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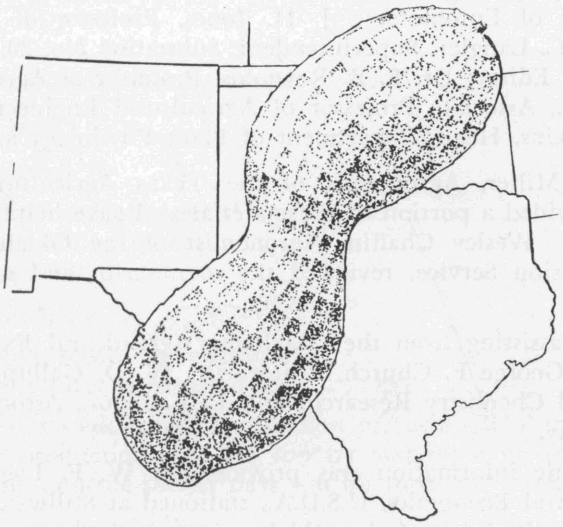
Texas Agricultural Experiment Station

Oklahoma Agricultural Experiment Station

*A Handbook of*

# PEANUT GROWING

## *In the Southwest*



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The Texas Agricultural and Mechanical College System
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**THE TEXAS AGRICULTURAL AND MECHANICAL COLLEGE SYSTEM**
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E. A. Miller, Agronomist of the Texas Agricultural Extension Service provided a portion of the material and gave helpful advice and suggestions. Wesley Chaffin, Agronomist of the Oklahoma Agricultural Extension Service, reviewed the manuscript and made valuable suggestions.

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Economic information was provided by W. F. Lagrone, Bureau of Agricultural Economics, U.S.D.A., stationed at Stillwater, Okla., and by Miss Ada B. Eden of the Oklahoma station's Department of Agricultural Economics.

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Mr. John Wright of the Southwest Peanut Growers' Association, Gorman, Texas, provided information on the technique of peanut grading, and the effect of grade on prices received by farmers for their peanuts.

## Pointers for Profits from Peanuts.

The peanut is one of the best cash crops for many sandy soils. It provides income from a type of land where most other crops are unprofitable.

BUT soil fertility maintenance is especially important where peanuts are raised. Few peanut growers can afford to overlook the use of fertilizer and soil-improving, erosion-resisting cover crops.

———o———

Profit from peanuts depends on two things:

1. Cutting production cost per ton; and
2. Producing high quality nuts.

This handbook was prepared to help you do those two jobs. It emphasizes these items as important:

## CONTENTS

## PEANUTS: An Important Southwestern Crop.

The peanut is an important cash crop in Texas and Oklahoma. Farmers in these two states received about $44,000,000 for the peanuts they grew in 1948. In addition, peanut hay and peanut meal provide roughage and protein for Southwestern livestock.

The Southwestern states — Arkansas, Louisana, New Mexico, Oklahoma, and Texas — grow about a fifth of the nation's peanut crop. More than 95 percent of the Southwest's production is in Texas and Oklahoma. Peanut growing in these states tends to concentrate in areas where soil and other resources are especially suitable. (See map, page 7.)

Peanuts as a peacetime crop in the Southwest showed a slow but steady increase in acreage from 1926 to 1941. Since the World War II "boom," the production has remained at about double the 1940-41 figure. (See graph, page 9.)

The Southwest's first modern peanut shelling plant was established at Terrell, Texas, in 1907. At present, 31 shelling plants are reported in operation in Southwestern states.

## A Cash Crop For Sandy Soils.

The peanut is one of the best cash crops for many sandy soils. But one-crop peanut farming depletes soil fertility. Organic matter is lost, and wind erosion hazards are increased. Continuous planting of peanuts on the same land also is likely to increase losses from the disease called Southern blight.

Peanuts should be grown in combination with other crops, pastures, and livestock. This balances farm operations and maintains soil fertility. *Handled this way, peanuts will provide an income from land where most other crops are unprofitable.*

## Where Peanuts Grow Best.

### CLIMATE.

Peanuts need a growing season of four and a half to five months without frost. They can adapt themselves to a rather wide range of climate, and can be grown in most parts of Texas and Oklahoma where soil conditions are favorable. However, wind erosion makes them unsuitable to the High Plains sections.

## SOIL.

Peanuts do best on well drained, sandy soils with friable sandy clay subsoil. The best peanut soils are such that—

(1) The pegs can penetrate them readily.

(2) The peanuts can be easily harvested without soil clinging to the nuts.

(3) The plants can be plowed up without too many peanuts remaining in the ground.

Heavier soils, such as clay loams and clay, will produce good yields if moisture conditions are right. But heavy soils often form a crust which keeps pegs from penetrating. If pegs do get into the ground and set a crop, harvesting often is difficult; many of the nuts break off and remain in the ground. On dark soils the hulls are discolored, which is undesirable; and on heavy soils particles of dirt cling to the nuts, which lowers the grade.

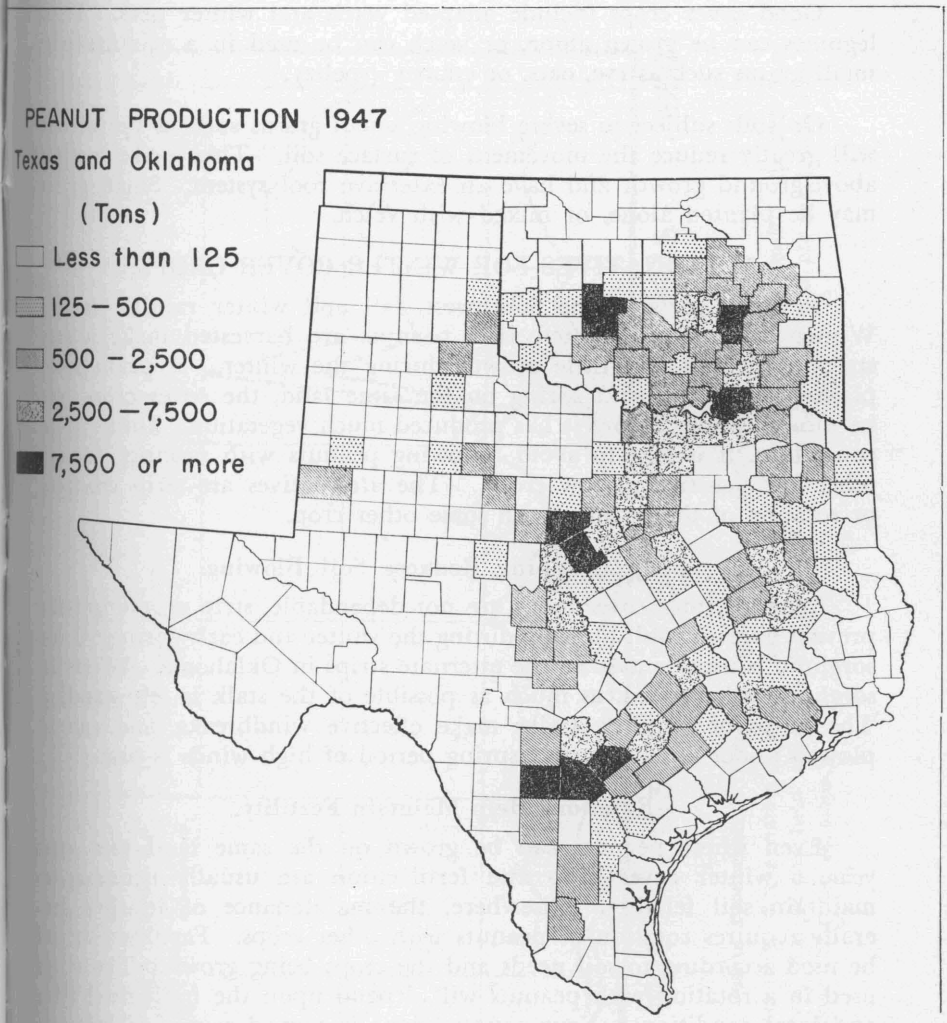
# Maintaining Soil Fertility and Boosting Yields.

One of the chief problems in peanut growing is to handle the soil so it will continue to produce good yields year after year. The problem arises from the method of harvesting, in which the whole plant is removed: tops, nuts, and most of the roots. This leaves the ground bare and subject to wind and water erosion, unless a winter cover crop is planted. Also, it removes from the soil most of the minerals taken up by the growing plants, as well as the nitrogen which peanuts (a legume) take from the air. The loss of plant food is made more serious by the fact that the sandy soils usually used for peanuts often are low in organic matter, nitrogen, and phosphorus, and sometimes are low in potash.

*Nevertheless, soil productiveness can be kept up, or even increased, by using soil-improving cover crops, fertilizer, and rotations. And, if erosion is controlled and soil fertility properly maintained, peanuts will provide an income from land that is too poor for profitable production of most other crops.*

### WINTER COVER CROPS DO THREE JOBS.

Winter cover crops, when properly inoculated and fertilized, protect the soil from wind and water erosion during the winter and early spring. When plowed under, they add organic matter and nitrogen to the soil, and the sandy lands best suited to peanuts need plenty of organic matter and nitrogen for best yields. Plowing under a cover crop also makes the soil more friable and mellow, so it will absorb and hold more moisture and be easier to cultivate.




**Peanut-growing Areas of Texas and Oklahoma.**

The map shows peanut production, by counties, in Oklahoma and Texas for the year 1947. One Texas county, Comanche, produced more than 25 million pounds.

Good cover crops include adapted vetch and winter peas. These legumes can be grown alone, or vetch can be used in a mixture with small grains such as rye, oats, or emmer (speltz).

On soils subject to severe blowing, small grains such as rye or oats will greatly reduce the movement of surface soil. They make a rapid above-ground growth and have an extensive root system. Small grains may be planted alone, or mixed with vetch.

## ALTERNATIVES FOR WINTER COVER CROPS.

In some parts of the Southwest, fall and winter rainfall is low. Winter cover crops planted after peanuts are harvested make a slow start in the fall and little growth during the winter. If peanuts are planted again the next spring on the same land, the cover crop must be plowed under before it has produced much vegetation. Under those conditions, it is best to avoid following peanuts with peanuts (or any other clean-cultivated row crop). The alternatives are strip cropping or rotation of the peanuts with some other crop.

### Strip Cropping Reduces Soil Blowing.

Where winter cover crops are not dependable, strip cropping helps prevent excessive soil blowing during the winter and early spring. Grain sorghum is usually used in the alternate strips in Oklahoma. When the sorghum is harvested, as much as possible of the stalk is left standing. The strips of standing stalks make effective windbreaks, and can be plowed under after the early spring period of high winds is past.

### Rotations Help Maintain Fertility.

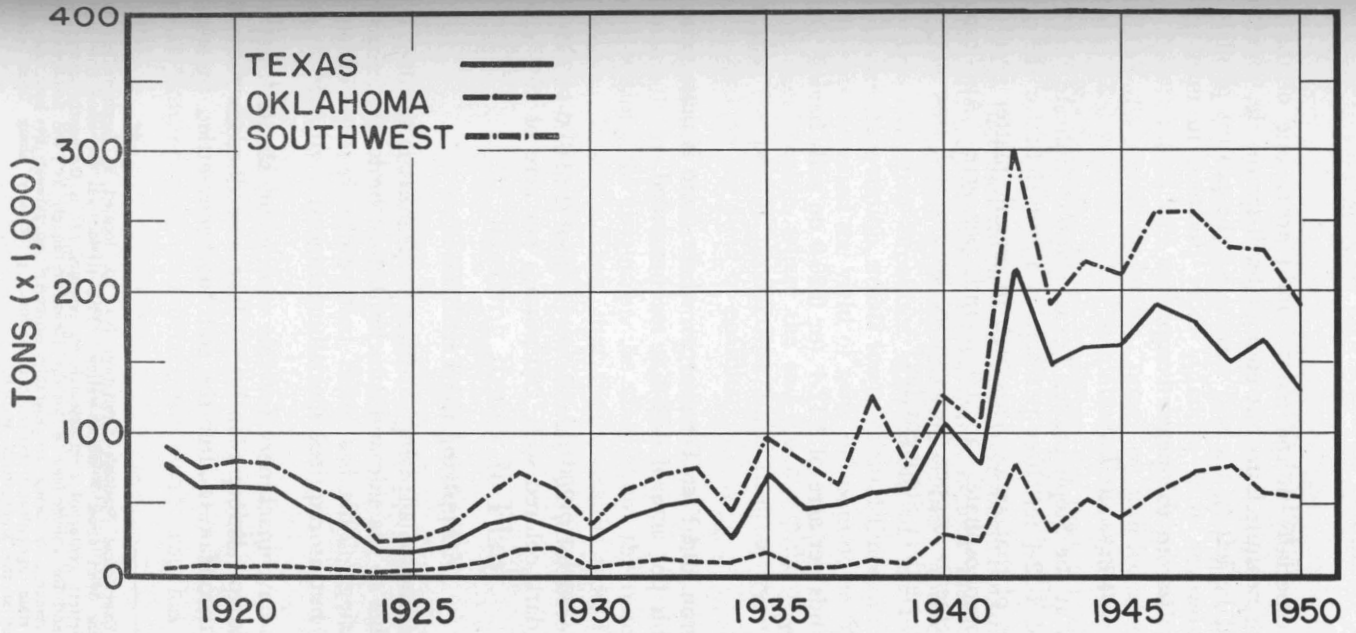
Even where peanuts can be grown on the same land year after year, a winter cover crop and fertilization are usually necessary to maintain soil fertility. Elsewhere, the maintenance of fertility generally requires rotation of peanuts with other crops. Fertilizer should be used according to soil needs and the crops being grown. The crops used in a rotation with peanuts will depend upon the individual farm and local conditions. Your county agent is a good source of information.

## COMMERCIAL FERTILIZER? THAT DEPENDS.

On fertile soils, commercial fertilizer usually does not increase the yield of peanuts. But fertilization is generally profitable on soils of medium to low fertility, unless the peanuts follow some other crop which was well fertilized.

### What Fertilizer, and How Much?

Where winter legumes (vetch or winter peas) are fertilized with 200 to 300 pounds per acre of 0-20-0 (20% superphosphate) and then




**Peanut Production Is Trending Upward in the Southwest.**

The Southwest now grows about one-fifth of the nation's peanut crop. Increase in production was steadily upward from 1925 to 1940. The drop since World War II has been about to the level where continuation of the pre-war trend would have placed it. (1950 figures in above chart are estimates.)

turned under, no additional fertilizer will be needed by the peanuts, on most soils.

In general, especially in the more humid areas, one of the best ways of fertilizing peanuts is to put enough fertilizer on the preceding crop so some will be left in the soil for use by the peanut plants. In the Southwest, however, it is probably more practical in many cases to apply the fertilizer to the peanut crop.

For West Cross Timbers of Texas.

Experiments at the Stephenville, Texas, station* indicate that 150 to 200 pounds of 4-12-4 fertilizer per acre is about right for the principal peanut soils of that area. Soils high in organic matter need only 0-20-0 (20% superphosphate) at 200 pounds per acre. Applications of the minor elements copper, manganese, boron, and zinc have not increased peanut yield at Stephenville.

For South Texas.

Use 200 pounds per acre of 4-12-4 (or 0-20-0 on soils having plenty of organic matter).

For East Texas.

In the Houston and East Texas areas, where there is more rainfall, 200 to 400 pounds per acre of 4-12-4 is recommended.

For Oklahoma.

On light-colored soils, 200 pounds per acre of 2-12-6, 0-14-7, 3-9-18, or 0-12-12. On dark colored soils, 200 pounds per acre of 20% superphosphate.

### Applying the Fertilizer.

The best method of applying fertilizer to peanuts is to place it in bands 2 to 3 inches to the side and 2 inches below the level of the seed, at time of planting. This has given best results in experiments in Southern states, but it requires special machinery.

If you do not have machinery for side placement, the fertilizer can be placed in a furrow before planting. Make a seedbed over the furrow, and plant the peanuts after the soil has been settled by a good rain.

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* Texas Agricultural Experiment Station's Substation No. 20, located at Stephenville, Texas, and known as the West Cross Timbers station. This station has for some time been a principal Southwestern center of field research on peanuts. It is frequently mentioned in this handbook, and for convenience is usually identified merely as "the Stephenville station." Peanut research is being considerably expanded at present by both the Texas and Oklahoma state agricultural experiment stations, principally along lines pioneered for the Southwest at the Stephenville station.

Another possible method is to apply the fertilizer along the row soon after the plants come up.

### USE OF LIME OR GYPSUM.

On soils very low in available calcium (lime), application of lime or gypsum will increase the yield and improve the quality of nuts.

Peanut plants will make good vegetative growth on a low-calcium soil; but there will be many "pops" or unfilled shells, especially of large-podded varieties. The available calcium must be in the top layer of soil – the "pegging zone" – because the pegs act as roots in taking part of the plant's supply of calcium from the soil.

Large increases in yield of nuts have been obtained in recent experiments in Southeastern states, using various methods of supplying calcium. In general, gypsum (calcium sulfate) applied each year was more effective than broadcast applications at less frequent intervals. At the Arkansas station, a half ton of ground limestone per acre applied in the row increased the yield of nuts 890 pounds per acre.

At Stephenville, where the soil has a supply of available calcium adequate for peanut production, application of gypsum has not had much effect on the yield of peanuts.

In the South Texas peanut-growing area, yield and quality of peanuts usually are increased by applying 200 to 300 pounds of gypsum per acre along the row or on the vines about the time the plants start to bloom. It seems likely that similar results would be obtained in other areas where the soil is low in available calcium.

## Getting Ready to Plant.

### SEEDBED PREPARATION.

Land for peanuts is prepared the same as for cotton, corn, sorghum, and other row crops. It is especially important to have the land free of vegetation at planting time. The young peanut plants cannot compete successfully with grass and weeds for moisture and plant nutrients.

Land should be plowed early enough to give cover crops, or residues from the previous crop, time to decay before peanuts are planted. A winter cover crop should be turned under about a month before peanut planting time, and before the cover crop has made too much growth.

In the main peanut-growing areas of Oklahoma and Texas, where soil is likely to blow, the soil is prepared by listing and relisting. Then peanuts are planted on the lister beds.

## CHOOSING THE SEED.

(For amount of seed needed, see page 17.)

### The Variety IS Important.

Like begets like, in crops the same as in livestock. Given an equal chance, the peanut variety bred and selected to fit your conditions is bound to give you better returns than "scrub" seed.

The White Spanish strains of peanuts are practically the only ones grown for sale in the Southwest. Their value has been proved by both experiment and experience. Buyers want them for shelling and for oil, because of their flavor and high oil content.

One of the best White Spanish strains is Spantex, a new variety developed in Texas. In Oklahoma, Spanish 18-38 and Spanish 146 are also recommended. At Stephenville, Texas, and Stillwater, Okla., these varieties have germinated much better in the field and produced higher yields of nuts than commercial Spanish. Enough seed of these varieties to meet the demand is expected to be available after 1951.

### Small Seed Is Cheaper, But Also Poorer.

Seed of Grade No. 2 and Peewee size costs less per pound than Grade No. 1. It also has a larger number of seeds per pound so it takes fewer pounds to plant an acre when planter plates with smaller holes are used. But these smaller seeds produce less vigorous seedlings than Grade No. 1 seed. The plants from small seed usually take four or five days longer to become high enough to cultivate. This gives weeds a chance to get a head start.

## CHEMICAL SEED TREATMENT IS CROP INSURANCE.

Chemical seed treatment is our best and cheapest insurance for high yields. But it is not a cure-all; for example, it has no effect on Southern blight – except possibly to get the plants off to a healthier start, and therefore in better condition to withstand Southern blight infection. Nor should chemical seed treatment be confused with inoculation (see page 14).

### The Benefits.

Recent research in Texas and other peanut-growing states shows both better stands and larger yields from chemically treated seed. At Stephenville, it has doubled the stand, and increased the yield of nuts more than 50 percent (see Table 1).

Shelled peanuts are more susceptible than most field crops to attacks by the plant disease organisms that live in soil. Machine shelling of peanuts breaks or scratches the seed coats. The breaks or scratches in the skin open a path for harmful bacteria and fungi in the

soil to attack the seed. Infected seeds rot, and produce weak seedlings or none at all. Seed treatment kills these soil organisms and thus helps prevent unwanted decay of the seed. It also reduces theft of planted seed by birds and rodents, researchers at the Stephenville station have observed.

Hand-shelled seed has fewer damaged skins. But even with hand-shelled seed, chemical treatment usually gives somewhat better stands and yields.

### The Treatment.

Materials used for treating peanut seed include 2% Ceresan, Arasan, Spergon, Phygon, and a few others. At Stephenville, 2% Ceresan has given somewhat better results than other materials. (Do not confuse 2% Ceresan with New Improved Ceresan, which is 5%. The 5% type is too strong for use on peanuts, and injures the seed.)

Two newer materials, Phygon and Dow 9-B, have been tested only two years, but have given stands comparable with 2% Ceresan.

Spergon W. P. has not insured good stands of peanuts; it should not be used for this crop.

Seed treatment chemicals should always be applied as recommended by the manufacturer. Two percent Ceresan, Phygon and Spergon are used at the rate of 3 ounces per 100 pounds of seed. For Arasan, the dosage is 2 ounces per 100 pounds.

The chemicals should be well mixed with the seed. If not, the seed may be damaged.

### SEED TREATMENT

TABLE 1.—Effect of Chemical Seed Treatment, and of Inoculation, on Plant Stand and on Yield of Nuts and Hay.*

| Treatment** | Percent stand | Yield per acre | |
|---|---|---|---|
| | | Nuts† (bushels) | Hay (tons) |
| 2% Ceresan | 66.7 | 31.1 | 1.20 |
| Arasan | 48.4 | 25.8 | 1.16 |
| Spergon | 45.7 | 27.9 | 1.10 |
| Inoculation only | 31.5 | 21.7 | .92 |
| No treatment | 29.6 | 18.8 | .93 |

* Stephenville (Texas) station; average of seven years, 1943 to 1949.

** Rates of treatment per 100 lbs. shelled seed were: 2% Ceresan, 3 oz.; Arasan, 2 oz.; Spergon, 3 oz.

† Thirty pounds per bushel.

Seedlings may be injured if more than the recommended amount of 2% Ceresan is used. The same is true of some of the other chemicals.

Seed treated with 2% Ceresan should be planted as soon as possible after treatment.

*CAUTION: Seed which is treated and then not used should be destroyed. Seed treated with most of the chemical fungicides is poisonous. It should never be left where it may be accidentally eaten by people or livestock.*

### INOCULATION? MAYBE.

Treatment of seed with fungicide chemicals should not be confused with inoculation. Fungicide treatment is needed every year; inoculation is seldom needed except on soils where peanuts have not grown before. Fungicides are used to kill harmful organisms that cause seed and seedling rots; inoculants put helpful bacteria into the soil – the bacteria which form nodules on the roots of legumes and take nitrogen from the air.

Inoculation of seed has little advantage in the peanut-growing areas. Most of the soils in those areas are already naturally inoculated with the proper bacteria. At Stephenville, chemical treatment with fungicides has been much more effective than inoculation in getting good stands and yields. (See Table 1.)

A question sometimes raised is: Can chemically treated seed also be inoculated? Research aimed at answering this question has so far given no clear-cut answer.

### STORAGE OF PLANTING SEED.

Shelled seed held in storage on the farm for even a few days should be kept away from dampness and not exposed to sunshine.

Seed is best left at the shellers until as near planting time as possible. Shellers generally have storage space where the seed peanuts can be well ventilated and protected from insects and rodents.

## Planting.

### DON'T PLANT TOO EARLY.

Wait until the soil has thoroughly warmed up before planting your peanuts. Planting too early results in poor stands; many of the nuts rot before the soil gets warm enough for them to germinate. Early plantings, too, usually need more hoeing and cultivation than later plantings.

The map on page 16 shows the approximate planting dates for various sections of Texas and Oklahoma. The dates given will vary considerably from year to year, depending on seasonal conditions.

## DEPTH TO COVER SEED.

Cover the seed 3 to 4 inches in the drier peanut-producing areas, and 2 to 3 inches in the more humid areas. Where seed are planted shallow, it is a good idea to use a packer behind the planter.

## SPEED OF PLANTER.

When planting shelled seed, *don't drive too fast.* Planters driven at high speed split a large number of the seeds, and also distribute the seed unevenly. That means poor or uneven stands.

It might be possible to increase planter speed by using a slow plate speed and changing the number of holes in the plate to give proper spacing. But good stands are more important than the saving of a little time during planting season.

## SPACING OF PLANTS.

Thick stands of peanuts in the row are a "must" for large yields of nuts and forage. This is shown without question by experience of growers and by results of experiments on spacing throughout the Southern states. In fact, *obtaining a thick stand of plants is one of the most important things we can do to get a large yield of nuts.*

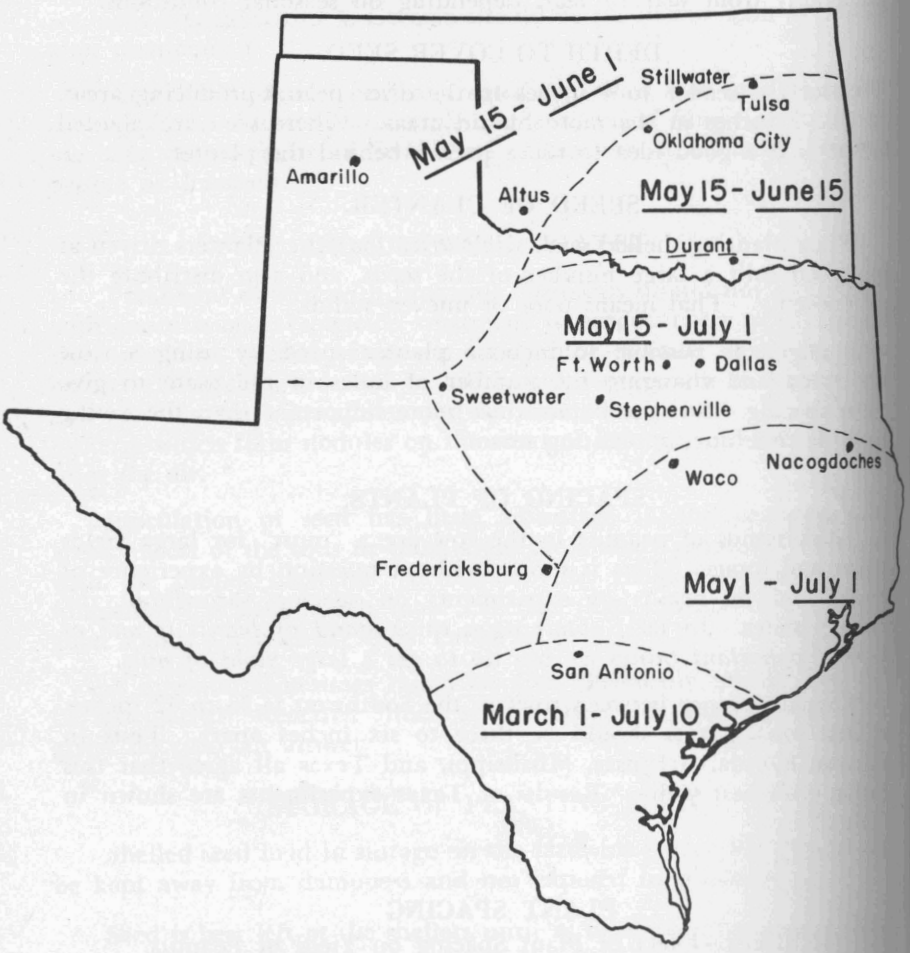
Normal distance between rows in the Southwest is 36 to 42 inches. In these rows, plants should be three to six inches apart. Tests in Alabama, Florida, Arkansas, Mississippi, and Texas all agree that this spacing gives best yields. Results of Texas experiments are shown in Table 2.

### PLANT SPACING

TABLE 2.—Effect of Plant Spacing on Yield of Peanuts.
(In 36-inch rows.)

| Spacing of Plants in Row | Yield of Nuts (Bushels per acre) | | | |
|---|---|---|---|---|
| | Stephenville (4 years) | Lubbock (6 years) | Angleton (2 years) | Average* |
| 3 inches | 39.5 | | 49.8 | 42.9 |
| 6 inches | 36.2 | 44.4 | 50.3 | 42.7 |
| 9 inches | 35.4 | 40.9 | 48.0 | 40.3 |
| 12 inches | | 38.7 | 45.0 | 40.3 |

* Weighted average for "station years" shown.




**Approximate Planting Dates for Peanuts in Texas and Oklahoma.**

Planting too early results in poor stands. The dates of planting overlap between regions, of course; and the date may vary considerably in some years on account of seasonal planting conditions. But the dates shown on the above map will serve as a general guide.

Close spacing of plants in the row not only makes larger yields, but also results in smaller plants which are easier to thresh with a combine. In addition, the branches of closely spaced plants are held upright so they produce fewer late-season nuts. These late-season nuts are of poor quality and lower the value of the extra good nuts produced at the base of the plant.

## SEED NEEDED TO PLANT AN ACRE.

The close spacing which gives best yields takes more seed per acre – about 35 pounds or more of shelled nuts as compared with the usual rate of 25 pounds per acre. But, at present prices, a yield increase of only one bushel per acre would pay for an extra 15 pounds of shelled seed; and the tests reported in Table 2 show an average yield increase of about 2½ bushels for the 3- or 6-inch plant spacings as compared to the 9- or 12-inch spacings.

Table 3 shows the amount of seed of different sizes needed to plant an acre, for several different row and drill spacings. The approximate number of seed per pound in a particular lot can be learned from the sheller or dealer.

## SEED NEEDED PER ACRE

TABLE 3.–Approximate Number Pounds of No. 1 Shelled Seed Needed to Plant an Acre.

| Spacing of plants in row (inches) | Approximate pounds shelled seed per acre with following number of seed per pound* | | | |
|---|---|---|---|---|
| | 1000 | 1200 | 1400 | 1600 |
| | | In 36-inch Rows | | |
| 3 | 81 | 67 | 58 | 50 |
| 4 | 60 | 50 | 43 | 38 |
| 6 | 40 | 34 | 29 | 25 |
| | | In 38-inch Rows | | |
| 3 | 76 | 64 | 55 | 48 |
| 4 | 58 | 48 | 41 | 36 |
| 6 | 38 | 32 | 27 | 24 |
| | | In 40-inch Rows | | |
| 3 | 73 | 60 | 52 | 45 |
| 4 | 54 | 45 | 39 | 34 |
| 6 | 36 | 30 | 26 | 23 |

* Information on approximate number of seed per pound can usually be obtained from the dealer or sheller who supplies the seed.

The figures shown in Table 3 include an allowance for seed split in handling and planting, and also for additional seed that will rot in the ground. (There is some rotting even with chemically treated seed.)

Peewee seed will run more than 1,600 seed per pound. Cost of seed per acre will be less when using them, if planter plates with smaller holes are used; but use of this poor seed is not recommended (see page 12).

## Cultivation and Weed Control.

Weed control begins with seedbed preparation. Careful and frequent cultivation before the seed is planted, and just after the plants are up, saves much hand hoeing later. One hoeing will do the job if early cultivation is well done.

Cultivation close to the plants is continued until they begin pegging down. After that, only stir the middles occasionally, to keep weeds under control.

In general, good peanut cultivation calls for stirring the soil close to the plants and also moving soil toward the plants, to make it easy for the pegs to go down. However, too much stirring of soil near the plants apparently increases the damage from Southern blight (see page 19). Where that disease is a problem, close cultivation probably should be only enough to let the pegs enter the soil.

Either flat sweeps or shallow-cutting shovels may be used for cultivating peanuts. Where Southern blight is not a problem, disk cultivators on the front frame help stir the soil and push it under the plants. The Spanish type peanuts, because of their bunch habit of growth, can be more closely cultivated while blooming and pegging down than is safe with the Runner types.

### USE OF WEED-KILLING CHEMICALS

Use of herbicides for control of weeds and grass in peanuts is being tested by experiment stations in the peanut-growing states. Results to date have been fairly satisfactory; but these chemicals are so new that there is not yet enough information to warrant recommending them whole-heartedly.

## Pest Control.

### PLANT DISEASES.

Only two diseases of peanuts are common in Texas and Oklahoma. They are leaf spot and Southern blight. The Southern blight is the

more destructive of the two. Leaf spot usually has not been serious, but seems to be increasing at present in Oklahoma.

### Southern Blight.

Southern blight disease rots the stems on which the peanuts are borne. As a result, many of the nuts are left in the ground at harvest time. This fungus disease also attacks the larger roots, and sometimes kills the plants. In severe cases, the white strands of the fungus can be seen on the surface of the roots and lower stems.

No satisfactory control is known, nor is there at present any resistant variety having good commercial characteristics. Losses can be held down by rotating peanuts with crops not attacked by this disease, such as cotton, corn, small grains, and sorghums. Losses can also be reduced by prompt harvesting, as soon as nuts are mature; and method of cultivation apparently affects the development of the fungus (see page 18).

When planting peanuts on new land known to be free of the disease, use shelled seed and remove all discolored seeds. This will avoid introducing the disease into the field with the seed.

### Leaf Spot.

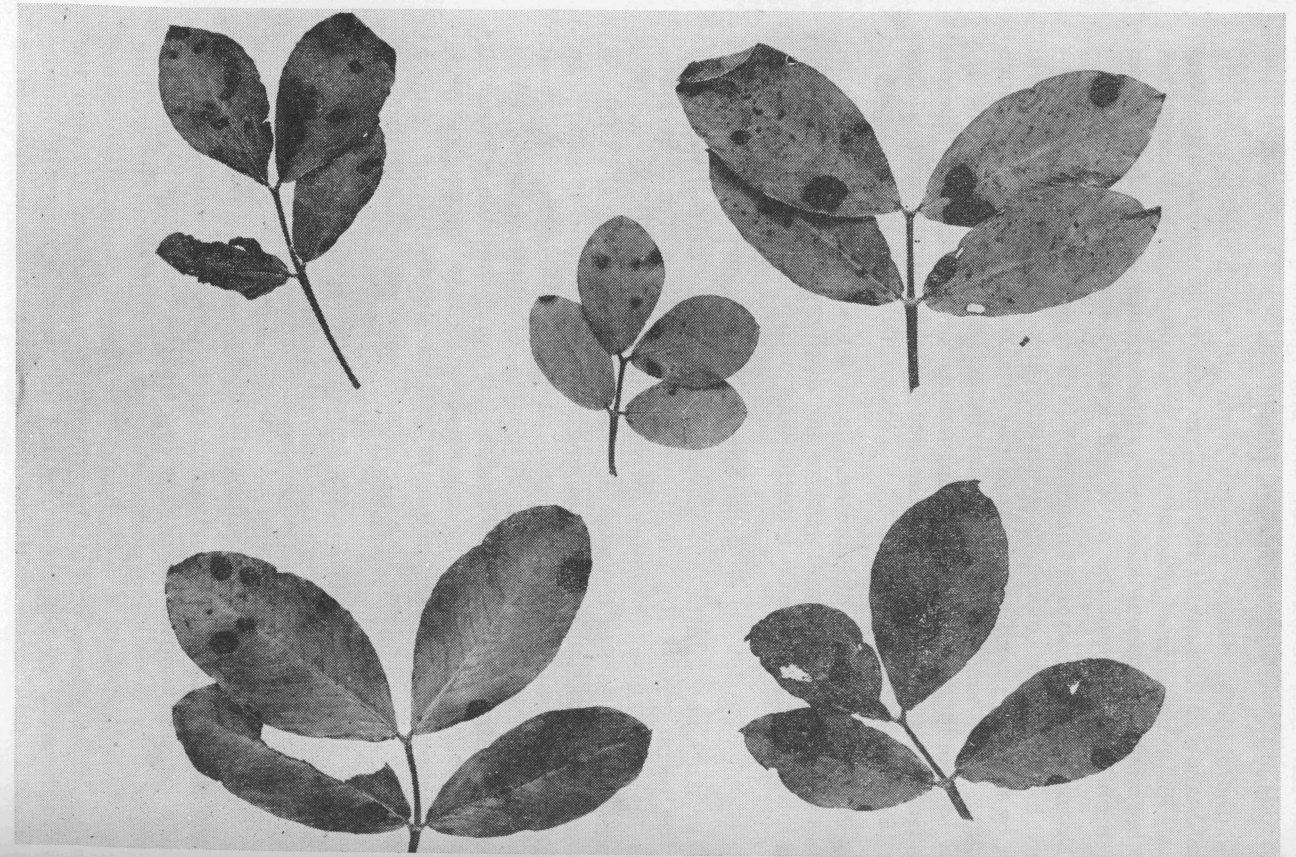
The black spots on peanut leaves caused by the *Cercospora* organism (see picture, page 20) usually are not serious in Texas or Oklahoma. However, they may injure the plant if there is much wet weather during the latter part of the growing season. When there is likelihood of serious leaf-spot damage, control must start *before* the spots appear, using 325-mesh dusting sulfur. Start dusting when the plants are about forty days old, using about 15 to 20 pounds of dust per acre. Make another application 10 days to two weeks later, and continue at intervals of 10 days to two weeks as long as necessary. If rain removes the dust within 24 hours after it is put on, repeat the treatment.

## INSECTS.

Peanuts have three chief insect enemies in the Southwest. They are the lesser cornstalk borer, the fall armyworm, and the corn earworm.

### Lesser Cornstalk Borer.

The lesser cornstalk borer often damages or completely destroys seedling peanut plants. Sometimes it damages maturing peanuts by boring into the developing pods. Presence of this worm in seedling peanuts is indicated by loss of stand. In larger plants, its presence is indicated by masses of borings which are pushed out through the holes in the stalk. When the worm is full grown, it leaves its burrow in the stalk, and changes to the adult stage under trash on the surface of the ground.



**Peanut Leaves Showing Leaf Spot Disease.**

This disease usually is not serious in Texas or Oklahoma. It can be controlled by dusting with sulfur (see page 19). Much more damage is done by the Southern blight disease, for which no control is yet known (see page 19).

The only effective control is fall or winter cleanup of the fields. Winter plowing helps reduce the number of insects the following summer.

### Fall Armyworm and Corn Earworm.

Either of these caterpillars may attack and severely damage the foliage of peanut plants. They may appear any time during the growing season, but more generally are a problem in late summer and early fall. The damage done to the leaves is easily found.

Excellent control of these pests is given by a dust containing 5 percent DDT and 75 percent sulfur. This is applied at the rate of 15 to 20 pounds per acre.

*If the peanut vines are to be used for hay,* the DDT-sulfur dust should not be used later than 30 days before harvest. If dusting is necessary, use 40 percent Cryolite at the rate of 15 to 20 pounds per acre, instead of DDT.

## Harvesting and Threshing.

### TIME OF HARVESTING.

Peanuts are mature and ready to harvest when the leaves begin to turn yellow, the kernels are full grown, and the inside of the pods begins to color and and shows darkened veins.

Best grades are obtained by harvesting promptly, as soon as the vines have matured the largest possible percentage of sound, mature peanuts – that is, when the tap root crop, if any, is mature. The limb crop seldom matures, and waiting for it merely delays harvest past the time when the best combination of yield and grade can be obtained.

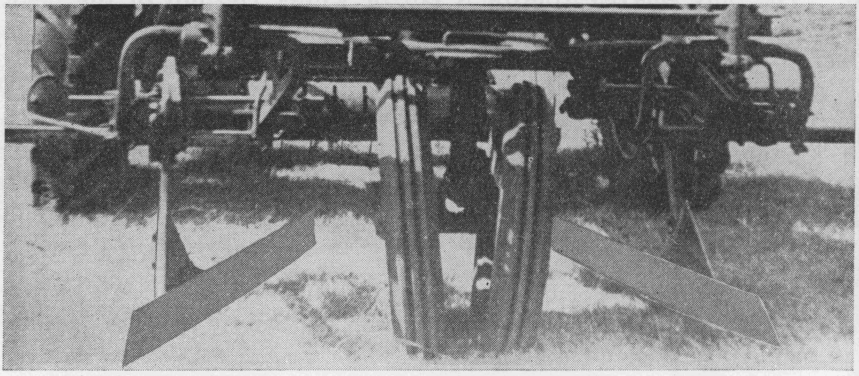
### METHOD OF HARVESTING.

#### Digging.

The first step in harvesting is to plow out, or dig, the peanuts. Two methods are used:

(1) Peanuts usually are dug by plowing out two rows at a time with 10-inch cultivator sweeps mounted on the front cultivator frames.

(2) Some growers use two long-bladed half-sweeps on the front cultivator frame, as shown in the picture on page 22. One right-hand and one left-hand sweep are mounted so that the wings extend toward each other under the tractor. The sweeps cut the tap roots and lift the vines out of the soil, with nuts attached.



**A Half-sweep Plow for Digging Peanuts.**
The sweeps cut the tap roots and lift the vines out of the soil, with nuts attached.

### Threshing.

Proper threshing is an important step in getting good yields and grades. Table 4 shows how improper threshing lowers the grade of the nuts, and thereby reduces the amount per ton received for them. (More information about the grading of peanuts is given on pages 26 to 28.)

Good threshing depends upon the efficiency of the pickers, screens and blowers in the threshing unit, and upon the operator's ability to adjust them.

Threshing aims at three goals:

1. *Remove all dirt, trash, and other foreign material.* A good job of threshing will leave 3 percent or less foreign material. The average of peanuts marketed is around 8 percent.

2. *Completely avoid breaking mature, sound kernels.* Where picker teeth are properly spaced and the cylinders are run at 400 r.p.m. or less, there should be no shelled nuts at all. Shelled nuts generally run about 1 percent or less at Central Texas warehouses.

3. *Recover the largest possible percentage of nuts.* Recovery rates at the Stephenville station have varied from 80 to 98 percent, and average about 90 percent.

### Threshing With a Combine.

Until recently, nuts were usually removed from the vines by using a stationary thresher. Now the combine-thresher is rapidly replacing the stationary machine.

## EFFECT OF THRESHING

TABLE 4.—Effect of Threshing on Market Return from Peanuts.*

| Items in Calculation | Losses on Foreign Material and Damaged Kernels (per ton) | | | |
|---|---|---|---|---|
| | Good Threshing** | | Poor Threshing† | |
| Amount of foreign material per ton | 60 lbs. | | 160 lbs. | |
| Penalty for foreign material | $ | | $2.50 | |
| Cost of threshing foreign material | .40 | | 1.06 | |
| Cost of hauling foreign material to market | .06 | | .16 | |
| Cost of sacks for foreign material | .15 | | .30 | |
| *Loss due to foreign material* | | $ .61 | | $ 4.02 |
| Loss of 1% of sound, mature kernels | | | $2.90 | |
| Penalty for 1% damaged kernels | | | 3.00 | |
| Other thresher damage†† | | | 4.35 | |
| *Loss due to thresher-damaged kernels* | | | | $10.25 |
| *TOTAL LOSS DUE TO THRESHING* (per ton) | | $ .61 | | $14.27 |

* Based on 1949 support price for Spanish type peanuts in the Southwest.

** Good Threshing: Not more than 3 percent foreign material; few damaged kernels.

† Poor Threshing: 8 percent foreign material; at least 1 percent more kernels damaged than in a good job of threshing.

†† Poor threshing results in an average of 1½ percent dirty-faced splits.

For combine threshing, peanuts are dug in the usual manner. Then four to six rows are windrowed together with a side delivery rake or one of the new shaker-windrow attachments. (See pictures on page 25.) If the rows are rather long, it has been found practical to pull a side delivery rake or shaker-windrow attachment behind the tractor which is doing the plowing.

The vines usually are dried in the windrow from three to ten days, depending upon weather conditions. Or they can be threshed after only a short drying period in the field if the nuts are to be dried by artificial heat after threshing.

A combine can thresh from 10 to 20 acres per day, depending largely upon how rank the vines have grown and upon how dry they are. Threshing is much slower when the vines are damp.

Comparisons made at the Stephenville station show that the combine does an excellent job of threshing and also obtains high commercial grades.

### Saving Hay When Combining.

A simple method of saving the hay when threshing with a combine is shown in the pictures on page 27. The slide drawn behind the combine is covered with a strip of heavy mesh-wire fencing, attached at one end. The hay is easily dumped at the ends of the rows, convenient for baling.

## DRYING THE THRESHED NUTS.

Before peanuts are sold, they should be dried until the moisture content is down to 7 or 8 percent. A lower price is paid for nuts having more than 7 percent moisture.

### Field or Shed Drying.

The most common practice is to let the peanuts dry in the windrow from three to ten days, depending upon the weather. Then, after threshing, the drying is completed by stacking the bags in the field, or in an open shed where air can circulate freely.

### Artificial Drying.

In some peanut producing areas there are frequent heavy rains during the harvest period almost every year. Even in the drier regions, wet seasons occur occasionally. Under these conditions, natural drying in the field, or under a shed, is extremely difficult. As a result, there has been an increasing interest in artificial drying within the past few years.

During the past five years, agricultural engineers at the Texas Experiment station have successfully dried peanuts with heated air.

**Using Side-delivery Rake and Combine to Speed Up Harvest and Save Labor.**

**Top:** After digging, four or six rows are thrown together in a windrow with a side-delivery rake, or with one of the new shaker-windrow attachments. **Bottom:** After the vines are dried, they are threshed with a combine. The combine will handle 10 to 20 acres a day. Tests at the Stephenville station show that a combine does an excellent job of threshing and also obtains high commercial grades.

Peanuts have also been artificially dried successfully by a few farmers and custom driers. The nuts have been dried both in sacks and bulk. Both stationary and portable type driers are in use.* (See picture on page 29.)

In artificial drying, the usual procedure is to let the nuts stay in the windrow for at least two days before they are threshed. Immediately after threshing they are carried to the drier, where the excess moisture is removed by circulating heated air through the nuts. The temperature of the drying air should not exceed 125 degrees F. The drying time will usually vary from 2 to 8 hours, depending upon the initial moisture content of the nuts.

The drying operation should be stopped when the nuts have reached a moisture content of about 10 percent. Tests have shown that the nuts will lose an additional 2 to 3 percent moisture during the first 24 to 48 hours after drying. This moisture is absorbed by the dry hulls.

One of the most important factors in the successful operation of a drier is to avoid over-drying. Nuts that are too dry crack badly during shelling. A number of growers and research workers have given considerable thought to the possibility of artificially drying green peanuts which are combined, or threshed, immediately after digging. There has been very little research on this method of harvesting and drying. In some of the tests, however, the dry nuts had a disagreeable flavor. Further experiments will be necessary to determine the feasibility of this method of drying peanuts.

## Market Grades of Peanuts.

The prices paid for peanuts are based on the proportion of sound, mature kernels. The largest percentage of "Sound, Mature Kernels" is obtained by:

1. Harvesting at the proper time (see page 21);
2. Correct curing (see page 24); and,
3. A good job of threshing (see page 22).

### HOW GRADE AFFECTS PRICE.

Prices are figured on the basis of peanuts containing 70 percent sound, mature kernels. The grower gets a higher price per ton for each 1 percent sound, mature kernels above 70 percent, and a lower price for each 1 percent below 70. The price he gets is also lower if the peanuts contain more than 3 percent foreign material (dirt and trash), or if they have more than 1 percent damaged kernels. Moisture con-

* Information on the construction and use of the equipment may be obtained by writing the Department of Agricultural Engineering, College Station, Texas.

**A Simple Hay-saving Device for Use with Combine.**

The hay is easily dumped where it will be convenient for baling (top picture), when the slide pulled behind the combine (bottom picture) is covered with heavy mesh-wire fencing, fastened at one end.

tent also affects price – higher if the nuts contain less than 7 percent moisture, lower if they contain more.

### HOW PEANUTS ARE GRADED.

The process of grading peanuts takes both care and skill. First, the grader follows known rules to be sure he gets a fair sample of the lot he is grading. Then he sorts out the dirt, stems, sticks, stones, sand, loose hulls, etc., and weighs all this waste. This is the "Foreign Material."

To get "Sound, Mature Kernels," the grader first shells the sample by hand. The shelled kernels (including any loose shelled kernels found in the sample before shelling) are placed on a screen having holes 14/64 inch wide and 3/4 inch long. The screen is shaken vigorously, and any nuts which fall through are recorded as "Small, Shriveled Kernels." The damaged peanuts left on the screen, if any, are picked out and scored. The peanuts still remaining on the screen are then scored as "Sound, Mature Kernels."

## Peanut By-products as Livestock Feed.

### THRESHED PEANUT HAY.

#### Feeding Value.

Properly cured, leafy peanut hay is practically equal to good alfalfa for dairy and beef cattle. It gains extra importance in a balanced farming program from the fact that peanuts are grown mostly on land where alfalfa grows poorly or not at all.

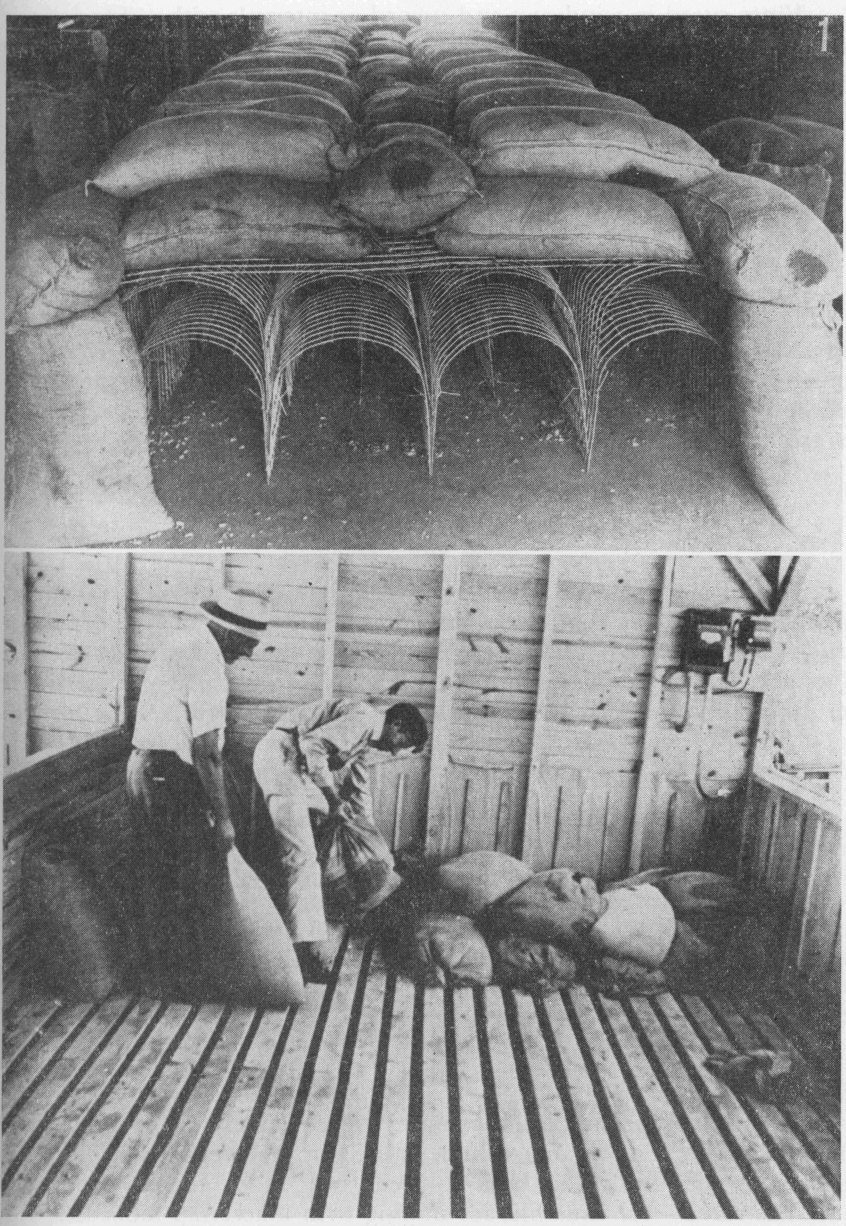
A ton of choice peanut hay contains about 200 pounds of protein, the equivalent of at least 450 pounds of cottonseed meal. Peanuts left on the vines provide additional protein and fat.

Peanut hay is highly palatable. Cattle eat it with surprisingly little waste, even when it is somewhat stemmy and discolored.

All peanut hay contains at least some dirt, although threshing usually removes a large portion of it. Hay that is very dirty, or is moldy, is not suitable for horses and mules. Peanut hay that is to be ground should first be screened.

#### Conserving Hay Quality.

One-fourth to one-half the protein in peanut hay can be lost before threshing. The leaves and small stems are high in protein, vitamin A (as carotene), and minerals, but the feeding value of the large stems is low. Good harvesting aims to save the leaves and small stems.



**Two Types of Equipment for Drying Peanuts in Sacks.**

**Top:** A portable drier used to force heated air into a movable tunnel. The tunnel is completely covered with sacks to force air out through the peanuts. **Bottom:** A permanently installed sub-floor type drier. The sacks of peanuts are placed on the sub-floor, not more than two sacks deep.

Vines cured in windrows and turned at intervals with a side-delivery rake usually lose their desirable green color and a good share of the leaves and finer stems. The older hand-harvesting methods were better from a hay standpoint.

Bright colored hay is obtained only if the crop is harvested before the first killing frost.

## WHOLE-PLANT HAY.

The entire cured peanut plant, including nuts, makes a satisfactory feed, but at present prices (1950) more income can be obtained by threshing and selling the nuts. When whole-plant hay is ground, it sometimes makes a rather damp, heavy product. In that case, it can be fed or stored to better advantage if mixed with a lighter material such as ground Johnson grass hay.

## PEANUT BY-PRODUCTS IN COMMERCIAL FEEDS.

### Meal and Cake.

Peanut meal or cake is the by-product left after the oil is taken out of shelled peanuts. It may be guaranteed to contain up to 45 percent crude protein, and is one of the best protein supplements for feeding livestock. In numerous experiments it has given equally good or better results than cottonseed meal of similar protein content. It is high in total digestible nutrients, but it is low in calcium, and it contains only about half as much phosphorus as cottonseed meal.

Solvent process peanut meal may be considerably lower in fat than hydraulic process meal, and consequently supply slightly less total digestible nutrient value. The protein content, however, is equal or higher.

Peanut meal may become rancid if stored for long periods in warm, moist climates. Southwestern feeders have had little trouble with peanut meal in this respect and should not hesitate to buy it if it furnishes feed nutrients competitive in price with other feeds.

### Hulls.

Commercial peanut hulls contain approximately 55 to 60 percent crude fiber. A considerable volume is used in the preparation of mixed feeds. Ground hulls add bulk to feed, and under certain conditions bulk has value – for example, for mixing with blackstrap molasses. Recent research indicates that peanut hulls should be finely ground when fed to cattle.

### Skins.

Peanut skins, the by-product from peanut roasters, consist of the thin covering of the kernels and particles of the kernels. The volume is small and is used chiefly in mixed feeds. The skins usually are crushed to remove the oil before they are used in feeds.