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PEANUTS

Tests of Varieties and Fertilizers

By

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J. T. WILLIAMSON,
O. H. SELLERS.

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PEANUTS—TESTS OF VARIETIES AND FERTILIZERS

By
J. F. DUGGAR,
E. F. CAUTHEN,
J. T. WILLIAMSON,
O. H. SELLERS.

SUMMARY.

The average yield of unshelled peanuts obtained from regular variety tests, made in different parts of the State and covering a period of five years, ranged from 871 pounds of McGovern to 1244 pounds of Red Spanish per acre. Taking the yield of Red Spanish as a basis (100 percent), the percentage yield of the different varieties averaged as follows:

Red Spanish	100	Tennessee Red	86
Valencia	91	Virginia Bunch	86
White Spanish	88	Virginia Runner	85
McGovern	87	North Carolina Runner	84

The average percentage of shelled nuts or "meats" of each variety, obtained by carefully weighing and hand-shelling a given amount of dry unshelled peanuts, shows a remarkably wide variation, from 39.3 percent in Jumbo to 75.1 percent in White Spanish. The true commercial value of the crop of an acre is based, not on the number of pounds of unhulled peanuts, but on the number of pounds of "meats" produced.

The common varieties of peanuts are divided into two great classes—those having an upright or bunch habit of growth, and those having a low spreading or running habit. To the bunch varieties belong the White Spanish, Red Spanish, Valencia, Virginia Bunch, and Tennessee Red. Among the running varieties are the North Carolina or African, Virginia Runner, McGovern, and the Running Jumbo.

In a number of experiments (Table IV) there were found great differences in the weight of single unshelled peanuts, of "peas" of different varieties, and the average percentage of sound "peas" per pod. The heaviest unshelled peanuts were the Tennessee Red

(246 pods to the pound), and the lightest, the White Spanish (461 pods to the pound).

Based on the average percentage of sound nuts of each variety and of its oil content, the varieties arranged according to the number of pounds of oil produced per ton take the following rank: White Spanish 702 pounds, Red Spanish 693 pounds, Valencia 572 pounds, McGovern 548 pounds, Tennessee Red 527 pounds, North Carolina Runner 524 pounds, Virginia Runner 493 pounds, and Jumbo 354 pounds.

The average yield of unshelled peanuts as reported by Alabama oil mills, is estimated at 850 pounds per acre. From a ton of Spanish peanuts the mills obtain from 600 to 700 pounds of oil, and from 1200 to 1300 pounds of peanut cake. All the oil mills reporting preferred the White Spanish variety, except one mill which preferred the North Carolina Runner because it is claimed that the yield of the latter per acre is in excess of the other varieties.

From many complete fertilizer tests with peanuts, located in different parts of the State and covering a period of six years, it is concluded:

1. That acid phosphate at the rate of 200 to 300 pounds per acre produced a profitable increase in peanuts grown on sandy and other soils that are well adapted to this crop;

2. That potash applied in the form of kainit at the rate of 100 and 200 pounds per acre did not always prove profitable, except in a few experiments located on infertile sandy soil;

3. That slaked lime at the rate of 600 pounds per acre made a profitable increase in yield when applied on sandy soil;

4. That cottonseed meal as a source of nitrogen did not give profitable increases in yield, and is, therefore, not to be generally recommended for this leguminous crop.

The average yield of peanut straw (vines after removal of peanuts) from four experiments varied from 2316 pounds of North Carolina Runner, to 1234 pounds of Virginia Bunch per acre. The average percent of dried unhulled peanuts to the weight of the whole plant ranged from 32 percent in North Carolina Runner, to 39 percent in Red Spanish.

Introduction.

The peanut industry is growing rapidly in Alabama. This rapid growth is coming as a result of the crop diversification campaigns, the change from the one crop system of cotton due to the invasion of the Mexican cotton boll weevil, and the growing demand for peanut oil and cake for stock feed and fertilizer.

In soil and climate Alabama is well adapted to peanuts. Its cottonseed oil mills are being converted into peanut mills to manufacture oil and cake. The farmer has most of the implements on hand needed for the planting and culture of this crop. The additional equipment most needed is a custom picker for each community that grows any considerable amount of peanuts.

Variety Tests of Peanuts.

Table I shows that the yields of a variety differ widely in different years and in different localities. This variation may be due to seasonal differences, time of planting, character of soil, fertilizer or cultivation.

Some of the experiments were made on the Experiment Farm at Auburn. Most of them were made on farms scattered throughout the State. These latter tests constituted part of the work conducted under the provisions of the Local Experiment Law. Each experiment made away from Auburn was planned and supervised by a Station representative. The soil, fertilizer and cultural treatment for each variety in any particular experiment was the same. The same strains of seed peanuts were supplied to every experimenter making variety experiments in a given year. The experimenter or a representative of the Station harvested plots of uniform size and reported the weight of the nuts after they had been thoroughly dried.

The time of the planting of the different experiments ranged from April 26 to June 27. It may be of interest to note that the largest yields came from plantings made between May 1 and June 15.

In all cases, the experiments were located on some type of sandy soil, ranging from sandy loam, with clay subsoil, to fine sand. A complete commercial fertilizer was used under nearly all the experiments.

TABLE I. *Yield of Varieties of Peanuts in Different Localities and Years; in Pounds of Unhulled and Hulled Nuts Per Acre.*

VARIETY		W. E. Clarke, Pinckard, 1911	J. E. Helms, Honoraville, 1912	T. W. Jockish, Greensboro, 1912	D. B. Lewis, Jasper, 1914	D. B. Lewis, Jasper, 1915	I. O. O. F. Home, Cullman, 1915	E. A. Simmons, Greenville, 1915	D. B. Lewis, Jasper, 1916	I. O. O. F. Home, Cullman, 1916	W. M. Dean, Auburn, 1916	E. A. Simmons, Greenville, 1916	H. J. Dudley, Seale, 1916	Experiment Station, Auburn, 1916	Average unshelled nuts	Average meats
		Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Virginia Bunch	Unhulled	591	----	----	1174	1126	2310	388	----	----	1225	----	----	1519	1190	----
	Meats	343	----	----	----	----	1190	137	----	----	----	----	----	573	----	561
Red Spanish	Unhulled	1084	1066	1344	----	2080	2080	588	1146	1664	784	512	816	1767	1244	----
	Meats	726	----	----	----	----	1527	386	832	1271	----	----	623	1352	----	960
White Spanish	Unhulled	532	1422	1056	960	1588	2310	512	913	1808	784	378	1088	734	1094	----
	Meats	----	----	----	----	----	1760	354	707	1412	----	----	843	531	----	935
Tennessee Red	Unhulled	867	----	----	780	1500	1500	486	994	1520	980	598	1072	1272	1052	----
	Meats	563	----	----	----	----	903	185	556	1026	----	----	651	642	----	645
Valencia	Unhulled	355†	1363	1008	544	1850	2208	336	651	1536	1421	683	1008	1219	1091	----
	Meats	121	----	----	----	----	1530	206	410	1061	----	----	647	740	----	674
Jumbo	Unhulled	591	1303*	1536	1024	----	----	----	----	----	----	----	----	----	1143	----
	Meats	242	----	----	----	----	----	----	----	----	----	----	----	----	----	242
N. C. Runner (or Grey African)	Unhulled	946	1185	1008	----	1750	1921	----	594	----	784	415	912	1164	1064	----
	Meats	691	----	----	----	----	411	----	----	----	----	----	583	561	----	562
Virginia Runner or Large Red	Unhulled	1241	1126**	1152	----	1226	1366	435	1451	----	1029	----	608	1234	1087	----
	Meats	931	----	----	----	----	470	193	827	----	----	----	303	732	----	576
Jumbo (Running)	Unhulled	----	948	1680	----	1300	1584	448	----	----	----	----	----	----	1192	----
	Meats	----	----	----	----	----	504	202	----	----	----	----	----	----	----	353
McGovern	Unhulled	----	----	----	----	----	----	----	237	----	1372	610	448	1689	871	----
	Meats	----	----	----	----	----	----	----	140	----	----	----	271	853	----	421

† Leaf spot reduced yield.
* Bought under name of "Bunch Jumbo."
** Bought under name of "Large Red."

Table I shows the relative yield of dry, unhulled peanuts and meats or kernels per acre, but does not show their commercial value. The unhulled dry nuts of some of the varieties have 60 percent of hulls and pops, while others like the White Spanish, have only 25 percent. The true value of an acre is found only by multiplying the number of pounds of peanuts made on an acre by the percent of meats or kernels of that particular variety. Particular attention is called to the figures in the last column of Table II, which shows the average percentage of meats obtained in experiments extending through three years.

Relative Yields of Varieties.

The preceding table (Page 6), taken as a whole, conveys but little meaning, yet when dissected, as below, the results throw considerable light on the relative yields of varieties as measured in the weight of dried and unhulled nuts.

For comparison, the yield of *unhulled nuts* of Red Spanish is taken as a basis, and hence this yield is rated at 100 percent. Then each variety is compared with the Red Spanish, but only in those years in which the compared variety and the Red Spanish were both tested along side. The results are given below:

In 7 out of 12 experiments Red Spanish proved superior in yield to White Spanish.

	Pounds per Acre	*Relative Yield*
White Spanish	1094	88
Red Spanish	1244	100

In 7 out of 12 tests Valencia was exceeded by Red Spanish:

Valencia	1137	91
Red Spanish	1244	100

In 8 out of 10 experiments North Carolina Running was equalled, or exceeded in yield of unhulled nuts by Red Spanish:

North Carolina Runner	1068	84
Red Spanish	1268	100

In 6 out of 10 tests Virginia Runner was surpassed in yield of unhulled nuts by Red Spanish:

Virginia Runner	1087	85
Red Spanish	1275	100

The comparison is still more unfavorable to Virginia Runner on the basis of pounds of meats per acre,

since in a number of the tests this variety had a large proportion of pops. The four localities in which Virginia Runner exceeded Red Spanish in yield of unhulled nuts were Pinckard, Dale County; Honoraville, Butler County; Jasper, Walker County; and Auburn, Lee County. In only one of the six tests (Pinckard) did Virginia Runner afford a larger weight of *meats* per acre.

In 3 out of 5 tests McGovern was exceeded in yield of unhulled nuts by Red Spanish, and in every year in which the meats were separated Red Spanish afforded a larger weight of meats per acre:

McGovern	871	87
Red Spanish	1005	100

In 6 out of 9 experiments Tennessee Red was surpassed by Red Spanish on the basis of unhulled nuts:

Tennessee Red	1079	86
Red Spanish	1252	100

In all experiments, except one, the yield of meats from Red Spanish was greater than the yield from Tennessee Red.

In 4 out of 6 tests Virginia Bunch was exceeded in yield of unhulled nuts by Red Spanish:

Virginia Bunch	1193	86
Red Spanish	1397	100

In every case where the meats were separated Red Spanish afforded a larger yield of meats per acre than did Virginia Bunch.

Sound Kernels (Meats) in Unhulled Dry Peanuts.

Table II shows the percent of sound kernels or meats for each variety as grown in different tests in various parts of the State. A given amount of dried peanuts without selection was taken from each variety and carefully weighed and hand shelled. The sound kernels were weighed and the percentage of kernels or meats calculated.

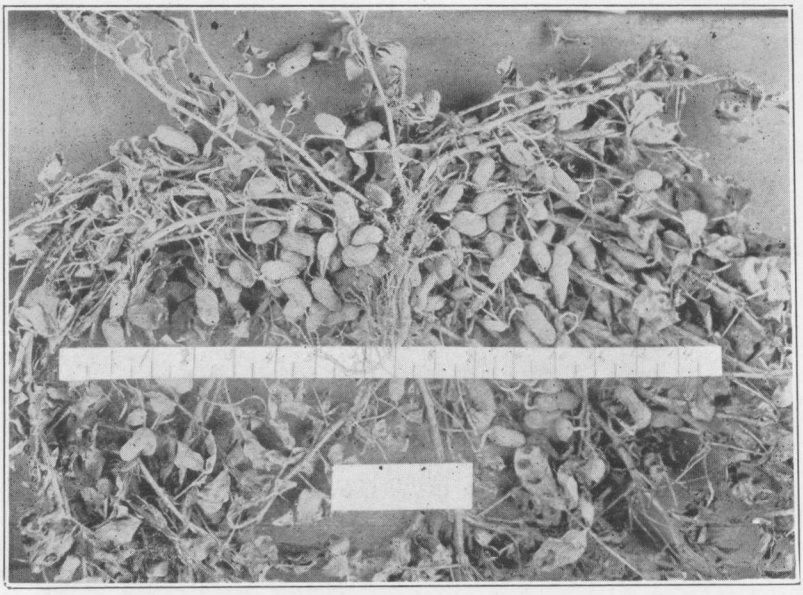


Fig. 1. North Carolina Runner, showing its spreading habit of growth and peanuts clinging along its stem.

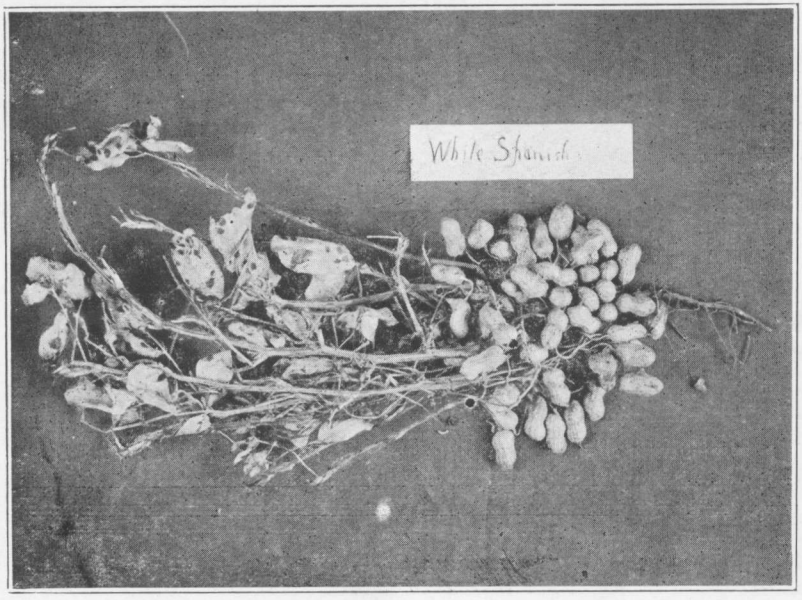
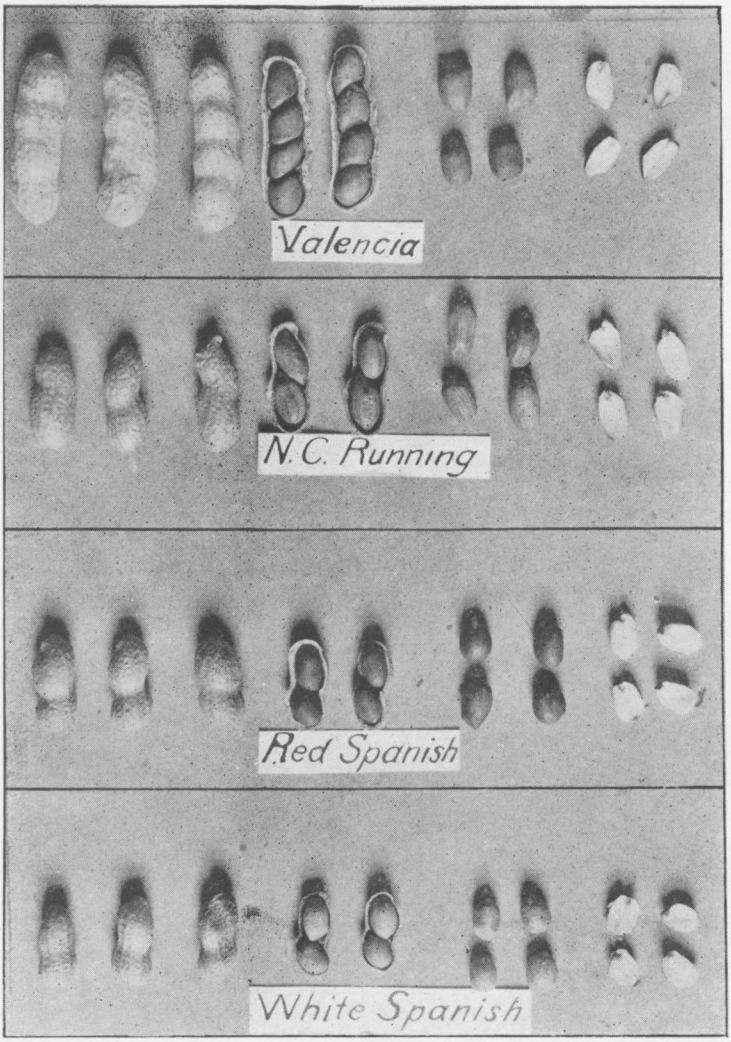


Fig. 2. White Spanish, showing the upright habit of growth of plant; the clustering of the peanuts about the base of the stems, and spots of disease on some of its leaves.

PLATE II



Plates II and III show eight common varieties of peanuts. The figures are reduced to about half size.

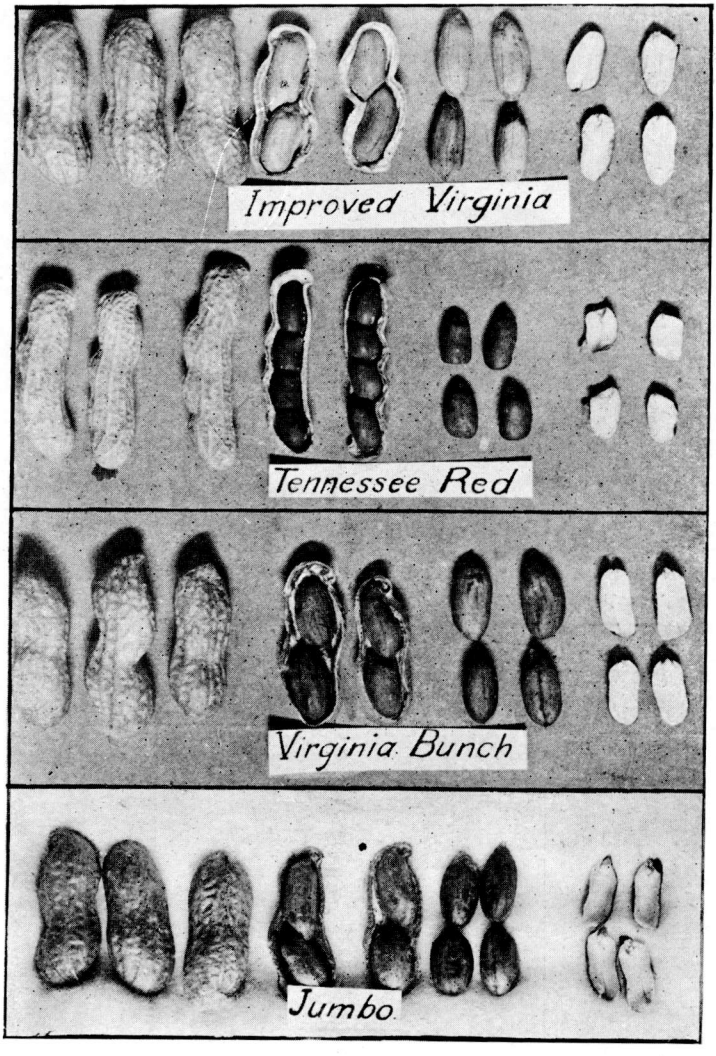

Improved Virginia
Tennessee Red
Virginia Bunch
Jumbo

PLATE IV

Fig. 3 One method of planting peanuts. A row of peanuts growing in the wide corn middle.

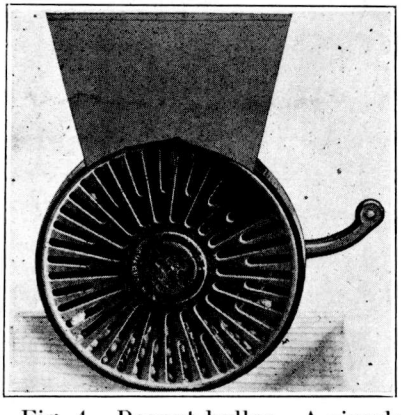


Fig. 4. Peanut huller. A simple coffee mill-like machine that hulls one pound per minute.

TABLE II. *Per Cent of Sound Kernels (Meats) in Unhulled Dry Peanuts.*

VARIETY	Location of Each Experiment								
	J. E. Helms, Honoraville, 1911	W. E. Clarke, Pinckard, 1911	H. J. Dudley, Seale, 1916	D. B. Lewis, Jasper, 1916	I. O. O. F. Home, Cullman, 1916	E. A. Simmons, Greenville, 1915	I. O. O. F. Home, Cullman, 1915	Experiment Station, Auburn, 1916	Average of all tests
	%	%	%	%	%	%	%	%	%
Virginia Runner		75.0	49.9	57.0		44.4	34.4	59.3	53.3
Tennessee Red		65.0	60.7	55.9	67.5	38.1	60.2	50.5	56.9
N. C. Runner	71.2	73.0	63.9			68.4	21.4	48.2	57.7
Virginia Bunch		58.0	47.5			35.4	51.5	37.7	46.0
McGovern			60.5	59.0				50.5	56.6
Valencia	54.0	34.0	64.2	63.0	69.1	61.3	69.3	60.7	59.5
Red Spanish	68.8	67.0	76.4	72.6	76.4	65.6	73.4	76.5	72.1
White Spanish			77.5	77.4	78.1	69.1	76.2	72.4	75.1
Jumbo		41.0				45.1	31.8		39.3

In the column of averages, it is noticed that the percentages of meats of the different varieties range from 75.1 percent in the White Spanish to 39.3 percent in the Jumbo. On this basis, a ton of unhulled Jumbo peanuts yields 786 pounds of meats, while a like amount of White Spanish affords 1502 pounds. The amount of waste in the form of hulls, pops and immature peas varies widely in the different varieties. The commercial value of peanuts is based largely on the amount of meats yielded by a ton of unhulled nuts. Hence oil mills can afford to pay a higher price for varieties having a high percentage of meats (as the Red Spanish and White Spanish) than for most of the running varieties.

The percentage of meats of a variety varies with season and soil. For example, in 1911, at Pinckard, Dale County, Virginia Runner shelled out 75 percent of meats; at Cullman, Cullman County, in 1915, it gave only 34.4 percent meats, showing the effect of seasons, soil, locality and other factors.

In the same year, the percentage of sound meats of a variety differs when grown in different parts of the State. Tennessee Red was grown in 1916 in Russell, Walker, Cullman and Lee Counties, and showed a va-

riation from 67.5 percent of meats in Cullman to 50.5 percent in Lee.

By grouping the tests into northern and southern divisions and taking averages, the following results are obtained:

TABLE III. *Average Percentage of Sound Nuts (Meats) in Unhulled Peanuts Grown in South Alabama and in North Alabama.*

	South: Greenville Honoraville Pinckard Seale Auburn	No. tests	North: Cullman Jasper Cullman	No. tests
	Percent.		*Percent.*	
Virginia Runner	57.2	1	45.7	2
Tennessee Red	53.7	4	61.5	3
N. C. Runner	64.9	5		
Virginia Bunch	55.5	2	59.0	1
Valencia	54.8	5	67.1	3
Red Spanish	70.8	5	74.1	3
White Spanish	73.0	3	77.2	3
Jumbo	43.5	2		

It is noticed that some varieties yield a higher percentage of meats in one section of the State than they do in another section. This difference may be due in part to the longer time required by some varieties to grow and mature. The running varieties, like North Carolina and Tennessee Red, which are late, have in these experiments averaged a larger percent of meats when grown in the southern than in the northern section, while the Spanish varieties, which are early, and also the Valencia, have in these tests shelled out a larger percent of sound peas in the northern than in the southern section.

DESCRIPTION OF VARIETIES OF PEANUTS.

The many different names used both for distinct varieties and for those whose characters do not mark them as distinct are confusing. It is unfortunate that some seedsmen and farmers, zealous to sell seed, should attach new names to old varieties, and thereby confuse and mislead the buyer. There is no objection to a grower attaching some distinguishing mark to a greatly improved strain or to a distinctly new variety, but it should be shown that he has improved the old variety or found a distinctly new one. If the originator would tell the true source of his improved strain or

the origin of his new variety, this knowledge would help the farmer to appreciate more fully the characters for which the new strain or variety is notable. A name should distinguish the variety from other varieties. The great number of variety names, without distinguishing characters, is a source of much confusion.

The common varieties of peanuts may be divided into two great classes; those having an upright, bunchy habit of growth, and those having a low spreading or "running" habit.

Among the common varieties of the first group are the White Spanish, Red Spanish, Valencia, Virginia Bunch and Tennessee Red. Those having the spreading habit are North Carolina, sometimes called African, Virginia Runner and McGovern. In this division may also be included one of the varieties called Jumbo, which name is listed by some seedsmen as a bunch and by others as a runner.

White Spanish.—This variety has an erect habit of growth, is about 10 to 14 inches high when grown on average soil, is early, and grows an abundance of foliage. Its pods grow in a cluster about the base of the stems and adhere well to the vines when they are harvested.

The pods are small and require about 461 unshelled peanuts to weigh a pound. The peas vary in color from light pink to cream. The unhulled nuts yield 75.1 percent of meats. The average amount of oil contained in a ton (but not all capable of being extracted) is 702 pounds, which is more than the amount of oil found in a ton of any other variety. The pods of both Spanish varieties are assumed to weigh 30 pounds per bushel, though 28 pounds are sometimes sold as a bushel. This is probably the most productive variety.

Red Spanish.—This variety in habit of growth is very much like the White Spanish. Its pods are larger, 390 weighing a pound. It shells out about 72 percent of light, red nuts. The amount of oil per ton is 693 pounds, which is the second largest amount obtained.

Valencia.—This variety, sometimes called Improved Valencia, is erect in habit and grows from 12 to 24 inches high. Its pods grow close to its roots and cling poorly to the vines when they are pulled up.

The pods are medium in diameter and are long, with two, three or four peas crowded closely together.

About 266 pods weigh a pound. The peas are red and small, and form about 60 percent of the weight of the pods. In unshelled perfect pods the percentage of oil was 28.6, or 572 pounds per ton. A bushel weighs about 24 pounds.

Virginia Bunch.—This is a semi-erect variety. Its pods cluster about the base of the stems; they are bright, nearly smooth, and require about 283 to weigh a pound. They contain one, two and sometimes three pale or pinkish peas. The percentage of meats found in the unshelled pods was 46, and of oil 21.2. The total oil contained per ton of unshelled peanuts was only 424 pounds. The usual weight per bushel is 22 pounds.

Tennessee Red.—This variety resembles the Spanish varieties in type of plant. It is medium early, and its pods cling to the stems when they are pulled up. The pods have two or three peas, and about 246 unshelled peanuts are required to weigh a pound. It shells out 56 percent of meats. The peas are red. The percentage of oil in the unshelled pods is 23.6, or 527 pounds per ton. A bushel is usually assumed to weigh 22 pounds.

North Carolina.—This variety, sometimes called African or Wilmington, has a low spreading habit of growth. The variety called McGovern or Florida seems to be nearly the same as this, with probably this difference, that the McGovern seems to have more resistance to rotting of the nuts and to leaf spot. The stems of McGovern are long, slender and spreading.

The pods of the North Carolina are small, and do not cling well to the stems when the vines are pulled up. A pod usually has two small reddish peas. This variety is late. It required about 440 pods to weigh a pound, and yielded about 66 percent meats. The percentage of oil found was 26.2 percent, or 524 pounds in a ton of unshelled pods. A bushel is assumed to weigh 22 pounds.

Virginia Runner.—This variety is sometimes called Virginia Improved. It resembles, in habit of growth, the North Carolina or African variety, except that its pods are considerably larger. Its pods and peas, in size and color, closely resemble those of the Virginia Bunch variety; 279 pods weighed a pound, and yielded 53.1 percent of meats. This variety yields 24.6 percent of oil, or 493 pounds per ton.

Jumbo.—Under this name, seedsmen have listed a running Jumbo and a bunch Jumbo. The two resemble each other in every respect, except in habit of growth of vines. In habit of growth and size of pods these two forms closely resemble the Virginia Bunch and Virginia Runner. Of the Jumbo samples studied, 276 of the pods weighed a pound, and yielded only 41 percent of meats. It seems that the name Jumbo has been applied to large nuts, and does not represent a distinct variety. A Jumbo may be a Virginia Bunch or a Virginia Runner, or even a Tennessee Bunch.

The varieties grown under the name of Jumbo averaged lowest in oil, 17.7 per cent, or 354 pounds of oil in a ton of unshelled peanuts.

Size of Peanuts and Number of Peas Per Pod.

Table IV shows the average number of unhulled peanuts and of sound peas required to weigh one pound; percentages by weight of sound peas in unhulled pods; and number of sound peas per pod, together with the maximum and minimum numbers. The averages are based on from 3 to 9 experiments made in 4 different years. The maximum and minimum numbers indicate that within each variety there is an extremely wide range in the size of nuts, number of peas per pod, and percentage of peas. These fluctuations are due apparently to variations in seasons, soils, etc. These figures are put on record as a part of the description of each variety.

Table IV. *Number of Peanuts Required to Make One Pound; Average Number Sound Nuts Per Pod; and Percent Sound Nuts Per Pod.*

VARIETY	No. Tests	No. Unshelled Nuts per Lb.			Number Sound Nuts per Lb.			Av. No. Sound Nuts per Pod			Per cent Sound NutsPer Pod		
		AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.	AV.	MAX.	MIN.
Tennessee Red	9	246	489	186	781	984	730	1.88	2.41	0.60	56.9	67.5	38.1
N. C. Runner	9	440	498	349	943	1080	854	1.34	1.87	0.50	57.7	73.0	21.4
Virginia Bunch	6	283	502	196	539	647	526	0.90	1.37	0.45	46.0	58.0	35.4
McGovern	3	351	399	315	871	964	809	1.41	1.57	1.20	56.6	60.0	50.5
Valencia	10	266	409	211	854	943	676	2.06	2.90	0.65	59.5	69.3	34.0
Red Spanish	9	390	573	212	984	1132	888	1.61	1.93	1.09	72.1	76.5	65.4
White Spanish	8	461	689	400	1105	1461	984	1.76	1.91	1.48	75.1	78.1	69.1
Virginia Runner	7	279	425	183	612	888	482	1.12	1.66	0.62	53.3	75.0	34.4
Jumbo	5	276	423	224	559	666	477	0.96	1.68	0.67	39.3	45.1	31.8

This table shows great differences in weight of single nuts and peas of different varieties, and in the number of peas per pod. Virginia Bunch yielded on an average in 6 tests only 46 percent of sound peas, which indicates the tendency of running varieties to produce pops when soil conditions are unfavorable. The White Spanish yielded 75.1 percent by weight of sound peas. This difference in yield is an important factor in determining the price that oil mills can afford to pay for nuts to crush.

The heaviest unhulled nuts are found in the Tennessee Red variety (246 pods to the pound). The lightest unhulled nuts are in the White Spanish (461 pods to the pound), which are considerably smaller than those of the Red Spanish. Virginia Bunch, closely followed by Jumbo and Virginia Runner, produce the heaviest shelled peas—if we take no account of the pops, or defective peas.

Relative Value of Varieties for Production of Oil.

The Analyses of Nine Varieties of Peanuts Grown in Different Parts of Alabama.

In Table V the analyses * of one sample of each variety for different years are shown in columns 1 and 2. The chemical analyses are based on composite samples of shelled nuts of each variety, made up of nuts grown that year in several different localities.

TABLE V. *Percentage of Oil in Shelled Nuts and Pounds of Oil Per Ton of Unshelled Nuts for Different Varieties.*

VARIETY	Oil in Shelled Nuts			Average percent of sound peas in unshelled pods	Average percent of oil in unshelled pods	Average pounds of oil per ton of unshelled pods	Rank for making oil
	Cullman Co 1915	All Samples 1916	Average percent of oil	All tests	All tests	All tests	
	%	%	%	%	%		
Virginia Runner	43.68	48.93	46.30	53.30	24.67	493	7
Tennessee Red	45.70	47.06	46.38	56.90	26.39	527	5
N. C. Runner	40.86	50.13	45.49	57.70	26.24	524	6
Virginia Bunch	45.27	47.00	46.13	46.00	21.21	424	8
McGovern		48.47	48.47	56.60	27.43	548	4
Valencia	47.42	48.78	48.10	59.50	28.61	572	3
Red Spanish	48.60	47.57	48.08	72.10	34.66	693	2
White Spanish	48.52	45.03	46.77	75.10	35.12	702	1
Jumbo	45.15		45.15	39.30	17.74	354	9

The table shows that the percent of oil is higher in the 1916 samples than in the 1915 samples except for two varieties. The figures show a variation in the average oil content of the different varieties from 48.47 percent in the meats of the McGovern to 45.15 percent in the shelled peas of the Jumbo. The meats of the Red Spanish afforded 2.54 percent of oil more than those of the White Spanish; but the percentage of sound peas in the White Spanish was greater by 3 percent than in the Red Spanish. The amount of oil in a ton of White Spanish was largest, 702 pounds; next came Red Spanish, with 693 pounds.

The column containing the pounds of oil in one ton of unshelled nuts shows that some varieties are much more valuable for oil purposes than other varieties. A ton of Jumbo contained 354 pounds of oil, while a ton of White Spanish contained 702 pounds, a difference of 348 pounds in favor of this Spanish variety. The oil mills cannot afford to overlook this difference, nor can the growers who expect to sell the peanuts for oil production. A variety like North Carolina Runner, which some farmers think especially productive,

yields, under the conditions of these experiments, 273 pounds of oil less per ton of unhulled nuts than the average of the two Spanish varieties.

The oil in the peanut hulls is not included in the above table. U. S. Department of Agriculture Farmers' Bulletin No. 751, page 9, shows that the oil in the peanut hulls of different varieties varies from .73 percent in the Virginia Runner, to 3.53 percent in the Virginia Bunch. The analyses of hulls * at Auburn shows 1.2 percent oil, 5.38 percent protein, 3.97 percent ash, 65.6 percent crude fiber, and 15.6 percent carbohydrates.

Based on the average percent of oil and of sound peas in the above table, the varieties of unshelled peanuts take the following rank in pounds of oil per ton:

White Spanish	702
Red Spanish	693
Valencia	572
McGovern	548
Tennessee Red	527
North Carolina Runner	524
Virginia Runner	493
Jumbo	354

OIL PRODUCTION AND YIELD AS REPORTED BY THE OIL MILLS.

From a questionnaire that was sent to a number of Alabama oil mills known to be crushing peanuts, the following facts were learned. These manufacturers are using the Anderson Expeller type of mill, which has a capacity ranging from 400 to 600 gallons of oil per day of 24 hours. The operators of these mills report that this machinery extracts from 92 to 95 percent of the oil contained in the peanuts.

They report from a ton of peanuts of the Spanish varieties, from 600 to 700 pounds of oil and from 1200 to 1300 pounds of peanut cake or meal. A ready sale for all peanut products is reported by the mills.

Some mills report that the color of the shelled peas is a matter of no importance. Others express a preference for "white" peanuts. All mills except the one at Brundidge prefer the White Spanish variety. The Brundidge mill prefers the North Carolina Runner, stating that its yield is higher than the yield of Spanish. The yield of peanuts in the locality of the mills in 1916 was estimated by the mills at 850 pounds of nuts per

* Made in the Chemical Laboratory of the Alabama Experiment Station.

acre, and the average price for the past season was placed at about 3 cents per pound.

Preparation and Planting.

Peanuts are grown on a wide range of soils, but those best adapted are sandy or loamy. Soils having considerable clay and lime produce good crops. A hard compact soil is poorly adapted because the pod stems called "needles" or "pegs" do not penetrate its surface, nor is poorly drained and sour land well suited. The mechanical condition of the soil is important. A liberal amount of humus, and lime and available plant food is essential to securing the largest yields.

Land intended for peanuts and not occupied by a winter crop should be plowed in the early spring. In case it is so occupied, the soil should be plowed as soon as the spring crop is removed. Where there is considerable trash on the surface from some preceding crop, this trash should be plowed under before planting in time for it to rot or at least to permit the soil to settle. About the same treatment given to land to prepare it for cotton is sufficient to prepare it for peanuts.

The importance of planting peanuts after a clean cultivated crop should not be overlooked. If the preceding crop had an abundance of grass and weeds it will be difficult to keep the peanut crop clean. It is not good practice to plant peanuts after peanuts. Some regular system of rotation of crops should be followed.

Planting a row of peanuts in the middles of corn rows, as practiced in southeast Alabama, has the advantage of making a peanut crop with little expense except the cost of the seed and the planting. The peanuts are cultivated at the same time the corn is cultivated. This is a satisfactory practice where the peanuts are gathered by hogs (except that it increases the amount of fencing); but when they are gathered for commercial purposes, the corn plants hinder the harvesting.

The peanuts are not planted on high beds because such beds dry out quickly, which condition tends to make a poor stand.

For the bunch variety, the rows may be made from 2½ to 3 feet wide, that is just wide enough to permit easy cultivation with ordinary cultivating implements. For the running variety, the rows should be from 3 to 3½ feet wide.

The seed of the bunch varieties may be dropped from 4 to 8 inches apart in the drill. The running type may be dropped from 12 to 15 inches apart in the drill. The seeding should be so thick that the vines will nearly cover the ground when they are fully grown. Planting should not begin until the middle of the usual period for planting cotton, and for the Spanish or early maturing varieties it may continue until the first of June, or even until the middle of June. The soil should be thoroughly warm.

Amount of Seed.

The following table shows the number of pounds of both shelled and unshelled peanuts of several of the leading varieties required to plant an acre at the various distances mentioned.

Table VI. *Pounds of Peanuts (from Table IV) Required to Plant an Acre at Stated Distances.*

Variety	Distance Between Rows	Distance Between Plants	Shelled Peas	Unshelled Peanuts
	Feet	Inches	Lbs.	Lbs.
White Spanish	2½	6	31.5	41.9
	2½	8	23.6	31.4
	2½	10	18.9	25.1
	3	6	26.3	35.0
	3	8	19.6	26.3
	3	10	15.8	21.0
Red Spanish	2½	6	35.4	49.1
	2½	8	26.6	36.8
	2½	10	21.2	29.4
	3	6	29.5	40.9
	3	8	22.1	30.7
	3	10	17.7	24.5
N. C. Runnner	3	10	18.5	32.1
	3	12	15.4	26.8
	3	16	11.5	20.1
	3½	10	15.9	27.6
	3½	12	13.3	23.0
	3½	16	9.9	17.3

The above figures are based on the planting of only one shelled nut in a place or "hill," and on the assumption that all of the nuts are sound. Those who prefer to drop more than one seed in a hill should increase the figures accordingly.

From the above, and after allowing for faulty nuts and occasional placing of two nuts in a hill, we may conclude that about the following amounts of seed should be provided per acre:

For Spanish varieties, rather close planting (6 x 30 in.) 7 pks.
For Spanish varieties, thin planting (10 x 36 in.) ------4 pks.
For North Carolina or similar running kinds, thick planting (10 x 36 in.) ----------7 pks.
For North Carolina or similar running varieties, rather thin planting (12 x 42 in.) ----------5 pks.

A special peanut planter, or an ordinary Cole planter and doubtless other types of one-horse planters may be used for planting shelled peanuts. The seed should be covered from 1¼ to 2 inches deep.

The varieties of peanuts that have large pods should be shelled in order to secure a good stand. Such varieties as the White and Red Spanish may be planted without shelling the nuts. However, shelling of any variety insures more prompt germination and a better stand.

Cultivation.

It is well to harrow the rows to destroy the young weeds and grass before the peanuts come up. One cultivation or more with a weeder or light spike-tooth harrow should be given before the plants get much growth. Following this time, the ordinary implements used for the cultivation of cotton may be employed. The cultivation may continue close up to the plant, until the fruit stems begin to form, after which time the cultivating implements should not run close to the row. The covering of the blooms with dirt is unnecessary.

Harvesting.

A farmer should judge when is the proper time to harvest the peanuts. The tops of the vines usually turn yellow and some of the leaves begin to drop off when the peanuts are ripe. If the harvesting is delayed the early maturing nuts of the Spanish varieties may sprout in the ground.

The harvesting may be done by hand or plow. Varieties whose pods cling well may be pulled up from very sandy land by hand. This is a slow method. An ordinary turning plow with its mold board removed to avoid covering the plants may be employed to raise the plants. The bunches may be collected in piles with an ordinary hay fork.

Curing and Picking.

The plants are usually left on the ground, after harvesting, for at least two or three hours. They should then be stacked. This is done by firmly setting up

stakes about 6 feet high, at the bottom of which are nailed two or three cross pieces 3 or 4 feet long. Around this stake the plants are stacked with the vines exposed, and the nuts inward. Ventilation is thus secured for the peanuts within, while they are protected from the weather by the vines.

From 15 to 20 such stacks will be necessary for one acre. The stacks should be capped with grass and remain 3 or 4 weeks in the field until the pods have become dry. They are then ready for a picker.

Some of the Florida growers have made use of a curing shed. On the posts are spiked cross timbers and on these timbers horizontal poles are placed sufficiently close to support the green peanut vines. From one floor of poles to the next is kept a vertical distance of about 5 or 6 feet. This space allows complete ventilation and the peanuts remain spread upon the poles until they become thoroughly dried. This method of curing secures a better quality of hay and bright pods.

The picking of the peanuts off the stems by hand is slow and expensive. In a community where a large acreage is planted a custom picker may be operated profitably. There are several types which are now offered on the market. One type depends for the removing of the nuts from the vines on the use of a system of vibrating wire screens, and is used exclusively for peanut *picking*. The other type of picker is an ordinary grain *thresher* with a special cylinder and concave for peanuts. This last machine readily removes the nuts and makes them ready for oil mill purposes, but according to the statement of the president of one of the peanut oil mills in Alabama, the peanut thresher breaks up the pods and injures the nuts for planting purposes.

Peanut Hay and Straw.

Peanut vines make a fine quality of hay if cut before the leaves drop. Their chemical composition is nearly that of alfalfa hay. Valencia, Virginia Bunch, and the Spanish varieties are the best suited for hay making on account of their upright habit of growth, which makes them easy to mow.

Peanut straw (the cured peanut plant after the filled pods have been picked off) has a larger proportion of woody stems and a smaller proportion of leaves than peanut hay, which render the former somewhat less nutritious than peanut hay.

TABLE VII. *Yields and Percentages of Dried Peanut Straw (Vines After Removal of Nuts.)*

VARIETY	D. B. Lewis, Jasper, 1914	D. B. Lewis, Jasper, 1915	D. B. Lewis, Jasper, 1916	Experiment Station, Auburn, 1916	Average	Average percent of stover	Average percent of dried pods
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Valencia	900	3600	952	3210	2165	63	37
Red Spanish	1332	2250	1558	2309	1862	61	39
White Spanish	2005	2750	1434	1303	1873	62	38
Tennessee Red	2431	3000	877	2109	2104	62	38
Virginia Bunch	1253	2200	1482		1234	62	38
Virginia Runner		3000	1620	2717	1834	67	33
North Carolina	1610	3350	1914	2392	2316	68	32

Peanut straw as a rule is not as bright as peanut hay. The plants are exposed to sunshine and dews during the curing. Table VII shows that the average yield of peanut straw per acre ranges from 1234 pounds to 2316 pounds per acre. The running varieties yield a higher percentage of straw than the bunch type. On ordinary soil, from three-fourths to one ton of straw per acre is considered a fair yield.

CHEMICAL COMPOSITION OF PEANUT STRAW.

The chemical composition of peanut straw, as reported by the Chemical Department of this Station, is as follows:

Water, 10.72 percent; ash, 6.03 percent; crude protein, 10.69 percent; crude fat, 1.66 percent; crude fiber, 29.5 percent; carbohydrates, 41.39 percent.

Its composition shows that it carries 1.2 percent potash, and 0.50 percent phosphoric acid.

RESIDUAL FERTILIZING EFFECT OF PEANUTS.

This table records the result of a test made to show the fertilizing effect of peanuts on following crops. As indicated in the table, peanuts were harvested in different ways, and the succeeding yields of rye and sorghum hay are compared with the hay yields from a plot on which corn had been grown.

TABLE VIII. *Residual Fertilizing Effect of Peanuts Compared With Corn.* (*)

Crop—Summer of 1899	Succeeding Crops	
	Rye Winter of 1899-1900	Sorghum Summer of 1900
	Lbs. per Acre	Lbs. Per Acre
Spanish peanuts—nuts harvested	1080	4480
Spanish peanuts—grazed by hogs	4280	4000
Running peanuts—turned under	2582	6320
Corn—ears pulled	1080	5040

The peanut plots gave a yield of rye higher than that of the non-legume plot in two instances; where the peanuts were grazed and the plot got the benefit of the droppings from animals, and where the luxuriant growth of vines were turned under on account of the running peanuts failing to make.

Two of the peanut plots yielded less sorghum hay than did the corn plot, and only on the plot on which the vines were turned under did the yield of this second succeeding crop prove greater than that following corn.

The conclusion is that a crop of peanuts harvested in the usual way for seed does not improve the soil for a succeeding crop.

INOCULATION OF PEANUTS.

The peanut is a legume, roots of which should be abundantly supplied with tubercles to make sure that it makes use of the nitrogen of the air rather than that of the soil. So far as the observations of the writers go, the peanut plant on Southern soils is naturally stocked with tubercles. Hence artificial inoculation, either with soil or with pure cultures, seems to be a useless expense.

Probably the usual occurence of tubercles on the roots of the peanut plant results from natural inoculation carried on the seed in the dust from the old field. This dust from the hulls comes in contact with the shelled nuts in any process of shelling, and is of course still more abundant if unshelled nuts are planted.

Experiments made on sandy land on the farm of the Alabama Experiment Station, at Auburn, showed no increase in yield from inoculating peanuts with appropriate soil, and no apparent increase in the number of tubercles per plant.

(*) Bul. 104, Alabama Experiment Station.

Diseases of Peanuts.

Leaf spot, which appears as a small, brown spot on the leaves and stems (See spots on leaves of White Spanish variety, Pl. I, Fig. 2), is caused by a fungus disease (*Cercospora personata*). It usually attacks the grown leaves, though it may attack the young ones causing them to fall off, thereby reducing the value of the hay and the yield of peanuts.

This leaf spot fungus may be carried from one year to the next on old peanut leaves and stems. Crop rotation and plowing under all old vines and stems are, therefore, recommended as good farm practice to lessen the amount of the disease in a succeeding peanut crop.

Sclerotial rot, (caused by *Sclerotium Rolfsii*) attacks the roots and peas, and destroys the pods. The top of the plant may be healthy in appearance, but when it is pulled up, many of its pods may be found completely rotten. The rotten pods may appear wet or dry, as other organisms of decay may have become associated with the decayed nuts.

No means of combatting sclerotial rot is known.

Red rot attacks the pods of the peanut and causes them to appear brown or reddish. The crop should be dug as soon as it matures to avoid loss from this disease. (See Alabama Station Bulletin No. 180).

Average Yield of Peanuts.

According to figures furnished by the Bureau of Crop Estimates of the United States Department of Agriculture, the average yield of peanuts for the United States for the past five years has been 38.6 bushels per acre. For the same period, the Southern States averaged as follows:

State	*Bushels*	*State*	*Bushels*
North Carolina	42	Alabama	37
South Carolina	45	Louisiana	32
Georgia	40	Mississippi	34
Florida	36	Texas	33
Tennessee	48	Oklahoma	38

As a rule, the yield is very nearly in proportion to the thickness of the stand. Especially is this true with the Spanish varieties. The largest yield on record is one made on the farm of Dr. J. F. Yarbrough, at Columbia, Alabama. The yield, as reported by Dr. Yarbrough, on the basis of 24 pounds of Spanish peanuts

per bushel, was 214½ bushels on an acre. On the basis of 28 pounds per bushel the yield was 183.9 bushels. These peanuts were planted in rows 17 inches apart. The nuts were very carefully placed 4 inches apart in the drill. Cultivation was chiefly with a weeder and by hand. The soil was a deep, loose sand, fertilized per acre as follows:

1,000 pounds ground limestone.
1,600 pounds 16 percent acid phosphate.
1,600 pounds kainit.

FERTILIZER EXPERIMENTS WITH PEANUTS.

The experiments reported in these pages were made by selected farmers in several counties. The land was selected and plots measured by a representative of the Experiment Station, who was also present at the harvesting of as many of the experiments as practicable. The fertilizer for each plot was separately weighed out, sacked and fully labeled at Auburn.

In interpreting these experiments the reader should bear in mind that it is more difficult to make accurate experiments with peanuts than with cotton or corn, since poor stands of peanuts are common.

Hence some of the experiments made are only briefly tabulated as inconclusive or not published at all.

The rule has been to wait one to two weeks after the nuts are dug before taking the weight of dry peanuts, on which the tables in this bulletin are based. The unshelled nuts were valued at 4 cents per pound and fertilizers at prices prevailing just before the European War.

HOUSTON COUNTY, 2 MILES SOUTH OF DOTHAN.

S. A. MULLINS, 1911.

Gray sandy loam, with stiffer yellow subsoil.

The land on which this experiment was made had been in cultivation many years. No leguminous crop had grown on it during the last three years.

A mixture of acid phosphate and kainit (Plot 8) was the only one showing any profit. The addition of cottonseed meal to acid phosphate and kainit did not increase the yield.

Experiment in Houston County, 1911
Dothan

Plot No.	Amount fertilizer per acre	KIND OF FERTILIZER	Yield of peanuts per acre	Increase over unfertilized plot	Profit from fertilizer usual price
	Lbs.		Lbs.	Lbs.	
1	200	C. S. Meal	704	−128	−$8 12
2	200	Kainit	864	32	−0.40
3		No fertilizer	832	------	------
4	240	Acid phosphate	768	−56	−3.64
5	200	C. S. Meal	864	48	−2.76
	240	Acid phosphate			
6	200	C. S. Meal	832	24	−3.44
	200	Kainit			
7		No fertilizer	800	------	------
8	240	Acid phosphate	896	96	0.76
	200	Kainit			
9	200	C. S. Meal	896	96	−2.24
	240	Acid phosphate			
	200	Kainit			

COVINGTON COUNTY, 1 MILE SOUTHEAST OF OPP.
BEN J. BARNES, 1913.

Gray sandy loam, with stiffer yellow subsoil.

This experiment was made on poor, gray sandy upland which had been cleared of its long leaf pine for eight years. The same plots were also used for fertilizer experiments with peanuts at Opp in 1914.

Similar soil on the same farm but on different plots was employed for this test in 1915.

In 1913 the largest net profit, $28.32, above the cost of fertilizer, was afforded by Plot 4, fertilized as follows:

240 pounds acid phosphate per acre.
200 pounds kainit per acre.
600 pounds slacked lime per acre.

Most of this profit was due to lime, the separate effect of 600 pounds of which was to increase the yield of dry nuts by 538 pounds per acre. This is a net profit of $18.52 per acre, after deducting the cost of 600 pounds of slacked lime at $10.00 per ton.

Experiments in Covington County.

Plot No.	Amount of fertilizer per acre	KIND OF FERTILIZER	Opp, 1913			Opp, 1914			Opp, 1915		
			Yield of peanuts per acre	Increase over unfertilized plot	Profit from fertilizer	Yield of peanuts per acre	Increase over unfertilized plot	Profit from fertilizer	Yield of peanuts per acre	Increase over unfertilized plot	Profit from fertilizer
	Lbs.		Lbs.	Lbs.		Lbs.	Lbs.		Lbs.	Lbs.	
1	240	Acid phosphate	1075	322	$11.20	903	279	$ 9.48	640	304	$10.48
2	200	Kainit	860	107	2.88	774	150	4.60	512	176	4.78
3	000	No fertilizer	753	----	------	624	----	------	336	----	------
4	240	Acid phosphate	1613	860	28.32	1246	627	19.00	896	560	15.46
	200	Kainit									
	600	Lime (slaked)									
5	240	Acid phosphate	1075	322	9.80	1032	419	13.68	624	288	7.58
	200	Kainit									
6	200	C. S. Meal	1290	537	15.40	1011	403	10.04	704	368	7.78
	240	Acid phosphate									
	200	Kainit									
7	000	No fertilizer	753	----	------	602	----	------	336	----	------
8	240	Acid phosphate	1183	430	14.82	----	----	------	800	464	15.75
	100	Kainit									

Next to lime, acid phosphate was the most important fertilizer for peanuts on this soil in 1913; even when used alone at the rate of 240 pounds per acre it increased the yield by 322 pounds of dry peanuts, affording a profit of $11.20 per acre. The average increase due to 240 pounds acid phosphate per acre was 269 pounds of dry nuts per acre.

Potash was also helpful, but to a less degree. The average increase due to 200 pounds of kainit per acre was 54 pounds of dry nuts per acre.

1914.

The largest net profit, $19.00 per acre, was again on the plot fertilized with slacked lime, acid phosphate and kainit. In this year lime was responsible for an increase of 208 pounds of dry nuts, which at 4 cents per pound, is a profit of $5.32 per acre, for the lime alone, in addition to a profit of $13.68 per acre due to the mixture of acid phosphate and kainit.

Again acid phosphate was, next to lime, the most important fertilizer. This fertilizer used *alone* increas-

ed the yield of nuts by 279 pounds per acre, and its *average* increase was 274 pounds of dry nuts per acre.

The average increase resulting from the use of 200 pounds of kainit per acre was 145 pounds of dry nuts per acre.

1915.

In 1915 the largest increase, 560 pounds of dry nuts, was again made by Plot 4, fertilized with acid phosphate, kainit and slacked lime. The profit on this plot this year was $15.46 per acre. Lime was separately responsible for 272 pounds of dry nuts per acre, or a profit of $7.88.

This year acid phosphate afforded an *average* increase of 208 pounds of dry nuts per acre. The use of 200 pounds of kainit afforded an average increase of 80 pounds of dry nuts.

Thus the results of each of the three years agree in showing that the most profitable investment was that in lime; the next most profitable was the investment in acid phosphate; while the 200 pounds of kainit increased the yield to a less extent, but to a point that was profitable on the basis of prices for potash prevailing before the European war.

However, we should not expect such favorable results from lime, except when applied, as in all these experiments, in combination with the other fertilizers, notably acid phosphate.

Separate Effect of Cotton Seed Meal, Acid Phosphate, Kainit and Slaked Lime in Increasing the Yield of Dry Nuts Per Acre at Opp, Covington County.

	1913	1914	1915
	lbs.	lbs.	lbs.
Increase of dry nuts per acre when cotton seed meal was added			
To acid phosphate and kainit plot	215	—16	80
Increase of dry nuts per acre when acid phosphate was added:			
To unfertilized plot	322	279	304
To kainit plot	215	269	112
Average increase with acid phosphate	269	274	208
Increase of dry nuts per acre when kainit was added:			
To unfertilized plot	107	150	176
To acid phosphate plot	0	140	—16
Average increase with kainit	54	145	80
Increase of dry nuts per acre when slacked lime was added:			
To acid phosphate and kainit plot	538	208	272

LEE COUNTY, 1 MILE SOUTHEAST OF AUBURN.
W. M. DEAN, 1915.

Gray sandy loam, with stiffer yellow subsoil.

This sandy upland had been cleared for several years.

The largest increase in yield, 336 pounds of dry nuts per acre, was obtained on Plot 4, fertilized with acid phosphate, kainit and lime. This was closely followed by Plot 8, fertilized with 240 pounds of acid phosphate and 100 pounds of kainit, which afforded an increase of 320 pounds of dry nuts, and a profit of $9.99 per acre. The separate increase due to lime is calculated as 208 pounds of dry nuts, or a profit of $5.37 per acre.

Acid phosphate was the most important single fertilizer constituent, its average increase being 216 pounds of dry nuts per acre.

Kainit in each of three combinations failed to effect any material increase in yield, and on every plot was unprofitable, whether used at the rate of 200 or 100 pounds per acre.

Experiments in Lee and Cullman Counties.

Plot No.	Amount of fertilizer per acre	KIND OF FERTILIZER	Auburn, 1915			Cullman, 1915		
			Yield of peanuts per acre	Increase over unfertilized plot	Profit from fertilizer	Yield of Peanuts per acre	Increase over unfertilized	Profit from fertilizer
	Lbs.		Lbs.	Lbs.		Lbs.	Lbs.	
1	200	Acid phosphate	688	304	$10.48	1925	-220	$-10.48
2	200	Kainit	384	000	-2 26	1888	-257	-12.54
3	000	No fertilizer	384	----	------	2145	------	--------
4	240	Acid phosphate	720	336	6.50	1906	-179	-14.10
	200	Kainit						
	600	Lime (slaked)						
5	240	Acid phosphate	512	128	1.18	1650	-376	-18.98
	200	Kainit						
6	200	C. S. Meal	672	288	4.58	1283	-683	-34.26
	240	Acid phosphate						
	200	Kainit						
7	000	No fertilizer	384	----	------	1906	------	--------
8	240	Acid phosphate	704	320	9.99	1246	-666	-29.21
	100	Kainit						

CULLMAN COUNTY, 1½ MILES NORTH OF CULLMAN.
I. O. O. F. HOME, ED. B. MILLER, SUPT., 1915.

Yellowish gray fine sandy soil, with stiffer yellow subsoil.

This upland soil had been in cultivation only six years, and, judging by the yield, apparently it was in a better state of fertility than other soils used in peanut fertilizer tests.

On such land, and with a rainy season after the middle of July, 1915, all fertilizers were without favorable effect. Indeed they seemed to decrease the yield under these conditions.

Separate Effect of Cotton Seed Meal, Acid Phosphate, Kainit and Slaked Lime in Increasing the Yield of Dry Nuts Per Acre at Auburn and Cullman.

	Auburn 1915	Cullman 1915
Increase of dry nuts per acre when cotton seed meal was added:	Lbs.	Lbs.
To acid phosphate and kainit plot	160	—307
Increase of dry nuts per acre when acid phosphate was added:		
To unfertilized plot	304	—220
To kainit plot	128	—119
Average increase with acid phosphate	216	—170
Increase of dry nuts per acre when kainit was added:		
To unfertilized plot	0	—257
To acid phosphate plot	—176	—156
Average increase with kainit	—88	—207
Increase of dry nuts per acre when slacked lime was added:		
To acid phosphate and kainit plot	208	197

GENERAL SUGGESTIONS FOR FERTILIZING PEANUTS.

1. Acid phosphate (or other source of available phosphoric acid, as Basic Slag) seems advisable for peanuts grown on practically all sandy and other soils that are especially well adapted to peanuts.

2. The amount of acid phosphate should probably range between 200 and 300 pounds per acre.

3. While potash is shown by some of these experiments to be helpful to peanuts grown on certain poor sandy soils, it is of less importance than available phosphoric acid. Present high prices and scarcity make the use of potash at this time impracticable and unprofitable for peanuts. When prices decline sufficient-

ly, 100 pounds of kainit per acre would seem, from certain of these experiments, to offer more promise of profit than 200 pounds per acre.

4. While in some of these experiments cottonseed meal seems to have increased the yield of peanuts on very poor soil, yet, until such evidence is stronger, the writers would not advise any investment in any form of nitrogen as a fertilizer for peanuts.

5. Some form of lime is generally helpful to peanuts, and on acid soils is strongly needed. Slaked lime at the rate of 600 pounds per acre gave profitable results in most of these experiments. It is believed that the use of about 1,000 pounds or more of ground limestone would be the most satisfactory and economical form in which to apply lime.

6. No form of lime should come in immediate contact with acid phosphate. The phosphate may be drilled in at or before planting. The lime may be applied in any convenient way, preferably before planting, and well harrowed in or otherwise mixed with the surface soil.

APPENDIX.

Inconclusive Experiments.

In Butler County, 8 miles north of Greenville, an experiment conducted by E. A. Simmons in 1916 proved inconclusive, because of a lack of uniformity in the stand due to damage by moles. (See page 32).

An experiment conducted in 1916 in Cullman County, on the farm of the I. O. O. F. Home, proved inconclusive because of poor stand and lack of uniformity of the land.

Eighteen other experiments were begun in the counties named below, but for various reasons they were not carried to a conclusion, or else for various reasons the results are not available for publication.

County	*Postoffice*	*Year*
Barbour	Clayton	1912
Bullock	Fitzpatrick	1915
Butler	Greenville	1912
Butler	Greenville	1913
Butler	Greenville	1914
Butler	Greenville	1915
Coffee	Enterprise	1914
Coffee	Enterprise	1915
Covington	Opp	1912
Dale	Pinckard	1911
Elmore	Tallassee	1912
Escambia	Atmore	1915
Houston	Dothan	1912
Houston	Dothan	1913
Lee	Auburn	1916
Monroe	Monroeville	1912
Mobile	Irvington	1914
Pike	Banks	1916

Separate Effect of Cotton Seed Meal, Acid Phosphate and Kainit in Increasing the Yield of Nuts Per Acre at Dothan, Houston County, 1911.

Increase of dry nuts per acre when cotton seed meal was added:

To unfertilized plot	—128 lbs.
To acid phosphate plot	104 lbs.
To kainit plot	—8 lbs.
To acid phosphate and kainit plot	0 lbs.
Average increase with cottton seed meal	—8 lbs.

Increase of dry nuts per acre when acid phosphate was added:

To unfertilized plot	—56 lbs.
To cotton seed meal plot	176 lbs.
To kainit plot	64 lbs.
To cotton seed meal and kainit plot	72 lbs.
Average increase with acid phosphate	64 lbs.

Increase of dry nuts per acre when kainit was added:

To unfertilized plot	32 lbs.
To cotton seed meal plot	152 lbs.
To acid phosphate plot	152 lbs.
To cotton seed meal and acid phosphate plot	48 lbs.
Average increase with kainit	96 lbs.

Inconclusive Experiments in Butler and Cullman Counties, 1916.

Plot No.	Amount of fertilizer per acre	KIND OF FERTILIZER	Greenville, 1916		Cullman, 1916	
			Yield of peanuts per acre	Increase over unfertilized plot	Yield of peanuts per acre	Increase over unfertilized plot
			Lbs.	Lbs.	Lbs.	Lbs.
1	4000	Ground Limestone	612	−168	1040	192
2	000	No fertilizer	780	------	848	----
3	240	Acid phosphate	1044	322	944	166
4	200	Kainit	876	211	896	189
5	200	C. S. Meal	768	161	672	35
	240	Acid phosphate				
6	200	C. S. Meal	1092	542	928	362
	200	Kainit				
7	000	No fertilizer	492	------	496	----
8	240	Acid phosphate	444	−29	736	224
	200	Kainit				
9	200	C. S. Meal	612	158	576	48
	240	Acid phosphate				
	200	Kainit				
10	200	C. S. Meal	708	274	592	48
	240	Acid phosphate				
	200	Kainit				
	4000	Ground Limestone				
11	240	Acid phosphate	660	245	544	−16
	200	Kainit				
	4000	Ground Limestone				
12	000	No fertilizer	396	------	576	----