

# THE New Guinea Agricultural Gazette.

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## PEANUTS AS A CROP FOR NEW GUINEA.

(George H. Murray, F.R.E.S., &c.)

The peanut is one of the most interesting objects in the vegetable kingdom, and correctly speaking is not a nut at all, being a leguminous plant closely akin to garden beans and peas, but developing its fruit beneath the surface of the ground.

The pollinated female organ of the blossom extends into the soil as a thread enlarging into what is known as the "peg", the tip of which eventually developing into the "peanut".

It was at one time thought to be indigenous to Africa, but, although cultivated by many races in that continent, and used as food by slavers for their human cargo during shipment from Africa to the Americas, it is probably a native of Brazil, to which other species of the genus exclusively belong.

It has now become a major crop in many of the warmer parts of the temperate zone, but it nevertheless reaches maturity more quickly in a tropical climate.

Many planters in New Guinea are on the look out for new crops to help them during the present copra crisis, and on account of their many uses peanuts are well worthy of consideration.

It is worthy of cultivation as a food for native labourers and for stock, particularly in pig-raising, an industry with considerable possibilities in New Guinea. Its highly nutritious value, therefore, as food for human beings and stock, adaptability to soil and climate, and easy cultivation, should encourage planters to devote portion of their land to this important crop, one of the most desirable and quick-growing that could be recommended to the planters of this Territory.

Peanuts were introduced by the Department of Agriculture to the Upper Markham Valley, and grew so successfully at the old Agricultural Station at Sangan that it became a regular native crop amongst the Atzera people of that district, where previously there had been frequent food shortage owing to the ravages of the taro beetle.

Not only did the peanuts provide ample food for the natives, but they sold the surplus to the gold-fields and recruiters, thus proving a very satisfactory money crop as well.

Other natives have taken readily to it as an article of diet, and planters are strongly advised to plant an area to provide part of their native food ration.

### **Selection of Land.**

Peanuts are grown more or less satisfactorily in every portion of this Territory according to the treatment they receive, and are adaptable to most soils and climates. Even in the poor volcanic sand and pumice soils of the Gazelle Peninsula, they give a satisfactory yield grown by natives, and find a ready though limited sale in Rabaul.

A bright coloured shell is preferred by the trade, and for that reason it is advisable to select land of light sandy loam, as the pods are then less likely to be stained or dark coloured. Soil of this nature also permits the "peg" to penetrate and develop beneath the soil, and for this reason dark stiff soils should be avoided.

Although adaptable to almost any warm climate its cultivation is more satisfactory in those districts with wet and dry seasons, or a medium rainfall, as long continued moist weather is apt to make the seeds germinate before thoroughly ripening.

### **Preparation of the Soil.**

If new scrub land is selected for this crop, the only preparation possible is to remove as many roots as possible after clearing and burning off. In land of this nature it is best to use peanuts as an intercrop or catch crop between the lines of young coco-nuts or other permanent crop.

If grass land is used it will need to be very carefully prepared by ploughing or hoeing and removal of all grass roots.

In land which has been covered with a dense growth of kunai it is best to plant and harvest one crop of sweet potatoes before sowing with peanuts, although quite good crops of peanuts have been obtained in newly-cleaned kunai land near Rabaul; but perfect cleanliness at time of planting and during subsequent cultivation is essential.

Animal draught agricultural machinery is practically unknown in this Territory so far, but where good soil conditions prevail breaking up the ground with hoes can be quite satisfactory.

Where peanuts are grown as catch crops in new soil of rich friable nature, good crops have been obtained, but where the land is under grass or has been previously cropped, it should be well prepared if even fair crops are to be expected. The soil preparation required is practically the same as that given in the cultivation of English potatoes.

### **Sowing.**

The quantity of seed required per acre depends on the variety sown, the size of seed and whether pods or beans. Seed is sometimes sown in the pod, but to be sure of satisfactory results it is always advisable to sow shelled seed, as this method is more economical; they germinate more readily, and it is easier to select the best type of seed. (Peanuts can also be propagated by cuttings, two or three of which can be taken from each plant, but this is not a general practice.)

If shelled nuts are used due care must be taken to see that all damaged kernels, or those having the red skin broken, should be discarded. Breaking the pods in two answers almost the same purpose as shelling. Only one plant as a rule develops from sowing an unbroken pod, so that by planting shelled kernels twice as many plants are obtained as when planted whole, besides getting quicker germination.

Many planters make the mistake of sowing peanuts at any time without considering the season, but although there is practically no resting season in plant life in New Guinea, the best time for planting should be considered beforehand. In those districts where the "nor'-west" or wet season commences in December, seed should be sown in January or February according to the climatic condition of the district, the aim being to have the crop ripen during the early part of the "south-east" or dry season. In those districts having a moderate fall of rain during the dry (south-east) season, it is possible to obtain a "dry season" crop also. For this crop the seed can be sown from May to July, so that it will be ready for harvesting before the "nor'-west" season commences.

Seed should be thoroughly matured before planting, as perfectly fresh seed is apt to contain excess moisture which causes the beans to become mouldy and decay. Several complaints of seed not germinating can safely be ascribed to this reason.

All peanuts should be cured, and those required for planting should be carefully selected, as good yields cannot be expected from poor or mediocre seed.

Every planter should endeavour to improve his crops by selecting seeds from plants showing highest yields and best type of pods. These should be sown separately in small beds to supply seed for general planting for next crop, the best plants being selected to supply seed for the crop following. By continuing this process of seed selection the intelligent planter can do much to increase the quantity and quality of his product. The quantity of seed required for sowing depends on the variety, bunch varieties being planted more closely than runners.

### Planting Distances.

Planting distance varies with the type of peanut and nature of the soil. The bunch varieties are sometimes closely planted 3 inches to 6 inches apart, planted in rows about 2 feet to 2 ft. 6 in. apart, but in ordinarily good soil of this Territory 12 inches apart in such rows is the planting distance recommended. Runner types are more widely spaced in rows about 3 feet or even more apart, and about 18 inches in the row according to the variety, although very wide planting is not advisable in this Territory owing to excessive weed growth when widely spaced.

By planting shelled seed instead of whole pods there will be fewer misses and consequently a heavier yield, besides less seed being required per acre. The larger varieties of peanuts go from 500 to 1,000 seeds per lb., and the smaller 1,000 to 1,500 to the lb. The quantities of shelled beans required for planting per acre are as follows:—

The larger varieties 500 to 1,000 to the lb. in rows 2½ feet apart and 6 inches in the row will require about 30 to 60 lb.

In rows 2½ feet apart and 12 inches in the row, 17 to 35 lb.

In rows 2 feet apart and 12 inches in the row, 43 to 86 lb.

The smaller varieties 1,000 to 1,500 seeds to the lb. in rows 2½ feet apart and 6 inches in the row will require 23 lb. to 34 lb.

In rows 2½ feet and 12 inches in the row will require 12 to 17 lb.

In rows 2 feet and 12 inches in the row 15 to 22 lb. will be required.

Two or three seeds are planted in a hill a couple of inches apart each way and ordinarily at a depth of about 3 inches deep in light soil and about 2 inches in heavier soils. In certain places, e.g. part of the Gazelle Peninsula, New Britain, where the soil is exceptionally dry, loose, and friable, and evaporation is rapid, it is advisable to sow the seed more deeply, even from 3 to 6 inches. This is a matter which must be left to the discretion of the planter after due consideration of the local conditions.

If the weather is dry it is advisable to soak the unshelled seed for about six to twelve hours to hasten germination. Care must be taken to see that such seed is planted deeply enough to be in moist soil, for if the soil is not in a favorable condition for growth the seed is likely to rot.

Insect pests, birds and rodents are sometimes troublesome after planting the seed, but such damage can be prevented to a considerable extent by the application of one of the following methods:—

- (1) Soaking the seed for ten minutes in a solution of 2 per cent. formalin or mercuric chloride (1 in 1,000) solution.
- (2) The application of sulphur dust.
- (3) Sprinkling with a mixture of equal parts of pine tar and kerosene.

The application of these repollants must be done very carefully when sowing shelled peanuts. In applying the last method it is a good plan to spread the seed on an old tarpaulin so as to permit the sprinkling and stirring in of the mixture as evenly as possible.

In good growing weather germination is rapid; in about four days with shelled seed, but much longer with whole nuts, depending on the moisture and temperature of the soil.

### Cultivation.

The soil for peanuts should be carefully prepared and clean cultivation maintained, as the plant is very sensitive to weeds, requiring much the same treatment as potatoes. To obtain maximum results the land should be thoroughly prepared by removal of all weeds and breaking up the soil. After the ground is in right order the soil should be thrown into ridges as better drainage is ensured and the crop more easily harvested than when grown on the flat. The heavier the soil the greater the necessity for ridging, the object being to provide loose fine soil permitting the lengthened pistil or "peg" to penetrate the soil easily and the nuts to mature evenly, as well as for ease in harvesting. Heavy soil will require more cultivation than that of a light character, as the surface must be kept broken after heavy rains to prevent caking, but after the "pegs" begin to form the plants should be disturbed as little as possible.

In cultivating due care should be taken not to throw any soil on top of the plant, as this would interfere with the pollination and future development of the blossom.

The crop matures more quickly in New Guinea than in Australia or other temperate climes. It will be reduced, however, by the presence of Thurston grass (*Paspalum conjugatum*) and other weeds, consequently it is advisable that it should only be planted in ground that has received clean cultivation or in virgin land. Sweet potatoes, cowpeas, and similar plants which make sufficient cover to keep down grass and other weeds are suitable preparatory crops for peanuts.

Belonging to the family of legumes, the peanut is particularly desirable as rotation with root, grain or other leguminous crops, as it has the power of deriving nitrogen from the atmosphere, which is turned by the action of micro-organisms in the root nodules into nitrates in an assimilable form. It should not, however, be planted more than three times continuously on the same piece of ground. Owing to the fact that most of the plant is removed from the soil at harvesting the peanut does not benefit the land to the same extent as other leguminous crops, so that soil building or green manure crops like various species of *Crotolaria* should be included in the rotations.

### Harvesting.

In the humid tropics, where growth is continuous, it is not so easy to notice when peanuts are ripe, as in the sub-tropics or temperate zone, where there is a wintering season, but the following particulars will be of assistance in judging when plants are ready for harvesting:—

- (1) When the foliage loses its bright fresh green and becomes yellowish or dull green.
- (2) The veins in the inside of the pod should be dark in colour.
- (3) The period of growth.

The quick-growing bunch varieties are ready for harvesting in 105 to 125 days and running types 165 to 185 days. When grown on an extensive scale the harvesting is generally done by a plough without mould board, but in the present state of development in New Guinea, digging with fork or long-pronged hoe must suffice.

If the vines are left in the ground too long the ripe nuts are apt to become detached from the roots, resulting in considerable loss of crop. In very humid weather, also, the seeds are apt to germinate in the pod if left in the ground even a few days after maturity. On the other hand, if harvested too soon, there will be too many duds or pops, and immature nuts which will shrivel up and be valueless. Careful judgment must, therefore, be exercised when deciding on the right time for harvesting. It is advisable to loosen the soil before lifting the plants. Harvesting should not be done when the plants are wet, as the vines in such a condition may start to rot and thus interfere with the subsequent curing of the nuts. After harvesting the crop must be cured, as this enables many imperfectly ripe pods to complete the process and prevent shrivelling of the beans.

### Curing.

The pods should be carefully harvested, removing as much soil as possible from the roots, which are then spread on the surface of the ground to the full exposure of the sun for a few hours to wilt. The bunches should then be stooked to complete maturing and ripening. This is done by stacking the clumps of plants around central poles about 6 feet high and about 3 inches in diameter, pointed at both ends and driven securely into the ground. About 30 poles will be required per acre, and it is advisable that the holes should first be made with crowbar to ensure that the poles are absolutely firm. If this is not done the stack may develop a lean or be blown down with the wind.

Two pieces of timber about 3 feet in length should be fastened at right angles to the pole at least 1 foot from the ground to prevent the bottom layer of the stack from rotting, and assisting in the aeration of the middle of the stack, for it is absolutely necessary to see that no part of the vines comes in contact with the soil. Hardwood 3 inches by 1 inch is best for the cross pieces, but as this is not always easily obtainable, suitable bush hardwoods or even stout limbong (split palm stems) can be made to serve the purpose. The clumps of vines are then arranged round the poles with the roots towards the centre, first arranging a few vines as a foundation on which to build up the stack, care being taken to see that they are pressed occasionally to make the stack secure. At the same time the stack must not be pressed too heavily, and it should not be more than 2 or 3 feet in height, otherwise heating will result and the crops be damaged.

The time required for curing depends greatly on the prevailing climatic conditions, but ordinarily it will be from three to six weeks. The stacks must be inspected frequently to see that they are not suffering from the depredations of rats or other vermin. They should be thoroughly cured before storage, otherwise they are very apt to heat and become mouldy, rendering them practically valueless.

It is absolutely necessary to see that the roots and pods are entirely free from soil, or full development of the oil known as curing will be prevented. The nuts should not be removed from the vines until they are cured or the kernels will shrivel and pods become mouldy. If the weather is suitable for curing, the vines will have wilted sufficiently to start stacking within a few hours after digging: they should be stacked while the leaves are still limp and before they become crinkly and brittle. In making the stack the vines should slope outwards and downwards so that the pods will be near the centre where they can have free upward circulation of air and yet be protected from the weather.

It will be of assistance in keeping the stack firm and secure if a bunch of vines is occasionally twisted round the pole. The centre of the stack should be kept about 12 inches higher than the outside, and so constructed that when complete the top will have sufficient slope to shed rain. Improperly stacked nuts will ferment, and for that reason they should not be more than 3 feet in diameter. When completed the stack should be fastened to the stake by a few vines in such a way that it is perfectly secure. Finally the top of the stack should be covered with a little thatch of kunai or palm leaves, sufficient to shed any rain, but due care must be taken that it is not put on in such a way as to interfere with free circulation of air, also on no account should green or wet material be used for this purpose or fermentation will invariably ensue.

A roof shelter similar to that given by good native cultivators in curing their yams before storing is a very suitable guide for covering the peanut stacks during the process of curing. Peanuts are sometimes seen curing in open sheds, but this is not advisable, in the first instance, as they cure more satisfactorily in properly made stacks. Stacking is the only way of curing nuts satisfactorily and the vines should remain three to six weeks before removal to sheds for picking the nuts.

The outside of the shell must be clean and bright as purchasers for roasting purposes will not accept them in any other condition. They must also be thoroughly dry, otherwise the kernels will be mouldy and valueless. Buyers in all parts of the world lay great stress on these points.

### **Picking.**

After curing has been completed the peanuts should be picked from the vines, a process rather slow and tedious by hand, which particularly with native labour cannot be considered cheap, but machinery for this purpose is only suitable when the crop is produced on an extensive scale.

Separation of pods from the roots is best done on a bright hot day and care should be taken that all immature or rotten pods should be discarded. One reason for the adverse report on the few peanuts shipped from this Territory is due to the fact that care was not taken in this matter, as marketable pods must be bright, clean, and free from stems and other refuse.

Though not a very satisfactory method, the pods can be removed by rubbing the whole plant over a tightly drawn piece of wire netting which lets the nuts fall through. Much trash falls through also, but this can be removed by winnowing. One of the disadvantages of this method is that many of the stems remain on the nuts, but if they are thoroughly dried afterwards and receive a further winnowing a fairly clean product will be obtained.

The nuts can be threshed by dragging the vines over wire netting strained taut on a horizontal frame. The vines should be dry and brittle when picking, otherwise the nuts will not detach readily; consequently this work should not be done in damp weather.

### **Washing.**

Most growers wash and dry the peanuts before shipment, but this should not be very necessary with peanuts that are intended for oil crushing provided sufficient care is taken in all previous operations of harvesting, curing, winnowing, &c.

To get a perfectly clean sample, however, the peanut should be washed in several changes of water and then dried in the sun, which is the method frequently employed in China and other Eastern countries. When so treated the pods have a bright clean appearance essential for the confectionery trade.

The appearance of the nut can be greatly improved by washing in a bleaching bath, then in fresh water and subsequently dried.

### **Winnowing.**

After picking over the nuts on completion of curing they should be winnowed in a strong wind, which is easily done by pouring the pods from a stage 7 or 8 feet from the ground on to a clean floor or mats in the open. A barbecue or cement floor fully exposed to sun and wind should be on every plantation for dealing with peanuts, rice, or any other crops which require to be winnowed or sun dried.

### **Bagging and Storage.**

Peanuts may be stored in bags when thoroughly dried, but the shed or house in which they are stored must be thoroughly water-proof, rat-proof, and ventilated. If stored in bags the tiers should not be more than seven tiers high with alleyways at every third row. They should not be bagged or stored until thoroughly dry or they are almost sure to ferment and be unfit for market. When grown on an extensive scale as in many parts of Southern United States of America,

mechanical pickers are used, but such machines are not applicable to the small cultivators in this Territory. If to be stored in store or sheds any time before shipment the bags should not be stacked directly on the floor, but saplings should be placed underneath to provide circulation of air. The store should also be made rat-proof by lining with wire netting not more than  $\frac{1}{2}$ -inch mesh.

### Crop Returns.

Yield varies according to the variety, soil characteristics, cultivation received and climatic conditions. Other things being equal the highest yield will be from the crop is planted in the wet season in time to reach maturity at the beginning of the dry season.

The average yield for the entire United States of America was 728 lb. per acre. Under the best conditions yields of 1,400 to 1,600 lb. per acre are frequent, but in various parts of the tropics yields of 2,000 lb. and even 4,000 lb. (in Barbados) are recorded.

### Market.

There is a limited market in Australia for peanuts from this Territory, but brokers who have been in communication with the Department of Agriculture, Rabaul, insist on having them shelled. There is no doubt some saving in freight when shipped in this condition, but on the other hand there is greater risk of the shipment being damaged by weevil and other vermin as well as being tainted by copra and other strong smelling cargo in the ships' holds. There is also danger of the kernels being bruised in transit, resulting in fermentation setting in.

### Varieties.

There are various types of both bunch and runner peanuts in cultivation bearing large and small nuts. The larger nut is preferred in the confectionery trade, but the smaller being heavier, bulk for bulk is preferred by the oil crusher.

The runner varieties are more difficult to harvest and to cure satisfactorily owing to the pods being distributed along the vines instead of being in a cluster at the base of the plant as in the bunch varieties. There are four varieties in cultivation at Keravat, the average time of yield has been as follows:—

Red Spanish	..	..	..	..	..	4½ months
White China	..	..	..	..	..	5 "
Shantung	..	..	..	..	..	4½ "
Pearl	..	..	..	..	..	3½ "

The average yield of all the above is  $\frac{1}{2}$  ton per acre varying according to climatic conditions and nature of soil. The largest crop obtained has been from Red Spanish which on a few occasions has yielded 1,400 lb. per acre.

As the peanut therefore reaches maturity in a few months it is very suitable as a catch crop to be given with those of a permanent nature.

### Uses.

More than 100 products can be obtained from peanuts, including oils, milk, butters, flours, meals, breakfast foods. It is also used in canning sardines and other fish, relishes, sauces, flavourings, confectionery of many kinds, wood stains, stock feeds from both nuts and vines, black ink, face powders, face creams, harness



dressing, in medicine, various arts, &c. Its easy cultivation and adaptability to varied soil conditions, and particularly its value as food for human beings and stock, apart from other economic purposes, should be sufficient to warrant its cultivation in New Guinea. Every part of the plant can be put to some commercial use, even to the residue resulting from processing the beans in the many forms in which it is now put on the market.

The beans are the richest of all vegetable foods, the oil being of excellent quality, little, if at all surpassed by the product of the olive. It is the basis of many valuable food products and according to the *American Nut Journal*, analysis shows it to contain three times the nutritious value of beef. It is therefore one of the best vegetable substitutes for meat and for that reason is greatly esteemed by believers in a vegetarian diet. It can be used in many forms, roasted or boiled in the shell or as peanut butter, and several recipes are given below for the information of the house-wife.

Its food value can be well appreciated when it is realized that the beans contain 29 per cent. protein and up to 50 per cent. fat. Apart from the economic value of the whole bean the residue after expression of oil can be processed into flour which is also an important food for human beings. After final pressure the residue still contains about 5 per cent. oil, and after thorough drying, grinding and sifting becomes a flour of high food value with a very pleasant taste. It is somewhat deficient in carbohydrates and it is advisable therefore to mix it with wheaten flour, and in this way can be turned into various nutritious articles of diet.

To popularize the use of this valuable product as an article of diet, the following recipes common in many parts of the southern United States of America are supplied:—

#### SALTED PEANUTS.

If green or unblanched nuts are used they must be first blanched in boiling water for five minutes to loosen the skins. Use two cupfuls of water to one cupful of shelled nuts. Drain, remove skins, and let dry, over night if possible.

#### *Browning the Nuts in the Oven.*

Put one-half cupful of nuts and one teaspoonful of oil in a flat pan and roast in a moderately hot oven, about 450 degrees Fahrenheit, for five minutes, if roasted peanuts are used, or ten to fifteen minutes if green or unroasted nuts are used. Stir frequently so as to keep uniform in colour. When golden brown put between paper towels or on brown paper to drain off any excess of fat. Put on waxed paper and sprinkle with salt in the proportion of a teaspoonful to each cup of nuts. A larger amount of salt may be used if desired.

#### NUT CHOWDER.

Cut two potatoes and one large onion into thin slices. Cut two tomatoes or the equivalent of canned tomatoes. Dissolve a teaspoonful of peanut butter in one-half cupful of cream or milk. Put all the ingredients into a quart of water with two tablespoonfuls of chopped nut meats, simmer until the vegetables are tender, then add salt and a tablespoonful of butter just before serving.

## FRUIT AND NUT PASTE.

Take 2 cupfuls of dates after stoning, 1 cupful of peanut butter, 1 teaspoonful of salt. Wash and dry the dates and put through a meat chopper, add the peanut butter and mix well with the salt. Take spoonfuls of the mixture, shape into small apples, put a currant for the blossom end and a piece of candied lemon or orange peel for the stem.

## PRUNE SALAD.

Prunes, lettuce, chopped peanuts, mayonnaise and peanut butter. Cook prunes as if for sauce, but omit sugar. Cool, remove stones, and fill cavity with peanut butter.

## TOMATO AND PEANUT SOUP.

- 1½ cups stewed and strained tomatoes.
- ½ cup peanut butter.
- 1 teaspoon salt.
- ¼ teaspoon paprika.
- 2½ cups boiling water.

Add tomatoes gradually to the peanut butter and when smooth add the seasonings and water. Simmer for ten minutes and serve with croutons. Well-seasoned soup stock may be substituted for the water; but if used, the quantity of salt should be reduced.

## PEANUT BUTTER LOAF.

- 2 cups bread crumbs.
- 1 cup cooked rice.
- ½ cup chopped stuffed olives.
- ¼ teaspoon dry celery salt.
- ½ cup peanut butter.
- 1 teaspoon onion juice.
- 2 teaspoons salt.
- 2 eggs.
- ½ cup milk.

Mix the ingredients and form into a loaf. Bake until brown. Serve with a tomato sauce.

## PEANUT BUTTER CANAPES.

Cut rounds of bread and toast to a delicate brown.

Mix peanut butter with cream cheese, add salt, spread lightly on the toasted rounds and serve.

## PEANUT BUTTER OMELET.

- 4 eggs.
- 4 tablespoons milk.
- 6 tablespoons peanut butter.
- 1 teaspoon salt.

Mix the peanut butter with the milk. Separate the whites and yolks of the eggs and beat well. Blend milk with the beaten yolks and fold in the beaten whites. Brown the omelet and fold. Serve on a hot platter with a cream or tomato sauce.

## PEANUT BUTTER FONDUE.

- 3 eggs.
- 6 tablespoons peanut butter.
- $\frac{1}{4}$  cup milk.
- 1 teaspoon salt.
- 1 cup dry bread crumbs.

Blend the peanut butter with the milk and add the beaten yolks and the bread crumbs. Fold in the stiffly beaten whites. Pour into a baking dish or individual baking cups, surround with hot water, and bake until firm.

## PEANUT BUTTER BREAD AND COOKIES.

Peanut butter is also good in various hot breads or in cookies. When used for such purposes the fat specified in the recipe may be greatly reduced or the peanut butter in some cases may entirely replace it; for instance, in baking powder biscuits, peanut butter may be used in place of other fat.

## PEANUT BUTTER SALAD WAFERS.

- 1 cup cornmeal.
- 1 cup wheat flour.
- $\frac{1}{2}$  cup peanut butter.
- 1 teaspoon salt.
- $\frac{1}{2}$  cup milk.

Mix together, roll out very thin, and cut out. Bake in a moderate oven until brown.

## OATMEAL PEANUT BUTTER DROP COOKIES.

- $\frac{1}{2}$  cup sugar.
- $\frac{1}{4}$  cup syrup.
- 8 teaspoons peanut butter.
- $\frac{1}{4}$  teaspoon salt.
- 2 eggs, well beaten.
- $2\frac{1}{2}$  cups rolled oats.

Mix together and drop by the spoonful on a greased baking sheet. Bake until brown.

## PEANUT BUTTER CAKE FILLING.

- $\frac{1}{2}$  cup syrup.
- 1 tablespoon vinegar.
- $\frac{1}{4}$  teaspoon salt.
- 2 tablespoons peanut butter.
- The white of 1 egg.

Cook the syrup with the vinegar until it forms a hard ball when dropped in cold water. Pour over the beaten egg white and beat until stiff. Add the peanut butter last thing. Spread between the layers of a simple 1-egg cake or sponge cake. Serve with a fork.

### PEANUT CANDY.

- 1 pound brown sugar.
- 1 cup molasses.
- 1 cup water.
- 4 tablespoons butter.
- $\frac{1}{4}$  pound shelled peanuts.

Boil sugar, molasses and water till it is crisp when dropped in cold water. Just before taking from the fire add the butter and the nuts, then pour into pan well oiled with butter.

### Value as Pig Food.

The whole plant is of value as pig food, and as the greater part of the pork consumed by Europeans in the Territory is imported from Australia as freezer cargo, the possibilities of a profitable pig-raising industry near the main centres of population are considerable, and peanuts are worthy of cultivation for this purpose alone.

It has been proved that less than 3 lb. of peanuts are required for each 1 lb. gain in the weight of pigs that weigh over 40 lb. at the start. An acre of peanuts pastured by pigs made over 1,200 lb. of gain, while an adjoining field of maize yielding 30 bushels per acre only gave 436 lb. of gain per acre on pigs.

Peanut meal, the residue after extraction of the oil, contains about 52% protein, 8% fat and about 27% carbohydrates (starch and sugar), which proves it to be one of the most highly valued stock foods on the market. Even the leaves and stems also provide a nutritious hay appreciated by most domestic animals, and for this purpose alone several years ago were considered in the southern United States of America to be worth about £5 per acre. The vines and leaves are also of value as green manure if not used for hay.

### Pests and Diseases.

Certain insect pests have been recorded on peanuts grown at the Keravat Demonstration Plantation, but they are not of sufficient importance to warrant drastic combative measures. A root disease has been noted at Keravat, but its appearance has been sporadic and there is no evidence to indicate that it is of a serious nature. Rosette disease which has been causing considerable damage to peanuts in some countries is so far unknown to New Guinea.

### Oil Extraction.

This is a simple process, but in the United States of America where the crop is put to so many uses, special machinery is used for dealing with it in large quantities.

The nuts must be thoroughly cleansed and have the red skin removed by washing, drying and winnowing. The cleansed kernels are then subjected to heavy pressure in hydraulic mills which is always done when cold to obtain high grade oil, colourless with pleasant odour and flavour. Further pressure under heat provides oil of inferior quality suitable for soap-making and other industrial purposes.

Machines now put on the market by British, German and American engineering firms, are known as oil expellers, and reduce the amount of machinery required to a minimum.

If a number of planters and others would form a co-operative concern for dealing with this crop it should pay them to crush the nuts locally and use the residue for stock feed as noted elsewhere in this article.

### **Fertilizers.**

Peanuts require an ample supply of organic matter in the soil, but this will be found in most newly cleared land in this Territory. Lime, when easily procurable, can be applied with advantage to most soils in New Guinea, but investigations on this crop indicate that the quality rather than the quantity of the crop is affected by such applications. When supplied with a sufficiency of lime peanuts are whiter in colour and weigh more per bushel, than soils lacking in this element. At the same time an excessive application is very apt to do more harm than good by causing a reduction in yield. Before deciding on any such application it is advisable to make a simple test of the soil for acidity, or to make only a moderate application of about 500 lb. of lime per acre.

Soils deficient in lime show such marked benefit by its moderate application that when easily obtainable any opportunity of using it should be taken. If not convenient to use burnt lime, crushed limestone or fresh coral can be applied with advantage.

Heavy crops are obtained on new ground for the first few years without manure or fertilizers, as the ashes and bush scraping after burning off will provide potash and other valuable fertilizing elements to the soil.

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