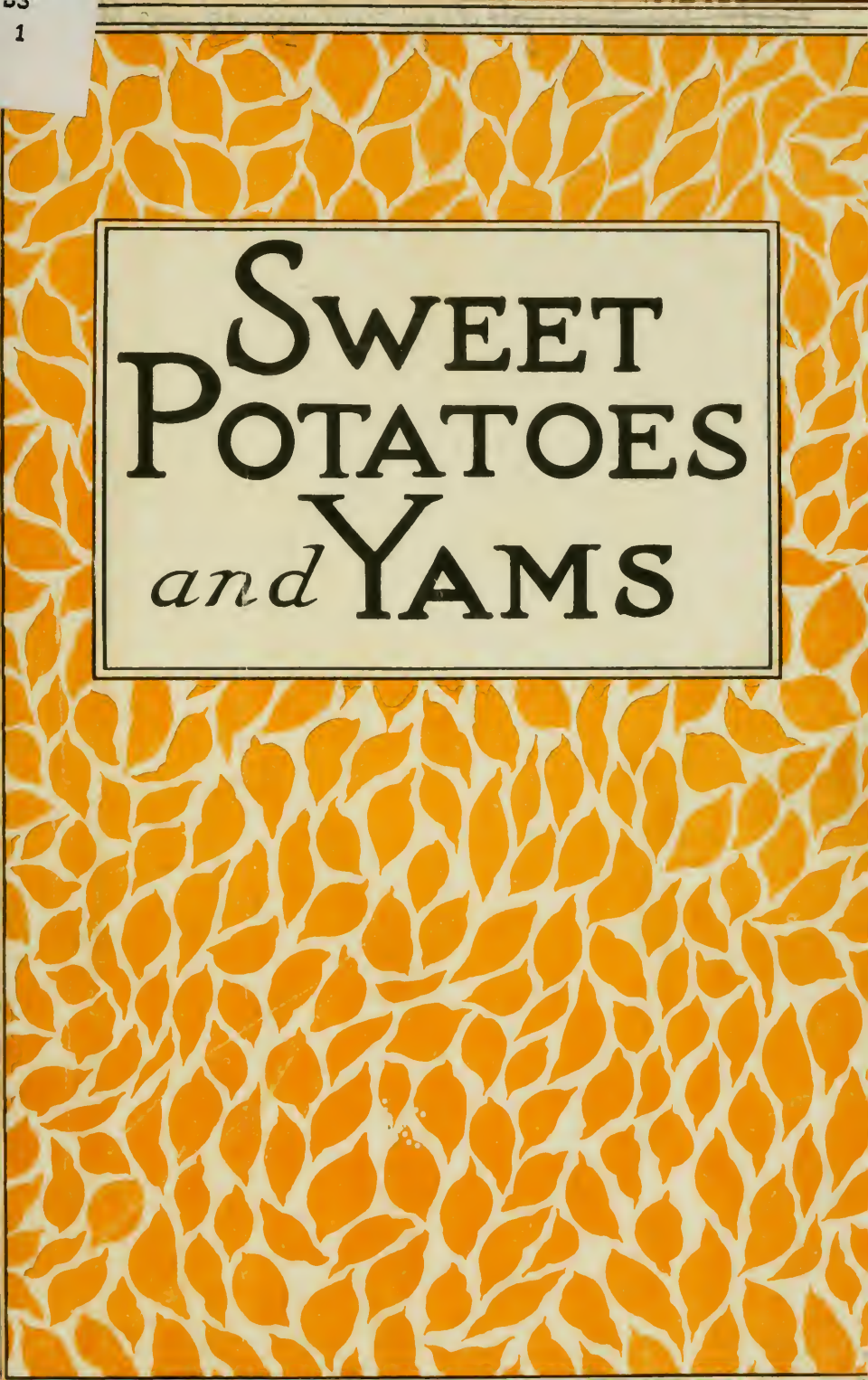


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SWEET
POTATOES
and YAMS

Issued by

The *Barrett* Company

AGRICULTURAL DEPARTMENT

New York, N. Y.

Athens, Ga.

Medina, O.

Berkeley, Cal.

Number 91

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MAY 10 1918

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Sweet Potatoes and Yams

INTRODUCTION

THE sweet potato is, so far as we know, a native of America. It was found growing here when the early colonists arrived and has continued to increase in volume and in favor as a food crop. Being of tropical origin, it appears most extensively in the Southern States, where it is generally used and appreciated; in fact, all through the South the term "potato" usually means the sweet potato, the white potato being distinguished as the Irish or round potato. Certain varieties of sweet potato are also called "yams" in the South and the name is now in general use, although historically a different family growing in the East Indies and the Philippines has the earlier claim to the name.

The sweet potato was a valued asset in our war of the Revolution, for history relates that General Francis Marion, the "Swamp Fox" of South Carolina, maintained his men for months at a time on little else. When a British envoy came to treat with him, he was invited to share this ration, and returning reported to his commander, Lord Cornwallis, that patriots so resourceful and self-denying could never be defeated. Again, in the war of 1812, General Andrew Jackson, in his campaign against the Spanish in Florida and Alabama and against the British in Louisiana, had but little food for his men except sweet potatoes. When the British general, Packenham, commanding at New Orleans, learned this, he reported home in substance that the Americans never would be conquered because of their determination and because they could always raise enough sweet potatoes, on which food they could fight indefinitely.

Sweet Potatoes and Yams

The sweet potato is rapidly gaining in favor and bids fair to become a food crop of national importance. It is easy to grow, the yield per acre is large, it may be prepared in many attractive and palatable forms, and it has a high food value. It should constitute a large and permanent part of our diet, but despite its advantages the sweet potato has not received the attention of either producer or consumer that it deserves. In the South, where the crop flourishes and where most of it is grown, the production is as yet insufficient and the quantity in storage does not adequately supply the local markets.

Food Value. Table I shows why the sweet potato is of high food value. Its water content is low and it contains a considerable proportion of the energy-producing materials—sugar and starch (carbohydrates). When first harvested, starch forms from one-sixth to one-quarter of the potato, but after a period of storage, much of it turns to sugar, which accounts for its characteristic taste and name. Energy, or heat value, is usually measured in calories. A pound of yams produces 570 calories as compared to 375 for the Irish potato.

TABLE I. From "Feeds and Feeding," Henry.

	Water	Protein	Carbohydrates	Fat
Sweet potatoes	68.3	1.9	27.9	.7
Irish potatoes	79.1	2.1	17.8	.1
Turnips	90.1	1.3	7.5	.2
Chufas	79.5	0.7	12.7	6.6

Production—Three pecks per capita. In 1917 953,000 acres were planted to sweet potatoes in the United States. The yield was 87,141,000 bushels with a total farm value of \$96,121,000. This yield provided only 0.85 of a bushel, or a little over three pecks per capita per annum.

Climate and distribution. The climatic conditions best suited to cultivation of the sweet potato are moderate rainfall through the growing season, warm nights and plenty of sunshine and a period of growth free from frost for at least four and one-half months. They are profitably grown as far north as forty-five degrees latitude. New York State and Michigan grow them successfully. Canada (Toronto section) has grown them on a small scale.

Prolific. The sweet potato is one of the most prolific of crops, a quality that is particularly important on the poor cotton or tobacco soils. Under the ordinary system of cropping, land that will produce 20 bushels of corn or half a bale of cotton, will produce 200 bushels of sweet potatoes. On the farm of the South Carolina Station, Prof. T. E. Keitt obtained an average of 250 bushels per acre with fifteen varieties. With intensive fertilization and cultivation, yields of 500 to 700 bushels per acre have been obtained.

Soil

A friable or loamy soil is best suited to its needs, but any well-drained soil of moderate fertility will produce a good crop, provided it is not too cold. The sweet potato is simply an enlarged root, so that the soil plays a very important part in its development. If it is too loose and deep the roots have a tendency to lengthen with a consequent shrinking in diameter. A stiff clay is not desirable but can be improved by turning under green crops, and should then produce a satisfactory yield.

Preparation of soil. The preparation of the soil involves the same general principles as does the profitable growing of any crop, namely, care and thoroughness. The soil is broken to a depth of from six to ten inches and well harrowed. A furrow is then opened, the fertilizers applied and bedded on. Later a light harrow or drag is passed over it before setting the plants.

Bedding potatoes—Home grown plants best. Most farmers can bed enough sweet potatoes to produce their own plants at home. It has been demonstrated that home grown plants will produce a better yield than plants of the same variety grown under different conditions. There are various methods of bedding followed with success in different regions. The wisest course is to adopt the method advised by the State Experiment Station for a given locality. The plants should be drawn from the bed and planted only after all danger of frost has passed.

Time of setting plants. The Georgia Station has found that the best yields are obtained if plants are set between May 16th and June 11th. The same varieties of potatoes planted before or after these dates did not produce as heavily. Local conditions will largely determine this question for the individual.

Rotation of crops. It is well to remember, at this point, that it is not advisable to grow sweet potatoes continuously on the same land, since that practise, if followed, usually results in a disease infested soil. This condition can be largely controlled by rotation, say, with corn, peanuts and grass.

Spacing. The usual practise in spacing plants is to place them in rows three feet apart with from eighteen to twenty-four inches between plants in the row.

Setting plants. If more than two or three acres of potatoes are grown, it may be advisable to use a transplanter. These machines are efficient and inexpensive. With a team of mules and three men to operate it a transplanter often sets four acres a day while sixteen men would be needed to cover the same ground planting by hand.

Fertilization

Fertilizers are an important factor in raising profitable crops. It is almost impossible to produce the smooth, well-shaped potato which the market requires without using a sufficient quantity of a balanced ration of plant foods. It has been noted, however, that an oversupply of vegetable matter in the soil or an excess of nitrogen in the fertilizer will affect the quality of the potato and sometimes cause it to crack. It is desirable therefore that the ingredients of the fertilizer be proportioned with due allowance for the quality of the soil.

Amount of fertilizer. An application of stable manure alone has not been found satisfactory. At the New Jersey Experiment Station comparisons were made with the use of commercial fertilizers and stable manure. Commercial fertilizers produced a good crop, but a combination of the fertilizer and manure produced a higher yield than when either was used alone. It is generally considered that the sweet potato crop can utilize a heavy amount of fertilizer. An application of from 600 to 1,200 pounds per acre, depending upon the condition of the soil, will be found profitable under most conditions and should be supplemented with some stable manure.

Formulas. The Georgia Station recommends a general formula containing approximately 8 per cent. of phosphoric acid, 5 per cent. of ammonia, and 8 per cent. of potash, which may be made up as follows:

Acid phosphate (16 per cent.)	-----	1,000 pounds
Sulphate of ammonia	-----	350 "
Cottonseed meal	-----	250 "
Sulphate of potash	-----	300 "

J. H. Beattie of the U. S. Department of Agriculture recommends the following as a good mixture for sweet potatoes:

Sulphate of ammonia	-----	250 pounds
Dried blood, 200 pounds, or fish-serap	-----	300 "
Acid phosphate (11 per cent.)	-----	1,200 "
Muriate of potash	-----	400 "

Either of these formulas is good for general use when it is possible to obtain potash at a reasonable price. Under present circumstances the potash figure in the first formula should be changed to 3 per cent. in place of 8, a part of this coming from the cottonseed meal; the proportion of nitrogen should also be varied to suit the soil type.

2,000 pounds per acre profitable. Many potato growers have used as much as 2,000 pounds of commercial fertilizer per acre with highly profitable results. Potash, which we are now forced to leave out of consideration, has for a long time been considered the most essential element for potatoes. Profs.



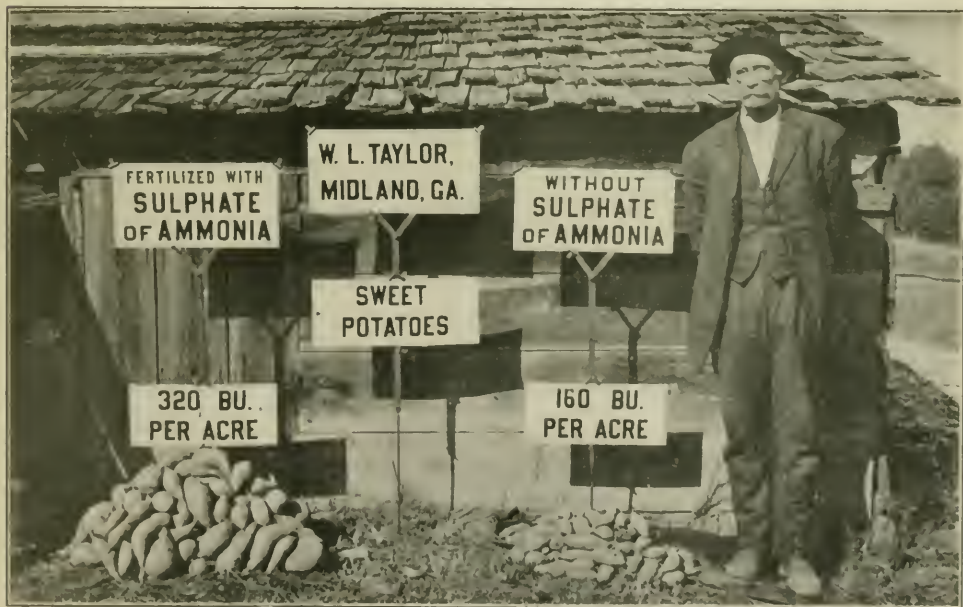
Experiment Made by H. B. Mitchell, Athens, Ga.

This experiment was made on a red clay loam that had previously been sown in small grain followed by cowpeas. The yield of potatoes from the unfertilized plot was small and nearly unmarketable, while the second plot, with phosphate and potash only, was but little better. Most of those from the Sulphate of Ammonia plot were of good marketable quality.

Duggar and Williamson of the Alabama Station, however, make the following statement, based on tests on heavy soils:

“Taken as a whole, these experiments seem to indicate that the popular idea that potash is the most important constituent in a fertilizer for sweet potatoes is incorrect, at least as to practically all the soils here represented. On the other hand, these tests show that phosphate and nitrogen were much more important than potash.

“These experiments also seem to discredit the notion that the use of a fertilizer containing nitrogen causes the sweet potato plant to run to vines to an injurious extent. In our experience this danger does not occur where reasonable amounts of nitrogen are used in combination with acid phosphate.”



Experiment of W. L. Taylor, Midland, Ga.

The soil was a gray, sandy loam, typical of South Georgia or the coastal plain. Both plots had received about 300 pounds per acre of a 12-2-0 fertilizer. Sulphate of Ammonia at the rate of 100 pounds per acre was applied June 1st. The yield was doubled and the quality of the potatoes receiving the Sulphate of Ammonia was far better.

Top-dressing sweet potatoes. Successful growers have generally adopted the practise of top-dressing their sweet potatoes with some quickly available nitrogenous fertilizer. By applying from 100 to 150 pounds of Sulphate of Ammonia per acre at the second cultivation, they obtain substantial increases in yield.

Sulphate of Ammonia. The Florida Experiment Station found when comparing the value of Sulphate of Ammonia and dried blood as ingredients of complete fertilizers, that Sulphate of Ammonia gave the better yield. Mr. J. R. Davis of Bartow, Florida, a well-known and successful sweet potato grower recommends it for this crop. The illustrations on the preceding page show the results of field tests with Sulphate of Ammonia applied as a top-dressing and figures 7 and 8, at time of planting (see page 15).



Harvesting Sweet Potatoes.

A typical scene near Savannah, Ga. The vines have been cut and are being hauled away to be fed to live stock. The potatoes are being plowed from the soil and carefully sorted into piles and baskets before being hauled to the storage house.

CULTIVATION AND HARVESTING

The cultivation of sweet potatoes does not differ in any essential way from that of any other farm or garden crop. Any of the ordinary farm tools employed to maintain a mulch may be used at intervals of from seven to ten days and particularly after each rain. Cultivation should begin soon after the plants are set and be kept up until the vines are large enough to interfere with the work. After the vines begin to run they should be turned into every other middle to facilitate cultivation and then returned into the cultivated middles while the work is completed. At the last cultivation as much soil as possible should be thrown to the row in order to leave the plants in hills.

Harvesting. There is little use in raising a crop unless it can be utilized to best advantage. Thus, upon the care exercised in harvesting sweet potatoes depends, to a considerable degree, the success which may be expected in storing them. Usually, it is desirable to harvest as early as possible in

order to take advantage of favorable prices, but it is necessary to avoid digging the crop while still immature because of the consequent decrease in both yield and keeping quality. A rule o' thumb, which has proved helpful, is to harvest at least ten days before the average date of freezing, inasmuch as severe injury is certain to occur if the potatoes are still in the ground when the first frost comes on. The crop should be harvested when the soil is dry, for if the work is done in wet weather earth will adhere to the potatoes and they are liable to rot. Where potatoes are raised on a small scale the ordinary middle buster is often used to throw the roots out of the ground. If larger areas are grown a potato digger may well be used. Regardless of the methods of harvesting, great care should be taken to prevent bruising or cutting the tubers, and any thus injured should be sorted and immediately sold on the local market or fed to live stock. They should never be stored or shipped to a distant market as they will not keep.

STORAGE

Poor storage facilities in the South, where most of our sweet potatoes are grown, are the greatest obstacle to increased production. H. C. Thompson, of the U. S. Department of Agriculture, estimates that from 20 to 50 per cent. of the potatoes stored in banks or pits in the Southern States spoil or are of an inferior quality. This is a difficulty that bears most heavily on the smaller growers. An ordinary type of pit is shown in figure 4. For a number



An Ordinary Sweet Potato Pit.

This method of storage is the reason why nearly half of the sweet potatoes grown in the South every year are lost by rot. The average Southern farmer produces enough sweet potatoes to supply his family needs through the winter but by spring the loss is so heavy that he has not enough left to bed for plants for next season.

of small growers these methods are possibly the only practicable ones. They can be made reasonably safe, however, if proper care is taken that the potatoes are thoroughly dry when stored and that the bank is kept dry, prop-



A Good Storage Pit.

This is a good type of small storage pit for housing sweet potatoes. Ample provision has been made to protect the potatoes from rain, to keep them dry, and for ventilation. Small loss by rotting occurs when pits are built with these provisions.

erly ventilated, and warm. A better type of pit is shown above. The specially designed storage house, however, is by far the best method. Several types of houses have been developed in different sections, and their use by large growers and by communities of smaller growers is increasing. In fact, according to Prof. H. P. Stuckey, of the Georgia Station, taking it year in and year out, sweet potatoes cannot be grown and stored at a profit unless some such storage house is provided. A satisfactory type is shown below. The house is provided with artificial heat and air-circulating passages so that the potatoes can be cured for a week or so at about 90° F., and the temperature then maintained constantly at 50° to 60° F. Full plans for such houses are given in Bulletin 548, U. S. Department of Agriculture.



A Community Storage House.

This large storage house was built by Mr. John D. Archibald at Thomasville, Ga., not to accommodate his own needs alone but to help the small growers in the community and to encourage the industry. These houses are neither expensive nor difficult to build and they aid the community by helping to conserve its food supply.

MARKETING

Sweet potatoes grown for early market are harvested, graded, packed, and usually shipped the same day. Where proper storage facilities have been provided, potatoes are dried in the field, graded, and placed in storage for winter and spring shipment. They may be safely shipped in barrels, crates, and hampers, but not in bulk or in sacks as they are easily bruised, thereby inviting decay.

VARIETIES

There are a great many varieties of sweet potatoes grown in the United States and all differ, more or less, in yield, flavor, shape, color and earliness of maturity. Prof. Stuckey writes: "The variety to be grown depends upon the purpose for which the potato is to be used.

Northern demand. "If a grower wishes to supply the Northern market he should select a potato that has a light colored flesh and is dry and mealy when cooked. To the average Northern family the ideal potato is the Irish potato. The nearer the sweet potato approaches the Irish potato in texture and flavor, the more salable it will be on the Northern market.

Southern demand. "In the South the demand is different. To the average Southern family a potato with a rich, yellow flesh and a very sweet flavor is preferred. A potato that has a candied appearance after baking, as though it had been dipped in cane sirup, is ideal for the Southern market."

The Jersey Yellow or Yellow Nancemond, Triumph and Red Jersey are typical of the dry mealy varieties belonging to the first class. The Pumpkin Yam, Providence, Nancy Hall, Porto Rico Yam and Golden Beauty represent the yellow, moist, sweet varieties that are popular in the Southern markets. For feeding to live stock such varieties as Enormous, Triumph and Southern Queen are suggested.

FEEDING VALUE OF SWEET POTATOESFOR LIVE STOCK

The principal use of the sweet potato is for human food but this is by no means its only importance. The roots and vines make excellent feed for live stock. The South, which fails to produce enough corn and hay for its own consumption, can use the sweet potato more largely as a supplement to its feed production from September to January. The Southern farmer is interested in finding a cheaper and more productive source of carbohydrates than corn, and the sweet potato fills the need. It is one of the best yielding of the Southern grown root crops. All kinds of live stock seem to be fond of both roots and vines. It is estimated that three bushels of sweet potatoes are equal to one bushel of corn, and the Florida Experiment Station states that when a ration of one-half sweet potatoes and one-half grain was fed to work stock, better results were obtained than with a whole grain ration and at a lower cost.

Sweet potato silage vs. corn silage. The same station finds that silage made from sweet potatoes is equal in nutritive value to nearly twice the quantity of corn silage. Comparing results obtained from these two crops he says: "Experience in feeding these two silages has been that 100 pounds of sweet potato silage will replace from 150 to 200 pounds of corn silage in the ration. This, no doubt, is due to the fact that the sweet potato silage contains less water and two and a half times as much nitrogen-free extract as the corn silage."

Sweet potato silage for milk. They investigated the relative values of sweet potato and sorghum silage in milk production and found that the former gave better yields. The cows on the potato ration produced 307 gallons of milk, while those on sorghum made 281 gallons. It is pointed out that "One noticeable fact in this experiment is that the cows ate one-third less sweet potato silage than sorghum silage. This is quite a saving in the amount of feed consumed by a herd during the year."

Vines as a feed for live stock. Sweet potato vines make an excellent soiling crop for all live stock. It is rather difficult to cure them, so the best results are usually obtained by feeding them when still green. They are nutritive and rank high even in comparison with legumes. In Table II will be found an analysis made by Prof. Keitt of the South Carolina Station giving the average from four of the common varieties of sweet potatoes, as compared with hay from red clover, crimson clover, cowpeas, and soy-beans.

TABLE II.

(Water-free)	Protein	Fat	Fiber	Ash	N-free extract
Red clover hay	14.52	3.90	29.28	7.32	44.98
Crimson clover hay	16.81	3.08	30.09	9.51	40.51
Cowpea hay	18.59	2.46	22.51	8.40	48.14
Soy-bean hay	17.36	5.86	25.14	8.12	43.52
Average	16.82	3.83	26.76	8.34	44.25
Sweet potato vines	12.48	4.86	18.22	8.73	55.71

CANNING SWEET POTATOES

The canning of sweet potatoes is assuming the importance of an industry, although more attention has been paid to it in the North than in the South. Each year many car loads of canned potatoes are shipped from the North to the South, possible only because a large part of the Southern crop is annually lost or wasted. Canning is receiving more attention in the South but not as much as it deserves. The process is not a difficult one and every family in rural communities where the crop is grown should preserve a supply for the winter and spring.

In addition to the familiar methods of preparing sweet potatoes, there are a few that are especially adapted to the moist, sweet, Southern varieties.

Candied Yams

This is probably the most favored method of cooking sweet potatoes. Partially cook in boiling water. Cool, peel, and slice one-fourth to one-third inches thick lengthwise of the potato. Place in layers in a baking-dish. Make a sirup of the sugar, water, lemon juice and cinnamon and cook it for about ten minutes. Pour this sirup over the layers of potatoes, place in a moderate oven, and cook until the potatoes are gummy. A few marshmallows may be added a few minutes before removing from oven.

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|--------------------------|-----------------------------|
| 1-2 dozen sweet potatoes | 1 teaspoonful cinnamon |
| 2 cups sugar | 1 teaspoonful salt |
| 1 cup hot water | 1 tablespoonful lemon juice |
| 2 ounces butter | |

Sweet Potato Custard

Line a pie-tin with pastry and fill with a mixture of 2 cups mashed potatoes, 1 cup sweet milk, 2 eggs, $\frac{1}{2}$ cup sugar, 2 ounces butter, 1 teaspoonful grated lemon-rind, and a little salt. Bake as usual.

“’Possum an’ Taters”

To the Southern negro there is no more tempting delicacy than “’possum an’ taters,” and the richest humor in the folklore of the race is to be found in the ancient tales which have been handed down about it. But only the “’ol’ colored mammy,” and we have her still, knows the secrets of the dish when made as it should be made.



SWEET POTATOES AND YAMS

In Table III will be found the acreage production, and total farm value for the more important sweet potato states. The South grows practically all the sweet potatoes, about 90 per cent. of the total. The only important producer among the northern states is New Jersey, which also plants the largest acreage per farm.

TABLE III.

Sweet Potatoes: Acreage, Production and Total Farm Value by States, 1917.

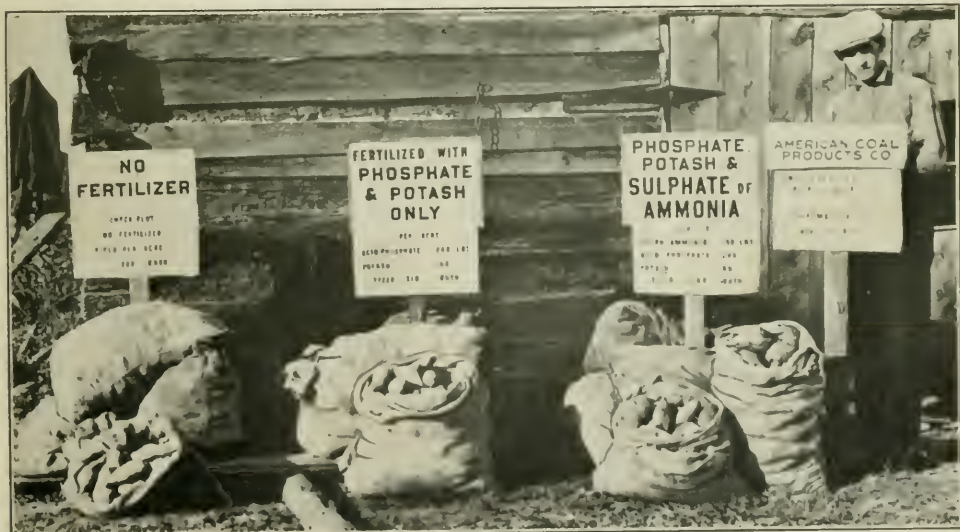
State	Acreage	Acreage per farm	Production Bushels	Yield per acre
Georgia - - - - -	125,000	.43	11,625,000	93
North Carolina - - - - -	90,000	.35	8,550,000	95
Alabama - - - - -	178,000	.68	16,020,000	90
Texas - - - - -	84,000	.20	6,552,000	78
Mississippi - - - - -	85,000	.31	5,525,000	65
South Carolina - - - - -	80,000	.45	7,600,000	95
Louisiana - - - - -	62,000	.51	4,898,000	79
Virginia - - - - -	40,000	.22	4,160,000	104
Arkansas - - - - -	40,000	.19	4,400,000	110
Tennessee - - - - -	30,000	.12	2,850,000	95
Florida - - - - -	35,000	.70	3,500,000	100
Total South - - - - -	849,000	.38	75,680,000	89
New Jersey - - - - -	24,000	.72	2,880,000	120
Other States - - - - -	80,000	.03	8,581,000	107
Total U. S. - - - - -	953,000	.20	87,141,000	91.4

The yield per acre for this crop falls slightly below the average for the past ten years, 93 1-3 bushels. The crop sold at an average of \$1.10 per bushel, so that its value per acre was nearly \$101.00. A noticeable feature in the table is that in the six heaviest producing states (first six in order) but little over one-third of an acre on the average is devoted to this crop. The average yields are also low when compared to crops of from 200 to 400 bushels per acre, which are readily obtained by careful growers.



Test Made by Lindsay Crawley, Prin. Appomattox Agricultural High School.

This test on sweet potatoes was made by Lindsay Crawley, Principal Appomattox Agricultural High School, on sandy loam low in fertility. The previous crop of oats yielded only 20 bushels per acre. The check plot received no fertilizer, and yielded 30 bushels; the PK plot received 440 pounds acid phosphate and 160 pounds muriate of potash per acre, and the yield was 55 bushels; the NPK plot received in addition 150 pounds Sulphate of Ammonia, and yielded 100 bushels, a gain of 45 bushels, worth \$24.90 above the cost of the Sulphate of Ammonia.



Test Made by Pierce Odor, Appomattox, Va.

Test with sweet potatoes made by Pierce Odor, Appomattox, Va. The addition of Sulphate of Ammonia at the rate of 150 pounds per acre increased the yield from 210 bushels to 260 bushels, a gain of 50 bushels, which sold for \$28.25 over and above the cost of the Sulphate of Ammonia.

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