should be set.

2. The trap may be placed anywhere along the runway, but a straight section of burrow is preferable. For most mole traps, loosen the soil with a fork or trowel where the trap will be set. The action of the trap will be easier and faster. Tramp down the main runway again before setting the trap. If only the short section of runway where the trap is set is tramped down, the mole may go around it; if the entire runway is flattened, he will be less cautious.

3. If the mole is not caught in 24 hours, he has probably abandoned that runway. Tramp down all the runways again, and reset the trap on another which is being used.

4. In many cases, moles use their own and other burrows interchange-
Gas in the Runways

Calcium cyanide or car exhaust gas may be used to kill moles. Calcium cyanide must be used in a garden dust gun or a cyanide dust gun, so as to distribute the material through the runway quickly. Car exhaust gas may be used by attaching a section of garden hose to the exhaust pipe of an automobile or tractor.

It is unnecessary and undesirable to tramp down the runways when using cyanide or car exhaust gas. All runways must be treated quickly and thoroughly. Open the runway; insert the nozzle of the dust gun or the end of the garden hose; introduce the gas rapidly; and close the runway. Repeat the process about every 10 feet until all parts of all runways are treated. Since the burrows are near the surface, the gas escapes rapidly and must be introduced at frequent intervals along the tunnel in order to kill the mole.

It is not unusual to see signs of mole activity during gassing of the runways, since the mole attempts to escape. The mole then can be scooped out of the ground with a spade or fork and killed.

Poisons of Little Value

Poisons are rarely effective in controlling moles. It is difficult to develop an acceptable substitute for the living grubs, worms and insects on which they feed. A large number of pellets introduced into the runway may have a repellent effect, causing the mole to abandon that portion.

Lead Arsenate, Moth Balls

Moth balls are offensive to moles. When introduced into the runways, they usually force the mole to abandon the treated burrows and extend his activities into previously uninfested portions of the lawn or garden.

Seed treatments are ineffective in controlling moles, since moles are not interested in seeds but in the insects attacking them. Seed treatments which prevent or hinder seed decay discourage insects and render the area less attractive to moles.

Lead arsenate has been successfully used to prevent mole infestation in lawns and gardens. This treatment has been used extensively in states east of Iowa but has not been thoroughly tested here. It apparently prevents the establishment of moles in the treated area but seems to have little or no effect on those already present.

The lead arsenate is applied at the rate of 1 pound per 100 square feet of lawn. It may be mixed with dry sand and applied with a lawn fertilizer cart or suspended in water and applied with a sprinkling can. If applied dry, the poison must be soaked into the ground by watering with a garden hose. Lead arsenate should not be applied to strawberry beds or to ground intended for strawberries, since it reduces the yield.

If a large area of lawn or garden is to be protected, reports from other states indicate that a band of lead arsenate 2 feet wide acts as an effective barrier. The poison is used at the same rate, i.e. 1 pound would cover a strip 2 feet wide and 50 feet long.

Calcium cyanide pumped into the runways at intervals of 10 feet, using a cyanide gas gun or garden dust gun, usually is effective. Car exhaust gas may be used in the same way. A garden hose may be fastened to the exhaust pipe of car to carry gas into the mole runway.

A single lead arsenate treatment may protect an area for 1 to 5 years, depending on the amount of rainfall, rapidity of leaching, type and character of the soil and on other factors.

Care for Your Canner

By LOUISE J. PEET

CONSERVING the 1944 food crop is going to require long hours of service from your pressure canner.

Because it probably put in many hours of overtime last year, the canner should be inspected and put in first-class repair now before the canning season starts. That will make the canning job easier. Then some care should be taken in cleaning the canner, especially the lid, during the canning season.

Probably the most important thing to remember about lid care after you've had the pressure gauge checked for accuracy — and that should be done now before the season starts — is that the lid should not be soaked in water when it is cleaned. Soaking may damage the mechanism so essential to proper operation of the canner.

Using a cloth dipped in warm soapy water is a good way to clean the lid. A cloth wrung out in clear water may be used to rinse it. Then the lid should be dried thoroughly.

The petcock should be unscrewed when the lid is being cleaned. And after the cleaning is done, you should be able to see light through the opening in the lid where the petcock fits. The petcock should always be opened before the lid is removed.

Each time the canner is cleaned, the safety valve, too, should be taken apart. The passageway into the canner can be cleaned out with a little brush. For this, baking soda may be used in the cleaning water. If the parts are corroded, fine steel wool may be used to clean them.

Another important fact to remember in cleaning the lid is that scratches on the rim will prevent the close contact necessary between the lid and the rim of the canner.

When putting on a lid which fastens by means of lugs, opposite lugs should be tightened together. A drop of sewing machine oil on each lug will make it easier to unscrew later.

Best service will be obtained if the canner is allowed to cool slowly after it has been used.