



University of Arizona

COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION

AMERICAN-EGYPTIAN COTTON UTILIZATION, SUPPLIES, AND PRICES

By

E. H. PRESSLEY, RODNEY WHITAKER, AND GEORGE W. BARR

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FOREWORD

This report is published in response to a request from Arizona producers of American-Egyptian cotton for a study of the utilization, production, and prices of their cotton. Co-operation between the Agricultural Marketing Service of the United States Department of Agriculture and the Department of Agricultural Economics and Rural Sociology, University of Arizona, made the study possible.

The report is based, in part, on a field survey of cotton merchants, spinners, weavers, and manufacturers of certain clothing, household, and industrial articles and, in part, upon pertinent data and information assembled from other sources.

On the field survey, E. H. Pressley represented the University of Arizona, and Rodney Whitaker the Agricultural Marketing Service. The work of the Agricultural Marketing Service was under the direction of Carl H. Robinson and that of the University of Arizona was directed by George W. Barr.

SUMMARY AND CONCLUSIONS

That portion of the domestic cotton textile industry utilizing extra-staple cotton wants high quality cotton in adequate, dependable quantities. How well does American-Egyptian cotton meet these requirements?

In *staple length* American-Egyptian cotton fully meets the needs of domestic spinners in that it averages as long or longer than its principal competitor, imported Egyptian cotton. In *grade* certainly the unusually high grade crops of recent seasons, with the exception of the first picking of the 1939-40 crop which was damaged by rain, have been fully up to any reasonable expectation of domestic spinners.

In *character* Pima cotton has acquired a certain amount of ill will in the domestic textile industry in comparison with imported Egyptian cotton. There is apparently some justification for the complaints of spinners, especially those manufacturing thread yarns, regarding the character of Pima cotton. The presence of upland fibers or fibers from hybrids between American-Egyptian and upland cotton often found in American-Egyptian bales may account for some of the complaints by spinners. This difficulty could be avoided by the use of certified seed. The extent to which these complaints are based on the intrinsic properties of cotton fibers rather than unjustified prejudices has not been definitely established. More complete authentic information is needed in this connection.

SxP, a comparatively new variety of American-Egyptian cotton, seems to compare favorably in character with imported Egyptian varieties and has been found satisfactory by thread yarn spinners. In this respect SxP seems to be superior to Pima but the extra-staple length of Pima cotton is preferred by certain manufacturers of fine yarns. This is notably true among mills manufacturing products advertised as containing Pima cotton.

The chief use for American-Egyptian cotton in the United States is in the manufacture of woven cloth. Ultimate uses for woven goods may be divided into three groups—namely, (1) clothing, (2) household, and (3) industrial. The principal fabrics used for clothing are broadcloth, shirtings, lawns, voiles, and organdies. The outstanding uses for these fabrics are shirts, dresses, sleeping garments, and handkerchiefs. Certain articles of clothing such as raincoats, ski suits, and shirt collars are made from cloth generally classed by manufacturers as “mechanical” fabric. Curtains and various specialties are the principal household uses for woven fabrics made from this cotton. The leading industrial uses for mechanical fabrics are airplane and balloon cloth, typewriter ribbons, and tire fabrics. In the aggregate it is estimated that roughly 65 per cent of the total consumption of

American-Egyptian cotton during the calendar year 1938 was spun by mills manufacturing mainly woven fabrics.

Yarns produced principally for use in thread, insulation, tapes, bands and belts, fish netting, automobile tire cords, coated yarns for foundation garments and knit goods constitute another important group of uses for this cotton. Yarns produced by spinning mills, largely for sale and including some yarns used for weaving, probably required about 35 per cent of the total American-Egyptian cotton consumed by domestic mills in 1938.

The quantity of American-Egyptian cotton used for various purposes fluctuates considerably from season to season. Some mills regard the use of this cotton as in the nature of a trade secret and it is difficult to make accurate quantitative estimates for different uses.

In most uses for American-Egyptian cotton, other extra-staples, especially imported Egyptian cottons, may be substituted with practically no difficulty. Such substitutions were made in considerable volume during the 1937-38 season when the supply of American-Egyptian cotton decreased to a volume smaller than consumption in the previous season and prices of American-Egyptian were high relative to Giza 7, Maarad, Sakha 4, and various other imported Egyptian varieties. Egyptian cotton with possibly a few exceptions could easily displace all of the American-Egyptian cotton used in this country and probably would do so if prices of American-Egyptian were maintained permanently at substantially higher levels than those for competitive Egyptian varieties. Egyptian cotton possesses a great deal of good will in the domestic cotton textile industry.

Supplies of American-Egyptian cotton averaged 24,300 running bales during the eight seasons ended 1937-38. This exceeded the average disappearance (supply minus stocks at the end of the season) by nearly 9,900 bales. In every season in recent years, except 1937-38, supplies exceeded average disappearance by substantial volumes. In every season, except 1937-38, supplies exceeded disappearance in the previous season. This would seem to indicate that in recent years supplies of American-Egyptian cotton have been adequate to meet mill requirements, except for one season. It does not follow from this, however, that the average disappearance, which was nearly all domestic mill consumption, would not have been larger if increased supplies of American-Egyptian cotton had been available at lower prices relative to other long-staple cottons, and it is certain that consumption of American-Egyptian cotton would have been considerably larger in 1937-38 if larger supplies had been available at lower prices relative to imported Egyptian cotton. American-Egyptian cotton no doubt could be substituted for at least a considerable part of the imported extra-staple Egyptian cotton now used in this country. But inaccessibility of Egyptian cotton or very wide

premiums over Pima prices would apparently be necessary to induce certain manufacturers, especially thread yarn producers, to use Pima cotton in the bulk of their output.

Supplies of Pima and SxP, the two commercial varieties of American-Egyptian cotton, are of primary importance from the standpoint of consumption, since a market outlet at some price could undoubtedly be found for a crop many times as large as the average for recent seasons. From the standpoint of Arizona cotton growers, however, the optimum level of supplies must be considered in conjunction with prices and farm returns in the producing areas.

Since yields per acre for American-Egyptian cotton averaged only about 250 pounds during the 5 years ended with 1939 against about 510 pounds for upland cotton grown in Arizona, production costs are naturally substantially higher for American-Egyptian than for upland cotton. In addition to higher costs resulting from comparatively low yields, picking and ginning costs are somewhat higher for the small boll, extra-staple American-Egyptian varieties than for upland cotton. Because of these differences in costs, farmers must get a substantial premium for American-Egyptian cotton or they can not afford to produce it. In recent years prices for Pima cotton at Phoenix have averaged about 2.1 times those for upland cotton.

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BY E. H. PRESSLEY, RODNEY WHITAKER,* AND GEORGE W. BARR

INTRODUCTION

American-Egyptian cotton is a specialty among cottons used in the United States and in world mills. With the exception of Sea Island, it is by far the longest staple cotton produced in this country. It is equal in average length to any foreign-grown cotton of commercial importance, except Sea Island, which is produced principally in the British West Indies. The comparatively small quantity produced and the substantial premiums paid for American-Egyptian cotton limit its use mainly to extra-fine or extra-strength yarns. The great bulk of the needs of the people of the United States and of the world is supplied by textiles made from cotton much shorter in staple and much lower in price than American-Egyptian cotton.

Varieties of American-Egyptian cotton produced commercially in the United States since about 1912 are products of scientific experimentation and plant breeding. Even before the turn of the century the United States Department of Agriculture on several occasions imported seed of Egyptian cotton and distributed it in small lots to farmers throughout the cotton belt. But these trial plantings failed to establish the production of Egyptian cotton commercially in this country. About the year 1900 systematic tests of certain varieties of Egyptian cotton were inaugurated in various localities in the cotton-growing states and in the irrigated districts of the Southwest. In 1908 a variety of cotton known as Yuma was segregated to be recommended for commercial production. This variety was developed from a stock of Mit Affi, an Egyptian variety, but it was distinct from its parent variety in character of plant and fiber. After a series of yield and spinning tests this variety, Yuma, was recommended for commercial production in 1912, and a small acreage was planted in the Salt River Valley in Arizona and in the Imperial Valley in California.¹

The United States Department of Agriculture continued to experiment and to supervise the seed stocks of American-Egyptian

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¹ "Seed Selection of Egyptian Cotton," *United States Department of Agriculture Bulletin No. 38, 1913*. "Production of American-Egyptian Cotton," *United States Department of Agriculture Bulletin No. 742, 1919*.

cotton after commercial production was established. Pima was the next variety developed. This new variety surpassed its parent variety in productiveness, size of boll, length and quality of fiber. Pima cotton displaced the Yuma variety, and commercial plantings were of this variety exclusively from about 1919 to 1934. A small acreage of a new variety called SxP was planted in the latter year and by 1939 had increased to a substantial portion of the American-Egyptian crop. SxP was developed from a cross between Sakellaridis and Pima by annual selection of the best individual plants. Most of this work was done by the Bureau of Plant Industry, United States Department of Agriculture, at the federal field station at Sacaton, Arizona.

Commercial production of American-Egyptian cotton was confined to Arizona during the years since 1923-24 when commercial production in California was discontinued. A peak acreage of 243,000 producing nearly 92,000 bales of cotton was grown in these two states in 1920, but 4 years later acreage dropped to only 8,000 and production to 4,400 bales grown entirely in Arizona. From 1929-30 to 1938-39 acreage averaged 36,700 with substantial variations from season to season. The indicated acreage for the 1939-40 season is 41,000. Production and consumption have also varied widely and American-Egyptian cotton growers, as well as domestic textile manufacturers utilizing extra-staple cotton, have frequently discussed the desirability of adopting some definite production policy.

It is generally agreed that something should be done to improve the market outlets of American-Egyptian cotton, but opinions differ widely as to what should be done. One group believes that production should be stabilized at a higher level than the average for recent years. Another is of the opinion that the crop should be held at a volume about equal to average mill consumption. Still another thinks production should be decreased below the level for recent years. All of these views have proponents among farmers, merchants, and cotton mill operators. Among the latter, however, a majority seems to think that a fairly constant, adequate supply of the higher grades and better character cotton would stimulate consumption.

There are many other questions in which the various groups growing and consuming American-Egyptian cotton are vitally interested besides those expressed in these alternatives which relate mainly to quantity. Quality also gives rise to many important considerations. Foremost among these is the question of the relative merits of different varieties with respect to suitability for use in thread yarns and in other special uses. Should more or less SxP be produced? Should Pima production be discontinued or is there a definite place for it in spinning mills of the United States? To what extent does competition from Egyptian and Sea Island cotton affect the use of American-Egyptian cotton? Have rayon and other synthetic fibers reduced the de-

mand for extra-staple cotton in this country, and to what extent are they likely to affect the use of American-Egyptian cotton in the future?

These and many other similar queries cannot be fully, completely, and definitely answered from available information. Such questions, though vital to farmers, involve a certain amount of prophecy, which is largely beyond the scope of this report. It is possible, however, to indicate the situation and outlook for American-Egyptian cotton, in its broad outlines, and to present pertinent facts which seem basic to intelligent answers to these questions. Such conclusions as seem warranted are drawn from the facts presented, and all of the information should be helpful to those who must make decisions regarding production of American-Egyptian cotton.

Official reports are the principal sources of the data used in this report, but certain data were obtained by computation and rough approximations. Sources and methods used are given in most instances. The small quantity of American-Egyptian cotton produced as compared with total cotton production in the United States makes it difficult to avoid certain unexplained discrepancies in production and distribution figures. Although this cotton is distinctive in quality, it is possible that some manufacturers and warehousemen may occasionally confuse consumption and stocks of this cotton with other growths in making their reports. The extent to which this takes place, of course, is not known, but figures for disappearance vary somewhat from figures for consumption plus exports. Since 1930-31, exports of American-Egyptian cotton have averaged considerably less than 500 bales annually, against about 5,000 bales in 1929-30.

Bale weights used in this report also may be somewhat confusing. Production is reported in running bales and in equivalent bales of 500 pounds gross weight (478 pounds net). Running bales average somewhat heavier than equivalent bales of 478 pounds net. Consumption and stocks are reported only in running bales. American-Egyptian cotton is sold on the basis of net weights whereas upland cotton is usually sold on a gross weight basis.

Any study of American-Egyptian cotton consumption, supplies, and prices must at least recognize the tariff situation with respect to extra-staple cotton. For the period from May 28, 1921, to September 21, 1922, there was a duty of 7 cents per pound on cotton $1\frac{3}{8}$ inches and longer imported into the United States. And from June 18, 1930, to date (1940) the same rate of duty has been applicable to imports of cotton $1\frac{1}{2}$ inches and longer. At least three studies have been made of the effects of the tariff on long-staple cotton in the United States:

1. The Emergency Tariff Act and Long-Staple Cotton, Tariff Information Series No. 27, published by the United States Tariff Commission, 1922.
2. Long-Staple Cotton, Report No. 85, Second Series, published by the United States Tariff Commission, 1935.
3. The Tariff on Long-Staple Cotton and Its Effects, published by the Bureau of Agricultural Economics, 1938.

No attempt is made to reappraise the effects of the tariff with respect to long-staple cotton in this report. But major emphasis is placed on the period beginning with the 1930-31 season during which time the duty of 7 cents per pound was in effect continuously.

The term "extra-staple cotton" as used in this report may be somewhat confusing. In most other studies, notably those mentioned above, the term "extra-long staple" was used to mean cotton $1\frac{3}{8}$ inches and longer. As used throughout this report, however, "extra-staple" means cotton $1\frac{1}{4}$ inches and longer. The reason for the inclusion of cotton as short as

1¼ inches in this classification, arises out of the displacement of Sakellaridis in recent years by Giza 7 in cotton exports from Egypt to the United States. Although nearly all Sakellaridis is 1¾ inches and longer, a considerable part of Giza 7 is somewhat shorter than 1¾ inches.

QUALITIES CHARACTERIZING AMERICAN-EGYPTIAN COTTON

The key to many of the problems associated with the use of American-Egyptian cotton is found in the special qualities that characterize this cotton.² Nearly all of the crop is 1½ inches and longer in staple.³ Staple length is one of the most important factors in cotton quality. Longer staples are required for spinning the finer yarns and for extra-strength yarns. For cotton of the same grade and character, the longer the staple the higher the maximum count of yarn that may be spun. Likewise, longer staples of a given grade and character yield yarns of greater strength than shorter staples of the same grade and character.

The grade of cotton is determined by its color, foreign matter, and ginning preparation. American-Egyptian and upland grade factors differ, and separate official standards for American-Egyptian cotton have been established.⁴ The deeper yellow color of American-Egyptian cotton distinguishes it from upland cotton although recent crops of Pima cotton have been reported to be

² Quality of cotton has been "... defined as the physical properties, characteristics, or attributes of cotton which affect its usefulness. The principal physical properties and characteristics of cotton which affect its quality are color, leaf and other foreign matter, ginning preparation, length of staple, uniformity or evenness of length, fineness, strength, and maturity." "The Classification of Cotton," United States Department of Agriculture, Miscellaneous Publication No. 310, p. 5.

³ Staple length has been defined as "the normal length by measurement, without regard to quality or value, of a typical portion of . . . fibers under a relative humidity of the atmosphere of 65 percent and a temperature of 70 degrees F." This is the definition given in the original order promulgating official staple standards by the United States Department of Agriculture. The linear inch is the basic standard in determining the normal length by measurement of a typical portion of the fibers in a given sample, but the process of stapling is facilitated by the use of staple types of the official cotton standards. Such types are available for American-Egyptian cotton in the lengths 1½, 1 9/16, 1 5/8, and 1¾ inches. In addition, descriptive standards have been established for American-Egyptian cotton in the lengths 1 17/32, 1 19/32, 1 21/32, 1 11/16 and 1 23/32. In the practical application of the standards, the selection or determination of a typical portion of the fibers of any cotton is made by the process of manual stapling. The method of stapling recommended by the Department of Agriculture is described in "The Classification of Cotton," United States Department of Agriculture, Miscellaneous Publication No. 310.

⁴ The standards have been established in physical form for five grades: No. 1, No. 2, No. 3, No. 4, and No. 5. There are also four descriptive half grades that fall between the full grades: No. 1½, No. 2½, No. 3½, and No. 4½. American-Egyptian cotton lower in grade than No. 5 is designated as "below grade No. 5."

of a lighter shade than those of earlier years. SxP is generally of a lighter yellow color than Pima.

Special color properties of American-Egyptian cotton are advantageous in some uses but may cause difficulties, especially when yarns are dyed in mixtures with those spun from other kinds of cotton. The leaf content of American-Egyptian is peculiar to this cotton and it does not match that in upland cotton standards. The preparation is very different from that of upland cotton because American-Egyptian is ginned on roller gins whereas upland is ginned on saw gins. It looks stringy and lumpy as compared with upland cotton.

Character is a quality factor that has special significance with respect to American-Egyptian cotton.⁵ Some of the factors generally recognized as a part of character in cotton are uniformity of fiber length, strength of fiber, fiber fineness, spirality, and pliability. The practical importance of character in Pima cotton may be illustrated by the problems encountered by manufacturers of thread yarns in the use of this cotton. Cotton manufacturers interviewed during the spring of 1939 without exception stated that Pima cotton was not suited for the manufacture of the bulk of their thread yarn output. This group of spinners included yarn producers, manufacturing the bulk of the thread yarn in the United States. The reasons given for not using Pima in thread were often vague, but they related, in the main, to such elements of character in Pima cotton as fiber uniformity, strength, fineness, and various fiber imperfections.

The character of SxP cotton, however, appears to differ from Pima, and currently (1939) SxP in that respect has a competitive advantage over Pima, at least among manufacturers who dislike Pima because of its character. Certain thread yarn spinners report as good or better results from SxP as from Giza 7, produced in Egypt. In fact, more than half of the thread yarn producers interviewed were consuming some SxP in 1939, or had tested it with satisfactory results.

More exact information relating to the character and comparative spinning utility of SxP, Pima, and the varieties imported from Egypt, however, is much needed in this country. Comparative spinning tests of these cottons conducted by respon-

⁵ "Character may be defined as those elements of cotton quality which are not included in grade or staple length. At present there are no official character standards, nor is there entire agreement as to all the quality elements that should be included in character. . . . Through experience, classers and millmen become familiar with the characteristics of cotton that will and will not give good spinning results for their particular purposes. . . . However, in spite of the skill that a classer or mill superintendent may have developed in differentiating between desirable and undesirable characters for his own purposes, classing for character, when put to the practical test of manufacture, is often disappointing." "The Classification of Cotton," United States Department of Agriculture, Miscellaneous Publication No. 310, p. 42.

sible, independent agencies would be especially helpful if they were publicized in the cotton trade—that is, among cotton merchants and manufacturers. Moreover, if it were definitely established that the character of SxP is equal to or superior to that of extra-staple Egyptian cotton, such information would tend to stimulate the consumption of American-Egyptian and to help broaden its market.

Trade concepts of the character of Pima cotton place it at a disadvantage in competition with cottons produced in Egypt. This is especially true among mills producing yarns for sale. Among spinners who weave their own yarns complaints are not so general, but the opinion is widespread that Pima is harder to spin than Giza 7, Sakha 4, Maarad, and other varieties of cotton produced in Egypt. A small minority of mills, however, stated that Pima was easier to spin than the Egyptian varieties. The extra length of Pima is partly responsible for the complaints that it is "hard to handle" (harder than extra-staple Egyptian varieties to card and comb), but the character of its staple is generally thought to be the principal factor accounting for manufacturing difficulties. Nearly all manufacturers seem to be agreed that the fibers of American-Egyptian cotton are coarser than those of competitive varieties produced in Egypt.

Some manufacturers also expressed the opinion that the percentage of waste from Pima cotton is somewhat higher than that from the extra-staple varieties produced in Egypt. The explanation of this, in most cases, was the higher degree of uniformity of staple length in competitive cottons grown in Egypt than in Pima cotton. "Pima has more short fibers" was a common expression of this situation used by cotton mill operators.

Closely if not directly connected with character in American-Egyptian cotton is the complaint that it fails to gain strength in mercerization to the same extent as cotton grown in Egypt. On this as well as other questions relating to the character of American Egyptian cotton more definite technical information should prove helpful.

As the situation now stands, sufficient information is not available to determine accurately the extent to which the complaints regarding the character of American-Egyptian cotton, especially Pima, are justified on the basis of the intrinsic characteristics of cotton fibers. Many persons having a technical knowledge of cotton, American-Egyptian as well as other growths, express the view that there is considerable prejudice in the domestic textile industry against Pima cotton, especially in the sewing thread industry. Nevertheless, the various elements that comprise character in cotton undoubtedly have an important influence upon spinning utility. Pima cotton and, to a lesser extent, SxP are thought by many commercial spinners to have some inherent weaknesses in this respect. And these opinions existing among domestic spinners are of real sig-

nificance to Arizona farmers regardless of the extent to which they are justified.

Certain causes of complaint in regard to American-Egyptian cotton by both cotton merchants and manufacturers in 1939 are such that it should be possible for the growers to remove them at least to some extent. Among these are poor preparation and packaging. Such complaints were heard most often in those mills where both American-Egyptian and Egyptian cottons are used. Whenever comparisons were made between American-Egyptian and Egyptian bales, insofar as ginning preparation and packaging are concerned, preference for the latter was expressed. The fact that a bale of cotton is out of shape and cannot be made to stand on end without support may seem of minor importance to the grower, but when all other things are equal it may be the deciding factor in causing a mill to use a competitive growth that is always properly packaged.

Spinners frequently complain that "Pima and SxP are running out." These complaints may have been due in some instances to the presence in American-Egyptian bales of fibers of either upland cotton or hybrids between American-Egyptian and upland cottons. Since such fibers are much lighter in color than either Pima or SxP fibers, they are noticeable, and detract from the appearance of a sample even if they do not reduce materially the spinning utility of the bale from which the sample was taken. The planting of the purest seed available and the removal from the field before picking of all upland plants and first generation hybrids would go far toward removing the cause of this complaint.

The belief that there is a tendency for the staple length of American-Egyptian to become shorter from year to year was given as another reason for the statement that "Pima and SxP are running out." In at least one instance it was reported that samples of the 1938 crop of SxP did not staple over $1\frac{1}{4}$ to $1\frac{3}{8}$ inches. The stubbing of considerable acreages of American-Egyptian in 1938 as a result of the preceding exceptionally mild winter may have resulted in the production of some very short fiber in both varieties.

Both cotton merchants and buyers for mills stated that it is sometimes impossible to distinguish between samples of SxP and Pima. If both of these varieties are to be grown in the future, some method of identification should be adopted so that mills will not make a mistake in the identity of the variety purchased.

UTILIZATION OF AMERICAN-EGYPTIAN COTTON

Regardless of what many mill operators may think about the character of Pima cotton, the fact remains that it is extra-staple and the bulk of it is high grade, and some manufacturers appar-

ently have no complaints regarding its spinning qualities. Consumption has been much larger than it now is, and if the crop were increased again most of it would probably be consumed, mainly by domestic mills. In seasons of increased production, stocks tend to accumulate and prices to decline, but eventually the cotton moves into mills and is utilized in one form or another.

MILL CONSUMPTION FLUCTUATES WIDELY

The shrinkage in domestic mill consumption of American-Egyptian cotton since the early twenties has been drastic. So has the decrease in production. During the 8-year period ended with 1929-30, consumption averaged about 24,100 bales annually against an average of 14,600 bales during the eight seasons 1930-31 to 1937-38. The peak in consumption was reached in 1922-23, when it totaled 65,200 bales; whereas the low point of only 6,200 bales was reached in 1937-38. For the 1938-39 season, however, consumption was 18,600, or well above average for the preceding decade, and three times as large as the unusually small volume in the preceding season (Fig. 1).

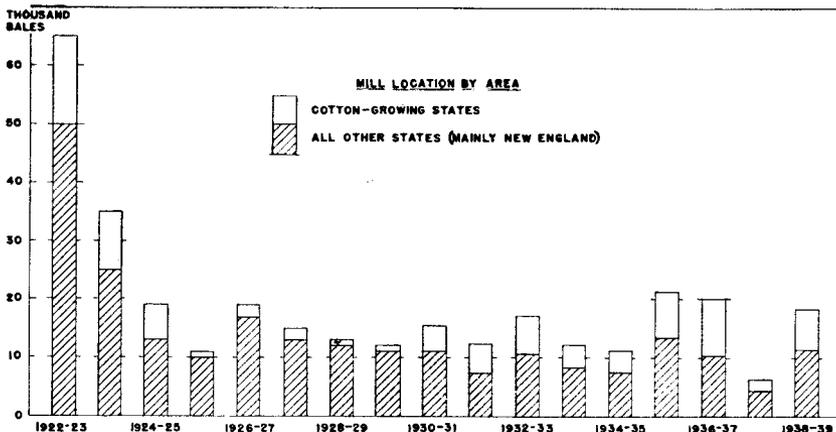


Figure 1.—Consumption of American-Egyptian cotton in the United States has decreased substantially since the early twenties. For the 8-year period ended 1929-30, total domestic consumption averaged 24,100 bales annually against 14,600 bales in the corresponding period ended 1937-38. Mills located in the cotton-growing states accounted for less than a fifth of the total consumption in the earlier period against nearly two fifths in the latter. But New England mills still consume the bulk of the crop.

Prior to the early thirties considerable American-Egyptian cotton was exported. But since the tariff of 7 cents per pound was placed on cotton $1\frac{1}{8}$ inches and longer imported into the United States (1930) nearly all of it has been consumed by domestic mills.

Most of the American-Egyptian cotton consumed in the United States is spun in New England mills, but during the period since 1929-30 the proportion consumed in southern mills has increased materially. During the 8-year period ended with 1937-38, consumption in the southern mills comprised nearly two fifths of the total against less than a fifth during the 8-year period 1922-29 (Fig. 1). North Carolina, South Carolina, and Georgia are the principal southern states in which mills consuming American-Egyptian cotton are located. New England states having a considerable volume of consumption are Massachusetts, Rhode Island, and Connecticut.

Changes in consumption from season to season are of special significance. Conditions have changed greatly since the early twenties when consumption was the highest in history, and farmers' attention is now focused mainly on the experience of more recent seasons. The greatest fluctuations in mill consumption since the early twenties came in the late thirties. The high point for the thirties was 21,400 bales in 1935-36 and the low only 6,200 bales in 1937-38. A larger-than-average consumption of 18,600 bales for 1938-39 indicates that consumption is not down permanently. Nevertheless, these wide fluctuations are significant and the reasons for such changes are of vital interest to producers. These recent years are especially important, not only because fluctuations were wide, but also because factors and conditions accounting for them may be more representative of present and near-future conditions than those prevailing in earlier years.

In general it is recognized that supplies, prices, demand for textile materials, and competition from other extra-staple cotton, especially cotton imported from Egypt, which in recent years has been largely Giza 7, Maarad, and Sakha 4, are outstanding among the factors affecting the consumption of American-Egyptian cotton. A more detailed discussion of these factors is given in subsequent sections of this report.

SOME CHIEF USES REQUIRING FINE AND EXTRA-STRENGTH YARN

A cotton mill is a manufacturing establishment. It consumes cotton only in the sense that it processes the fibers and converts them into yarns and fabrics. The ultimate uses for yarns and fabrics made from American-Egyptian cotton are numerous. They range from coarse textiles for industrial uses to the finest materials for women's fashionable clothing such as evening dresses.

Yarns made from American-Egyptian cotton are spun in two types of mills. A yarn mill spins yarns for sale or use in other establishments or industries and does not weave or knit its output. Spinning-and-weaving mills, on the other hand, spin their own yarns and weave them into cloth. Some mills also bleach, dye or otherwise "finish" the cloth they weave. These mills may also produce some yarn for sale and they may purchase a

part of their requirements. The principal purchasers of yarns produced for sale are thread manufacturers, weaving, knitting, and various other textile manufacturers. On the basis of information obtained from mills and various other sources, the list of uses presented in Table 1 was compiled. It should be noted in connection with this table that mills producing yarns for sale were, as a group, prone to consider much of the information regarding the use of their output as in the nature of trade secrets and were reluctant to reveal specific information relating to uses. Mills weaving their own yarns, in most instances, were much less secretive about their operations than were yarn mills. There were exceptions, however, to these generalizations in both groups.

TABLE 1.—CLASSIFICATION OF THE SPECIFIED USES FOR AMERICAN-EGYPTIAN COTTON DURING THE CALENDAR YEAR 1938.

<ul style="list-style-type: none"> I. Woven goods (produced mainly in spinning-and-weaving mills) <ul style="list-style-type: none"> A. Clothing and accessories <ul style="list-style-type: none"> 1. Shirtings, broadcloths, etc. <ul style="list-style-type: none"> a. Shirts b. Dresses c. Waitresses' uniforms, etc. d. Pajamas e. Sportswear f. Handkerchiefs 2. Voiles, organdies, marquissettes, etc. <ul style="list-style-type: none"> a. Dresses b. Undergarments 3. Brassiere cloth 4. "Mechanical" cloth <ul style="list-style-type: none"> a. Raincoats b. Ski suits c. Golf jackets d. Shirt collars and cuffs B. Household articles <ul style="list-style-type: none"> 1. Marquissettes 	<ul style="list-style-type: none"> a. Window curtains 2. Specialties C. Industrial fabrics ("mechanical" fabrics) <ul style="list-style-type: none"> 1. Airplane and balloon cloth 2. Typewriter cloth 3. Sail ducks 4. Tire fabrics II. Yarns (produced mainly for sale) <ul style="list-style-type: none"> A. Thread <ul style="list-style-type: none"> 1. Sewing thread <ul style="list-style-type: none"> a. Clothing, hosiery, etc. b. Shoes 2. Embroidery thread B. Insulation, electrical, etc. C. Fish netting D. Woven goods E. Knit goods F. Lace G. Tapes, bands, and belts H. Tire cords
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A rough approximation of the quantity of American-Egyptian cotton used for various purposes indicates that about 65 per cent of the comparatively small consumption of this cotton during the calendar year 1938 was spun by mills manufacturing mainly woven fabrics. The remaining 35 per cent was spun by mills manufacturing yarns for sale in uses such as thread, insulation yarns, knit goods, and woven goods. The estimated 65 per cent of the total consumption used by mills weaving their own yarns was probably distributed roughly as follows: 20 per cent in shirtings, broadcloths, etc.; 20 per cent in voiles, organdies, marquissettes, etc. (including those used for household articles as well as clothing); and 25 per cent in "mechanical" cloth (including that

used for articles of clothing as well as that used for industrial fabrics).

A somewhat larger proportion of the 18,600 bales consumed during the 1938-39 season was probably used in yarns produced for sale than during the calendar year 1938. This was due, in part, to the increased use of SxP in yarns for thread, insulation, and for various purposes other than woven goods. The proportion of Pima used in shirtings and similar fabrics during the 1938-39 season was also probably somewhat larger than during the calendar year 1938 because of the significant shift from Maarad and Sakha 4 to Pima.

The classification of the uses for American-Egyptian shows the sort of textile materials upon which Arizona farmers are dependent for the final disposal of their crop. Reduced sales of these textile materials during periods of economic depression are unfavorable to the use of American-Egyptian cotton, and conversely increased sales during periods of prosperity stimulate the use of this cotton. Special demands such as the increased use of extra-staple cotton for airplane and balloon cloth might have a very significant influence on the use of American-Egyptian cotton. A knowledge of the uses of American-Egyptian cotton is also significant for another reason. Competition between Pima and SxP and other extra-staple cottons differs substantially in uses such as thread from that in uses such as broadcloth shirts. Also, competition with other growths of cotton has an important bearing upon the consumption and use of American-Egyptian cotton.

COMPETITION BETWEEN AMERICAN-EGYPTIAN AND OTHER COTTONS

Competition of a more direct nature between American-Egyptian cotton and other growths of cotton is confined to a comparatively small sphere. This arises out of the fact that the domestic consumption and use of extra-staple cotton, such as Pima and SxP, is relatively small. The bulk of the American-Egyptian crop is $1\frac{1}{2}$ inches and longer, but keen competition exists between this growth and cotton imported from Egypt, much of which ranges from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in staple length. Also there is, of course, some competition of a less direct nature with upland cotton $1\frac{1}{4}$ inches and longer.

Total domestic consumption of cotton $1\frac{1}{4}$ inches and longer cannot be accurately determined but rough estimates indicate that annual consumption of this kind of cotton probably has not exceeded 120,000 bales since the prosperous period of the late twenties (Table 2). During the 8-year period ended with 1937-38, consumption of this extra-staple cotton apparently averaged less than 85,000 bales annually, of which American-Egyptian constituted less than one fifth. Cotton grown in Egypt is the leading extra-staple cotton used in America, possibly comprising

about two thirds of total consumption during this 8-year period. Sea Island cotton is as long or longer in staple than American-Egyptian cotton but until the last two seasons it has comprised less than 1 per cent of the total domestic consumption of extra-staple cotton during recent years. Upland cotton $1\frac{1}{4}$ inches and longer probably averaged about the same as the consumption of American-Egyptian cotton in the United States during the 8 years, 1930-31 to 1937-38. However, with the increased production of the longer staples of upland cotton during the late thirties, consumption of upland $1\frac{1}{4}$ inches and longer appears to have increased (Table 2). The figures upon which this discussion of total extra-staple cotton consumption in the United States is based are only rough approximations as regards Egyptian and upland cotton stapling mainly $1\frac{1}{4}$ inches and longer. They are presented in an effort to provide reasonably complete information on the consumption of extra-staple cotton that is competitive with American-Egyptian cotton. The figures for Egyptian cotton may vary from the facts considerably from season to season, but it is believed that they are fairly accurate for the period as a whole. Those for American upland cotton are disappearance figures which undoubtedly include some cotton that was exported.

In addition to American-Egyptian, Egyptian, domestic Sea Island, and extra-staple upland cotton, a small quantity of extra-staple Peruvian and Sea Island from the British West Indies is consumed in the United States in most seasons. The quantity of Peruvian used has been small in recent years and is used principally in mixtures with wool and by the asbestos trade. It is ordinarily not a direct competitor of American-Egyptian cotton. Imports of Sea Island from the British West Indies are very small and are included with domestic Sea Island in consumption figures (Table 2). Some Sakellaridis and possibly other varieties of extra-staple cotton are imported from Anglo-Egyptian Sudan, but these cottons are included with Egyptian cotton in consumption figures.

The total estimated consumption of cotton $1\frac{1}{4}$ inches and longer in the United States exceeded 100,000 bales in only one season during the eight seasons ended with 1937-38. Although the period 1930-37 is comparatively short, there is no indication that the use of these extra-staple cottons is pointing downward. Consumption was in the neighborhood of 120,000 bales in 1938-39 or only a little less than that for 1928-29. During most of the past 8 years, when the average annual consumption was around 80,000 bales, economic conditions have been depressed. But in 1936-37 when total domestic consumption of all kinds of cotton was the largest in history the consumption of extra-staple cotton was estimated at only about 105,000 bales. The apparent high level of consumption of cotton $1\frac{1}{4}$ inches and longer in

TABLE 2.—ESTIMATED CONSUMPTION OF COTTON, MAINLY 1¼ INCHES AND LONGER, BY SPECIFIED KINDS AND TOTAL OF ALL STAPLE LENGTHS, UNITED STATES, BY SEASONS, 1928-29 TO 1938-39.

Season beginning August 1	Mainly 1¼ inches and longer					Total all lengths*
	American-Egyptian*	Sea Island*	Egyptian†	American upland‡	Total 1¼ and longer	
	Bales§					
1928-29	13,455	636	71,000	39,800	124,891	7,091,000
1929-30	12,572	298	35,000	20,000	67,870	6,106,000
1930-31	15,359	328	55,000	11,400	82,087	5,263,000
1931-32	12,430	262	44,000	14,100	70,792	4,866,000
1932-33	17,808	731	57,000	12,700	88,239	6,137,000
1933-34	12,535	237	54,000	7,800	74,572	5,700,000
1934-35	11,343	453	54,000	13,800	79,596	5,361,000
1935-36	21,376	190	50,000	20,900	92,466	6,351,000
1936-37	20,097	316	64,000	19,900	104,313	7,950,000
1937-38	6,187	1,580	46,000	19,800	73,547	5,748,000
1938-39	18,638	2,580	50,000	46,700	117,918	6,858,000
Average, 1930-37	14,642	510	53,000	15,050	83,202	5,922,000
	Index numbers (1930-31 = 100)					
1928-29	88	194	129	349	152	135
1929-30	82	91	64	175	83	116
1930-31	100	100	100	100	100	100
1931-32	81	80	80	124	86	92
1932-33	116	223	104	111	107	117
1933-34	82	72	98	68	91	108
1934-35	74	138	98	121	97	102
1935-36	139	58	91	183	113	121
1936-37	131	96	116	175	127	151
1937-38	40	476	84	174	90	109
1938-39	121	787	91	410	144	130
Average, 1930-37	95	155	96	132	101	113

* Compiled from reports of the Bureau of the Census.

† These figures are rough estimates based on the following computations: Total domestic consumption of Egyptian cotton in each season was multiplied by the estimated percentage of Egyptian cotton, mainly 1¼ inches and longer, in the total disappearance of Egyptian cotton each season. Disappearance of Egyptian cotton, mainly 1¼ inches and longer, was computed by adding carry-over at the beginning of the season and imports for consumption and subtracting carry-over at the end of the season. Egyptian, mainly 1¼ inches and longer, imported for consumption was estimated by multiplying total Egyptian imports for consumption by the estimated percentage of Egyptian exports 1¼ inches and longer (Sakellaridis, Giza 7, Sakha 4, Maarad, and certain other varieties) to the United States.

‡ Disappearance figures, that is, carry-over at beginning of season plus production minus carry-over at the end of the season. Mainly mill consumption but includes exports.

§ American-Egyptian, American upland, in running bales, round bales counted as half bales. Egyptian in equivalent 500 pound bales. Sea Island consumption figures adjusted to equivalent bales of approximately 500 pounds.

|| These are very rough preliminary estimates.

1938-39 was due in considerable part to the increased production and use of extra-staple upland cotton (Table 2).

American-Egyptian cotton is, at least in some degree, directly competitive with nearly all extra-staple cottons. And the extra-staple cottons as a group are indirectly competitive with shorter staple cottons. It is true that the longer staples are required for fine and extra-strength yarns and command substantially higher prices than the shorter staples. But this does not mean that the longer staples are unsuitable for the production of cotton textiles made from shorter staples of upland cotton. Cotton textiles re-

quiring medium and coarse yarns constitute the bulk of the output of domestic mills. And if adequate supplies of the longer staple cottons were available at prices more nearly equal to those for shorter staples, they would undoubtedly be used in much larger volume for spinning these coarser yarns. Whenever American-Egyptian and its more direct competitors such as extra-staple cottons grown in Egypt are twice or even more than twice as high in price as upland cotton 7/8 to 15/16 inch in staple, the market outlet for the extra-staple cottons will probably be restricted to a comparatively small volume.

COTTONS GROWN IN EGYPT (GIZA 7, MAARAD, SAKHA 4, ETC.)
COMPETE DIRECTLY

Direct competition from cotton grown in Egypt is of immediate concern to Arizona producers of American-Egyptian cotton. The domestic consumption of these competitive Egyptian cottons was estimated at about 50,000 bales in 1938-39 or about the same as the 8-year average ended with 1937-38 (Table 2). The consumption of Egyptian cotton approximating $1\frac{1}{4}$ inches and longer was substantially more than double that of American-Egyptian in 1938-39 and on the average about three and one half times as large.

Total Egyptian cotton consumed in the United States in 1939 was confined largely to staples $1\frac{1}{4}$ inches and longer, although until recently a substantial volume of shorter cotton ranging around $1\frac{1}{8}$ inches in staple length was imported from Egypt. The principal extra-staple varieties of Egyptian cottons now used by mills in the United States are Giza 7, Sakha 4, and Maarad. A survey of mills in 1939 indicated that Giza 7 is directly competitive with American-Egyptian, especially SxP, in the coarser counts of yarn usually made from extra-staple cotton, especially those spun by mills specializing in thread yarns, and in general that Maarad and Sakha 4 are directly competitive in the finer counts of such yarn, notably in yarns spun by mills weaving shirtings and dress goods.

With many yarn mill operators holding the view that the character of Pima cotton makes it unsuited for thread yarns where extra-staple cotton is used and with SxP a comparatively new product, it is not surprising that it is in thread that imported Egyptian cotton finds its principal use. In 1932 it was estimated that 75 per cent of Egyptian Sakellaridis consumed in the United States was used in the manufacture of thread.⁶ Although the importance of Sakellaridis has diminished considerably since 1932, Giza 7 having displaced most of it in domestic mills, the bulk of the extra-staple cotton used in the manufacture of thread yarns is still imported Egyptian.

SxP appears to be gaining ground as a raw material for the

⁶ *Long-Staple Cotton*, Report No. 85, Second Series, United States Tariff Commission, p. 55.

output of mills specializing in thread yarns, but its use was not extensive during 1939. It is nevertheless significant to note that if SxP should prove generally satisfactory to thread yarn spinners it might displace considerable extra-staple Egyptian cotton now imported. The extent of any such displacements, naturally, will depend upon the size of the crop and supply of SxP. Moreover, until SxP becomes established, a price incentive, in the form of discounts under prices of Egyptian cotton, may be needed to induce mills to use it instead of imported Egyptian cotton. An incentive of this sort made itself felt during the 1938-39 season when supplies of SxP increased and when prices of SxP averaged something like 2 cents per pound lower than competitive Egyptian cottons during the months of September through December.

Even if it were definitely established that neither Pima nor SxP is technically suited for the bulk of the thread yarn output of domestic mills, there is room for expansion in other uses. Not all extra-staple Egyptian cotton is used in the manufacture of thread yarns. It seems probable that the quantity of imported Egyptian cotton used for weaving, knitting, and for various purposes, other than thread yarns, exceeded 10,000 bales annually during 1938-39 and in the preceding 8-year period. The displacement of this much imported Egyptian by American-Egyptian cotton might almost double domestic consumption of the latter.

It is important to re-emphasize that increased supplies and lower prices of American-Egyptian cotton as compared with imported Egyptian would tend to stimulate the use of both Pima and SxP in most if not all uses. This was well demonstrated during the 1938-39 season, when consumption increased to about 18,600 bales against only 6,200 in the preceding season. Conversely, a reduction in supplies of American-Egyptian and higher prices relative to imported Egyptian would undoubtedly reduce the domestic use of extra-staple cotton produced in Arizona. This was demonstrated by the 1937-38 season when the domestic consumption of American-Egyptian cotton dropped to less than 6,200 bales as compared with more than 20,000 in each of the two previous seasons (Table 2).

Most mill operators express a preference for imported Egyptian cotton. There is little or no disfavor or prejudice against Egyptian cotton apparent among spinners such as is found with respect to American-Egyptian cotton. It is true Giza 7 is generally considered too short in staple length to displace Pima in the finer yarns. But Maarad and certain other varieties of cotton produced in Egypt compare favorably with Pima in staple and could easily displace American-Egyptian in the finer count yarns.

The relationship between price spreads of American-Egyptian and imported Egyptian cotton and the resultant changes in consumption of American-Egyptian is shown by the four seasons

ended with 1938-39.⁷ These four seasons should be more significant from the standpoint of the near future than any other similar period because uses and mill practices in connection with American-Egyptian cotton have undoubtedly changed considerably over a period of years. Moreover, this is the period regarding which mill operators were interviewed with respect to the influence of price spreads upon intersubstitutions between American-Egyptian and imported Egyptian cottons. These interviews showed fairly definitely that price was an important factor accounting for shifts from one growth to the other during the seasons under consideration. It was, of course, not the sole influence but for this period it was an important if not a dominant factor accounting for variations in the consumption of American-Egyptian cotton.

During the 1935-36 marketing season (September-December) the price of Pima No. 2 averaged 2.2 cents less than the price of Egyptian Sakellaridis at New England mill points. This price spread was enough to induce a substantial shift from imported Egyptian to American-Egyptian. Mill consumption of American-Egyptian increased 10,000 bales or nearly 90 per cent from that in the 1934-35 season, whereas the consumption of Egyptian cotton 1¼ inches and longer decreased an estimated 3,200 bales or about 8 per cent from the previous season (Table 3).

TABLE 3.—PRICES AND PRICE SPREADS BETWEEN PIMA AND SAKELLARIDIS AT NEW ENGLAND MILL POINTS AND CHANGES IN CONSUMPTION OF AMERICAN-EGYPTIAN AND EGYPTIAN, MAINLY 1¼ INCHES AND LONGER, UNITED STATES, 1935-36 TO 1939-40.

Season beginning August 1	New England mill prices (cents per pound)			Consumption (increase or decrease from previous season)			
	Pima No. 2*	Sakellaridis F.G.F.*	Spread Pima minus Sakel.	American-Egyptian		Egyptian 1¼ inches and longer†	
				Bales‡	Per cent	Bales‡	Per cent
1935-36	24.8	27.0	-2.2	10,000	88	- 3,200	- 8
1936-37	30.6	29.9	0.7	- 1,300	- 5	14,000	28
1937-38	27.8	26.7	1.1	-13,900	-69	-18,700	-30
1938-39	21.2	23.8	-2.6	12,400	201	- 4,300	9
1939-40	25.2	23.0	2.2

* Average prices for the 4 months, September through December.

† Estimates.

‡ American-Egyptian is in running bales, and Egyptian is in equivalent 500-pound bales.

⁷ For the purpose of these comparisons New England mill prices for Pima No. 2, 1 9/16 inches and Egyptian Sakellaridis Fully Good Fair are used. Although the use of Sakellaridis in the United States was comparatively small, especially in the last two seasons, a series of New England mill prices is not available for any other Egyptian variety during the whole of this period, and Sakellaridis prices are believed to be reasonably well suited to illustrate these relationships. Since many mills buy most of their season's supply of American-Egyptian during the marketing season for this variety, average prices for the 4 months, September through December, are used to show price-consumption relationships.

With Pima averaging about 0.7 cent higher than Sakellaridis during the 1936-37 marketing season, consumption of American-Egyptian decreased about 1,300 bales or 5 per cent. Egyptian consumption on the other hand increased an estimated 14,000 bales or 28 per cent (Table 3). Three-quarters of a cent spread between Pima and Sakellaridis prices is apparently not sufficient inducement to cause widespread shifting from one growth to the other, and this point was substantiated by interviews with spinners using these cottons interchangeably. Nevertheless there was apparently some shifting even at this difference, since the consumption of American-Egyptian decreased slightly, whereas that of extra-staple Egyptian appears to have increased substantially, and the domestic consumption of all kinds of cotton increased to a new high.

Price spreads during the 1937-38 marketing season averaged higher than during the previous season. In August, 1937, the price of Pima No. 2 was quoted at 4.0 cents per pound higher than Sakellaridis Fully Good Fair at New England mill points. As the marketing season got under way, however, the spread narrowed, but the average for the 4 months, September through December, was 1.1 cents. The continuation of a relatively higher price for Pima cotton coupled with a comparatively small supply of this cotton and the reduced demand for cotton textiles generally during 1937-38 resulted in a drop of almost 14,000 bales in the consumption of American-Egyptian cotton. Consumption of only 6,200 bales of American-Egyptian in that season was the smallest in more than 20 years. Consumption of imported Egyptian also dropped sharply in 1937-38, the decline amounting to about 19,000 bales or 30 per cent of consumption for the previous season. The consumption of American-Egyptian, however, was off nearly 70 per cent (Table 3). The financial advantage gained by mills through the use of Egyptian cotton rather than American-Egyptian was emphasized by the fact that some mills reported the disposal of their stocks and the purchase of Egyptian cotton during the 1937-38 season.

This competitive situation with respect to extra-staple Egyptian cotton was changed sharply in 1938-39 as compared with the previous season. With price spreads again favorable to the use of American-Egyptian cotton, adequate supplies, and improved demand conditions for cotton textiles generally, consumption increased sharply. The price of Pima No. 2 averaged 2.64 cents per pound less than Sakellaridis during the 1938-39 marketing season, and consumption increased 12,400 bales, or more than 200 per cent. Consumption of imported Egyptian cotton increased an estimated 4,300 bales, or less than 10 per cent (Table 3).

SEA ISLAND COTTON MAY BECOME AN IMPORTANT DIRECT COMPETITOR

Sea Island cotton production is being revived after a period in which production was negligible in the United States. More

than 90 per cent of the 1938 Sea Island crop was 1 9/16 inches and longer as compared with less than 75 per cent for American-Egyptian cotton in that season. The Sea Island crop (produced mainly in Florida and Georgia) was placed at 3,400 bales of 500 pounds gross in 1938 and 1,900 bales in 1939 (December 1, estimate). It sells for a somewhat higher price per pound than Pima cotton, and since most Sea Island is used in the manufacture of thread yarns it seems unlikely that it has displaced much, if any, American-Egyptian cotton. But if the production of Sea Island should be materially increased, it might become a significant direct competitor of American-Egyptian, especially SxP, for use in thread yarns. Total consumption was placed at about 2,600 bales in 1938-39 against about 1,600 in the previous season and an 8-year average of only a little more than 500 bales (Table 2).

LONGER STAPLES OF AMERICAN UPLAND COMPETE INDIRECTLY

The consumption of American upland cotton 1 1/4 inches and longer has been well maintained during recent years, with some increase during the late thirties and a substantial increase in 1938-39, according to disappearance figures (carry-over at the beginning of the season plus production minus carry-over at the end of the season). Disappearance of these extra staples of upland cotton averaged about 15,000 bales during the 8 years ended with 1937-38 against an average of about 20,000 bales in the last three seasons of this period. In 1938-39, however, consumption appears to have increased to upwards of 47,000 bales with the substantial increase in production in that season. Exports included in these disappearance figures are not known, but they are believed to be small, at least since 1930-31.

This extra-staple upland cotton averages considerably shorter in staple length than American-Egyptian, since very little of it is as long as 1 1/2 inches. It probably competes directly with the shorter lengths of imported extra-staple Egyptian and indirectly with American-Egyptian cotton. New England mill prices of Middling 1 1/4 inches upland cotton averaged about 17.7 cents per pound during the eight seasons ended with 1937-38 against 25.7 for Pima No. 2. Although the 8-year average price spread between Middling 1 1/4 inches cotton and Pima No. 2, 1 9/16 inches was 8 cents per pound, average differences varied from a low of approximately 4.5 cents for 1934-35 to a high of nearly 11 cents in 1936-37. But in 1938-39 this spread narrowed to less than 5 cents against nearly 10.5 cents in 1937-38.

If American-Egyptian cotton production should be expanded to the high levels of the twenties when a maximum crop of 100,000 bales was produced, it would doubtless meet more direct competition from upland cotton 1 1/4 inches and longer. In the absence of a marked extension of the uses for extra-staple cotton another possible outlet for sharply increased supplies of Pima

and SxP is the export market. But American-Egyptian cotton entering foreign markets would compete with the longer stapled cottons produced in Egypt and forego the protection afforded by the United States duty of 7 cents per pound levied on imports of cotton $1\frac{1}{8}$ inches and longer.

Under present conditions there is undoubtedly indirect competition between the longer staples of upland cotton and American-Egyptian, but the two usually do not compete directly in the sense that they are used interchangeably in the same kinds of yarns and fabrics as are imported Egyptian cotton and American-Egyptian. The sort of competition that occurs between American-Egyptian and the longer staples of upland is largely found in the manufacture of woven goods.

In shirtings, for example, yarns may be made in counts ranging from approximately 50s to 100s from staples varying from $1\frac{1}{8}$ inches or longer upland to $1\frac{5}{8}$ inches or longer Pima. This does not necessarily mean that these fabrics are made in the same mill, but the finished shirtings regardless of source may be made up into shirts to sell within a retail price range of from \$1.85 to \$4.50 each. Mail order catalogues for the spring and summer of 1939 advertised "Pima" shirts priced under \$2.00 and a large New York department store advertised Pima shirts at \$2.50. Some of the lower-priced shirts have Pima yarns in the warp only. The lower-priced shirts usually contain single yarns of about 50s count, whereas the higher-priced shirts ranging from \$2.50 to \$4.50 or more are often made of much finer yarns—frequently two-ply yarns of about 100s count requiring extra-staple cotton. That these Pima shirts compete directly with similar garments made from the longer staples of upland cotton is indicated by the fact that many of the shirts sold in the retail price range of from \$1.85 to \$2.50 are made from upland cotton. The same situation exists with respect to woven goods used for such purposes as house dresses, street dresses, and tea-room uniforms.

In clothing where the fabrics are not subjected to rigid strength tests, considerable variation in cottons and yarns is possible and frequently occurs. One of the principal reasons for varying the materials used in finished clothing is the desire on the part of garment manufacturers to keep their finished product within a certain retail price range. When shirts, for illustration, are being made to sell at around \$2.00, a high quality Pima broadcloth may be used when cotton and labor costs are comparatively low, and a much less expensive material from $1\frac{1}{8}$ inches or longer upland cotton when cotton prices and other costs are relatively high.

In uses like these where considerations having to do with retail merchandising rather than direct competition between cottons exist, the competitive position of American-Egyptian cotton may be strengthened through advertising. As indicated

above, certain manufacturers, mail order houses, and retail stores advertise garments such as shirts and dresses by stating that they contain Pima cotton. In this connection more definite information is needed regarding the durability and other qualities of garments made from Pima cotton and those made from the longer staples of upland cotton. If definite advantages, in addition to more attractive cloth and garments, could be correctly and effectively presented to consumers, such information would certainly strengthen the competitive position of American-Egyptian cotton.

COMPETITION WITH RAYON

Rayon has undoubtedly displaced a substantial quantity of cotton in nearly all qualities except possibly the lowest grades and shortest staples. These displacements have reduced the consumption of American-Egyptian cotton as well as that of upland and other kinds of cotton below what it would have been otherwise. During the eight seasons, 1930-31 to 1937-38, there is some evidence that the use of extra-staple cotton was decreased by rayon competition more than that of the shorter staples. When expressed as a percentage of consumption during the 1930-31 season, the average annual consumption of American-Egyptian cotton was 96 for the 4 years ended with 1937-38 against 107 for total extra-staples (mainly $1\frac{1}{4}$ inches and longer) and 121 for all kinds of cotton. Consumption of American-Egyptian cotton was unusually low in 1937-38, but it was comparatively high in the two preceding seasons and in 1938-39 was 121 per cent of that for 1930-31 against 144 for the total consumption of extra-staple cotton and 130 for domestic consumption of all kinds of cotton (Table 2).

Prices as well as domestic consumption of the extra-staple lengths of cotton in the United States have advanced relatively less than those of the shorter staple lengths of cotton during recent seasons. Prices of Pima No. 2, $1\frac{9}{16}$ inches, and Egyptian Sakellaridis both averaged about 110 per cent of their 1930-31 average, during the four seasons ended with 1937-38 at New England mill points against nearly 120 per cent for Middling $15/16$ inch in southern markets. These relatively lower prices for the extra-staple cottons than for the shorter lengths coupled with the failure of the longer staples to keep pace with total consumption indicate a lessening in the relative demand for the extra-staples, particularly those staples other than $1\frac{1}{4}$ inches upland cotton, the relative consumption of which has apparently increased under the stimulus of increased supplies and relatively low prices (Table 4). This may mean that these longer staples have felt the impact of rayon competition to a greater extent than the shorter staples.

But to attribute all of any decrease in demand for extra-staple cotton that may have taken place during recent years to rayon

TABLE 4.—PRICES OF UPLAND, PIMA, AND SAKELLARIDIS BY SEASONS, 1928-29 TO 1938-39.

Season beginning August 1	Middling 15/16 inch*	Middling 1 1/8 inches†	Middling 1 1/4 inches†	Pima No. 2 1 9/16 inches†	Egyptian Sakellaridis F.G.F. 1 3/8 inches†
Cents per pound					
1928-29	19.00	22.98	28.63	42.73	37.37
1929-30	16.24	19.99	25.98	36.62	30.48
1930-31	10.02	13.34	20.36	25.39	25.01
1931-32	6.10	8.90	13.27	20.65	19.22
1932-33	7.29	9.46	12.68	20.82	20.65
1933-34	11.00	13.34	17.51	26.83	25.38
1934-35	12.70	14.82	19.65	24.18	26.18
1935-36	11.92	14.31	19.11	26.94	27.25
1936-37	13.29	16.98	21.96	32.95	30.49
1937-38	9.09	12.77	17.22	27.67	25.67
1938-39	9.00	12.33	17.27	22.13	22.55
Average, 1930-37	10.18	12.99	17.72	25.68	24.98
Index numbers (1930-31 = 100)					
1928-29	190	172	141	168	149
1929-30	162	150	128	144	122
1930-31	100	100	100	100	100
1931-32	61	67	65	81	77
1932-33	73	71	62	82	83
1933-34	110	100	86	106	101
1934-35	127	111	97	95	105
1935-36	119	107	94	106	109
1936-37	133	127	108	130	122
1937-38	91	96	85	109	103
1938-39	90	92	85	87	90
Average, 1930-37	102	97	87	101	100

* Computed by adding to the ten-market average price of Middling 7/8 inch cotton staple premiums for Middling 15/16 inch cotton (premiums for 15/16 inch are averages for six southern markets except for the period since mid-June 1937).

† New England mill prices. Compiled by the Agricultural Marketing Service, U.S. Department of Agriculture.

competition would in all probability be incorrect. In connection with rayon competition and its influence on consumption of American-Egyptian cotton, it is significant that during the two seasons, 1935-36 and 1936-37, consumption was at the highest level in more than a decade, whereas in 1937-38 it reached the lowest point in more than 20 years. Whatever the long time effect of rayon competition may have been upon the use of American-Egyptian cotton, wide season-to-season fluctuations such as these cannot be explained by competition from rayon. Although domestic rayon consumption has increased comparatively little during the last 3 years, the 1938 level of consumption was almost three times that of 1930.

Most of the rayon consumed in the United States is used in the manufacture of woven goods (about 75 per cent in 1937 and 1938), principally for dress goods and underclothing. A substantial quantity, however, is utilized in knit goods (about 23 per cent in 1937 and 1938)—i.e., mainly underwear and hosiery. Woven goods are also outstanding among the uses for American-Egyptian cotton. But in such important uses for this cotton as broadcloth for shirts, uniforms, and house dresses rayon's lack of

sturdiness and launderability places it at a competitive disadvantage with cotton fabrics. It would seem to follow that rayon competition has not been an important factor affecting the use of American-Egyptian cotton in broadcloths and shirtings except indirectly.

In other woven goods used principally in clothing, such as lawns, voiles, and organdies, competition with rayon appears to have been of considerable importance over a period of years. But style changes have an important bearing upon season-to-season fluctuations in the sales of these fabrics and the use of American-Egyptian cotton therein. In marquisettes, which are used principally for window curtains but to some extent for clothing, rayon has displaced considerable cotton.

In woven goods for airplane fabrics, typewriter ribbons, raincoat fabrics, and various other "mechanical" fabrics, where considerable American-Egyptian cotton is used, rayon has not been used in any substantial quantity and even indirect competition has had little effect on the use of cotton in these materials.

Thread is still made largely of either cotton or silk, and rayon has probably not displaced much cotton in this use. This also applies, in general, to other yarns produced mainly for uses other than weaving, such as those used in fish netting where extra strength is an important factor.

The use of American-Egyptian cotton in tire cords had dwindled to a comparatively small volume prior to the development of rayon tire cords for use in high-speed truck and bus tires, but some American-Egyptian cotton may have been displaced by rayon in this use during 1937-38 and 1938-39.

To summarize, it can be said that from the longer-run standpoint, fine cotton yarn consumption in dress goods, underwear, and hosiery probably would have been considerably larger during recent years if rayon had not been developed and that the use of American-Egyptian cotton would have been larger. The displacement of Pima and other extra-staple cotton by rayon has taken place over a period of years with the rapid growth of the rayon industry, and there is no indication of any unusual displacement of American-Egyptian cotton by rayon in recent years. Possibly technical developments resulting in the use of shorter staple cottons such as have taken place in the automobile tire industry have been of more influence upon the demand for extra-staple cotton than rayon competition.

ACREAGE, YIELDS, PRODUCTION, AND STOCKS

ACREAGE OF AMERICAN-EGYPTIAN AVERAGES UNDER 40,000

Commercial acreage of American-Egyptian cotton has been confined in the main to two Arizona counties—Maricopa and Pinal—during recent years. In 1939 a substantial acreage was grown in both Pima and Graham counties. Total acreage

reached a peak of 200,000 in 1920-21 when the combined Arizona-California acreage was 243,000. From this peak, however, acreage dropped sharply. California apparently discontinued commercial production after 1922-23, and the Arizona acreage dropped to a low point of 8,000 acres in 1924-25. There was a revival in acreage during the late twenties and in 1929-30 about 67,000 acres were reported. The low point for the thirties was 21,000 acres in 1937-38 and for the 8 years ended with that season the American-Egyptian acreage averaged nearly 32,000. Following the low point of 1937-38, acreage increased, totaling 44,000 in 1938-39 and 41,000 in 1939-40 (Table 5).

TABLE 5.—AMERICAN-EGYPTIAN COTTON: ACREAGE, YIELD PER ACRE, PRODUCTION, CARRY-OVER, SUPPLY, AND DISAPPEARANCE, UNITED STATES, BY SEASONS, 1928-29 TO 1939-40.

Season beginning August 1	Acreage harvested* Acres	Yield per acre* Pounds	Production		Carry-over beginning of season†	Supply‡	Carry-over end of season†	Disappearance§
			Bales of 478 lbs. net*	Running bales†				
1928-29	51,000	278	29,800	28,313	5,783	34,096	7,204	26,892
1929-30	67,000	217	30,400	28,771	7,204	35,975	8,139	27,836
1930-31	47,000	260	25,400	23,312	8,139	31,451	16,709	14,742
1931-32	35,000	199	14,600	13,668	16,709	30,377	16,532	13,845
1932-33	22,000	189	8,700	8,365	16,532	24,897	9,826	15,071
1933-34	26,000	184	10,000	9,683	9,826	19,509	7,041	12,468
1934-35	28,000	247	14,700	14,052	7,041	21,093	8,615	12,478
1935-36	39,000	229	18,600	17,619	8,615	26,234	6,960	19,274
1936-37	38,000	230	18,300	17,551	6,960	24,511	5,488	19,023
1937-38	21,000	269	11,600	10,991	5,488	16,479	7,859	8,620
1938-39	44,000	234	21,500	20,501	7,859	28,360	10,289	18,071
1939-40*	41,000	291	25,000	24,500	10,289	34,789
Average, 1930-37	31,900	226	15,238	14,405	9,914	24,319	9,879	14,440

* Compiled from reports of the Agricultural Marketing Service, United States Department of Agriculture.

† Compiled from reports of the Bureau of the Census.

‡ Production in running bales plus carry-over at the beginning of the season.

§ Supply minus carry-over at the end of the season, mainly domestic consumption, but includes a substantial volume of exports in some of the earlier seasons.

|| Running bales except for production which is in bales of 478 pounds net and running bales as indicated.

* Preliminary.

Variations in acreages from season to season are outstanding among the factors accounting for the wide swings in total production of American-Egyptian cotton. The difference between the largest and the smallest acreage during the 8-year period 1930-31 to 1937-38 was 26,000 acres and that between the low point of 21,000 in 1937-38 and the high of 67,000 in 1929-30 was 46,000 acres. At average yields per acre of about 225 pounds during the 8 years ended with 1937-38, an area equal to 26,000 acres would produce a crop of more than 12,000 bales, and 46,000 acres a crop in excess of 21,500 bales. These quantities compare with an 8-year average crop of 15,200 bales, 21,500 in 1938-39 and 25,000 in 1939-40 (Table 5).

Changes in acreage largely are within the individual farmer's control and are not materially influenced by climatic conditions.

It is apparent that over the last decade variations in production of American-Egyptian cotton could have been substantially reduced by stabilizing acreages. Even with acreages stabilized, however, the size of crops would vary considerably from year to year due to variations in yields per acre.

YIELDS PER ACRE AVERAGE 225 POUNDS

The average annual yield per acre for American-Egyptian cotton was approximately 225 pounds during the 8-year period ended 1937-38 against 234 in 1938-39 and 291 in 1939-40. Yields per acre ranged from 184 pounds in 1933-34 to 269 pounds in 1937-38, or a difference of 85 pounds per acre. With an average acreage of 32,000 a difference of 85 pounds in yield per acre would amount to 5,700 bales. This is a fairly large quantity of American-Egyptian cotton, exceeding the carry-over on August 1, 1937, and amounting to more than half of the average carry-over. It is, however, a little less than half as much as the range in production resulting from changes in acreage, 1930-37 (computed on the basis of average yields) and less than two fifths of the average crop during the 8-year period 1930-37 (Table 5).

It is apparent from the experience of recent years that variations in production could be substantially reduced by stabilizing acreage, but that the size of the crop could not be stabilized solely by acreage control. The experience of recent years indicates that there would still be changes in production amounting to as much as half of the average carry-over and a little less than two fifths of the average crop resulting from variations in yields per acre.

Yields per acre for a given variety of cotton are determined largely by soil, climatic, and cultural conditions as well as the extent of damage from insects and plant diseases. Differences in these factors account for most of the year-to-year variations in yields per acre of American-Egyptian cotton. Different varieties of cotton, however, vary widely in yielding capacity. This is emphasized by the difference in yields between American-Egyptian and upland cotton grown under the same conditions in Arizona. The average 8-year (1930-37) yield per acre of about 225 pounds for American-Egyptian cotton compares with an average of about 415 pounds for upland cotton in Arizona (Table 8).

Thus, yields per acre of upland cotton average almost double those for American-Egyptian. Moreover, in recent years the per-acre yields of American-Egyptian cotton have increased much less than have yields of upland cotton in Arizona during recent years, despite the fact that the acreage of SxP has expanded and various comparisons of yields per acre indicate that SxP outyields Pima by about 10 per cent (Figure 2). Yields per acre of American-Egyptian averaged about 215 pounds during the 5-year period, 1930-31 to 1934-35, against 250 pounds dur-

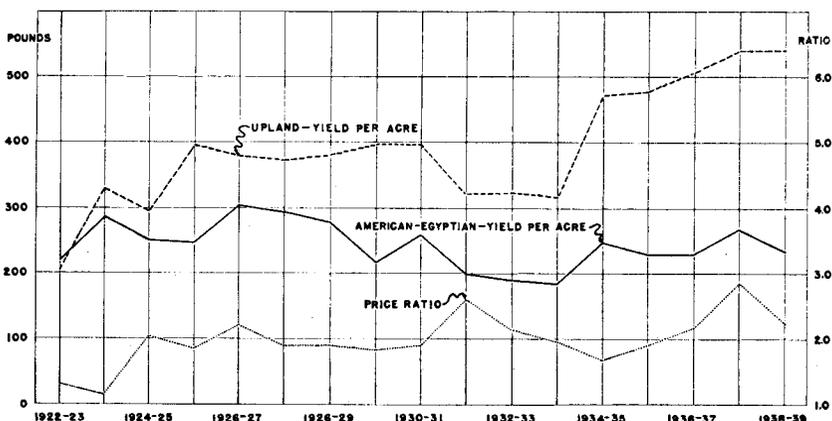


Figure 2.—Yields per acre of upland cotton produced in Arizona have increased sharply, particularly since 1933-34, whereas yields of American-Egyptian have shown little or no increase. The trend in price ratios between American-Egyptian and upland cotton has been upward over a period of years.

ing the corresponding period ended with 1939-40. Yields per acre of upland cotton, on the other hand, averaged approximately 370 and 510 pounds, respectively, during these two periods. These increases in average yields of cotton in Arizona during the 5 years ended with 1939-40 are associated with a general increase in yield per acre in the United States. These increases in yields are generally attributed to crop diversification, soil improvement, better cultural practices, better seed, and the selection of land more suitable for cotton production.

PRODUCTION AVERAGES ABOUT 15,000 BALES

Production of American-Egyptian cotton averaged 15,240 bales of 500 pounds gross during the 8-year period ended with 1937-38 against 21,500 bales in 1938-39 and 25,000 bales in 1939-40 (Table 5). The 8-year average production is only about half as much as that during the two predepression and pretariff (on long staple cotton) seasons 1928-29 and 1929-30 and less than half as large as the average production of 33,000 bales during the decade ended with 1927-28. Production, however, was relatively more stable in recent years than during the decade ended with the late twenties. In the earlier decade, production varied from a record high of around 92,000 bales in 1920-21 to a low of 4,400 bales in 1924-25. In more recent seasons it has varied from 30,400 bales in 1929-30 to about 8,700 in 1932-33 (Table 5).

Production, of course, constitutes only a part of total supplies of American-Egyptian cotton each season, and in considering stocks, supplies, and distribution, running bales are used instead

of equivalent 500-pound bales because stocks and consumption are reported only in actual bales and have not been converted to bales of a specified weight.

CARRY-OVER EQUIVALENT TO TWO FIFTHS AVERAGE SUPPLY

The carry-over of American-Egyptian cotton comprises a substantial part of the total supply of this cotton. Carry-over consists of stocks of cotton on hand at the beginning (August 1) or at the end (July 31) of each cotton marketing season. Most of this cotton is in mill warehouses or in public storage and at compresses. The carry-over at the beginning of the season averaged about 9,900 running bales annually during the 8 years ended with 1937 against 7,900 bales in 1938 and 10,300 bales in 1939. It varied during this period from 16,700 bales in 1931 to about 5,500 bales in 1937 (Table 5). The carry-over constituted about 41 per cent of the total supply (production plus carry-over) during the 8-year period. In some seasons, notably when the economic depression of the early thirties was at an acute stage, carry-over exceeded production. And before this period, in 1920, the carry-over of American-Egyptian reached a record of 104,000 bales. It required several years to reduce this large surplus to more normal levels.

Supplies of American-Egyptian cotton averaged 24,300 bales annually during the eight seasons ended with 1937-38 against 28,400 in 1938-39 and 35,000 in 1939-40. The average in recent seasons has been considerably less than that for the preceding decade which included the record supply of nearly 200,000 bales in 1920-21. In the recent 8-year period supplies varied from about 31,500 bales to 16,500 bales (Table 5). This range of 15,000 bales was about the same as the range in production. But the range in supplies amounted to only 62 per cent of average supplies against 104 per cent for the range in production expressed as a percentage of average production. In some seasons large carry-overs are offset by small crops and vice versa, so that supplies vary relatively to a somewhat lesser extent than production (Table 5).

The disappearance of American-Egyptian cotton (supply minus stocks at the end of the season) averaged 14,400 bales during the 8-year period 1930-37 against 18,100 in 1938-39. The range in disappearance was about 10,700 bales or from 19,300 bales in 1935-36 to 8,600 bales in 1937-38. Thus, the range in disappearance was about 74 per cent of the average for the period or relatively somewhat more than the corresponding percentage for supplies but considerably less than the 104 per cent for production. The greater relative fluctuations in disappearance from season to season than in supplies are further indication of substantial variation in the demand for American-Egyptian cotton.

The smallest supply for the 8-year period was 16,500 bales in 1937-38. This supply was substantially less than the disappearance of more than 19,000 bales in the two preceding seasons. In that season supplies were probably inadequate to maintain consumption even at average levels since mills must carry a certain amount of stocks, and when supplies get too small it is difficult for them to obtain needed qualities. Prices of American-Egyptian cotton at mills in that season averaged relatively higher than prices for imported Egyptian cotton, and domestic mills shifted to competitive growths produced in Egypt. The effect of these shifts coupled with some decrease in the demand for goods made from extra-staple cotton resulted in a drastic reduction in the use of American-Egyptian cotton during the 1937-38 season. The carry-over of about 7,900 bales at the end of the season was about 2,400 bales larger than in the previous season, and the 1938 crop of 20,500 bales was almost double that for a year earlier. As a consequence of the large increase in the 1938-39 supply to 28,300 bales over the previous season and comparatively lower prices, the disappearance of 18,100 bales was more than double that for the previous season of apparently inadequate supplies.

The adequacy of supplies to meet spinners' requirements for American-Egyptian cotton may be limited by the quality of supplies as well as by quantity. Some spinners complain of an accumulation of the shorter staples in the carry-over so that the supply in some seasons contains a smaller proportion of the medium and longer staples needed by domestic mills than is found in the crop. This contention seems to have been justified to some extent in recent seasons when in 1938-39 about 47 per cent of the carry-over at the beginning of the season was shorter than 1 9/16 inches against 44 per cent in the preceding season and an average of 24 per cent during the 8 years ended with 1937-38 (Table 6). It is to be noted, however, that in 1938-39 the proportion of cotton shorter than 1 9/16 inches in the supply was about 32 per cent or only a little more than average of 25 per cent. On the other hand, the supply of staples longer than 1 9/16 inches constituted 18 per cent of the total against an average of 12 per cent. Moreover, in every season since figures on the grade and staple of American-Egyptian cotton became available, the supply of 1 9/16 and 1 19/32 inch staples equaled or exceeded half the total supply with but one exception and that was the first season of the period or 1928-29. The percentage of the shorter staples and longer staples in the carry-over averaged somewhat less than the percentage in the crop for the 8-year period, whereas that of the medium staples in the carry-over averaged a little larger than that in the crop (Table 6).

In connection with the staple length of American-Egyptian cotton it is worth noting that under experimental conditions, SxP produces an average staple length about 1/16 to 3/32 inch shorter than the average length of Pima. If this difference existed under commercial production there should have been a tendency for the proportion of the shorter lengths of American-Egyptian cotton to increase during recent seasons with the increased production of SxP since 1934. Although the proportion of this cotton shorter than 1 9/16 inches produced during the 11 years ended with 1938-39 varied considerably from season to season, there was no apparent tendency for the proportion of the shorter lengths in the crop to increase during the last few years of the period. During the five seasons ended with 1933-34, cotton shorter than 1 9/16 inches constituted about 28 per cent of the crop or approximately the same as for the corresponding period ended with 1938-39. The fact that the proportion of the shorter

TABLE 6.—AMERICAN-EGYPTIAN COTTON CARRY-OVER, PRODUCTION, AND SUPPLY OF SPECIFIED STAPLE LENGTHS, UNITED STATES, BY SEASONS, 1928-29 TO 1938-39.

Season begin- ning August	Carry-over				Production				Supply			
	Shorter than 1 9/16"	1 9/16" and 1 19/32"	1 5/8" and longer	Total	Shorter than 1 9/16"	1 9/16" and 1 19/32"	1 5/8" and longer	Total	Shorter than 1 9/16"	1 9/16" and 1 19/32"	1 5/8" and longer	Total
	Bales*											
1928-29	1,700	2,400	1,700	5,800	14,100	12,500	1,700	28,300	15,800	14,900	3,400	34,100
1929-30	1,000	5,100	1,100	7,200	5,300	17,100	6,400	28,800	6,300	22,200	7,500	36,000
1930-31	200	7,100	800	8,100	2,500	16,200	4,600	23,300	2,700	23,300	5,400	31,400
1931-32	2,600	13,600	1,100	16,700	2,400	8,400	2,900	13,700	4,400	22,000	4,000	30,400
1932-33	3,100	12,400	1,000	16,500	4,600	2,600	1,100	8,200	7,700	15,000	2,100	24,800
1933-34	3,600	3,100	1,100	9,800	3,300	5,400	1,000	9,700	6,900	10,500	2,100	19,500
1934-35	2,200	3,600	1,000	7,800	4,600	7,300	2,100	14,000	6,800	11,100	3,100	21,000
1935-36	2,100	6,500	0	8,600	4,800	12,000	700	17,600	7,000	18,500	700	26,200
1936-37	3,200	3,400	400	7,000	4,600	10,800	2,200	17,600	7,800	14,200	2,600	24,600
1937-38	2,400	2,200	900	5,500	3,000	6,500	1,500	11,000	5,400	8,700	2,400	16,500
1938-39	3,700	3,900	200	7,800	5,400	10,100	5,000	20,500	9,100	14,000	5,200	28,300
Average, 1930-37	2,350	6,762	788	9,900	3,738	8,650	2,012	14,400	6,088	15,412	2,800	24,300
Per cent												
1928-29	29	42	29	100	50	44	6	100	46	44	10	100
1929-30	14	71	15	100	19	59	22	100	17	62	21	100
1930-31	2	88	7	100	11	69	20	100	9	74	17	100
1931-32	12	81	7	100	18	61	21	100	15	72	13	100
1932-33	19	75	6	100	56	31	13	100	31	61	8	100
1933-34	37	52	11	100	34	56	11	100	35	54	11	100
1934-35	32	54	14	100	33	52	15	100	32	53	15	100
1935-36	24	76	6	100	28	68	4	100	27	70	3	100
1936-37	46	48	6	100	26	61	13	100	32	58	10	100
1937-38	44	40	16	100	27	59	14	100	33	53	14	100
1938-39	47	50	3	100	26	49	25	100	32	50	18	100
Average, 1930-37	24	68	8	100	26	60	14	100	25	63	12	100

* Running bales. Compiled from reports of the Bureau of Agricultural Economics.

staples of American-Egyptian cotton has not increased with the expansion of SxP production, of course, does not necessarily mean that the commercial crop of SxP averages as long as Pima cotton. It may be that the average staple length of Pima cotton has increased somewhat in recent years, offsetting the influence of the increased production of the shorter staple SxP on the proportion of the shorter staples in the total crop.

Grade is the other quality factor for which statistics have been available since the 1928-29 season. With respect to grade, one of the complaints frequently heard in consuming centers is that the lower grades of American-Egyptian cotton tend to accumulate in the carry-over and often comprise a relatively large portion of the total supply. It is further contended that these lower grades are not suited for certain uses and that supplies comprised largely of such qualities sometimes cause mills to turn to Egyptian cotton even when the total supply of American-Egyptian is relatively large. Variations in the proportion of low grades in the carry-over are considerable, but on the average the percentage of these qualities is only slightly larger than the proportion in the crop (Table 7). It is true that in 1937-38 about 55 per cent of the total carry-over was 3 and lower in grade, and this may have further aggravated the short supply situation in that season. But the proportion of low grades in the crop was very small in 1937-38 so that the lower grades (3 and lower) comprised only 24 per cent of the total supply or about average. In 1938-39 the proportion of low grades in the carry-over dropped to 34 per cent and that in the crop to only 3 per cent so that the percentage in the supply was only 12 or the lowest since these figures became available (Table 7).

The proportion of the higher grades (1 and 1½) in the crop during 1937-38 and 1938-39 was unusually large, amounting to 66 and 77 per cent, respectively, against an average of only 30 per cent for the 8 years ended 1937-38. On the average for the 8-year period about half of the crop, carry-over, and supply was medium in grade (2 and 2½). A little more than a fourth of the average supply was high in grade (1 and 1½), and a little less than a fourth was low grade (3 and lower) (Table 7).

Assuming no greater variations in the grade and staple of supplies of American-Egyptian cotton than have occurred over the past decade, it seems that under normal conditions a supply of around 25,000 bales would be sufficient on the average to fulfill the needs of domestic mills for this cotton. A larger supply than this quantity would undoubtedly be used, although probably at somewhat lower prices than would otherwise prevail. A smaller supply would doubtless result in higher prices and smaller consumption. And with an abundance of extra-staple Egyptian cotton it seems apparent that domestic mills could dispense with the use of American-Egyptian cotton altogether without en-

TABLE 7.—AMERICAN-EGYPTIAN COTTON CARRY-OVER, PRODUCTION, AND SUPPLY OF SPECIFIED GRADES, UNITED STATES, BY SEASONS, 1928-29 TO 1938-39.

Season beginning August 1	Carry-over			Production			Supply					
	1 and 1½	2 and 2½	3 and lower	Total	1 and 1½	2 and 2½	3 and lower	Total	1 and 1½	2 and 2½	3 and lower	Total
Bales*												
1928-29	1,300	1,100	3,400	5,800	5,500	13,600	9,200	28,300	6,800	14,700	12,600	34,100
1929-30	1,700	4,000	1,500	7,200	5,500	16,400	6,900	28,800	7,200	20,400	8,400	36,000
1930-31	2,400	3,500	2,200	8,100	6,200	11,400	5,700	23,300	8,600	14,900	7,900	31,400
1931-32	4,700	8,600	3,400	16,700	1,200	5,900	6,600	13,700	5,900	14,500	10,000	30,400
1932-33	2,900	9,100	4,500	16,500	2,000	3,700	2,600	8,300	4,900	12,800	7,100	24,800
1933-34	1,800	5,500	2,500	9,800	4,900	4,300	5,000	9,700	6,700	9,800	3,000	19,500
1934-35	2,900	3,100	1,000	7,000	6,100	5,600	2,300	14,000	9,000	8,700	3,300	21,000
1935-36	1,800	4,900	1,900	8,600	3,400	12,000	2,200	17,600	5,200	16,900	4,100	26,200
1936-37	1,900	3,700	1,400	7,000	3,500	9,100	5,000	17,600	5,400	12,800	6,400	24,600
1937-38	800	1,700	3,000	5,500	7,200	2,900	900	11,000	8,000	4,600	3,900	16,500
1938-39	2,600	2,560	2,700	7,800	15,600	4,100	600	20,500	18,400	6,600	3,300	28,300
Average, 1930-37	2,400	5,012	2,488	9,900	4,312	6,863	3,225	14,400	6,713	11,875	5,712	24,300
Per cent												
1928-29	22	19	59	100	19	48	33	100	20	43	37	100
1929-30	23	36	21	100	19	57	24	100	20	57	23	100
1930-31	30	43	27	100	27	49	24	100	27	48	25	100
1931-32	28	55	20	100	9	43	48	100	19	48	53	100
1932-33	18	55	27	100	24	45	31	100	20	52	28	100
1933-34	18	56	26	100	51	44	55	100	34	51	15	100
1934-35	42	44	14	100	44	40	16	100	43	41	16	100
1935-36	21	53	22	100	19	68	13	100	20	64	16	100
1936-37	27	53	20	100	20	52	28	100	22	52	26	100
1937-38	14	31	55	100	66	26	8	100	48	28	24	100
1938-39	33	32	35	100	77	20	3	100	65	23	12	100
Average, 1930-37	24	51	25	100	30	48	22	100	28	49	23	100

* Running bales. Compiled from reports of the Bureau of Agricultural Economics.

countering any serious difficulty except in the production of goods advertised as containing Pima cotton.

These conclusions are obviously based on conditions such as those prevailing during the period studied, mainly the thirties. During a considerable part of this period cotton consumption was depressed along with general business conditions, but in 1936-37 total cotton consumption in the United States and in the world reached the highest levels on record, whereas the disappearance of American-Egyptian in that season was substantially less than the high levels reached in the early twenties.

In this connection, however, it is important to note that with the outbreak of a major war in Europe, as this report was being finished and with prospects of at least some difficulty in shipping cotton from Egypt to the United States, American-Egyptian cotton may have a competitive advantage during the war period. The extent of any such advantage cannot be accurately forecast at this time.

PRICE RELATIONSHIPS

The importance of the relationship between prices of American-Egyptian and imported Egyptian cotton has already been stressed. Variations in price spreads between competitive growths are especially important from the standpoint of shifts from season to season in mill consumption. Price differences constituted the chief incentives for making such changes during the late thirties. But if the consumption of American-Egyptian cotton is to be sustained over a period of years, adequate supplies must be available. To a considerable extent changes in price spreads between American-Egyptian and imported Egyptian cotton are manifestations of changes in supplies.

The level of supplies of Pima and SxP is of primary importance from the standpoint of consumption, since a market outlet at some price could undoubtedly be found for a crop many times as large as the average for recent seasons. From the standpoint of growers, however, the optimum level of supplies must be considered in conjunction with prices and farm returns in the producing area. Since yields per acre for American-Egyptian cotton averaged only about 250 pounds during the 5 years ended with 1939-40 against 510 pounds for upland cotton grown in Arizona, production costs per pound are naturally substantially higher for American-Egyptian than for upland cotton. In addition to higher costs resulting from comparatively low yields, picking and ginning costs⁸ are somewhat higher for the small-bolled, extra-staple American-Egyptian varieties than for upland cotton. Because of these differences in costs, farmers must

⁸ In 1935-36 the average cost per bale for ginning and wrapping American-Egyptian was nearly \$13 against less than \$6 for upland cotton. "Cotton Marketing in the Irrigated Southwest," published by the Bureau of Agricultural Economics, U.S. Department of Agriculture, June, 1938.

get a substantial premium for American-Egyptian cotton or they cannot afford to produce it. Their principal alternative is upland cotton, but crops other than cotton might also be produced. Under the Agricultural Adjustment programs, in effect since 1933, however, the production and marketing of upland cotton has been curtailed by acreage adjustment measures and marketing quotas, but American-Egyptian cotton has not participated in these programs during recent years. The exemption of extra-staple cotton (1½ inches and longer) from the adjustment program may have accounted for a somewhat larger production of American-Egyptian cotton than would otherwise have been the case, especially from 1937-38 to 1939-40.

Arizona farmers apparently sold their American-Egyptian cotton for roughly 2.2 times as much per pound as they received for upland cotton in 1938-39 against 2.8 in the preceding season and an average of 2.1 for the 8-year period, 1930-31 to 1937-38. These ratios compare with an average ratio of 1.7 for the 8-year period ended 1929-30. It thus appears that compared with prices received for upland cotton those for American-Egyptian were relatively somewhat higher during the thirties than in the twenties. Actually, of course, prices of both growths averaged much lower in the latter period than in the former (Table 8).

In computing ratios between prices of American-Egyptian and upland cotton no adjustment has been made for difference-in-weight basis upon which the two are sold, since this factor remains constant. It should be noted, however, that prices for up-

TABLE 8.—AMERICAN-EGYPTIAN COTTON YIELD PER ACRE AND PRICES, UNITED STATES, 1922-23 TO 1939-40.

Season beginning August	Yield per acre (pounds)		Arizona prices per pound* (cents)		Ratio of American-Egyptian to upland	New England mill prices† (cents)	
	American-Egyptian	Upland	American-Egyptian	Upland		Pima No. 2	Saks. F.G.F.
1922-23	220	203	32.0	25.0	1.28	36.3	41.0
1923-24	287	331	40.0	35.0	1.14	39.5	44.6
1924-25	252	291	47.0	23.0	2.04	49.5	53.1
1925-26	247	399	41.0	22.0	1.86	51.3	44.7
1926-27	306	378	31.0	14.0	2.21	35.9	30.1
1927-28	296	352	38.0	20.0	1.90	43.0	37.5
1928-29	278	374	36.4	19.2	1.90	41.3	37.5
1929-30	217	383	32.5	17.8	1.83	38.0	32.0
1930-31	260	382	20.0	10.5	1.90	23.9	25.5
1931-32	199	323	15.3	5.9	2.59	20.1	19.4
1932-33	189	318	14.6	6.9	2.12	19.8	20.0
1933-34	184	365	20.3	10.4	1.95	24.2	23.4
1934-35	247	453	22.0	13.1	1.68	24.3	26.3
1935-36	229	461	21.8	11.5	1.90	24.8	27.0
1936-37	230	485	27.3	12.7	2.15	30.6	29.9
1937-38	269	518	24.5	8.6	2.85	27.8	26.7
1938-39	234	525	18.5	8.3	2.23	21.2	23.8
1939-40‡	291	560	21.9	9.2	2.38	25.2	23.0
Averages							
1922-29	263	339	37.2	22.0	1.69	41.8	40.1
1930-37	226	413	20.7	10.0	2.08	24.4	24.8

* Average prices in Phoenix, Arizona, during the months in which the bulk of the crop is sold, September to December, except prices on December 1 prior to 1927-28.

† New England mill prices for the 4 months September to December.

‡ Preliminary.

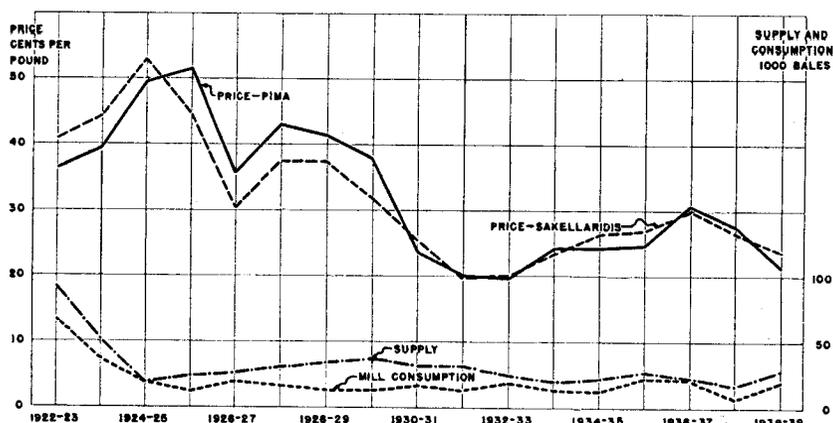


Figure 3.—New England mill prices of Pima No. 2 and Sakellaridis, Fully Good Fair, and supplies and mill consumption of American-Egyptian cotton, United States. Prices of American-Egyptian and imported Egyptian cotton tend to move together, but spreads between them vary considerably with changes in supplies of American-Egyptian cotton and various other factors. Consumption of American-Egyptian cotton tends to increase with increased supplies of and relatively low prices for American-Egyptian cotton.

land cotton are gross-weight prices. On the other hand, American-Egyptian cotton is bought from farmers and sold to mills on a net-weight basis, 22 pounds being deducted for the weight of bagging and ties on each bale.

Actual prices of American-Egyptian cotton form a part of the general cotton price structure. They fluctuate with changes in the level of cotton prices generally but more directly with changes in prices of extra-staple Egyptian cottons (Figure 3). The price of Pima No. 2 at New England mill points averaged 21.2 cents per pound during the 1938-39 marketing season (4 months—September through December) against 27.8 cents in the preceding season and an average of 24.4 cents during the 8 years ended 1937-38. These figures compare with 23.8, 26.7, 24.8, respectively, for imported Egyptian cotton (Sakellaridis, Fully Good Fair). Thus, Pima prices averaged 2.6 cents per pound less than Sakellaridis in 1938-39 against 1.1 cents more than Sakellaridis in 1937-38 and about 0.4 cent less during the 8-year period. Pima averaged 1.7 cents per pound higher than Sakellaridis during the 8-year period, 1922-23 to 1929-30, or 41.8 cents per pound against 40.1 cents (Table 8).

The shift in the average price of American-Egyptian from slightly higher than Egyptian on the average in the pretariff and predepression periods (prior to 1930-31) to slightly lower average prices in the corresponding period ended 1937-38 may be explained in part by a shift in uses. Apparently a large part of the total consumption of Pima cotton was used for tire fabric during

the twenties, whereas in recent years only a very small proportion of it has been used for this purpose.

Recent surveys have shown that in mills where American-Egyptian cotton and imported Egyptian cotton are used interchangeably, the latter is generally preferred to the former. This may not have been the case in the earlier period, although this is largely conjecture, since available information is not adequate to draw definite conclusions. There is some reason to believe, however, that Pima was in somewhat greater demand in the earlier period than in the latter for uses such as tire fabric where its extra-staple (Pima 1 9/16 inches against Sakellaridis 1 3/8 inches) was then considered necessary.

Theoretically, at least, if two growths of cotton have the same spinning utility they should in the long run sell at the same price. As the domestic cotton textile industry is now constituted, however, comparative spinning utility of various growths of cotton is largely a matter of opinion and, as has already been indicated, varies from one use to another. Moreover, price quotations and information on uses are insufficient to make a thorough analysis of the influence of price spreads upon the utilization of the various kinds of American-Egyptian and Egyptian cottons. About all that can be done in this connection is to make some very rough generalizations:

1. The prices of American-Egyptian and imported Egyptian cottons are quite closely related, although in some recent seasons prices of the former have averaged higher than the latter, and vice versa.

2. In recent seasons prices of Pima No. 2 at New England mill points have averaged almost half a cent under the price of imported Egyptian Sakellaridis (F.G.F.).

3. This average price spread may be indicative of the general preference for Egyptian over American-Egyptian cotton which has been found to exist in the domestic industry (Table 8).

4. Larger supplies of American-Egyptian cotton tend to depress prices of this growth below Egyptian prices, whereas smaller supplies have the opposite effect (Figure 3).

5. In seasons of large supplies of and low prices for American-Egyptian cotton relative to prices for imported Egyptian, consumption is stimulated, and in seasons of small supplies of and high prices for the former relative to the latter, consumption is curtailed.

6. These relationships are by no means perfect for fairly obvious reasons. (a) All mills do not respond alike to price differences. (b) Price quotations are not entirely satisfactory for making such comparisons. (c) Changes in the demand for goods and various other conditions occur from season to season and tend to obscure these general relationships.

Imperfect as these supply-price-consumption relationships are they should be of assistance to Arizona cotton producers in mak-

ing decisions regarding the future production of American-Egyptian cotton.

Under present conditions the utilization of American-Egyptian cotton can be stimulated by increased supplies of American-Egyptian and price discounts under Egyptian prices. If these increased supplies should be maintained, these initial price discounts may narrow and even disappear. Increased production of cotton having a staple similar to or better in character than imported Egyptian varieties and demonstrational work among mills consuming extra-staple cotton would help to narrow any price discounts that might persist for American-Egyptian cotton as compared with imported Egyptian. The development of SxP seems to be a step in this direction.

The larger the increase in production and supplies of American-Egyptian cotton the greater the probable initial discount as compared with Egyptian is likely to be. But if production is not increased to the point where this cotton enters competition with the longer staples of upland cotton and as the mills having a stronger preference for imported Egyptian are won over to American-Egyptian by price discounts, demonstrations of spinning utility, and by other means, initial price discounts should narrow.