

Response of Peanut Production to Technological Progress, Institutional Changes, and Economic Conditions

PART I

RECENT IMPROVEMENTS IN THE TECHNOLOGY OF PEANUT PRODUCTION



Agricultural Experiment Station
Virginia Polytechnic Institute
Blacksburg, Virginia

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of Peanut Production**

by

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Preface

This publication is one of a group of three devoted to the topic "Response of Peanut Production to Technological Progress, Institutional Changes, and Economic Conditions." This Part I is a descriptive study of the major technological factors of recent date believed to be influential in bringing about higher peanut yields per acre in the three geographic areas of peanut production: Virginia-Carolina; the Southeastern, composed of Georgia, Florida, and Alabama; and the Southwestern, composed of Texas and Oklahoma.

Part II is devoted to institutional changes and consists mainly of a chronology of peanut legislation (Research Report No. 49). An attempt is made to provide in one place a brief, up-to-date description of the government peanut programs which have been in effect since 1933. In so doing, duly credited and condensed material from previous publications of other authors, and a substantial contribution of new material by Joe F. Davis, Agricultural Economist, Oils and Peanut Division, Commodity Stabilization Service, U.S.D.A., have been brought together in order to provide research workers and others with an indispensable and convenient reference.

Part III forecasts the production of peanuts in the United States from 1959-1965 and compares it with prospective demand for peanuts (Research Report No. 50). The production forecast is derived from single linear equations for yields per acre developed for each of the seven states, using ordinary least squares procedures. Adjustments have been made to allow for recent technological progress, and to take into account current institutional arrangements. The equations attempt to measure the association of yields per acre with changes in price, costs, weather effect (rainfall in critical months), and time as a measure of technology. Comparative demand forecasts are offered under differing sets of assumptions. One is based on a demand equation for farmers' stock peanuts recently developed by Badger and Plaxico, Oklahoma State University. The other assumes constant per capita consumption at about the current level. Conclusions are stated in terms of prospective surplus for the period 1959-1965 above requirements for edible use.

The study was conducted with funds from Regional Project SM-14, Agricultural Research Service, U.S.D.A., and the Virginia Agricultural Experiment Station. The three publications are based on a thesis submitted by the author to Michigan State University, East Lansing, Michigan, in partial fulfilment of the requirements for a master of science degree.

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PART I

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Introduction

The status of peanut production technology has an important bearing on the average yields per acre in the several states. Many factors are involved which do not lend themselves to time series analysis. Furthermore, the statistical approach attempts to deal with the manner and extent to which one factor is associated with one or more other factors; it has little to say about causes. In this study, the effect of innovations in pest control, improved plant varieties, cultural practices and skills, and harvesting methods is reflected in the time variable included in the several yield models which will be discussed in Part III; that is, the extent to which improvements in technology are associated with the passage of time.

Since the time variable may include also the effect of certain non-technological factors, it is not necessarily a precise measure of technology. Accordingly, this Part I will outline some of the major developments in the field in order to provide a limited basis for subjective evaluation of the influence of the "state of the arts" on yields per acre. This evaluation applies mainly to the most recent 10 to 20 years and attempts to offer some explanation of why yields have increased recently, and why further increases constitute a reasonable expectation in accord with the results of this study.

It may be safely assumed that new knowledge in the field is quickly made available to growers through the several state Extension Services, as well as through many mass information media. It is not reasonable to assume, however, that experimental results are entirely duplicated or fully applied in their extension to farm conditions. For example, a pest control procedure which increases yields 30% experimentally will probably increase average yields by some lesser amount when applied generally. Nevertheless, a continuum of experimental success and its general application in dealing with yield-depressing factors

has a steady yield-increasing effect, even though there is often considerable lag in adoption of new technology. This suggests that growers are continually confronted with some degree of technological obsolescence, but its degree is variable and unknown. When price-cost conditions and acreage limitations are such that rapid adoption is highly profitable, as in recent years, the pronounced effect is worthy of special attention.

This resume does not purport to be more than a modest and incomplete review of the subject. It has been necessary to prepare it without the opportunity of personal visits to the Southeast and Southwest production areas. Nevertheless, an impressive literature is available which, viewed comprehensively, describes the persistent efforts of scientists over the years to apply new knowledge from many disciplines to the particular problems of peanut production. Special mention is deserved for the work of the Engineering Experiment Station,¹ Georgia Institute of Technology, and its project sponsor, GFA Peanut Association, Camilla, Georgia, for the 250-page bibliography of peanut technology, a work which is now being supplemented through 1960.

Virginia-Carolina Area

Peanut yields per acre in the states of Virginia and North Carolina have shown the most consistent and greatest rate of increase to the highest levels among the three production areas. The reasons for the high level are beyond the scope of this chapter, which is concerned with change rather than the comparative level of yields geographically.

A Virginia Extension publication² says that the average yield of peanuts in the state can be increased 25% in the next few years through better production practices if growers will:

1. select good soils
2. select proper varieties
 - (a) Holland Jumbo (runner)
 - (b) Virginia Bunch (bunch)
 - (c) Virginia 56-R (runner)
 - (d) Georgia 119-20 (bunch)

¹W. A. Gresham, Jr., C. E. Collum, and R. J. Kyle, Bibliography on the Technology of Peanut Production, 1896-1956, Engineering Experiment Station Special Report No. 32, (Atlanta: Georgia Institute of Technology, 1957), pp. 1-250.

²M. P. Lacy, Larger Yields and Better Quality Peanuts, Agricultural Extension Service Circular 413 rev., (Blacksburg: Virginia Polytechnic Institute, 1960), pp. 1-8.

3. use good seed
4. treat seed before planting
5. inoculate seed when needed
6. prepare good seed bed
7. plant on time
8. space plants closer
9. fertilize adequately
10. apply lime cautiously
11. use gypsum for calcium
12. control weeds and grass
13. use pre-emergence chemical weed control
14. control insects
15. dust for leafspot control
16. control stem rot by cultural methods
17. fumigate for nematodes
18. dig at the proper time
19. shock and cap well
20. cure before picking
21. use proper procedure for mechanical harvesting and curing
22. use a proper crop rotation

While a few would fail to agree that complete and successful attention to all of these practices by all growers "can" potentially increase yields per acre by 25% (or more), the problem of what increase will be realized by 1965 still remains.

Some of the recommendations listed are not under full control of the operator (for example, weather may prevent digging at the "proper" time); some pests, such as stem rot, have no complete control or methods of eradication. Some growers will be less than ideally successful in applying one or more practices; some will skimp to reduce costs or to devote limited time and capital to other enterprises. However, yields obtained in experimental plots are often 75 to 100% above average yields for the area, so a great potential increase exists.

Discussions with close observers in the area suggest a 5 to 10% yield increase over the next few years. There are some unknowns. Chemical residues on crops are receiving closer scrutiny now than formerly. On January 19, 1960, the Commissioner of Food and Drugs, Department of Health, Education, and Welfare, published an order establishing zero tolerance for residues of heptaclor on peanuts. This may be difficult if not impossible to meet, according to Campbell and Boush.³ The same authors point out that "the southern corn rootworm has become resistant to aldrin and heptaclor in Nansemond County, Virginia."

³W. V. Campbell and G. M. Boush, "Chemicals in Insect Control," Virginia-Carolina Peanut News, Vol. VI, No. 2 (Spring, 1960), p. 1.

These two chemicals have controlled the southern corn rootworm and thrips. On the other hand, research workers are hopeful that by careful attention to specified methods of cultivation, the incidence of stem rot can be substantially reduced. This might add another 100 pounds to average yields (5%) in the near future if all goes well in current tests and the recommendations are adopted generally by growers.

In comparing the rate of progress in Virginia and North Carolina, close observers suggest that there was a comparative lag in North Carolina in widespread early adoption of improved technology, but now the rate of yield increase in North Carolina will exceed that of Virginia over the next few years. The comparative lag is attributed to a less compact geographical area, more growers, and more acreage, as well as more competition from other crops such as cotton and tobacco for the time, attention, and capital of North Carolina growers.

Some of the specified practices listed above deserve some comment in their relation to the study of future trend in yields.

Select Good Soils

Since 1949, when acreage allotments became mandatory, it was assumed that the acreage used would be on the better soils and would result in higher yields per acre. The yield regressions confirm this relationship. Projections to 1965 assume no further acreage reduction; consequently, little if any increase in yields would be expected from this source if acreage is assumed constant from 1958 to 1965.

Select Proper Varieties

Varieties are bred not only for their high yielding attributes, but also for certain marketable characteristics specified by shellers and end-users as a reflection of consumer demand. An important consideration in the Virginia-type peanut is the percentage of Extra Large nuts because of the price premium in the salted nut market. Another important consideration is desirability for roasting in the shell, characteristic of the large Virginia-type peanut. The Holland Jumbo and Virginia Bunch are relatively high yielding varieties of long standing and are still grown extensively. Virginia 56-R was introduced in 1956 not only because it gave a higher percentage of extra large peanuts, but also for its higher yield. It is expected to account for about 75 to 80% of the acreage in 1960. The Georgia 119-20 is currently being introduced not so much for its higher yield, but for its desirable characteristics for the roasting (in the shell) trade. The NC-2 variety was introduced in North Carolina in 1954 for its much improved percentage of extra large kernels as well as for larger yields per acre.

Close and informed observers estimate the following peanut variety percentage distribution in North Carolina in 1954: Virginia Bunch,

65; Virginia Runner, 29; NC-1, 4; NC-2, 2. By 1960, the following percentages were estimated: Virginia Bunch, 8; Virginia Runner, 10; NC-1, none (introduced in the interim period but not found acceptable); NC-2, 78; and a new variety introduced in 1960, NC-4X, 4. The rapid adoption of NC-2 reflects its increased yield and profitability. Its innovation probably explains much of the increase in yield per acre since 1956.

The following press release issued July 23, 1958, by the Virginia Agricultural Extension Service provides a comparative evaluation of the 56-R variety:

A new high-yielding, top-quality peanut variety is gaining popularity in Virginia.

Agronomists at the Tidewater Research Station at Holland, where the variety was developed, and reports from test plots throughout the peanut belt, confirm the superiority of Virginia 56-R. This variety was grown for seed increase in 1956, and certified seed were distributed last year (1957) to producers in all the peanut-producing counties in Virginia.

The yield of Virginia 56-R has been consistently high. During a three-year period at four test locations, each year the new variety has averaged 3,002 pounds per acre compared to 2,782 pounds for Holland Jumbo, the check variety. This is an 8% increase.

Virginia 56-R has been tested on a wide range of soil types and has done well on light soils as well as medium heavy soils. For top yields, this variety should be planted in rows 30 to 36 inches apart and 6 to 8 inches within the row. This variety matures a few days earlier than Jumbo runner varieties, and should therefore be harvested earlier to avoid excessive shedding before harvest, the agronomists say.

Classified as a Virginia runner peanut, the new variety has moderately thin shells, and high meat percent. When grown in light sandy soils, the peanuts are excellent for roasting in the shell for sale as "ball park" peanuts. The average shelling percentage, based on unshelled farmers' stock, is about 70%. The proportion of Extra Large kernels varies from 25% to 45% with an average of 36%. The percentage of Extra Large is generally a little lower on light sandy soils, and tends to be a little higher on the heavier soils. Climatic variations also affect the percentage of Extra Large.

Innovations often stimulate pride, fear, or rejoicing, depending upon their impact on interregional competitive interests. In the appendix are selected readings from a "Statement of the Virginia-Carolina

Peanut Association (a sheller organization) to Mr. J. E. Thigpen, Director, Oils and Peanut Division, United States Department of Agriculture, Relative to the 1958 Support Program for Peanuts, April 28, 1958." The purpose of the statement was to obtain a price differential adjustment among production areas; however, the testimony is highly descriptive of the impact of new plant variety developments in the industry. This includes the subjective evaluation of several growers and shellers which casts light on the reasons for rapid adoption. Also included is a brief objective evaluation by Dr. Gregory of the North Carolina Agricultural Experiment Station who developed the NC-2 variety.

Use Good Seed

A certified seed program has recently been inaugurated in Virginia through the Experiment Station, Extension Service, and the Crop Improvement Association which is the organization for maintaining foundation seed stocks for the state. The Peanut Growers Marketing Cooperative, Franklin, Virginia, is also cooperating in the program. If properly maintained varieties in pure form are more readily available to growers in the future, there may be a yield-increasing effect from this source.

According to Moore,⁴ the area has "taken world leadership in the development and utilization of tetrazolium for quality evaluation of seed peanuts." This is a two-day method of testing germination by chemical analysis of the seed's "breathing" ability, a factor associated with life and growth. This technique might affect yields favorably through better stands.

Improved seed-shelling equipment and technique have been developed in recent years, and sources of certified seed now exist in contrast to the "seed selection and saving" custom formerly practiced by growers as the only source of seed. Shelling for seed use requires care that is unnecessary for other uses.

Closer Spacing for Higher Yields

Research indicates that not as much yield increase from this practice may be expected for peanuts as may have been the case for some crops, such as corn. Shear and Miller⁵ indicate that important considerations from the practical standpoint concerning close spacing are the

⁴R. P. Moore, "Tetrazolium Testing Seed Peanuts," Virginia-Carolina Peanut News, Vol. VI, No. 2 (Spring, 1960), p. 12.

⁵G. M. Shear and L. I. Miller, Influence of Plant Spacing of the Jumbo Runner Peanut on Fruit Development, Yield, and Border Effect, (Agronomy Journal, Vol. 52:125-127, 1960).

large quantities of seed required and the difficulties in controlling diseases which affect leaves and branches. An acre of peanuts planted in 30-inch rows with the plants a foot apart in the row would require 17,424 seed, while an acre planted 6 by 6 inches would require ten times as many seed. As for disease control, close spacing not only increases the difficulty of effectively applying fungicides but appears to favor the development and spread of diseases.

Fertilize Adequately

For many years it was thought that little or no response was obtained from application of fertilizer to peanuts. More recently, fertility studies have shown that fertilizer for peanuts may be applied to the previous crop in the rotation or to cover crops, a practice which is equally as effective as applying fertilizer directly with the peanuts. Using lime containing magnesium and gypsum (land plaster) are also established practices. Improved application equipment and technique could effect some further increase in yields from this source, as well as quantity applied under favorable price-cost conditions.

Cultivation

Control of weeds and grass is not now regarded as a problem insofar as methods are concerned. Improved tillage equipment and the herbicides developed in recent years are effective controls. Some of the yield increase during the past decade probably derives from this source.

Pest Control

The organisms that cause disease of the peanut and insects that attack the peanut are listed by the United States Department of Agriculture as follows⁶: bacterial wilt, leafspot, root rot, southern blight or stem rot, meadow nematode, root-knot nematode, sting nematode; and corn earworm, fall armyworm, potato leafhopper, southern corn rootworm, tobacco thrips, velvet bean caterpillar, and white-fringed beetle. Some of these are more destructive than others. Effective controls developed for some of these in recent years have doubtless contributed substantially to the increase in average yields per acre since 1940; however, the scientist faces a continuous battle to find effective controls and overcome the resistance that some organisms develop to controls which are effective initially.

⁶J. H. Beattie, F. W. Poos, and B. B. Higgins, Growing Peanuts Farmers' Bulletin No. 2063, (Washington: United States Department of Agriculture, May, 1954), p. 54.

One of the most destructive diseases of peanuts is cercospora leafspot. The disease was recognized early in the century, but according to Miller,⁷ farmers accepted the disease as a necessary evil and many research workers believed its control would be impractical. Experiments by Miller⁸ and others whom he cites indicate that circa 1940, effective control by the use of sulphur dust was introduced. An Extension Service leaflet⁹ says that dusting with sulphur "may increase peanut yields 20 to 30%." It is interesting that Batten and Poos, in 1938, as cited by Miller,¹⁰ were primarily interested in controlling leafhoppers and discovered that the sulphur and bordeaux they used also controlled leafspot. They found that peanut yields were increased 25.2 and 29.6% by controlling these two pests. More recently, DDT has been used to control leafhoppers when necessary.

Two other very destructive insect pests of peanuts are thrips and southern corn rootworm. It was found in 1955¹¹ that two pounds of aldrin or heptachlor per acre will control both of these. Application is made as a dust or in a fertilizer mixture. Some estimates indicate a 20% increase in yield as a result of this means of control.

Southern blight or stem rot is one of the most widespread and destructive diseases of peanuts. It is caused by the soil borne fungus, Sclerotium rolfsii. Control¹² measures consist of covering the surface litter 4 to 8 inches deep in preparing the seed bed and cultivating carefully to avoid throwing soil against the plants, together with herbicide treatment to control weeds. These are measures based on concepts by L. W. Boyle of Georgia Agricultural Experiment Station. Agricultural

⁷Lawrence I. Miller, Peanut Leafspot Control, Technical Bulletin 104, (Blacksburg: Virginia Agricultural Experiment Station, October, 1946), pp. 3-5.

⁸Miller, Technical Bulletin 104, pp. 1-7.

⁹M. P. Lacy, Larger Yields and Better Quality Peanuts, Agricultural Extension Service Circular 413 rev., (Blacksburg: Virginia Polytechnic Institute, 1956), pp. 1-7.

¹⁰Lawrence I. Miller, Peanut Leafspot and Leafhopper Control, Bulletin 338, (Blacksburg: Virginia Agricultural Experiment Station, May, 1942), pp. 3-4.

¹¹Interviews with representatives of the Virginia Peanut and Hog Growers Association, April, 1960, suggested this date.

¹²"How to Control Peanut Stem Rot," Agricultural Research, April 1959, p. 7.

Research Service pathologist K. H. Garren and agricultural engineer G. B. Duke, working cooperatively with the Virginia Agricultural Experiment Station, conducted tests at Holland, Virginia, and obtained substantial reduction of infection with yields substantially higher than for check plots where mulching and dirting were used. Plant breeders have thus far been unsuccessful in developing varietal resistance to this disease.

Limited work has been done on developing varietal resistance to disease, and practically no work on varietal resistance to insects.

Stem rot and associated peg rot cause the greatest loss late in the season.¹³ While the disease is not pronounced during dry periods, nor in periods of very heavy rainfall, loss is increased by moderately heavy rainfall. The disease may even cause losses by discoloration of the pods in windrows or stacks, or in storage if moisture is high. This may be part of the explanation of why yields tend to be negatively associated with rainfall in the specified third critical month as discussed later in the statistical analysis. The negative coefficient of September rainfall may be reflecting the incidence of this disease.

Wells¹⁴ suggests certain rotations for control of rootknot nematode, but indicates that only soil fumigation will control the sting nematode. Since fumigation is said to cost \$20 or more per acre, many growers may prefer the risk to the "insurance," depending upon their personal experience with the incidence of the disease. Perhaps the practice could be regarded more as yield-maintaining than as yield-increasing.

Harvesting

There is no available record of any peanut combine having been sold in Virginia before 1957, and only 10 or 15 in North Carolina.¹⁵ In April 1960, Duke estimated for Virginia that in 1957, 600 acres were combined by 8 growers; in 1958, 1,275 acres by 18 growers; and in 1959, 1,800

¹³Beattie, et. al., No. 2063, pp. 28-30.

¹⁴J. C. Wells, "Peanut Disease Control," Virginia-Carolina Peanut News, Vol. VI, No. 2 (Spring, 1960), p. 14.

¹⁵George B. Duke, Progress Report on Harvesting Virginia-Type Peanuts, Agricultural Research Service ARS 42-11, (Washington: United States Department of Agriculture, July, 1957), p. 1.

acres by 25 growers.¹⁶ Presumably, an increase on this order is occurring in North Carolina. In contrast, 60% of the crop in the Southeast, and probably 90% in the Southwest, was combined¹⁷ as of 1959. By 1960, Duke estimated that probably 80 to 90% of the Southeast's crop is being combined and less than 5% in Virginia.

In the more remote past, peanut harvest was largely a hand operation; later, machines developed for other crops were modified to help harvest peanuts. In recent years, through invention, development, and manufacture, farm equipment especially adapted to peanut tillage, planting, cultivating, digging, and other stages of harvesting has arrived on the scene.¹⁸ In the Virginia-Carolina area, peanut-curing (drying) equipment is a necessary accompaniment to the combine.

Increased use of equipment may be attributed mainly to the declining farm labor supply, higher labor cost, and of course, convenience and timeliness of operation. The stack-pole method, from digging through picking and threshing, requires 38 hours compared to 4.5 hours for the combine method¹⁹; to the latter must be added labor associated with the artificial curing necessary after combining in the Virginia-Carolina area.²⁰

Duke's research²¹ indicates an increase of approximately 3% in pounds harvested by the combine method over the stack-pole method.

¹⁶Interview with George B. Duke, Agricultural Engineer at Virginia Tidewater Research Station, April, 1960.

¹⁷Duke, ARS, 42-11, p. 1.

¹⁸Manufacturers include Benthall Machine Co., Ferguson Mfg. Co., Lilliston Implement Co., Roanoke Mfg. Co., Harrington Mfg. Co., Frick Co., Southern Plow Co., Turner Mfg. Co., Long Mfg. Co., McClenny Farm Machinery Co., Bauer Brothers Co., Koger Pea and Bean Thresher Co.

¹⁹Duke, ARS, 42-11, p. 5.

²⁰George B. Duke, Machinery and Methods for Harvesting the Virginia Type Peanut, paper No. 59-137, A report to the annual meeting of the American Society of Agricultural Engineers, Ithaca, New York, June 21-24, 1959, (Holland, Virginia, Agricultural Engineering Research Division, 1959), p. 1.

²¹G. B. Duke, Peanut Recovery Yields from Two Harvesting Methods, Virginia-Carolina Peanut News, Vol. 6, No. 4, (Fall, 1960), p. 14.

Accordingly, the apparent forthcoming increase in the use of improved and specialized tillage, planting, harvesting, and curing equipment may be regarded as yield-increasing in this area. Because considerable capital investment is involved, the adoption rate for heavy equipment may be rather slow, particularly as adoption moves from the larger to the smaller allotment farms where labor may be less scarce than capital and where costs per unit will be higher. Custom operation, or dealer-grower equipment leases might mitigate these costs. The latter arrangement is an innovation being tried by some equipment dealers, but not necessarily in the peanut area at present. Another aspect to the combine-drying method in this area is one of earlier marketing, and earlier flow of peanuts to end-users. This might mean some increase in gross sales from the area which now lags behind other areas by a month or more in time of shelling and shipment.

In summary, the implications of the following statement make clear that progress in peanut farm machinery and equipment is of recent date. Writing in 1950, Barlow,²² et. al., describe the situation thus:

There has been little change for at least a century in the conventional method used to cure peanuts. Some important changes, however, have taken place in the overall method of harvesting peanuts. In most cases, peanut diggers have replaced the single moldboard plow. Pitchforks are now employed extensively for shaking dirt out of the nuts and vines, thus making the old handshaking technique obsolete. The process of separating the nuts from the vines has been greatly expedited by the advent of the mechanical picker, which has superseded the very slow, tedious, and primitive process of hand-picking.

The advancements in the digging and the picking phases of harvesting have not been accompanied by comparable progress in the curing stage. Peanuts are still stacked around poles to make shocks which normally are five to six feet tall and about three feet in diameter. These shocks are allowed to remain in the field for a period of about three weeks or more while the nuts and hay cure enough for picking and storage without danger of spoilage and excessive heating. During this period, the shocks are exposed to weather conditions which reduce the quality of both nuts and hay. The nuts are discolored while the hay turns brown and even black in bad weather, which may occur at this time of the year. There is little doubt that many of the nutrients present at the time of

²²G. E. Barlow, E. T. Batten, and R. B. Davis, Jr., Peanut Harvesting and Drying Research 1947-48-49, No. 439, (Blacksburg: Virginia Polytechnic Institute, June, 1950), p. 2.

shocking have "weathered" out by the time the peanuts are picked. The shocks are also vulnerable to the attack of crows, blackbirds, rats, mice, and squirrels. These birds and animals are usually present in large numbers and cause much destruction during the harvesting season in the peanut-growing section of Virginia. From these factors, it has been felt that research work needs to be done in an effort to improve the curing of peanuts.

Southeast Area

The foregoing statement regarding technological progress in the Virginia-Carolina area may be said to hold generally for the Southeast area in direction and purpose. The type of peanut differs, but growers are confronted with the same or similar problems: good seed, seed treatment, leafspot, stem rot, and various organisms. The windrow and combine method of harvesting prevails. A progressive research program and related extension education, plus other active promotional organizations, all suggest a continuation of the yield increases and quality improvements which have become evident statistically in the past decade. The statement in the Appendix by Mr. E. J. Young, Stevens Industries, Dawson, Georgia, reflects a feeling of progress which is doubtless justified. Accordingly, development of new varieties will be discussed here as one of the main additives to a yield-increasing program. Since Georgia is the principal producing state, it will be used as illustrative of the area.

A breeding program was started in Georgia in 1931.²³ Its primary objective was to develop a Spanish-type peanut resistant to leafspot and stem rot. When this failed, attention was directed to yield and quality characteristics. Since 1941, more than 300 tests have been conducted. In 1955, Higgins reported that 6 selected strains of old varieties had proved sufficiently superior for release to growers. These were GFA Spanish, Dixie Spanish, Southeastern Runner 56-15, Virginia Bunch 67, Virginia Bunch G2, Virginia Runner G26, and one hybrid selection, Georgia 119-20 (see Virginia-Carolina discussion).

Another factor in increasing yields is the shift from Spanish to runner type. Higgins says that prior to World War II about 90% of the peanuts marketed in Georgia were of the small Spanish type, but today (1955), 75% of the Georgia crop is of the small-seeded runner type.

²³B. B. Higgins, and Wallace K. Bailey, New Varieties and Selected Strains of Peanuts, Georgia Agricultural Experiment Station Bulletin N. S. 11, (Experiment: Georgia Agricultural Experiment Station, 1955) pp. 1-31.

The shift arose from end-user demand and the belief of growers that higher yields were obtained. Hammons²⁴ et. al. estimate the runner crop in 1958 as 55% of total acreage. Of this acreage, they estimate 63% Dixie Runner; 17% Virginia Bunch-67, 14% Early Runner; and 6% Southeastern Runner 56-15. They report that in 26 tests since 1948, the average per acre yield in pounds of pods was 2,145 for Dixie Runner, 2,406 for Southeastern Runner 56-15, 2,593 for Virginia Bunch-67, and 2,779 for Early Runner.

It now appears that Dixie Runner may be replaced by these new varieties in much the same manner that Dixie Runner replaced, over the past 15 years,²⁵ the old Southeastern Runner (Georgia Runner, Florida Runner, Alabama Runner, and North Carolina Runner). Foundation seed programs for these new varieties are maintained.

In another report, Hammons²⁶ et. al. indicate that the Spanish Argentine, in 32 tests, exhibited a 10.3% increase over the Dixie Spanish. This variety came into the United States as a foreign plant introduction from Argentina in 1937, and was included in breeding plots in Georgia in 1941. Certified seed is now available in Oklahoma, where the variety was released to growers in 1951. Seed should be available in Georgia in 1962.

Progress continues; yields will increase; but the elusive goal of producing a Virginia-type peanut in the Southeast has yet to be accomplished, although some progress is being made.

Southwest Area

Harrison²⁷ indicates that southern blight (stem rot) is one of the major problems in Texas peanut production, and that irrigation magnifies the incidence of the fungus. The necessary tillage practices helpful in mitigating the losses expose the land to severe wind erosion.

²⁴R. O. Hammons and others, Comparative Performance of Four Varieties of Peanuts in Cooperative Tests in Georgia, Georgia Agricultural Experiment Station Mimeograph Series N. S. 76, (Tifton: Georgia Coastal Plain Experiment Station, 1959), pp. 1-7.

²⁵Hammons, Mimeograph Series N. S. 76, p. 1.

²⁶R. O. Hammons and others, Comparative Performance of the Spanish Peanut Argentine in Cooperative Tests in Georgia, Georgia Agricultural Experiment Stations Mimeograph Series N. S. 72, (Tifton: Georgia Coastal Plain Experiment Station, 1959), pp. 1-7.

²⁷A. L. Harrison, Terraclor for the Control of Southern Blight of Peanuts, Progress Report 2014, (College Station: Texas Agricultural Experiment Station, Feb. 1958), pp. 1-3.

Preliminary tests with Terraclor in 1956 and 1957 indicated that when sprayed around the crown of peanut plants, it may control stem rot. At the time the study was published, use of Terraclor was not yet recommended except on an experimental basis. However, Chaffin,²⁸ Oklahoma Extension Agronomist, makes reference to this study to the effect that it "can be used for effective control of southern blight," and gives recommended procedure. He despairs of its high cost as limiting its use. An earlier Extension Service recommendation²⁹ for Oklahoma suggests only appropriate tillage practices for control of stem rot.

Walton and Matlock³⁰ report an exceptionally heavy and widespread infestation of the red-necked peanut worm, Stegasta basqueella (Chambers), Gelechiidae, in Oklahoma in 1957 and 1958. Matlock observed a few specimens in 1955, but no collection of the species was on record for the state prior to 1957. The authors say that a collection of these from Texas and Kansas was in the United States National Museum in 1903, according to Busck.³¹ The name derives from a wine-red band on the first two segments behind the caterpillar's brown head. The body is "greenish or yellowish white." The caterpillars feed in or on the buds or within the leaflet surface or eat holes in it. The authors make no recommendations, but their progress report on the tests conducted suggests that insecticides may offer a suitable means of control. Peanut literature obtained from other states makes no reference to the red-necked peanut worm.

The peanut production and harvesting recommendations³² for Texas and Oklahoma, published in 1950, suggest all of the practices common to other areas for dealing with common problems (with variations for

²⁸Wesley Chaffin, Peanut Production in Oklahoma, Circular E-410, (Stillwater: Oklahoma State University, June 1959), p. 18.

²⁹Agricultural Extension Service, Higher Yields of Peanuts, Agronomy Series No. 6, (Stillwater: Oklahoma State University, March, 1958), p. 1.

³⁰R. R. Walton and R. S. Matlock, A Progress Report of Studies of the Red-necked Peanutworm in Oklahoma, Processed Series P-320, (Stillwater: State University of Oklahoma, April, 1959), pp. 1-5.

³¹Walton, Processed Series P-320, p. 1.

³²Staff members of Texas Agricultural Experiment Station and Oklahoma Agricultural Experiment Station, A Handbook of Peanut Growing in the Southwest, Texas Bulletin 727, Oklahoma Bulletin B-361, (College Station, Texas, and Stillwater, Oklahoma, 1950), pp. 1-25.

local conditions), including seed treatment, herbicides, combining, and artificial drying; but significantly, no reference is made to irrigation.

Hughes and Magee³³ say that no instance of peanut irrigation was found in the 1948 inventory of irrigation in Texas, but in recent years, peanuts have been added to the list of such crops. It is believed to have begun in Frio County in 1949 and to have expanded from there to other areas during the drought of 1952-1956. No opinion was expressed in their study as to the extent of irrigation in Texas except to say that scant water supplies and acreage allotments have limited the total acreage irrigated. Their study of five farms showed that wells of low capacity could be used profitably. Development costs ranged from \$146 to \$301 per acre. Operating costs were higher for increased quantities of seed, fertilizer, cultivation, and labor. Yields more than doubled from the 5-year average of 14 bushels on dry-land to 34 bushels on irrigated land, along with better quality and increased hay yields. The average total cost of irrigation, including operating and overhead, ranged from \$38 to \$63 per acre and averaged \$47 per acre of irrigated peanuts for all farms in the study. The 5-year average net return from irrigated peanut production ranged from \$40 to \$60, equivalent to a return ranging from 19 to 33% on capital invested in irrigation facilities. The figures are in terms of added receipts, added costs, and net added returns attributable to or associated with irrigation only.

In Oklahoma, the big story on yield increases is one of irrigation. Chaffin³⁴ says "peanuts respond well to irrigation" and indicates that slightly more than 18% of the total peanut acreage in Oklahoma was irrigated in 1957. The 19,942 acres of irrigated land produced 44 million pounds, or 51% of the total state production for one year. This is a yield per acre of 2,200 pounds compared to the state average of 800 pounds in 1957, including irrigated production.

Matlock³⁵ estimates the current (1960) level of irrigated acreage at 26,000 and suggests that not much further increase is likely because of water supply limitations. Caddo County is the main center with some irrigation in Hughes. Matlock believes 3,000 pounds per acre is about average with some growers obtaining 4,000 to 4,500 pounds. While irrigation was stimulated by drought in 1954 and 1956, rainfall

³³William F. Hughes and A. C. Magee, Costs and Returns of Irrigated Peanut Production, West Cross Timbers, 1953-57, Bulletin 917, (College Station, Texas Agricultural Experiment Station, 1958), pp. 1-10.

³⁴Chaffin, Circular E-410, p. 5.

³⁵Interview with Ralph S. Matlock, Professor of Agronomy, Oklahoma State University, Stillwater, Oklahoma, April, 1960.

was adequate in 1958 and 1959 and was mainly responsible for the record average yields; irrigation was used moderately as needed. Commenting generally regarding irrigation in Texas, Matlock suggests that irrigation may not receive as much emphasis as in Oklahoma because of water supply limitations.

Progress in the Southwest in developing new and higher yielding varieties is comparable to other areas. In the 1950 joint handbook,³⁶ Spantex is mentioned as a new variety developed in Texas along with Oklahoma's Spanish 18-38 and Spanish 146. By 1959, Chaffin³⁷ suggests the Spanish Argentine is adapted to both irrigated and dry-land conditions, and is superior to Spantex. The Dixie Spanish is similar to the Argentine.

It seems clear from this brief review of developments in the Southwest that irrigation and new varieties, coupled with progress in cultural practices and skills, explain the recent increase in yields per acre and point toward still higher average yields in the near future; in fact, substantially higher, if irrigation becomes more widely established.

Footnote to Progress

Should one seek a perspective of technological progress during the past decade, Wilkins³⁸ may be consulted for a good description of the "state of the arts" 15 to 20 years ago. He toured the three areas; he regarded much that he saw as relatively primitive. He witnessed and described the initial stages of many methods, machines, and practices which were under research at the time and which have since become highly specialized tools of production and marketing. Occasionally, he envisioned things to come; for example, electronic sorting for color, which is now in use in processing plants.

³⁶Staff members, Texas Bulletin 727, Oklahoma Bulletin B-361, p. 12.

³⁷Chaffin, Circular E-410, p. 9.

³⁸Charles Smith Wilkins, "An Economic Study of the Peanut Industry," (unpublished doctoral thesis, Department of Agricultural Economics, Agricultural and Mechanical College of Texas, 1949), pp. 1-117.

APPENDIX

Statement of the Virginia-Carolina Peanut Association To
Mr. J. E. Thigpen, Director, Oils and Peanut Division U. S. Department
of Agriculture, Relative to the 1958 Support Program
for Peanuts, April 28, 1958.

We would like to bring to your attention our conclusions concerning the impact of a very significant technological change on the Virginia-Carolina peanut industry. We have seen this change coming for some years, but it is now accentuated to the point where constructive action must be taken to make adjustments which no longer can be postponed. There are two major developments we would like to discuss.

1. In the Virginia-Carolina area farmers have done a wonderful job in responding to the demands of the market for ELK (extra large kernels). Research in plant breeding has enabled them to do it, and a price premium has provided the incentive. We have been able to pay premium prices because market demand and supply justified it in meeting the needs of the trade. A premium price for Virginia peanuts is still justified for premium uses. However, because of the rapid technological change, the supply of premium product has outrun the premium market demand.

2. These rapid changes and trends in supply arising from the advance of technology have made it imperative that the method of pricing peanuts among grades and types be reconsidered so that this new supply situation may be fitted to market demand.

The Virginia-Carolina industry, under the present pricing structure based on historical price and supply data, has no means of adjusting to this situation. The forces at work through the use of historical data worsen the situation with each passing year, compound the pricing "error", and magnify the market maladjustment.

Technological Change

First we need to appraise the rapid changes which have occurred in the product we have to market. It is a different product now from what it was 5, even 3 years ago. This is not only true for the Virginia-Carolina area, but also in other areas as well. These changes give rise to a need for reconsidering the price relationships.

NC-2. In 1953 a new variety, NC-2, was introduced in North Carolina. This variety was genetically bred to produce 42% ELK. It is now used on about 95% of the North Carolina acreage.

56-R. A similar variety, 56-R, will be available to growers in Virginia in 1959 in sufficient quantity of seed to plant all of the Virginia acreage. Tests at Tidewater Research Station, Holland, Virginia, have shown for the past two years (1956-1957) an average of 44-1/2% ELK.

The use of these varieties of seed is here to stay because growers are well satisfied with them. Their use also establishes the content of ELK at a substantially higher level, heretofore impossible. Briefly, in 1949 ELK was 19.51%; in 1954, 31.34% and in 1957, about 35%, or even higher, after allowing for an unusually high percentage of damaged kernels. But you need not rely on our chart for an appraisal of this trend. We submit Exhibit B, a series of letters from growers themselves, seed shellers, dealers, and agronomists, testifying to the results they have obtained in terms of what we shall call this "brand new product"; for indeed, it is not the same product we produced and marketed - even 3 years ago. And, as we shall demonstrate later, it will no longer fit the old historical pricing structure, or the basic structure of the support program. It is resulting in "over-support" of price, which means that the historical price formula is no longer adapted to the new products we market now.

Technology Developments in Southeast

The Virginia-Carolina area is not the only place where production technology has advanced. The runner peanut is not the same peanut it was 10 years ago. "Change is the law of progress," says Mr. E. J. Young, Stevens Industries, Dawson, Georgia, speaking at the convention of the Southeastern Peanut Association.

We submit Exhibit C, which sets forth a very able description of the new runner peanut. Mr. Young says that the runner "is uniform in size, has a smooth seed coat, mild and sweet in flavor, easily blanched and of fine texture." It is a more valuable product than it used to be. Mr. Young states, "already manufacturers of peanut butter, candy and specialty lines are turning to runners for their peanut requirements." Regarding its greater value, Mr. Young says, "For the first time in years, the new No. 1 Runner brought as much or more than its leading competitor in the market place."

These technological changes have drastically altered the competitive situation to the disadvantage of the Virginia-Carolina area. Under a truly competitive free market situation, the Virginia-Carolina area would have to adjust to change or suffer. And it would deserve to suffer if it refused to keep up with the technological changes. However, it does not deserve to be crippled at the hands of an outmoded government price formula.

All of these characteristics of the new runner peanut make for greater ease of substitution of one peanut for another and obsoleted

and outmoded the degree of price differential that has been a part of the historical data in the pricing structure. In addition to the great advance in production technology, there have been other innovations which give greater relative value to the runner peanut. These include the use of stabilizers in peanut butter to prevent oil separation and the homogenization process. These processes render less valuable some of the characteristics for which the Virginia type peanut has long been noted, and neutralize its importance and need. (Mr. G. L. Houston, President, Southeastern Peanut Association, at a meeting held with the Department on March 14, 1958, stated):

"All types of peanuts are now highly competitive.

"All types are interchangeable for practically any and all needs and uses.

"Any and all can be used for peanut butter or for candy or for roasting or for salting.

"The Dixie runner today is just as good as the Virginia or Valencia for salting, roasting or the ballpark. They are expanding out West.

"Last year you were agreeing that Spanish were substitutable - this year, you say that Virginias are substitutable, so we are contending in the Southeast that all peanuts are substitutable and we have plenty of peanuts."

Exhibit "B"
(Statement to Thigpen)

Excerpts from letters to the North Carolina Peanut Growers Association,
and others.

From Severn Peanut Co., Inc., Severn, North Carolina, 4/21/58

.....As you know, sometime around 1950 extra large became virtually non-existent. About this time, the Virginia-Carolina Peanut Association began to realize that something had to be done, and at the same time, Dr. Gregory, of N. C. State College, had started working toward seed improvement. As seed shellers, in an effort to relieve this situation to some extent, we carried out a program of very strict seed selection and screening of the smaller peanuts from planting seed. This probably had some beneficial results but not to the extent we had hoped. We know that you realize that it takes quite a long time to develop an entirely new strain of seed and get a large volume into the hands of the dealers and planters. About 1953 or 1954, some of these seed developed by Dr. Gregory and known as NC-2 and NC-1, were released on a rationed basis to the grower, the maximum to each being fifty pounds. These, of course, were certified seed and naturally the demand was overwhelmingly greater than the supply. In 1955 it became evident that the NC-2 was far superior to the NC-1 and the NC-1 dropped out of the picture almost completely. We believe that 1957 was the first year in which about 95% of the North Carolina crop was planted in NC-2's.

Naturally, as seed dealers we like to have a large supply of all varieties to offer to the trade. During the 1957 harvest season when we began our program of field selection for seed, we began to realize that the old "true blue" Virginia Bunch had virtually faded out of the picture. As a concrete example, in Northampton, Halifax, and Edgecombe counties, we were able to locate only two farmers who actually had the old Virginia bunch seed and they knew and we knew that they were this variety. That proves to us that practically all the North Carolina peanut crop, for the first time, was planted in one of the newer varieties.

Mr. Gilliam, (Virginia-Carolina Peanut Shellers Association) we want to impress upon you that we feel very strongly that it would be next to impossible to switch the farmers to any other variety that one which gives a bigger dollar per acre return. In the NC-1's and NC-2's, particularly the twos which have been most popular, the yield per acre and the per cent of extra large kernels has been far above anything in previous years, thereby resulting in a larger money yield per acre. We do not hesitate to say that should other varieties be developed which would give a larger yield and per cent of extra large kernels than we now have that farmers would most certainly switch to them.

We believe that Virginia is most certainly at the crossroads of a complete switch. The last couple of years, we have been distributing some of our NC-1's and 2's to several points in Virginia and at these points, we notice, from year to year, a bigger demand for this type peanut. We know that you are aware that the Virginia Department of Agriculture has developed a couple of strains of certified seed to serve the same purpose as the NC-1 and NC-2, that are known as 56-R and 46-2. Right at this moment there is a very great demand, particularly for the 56-R, and of course the supply is very limited. The farmer is paying as high as 40¢ per pound for these where they are available. We do not hesitate in saying that Virginia will switch to these large types just as fast as they are available for planting seed. Etc.....

From P. O. Bulluck, Battleboro, North Carolina, 4/16/58 (Grower)

.....I have planted 30 acres of NC-2 peanuts for four (4) years. I have been very well pleased with the yield. They have also graded well the extra large kernel running from 40% to 46%.

I also planted a test plot of Virginia Bunch and NC-1 and NC-2 graded much better than either of them. Etc.....

From Walter Sarkey (Grower) Murfreesboro, North Carolina 4/12/58

.....In reply to your letter of April 14 -- we have planted approximately 200 acres of NC#2 for the past (5) five years and have had excellent results with same.

Our Extra Large has run from 40% to 54%, and our SMK has run from 66% to 72% for the past three years. We have developed an excellent peanut for the edible trade. Etc.....

From Mr. R. Gilbert Whitley (Grower) Como, North Carolina

.....To whom it may concern, this is to certify that I have planted NC-2 peanuts for the last three years and have averaged from 38% to 50% extra large. I have planted NC-2 on from 65 to 80 acres each year. Etc.....

From Mr. G. E. Fisher (Grower) Pendleton, North Carolina

In 1954 I planted about 1/5 of my peanuts with NC-2 variety. My old varieties averaged 24% extra large and the NC-2's averaged 44%.

In 1955 I planted 50% of my crop in NC-2's and my average grade on extra large was 36%.

In 1956 I planted 95% of my crop in NC-2's and my average grade on extra large was 40%.

In 1957 I planted 95% of my crop in NC-2's and my average grade on extra large was 34%. This drop in extra large was due to high damage in our crop and most of the damage was in the large peanuts. Etc.....

From Ralph Brake, Jr. (Grower) Battleboro, North Carolina 4/17/58

.....Here is the lineup on my NC-2 experience

1953	1 a. NC-2	32% Ex. L.
	46.8 A. Va.	17-29%
1954	42.7 a. NC-2	28-54%
1955	43.6	21-47%
1956	49.9	30 to 50%
1957	43.8	30 to 48%

Better care in allowing peanuts to reach maturity before digging and rotation might contribute to a better grade of peanuts, as does the NC-2 variety.

From Jim Shields (Grower) 4/15/58

.....I have been planting 105 to 117 acres of peanuts, and for the past 3 years I've planted only "NC-2's". Our extra large have been running anywhere from 40% to 47%.

From Mr. R. V. Knight (Grower) Tarboro, North Carolina

.....I find a variation in the extra large peanuts of NC-2 variety running from 35 to 50%. I have gone over the results of my three years planting.

From Mr. J. B. Gillam, Jr. (Grower) 4/15/58

We have planted approximately 400 acres of NC two variety of peanuts for the past three years. The Extra Large in the NC two peanut is increasing in size each year. We have averaged the percentage of Extra Large from our 1957 sales and the average of Extra Large was 42%. Some of these peanuts graded as high as 50% Extra Large. Etc.....

From Severn Peanut Co., Inc., Severn, North Carolina 4/15/58

.....We have noticed in our buying of farmers' stock peanuts through the past two years that the percentage of Extra Large kernels has increased considerably. We believe this is due to a very high percentage of the crop in North Carolina being planted with the NC-2 variety.

The percentage of Extra Large content during these two years has ranged from 35% to 50%. Etc.....

From Walton C. Gregory, North Carolina State College, Dept. of Field Crops, Raleigh, North Carolina 4/15/58

.....I am happy to reply to your request for information on the kernel size of NC-2 peanuts. As you know, this peanut has existed as a line since 1947 and was released to growers in 1953. By this time (1958), we are beginning to feel fairly sure of its characteristics.

For your information, I am going to present some figures for different growing conditions comparing NC-2 with good farm stock peanuts.

	No. of Different Tests	Percentage Extra Large Kernels	
		<u>Farm Stock</u>	<u>No.2</u>
Extreme and Protracted drought	3	24.6	30.0
Continuous hurricane rains	2	16.0	25.0
Good growing conditions	21	34.0	46.0

We have, of course, more extensive data but I tried to select contrasting situations for you. Etc.....

From the Columbian Peanut Company, Norfolk, Virginia 4/16/58

.....In reply to your letter of the 14th, we regret that we do not make a separate analysis of the peanuts that we buy according to seed variety. We do analyze our purchases at each of our mills but, as you must know, the total purchases will include some of each variety of peanuts grown in the area.

We do know the increased production through our mills of the Extra Large kernels has shown a phenomenal rise in the last two years. We are confident that the range of Extra Large in the NC-2 variety would be higher than the general average from our mill points and, I feel, I am reasonably accurate in this statement.

The percentage of Extra Large in the NC-2 variety would range from 32 to 52% with an average of close to 40%.....

From Mr. Hassell Thigpen, Tarboro, North Carolina

.....Our entire crop of peanuts in 1956 and 1957 was planted in the NC-2 variety.

In 1956 we planted and harvested 114 acres of NC-2 peanuts. These were sold in 32 different lots.

In 1957 we planted and harvested 101 acres of peanuts. They were sold in 28 different lots.

The E L K was as follows:

1956		1957
2 lots	under 35%	0 lots
6 lots	35 to 39%	8 lots
11 lots	40 to 44%	6 lots
6 lots	45 to 49%	8 lots
6 lots	50 to 54%	3 lots
1 lot	55% and over	3 lots

The above figures are taken from 1956 and 1957 sales records and give a complete record of the percentage of extra large in the two years. Etc.....

From Keel Peanut Company, Greenville, North Carolina, 4/18/58

.....Minimum around 20%, maximum around 55%, 90% of the peanuts run around 35 to 45% with average 38%. This is an average of approximately 12% more than we used to have with the old variety NC-2 peanut. We believe 98% of the farmers in the Pitt County area are planting NC-2 seed. Etc.....

From C. W. & H. B. Spruill Company, Windsor, North Carolina, 4/16/58

.....We have been planting from 390 to 440 acres of NC-2 variety of peanuts since 1955, (three years).

Our Extra Large grade has been from 40 to 54%, with an average of about 46%. Etc.....

Exhibit "C"
Address of Mr. E. J. Young, Stevens Industries
Dawson, Georgia

Before the Thirty-Ninth Annual Convention of the Southeastern
Peanut Association, Atlanta, June 10, 1957.

RUNNER PEANUTS - OPPORTUNITY UNLIMITED

LADIES, GENTLEMEN AND DISTINGUISHED VISITORS:

Lately we have given a lot of thought to the subject of pride. Of course there are two kinds: False, and the good and humble kind of justifiable pride. Here in the Southeast where over 50% of our acreage is devoted to the production of runner type peanuts we must very carefully avoid and work to eliminate a false pride in the product which provides by far the principal source of our total revenue. We can though, be humbly proud of the progress made to date in improving the quality of our principal product.

To better understand the opportunities ahead for runner peanuts, it is well that we briefly view the history of the runner peanuts. Actually we find it rather difficult to ascertain the true origin of the runner type peanut as a distinct specie. In the book "The Peanut, the Unpredictable Legume," we find quoted "Taxonomists frequently resort to controversy concerning specie delineation because the ultimate nature of organic variation necessarily leads to integrating forms. As early as 1907 an attempt was made to list some forty varieties into runner and bunch on the basis of superficial characters, such as seed coat, color, etc." Actually in this book, under the subject of varieties in the chapter, Morphology, Genetics and Breeding, peanuts grown commercially are classified as erect or prostrate and all the prostrate are further classified as Virginias.

It appears that the original runners in the Southeast were descendants of the African, North Carolina and Wilmington varieties of runners, which specie could have been the ground nuts or ground peas grown in early colonial days from seed from Africa. We find in early writings that runners were first grown in Virginia, Carolina and Southeastern peanut belt, principally for farm and feed purposes and writers then referred to the rough and ridged seed coat cover as making the runner peanuts very undesirable for edible uses. As late as 1938 another common complaint from producers, shellers and end users was the concealed damage, typical of runner peanuts, and attributed largely to the hollow center. The Southeastern runner most commonly grown today is the Dixie runner, developed by Dr. W. A. Carver of the Florida Experiment Station, from a cross made in 1933 from Florida small white Spanish and Dixie giant, a large seeded Virginia-runner type. The unfavorable characteristics of the preceding specie were largely overcome with the introduction of the Dixie runner, which really began gaining in importance

insofar as production is concerned in the early 1940's. The introduction of the Dixie runner, the fact that it has provided farmers with a consistently high yield, and because it is by nature especially suited for windrow harvesting, has encouraged the expansion of the acreage devoted to runner type peanuts to the extent that today the production of runner peanuts exceeds that of any other one variety.

It is encouraging to note that while the production of runner type peanuts was increased there has been an even more significant increase in the use of runner peanuts for edible purposes. In reviewing the use of runner peanuts for the period 1945 through 1955 it is interesting to note that the use of runner peanuts in candy and peanut butter for each of the three years, 1953, 1954 and 1955, has exceeded the average use for those two purposes for the eleven years and, in the case of salted peanuts with the exception of the short crop year of 1954, the use of runners in salted peanuts for the same three years has well exceeded the average consumption for the eleven year period. For the three years, 1953, 1954 and 1955, the use of runner peanuts for edible purposes has exceeded the eleven year average by 15%, 25% and 20% respectively, while the use of all peanuts for the same three years has exceeded the average use of all peanuts for edible purposes by only 6%, 5% and 12% respectively. In reviewing the production of milled peanut products in the most recent report of April 30, it is interesting to note that the production of milled runner peanuts for edible purposes, to date exceeds the production for the same period of 1956 by approximately 11,000,000 pounds, as compared to a total increase for Virginia and Spanish types of slightly less than 16,000,000 pounds.

Let us look for a few minutes at some of these qualities inherent of the runner peanut which have contributed to this steady and significant change in consumer preference. Dr. Carver, in writing about his Dixie runner peanut, stated the flavor of the Dixie runner is mild and sweet. This apt statement truly expresses the sound and fundamental basis for the increasing popularity of the runner peanut, because in food products flavor is now receiving more attention by manufacturers and is of prime consideration in the purchase of good food products by consumers. Looking further into the question of quality, we find two significant statements in an article entitled "Factors Affecting the Stability of Crude Oils of Sixteen Varieties of Peanuts" as reported in the Journal of the American Oil Chemists Society in July of 1953 and having to do with work conducted by the Southern Regional Research Laboratory. These statements are, first, that "rancidity has long been recognized as a troublesome factor in the marketing of roasted peanut products and workers have reported that roasted runner or Virginia peanuts show less susceptibility to rancidity" and, secondly, that "with the exception of the oils from runner peanuts the Tocopherol composition of the sixteen oils studied were not found to vary significantly. The enhanced stability of the oils from the runner peanuts may be due in part to the higher tocopherol content of these oils." It is also recognized that the oil content of runner peanuts is, generally speaking, equal to or higher than that of other varieties. In addition to

the mild and sweet flavor and the favorable physical characteristics of the runner peanut, there remains the fact that today farmers are producing and shellers are marketing a better runner peanut.

Change is the law of progress. Nowhere is this axiom more applicable than in the production and shelling of runner peanuts. With the adoption of improved varieties and in 1956 of new standards for shelled runner peanuts, manufacturers are today being supplied with a desirable and readily merchantable raw material. The new runner peanut is uniform in size, consistently counting from 950 to 1050 kernels per pound and has a smooth seed coat, mild and sweet in flavor, uniform in size, easily blanched and of fine texture and color, the runner peanut is gaining popularity and strength in the market place. Already manufacturers of peanut butter, candy, and specialty lines interested in improving their products have turned to runners for their peanut requirements. For the first time in years and as late as the 8th of May 1957 the new No. 1 runner brought as much or more than its leading competitor in the market place. In November of 1956 Jim Thigpen in addressing the Georgia Farm Bureau, asked the question "Can the production of peanuts in terms of type, variety and quality be modified more in line with consumer preference?" We say today that this question has been answered in large part by the shellers and producers of runner peanuts.

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