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PART ONE

The Textile Markets

THE MARKETS IN WHICH TEXTILE PRICES ARE MADE

TEXTILE products move through the textile markets somewhat as an automobile moves along an assembly line. One processor specializes upon certain operations, then sells his product in an open market to some subsequent processor, who in turn re-sells it in another market after he has performed his own specialized operation. Each new owner thus brings it nearer to the form in which it will meet some specific consumer requirement. With a few exceptions, two or more of the steps in manufacture may be conducted by a single firm within the industry, or even by a majority of the firms; in some instances, as in the manufacture of blankets, the entire manufacturing process may be completed within a single organization. Despite these exceptions, the segregation of the successive processes of fabrication and their performance by separate firms must be regarded as one of the outstanding characteristics of the textile industries.

Separation of wholesale and retail distribution from the manufacturing function is under these circumstances to be expected. In some industries, such as petroleum, coal, and automobile manufacturing, distribution tends to be carried through as an integral part of the merchandising of the product; that is, distribution is so closely identified with manufacturing that the 'industry' is popularly re-

garded as embracing both. In textiles, the cloth manufacturing operations are usually all that are regarded as within the textile industries proper, although for some purposes, as in the classification used by the Census of Manufactures, products of the cutting-up and fabricating trades are also included. In economic research, and more particularly in price research, all manufacturing and distribution functions must be regarded as part of a single process—the meeting of consumer demand. Accordingly the following list of textile market levels includes the wholesale and retail markets for finished products as well as those identified with raw materials and semi-manufactured goods:

1 Raw Fiber Markets
2 Processed Fiber Markets
3 Yarn Markets
4 Gray Goods Markets
5 Finished Goods Markets
6 Fabricated Product Markets
7 Wholesale Markets
8 Retail Markets

The term 'market' is used here in the rather specialized sense in which the trade itself refers to the market for a given type of goods, namely, the buyers and sellers of a group of products, closely related in character and produced from the same equipment or by the same type of mill which tend to be sold interchangeably to the same group of purchasers. This is a much narrower meaning than is attached to the word 'industry', since a given industry may produce goods for a fairly large number of markets.

Just where one market ends and another begins is a question frequently difficult to answer. In one sense, every fabric has a market of its own. The trade concept is on the whole quite clear, however, so that the theoretical difficulties suggested by this use of the term need not be considered. The important thing is that a trade area designated as a market must possess a fairly high degree of internal unity; that is, the products should be of similar construction, serve the same uses, and be sold to the same group of buyers. Just how far analysis should go in breaking down a group of products according to their separate

markets must be determined by the individual investigator in the light of the particular situation with which he is dealing.

It will be noted that markets are identified with products, rather than with geographical areas, or even primarily with certain groups of buyers. The reasons are first, that geographical price differentials are for all practical purposes either non-existent in the textile industries or of minor importance; second, that in a general sense everyone uses textiles and hence the ultimate market extends throughout the nation. It is the differences in products, in the raw materials from which they are derived, and in the processes by which they are manufactured that draw the lines of distinction among textile markets.

Even though one producer may limit his distribution to a small geographical area his product is priced in competition with similar products having a national market. The center of this national market is New York City, or more specifically some particular district in it where the principal sellers have their merchandising offices. Some buildings in the Seventh Avenue garment district house practically an entire industry; similarly 'Worth Street', an area barely three crosstown blocks, houses the entire cotton goods market. Thus are the primary textile markets centralized and geographical price differentials per se ruled out of the picture. Local markets do exist, of course, in retail and wholesale distribution. But their prime characteristics are those arising from special services of a strictly local character performed by a given firm, not those due to location with respect to the national market.

The reality of intermediate markets in the flow of goods between raw material and finished products is not lessened by the fact that integrated firms may at some particular level bridge the gap and transfer their goods directly from one operation to another without recourse to the market. Where the amount of goods moving in this way is large in proportion to total production, the significance of the open market quotation may have to be qualified.

Furthermore, differences in the character of the buying and selling agencies may exist between markets. In some instances such differences may be quantitative, only two or three sellers in one case and in another a great many; or they may be qualitative with vertically integrated organizations in one instance selling a finished product as compared with the sale of gray goods through brokers.

Textile price analysis must of necessity adopt a classification of data according to markets that is in line with trade distinctions and terminology. Very early in such analysis some product representative of a particular market that can be traced backward and forward through manufacturing and distribution must be selected for detailed study. To give a clear picture of the classification of textile markets and their interrelationships a chart showing over 200 markets, some of which are really market groups requiring further subdivision for actual analysis, is inserted in a pocket at the end of this book.

It is insufficient, naturally, to deal with price data by themselves, unrelated to quantity data. For most significant price analyses comparable quantity data are requisite. Yet here a major problem presents itself in that while price data logically follow market lines, quantity data tend to follow 'industry' lines. Sometimes production or sales data directly parallel market data. In most basic industry data, however, such as that reported by the biennial Census of Manufactures, mills are grouped according to broader classes of products than are directly relatable to price data. It is important, therefore, to be thoroughly familiar with classifications according to industries and the direct relation of such totals to particular markets. Practically all non-price data, or data based upon producing rather than market units, follow such 'industry' classifications. That used by the Census in 1935 and 1937 represents about as fine a breakdown as is considered practicable. These 'industries' as designated by the Census are grouped in Table 1 according to the market levels into which this study has been divided. A grouping of this sort involves an over-

simplification since integration between two or more levels, where it exists, is necessarily overlooked. In every industry there are bound to be firms that make products which, according to this classification, might be listed under two or more industries: either unrelated products or products of successive operations that are made elsewhere in other industries. While this classification undoubtedly is of aid in placing these various industries in relation to the flow of goods, it is not so much by industries as by markets and market levels that price analysis must be made.

Complete analysis of market pricing in the textile industries would entail separate analysis of the price determining forces in each of the several hundred textile markets. That, obviously, is beyond the scope of this report. In fact, it would of itself involve quite a number of separate research projects. What this report attempts to present is not so much the price determining forces for all these various markets as an analysis of price characteristics according to the various levels of manufacture. It outlines the scope of the markets at each stage of manufacture and shows how research students can best select representative items for price study, how deal with quality and grade differentials, and in what sources find current price and related data.

Grades and qualities constitute one of the most important aspects of analysis according to market levels. Specifications of grade and quality for one level are dependent upon those of the preceding level. In fact, at each level of production new qualities or characteristics are imparted to the product which must be taken account of in addition to those of the preceding level, in order adequately to describe and specify for price recording purposes just what the article is.

Since the fiber level provides the one definitive set of grades to which price analysis must defer, it is perhaps most important that the student have a clear picture of qualities and grades at that level. For this reason textile fibers are discussed in considerably more detail than the ever increasing number of products available on subsequent levels. To

TABLE 1

The Textile and Related Industries by Major Market Levels and Relative Importance, 1937

As Measured by Establishments, Value Added, and Value of Product

	MARKET LEVEL AND INDUSTRY	NO. OF ESTABLISHMENTS	VALUE ADDED BY MANUFACTURE	VALUE OF PRODUCT
			(millions of dollars)	
	Grand Total	20,634	2,978.2	7,076.7
1	*Raw Fiber Level, total* [1]	39	6.6	21.3
	Wool pulling	19	4.0	16.7
	Wool scouring (largely on commission)	20	2.6	4.6
2	*Processed Fiber Level, total*	247	30.3	85.4
	Batting, padding, wadding, and upholstery filling	110	13.0	36.9
	Processed waste and recovered wool fiber (for sale)	126	11.6	38.2
	Wool combing (on commission and tops for sale)	11	5.7	10.3
3	*Yarn Level, total*	993	217.6	554.5
	Carpet yarn, woolen and worsted (for sale and on commission)	15	5.1	16.9
	Cordage and twine	118	28.4	66.4
	Cotton yarn and thread (for sale)	396	107.8	266.7
	Dyeing and finishing yarn, cotton, rayon, and silk (for sale and on commission)	128	14.8	21.6
	Rayon throwing and spinning (on commission)	25	1.9	2.4
	Rayon yarn and thread (for sale)	51	6.9	21.7
	Silk throwing and spinning (on commission)	96	11.6	15.3
	Silk yarn and thread (for sale)	52	12.7	40.2
	Woolen yarn (for sale and on commission)	41	5.0	13.6
	Worsted yarn (for sale and on commission)	71	23.4	89.7
4	*Gray Goods Level, total*	1,499	598.5	1,361.7
	Cotton narrow fabrics	156	21.4	43.5
	Cotton woven goods (over 12" in width)	675	438.9	961.0
	Jute goods	32	12.4	25.6
	Linen goods	12	2.6	6.4
	Rayon broad woven goods (over 12" in width)	237	80.6	220.8
	Rayon narrow fabrics	112	10.2	18.5
	Silk broad woven goods (over 12" in width)	194	24.2	63.1
	Silk narrow fabrics	81	8.2	13.8

[1] The production of textile fibers per se, either in agriculture or by the chemical industries, has been omitted from this table.

5	*Finished Goods Level, total*	1,251	434.8	1,105.9
	Artificial leather, oilcloth	33	12.6	40.4
	Dyeing and finishing, cotton fabric [2]	246	98.7	201.7
	Dyeing and finishing, rayon and silk fabric [2]	159	34.8	57.6
	Dyeing and finishing, woolen and worsted	53	6.4	11.1
	Felt goods, except woven felts	39.0	11.0	29.6
	Knitted cloth	213	23.7	68.0
	Woolen woven goods, incl. woven felts	332	115.7	288.7
	Worsted woven goods	176	131.9	408.8
6	*Fabricated Product Level, total*	16,605	1,690.4	3,947.9
	Apparel, Men's and Boys'			
	Clothing, leather and sheep lined	78	6.6	21.0
	Clothing, men's, youths' and boys', n.e.c. (suits, overcoats, etc.), regular and contract factories	2,218	260.2	619.8
	Clothing, work (incl. work shirts) and sport garments (except leather)	674	71.2	202.7
	Furnishings, men's n.e.c. (bathrobes, neckwear, etc.), regular and contract factories	364	23.8	60.9
	Shirts (except work shirts), collars, and nightwear, regular and contract factories	529	80.2	184.2
	Trousers (semi-dress), wash suits, and washable service apparel	232	18.0	46.8
	Apparel, Women's and Children's			
	Blouses, regular and contract factories	192	12.3	29.2
	Clothing, women's, misses', and children's, n.e.c., regular and contract factories	787	56.3	155.2
	Coats, suits, and separate skirts, regular and contract factories	1,767	117.5	321.2
	Corsets and allied garments	215	38.3	70.8
	Dresses, except house dresses, regular and contract factories	2,422	200.5	461.6
	House dresses, uniforms, and aprons, regular and contract factories	482	41.2	97.1
	Outerwear, children's and infants', regular and contract factories	452	35.5	82.5
	Apparel, n.e.c.			
	Gloves and mittens, cloth or cloth and leather combined, made from purchased materials Gloves and mittens, knitted	122	17.3	38.4
	Handkerchiefs, regular and contract factories	74	6.1	19.7
	Hats and Millinery			
	Hat bodies, carded, wool felt	14	6.9	15.5
	Hat and cap materials, men's	69	5.1	15.2
	Hats and caps, except felt and straw, men's	258	5.8	11.7
	Hats, fur felt	140	32.0	66.8
	Hats, straw, men's	47	6.5	13.6
	Millinery, regular and contract factories	755	47.2	88.2

[2] Including finishing departments of integrated gray goods mills.

TABLE 1—*(Continued)*

MARKET LEVEL AND INDUSTRY	NO. OF ESTABLISHMENTS	VALUE ADDED BY MANUFACTURE	VALUE OF PRODUCT
		(millions of dollars)	
Hosiery	746	202.1	362.5
Knitted outerwear, regular and contract factories	669	47.3	106.8
Underwear			
Knitted underwear	179	54.3	117.8
Underwear, men's, regular and contract factories	59	7.3	21.2
Underwear and nightwear of cotton and flannelette woven fabrics, women's, children's, and infants'	122	10.4	30.0
Underwear and nightwear of knitted fabric, women's, children's, and infants'	113	15.0	36.3
Suspenders, garters, and other elastic woven goods	64	6.4	15.0
Floor Coverings			
Asphalted felt-base floor coverings	13	15.9	33.5
Carpets and rugs, paper-fiber and grass	9	1.9	3.2
Carpets and rugs, rag	35	0.7	1.3
Carpets and rugs, wool (other than rag)	55	78.6	162.2
Linoleum	3	20.4	35.6
House Furnishings			
Curtains, draperies, and bedspreads, regular and contract factories	332	16.2	53.6
Lace goods	57	17.8	28.3
House furnishings, n.e.c. (incl. all sheets and pillowcases)	404	24.4	69.1
Misc. Fabricated Products			
Awnings, tents, sails, and canvas covers	367	12.8	30.3
Bags, other than paper	186	26.3	130.0
Embroideries, regular and contract factories	585	13.2	19.8
Fabricated textile products, n.e.c. (incl. belting, horse blankets, etc.)	101	8.2	19.8
Fish nets and seines	9	1.2	3.1
Flags, banners, regalia, and related products	120	4.0	7.3
Trimmings (not made in textile mills), stamped art goods, regular and contract factories	486	17.5	39.1

SOURCE: *Census of Manufactures, 1937*

indicate subjects of unusual interest to price study special markets have been singled out for somewhat more attention than others: exceptional market situations that either stand out as unique in the industry or may be duplicated elsewhere in the textile industries.

THE TEXTILE FIBERS

The textile industries start not with a single basic raw material as do the mineral industries, but with some dozen entirely different raw materials, each of which can be shaped into a product solely by itself without regard to the others. All these fibers are on an equal footing so far as their utility is concerned, for each is preferred for some uses over all the others. Although each has its own distinctive properties, they are enough alike so that there are few uses that cannot be served by at least two. Consequently in almost every market and consumer use there is competition among the different textile fibers. Furthermore, the raw fiber markets are the best organized of all the textile markets. They derive a large part of their importance from the fact that each fiber comes from a wholly different set of producers. Each passes through a separate market down to the point where it is fabricated into the products designed to meet a specific consumer use. Even down to the consumer the distinctive fiber content of the article is usually maintained.

The consumer chooses among the textile fibers on the basis of style, serviceability, and price. Thus one of the most important aspects of textile price research revolves around the role of price in inter-fiber competition. The cases in which price can be expected to be the more important determinant will be clearer after considering the uses to which the fibers are put and their price differentials. The extent of these differentials is indicated in Table 2 listing the eight groups of textile fibers and the prices quoted for key grades as of March 1, 1939.

All fibers do not compete for the same uses; their physical properties differ far too widely. Only when they reach the ultimate use can one determine the extent of inter-fiber

TABLE 2

Prices of the Textile Fibers

(as of March 1, 1939)

	CENTS PER POUND	QUALITY
Raw Cotton	9.05	7/8" middling upland, New York spot *
Wool, Hair, and Related Fibers		
Wool	71	Fine French combing, graded territory, scoured basis, Boston
Mohair	48–59	Medium, grease basis, Boston
Camel hair	$1.15	
Alpaca	65	
Rayon		
Filament yarn, viscose	51	150 denier, 40–60 filament, f.o.b. mill
Filament yarn, cellulose acetate	54	150 denier, 40–60 filament, f.o.b. mill
Staple fiber, viscose	25	1½ denier, 1½", f.o.b. mill
Staple fiber, cellulose acetate	46	Any denier up to 10 denier, any length
Raw Silk	$2.31	13/15 denier, 78% general evenness by seriplane, nearby delivery, New York
The Cordage Fibers		
Abaca (Manila fiber)	5¼	I fair current (c.i.f. N.Y.)
Henequen (Mexican)	3⅛	Current clean (c.i.f. N.Y.)
Palma	2⅝	(c.i.f. N.Y.)
Mauritius fiber	4½	Prime (c.i.f. N.Y.)
New Zealand fiber	4¼	High fair (c.i.f. N.Y.)
Jute	5 3/16	First actuals (c.i.f. N.Y.)
Flax and Hemp		
Flax (Dutch)	23	(c.i.f. N.Y.)
Hemp (Italian)	19¾	G (duty paid, c.i.f. N.Y.)
Upholstery Stuffing Fibers		
Kapok	14¾	Prime Japara (c.i.f. N.Y.)

* Base staple length of cotton for futures contracts changed August 15, 1939 from 7/8 to 15/16 of an inch.

competition. For example, for the sleeve lining of men's suits, filament rayon competes with mohair. Similarly, in handkerchiefs cotton and linen compete, and in any number of apparel items, cotton, filament rayon, spun rayon, silk and wool compete in some degree. Thus we are brought ultimately to the study of specific markets, where the problem is the competition of two or more specific fibers for some particular use.

Because of the influence of fiber prices upon the price structure at subsequent market levels textile price research must necessarily begin with the fiber markets. Since the supply conditions of the textile fibers vary so widely, all except rayon being agricultural in origin, fiber prices are subject to continual and extreme fluctuations. The impact of price fluctuations such as those of cotton, fluctuating repeatedly over the last twenty-five years by as much as 50 per cent in a single year, cannot help but create serious dislocations in the markets for cotton products. Moreover, the whole structure of retail trade is built on relatively stable prices. Thus the price organization of the textile industries may be visualized as having, at one extreme, relatively stable retail prices, and at the other, violently fluctuating raw material prices with a series of intermediate market levels which must in the best way possible adjust these differences. Under these conditions the importance of adequate data on fiber prices is readily apparent.

The use of fiber prices in textile economic research assumes an understanding of grade differentials and their significance. What are the standard grades and their relation to other grades? How do these differentials affect prices at subsequent levels of production? Unless one knows, for example, that print cloths, the largest single group of cotton textiles, are usually made from 1″ strict middling cotton, whereas 15/16″ middling is the standard grade most generally quoted in the market, and that there is customarily a differential or premium ranging around 1 cent per pound for the longer staple, one cannot determine the true rela-

tionship between the prices of print cloths and raw cotton.[1]

Standards of grade and grade differentials thus become a basic consideration in price research. They have been worked out most completely and with greatest precision for the textile fiber markets. In fact, at no subsequent level of production do standards of quality exist comparable with those for fibers. Being all, except rayon, products of agriculture, the textile fibers are subject to that infinitude of variation in outward form that is characteristic of all products of nature. Unlike synthetic fibers, the quality of which can be approximately predetermined by formulas and mechanical adjustments used in the manufacturing process, the exact quality of these agricultural fibers is determinable at the time of initial sale only by actual inspection.

The technical requirements of manufacturing require mills to standardize on the quality of the fiber they use. This has made necessary the development of reasonably reliable and practical standards of quality precise enough to meet the requirements of both buyers and sellers. In part these standards have been developed by governmental action, as in the case of the standards for cotton classing in this country; and in part they are the work of the trade itself or of the commodity exchanges, as in the case of silk.

Despite extreme variations in quality most natural fibers tend to center around a single narrow range of qualities which may comprise a fairly large part of total production. This narrow range of qualities tends to become the standard grade in trading, and is selected by common consent as the basis for price quotations, first in the spot markets, then in futures transactions. Prices for other grades may either be figured up and down from this standard by means of some sliding scale arrangement or be quoted independently of any base price. The latter practice is most common where futures markets are not well developed, usually because of the difficulties of establishing a market standard to which other grades bear a fixed and readily determinable relation.

[1] Grades of raw material most frequently used for several types of cotton fabrics are given in the section on gray goods.

Further differences in quality are introduced in preparing the fiber for market. The separation of the cotton fiber from the seeds, the removal of the pulp surrounding the cordage fibers, the unreeling of silk from the cocoon, and the sorting of wool all provide opportunities for accidental lowering of the grade or possibly improving it.

Discussion of the textile fibers would be incomplete without some mention of secondary sources of supply, particularly in dealing with statistics of materials used. Secondary sources of supply figure less in the textile industries than in many others,[2] but even here they play an important role. Secondary sources are particularly important in the case of wool recovered from rags and clippings, the proportion of which to raw wool is estimated to average about one-fourth. The various types of wastes that develop during mill processing constitute a further important secondary source, not only in wool manufacture but also especially in cotton, rayon, and silk. Since these secondary sources exert a salient influence upon many textile markets, a detailed statement concerning them is given under 'Processed Fibers'.

COTTON

The pricing of cotton is dependent upon the variety, 'grade', length, and character of the fiber. American upland is the leading type both in this country and abroad. Other types exist, however, and are quoted in market centers such as Liverpool and Osaka which draw upon the production of all important cotton producing countries. The more important foreign types—Egyptian, Indian, and China—differ sufficiently from upland to be classed by botanists as separate species.

Although American upland was originally developed commercially in the Piedmont region of the South, its cultivation has since been extended to practically every cotton growing country of the world, notably Brazil and the British

2 The amount of reclaimed rubber used by the rubber trade in 1930 constituted 29 per cent of total consumption; in the copper and lead industries the percentages of reclaimed metal were 43 and 40 respectively.

colonies in Africa. This species comprises over 99 per cent of the American crop, the only other being Pima cotton, or American-Egyptian, which is grown on irrigated lands in the Southwest. Sea Island cotton, also related to Egyptian and formerly of some importance, is no longer grown in this country in any important way. Within the American upland type there are said to be a thousand named varieties,[3] usually identified with either the name of the originator or with the district in which first produced. One commercial variety of particular importance frequently referred to by name is 'Peeler' or 'Delta' cotton. Originally the term 'Peeler' referred to a variety of long staple cotton grown in the lowlands of the Mississippi delta, but it is now applied indiscriminately to all 1¼" cotton produced in that region.

'Grade'[4] is a composite of three factors which are judged simultaneously: color, nature and amount of foreign matter, and preparation of the cotton at the gin. Certain types of stains, indicative of weathering in the field and of insect attacks, interfere with subsequent bleaching and dyeing. Undue amounts of foreign matter, usually dried and broken plant foliage and occasionally sand and dust, require extra processing to remove, thereby increasing the mill cost; if not entirely removed, they may lower the quality of the finished product. Similarly, smoothly ginned cotton contains less waste and produces a more uniform yarn than roughly prepared cotton. Grade thus refers in large part to non-cotton elements, particularly to effects produced after the boll has been picked.

The United States Department of Agriculture has since 1914 prescribed grade standards for American upland cotton. The revised standards established under the United States Cotton Futures Act, effective August 20, 1936, are designated as the Universal Standards for American Upland Cotton and are used throughout the world for Ameri-

[3] A. H. Garside, *Cotton goes to Market* (Stokes, 1935) p. 48.

[4] For a detailed statement on grade see U. S. Department of Agriculture, *The Classification of Cotton 1938* (Misc. Pub. 310).

can cotton. The distribution of the American upland crop by grade, 1931-35, is shown in Table 3.

TABLE 3

Percentage Distribution of United States Cotton Crop by Grade

American Upland Type

(Three-Year Average, 1936-1938)

GRADE	PER CENT	
Extra White	1.2	
White	76.2	
Middling Fair		..
Strict Good Middling		..
Good Middling		3.0
Strict Middling		17.5
Middling *		28.8
Strict Low Middling		18.5
Low Middling		6.1
Strict Good Ordinary		1.8
Good Ordinary		.5
Spotted	21.5	
Tinged	.6	
Yellow Stained	..	
Gray	.1	
No Grade	.4	

SOURCE: *Agricultural Statistics,* U. S. Department of Agriculture

* The standard grade.

Color and amount of foreign matter are graded together in 32 classes. Six major color classifications range from gray through extra white (the best grade) to yellow stained. In amounts of foreign matter there are five full grades, between which are half grades, designated 'strict'; quarter grades, designated 'barely'; and three-quarter grades, designated 'full'. Actually the trade goes no finer than half grades, using but nine grades in all, ranging from middling fair to good ordinary. Of these 32 standards 13 are represented by actual samples of cotton, supplied by the United States Department of Agriculture and kept in specially built containers for visual comparison with the sample being classed. The rest are descriptive. Expert classers seldom need to refer to these official samples except in cases of dispute.

Tentative standards have recently been adopted for prep-

aration, but quoted prices are not ordinarily based on them. In fact, whenever a grade is named without reference to color or preparation, it is presumed to be equal to the standard for white color.

The length of the cotton fiber, or staple length, is one of the most important factors of quality. Finer yarns require longer staples, other factors being equal. Also, longer staple cottons ordinarily produce greater strength in yarns of a given fineness than do short staples. There are 20 recognized staple lengths ranging from ¾″ to 1½″ in length, at intervals of 1/32″ in the middle range. The largest proportion of the American crop, as indicated in Table 4, tends to center around 15/16″.

TABLE 4

Percentage Distribution of United States Cotton Crop by Staple Length

American Upland Type

(Three-Year Average, 1935-1937)

LENGTH IN INCHES	PER CENT
Shorter than ⅞	10.6
⅞ and 29/32	28.5
*15/16 and 31/32	25.2
1 and 1 1/32	19.6
1 1/16 and 1 3/32	9.9
1⅛ and 1 5/32	5.2
1 3/16 and 1 7/32	.9
1¼ and longer	.1

SOURCE: *Agricultural Statistics*, U. S. Department of Agriculture

* The standard quality for market quotations up to August 15, 1939 was ⅞″ middling upland. It was changed as of this date to 15/16″.

Character is a term representing a group of qualities—uniformity of length, fineness, strength, and maturity—not susceptible of direct measurement, but which have a definite bearing upon the value of a given lot of cotton to a spinner.

WOOL

Sheep's wool, the most widely used of the animal fibers, competes with textile fibers of agricultural origin on the basis of its specific properties as much as by reason of price. Other similar animal fibers in general use are mohair, cashmere, alpaca, and camel hair.

The relatively high price of raw wool encourages the use of wool substitute fibers. These come into direct competition with wool, usually entering into the same fabric, and may not always be separately identified in the final product.[5] The principal wool substitutes used because of their lower price are cotton, rayon waste and staple fiber, and reworked wool.

Two general classes of raw wool are recognized in the American market at present: apparel and carpet. These terms refer more to general quality than to actual use. So-called 'apparel' wools are the finer wools and are shorn from improved breeds of sheep. Carpet class wools tend to be coarse and are usually shorn from native or unimproved breeds. Nearly all carpet class wool is ordinarily used for purposes other than the manufacture of clothing, especially for floor covering for which it may be imported into this country free of duty. However, where a special effect is desired as, for example, in certain kinds of tweeds, it is often used by producers of apparel fabrics. There is no established system for grading carpet wools, prices usually being quoted in terms of the locality where grown.

Apparel class wools are graded according to degree of fineness (diameter of fiber). Two systems of designating wool fineness are used interchangeably in this country: the 'blood', which runs from 'braid' to 'fine', and the numerical, which runs from 36s, 40s to 64s, 70s, 80s. Originally both systems had special significance, the 'blood' referring to the amount of merino blood in the animal producing the fleece;

[5] Rules of trade practice concerning fiber content of fabrics containing rayon have been promulgated by the Federal Trade Commission.

the 'numerical', to the count or fineness of worsted yarn to which the wool could be spun. Neither system, however, carries its original meaning today, both having become synonymous descriptions of fineness. These grade descriptions are listed in Table 5, together with the mill consumption of apparel wool by these grades, 1936-38.

TABLE 5

Percentage Distribution of Apparel Class Wool Consumption by Grade

(Three-Year Average, 1936-1938)

GRADE	PER CENT
64s, 70s, 80s (fine)	38.6
58s, 60s (½ blood)	13.6
56s (⅜ blood)	21.6
48s, 50s (¼ blood)	15.6
46s (low ¼ blood), 44s (common), 36s, 40s (braid)	10.6

SOURCE: Computed from monthly reports by the Bureau of the Census

In addition to fineness, fiber length is important in the pricing of apparel wools. For shorn wools this is indicated by such terms as 'combing' and 'clothing', or 'worsted type' and 'woolen type'. Generally speaking, 'combing' wools are those long enough to be combed, that is, processed on the worsted system; 'clothing' wools are those too short for satisfactory combing and are therefore usable only on the woolen system (the term 'clothing' when used in raw wool specifications has no significance beyond indicating short fibers). Combing wools are of more interest from a price standpoint since they constitute the largest volume of raw wool on the market today and are the chief raw material of the worsted branch of wool manufacturing. Clothing wools are but one of the numerous raw materials used by the woolen branch, other materials being pulled wool, reworked wool, and noils.

'Pulled wool' is wool that has been removed from the pelts of slaughtered sheep. While often used by worsted manufacturers when it is long enough, it is usually thought

of as 'woolen' wool. Quality or fineness of pulled wool is indicated in the United States by letters such as AA, A, and so on down to C super, AA being approximately equivalent to a fine shorn wool. From the standpoint of volume, pulled wool is greatly overshadowed by shorn wool, which constitutes more than 75 per cent of the apparel class and 95 per cent of the carpet class wool consumed in this country.

The locality of growth is also a factor in apparel wool as in carpet wool prices. Australian wools, for example, command a premium not only because of better grading but also because climatic conditions are ideal for growing high quality wool. Shorn wools grown in the United States are usually sold with reference to the state where produced. For convenience the market tends, however, to group wools grown in this country into three broad classes; (1) Texas wools; (2) territory wools, or those grown in the range areas west of the Mississippi other than Texas; (3) domestic or fleece wools, or those grown in the farm land areas, mostly east of the Mississippi. The third group includes the Ohio delaine, the finest wool grown in this country. Sometimes fleece wools are classed as 'bright' or 'semi-bright', depending upon color.

In proportion to wool the amount of other animal fibers used in the wool manufacturing industry is quite small (Table 6). The use of camel hair, as well as cashmere and

TABLE 6

Animal Fibers Used in Wool and Hair Manufacturing,* 1935

(Apparel Class)

	POUNDS
Wool, raw (scoured weight)	221,257,000
Mohair	24,871,000
Camel hair	941,000
Goat, including cashmere	736,000
Alpaca and vicuna	675,000
Rabbit hair	102,000

SOURCE: *Census of Manufactures, 1935*

* Includes only raw material; excludes waste and re-worked fibers.

alpaca, is restricted almost wholly to the production of certain types of overcoatings and knit outerwear to produce exceptionally soft textures. Fabrics produced from these fibers command substantial premiums over wool fabrics, so that competition between them and wool must be regarded as on a use rather than a price basis.

Mohair, however, is used in larger volume and directly competes with wool. Currently its volume amounts to about 10 per cent of that of raw wool. Mohair is the fleece from the angora [6] goat, a breed originated in Asia Minor and prior to the War developed for commercial purposes in South Africa. Since 1900 it has been bred extensively in Texas, which now furnishes almost our entire domestic requirements. Mohair resembles in many respects a coarse wool, except that it will not felt, and is much more wiry. This resiliency makes it especially suitable for pile upholstery, as in automobiles, which is its principal use. It is used also in apparel fabrics, usually blended with either cotton or wool, and more recently with rayon staple. Uniform grade standards for mohair are lacking, although the tendency today is to apply count terms, as 40s, 36s, 32s, according to fineness of yarns that can be spun, to the various sorts of mohair. Diameter is the dominating factor in grade determination, although length of staple, luster, and that rather vaguely defined term 'spinning quality' also enter into the sorters' considerations. Four grades are used by the Department of Agriculture in their reports: first kid, second kid, medium, and low.

RAYON AND OTHER SYNTHETIC FIBERS

The potential significance of the synthetic fibers has been greatly enhanced within the last few years by the development of new modified types of existing fibers and the invention of wholly new types. The term 'rayon', which is prop-

[6] Two fibers can rightly be called 'Angora': one, the hair of the angora goat, known as mohair; the other, the hair of the angora rabbit. The latter is always meant in trade references to 'Angora,' a pure white, extremely fine and downy fur.

erly applied at present to only the first two of the nine groups[7] listed below, today encompasses probably 99 per cent of all the man-made fibers produced in the world. Nevertheless, most of the non-rayon fibers shown are relatively new and their commercial production in the future cannot be accurately predicted either absolutely or relatively to the production of rayon itself.

Rayon is the generic term for filaments made from various solutions of modified cellulose by pressing the cellulose solution through an orifice and solidifying it in the form of a filament.

It is sold in two distinct forms:[8] as continuous filament yarn in skeins, cones, or similar packages, and as cut staple fibers compressed into bales, much as is cotton. Rayon filament yarn should properly be regarded as a yarn rather than as a fiber. Its inclusion at this point in the discussion is useful, however, to stress the contrast among the various fibers. Rayon filament yarns are comparable in price with yarns of the other fibers rather than with the raw fibers themselves. Staple fiber, on the other hand, is a true 'fiber' in the same sense as cotton or wool, since it must undergo a spinning operation before it is in yarn form. While distinct in form, the common origin of rayon filament yarn and staple fiber makes it desirable to consider these two fibers together.

The two basic types of rayon, regenerated cellulose fibers, and cellulose derivative fibers, constitute the first two groups of the synthetic fibers:

Group I Rayon—Regenerated Cellulose Fibers

This group includes yarns and staple fibers that are essentially 100 per cent cellulose in their final form. The viscose,

[7] *Rayon Organon* (Textile Economics Bureau, New York, November 1939); see also the *Textile World,* September 1939.

[8] Two other forms of rayon are commercially important, although not as textile fibers: rayon monofil, which is a single coarse round filament often used in place of horsehair; and rayon bands and strips spun through a single rectangular or slit-like orifice and used for hat braids and millinery fabrics.

cuprammonium, and nitro-cellulose rayon yarns and staple fibers make up this class.

Some rayon filament yarn trade names in this group are Bemberg, Chardonize, Cordura, Crown, Du Pont, Enka, North American, Spun-lo-, Tenasco, etc. (United States); Brenka, Tudenza (Great Britain); Matalva, Rayolva (France); Fortesia, Sedura (Germany); and Autar, Snia (Italy).

Among the rayon staple fiber trade names in this group are Du Pont, Fibro, Nupronium, Sylph (United States); Fibro (Great Britain); Floccal, Velna (France); Cuprama, Vistra (Germany); and Lucia, Sniaflocco (Italy).

Group II Rayon—Cellulose Derivative Fibers

By far the most important members of this group are the cellulose acetate yarns and staple fibers. Another cellulose compound that has appeared recently as fiber for special purposes is ethyl cellulose. The yarns and fibers in this group are chemical compounds of cellulose.

Some trade names for filament yarns in this group are Acele, Celanese, Eastman Acetate, Ethofil, Seraceta, Tubize (United States); Apaceta, Celanese (Great Britain); Rhodiaceta (France); Acelan, Aceta (Germany); and Opalba, Sapolba (Italy).

Trade names of some acetate staple fibers are Acele, Teca (United States); Celafibre (Great Britain); and Aceta, Rhodia Fiber (Germany).

Rayon Filament Yarn

Rayon filament yarn is composed of several continuous filaments, usually lightly twisted together. The number of filaments may vary within a standard size yarn. This is possible since the filaments, in contrast to silk, can be produced of varying size. Thus a popular size of 150 denier [9] yarn

[9] The standard unit of size in the silk and rayon numbering system is the denier, the weight in grams of 9,000 meters of yarn. This system could be called the weight-of-a-standard-length system. Thus a fine yarn has a small denier number and a coarse yarn a higher denier number. By contrast,

today is composed of 40 individual filaments and is referred to as 150-40 yarn. Each filament would then weigh 3¾ deniers, the sum of their weights being 150 deniers. But 150 denier yarn is also made commercially in 60 filaments (2½ deniers per filament), 100 filaments (1½ deniers per filament), and on up to 225 filaments (⅔ denier per filament). Other yarn deniers are similarly available in various filament sizes. Fine filament (or so-called multi-filament) yarns usually command price premiums.

Similarly, yarns are produced in a variety of sizes. Other prominent coarser deniers are 200, 300, and 450. Chief among the finer denier yarns are 100, 75, and 50. The more commonly quoted size for price comparison purposes is the 150-40 yarn, which may be considered as serving as a base grade for rayon filament yarn.

Rayon filament yarn is sold in various types of packages, such as cones, skeins, cops, tubes, spools. Cones are by far the most popular form of package both for weaving and knitting, followed by skeins. Other package forms are of relatively small importance today. Rayon yarn prices are basically quoted on skeins, there being an additional charge for some of the alternate types of package.

Rayon is graded by each producer into various qualities. Thus filament yarn may be graded as first, second, or inferior quality. Factors causing a lower grading than first quality may be lack of evenness, presence of knots or broken filaments, off-color, etc. The lower qualities of yarn are usually sold at discounts from first quality yarn.

Luster in rayon may be varied by the producers by inserting minute particles of titanium dioxide in the spinning solution. If none of these particles is used, the filaments have a smooth surface; thus they reflect light and appear to be bright. But if the titanium particles are introduced into the spinning solution, then infinitesimally rough filaments

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the cotton and wool yarn numbering systems might be called the length-of-a-standard-weight systems; in these systems the finer the yarn the larger the yarn number. Adopted by an International Congress in 1900, the denier system is used universally today for both silk and rayon.

are obtained, light is diffused on striking such yarn, and the surface appears matt or dull. Common rayon lusters are bright, semi-dull, and dull (pigmented). The dull yarn formerly commanded a price premium over other lusters, but today is sold at the same price as the bright yarn.

Rayon can be had from producers tinted or untinted, oiled or unoiled, and with varying turns of twist per inch from no-twist up to a commercial maximum of about seven turns per inch. When more twist is required, it is put into the yarns either by the weaving mill itself or by commission throwsters who specialize in 'throwing' or twisting yarn for the weaving and knitting trades.

Rayon Staple Fiber

Rayon staple fiber or cut rayon is produced by cutting a bundle (tow or rope) of continuous rayon filaments into uniform lengths ranging usually from 1½ to 5 inches. These cut fibers may then be spun into yarn on a cotton, woolen, worsted, or spun silk spinning system. After rayon staple fiber is spun into yarn, it is called spun rayon yarn. While it may seem unnecessary to chop a continuous filament up into short lengths, then reassemble them by spinning the fiber into yarn, there are good reasons for doing so. For various technical reasons and because of the saving in processing cost, rayon staple fiber is sold for about half the price of rayon filament yarn. Almost equally important is the fact that rayon staple fiber may be spun to resemble almost any of the other fibers: cotton, wool, flax, or spun silk. It may be blended with these fibers to ensure greater resemblance to them, or it may be used by itself. Here is price competition from a fiber that in woven fabrics has physical characteristics closely resembling all the other apparel fibers. The rapid growth in the use of spun rayon apparel fabrics in the last few years indicates a fertile field for study of interfiber competition.

Rayon staple fiber is sold in standard lengths and denier sizes per filament depending on the use to be made of it. For example, the 1½" 1½ denier rayon staple is the most

popular for spinning on the cotton system. On the other hand, a worsted spinner requires longer fibers, comparable in length to the wool fibers he would ordinarily use, such as staple of 5″ 5½ denier. A large assortment of lengths and filament size is manufactured. Rayon staple fiber today is made in bright and dull lusters, the latter commanding a price premium over the former in the viscose process, but both lusters being sold at the same price in the acetate process.

Both rayon filament yarn and rayon staple fiber are primary products. Rayon producers' waste, on the other hand, is a secondary product resulting from viscose or cuprammonium yarn production; waste from the acetate rayon process is usually not sold as such, but is redissolved and respun through the spinnerette into rayon filament yarn by the rayon producer.

The characteristics of rayon described above apply in general to the other synthetic fibers as well, so far as they have been developed up to the present time. These other fibers may be grouped as follows:

Group III Natural Protein Fibers

The most important commercial fibers in this group today are those made from milk casein. These fibers generally are produced in the form of short staple fibers rather than in the continuous filament yarn forms. Included in this group are Lanital (Italy); Lactofil (Holland); Casein Fiber (Great Britain); Tiolan (Germany); and Cargau (Belgium).

Also to be included here is the new man-made 'silk' developed by Showa in Japan, and by the Ford Motor Company and the Glidden Company in the United States, the base of which is protein from the soybean.

Similarly, protein-base fibers are made in Japan and Germany by dissolving silk noil or waste and making this into regenerated 'silk' filaments.

Experiments are announced also by the Corn Products Refining Company on another group of protein-base fibers

derived from zein, which is obtained from corn. The trade name of the derived protein is Mazein.

It is reported from Germany, Holland, and Japan that there is some commercial production of fibers with a base of protein from fish, as well as from animal protein sources.

The wide range of these natural protein fibers suggests that many proteins can be used as a base for man-made fibers. Commercial production of fibers in this group is still relatively small, however, with the possible exception of the casein type.

Group IV Nylon—Synthetic Protein-like Fibers

This group of fibers is basically made from coal, water, and air, and has a protein-like structure, but they are not synthetic resin fibers. The generic name for fibers in this group is nylon, officially defined as follows: "Nylon is the generic name for all materials defined scientifically as synthetic fiber-forming polymeric amides having a protein-like chemical structure; derivable from coal, air, and water or other substances and characterized by extreme toughness and strength and the peculiar ability to be formed into fibers and into various shapes such as bristles, sheets, etc."

Group V Synthetic Resin Fibers

These fibers have an all-chemical base (such as vinyl or acrylic) and do not utilize as raw materials any vegetable or animal substances, such as cellulose or protein. Included in this group are Vinyon (United States); Pe-Ce (Germany). The Vinyon itself is a special grade of unplasticized Vinylite, the copolymer of vinyl chloride and vinyl acetate.

Group VI Fibers of Regenerated Cellulose containing Protein

These fibers are made from a mixture of viscose and casein in the spinning solution and are produced in staple fiber lengths only. Listed in this group are Cisalpha, Lacisand (Italy); and Fibramine (Belgium).

Group VII Animalized or Basified Viscose Fibers

The production of these fibers, which possess wool dyeing properties in varying degrees, involves the chemical introduction of nitrogenous groups or synthetic resins which become a physically integral part of the fibers. This material is incorporated directly into the viscose spinning solution or into the freshly-formed fiber by an after-treatment. In this group of fibers are Rayolana (Great Britain); and Artilana, Vistralan (Germany).

Group VIII Glass Fiber

The spinning of glass into fine filaments which may be used either as continuous filament or as staple fiber has been begun recently on a commercial basis by the Corning-Illinois glass works in the United States, under the trade name Fiberglas. This fiber possesses unusual dielectric and thermal properties as well as being non-inflammable.

Group IX Rubber Filaments

Rubber and rubber-like filaments for use as the core of Lastex and similar elastic yarn have been produced for some years by the United States Rubber Company. While not usually thought of as a textile fiber, rubber serves in this particular use in place of a textile fiber.

SILK

Raw silk is a continuous fiber similar to rayon filament yarn. It is included here with the other textile fibers to round out the picture, although in price comparisons silk prices would ordinarily be compared with the yarn prices of the other fibers.

The strand of raw silk is composed of two separate filaments, each originating in one of the worm's pair of silk glands, cemented together by another secretion of the worm, giving the appearance of a single strand. The cementing liquid, known as sericin, which, like the silk or fibroin itself, hardens upon contact with the air, must be

removed from the raw silk before it is dyed. The process of removal is known as the boil-off. The removal of this sericin, necessary to the dyeing and finishing of silk, gives rise to one of the most important economic aspects of the silk industry, weighting. In the boil-off of this gum, silk loses from about 10 per cent to as much as 23 per cent of its weight. The average is about 19 per cent for Japan white silk, and about 2 per cent more for yellow. It is to restore this weight that weighting with tin salts was originally resorted to.

Raw silk is defined as the single strand reeled from cocoons. As the double fiber is about 2½ to 3 denier in size, the single filament would be just half that. Too fine to be used by itself, the silk from several cocoons must be combined to form yarn of commercial sizes. Most raw silk for the hosiery industry is 13/15 denier, obtained from reeling the silk from 5 or 6 cocoons together. Similarly the 20/22 raw silk used in weaving is obtained from 9 to 10 cocoons. The silk within a single cocoon varies widely in quality. Only about half of the thousand or so yards in a cocoon is strong and even enough for reeling. All but the middle half must be discarded as waste. The innermost layers are too fine and weak, whereas the outermost layers, which anchor the cocoon to the leaf or twig, are coarse, rough, and frequently broken.

Commercial silk is either white or yellow.[10] The difference between these two grades arises from the slightly higher gum content of yellow silk. Consequently, a pound of yellow silk contains about 2 per cent less silk and sells at a slightly lower price. Also yellow silk cannot be used as satisfactorily for delicate shades, since it boils off to a pearly white rather than a blue white. Furthermore, it tends to be less elastic than white silk and is accordingly used chiefly in weaving rather than in hosiery.

Grading raw silk turns on three primary qualities: evenness, cleanness, and neatness; and the auxiliary characteris-

[10] There is also a wild silk, or tussah, which is rather harsh and has a natural brownish color that cannot be removed by bleaching.

tics of strength, elasticity, color, and size. The primary qualities, it will be noted, apply to yarn rather than to fibers such as wool or cotton.

The study of raw silk prices over a period is complicated by the fact that a system of grades determinable by objective tests has been set up only within the last ten years. Since silk to meet domestic requirements is wholly imported, the establishment of grades has not been a concern of the Department of Agriculture, as in the case of cotton. In the early days the grading of silk was left to the trade, under the 'chop' system, whereby each importer or dealer sold under his own 'chop' or brand. Each firm dealt in raw silk of more or less uniform grade, or if it carried a range of qualities, set up certain standards of its own, to which presumably it adhered. Grades of one house were not necessarily related to those of other firms. The classification finally adopted by the National Raw Silk Exchange, established in 1928, requires objective tests for evenness, cleanness, and neatness. Samples of the silk are wound on panels and compared under standard light conditions by visual test with a standard set of photographs approved by the trade association for the industry. Variations in evenness of the raw silk and imperfections due to slugs, knots, etc., show up at once. The results of the tests are expressed in percentage seriplane, as 78 per cent seriplane.[11]

Strength is determined by the number of breakages that occur in winding 30 or more skeins at the rate of about 120 yards per minute. Certain tolerances in breakage are identified with each grade. Silk that meets other tests of a certain grade but is defective in strength would be graded down. Usually weakness in winding accompanies a low seriplane rating. The present grading system used in the trade, together with seriplane rating for each grade, is shown in the accompanying table. The grade letters are composites of the various factors included in grade. The standard grade used on the New York Raw Silk Exchange for trading in

11 By agreement in the trade, the U. S. Testing Company has been designated as the official agency for testing silk for grade.

Raw Silk Grade Standards

GRADE	GENERAL EVENNESS BY SERIPLANE	LOW EVENNESS BY SERIPLANE	COMPOSITE PERCENTAGE 17 DENIER AND BELOW	COMPOSITE PERCENTAGE 18 DENIER AND ABOVE
*Special AAA	92	83	90	90
AAA	89	80	88	88
AA	86	77	86	85
A	84	74	84	83
B	82	72	82	81
C	80	69	80	79
D	77	65	77	76
E	72	60	73	72
*F	67	54	68	67
*G	below 67	below 54	below 68	below 67

* Not deliverable against futures contracts on Commodity Exchange, Inc.

futures is grade D, 78 per cent seriplane, 13/15 denier.

Comparison of the grades now current in the trade with those in existence prior to 1928 is quite difficult. The old grades had been established solely by the tests of individual buyers using no uniform method or objective tests. This led to gradual debasement of grade. In 1914, for example, double extra (XX) was the best grade on the market. It was probably equal in physical characteristics to double A (AA) today. However, firms kept developing what purported to be finer grades, such as crack double extra, and later a still finer, super crack double extra. Yet it is improbable that actual improvements in quality occurred. In other words, triple extra (XXX) today is in all probability the same as double extra (XX) was in 1914. Thus, there were many 'old' scales, for the quality, the grading, and the classification of silk have been changed many times. The best that can be said is that when the new scales were adopted in 1928 the market grade, if that term can be used, known as Triple Extra was about equal to A; Grand Double Extra to B; Crack Double Extra to C; Double Extra to D; and Extra to E.

THE CORDAGE FIBERS

One of the most striking examples of inter-fiber competition is to be found among the cordage and twine fibers. Here are some 12 or 15 different fibers, which, since they

are all usable within fairly broad limits for the same or similar products, sell in competition with one another, both to consumers, and to a less degree, to mills.

Cordage is made principally from the so-called 'hard fibers'. A relatively small amount is made from 'soft fibers' but these types have specific uses and are not directly competitive with hard fiber cordage for most uses. Twine is made of cotton, soft fiber, and hard fiber. Hard fiber twines have, to some extent, in recent years, replaced certain soft fiber twines, such as jute twine. Generally, hard fiber twines are produced in the coarser sizes with higher relative strengths, while soft fibers are used for finer twines.

'Soft fibers' have other uses, particularly in woven fabrics. The distinction between hard and soft fibers parallels, in a general way, the botanical classification into leaf fibers, which are obtained from the tissues of leaves, and bast fibers, obtained from the tissues of stems.

The relative importance of the different fibers in the cordage industry is indicated by the different raw materials used in 1935 by the cordage and twine, jute and linen goods industry group, as reported by the Census of Manufactures (Table 7). Demand for the cordage and twine fibers is peculiarly subject to forces external to the industry, particularly the influence of mechanical inventions. The demand for oil well cordage, for example, has been affected by the substitution of wire rope for cable drilling, which in turn was affected by rotary drilling. Similarly the invention of the automatic grain binder about 1880 created an enormous new demand for binder twine, today the largest single product of the industry. More recently the use of the harvesting combine has hastened a reduction in the amount of binder twine needed. In the same way fluctuations in domestic and world grain crops have a direct effect upon the demand for and price of these cordage fibers used for binder twine.

Consumers purchase finished products made from Manila fiber, sisal, jute, and hemp by fiber identification alone. Henequen is often referred to, erroneously, as sisal. Never-

TABLE 7

Raw Materials Used in the Cordage and Twine, Jute Goods and Linen Goods Related Industry Group, 1937

	POUNDS
Hard Fibers *	
Abaca (Manila)	83,791,194
Sisal and henequen	158,923,063
New Zealand fiber	82,643
Istle	10,481,794
Maguey	1,601,768
Other hard fibers (incl. Mauritius fiber)	2,588,113
Total	257,468,575
Soft Fibers *	
Jute	149,791,480
Jute butts and rejections	54,573,869
Hemp and hemp tow	2,863,620
Flax, hackled	8,124,725
Flax tow	2,071,418
Other soft fibers	4,325,231
Total	221,750,343
Cotton	73,224,404
Grand Total	552,443,322

SOURCE: *Census of Manufactures, 1937*

* A fairly large part of the soft fibers was used for purposes other than cordage and twine, such as jute webbing and bagging for baling cotton, carpets, and linen thread. Practically the entire amount of hard fibers, however, was used for cordage and twine.

These statistics apply to the United States alone. Total world consumption is in radically different proportions.

theless, it is common practice to blend different grades and fibers to produce desired variations in strength and price. Hence, competition among the cordage fibers may be either direct or indirect, depending upon consumer specifications or requirements.

Hard Fibers

Hard fibers, except New Zealand fiber, are produced only in the tropics. Native plants yielding fibers suitable for cordage and twine are to be found in practically all tropical countries, but as the quality of fiber obtained from them varies widely, only a few are cultivated commercially. The eight fibers of greatest importance in world trade are: (1) Abaca (Manila fiber); (2) Henequen; (3) Sisal; (4) New Zea-

land fiber, or phormium; (5) Mauritius fiber, or piteira; (6) Maguey, or cantala; (7) Istle or Tampico; (8) Palma. All these fibers, and especially abaca, are often referred to colloquially as hemp, particularly in European countries. In this country, however, the trade generally applies the term 'hemp' only to 'true' hemp, one of the soft fibers, whereas the hard fibers are designated as shown in the above list.

Tensile strength is the basic quality of the cordage fibers, and a fiber must possess this quality if it is to be included in any of the standard grades rather than be classed as 'damaged' or waste. The combined qualities of *cleaning* and *color* are the determinative factors in grading. With respect to abaca fiber, *cleaning* determines the group under which a certain fiber belongs, and *color* determines the grade within this group. Both the stem and leaf fibers are surrounded by vegetable pulp, from which they must be separated. The method of cleaning and the degree of thoroughness of the cleaning process are extremely important factors affecting the quality of the fiber.

Fibers are graded also according to the method by which they are separated from the pulp: hand or spindle stripping, mechanical decortication, and retting. Hand or spindle stripping produces the finest grade of fibers, although the product of mechanical decorticators is of adequate quality for ordinary use, as for binder twine. Retted fiber is always of inferior quality.

ABACA (MANILA FIBER)

Abaca is the principal fiber used in this country in rope where the greatest possible strength for a given diameter is needed. Its special properties of being able to resist rot in salt water, and to absorb large amounts of water-resisting and lubricating compounds, enabling it to remain afloat longer, make it particularly desirable for marine cordage. Since about the middle of the 19th century, abaca has replaced all other fibers, chiefly true hemp, for this use. The substitution has arisen not from a price differential so much as from superiority for a given use.

Abaca, a banana-like plant, is native to the Philippine Islands. The fiber lies in the outer bark of the leaf stems, which grow together much like a stalk of celery, and must be separated from the soft pulp on the inner side of the leaf stem. Fibers range up to about eighteen feet in length, the largest proportion being from six to nine feet.

Because of the rigid strength requirements manila cordage must meet, grading of abaca has been carried to an exceptionally fine point. The grading system currently in use, adopted by the Philippine Government in 1914 and subsequently modified, is based upon the intrinsic quality of the plants from which the fiber is extracted and covers the many forms the fiber takes after stripping, as well as its various uses. There are 42 grades, of which 34 apply to hand stripped and 8 to decorticated abaca. The former includes 6 grades of a superfine quality of fiber, 'Tagal', which is used for hat braids and commands a substantial premium in the market. The largest proportion of abaca is classed among the standard grades, of which there are 18, based upon variations in cleaning and color, with 11 additional grades for 'damaged', tow, and waste.

Abaca is identified in world markets according to the port of origin. A leading port of export today is Davao. Fiber from there is produced on a plantation system mainly by Japanese, and has a somewhat more uniform quality than the product of small producers, which comprises the bulk of the shipments from the ports of Manila and Cebu. Davao fiber is also spindle stripped and is more uniform in length and quality than hand stripped fiber. The unit of sale is the bale of 126.5 kilos net (278.3 pounds net).

SISAL AND HENEQUEN

Henequen and sisal are the principal sources of binder twine, and are also used in twine for tying bundles, etc. They are used also in the manufacture of a relatively small quantity of lower priced cordage. Henequen, produced in Yucatan and often called Mexican sisal, furnishes the bulk of our domestic requirements for binder twine. Sisal, a

botanical species distinct from henequen, was brought to Florida from Yucatan about a century ago and subsequently distributed in various parts of the tropics, particularly in the British colonies of East Africa and in Netherland India.

Abaca matures its first stalks about two years after planting, and continues to be harvested for twelve to fifteen years without replanting. Henequen matures its first leaves after four to seven years of growth, depending on soil and climatic conditions, after which harvesting is continuous for ten to twenty years. Sisal matures its first leaves after two to three years of growth, and harvesting is continuous for four to seven years. Harvesting consists simply in removing about fifteen of the lowest leaves at a time, ordinarily at intervals of about six months.

Sisal and henequen are usually cleaned by mechanical decorticators. The first henequen machines were built in Yucatan, but machines for cleaning both henequen and sisal are now manufactured in several countries.

Grading is much more simple for sisal than for abaca, only five grades being generally recognized in the trade. 'Current clean' is the standard grade for market quotations. Sisal sold on the market is always identified with country of origin. The unit of sale is a bale of about 400 pounds.

OTHER HARD FIBERS

Although abaca, henequen, and sisal are the principal hard fibers used in this country, they are priced in a world market where they come into competition with the other hard fibers. At times substantial quantities of these other fibers have also been used in this country (as was the case with New Zealand fiber up to a few years ago). Some have distinct properties of their own, although for many purposes they are used interchangeably, depending upon price and nearness to the market.

New Zealand fiber is longer than sisal, 5 to 10 feet in length, and is finer and softer than abaca. Because of its fineness it is frequently referred to as New Zealand flax. It is produced from the leaves of the harakeke lily, grown

both wild and cultivated in New Zealand and St. Helena. Since no entirely satisfactory automatic decorticator has yet been devised to clean this fiber, it must be cleaned by several operations, including retting, which places it at a price disadvantage in world markets with machine-cleaned sisal. There are five commercial grades, similar to sisal but with different designations.

Mauritius fiber, because of the method of cleaning which includes boiling in a solution of soap and water, is about half way between the soft and hard fibers, being considerably finer and softer than sisal. It can thus be used for bags as well as cordage. As it is almost white, one of its principal uses has been in mixing with other fibers to lighten the color of rope. The fiber ranges from 4 to 7 feet in length and is obtained from the leaves of the giant Cabuya, a plant grown in Brazil, India, and Natal as well as in the island of Mauritius.

Manila maguey or cantala is obtained from an agave plant native to Mexico, but now grown in Netherland India, the Philippine Islands, and India. This fiber is cleaned in the Philippines by retting and in Netherland India with automatic fiber cleaning machines. It is about the same length as sisal but finer and weaker. It competes with sisal in Continental Europe and the Far East for use in the manufacture of the lower sizes of rope.

Istle, also known as 'Tampico' or 'Mexican fiber', is obtained from the leaves of two Mexican agaves found principally in the desert uplands of northern Mexico. The fibers are from 8 to 20" long, and in addition to being used in cheap twines are used as a substitute for animal bristles in cheap brushes. Palma, also called Palma istle, is about the same length, and used for similar purposes, but is obtained from a tree, yucca.

Soft Fibers

Cotton is used in the United States, in both cordage and twines, in larger quantities than any of the soft fibers. The main product is, of course, wrapping twine, but cotton rope

for clothes lines, braided sash cords, mops, etc., is also important.

'True' hemp (Cannabis sativa) is historically the principal soft fiber for cordage purposes. It is a bast fiber, similar to jute and flax, and, like other bast fibers, is extracted from the stalk by retting. Hemp is still produced in the agricultural regions of southeastern and Central Europe from Italy to Soviet Russia, but has been largely replaced in this country, chiefly by abaca in cordage, and by cotton in many smaller sizes of twine. Some hemp is still produced in Wisconsin and Kentucky, and is designated as Wisconsin or Kentucky hemp in the domestic market. The chief use for it today in this country is in special types of twine and in halibut fishing lines.

Other soft fibers used for cordage include Sunn, a fiber grown in India and consumed mainly in Europe; kenaf, a jute-like fiber grown in various countries; and jute, used principally for twines. Paper twines compete on a price basis with cotton and jute wrapping twines and also have specific uses as 'wool twine'.

Wrapping twines represent a particularly interesting example of inter-fiber competition on a price basis, since so many different fibers are available and so many different grades can be marketed.

JUTE

An especially significant example of inter-fiber competition and one certain to receive increasing public attention is the competition of jute with cotton. Many of the uses now served by jute could be served equally well by cotton: for bags, twine, wrapping material, rugs, and cotton bagging. Uses where cotton would not serve as well are in certain kinds of webbing, insulation, linoleum backing, packing, carpet yarns, and interlinings—uses that account for approximately one-fifth of total domestic consumption.

British India has virtually a monopoly on the production of jute. It is grown in the delta of the Ganges in the densely settled province of Bengal, where abundant native labor is

available for the arduous cultivation and retting required. An increasing amount of the fiber, currently about half of total production, is woven in India into cloth, burlap or hessian, and sacking. More recently the sewing of bags has been begun there.

It has been said that the price advantage of jute in this country is due, on the one hand, to the very low cost of labor in India for producing the fiber, weaving it into cloth and sewing it into bags, and on the other, to relatively low tariffs. Also, that the imposition of a higher tariff to bring cotton and jute to a comparable basis might lead to a broad substitution of cotton for jute, and by the same token, mean higher costs to grain farmers. A study of price relationships of the two fibers should yield interesting results if done impartially without regard to the economic and political interests involved.

United States consumption of jute products amounts to about 8 hundred million pounds per year. It is imported in the raw state, as woven fabric, and as bags (Table 8).

TABLE 8

Imports of Jute and Jute Products, 1937

	(THOUSANDS OF TONS)	(MILLIONS OF DOLLARS)
Jute, raw*	92	8,793
Jute, butts	27	1,133
	(MILLIONS OF POUNDS)	
Waste bagging and waste sugar sack cloth*	63,911	1,803
Jute yarns	4,475	336
Cordage	163	17
Bagging for cotton	....	744
Burlaps	657,724	41,144
Woven fabrics, n.e.s.	2,315	509
Bags or sacks	50,855	2,556
Other manufactures	....	890
Total	....	57,925

SOURCE: Bureau of Foreign and Domestic Commerce

*Free of duty.

FLAX AND RAMIE

Flax enters the markets of the United States almost wholly in the form of woven fabrics and fabricated articles from European weaving centers. Accordingly its significance in price research as a fiber per se is relatively small. Certain amounts of flax or flax waste do enter this country for the production of threads, fishing lines and nets, and toweling, and for mixing with cotton in the production of part-linen goods, but from the standpoint of this report, prices for the woven fabrics are far more significant.

Ramie, or china grass, a bast fiber-like flax or hemp, has never attained commercial importance in this country, although it is used in China and small amounts originating there do enter world commerce.

FIBERS FOR STUFFING PURPOSES

Stuffing fibers may be regarded as of two types: coarse fibers for upholstery stuffing and softer fibers for such purposes as mattresses and bedding. The principal requirements of this group of fibers are to produce bulk without undue weight and to possess a certain amount of resilience. As this involves no direct strain upon the fibers, it is possible to use grades that would have to be rejected for yarn manufacture. Hence short fibers, and waste from all the other fibers, are available for this use and compete among themselves, in part on a price basis and in part on their special properties, together with specialty fibers produced just for padding. For example, for such uses as mattress felts, cotton batting, and surgical cotton, at least three types of cotton are available: cotton linters (i. e., the short fibers removed from the cotton seed after ginning), certain types of cotton waste, and lower grades of raw cotton. Again, in comfortables, cotton, wool noils, and silk waste compete, although on different price levels. For upholstery stuffing a wide range of fibers is available: Spanish moss, obtained from the limbs of trees in swamps along the Gulf Coast, crin vegetal, a product of French Morocco, flax upholstery tow, from the

stalks of flax grown for its seeds, sisal, coir, excelsior, horsehair, etc.

Kapok differs from other upholstery fibers in that it possesses unique properties. Its extreme lightness and resistance to absorption of moisture make it particularly suited to life preserver belts. It is also used for temperature and sound insulation. Owing to its brittleness and the extreme smoothness of the fibers, it is not spinnable, and its usefulness as mattress or upholstery stuffing is limited to five years or so.

Coir (or coconut fiber) is the fibrous mass contained between the husk of the coconut fruit and the shell of the nut and is separated from the husk by a retting (or soaking) process. There are three main types: (a) curled fiber, a short variety used for mattresses or for stuffing upholstery as a substitute for horsehair, etc.; (b) mat fiber, the finest quality, used in the manufacture of ropes, twines, and matting; (c) bristle fiber, a coarser and thicker quality, from which brushes and brooms are manufactured. The extraction of coir for manufacture and foreign trade is almost entirely confined to India and Ceylon, where the industry is carried on in the villages.

THE TEXTILE FIBER MARKETS

With the exception of rayon, the leading textile fibers are all products of agriculture. Their primary markets are accordingly characterized by fairly large fluctuations in yield and production arising from climatic conditions, by a large number of sellers, usually under the necessity of disposing of their product quickly, and by a certain amount of governmental supervision over the marketing process.

Spot and Futures Markets

Only small amounts of textile raw materials are purchased directly by mills from growers, since the mills' requirements as to grade cannot readily be adjusted to the year-to-year fluctuations in quality of any given set of producers. Growers' markets must, therefore, necessarily exist for as-

sembling agricultural products for ultimate distribution through central markets. In these growers' markets the primary producers sell their crop to local merchants or other country buyers. The prices in these markets, commonly termed, 'prices received by farmers', represent sales only during that part of the year when farmers are disposing of their crop. Price series of this kind are compiled by the United States Department of Agriculture for cotton and wool based upon returns from special price reporters. They are released in the form of monthly and weighted average seasonal prices by states and for the United States. The most representative price series are those for the central spot markets to which farmers ship the largest part of their product for sale through a factor or commission merchant. Here transactions are carried on between purchasers representing mills, exporters, and other interests on the one hand, and commission merchants, shippers, factors, and other representatives of growers, such as growers' co-operatives on the other. Sometimes there is only one central market for a fiber, such as Calcutta for the jute trade. Usually, however, many of these market centers are scattered over the growing area, all important in the assembling and marketing of the crop but tending in pricing to follow the leadership of some one or two central markets in which all leading buyers and sellers operate. Thus in the cotton belt almost any city with a population of 25,000 or more is regarded as a market center, but New Orleans holds the leadership in spot pricing.

For cotton and silk, futures markets exist in this country and for some of the other fibers futures markets may be found in England, on the continent, or in the producing country (Table 9); recently, Japan established a rayon futures market. In these futures markets, contracts are entered into for the delivery of standard grades of the commodity for specified future deliveries. These prices are the familiar 'futures' prices and are identified by the particular month in which delivery is to take place, usually the nearest active month being referred to as 'the' futures market quotation.

TABLE 9

Market Centers for the Textile Fibers

	LEADING WORLD MARKET	U.S. MARKET CENTERS	OTHER IMPORTANT MARKET CENTERS
Cotton	Liverpool * New York *	New York * New Orleans * Chicago *	Havre *, Bremen *, Osaka * (U.S. crop) Bombay * (Indian crop) Alexandria * (Egyptian crop) Shanghai * (Chinese crop)
Wool	London (apparel) Liverpool (carpet)	New York * (tops) Boston (apparel) Philadelphia (carpet)	Sydney, Wellington, Buenos Aires, Cape Town, Antwerp *, Roubaix *
Mohair	London	Boston	
Silk	Yokohama * Kobe *	New York *	Milan, Lyons, Canton
Abaca	Manila	New York	London
Henequen	Merida	New York	
Sisal	London	New York	Amsterdam
Hemp	Various	New York	Naples, Odzaki (Hungary), Belgrade, Bombay, Calcutta
Jute	Calcutta * London *	New York	Hamburg, Trieste, Genoa, Dundee
Flax	Leningrad		Courtrai, Riga

* Futures Market.

The relation of this market to the spot market has been particularly well stated by Bradford B. Smith with respect to cotton: [12]

"The price of cotton is determined largely in the futures markets, although the spot situation may be and often is an important factor. Since cotton may be sold or bought for delivery in future months, a purchaser, in effect, can place his order for his future needs and a seller can provide for the disposition of his cotton when it becomes available. In the meantime an operator can buy from one and sell to the other, thus evening up the operation. In case the price for future delivery goes much higher than the current price the operator buys the cotton in the spot market and sells it for delivery in the future month at the higher price, carrying the cotton over the intervening period. The continuation of this process tends to bring the prices together. A similar purchase in one market and simultaneous sale in another, known as a straddle between markets, tends to keep prices in the two markets within a margin equal to the cost of transportation between them. As a result, all the prices at the central and futures markets, as well as at the local farm markets, tend to move together, both as between markets and between months for future delivery. Since it is in the futures operation that anticipated needs are met, and since, by the mechanism of straddles, such needs are averaged out and communicated to the spot markets, it may be said that the futures markets determine the price."

Spot prices are generally available for all fibers, in at least one or more markets, even where there are no organized exchanges or markets. In the case of wool, for example, Department of Agriculture representatives interview both

12 Factors Affecting the Price of Cotton, Technical Bulletin 50 (U. S. Department of Agriculture, 1928).

Some modification of this explanation is desirable today in the light of conditions in the cotton market that have prevailed recently. A more accurate general statement would be: "The large swings in prices of spot cotton are generally associated with more or less similar changes in prices of cotton futures contracts for the near-active month. But these prices do not always change by the same amounts or in the same direction." (L. D. Howell, 'Cotton Prices in Spot and Futures Markets', Technical Bulletin 685, U. S. Department of Agriculture, 1939.)

TABLE 10

Selected Sources of Fiber Prices and Related Data

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
	A RAW COTTON		
15/16" middling [1]	*Daily Official Report of Designated Spot Cotton Markets* pub. by Department of Agriculture office at Atlanta	Daily average spot price based on quotations in the ten leading markets	Data on production, ginnings, consumption, stocks on hand, imports, and exports comp. monthly by Census in terms of origin (domestic and foreign). Receipts into sight comp. by New Orleans Cotton Exchange; imports and exports by BFDC
15/16" middling [1]	New York Cotton Exchange	Futures, nearest active month, closing price	
Staple cotton 1 3/16" middling, delivered to N. E. mill points 1⅛" middling, delivered to N. E. mill points 1 1/32" middling, Memphis Territory and Western delivered to Carolina mill points 1" middling, Memphis Territory and Western delivered to Carolina mill points ⅞" middling, Memphis Territory and Western delivered to Carolina mill points	*Cotton Market Review*, issued weekly by Department of Agriculture office at Washington, D. C. and Memphis	Premiums for grade and staple	

[1] Base staple length of cotton for futures contracts changed August 15, 1939 from ⅞ to 15/16 of an inch.

B RAYON STAPLE FIBER

Rayon staple fiber Viscose, 1½", 1½ denier Acetate, 1½", 1½ denier	Prices pub. in trade papers; e.g., *Daily News Record, Commercial Bulletin*	Weekly prices for luster, semi-luster, and dull cut fiber in Boston market	Production data comp. by Textile Economics Bureau; pub. in *Rayon Organon.* Imports comp. by BFDC

C RAW SILK

Japan 13–15 denier 83% seriplane (grand crack double extra) Japan 13–15 denier 78% seriplane (crack double extra) Japan 20–22 denier 81% seriplane yellow (special crack double extra) Japan 20–22 denier 81% seriplane white (special crack double extra) Italian 20–22 denier 83% yellow	Prices pub. in trade papers; e.g., *Daily News Record, Journal of Commerce.* Also certain grades in *Daily Market Report on Raw Silk* of Commodity Exchange, Inc.	Prices quoted daily for Japan raw silk in N. Y. market; also Raw Silk Futures prices on N. Y. Commodity Exchange. Foreign spot and futures prices pub. for the Yokohama and Kobe markets	Imports and exports comp. by BFDC. Into-sight movements, mill takings, stocks by countries of origin in monthly statistical suppl. to *Daily Market Report on Raw Silk* of the Commodity Exchange, Inc.

D RAW WOOL

Apparel Class, Domestic, Boston 64s, 70s, 80s, French combing, graded territory, scoured basis [2] 56s, ⅜ blood, combing, graded territory, scoured basis 48s, 50s, ¼ blood, combing, graded bright fleece, scoured basis Pulled, B super, scoured	*Weekly Review of the Wool Market* pub. by Agricultural Marketing Service, Boston, Mass.	Weekly range of sales based on interviews with dealers, top-makers, and mill buyers; when sales negligible, quotations asking prices of dealers. During recent years quotations on foreign apparel wools largely nominal except for occasional buying spurts	Data on monthly consumption by mills and quarterly stocks in hands of mills and dealers pub. by Census in terms of origin (domestic and foreign, no breakdown of domestic by territory and fleece), class type (shorn or pulled), grade, and staple or system on which consumed. Weekly import data for three chief ports and monthly for entire country pub. by Departments of Agriculture and Commerce, respectively, classifications comparable to those used by the Census
Apparel Class, Foreign, Boston (in bond) Australian 64s. 70s, good average scoured basis Montevideo 1s, 56s, grease basis Montevideo 2s, 50s, grease basis	Same source as Domestic		

[2] Grade from which top is made that is most freely traded in both in spot and futures markets.

TABLE 10—*(Continued)*

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
Carpet Class China, scoured basis B. A. 6s, scoured basis India, Vicaneer, scoured basis Scotch Blackface, scoured basis	Prices on grease basis pub. in trade papers; e.g., *Daily News Record,* Monday issue; *Commercial Bulletin, Journal of Commerce, American Wool and Cotton Reporter*		Same as Apparel Class
	E CORDAGE AND OTHER FIBERS		
Manila, I, fair, current, c.i.f. N.Y. Manila, Davao, I, c.i.f. N.Y. Henequen (Mexican), current clean, c.i.f. N.Y. Sisal (Java), grade A, c.i.f. N.Y. Mauritius fiber, prime, c.i.f. N.Y. Jute, first, actuals, c.i.f. N.Y. Hemp (Italian), G (duty paid), c.i.f. N.Y. Flax (Dutch), c.i.f. N. Y. Kapok, prime Japara, c.i.f. N.Y.	Selected prices pub. in trade papers; e.g., *Commercial Bulletin, Journal of Commerce, Daily Mill Stock Reporter, Cordage Trade Journal,* or available from importing firms	Weekly prices in N. Y. market	Imports comp. by BFDC

dealers who are offering wool and top-makers and mill buyers who are looking for wool. The quotations represent actual sales to the extent that significant transactions have occurred; for grades on which sales have been negligible, the quotations are the asking price of dealers, or if available, bid and asked prices. In other fiber markets, where organized exchanges or government compilation of prices is lacking, various trade papers or brokers frequently compile price information for release to the trade daily or weekly. (See Table 10 for detailed information on Sources for Spot price data of the various fibers.)

For cotton and wool the Bureau of Agricultural Economics compiles quotations which are accepted by the trade as representative spot price series. For cotton this price series is in the form of a daily average price of spot cotton for the 7/8" middling grade, based on prices quoted in ten leading spot markets: Norfolk, Augusta, Savannah, Montgomery, Memphis, Little Rock, Dallas, Houston, Galveston, and New Orleans. For apparel class wool it is in the form of a weekly average of prices of domestic [13] and foreign apparel class wool in the Boston wool markets.

The market for raw wool has not so far been organized around a futures market as has that for cotton and silk, since the delivery of wool in homogeneous units, which might be sold by sample or grade, would be exceedingly difficult. Not only are the classifications as to quality much broader than in the case of cotton, for example, but decisions as to quality must necessarily be largely a matter of individual judgment owing to the absence of definitive standards. Since 1931, however, a wool top futures market has existed in this country, which serves to some extent as a hedging market for the wool trade.

[13] The term 'domestic' has a special meaning with respect to wool in addition to its general use in reference to wool of domestic origin. During the 19th century, when most of our domestic wools were produced in the Ohio valley, the term 'domestic' was applied to wools from that area to distinguish them from wools from the great plains 'territories' west of the Mississippi, to which the raising of sheep was then being extended. 'Domestic' wools are today more frequently termed 'fleece' wools.

Apparel wool is sold abroad at auctions. Such sales have taken place for almost a century in London, Liverpool, Antwerp, Bremen, Hamburg, Marseilles, and recently in Australia. This method of marketing has been little used in this country, partly, no doubt, because wool is not graded at shearing sheds and partly because wool growing is spread over so vast an area. The bulk of the American clip therefore passes through the hands of dealers in the leading market centers of Boston, Philadelphia, New York, Chicago, and St. Louis. Imported wool passes through these same markets, particularly Boston for apparel wool, and New York and Philadelphia for carpet class.

Wool of domestic origin supplies by far the largest part of the United States apparel wool consumption, varying in recent years from 65 to 90 per cent of the total. A high protective tariff makes for priority of the domestic apparel clip in the American market. All our carpet class wool, however, is imported. There is no tariff on this class of wool or on low grade apparel wool (not finer than 40s) if used for floor coverings, press cloths, knit or felt boots, or heavy fulled lumberman's socks, etc.

The domestic market for raw silk, like that for cotton, tends to center around the New York futures market. Organized in 1928 by Commodity Exchange, Inc., the New York futures market is the principal center for pricing of raw silk in this country.

For these three fibers, cotton, wool, and silk, the domestic price is peculiarly sensitive to fluctuations within this country, in either supply or demand. The United States is the largest producer of raw cotton and accordingly exerts a marked influence upon the world price. Similarly, it is the largest consumer of silk, so that world prices are largely dependent upon purchases of raw silk by American mills. The high tariff on wool, together with the adequacy of our domestic supply of clothing type wool, places us in a different position with respect to the world market than for these other fibers. Likewise for mohair, our domestic production approximately equals our needs. With respect to

the other textile fibers, jute, and the cordage fibers, the United States is only one factor in a world demand where other countries exert an equal or even greater influence.

Adjustments in Price for Quality

Foreign matter or excess moisture in the fibers, and the wide range of qualities, are further important factors in pricing textile fibers. Silk, wool, and abaca readily absorb large amounts of moisture—in fact, their hygroscopic qualities are among their most important; they must accordingly be 'conditioned' before the actual weight of fiber in a given lot of goods can be determined. For this purpose conditioning warehouses are important adjuncts to the market.

Wool in the natural state as it comes from the sheep's back, furthermore, contains a large amount of natural grease, and also, besides dust and vegetable matter, a considerable amount of dried perspiration or suint. Altogether, this foreign matter may constitute from 20 to 80 per cent of the total weight of the fleece. Wool prices quoted in the 'grease', therefore, vary not only with grade, staple, and general character but also with expected shrinkage during the scouring process. When wool prices are quoted on a 'scoured basis', it means that account has been taken of the probable yield of scoured wool that would result under ordinary commercial scouring. Such prices do not include actual cost of the scouring operation. If wools are quoted 'scoured', which is the customary practice for pulled wools, it means that the wool has been scoured, thus removing the grease and other foreign matter, and that the scouring charges are included in the price.

Variations in grade and staple are reflected in each fiber market, and are reported in detailed price quotations for the fiber. For fibers sold on a futures exchange, such as cotton and silk, where transactions are carried on in some one standard grade, some means for establishing the price differential for grade and staple at the time when delivery is due, must be provided for. In the case of silk this was, until July 1938, taken care of by a committee of the New

York Commodity Exchange, which once a month, or oftener if required, fixed the grade differentials. In the new contracts in force since that date, certain differentials are fixed for each grade, amounting to so much per pound over the base grade.

For cotton the Department of Agriculture compiles each day the current differentials for all grades established by law and for a wide range of staple lengths, for use in the settlement of futures contracts as well as for other purposes. These differentials are compiled in the form of daily averages for the ten spot cotton markets designated by the Secretary of Agriculture for use in determining the differentials to be used in the settlement of contracts traded in on any of the three domestic futures exchanges. The differentials are expressed in terms of points to be added to ('on') or subtracted from ('off') the quotations for futures contracts. The Atlanta office of the Bureau issues a daily report giving most of these differentials.

Futures contracts for cotton usually include in the price freight to some designated point, whereas spot sales represent only the value of the cotton in a particular market center. Inclusion of warehouse charges in the price varies from one market center to another.

The units of trading vary from one fiber and one country to another. On fibers of domestic origin prices in the United States are quoted in cents per pound, as in the case of cotton, wool, and mohair. Silk in Japan is quoted in yen per picul bale, containing 133⅓ pounds of silk. Italian silks, on the other hand, are packed in bales of about 200 pounds, etc.

The Rayon Market

The market for rayon is fundamentally different from all other textile fiber markets. This difference arises from the fact that the rayon fiber is itself a manufactured rather than an agricultural product. It is different also in that there are no intermediaries in the sale of the fiber to users: rayon producers usually sell directly to mills rather than through

countless assemblers, brokers, or commission merchants, as in the case of a fiber like cotton.

Prices are made by the eighteen rayon producers in this country in the form of list prices. These cover the very large range of different sizes of yarns, together with all the combinations of luster, quality, type of put-up or package, etc. Prices for both rayon staple and rayon filament yarn, like the prices of most manufactured products involving relatively large amounts of fixed labor and capital costs, tend to be fairly stable, with rather infrequent changes during the merchandising season. This is in contrast to the wide day-to-day fluctuations in prices of agricultural fibers, arising in large part from the absence or abundance of rainfall in some near or remote corner of the world.

Rayon prices, like prices of all other manufactured textiles discussed in this report, are subject to slight variations not indicated in the list prices. Thus for several years most of the rayon producers maintained a quantity discount system whereby large users obtained a discount up to 5 per cent for purchase of rayon in quantities of 1,000,000 pounds per year or more. These quantity discounts were discontinued in 1936, concurrent with the effective date of the Robinson-Patman Act. Trading prices, as for other manufactured textiles, are of varying importance, being more likely to occur in prolonged slack periods where an open change of the list price during the season would unsettle the market rather than increase sales. Rayon producers have at times guaranteed their prices against decline during a stated period in order to assure a steady flow of their product. But this practice was last used in 1937. One of the most interesting aspects of rayon has been the improvement in quality in addition to, and independent of, price reductions. The improvement in the technology of yarn production and fabric construction, the steady reduction in prices over the last twenty years, and the accompanying steady increase in consumption, is an almost perfect example of elastic demand with increasing values and decreasing prices.

PROCESSED FIBERS

Under the heading processed fibers are two types of products:

1) Fibers that have undergone some manufacturing beyond the state in which they appear in the raw fiber markets, but that have not yet been spun into yarn.
2) Wastes of all kinds, including byproducts of textile manufacture.

WOOL TOPS AND THE WOOL TOP MARKET

Only for wool and spun rayon are there important markets intermediary between the raw fiber and yarn. They have arisen from the fact that long and short wool fibers lie intermingled in the fleece. Since the worsted system of manufacture is dependent upon the exclusive use of long fibers, their segregation in the form of 'tops' is essential. This is done in the combing process, which removes the shorter fibers called noils, and delivers the 'tops' in the form of a continuous strand of parallel fibers to be subsequently drawn and spun into worsted yarn.

The organization of top making into a specialized industry in this country, rather than as part of the vertically integrated process of worsted manufacture, has expanded rapidly in recent years. At present about half of the wool used by worsted mills is bought in the form of top against only a quarter ten years ago. Reasons for the organization of this separate trade and the introduction of an important new market in the chain of manufacture include the desire of integrated worsted mills to shift a part of their inventory risk, since tops can be bought in smaller quantities and nearer to the time of actual use. Another reason is the ability of specialist top-makers to produce desired qualities of tops at lower costs by selecting the right wools and blending them in the right proportions, and by keeping the equipment of the commission combers on whom they rely operating at a higher rate than that of mills with their own combing departments.

Tops are identified with the grades of wool from which they are combed. They may be designated by either the blood or the numerical system; sometimes the origin of the wool, such as territory wool, is also specified. Tops are produced for both the English or Bradford and French systems of spinning; that is, oiled and dry combed. Oiling involves the addition during the combing process of olive or mineral oil to the extent of about 3 per cent of the weight of the wool. Oil makes the fiber more pliable and easier to handle, particularly the coarser grades, the French system of dry spinning being ordinarily used to spin the finer grades of wool tops.

Practically all the spot trading in wool tops is done on makers' standard grades. Each top-maker has his own trade name so that comparison between grades of different top-makers to establish market prices is sometimes difficult. On the whole these grades tend to approximate the different grades of wool used generally in the trade.

In addition to this spot market, which centers in Boston, there has been since 1931 an important futures market in tops, the New York Wool Top Exchange, conducted by the Wool Associates of the New York Cotton Exchange. This serves as a hedging market for the apparel wool trades.

Prices for wool top futures, while not identical with spot prices, are more readily available and serve to indicate general price movements. Trading is conducted in a single quality, American Fine Top, made from average 64s domestic wool, oil combed, and of average length and color. Deliveries may be made in other grades of tops, however, subject to a premium or discount depending upon their quality relative to the Exchange standard.

RAYON TOPS

The sharp rise in the price of wool during 1936-37, which took it well above its range over a decade, encouraged the processing on a large scale of rayon staple fiber and waste as wool substitutes in the worsted industry. More recently, style as well as price factors have contributed to a contin-

uance of this blending to obtain a wide variety of effects in both low- and high-wool-content fabrics. In blending with wool in tops for worsted machinery, the rayon waste or low grade staple fiber used for this purpose must first be converted into tops by combing out short or broken fibers. The resulting product closely resembles wool tops and can be combined with the latter in the drawing operation. Like the manufacture of wool tops, rayon tops tend to be produced by specialized top-makers for sale to worsted mills.

After 1937, with the sharp decline in the price of wool to a relatively low level, the use of rayon tops by wool manufacturers fell off sharply. Their future use on any large scale will probably be handicapped by fiber identification requirements. Worsteds are characteristically higher priced fabrics and are generally regarded as all-wool fabrics, so that mixtures are undoubtedly at a disadvantage in competition with all-wool worsteds. This statement presumes that rayon staple fiber is used as an adulterant with wool and not for any unique qualities of its own, a viewpoint that is changing somewhat today.

TYPES OF WASTE

Waste originates at all stages in the processing of textile fibers, although it seldom attains a status that would justify the dignity of the word 'byproduct'. The production of waste provides an important source of materials for use in place of the raw fibers themselves. The relation between waste and fibers is continually shifting in accordance with price movements in the world commodity markets. Waste materials may either re-enter the flow of manufacture, by being 'processed' or rehandled in some way, in which case they compete directly with raw fibers; or they may be disposed of for certain other purposes requiring a lower priced material. Some of the principal uses of wastes are:

a) *Reworking*—for re-entry into the flow of manufacture. Wastes from all stages of production are eligible for this use, although only in wool and rayon are wastes beyond the roving stage processed for re-manufacture into yarn.

TABLE 11

Common Types of Waste

STAGE OF MANUFACTURE	COTTON	WOOL	FILAMENT RAYON	SILK	CORDAGE FIBERS	JUTE
Fiber preparation	Cotton linters, short fibers attached to the cotton seeds	Noils, from combing out tops		Filature waste, outer and inner portion of cocoon, and waste in reeling Pierced cocoons Dupionne	Tow waste	Jute butts or cuttings
Yarn manufacture or preparation	*Soft waste* Picker waste Card strips Vacuum strips Comber noils Fly waste *Hard waste* Thread waste *Sweepings* Yarn waste	*Soft waste* Card waste Tops waste Lap waste Slubbing Roving Ring waste *Hard waste* Thread or yarn waste *Sweepings* Yarn waste	Producers' waste Throwsters' waste Mill waste Yarn waste	Throwsters' waste Mill waste Yarn waste	Mill waste	Mill waste
Weaving and knitting	Weave room patches Mill ends or short lengths	Mill ends	Mill ends	Mill ends		Mill ends
Finishing	Napper waste Pound goods	Napper and shear waste Finishers' flocks				
Fabrication	Clippings	Clippings	Clippings	Clippings		
Articles for re-use	Old rags, woven and knit	Old rags, woven and knit	Old rags, woven and knit	Old rags, woven and knit	Old rope	Old bags and burlap

TABLE 12

Selected Sources of Processed Fiber Prices and Related Data

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
	A COTTON LINTERS		
Linters, U. S. No. 2 Linters, U. S. No. 6	Department of Agriculture weekly report, pub. also in *Daily Mill Stock Reporter*	Transaction prices, f.o.b. mill	Data on production, exports, and imports comp. monthly by BFDC. Annual estimate by Department of Agriculture showing production by grades
	B COTTON WASTE		
Card strips, No. 1, upland strips Comber noils, No. 1, peeler comber waste	Mill sales prices pub. by Southern Combed Yarn Association for Charlotte market. Dealers' quotations in Boston market pub. in *Daily Mill Stock Reporter* and *Commercial Bulletin*	Dealers' prices, f.o.b. shipping point	Imports and exports comp. by BFDC
	C RAYON TOPS		
Tops from rayon waste Bright Dull Tops from cut fiber Domestic, bright Domestic, dull Foreign, bright	Prices pub. in trade papers; e.g., *Commercial Bulletin,* or *Daily News Record*	Weekly prices of dealers in Boston market	Imports comp. by BFDC
	D RAYON WASTE AND NOILS		
Rayon waste Open Thread Rayon noils Bright Dull	Prices pub. in trade papers; e.g., *Commercial Bulletin, Daily News Record*	Weekly prices of dealers in Boston market	Imports and exports comp. by BFDC

E SILK WASTE

	No published prices	Imports and exports comp. by BFDC

F WOOL TOPS

New York futures price 64s, 70s, 80s, Territory tops	*Daily Market Report* of N. Y. Wool Top Exchange	Daily futures price
Fine staple Territory 64s Fine dry combed Territory 64s ⅜ blood staple (56s) ¼ blood staple (50s)	Prices pub. by trade papers; e.g., *Daily News Record, Commercial Bulletin*	Weekly prices in Boston market

G WOOL NOILS

Fine white noils ½ blood noils ⅜ blood noils ¼ blood noils	Prices pub. in trade papers; e.g., *Commercial Bulletin, Daily News Record, American Wool and Cotton Reporter*	Weekly prices in Boston market

H WOOL WASTES

Lap waste Ring waste Thread waste	Prices pub. in trade papers; e.g., *Commercial Bulletin, Daily News Record, American Wool and Cotton Reporter*	Weekly prices in Boston market

I REWORKED WOOL AND SHODDY

	No pub. prices	

J WOOL RAGS

Ungraded rags Mixed softs (N.Y.) Rough cloth Old graded rags Blue serges Black and white worsteds Graded clips Fine mixed clips Black and white worsteds	Prices pub. in trade papers; e.g., *Commercial Bulletin, Daily News Record, American Wool and Cotton Reporter*	Weekly prices of dealers in Boston market. Also buying prices of grades in N. Y. market

		Imports comp. by BFDC

		See Raw Wool. Quarterly stocks of wool tops by grades comp. by Census. Imports comp. by BFDC

		See Raw Wool. Quarterly stocks of wool noils by grades comp. by Census. Imports comp. by BFDC

		Imports comp. by BFDC

b) *Stuffing purposes* (including surgical cotton)—cotton linters and other wastes, for padding, wadding; wool noils and waste for comfortables; hard fiber tow for upholstery stuffing, etc.

c) *Cleaning and Wiping purposes*—cotton hard wastes, cloth patches, etc.

d) *Paper Making*—wastes of all fibers, usually woven-fabric waste, especially cotton rags for writing paper; cordage fibers and jute for 'manila' paper, corrugated cartons, etc.

e) *Chemical Products*—especially cotton linters, for cellulose acetate and nitration products, such as rayon and gun cotton.

The basic classification of wastes is that of the process in which the waste originates. The major forms of waste for the various fibers are tabulated in Table 11, and sources of price data in Table 12. Wastes occurring at any stage prior to the actual spinning of the yarn are termed 'soft' wastes. Yarn and subsequent wastes are called 'hard', since they must be passed through a garnetting machine to reduce them to a mass of fibers that can be used again as a raw material. Soft cotton wastes are similarly classed as spinnable or non-spinnable. This distinction is none too sharp since some grades of waste that are spinnable are not usually used for that purpose. For example, cotton card strips, although spinnable, are usually used in the better grades of batting and wadding.

The largest volume of mill wastes originates in the processes prior to weaving, for an obvious reason. What in yarn manufacture would correspond to waste, in gray or finished cloth is turned out as 'seconds', 'thirds', 'mill ends', 'short lengths', 'pound goods', etc., and is disposed of through regular channels of distribution. Waste occurs also in the cutting-up operation, for no matter how carefully the cutter lays his pattern, small scraps of cloth must always be cut out between sections of the pattern. These scraps, together with old rags, can be reconverted into fiber by passing them through a card or garnett which unravels the cloth structure

until it is reduced to fibers. For the more expensive fibers, this 'reworked' processed fiber may re-enter the productive process through blending with raw or other fiber. This use is limited largely to wool, rayon, and silk, the reworked fiber for all three going chiefly to the woolen trade for 'blending' with wool and sometimes cotton. Cotton clippings and rags and reworked jute and cordage fibers go almost exclusively to the paper trades.

Wastes of the same grade vary considerably in quality from one mill to another. Some mills maintain sorting departments and thereby obtain a better price. The large waste dealers clean and willow their purchased waste and, from experience over a period of time, have acquired a knack of grading it despite the absence of objective standards, so that to a certain degree they can deliver a fairly uniform product.

Boston tends to be the central market for all types of textile waste; wool, cotton, and rayon. Other cities are also important, such as Charlotte for cotton and New York for wool rags. Usually there are two markets for waste: that in which the producer disposes of his waste to a dealer, who assembles and grades it; and that in which the dealer disposes of it. Both are closely dependent upon the primary markets for leadership in pricing.

Mill sales prices on combed yarn wastes have been compiled and published by the Southern Combed Yarn Spinners Association for several years. This is one of the few if not the only waste market where prices for the first of these two markets are available. The absence of quotations is to be explained in part by the fact that many mills enter into contracts with dealers who agree to take their entire output of certain grades of waste over a year or more at a price bearing some fixed relation to the raw material price. For the most part the price series now available are the asking prices of dealers.

The complexities of organization of the waste trades are frequently quite baffling. Yet the importance of waste as a type of byproduct, and of reworked fiber as a substitute

for new raw materials, makes the inclusion of the waste trades essential to a complete understanding of fiber price action. After all, the utilization of textile wastes in some way is an inevitable aspect of our scarcity economy.

COTTON LINTERS AND COTTON WASTE

Cotton Linters

In the ginning of cotton a special type of waste, known as cotton linters (ginned or staple cotton is referred to as 'lint'), is produced. These are short fibers of 1/4" to 5/8" in length which adhere to the cotton seeds. For the most part they are too short for spinning and are used for stuffing, mattress felts, and surgical cottons, as well as chemical cellulose products such as rayon, plastics, lacquers, and munitions. There are three basic classes of linters, determined by the number of times the seed is passed through the cutting or delinting machine. If passed through just once, the linters are referred to as first cut. These fibers are longer than second cut. Seven official grades have been developed and standardized by the Department of Agriculture, the best being U.S. 1 and the poorest U.S. 7.

The producers of linters, cottonseed crushing mills, are all in the cotton growing states. Closely related to cotton linters production is the production and sale of cottonseed and its products such as cottonseed oil. Some persons hold that the cottonseed itself is the primary product and that the linters are a secondary product in its manufacture. While there is some correlation between the size of the cotton crop and the linters production, this is not always true because of (a) the production of cottonseed oil products and (b) the fact that more or fewer (deeper or thinner) cuts of cotton linters may be taken from the seed. Cotton linters prices are influenced by the supply of and demand for them, and also to some extent by the price of raw cotton itself. The range of prices for each grade varies according to the color, character, quantity of foreign matter included, and the quality of the particular producer.

The unit of sale is a bale weighing 600 pounds, although actually bales may vary in weight from 500 to 700 pounds.

Cotton Waste

The term 'cotton waste' is almost exclusively applied in the trade to waste obtained in yarn manufacture. Non-spinnable waste, that is, thread or yarn waste, is sold principally for use as a wiping material for machinery and for stuffing, where it competes with certain grades of cotton linters, kapok, and other upholstery stuffing materials.

Spinnable cotton waste may either find its way back into the yarn preparatory processes or be used for batting and wadding. Many mills sell their less easily utilizable wastes. At times there are price advantages in using some of these grades of waste, since their prices do not always move in exact accord with cotton. Again some mill may have purchased a special grade of cotton to fill a contract for a certain construction of cloth. When the contract has been filled, the waste is still on hand, and may bring a higher price in the waste market than if mixed with other cotton and used to produce some other fabric. Or it may not be a suitable type of cotton for the other products of the mill. Operation in the waste market in preference to using the waste in the mill or to buying new cotton is one of those fine points of judgment in mill management that deserves attention in a study of pricing policies.

Cotton waste is classified according to the length of fiber and amount of foreign matter, much as cotton itself is. It is always identified with the specific operation where it originated. About twenty grades are recognized in the market, but inasmuch as standards are not established by law as in the case of raw cotton, each mill's product may be said to be a grade in itself.

Comber waste, which contains the greatest number of long fibers of any waste produced, stands near the top of the list in quality, being surpassed in price only by such specialties as 'card strips' from Egyptian (Sakellarides) cot-

ton and No. 1 white spinner. From there the list runs on down to sweepings and motes.

Prices for card strips and comber noils are given as percentages of the price of New York spot cotton. This basis is used because of the close relation between these two grades of waste and raw cotton. Ordinarily the relation varies between 75 and 90 per cent of New York spot prices, but during the processing tax period the ratio was above 100 per cent, since New York spot prices did not include the processing tax, whereas the price of waste included the tax, which amounted to approximately 20 to 30 per cent of the raw cotton price. Prices of all grades of cotton waste are quoted in cents per pound with a range to indicate the highest and lowest quality. When demand is strong the range is narrow. Prices of all grades of waste tend to move together as there is very little opportunity for the price of one grade to remain out of line long, the possibilities of mixing and substitution being almost unlimted.

WOOL NOILS AND WASTE

Noils, a byproduct of the worsted combing operation, serve as one of the basic raw materials of the woolen industry and are used by woolen mills together with clothing type wool and reworked wool mill waste for the production of woolen yarn, and by felt mills for the production of felt. As taken from the comb, noils consist of the shorter fibers which contain varying amounts of straw, burrs, and other extraneous matter. The removal of this vegetable matter by means of various chemicals is known as carbonization. Noils are identified according to the grade of wool from which they are combed, as fine, half-blood, etc. They are sold both as carbonized and un-carbonized, the latter being the more important.

Wool wastes similarly are classified according to the grade of wool from which they are derived, as well as being identified with the process in which they originated. Most wool wastes are produced by the worsted branch of the industry. Woolen mills tend to utilize their own wool waste

by mixing it with other stock to be carded. The only regular quotations on soft wastes are for card, lap, and ring wastes. 'Thread' wastes constitute the more important type, so far as volume is concerned, and may be sold in their natural state as a hard waste or as fiber after garnetting.

WOOL RAGS

The wool from rags may be sold either as rags or as reclaimed or reworked wool or shoddy. While many woolen mills using this type of material purchase it in the form of rags, a separate reworked wool industry does exist which recovers fiber from rags and sells it to mills. There are, however, no recognized grades of recovered fiber, all market news in this field being written in terms of the rag market.

Wool rags are of two types: used rags, 'mixed country rags', or 'mixed stock'; and new wool rags or 'clips', remnants from the cutting tables of garment manufacturers, plus manufacturers' 'headings' and samples.

The heterogeneous collection of old garments and scraps gathered by peddlers and sold to rag dealers is sorted into three groups: soft wool cloth ('mixed softs') consisting chiefly of women's wool fabrics; knit goods, serges, and merinos; and hard wool rags ('rough cloth') principally men's worsted suitings. Each classification is subjected to further grading according to color and type of fabric, from which a rather extensive set of grades is developed.

New wool rags, or clippings are subjected to a somewhat more intensive grading. Thus 'grading clips' may be sorted into classes according to color, type of fabric, and use for which the fabric was intended. Grading is a function of the rag dealer. While the rag trade has developed fairly standardized classifications, there is still a certain amount of variation in the quality of different grades as between one rag dealer or grader and another. This may occur when one grader subdivides the primary classifications more finely than another. Furthermore, two dealers may not recognize

material of the same grade under its various names or may apply the same name to two or more grades.

RAYON WASTE AND NOILS, RAYON RAGS, AND SILK WASTE

The position of rayon as a processed fiber is derived primarily from the property of rayon fiber, when not used as a continuous filament, of giving an effect in both knitted and woven fabric closely resembling wool. It has accordingly developed as an important wool substitute in the wool manufacturing industry. In this particular use it has not been rayon staple, as sold by the rayon producers, but rayon waste, which sells at a still lower price, that has commanded the interest of this trade. Rayon waste or rayon noils, derived from combing rayon tops, are put through the same preparatory processes as wool noils or reworked wool or waste. Rayon waste for this purpose may originate with the rayon producer, with mills processing rayon, with the garment cutter, or from the garnetting of old rayon garments. Large amounts of rayon waste in recent years have been imported from Japan, in addition to which a large part of their rayon staple fiber has been of such grade as to be usable only in this way.

In analyzing prices for rayon waste it should be kept in mind that there are just as many types of waste as there are of the original yarn: bright, semi-dull, and dull, and in different deniers and number of filaments. There are also clippings, just as for woolens and cottons which originate in the cutting-up trades.

What has been said about rayon waste applies in a general way to silk waste, except that the amount used in this country is relatively small. A certain amount goes to the pile fabric trades for the production of spun silk yarns for velvets and for colored stripings in the woolen and worsted industries. In Europe and the Orient, however, the production of spun silk fabrics, made from silk waste and known as Schappe, is quite large, since an equal amount of waste is produced for every pound of filament silk.

BAST FIBER AND JUTE WASTES

The ultimate use for all bast fiber and jute products, as well as for grower and mill wastes of these fibers, is in the production of paper. The collection by dealers and grading of these products for sale to paper manufacturers follows the same general pattern as for other reclaimable fibers. Before old jute bags reach this point, however, they pass through the used bag market, which is shared by cotton bags and cotton linters to jute bags. This used bag market serves a wide range of users, both of washed and unwashed bags, for resale to farmers and for baling and wrapping purposes. Larger manufacturers purchase new bags which they have stamped with their trade mark. After they have once been used, the significance of this stamping is lost, although the bags are usually still serviceable. Eventually all jute bags, when no longer usable, find their way into the 'old bag' market for reclaiming the jute fiber preparatory to being converted into paper.

YARN, THREAD, AND CORDAGE

The term 'yarn' refers both to yarn spun from short fibers and to that made from continuous filaments. The main characteristics of yarn are that it must (1) be continuous, (2) contain twist. Both characteristics are present in cotton and in rayon filament yarns, but not in raw silk, which is the reason why raw silk cannot be called a yarn. The preparation of rayon and silk for weaving or knitting is termed 'throwing' and is essentially a twisting operation, whereas the term 'yarn manufacturing', except for rayon, always refers to the processing of short fibers.

SPUN YARN

From the standpoint of price research, the manufacturing of yarn is important because the wide variation in fiber quality is replaced by a pseudo uniformity of yarn quality under the direct control of the mill. This applies to all short staple fibers and arises from the nature of the manufactur-

ing process. One of the most important operations in the yarn mill is the thorough mixing of the raw material to ensure uniformity in the product. In a cotton mill it is common practice to feed cotton from as many as twelve bales into the opener at once to ensure perfect blending and to prevent variations of grade in a single bale from changing the quality of the yarn from the mill standard. From loosening the fibers from the tangled and sometimes compressed mass in which they reach the mill, bringing them into a degree of parallel order in the carding and combing operations, to drawing them out with ever increasing twist until the yarn of desired size and twist has been obtained, all processes of yarn manufacturing are controlled with the aim of attaining uniformity of quality. The ability of yarn manufacturers to produce a standard quality product from varying grades of raw material, and from varying proportions of different grades, constitutes a primary source of differences in costs and profits between mills, for within a fairly wide range, the quality existing in the fiber need not be passed on by the manufacturer in precisely the form in which it exists in the raw state. A cotton mill, for example, may use short staple or inferior cotton to make what appears to be (under some conditions may actually be) a quality of yarn or cloth equal to what another mill would produce from cotton of a better grade. This is true in some measure all through textile manufacturing processes wherever ingenuity and skill can be made to produce a competitive advantage. Similarly, differences in the relative efficiency of machinery and operatives in different mills may introduce new variations in quality over and above those existent in the raw material. Such differences in quality may be sufficient, if maintained over a period, to justify preference in the eyes of the trade or outright premiums for the product of one mill over another. Or they may arise from intentional variation in the quality of the raw material used, caused perhaps by the shortage of a particular grade in the market. On the whole, however, the yarn markets tend to minimize these inequalities between

the products of different mills for yarns otherwise presumably identical.

The designation of grade or size of spun yarns requires specification, either direct or implied, of the following:

1) System of spinning, whether carded or combed
2) Grade of fiber used
3) Size or count of yarn
4) Number of strands, single or ply yarns
5) Amount of twist put in by spinning
6) Type of package, spools, skeins, cones, warps, etc.
7) Color, if dyed.

The spinning system must definitely be specified for wool yarns. Wool may be spun on three basically different systems: the woolen, the Bradford or English, and the French or continental systems, each of which produces a yarn having different characteristics from the other two.

Woolen spun yarn is made from fibers of varying length from less than one inch up to more than two inches, which have been twisted into a yarn with the fibers interlaced in every direction. In manufacturing woolen spun yarn so-called 'wool substitutes' are almost as important as raw wool: 'reworked wool' or 'shoddy'; wool noils, a byproduct of worsted combing; wool waste; cotton; and rayon and silk wastes may be mixed or 'blended' together in varying amounts. Hence price analysis of the components of woolen spun yarn is not possible without access to the formula used by the mill in its production. Woolen fabrics, in addition to being used for suitings and dress goods, furnish the bulk of overcoatings for both men and women.

Worsted spun yarn is made from tops; that is, the long fibers of the wool, 2½" to 8" or 9" in length, from which the short fibers have been removed by combing. These fibers are parallelized in the combing process preparatory to drawing and twisting into worsted yarn. English or Bradford spun yarn, as indicated above in the discussion of tops, is oiled to increase the pliability of the fibers. These are usually longer and coarser than those used in French spun yarn, and receive more twist. French or continental spun

yarn tends to be fuller and softer and to have less tensile strength than Bradford yarn. This difference shows up in their use, French spun yarn being more frequently used for women's wear, either woven or knit; and Bradford spun yarn, while also used in women's wear, comprising the basic material for men's medium and better grade suitings and pantings. The Bradford system of spinning is less expensive than the French, and consequently yarn made from the same grade of wool is usually a little lower in price.

Spun rayon yarn, made wholly from rayon staple, has so far been produced wholly on the cotton system. Rayon staple is also used as a 'blending' fiber with wool, particularly in certain grades of worsted yarns. While up to the present time the sale in the yarn markets of worsted-rayon yarns made on the worsted system has not reached large proportions, it will probably become fairly important in the future. Meanwhile rayon-wool blends with wool content as high as 40 per cent, made chiefly from reworked wool and noils, are currently being produced on the cotton system, principally by mills for their own use, rather than for sale to other weavers. Some day this type of yarn also may come to be sold actively in the market.

Cotton-spun yarns are of two types: carded and combed. These correspond directly to woolen- and worsted-spun yarns so far as differences in processing are concerned. The differences in their characteristics are not nearly as sharp, however, being limited chiefly to the fineness to which the yarn can be spun and its smoothness. Combed cotton yarn is made from long staple cotton, from which, as in the case of wool, the short fibers are 'combed' out. The distinction between combed and carded cotton yarn has become less sharp in recent years because of a pronounced improvement in carding methods, by which double-carded yarns can be made of almost as fine a quality in the medium range of counts as combed yarn. These super-carded yarns have definitely reduced the demand for combed yarns in certain types of fabrics and knitted garments.

The grade of fiber used for both cotton and worsted

yarns is also either designated or implied. Specification of grade of fiber is not as important here as with the raw material and tends to be limited to broader groups of grades. Thus cotton sales yarn carries no reference to grade of cotton except for either the finer grades of combed yarn made from Egyptian, Sea Island or 'peeler' cotton, or yarns made in whole or part from waste. Otherwise white cotton of the grade and staple length customarily used is assumed. The grade of tops out of which worsted yarns have been made is always specified.

The size or count is the basic market designation for yarn, corresponding in importance to the 'grade' of the raw material and the various standard constructions of gray cloth. Since yarn size can be readily controlled and its determination is dependent upon simply weighing a given length of yarn, the whole question of grade, aside from quality differences between mills, is vastly simpler than with the raw material. When one attempts to compare yarn sizes of the different fibers, one finds, however, that the systems of measurement differ sharply. This arose from different practices in the woolen, worsted, and cotton trades, each of which based its yarn sizes upon the number of yards of yarn in a given *weight,* the weight differing in each trade. On the other hand, the international denier system, established in 1900 for silk and later used for rayon, is based upon the weight of a fixed *length* of yarn. Thus these two types of numbering systems move in opposite directions, a small number designating a coarse yarn for cotton and wool, and a fine yarn for silk and rayon. Table 13 gives the various yarn sizes in order that yarns of comparable size in the different fibers may be compared. The most common size in rayon yarn is 150 denier; in cotton, print cloth yarn sizes, 30s to 40s; in worsted, 30s to 40s for weaving, 18s for knitting; and in woolen from two to three run. Different uses require different yarn sizes so that actually every possible yarn size has some use.

The combining of yarns into two or more plies to give greater uniformity and strength as well as a better appear-

TABLE 13

Comparative Yarn Sizes for the Principal Systems of Yarn Manufacture

COTTON [1]	WORSTED [2]	LINEN (LEA) [3] OR WOOLEN (CUT)	WOOLEN [4] (RUN)	RAYON [5] OR SILK (DENIER)	TYPP [6]
1.	1.5	2.8	.5	5313	.84
8.*	12.	22.1	4.2**	664	6.72
12.	18.*	33.6	6.3	443	10.08
13.3	20.*	37.3	7.	399	11.20
17.3	26.*	48.5	9.1	307	14.56
17.7	26.6	49.6	9.3	300*	14.88
20.*	30.*	56.	10.5	266	16.80
21.3	32.*	59.4	11.2	249	17.92
24.*	36.*	67.2	12.6	221	20.16
26.6	39.9	74.4	14.	200*	22.32
26.7	40.*	74.7	14.	199	22.40
30.*	45.	84.	15.8	177	25.20
35.4	53.2	99.2	18.6	150*	29.76
40.*	60.	112.	21.	133	33.60
50.*	75.	140.	26.2	106	42.00
53.3	80.	149.3	28.	100*	44.80
60.	90.	168	31.5	89	50.40
70.7	106.	197.9	37.1	75*	59.36
80.*	120.	224.	42.	66	67.20

SOURCE: Yarn-Number Conversion Table in *Textile World Yearbook, 1935*

* Indicates the more important yarn sizes.

** Most woolen yarns are from two to three run.

[1] Number of hanks of 840 yards each per pound of yarn. These counts used for cotton, and spun rayon and spun silk yarn spun on the cotton system.

[2] Number of hanks of 560 yards each per pound of yarn. These counts are used for mohair, alpaca, camel hair, spun rayon as well as wool yarns spun on the worsted system.

[3] Number of hanks of 300 yards each per pound of yarn. These counts are used for linen, and by New England spinners for woolen yarn.

[4] Number of hanks of 1,600 yards each per pound of yarn. Run system used by Philadelphia spinners for woolen yarns.

[5] Weight in grams of 9,000 meters of yarn. Size of thrown silk, formerly determined by dram system, now generally discarded in favor of denier system. To convert deniers to drams divide by 17.44.

[6] Typp (thousands of yards per pound) a universal system of counts sponsored by *Textile World,* which may be used for yarns of any fiber. Currently used on spun glass yarns.

ance is highly important for many uses. Where yarn is to be plied, it is customary to use a slightly lower grade or shorter staple raw material in its manufacture. Cotton carpet yarns, for example, which are usually 3 or 4 ply, may be made from part-waste cotton. Also for certain kinds of knit goods, where an even appearance is desired, ply yarns may be used. Sewing thread is a special instance of plied yarn. In the case of worsted yarns the designation of the number of plies usually precedes the yarn count; e.g., '2/30s' means two-ply 30s yarn. Cotton yarn counts customarily show the number of plies after the size of the yarn, as 20/1 or 20s singles and 20/2 or 20s two-ply.

In rayon yarn the number of turns per inch is definitely specified. That is possible because the yarn is a continuous filament and the twisting operation is directly controllable. With the short fibers, designation of twist is limited to indicating relative amounts of twist. This shows up always in the use to which the yarn is to be put. Warp yarns, in order to withstand the strain of the motion of the warp harness, must be stronger relatively than filling yarns and are accordingly given a higher twist. The amount of twist is not specified, but may be designated as 'warp twist', or simply by stating that the yarn is warp yarn.

Aside from yarn count, perhaps the most significant designation is that which indicates the use to which the yarn is to be put, usually implied in the put-up or package in which the yarn is sold. Thus yarn put-up on cones is intended for the knitting trade or for warping, whereas warp yarns put-up on beams are for weaving or for warp knitting. Yarn put up in skeins may be used for dyeing, although that is less common now than formerly, since dyeing may be done today on tight packages such as cones, tubes, or ball warps. Yarn in skeins may also be rewound onto special size bobbins or shuttles if it is to be used on special machinery. The principal users of cotton and wool sales yarn (yarn produced for sale) are the following trades:

1) *Knitted underwear, outerwear, and hosiery:* knitting

mills represent the largest market for both cotton and wool sales yarn. Nearly all the worsted-spun yarns used by knitters are purchased, and part of their woolen-spun yarns. About three-fourths of all cotton yarn used by knitters is similarly purchased in the market.

2) *Weaving mills producing convertible-fabrics:* many weaving mills occasionally purchase yarn, usually odd sizes, or novelty yarns they are not equipped to make, or yarn to be dyed,[14] or yarn beyond what their own spinning can produce. Worsted-spun yarns sold to worsted mills constitute about a sixth of all that are produced. Some mills weaving cotton duck and towels purchase part of or all their yarn.

3) *Insulated wire manufacturers:* a large volume of part-waste cotton yarn is used by electric wire manufacturers for winding or braiding on insulated wire.

4) *Carpet manufacturers:* the largest proportion of woolen spun yarn produced for sale goes to this trade. Carpet and rug mills are also large users of heavy ply cotton yarns for their warps.

5) *Upholstery and drapery fabric manufacturers:* owing to the very wide range of yarn sizes, colors, and novelty effects required, as well as the small yardage per style, upholstery and drapery fabric manufacturers by and large purchase their yarn requirements. They use cotton yarn for warps in plushes and mohair velvets, as well as a wide range of mohair and wool yarns.

6) *Narrow fabric manufacturers:* these mills purchase a fairly large amount of cotton warps and filling yarns, as well as some rayon for the production of such articles as tapes, labels, braids, laces, embroidery trimmings.

7) *Thread mills:* mostly integrated, but not fully.

[14] Yarn dyeing is a specialized operation, usually performed on a job-finishing basis. The Franklin Process Company, with branches in various places throughout textile producing areas, controls important patents on yarn dyeing machinery and processing that give it a dominant position in the dyeing of cotton, rayon, and silk yarn. Wool is usually dyed as raw stock, as is a large proportion of cotton used in colored cotton fabrics.

8) *Lace curtain manufacturers:* users chiefly of 2-ply combed peeler yarns.

THE YARN MARKETS

Yarn is the end product of a definite series of manufacturing operations, but since most of it is not in a form for ultimate consumer use, it must undergo further processing. Yet it is a distinct product in that the yarn mill need not perform the subsequent operations itself, but may turn over its product through the yarn markets to different types of manufacturers. In the United States, in contrast to England, yarn production generally tends to be integrated wherever possible with the subsequent operation of weaving, knitting, or other manufacture. Such integration is not industry-wide, however, so that while a large proportion of all yarn is produced by mills for their own use, a fairly substantial amount is distributed through the yarn markets.

The largest proportion of all sales yarn, i. e., yarn produced for sale, is made by spinning mills having no looms, which specialize in yarn manufacture. Some integrated mills, however, use the yarn market as an aid to maintaining a balance in their own manufacturing operations—by keeping their spinning machinery operating at a high rate and selling surplus yarn not needed by their weaving mills in the yarn markets, or by purchasing yarn needed in excess of their spinning capacity.

Most sales yarn mills tend to be relatively small, particularly in the southern cotton yarn industry where the average mill has from 10,000 to 12,000 spindles. Their small size precludes direct selling of their product and has led to the organization of selling through relatively few agents. Similarly, many knitting mills are too small to purchase their entire requirements regularly from mills. Accordingly about a third of all knitting yarn for the outerwear trade is sold through yarn jobbers located at central points in knitting areas. Weaving yarn, on the other hand, and the rest of knitting yarn is sold directly by the spinner or his selling agent to the mill using it. The principal yarn markets are

TABLE 14

Selected Sources of Yarn Prices and Related Data

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
A COTTON YARN			
Carded sales yarn 10/1 knitting cones 30/1 knitting cones 20/2 ply warps 30/2 ply warps 20/2 ply skeins or tubes 8/3 ply tubes, carpet yarn tinged cotton *Combed sales yarn* 30/1 combed peeler knitting cones 40/1 combed peeler knitting cones 40/2 combed peeler warps 60/2 combed peeler warps 36/2 reverse thread twist	Prices pub. in trade papers; e.g., *Daily News Record, American Wool and Cotton Reporter, Commercial Bulletin, Journal of Commerce*	Daily prices in Phila. and N. Y. markets; also weekly prices in Boston market, pub. in *Journal of Commerce*	Production data comp. on confidential basis by Cotton Textile Institute. Imports and exports comp. by BFDC
B RAYON YARN			
Filament yarn 150 denier, minimum filament, 1st quality viscose skeins 100 denier, minimum filament, 1st quality viscose skeins 100 denier, minimum filament, 1st quality acetate skeins	Daily prices pub. in trade papers; e.g., *Daily News Record*	Quotations available are from producers' price lists which are changed periodically	Data on filament yarn production, stocks, shipments by trades, pub. in *Rayon Organon.* Imports and exports comp. by BFDC
Spun rayon yarn 24/1 cotton system (1½ staple, 1½ denier) 20/2 cotton system (1½ staple, 1½ denier)	Prices pub. occasionally in trade papers, or available from mills		

C SILK YARN

Thrown silk yarn Hosiery 3 thread 13/15, 20 turns, 87% 4 thread 13/15, 15 turns, 85% 6 thread 13/15, 5 turns, 81% *Crepe weaving* 2 thread 20/22, 60/65 turns 3 thread 20/22, 60/65 turns 4 thread 20/22, 60/65 turns *Organzine weaving* 2 thread 13/15 3 thread 13/15 *Spun silk yarn* Domestic, mill 60s singles 60s 2 ply Imported 200/2, 1st quality, N. Y.	Prices pub. occasionally in trade papers, or available from mills	

D WORSTED YARN

Bradford spun, 2/30/64s, weaving fancy mix on dresser spools Bradford spun, 2/20/50s, knitting skeins in oil undyed French spun, 2/30/64s, weaving fancy mix on dresser spools French spun, 2/40/64s, knitting yarns, undyed	Prices pub. in trade papers; e.g., *Daily News Record, Journal of Commerce, American Wool and Cotton Reporter, Commercial Bulletin*	Spinners' prices on a weekly basis in Boston and Phila. markets

E WOOLEN YARN

Weaving Knitting Carpet	No published prices	Data on orders, production, shipments, and stocks comp. by National Association of Wool Manufacturers covering about 70% of yarn spun on the Bradford and more than 90% of that spun on the French system

TABLE 14—(*Continued*)

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
F CORDAGE, TWINE, AND THREAD			
Twine Binder, standard 500′ per bale (50 lb.) f.o.b. Chicago or New Orleans Cotton, No. 1 wrapping, per lb., mill Class II (Java) 300′ medium, reels, per lb., N. Y. (Zone 1)	Prices of specific commodities pub. in trade papers; e.g., *Commercial Bulletin, Cordage Trade Journal*	Weekly prices in Boston market	Imports and exports comp. by BFDC
Rope Cotton, commercial, 5/16″, 2d grade Manila No. 1, ¾″ diameter and larger Manila No. 2, ¾″ diameter and larger Sisal No. 1 (Java) ¾″ diameter and larger Sisal No. 2 (Mexican) ¾″ diameter and larger			
Yarn, carpet, jute, per lb. mill No. 1 14/16 No. 2 14/16			
Thread, linen, shoe, 10s, per lb., N. Y.			
Cotton thread, 6-cord, white			

in consuming areas. New York City is the chief market for worsted yarns, because of the quantity of knitting yarns used by knitters in New York and the vicinity. Prices for worsted weaving yarns tend, however, to be based upon quotations in Boston, and those for worsted knitting yarns upon quotations in Philadelphia. Because they are near the knitting industries of Pennsylvania and upstate New York, Philadelphia and New York tend to be the leading market centers for cotton yarns. In recent years Gastonia, N. C., the center for the combed cotton yarn industry, and Charlotte, N. C., which is similarly the center for carded sales yarn, have come to be increasingly important as primary market centers, although practically all the actual selling of yarn is still done in the Philadelphia and New York markets.

Price quotations appear regularly in the trade press (Table 14) for a limited range of worsted and both combed and carded cotton yarns. (For yarn numbers other than those quoted, the probable price may be interpolated from the differentials for those quoted.) By reason of the variation in quality indicated above there are no regularly quoted prices on woolen spun yarns. The quotations, as in the case of all textile markets except those for raw fibers, are usually sellers' prices, obtained by news reporters from yarn dealers, selling agents, brokers, and mill representatives.

THROWN YARN

Since both silk and rayon are produced as continuous filaments the process of preparing them as yarn for spinning or knitting is fundamentally different from that used for short or cut fibers. Rayon is already in yarn form when delivered by the producer. Except for additional twist required for crepe or other special uses, rayon yarn may go directly to the loom or knitting machine on the cones or other packages in which it arrives from the yarn producer.

Raw silk, on the other hand, while already in the form of a continuous filament as delivered by the Japanese exporters, is too fine for use in textile manufacture. As it is

only 13/15 or 20/22 denier, whereas deniers of 75 or more are ordinarily required for both knitting and weaving, several strands must be combined or twisted together to give yarn of the desired size and strength. This process is called 'throwing'. All silk must be thrown before being used in either knitting or weaving. The term throwing is applied also to the process of giving additional twist to rayon yarns.

Varying amounts of twist are given to the raw silk in the throwing process depending upon whether the yarn is to be used for warp or filling, or for crepe or other special effects. Warp yarn, or organzine, as it is called, is high twist yarn produced by first twisting single strands of raw silk, 16 turns to the inch, and then combining two or three into a single strand by twisting in the opposite direction with 14 turns to the inch.

Tram or filling yarn receives a single twist, only enough to hold the separate strands together and to prevent their splitting and becoming fuzzy while being dyed.

The amount of twist applied in throwing determines the character of the fabric, some crepes requiring twists up to 70 turns per inch. Satins, on the other hand, receive relatively little twist in the warp in order that the surface may be unbroken and the fabric soft and lustrous. Some hosiery yarn receives relatively low twist. Within recent years to get both sheerness and dull luster, there has been a trend toward crepe or hard twist. Much of this twisting is done in opposite directions in what is known as compensating twist. The present standard crepe twist is 100 turns on 2-thread yarn.

Thrown silk is numbered in terms of the number of singles used and the amount of twist. Thus it may be described as 3-thread 13/15 denier, 60/65 turns crepe twist. The grade of raw silk may also be described. Some years ago, when silk was widely used for woven fabrics, a fairly important thrown silk market developed. Today most throwing is performed either within integrated mills or on a commission basis, commission throwing being more important than the sale of thrown silk yarn.

THREAD

The resemblance of thread to yarn in the popular mind often leads to the use of the two terms synonymously. Properly speaking, the term 'thread' should be applied solely to twisted yarn sewing thread. This is a smooth, evenly spun, hard twisted, ply or cable yarn, treated by special finishing processes to make it resistant to abrasion in its passage through the eye of a needle and through materials in seaming and stitching operations. Actually thread is the product of a manufacturing process beyond the yarn stage just as much as is woven cloth, the difference being in the twisting of several strands of yarn together, rather than interlacing them as in cloth. Thread, like gray cloth, also undergoes subsequent bleaching, dyeing, and finishing operations. Thread is accordingly a finished article and, since it passes directly from the mill to the retail counter or industrial user, thread prices exhibit the characteristics of prices for finished and fabricated products.

The general principle of thread construction is to twist the various plies of yarn together in the opposite direction to the twist with which the yarns were spun. This gives a balanced twist and reduces the danger of kinking in the sewing operation. Thread may be straight laid, cabled, or braided. In the construction of straight laid thread, two or more ends of single yarn are by one operation twisted into a plied thread. Cabled thread usually has greater strength than straight laid, and is used where sewing conditions are severe. There are two twisting operations in cabled thread construction, the first making ply yarn from two or more singles; the second making the cabled thread from three or more ply yarns. Straight laid threads are the most widely used in industrial use; cabled, in home sewing. Braided threads have very limited use for especially heavy duty in certain industries.

Cotton thread represents by far the largest proportion of the total. Linen thread, which closely resembles cotton in its construction, has certain special uses of its own, particu-

larly in the shoe manufacturing industry. Wool is seldom made into thread, but hand knitting yarns constitute a rough equivalent so far as retail sale is concerned, although in both construction and use these are yarns, not thread.

Silk thread has an advantage over cotton for certain uses owing to the high elasticity and great strength of raw silk. However, it is more expensive, and does not allow as high machine speeds as cotton. Furthermore, a silky appearance can be produced in cotton thread by mercerizing. Mercerized cotton thread is used extensively in the cutting-up trades, even in the manufacture of silk dresses, when silk might otherwise be used. There are two types of twisted silk thread: 2-ply thread, confined to hand sewing, and machine twist, a 3-ply cable twist thread. In addition, there are soft silk yarns, floss silk, and embroidery silk. There is also rayon thread on the market, and more recently, thread made of the new synthetic yarn, nylon.

The behavior of thread prices can be understood solely in terms of the types of cotton used in thread manufacture. Since strength and evenness are the most important qualities in thread, longer staple cotton is essential. Formerly fine thread was largely made of Sea Island cotton, but with the elimination of the Sea Island crop by the boll weevil in the early 'twenties, thread manufacturers now use Egyptian cotton alone for the better grades of thread. The best Egyptian types are Sudan cotton, with a staple of as much as 1 7/16", and Sakellarides, with a staple ranging from 1¼" to 1 13/32". A considerable quantity of Egyptian 'Uppers', with a staple about 1 3/16" is used for general utility threads. Of the domestic grown cottons, peeler cotton, from 1" to 1¼",[9] can be used for the coarse numbers. All these grades of cotton exhibit far more stable prices over long periods than the standard market grade of cotton, a factor contributing to greater relative stability in thread prices.

The thread industry has two distinct branches: 'Domestic' or threads for home sewing and 'Industrial' or threads for manufacturers. Owing to the great strides in the invention of sewing machines of highly specialized construc-

tion, the manufacture of more and more articles has come to be concentrated in factory production, taking the place of production in the home or by craftsmen. This change has, on the one hand, led to a reduction in the relative importance of domestic types of threads. Its more direct significance to the thread industry is that it has led to the production of a large number of specialized types of thread.

The tensions, speeds, and complicated stitching of modern machines vary widely from one industry to another, or one type of fabric or material to another. As a result of the continual search to meet the needs of special trades, the manufacture of 'industrial' thread has become extraordinarily complex, involving the production of literally thousands of articles differing in size, construction, twist, color, finish, put-up and yardage, quality and brand. For example, in the production of men's clothing, different grades of thread are employed for each of the following operations: stitching, seat and leg seams, lapels, linings, hand basting, button-holes, and buttons. In addition, every cutting-up trade or other trade using sewing machines, has its own special sizes and types of threads.

The usual classification of thread is by size and cord (ply); generally speaking, the more cords, the better the thread. Threads with a greater number of cords are rounder, smoother, more uniform and more elastic. Finer sizes of yarn are required for their manufacture, which usually means that a better quality of cotton is essential.

Thread sizes[15] have a general relation to yarn sizes, although there is no standard thread numbering system. Three cord thread is designated by the size of the constituent yarns. Thus 3 cord thread made from 30s yarn would be sold as 30s thread. Six cord thread made from 60s yarn would also be designated as 30s since the initial plying of two 60s would give a strand equivalent to 30s single, of which three would be twisted in making the thread.

[15] The numbering system for silk thread is entirely different from that for cotton and is based upon number of yards per ounce, ranging from 000 through A to G.

THE THREAD MARKETS

In one respect the thread markets differ from almost any other textile market. As indicated by the recent textile studies of the Federal Trade Commission, "three firms represent about 85 or 90 per cent of the total investment in the thread industry and about the same per cent of net sales". The dominance of these firms arose originally from their success in producing superior qualities of thread in the days when all sewing was done in the home or by craftsmen. Their trademarks still have a tremendous consumer acceptance, equaled nowhere else in textiles. Yet their percentage of the total market has probably been declining in recent years as the size of the market has increased and other firms have entered the industrial field, where the importance of trade names is much less.

The two branches of the industry, domestic and industrial, have really two distinct markets. In the industrial market thread is sold somewhat like yarn, on a poundage basis, with the thread put up on cones ranging from 3,600 to 30,000 yards each.

Thread for domestic uses is put up in the familiar spool form for sale in that large class of low-priced items sold at fixed prices in variety and department stores. As is characteristic of goods of this type, variation in costs is reflected by varying the quantity offered without changing the price. For domestic threads this is accomplished by changing the number of yards on the spool. Since the cotton used in the higher grades of thread sold in domestic put-up is not subject to the violent fluctuations in price of the domestic cotton market, price adjustment is much easier than on products made from lower grades of cotton.

CORDAGE AND TWINE

Cordage and twine, like thread, constitute a specialized group of products that are ready for consumer use as they leave the mill. Also like thread they cover an enormous range of uses: the entire field of transmission of mechanical

power, tyings, and such specialized uses as wicks, sash cords, clotheslines, fishlines, with a continuous gradation in size and strength from small twines only slightly larger than thread up to oil-well cables and hawsers 6″ to 10″ in diameter. The basic grouping of these products is into two classes: cordage, the term used for stranded or cable constructions 3/16″ diameter and larger, and twines, usually a single yarn or two or more yarns twisted or laid together.[16] In some short staple fibers, such as cotton, it is necessary to spin the fibers into a basic element, like a 'thread', which is comparable in further manufacture to individual long staple fibers like abaca. For instance, individual abaca fibers are spun to form an abaca yarn, while in cotton cordage or twine the cotton 'threads' are twisted together to form a cotton yarn.

The commercial classification of cordage and twine turns principally about the three factors of size, grade, and type of fiber used in its production and use. Cordage sizes are usually specified in terms of inches in diameter or fractions thereof, except where the use itself implies the size. Marine cordage is usually specified in terms of inches in circumference. The basic size in hard fiber cordage is ¾″ in diameter, from which other sizes are figured up and down on a sliding scale. Twine sizes tend to follow yarn numbering systems in that they are sold on the basis of a given length to the pound. The standard size of sisal binder twine, for example, is 500 feet per pound.

In the larger sizes of cordage where the greatest possible strength and durability for a given diameter is needed, abaca (manila fiber) stands alone as the sole available fiber. There are many grades of manila fiber, however, as already indicated, and the possibilities for blending them to produce varying qualities of rope are very wide. The trade has standardized grades to a certain degree by specifying such grades as Yacht, Bolt, 1st, 2d, and 3d grade manila rope,

[16] The terminology most generally applied is as follows: Twine is less than 3/16″ in diameter; cord is 3/16″ to 5/16″; rope is 5/16″ to 3 3/16″; cables are 3 3/16″ up.

which reflect directly the grades of manila fiber used in their manufacture. Similarly, sisal and henequen rope, which is of lower quality than manila and sells at a lower price, is classified according to the fiber used.

Durability is not a prime requirement of wrapping twine. Principal requisites are 'immediate' tensile strengths (while the twine is used to transport the package), size (bulk is desirable for some uses to prevent injury to the package, while fineness of the twine is more desirable for other uses), appearance, knotting qualifications, and consumer preference from the viewpoint of handling the twine. Here is one of the most interesting examples of direct inter-fiber competition in the textile industries. Hemp, jute, cotton, paper, istle, maguey, and similar fibers, and gummed tape and soft wire, all compete among themselves and with abaca and sisal for the wrapping twine market. Competition is largely on a price basis, although consumer preference plays a considerable part. Some of this competition is more in the nature of the substitution of another fiber. For instance, hard fibers have displaced jute, particularly in the coarser twines, and there is little or no continuing competition.

Cotton is the only one of these fibers produced domestically; all the others are admitted to this country on the free list. This benefits the grain farmer (large users of binder twine), manufacturers and distributors (retail and wholesale), who use twines made of fibers other than cotton. There have accordingly been attempts from time to time to impose a tariff, which would enhance the use of cotton in these uses at the expense of these imported fibers. The economic effects of such substitution would provide a suitable subject for research along the lines suggested by this report. The relative prices of the various fibers, the effect upon both the immediate and ultimate consumer, and the relative properties of the various fibers for each use would all need to be taken into account.

Many special types of twine and cordage are produced for special uses, with certain sizes and strength requirements generally taken for granted in the trade so that specification

on these two points, while still necessary, is minimized. A list of some of these indicates the range of industrial uses for twine. To these could be added many other special uses, and of course, an almost infinite number of general uses.

USE	PRINCIPAL FIBER
Lath yarn	Henequen
Fodder yarn	Henequen
Clothes lines	Cotton
Seine twine	Cotton
Wool twine	Paper
Sail twine	Cotton, jute, hemp
Tobacco twine	Jute, cotton
Hop twine	Henequen
Mop twine	Cotton
Candlewicking	Cotton
Braided sash cord	Cotton
Broom twine	Hemp, cotton
Mattress twine	Cotton, hemp

This production of special types and sizes for specific purposes is carried equally far or even further in cordage, where the range in requirements and in possible sizes is greater.

THE CORDAGE AND TWINE MARKETS

Since all the products of the cordage and twine industry are ready for direct consumption when they leave the mills, their distribution pattern is radically different from that of gray or finished woven cloth, which must be further processed. The demand side of the market is thus comprised not of a relatively few processors but of many ultimate users, who must be reached through various channels of distribution. For hard fiber cordage the final market is the ultimate consumer in the true sense of the word—the builder or contractor who buys some rope at his local hardware store, the owner of a boat who buys through a ship chandler, etc. The study of distribution of hard fiber cordage in 1930 by the Harvard Bureau of Business Research showed that wholesalers purchased 58 per cent of the total

product of the industry. The rest went directly to industrial consumers: manufacturers of machinery, canvas products, fishing equipment, construction companies, and the like.

Binder twine has quite a different distribution pattern, being used wholly in the harvesting of grain. It is the largest volume product of the industry, since 2½ to 3½ pounds of twine per acre are required in the harvesting of most grain crops. This whole picture is influenced by the position of the International Harvester Company as the largest single producer in the country, selling to farmers through its machinery selling organization. Of great importance also is the fact that in 1936, of domestic production and imports of binder twine, 32 per cent were imports, 23 per cent were made in penal institutions, and only 45 per cent were made by domestic manufacturers using free labor.

For wrapping twine the ultimate users are the distributing trades as a whole—manufacturers, wholesalers, and retailers who need twine to tie packages. In this market twine is strictly ancillary, not a major item of cost. Hence, except for the large users who purchase directly from manufacturers, it is a typical distributor's item for sale to smaller business consumers and in very slight degree to households.

GRAY GOODS

TYPES AND QUALITIES OF GRAY GOODS

The gray and finished goods markets lie about half way between the raw fiber and retail markets. From the standpoint of pricing this position is their most important characteristic—they are intermediate markets of price adjustment, cushioning the rise and fall of raw fiber prices, not originators of primary price movements. Price fluctuations in the fiber markets are adjusted to the requirements of rigid retail prices by the method dominant in textiles: variation in quality or size. In these two markets, however, the arbitrary and concealed changes in quality, characteristically associated with quality changes, are definitely sub-

ordinated to their accomplishment through a regular process of shifting from one to another of a range of standard cloth constructions. This is particularly true of gray goods, in the pricing of which standard market constructions play a role no less important than grades for raw fibers.

Cloth as it comes from the loom or knitting machine may be of two types: gray goods made from uncolored yarns or colored goods of which the warp or the filling or both are composed largely of colored yarn. Since the surface decoration of colored yarn goods is determined by the way in which the colored yarn is used, the pattern must be decided upon before weaving. When the cloth comes off the loom it needs only to be washed and calendered or put through other related finishing operations before it is ready for delivery to the customer. These operations are almost invariably performed by the weaving mill itself.

With gray goods, however, the ultimate surface appearance is indeterminate so far as the mill is concerned, as the cloth may be decorated with a printed pattern, dyed in a plain color, bleached white, or used in the gray. The possible variety of effects that may be achieved is unlimited. Much of the style risk and responsibility for pattern selection can therefore be shifted by the mill to the buyer of the gray cloth. In this way pattern variation can be made to play merely a minor role in the weaving mill's production schedule, assuring a steadier rate of operation, especially if the cloth has a large market; i. e., a large number of possible uses or at least a large number of potential trade customers.

Appropriate patterns, colors, and finishes for gray goods are selected not by the weaving mills or by the finishing plants as such, but by a group of specialists in styling known as converters. In some instances converting establishments are operated as part of a vertical mill organization, or as an adjunct to a finishing plant, but more frequently they are independent. Converters are accordingly buyers of gray goods from weaving mills and comprise one of the largest demand elements in the gray goods markets. Industrial users are the next largest. They may either consume the

cloth in the gray or themselves apply some special finish required for their purposes.

Most cotton, rayon, silk, and linen fabrics are characteristically sold by mills in the gray or unfinished state, whereas wool goods are usually sold by mills as finished goods. Hence there are no gray goods markets for wool fabrics, whereas for the others there are both gray and finished goods markets. Trading in the gray goods markets turns on cloths of standard construction. The greater the demand for a given type of cloth, the more certain is it that the trade will standardize upon a relatively few constructions. Purchasers on the one hand tend to adapt their needs to standard constructions in the expectation that over a period they will have enough sources of supply to assure competitive prices. Mills similarly seem to prefer to operate on standard constructions since it assures them a ready market as well as low costs resulting from continuous mass production. A further reason for concentrating upon standard constructions is indicated by the function of the gray goods markets in making price adjustments. A common illustration is the wide print cloth division of the cotton goods industry. As of a given day the four major print cloth constructions may be quoted.

WIDTH *(inches)*	CONSTRUCTION *(ends picks)*	WEIGHT *(linear yards per pound)*	PRICE *(cents per yard)*
39	80x80	4.00	6⅜
39	68x72	4.75	5¼
38½	64x60	5.35	4½
38½	60x48	6.25	3⅞

It will be noted that there is a steady downward progression of prices per yard as one proceeds from heavier (fewer yards to the pound) to lighter constructions.[17] This makes it possible for the cutting-up and retail trades to adjust for raw material price fluctuations by shifting from one standard construction to another without changing the retail price of the finished article. A rise in the price of 80x80 gray cloth, for example, from 7½ to 10 cents per yard would

[17] In price *per pound* these four constructions, made of very similar yarns, are very close together.

throw printed percales made from this construction out of the range the dollar dress cutter could pay. After the supply of goods he had purchased in expectation of that price rise had been exhausted, he would be obliged to turn to the next cheaper construction of percales for his dollar dress line; i. e., 68x72s and so on. Over the last fifteen years all these constructions have been used for the dollar dress at one time or another. If prices of gray goods are to be compared over long periods, therefore, both the typical construction and its probable substitutes should be considered together.

While the four print cloth constructions mentioned are the most important, they do not comprise the entire print cloth market. Several other constructions of less general importance, intermediate constructions like 72x76, subcount constructions like 36" 60x48, or constructions for special uses such as 38½" 44x40 8.20 yd., are also included in the group of standard constructions sold in the print cloth market.[18]

This same general outline holds for other gray cloth markets. Usually at least two gray cloth constructions are important for any given type of fabric. Sometimes the number of constructions is so large that no one fabric or group of fabrics is dominant. This is true of certain types of industrial fabrics where the particular requirements of different uses vary so much that different specifications are required in the construction of fabrics for each use. In the case of novelty weaves where patterns are woven into the cloth, as in fancy dress goods and clipped-spot marquisettes, each pattern is a separate construction. These kinds of fabrics tend to be priced on the 'basis' of some standard construction with the actual price figured up or down from that 'basis'.

The term 'standard construction', though it indicates a

[18] Strictly speaking, print cloths have at least 100 threads per square inch. Fabrics made from the same yarns of lower construction are usually termed cheese cloths. However there is a tendency to include all print cloth yarn fabrics under the heading of 'print cloths'.

certain uniformity of quality, should not be interpreted as meaning that all mills produce cloth of exactly the same quality in the same constructions. Variations between one mill make and another are bound to exist, because of the use of better cotton, better machinery, greater skill of operatives, or higher standards of quality. They may lead to price differentials between one mill make and another, usually amounting to not more than 2 or 3 per cent of the value of the cloth. Similarly it should be recognized that as in all manufactured goods, long term quality changes occur within a given standard construction as improvements are made in the manufacturing process. For example, the 64x60 print cloth produced today under conditions of controlled humidity, with feeler motion and on automatic looms, is definitely superior to that sold twenty-five years ago. Weak spots have been greatly reduced through far greater uniformity in the yarns.

Similarly the building up of continuous price series on 'standard constructions' covering a long period is frequently difficult because of the outmoding of certain constructions and widths and the substitution of others. A classic example is the 27" 64x60 7.60 yd. print cloth construction which, twenty-five years ago, was the leading print cloth construction. Although still quoted, its volume is insignificant today as it has been superseded by the 38½" width.

Quality changes of this kind have an important bearing upon the study of prices. If consumers are receiving greater wearing quality in an article ostensibly the same as they used to purchase, that fact should be taken into account in some way in arriving at any conclusion concerning price changes. Methods for measuring serviceability and wearing qualities of textiles have improved rapidly in recent years. The work of Committee D-13 of the American Society for Testing Materials, of the United States Bureau of Standards, and of consumer testing agencies has made available material which, over the course of time, should make possible comparative studies showing the extent of quality changes. It should be recognized, however, that for most

studies of price movements, measures of quality change are not available. Their development must await studies undertaken jointly by technical and economic research workers.

In this connection it should be borne in mind that there is no one best quality in a given field that can be thought of as the standard to which the market 'ought' to conform. Whatever the volume constructions, higher count, stronger, and more durable cloths can be constructed. Such 'better' constructions would not necessarily be more desirable for a given use. For a woman's summer dress, a sheer light weight and none too sturdy fabric is to be preferred to a stronger or higher count fabric. Similarly the 64x60 print cloth is suitable for use in men's inexpensive handkerchiefs, whereas the 80x80 construction would be unsuitable. Here porosity and lightness in weight are more important than strength or wearing quality. This situation is to be found all through the textile field and makes it necessary that qualities of fabrics always be regarded in terms of their uses. Wearing strength, merely one of the qualities desired in fabrics, is frequently subordinated in the minds of consumers to other qualities.

For the study of gray cloth prices we have listed in Table 15 the more important classifications of fabrics sold actively in the gray goods markets. Changes in major constructions are relatively infrequent in cotton fabrics, but frequent in rayon. Any given type of rayon fabric may pass quickly through a cycle of popularity and then disappear. The rayon fabrics and constructions listed, however, have shown over the last three or four years a measure of persistency and can be regarded today as more or less staple.

The proper identification of a given cloth involves specification as to six points:

1) Width
2) Warp and filling threads per inch
3) Weight per linear yard
4) Kind of weave or name of cloth
5) Size of yarns—single or ply (usually implied)
6) Kind of yarn

TABLE 15

Selected Sources of Gray Goods Prices and Related Data

A COTTON WOVEN GOODS

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
Print cloth yarn fabrics Plain print cloths, 36" and wider 38½" 64x60 5.35 yd. 39" 68x72 4.75 yd. 39" 80x80 4.00 yd. Plain print cloths, under 36" 27" 64x60 7.60 yd. 32" 64x60 6.50 yd. Carded broadcloths 36½" 80x60 5.00 yd. 37" 100x60 4.10 yd. Pajama checks 36½" 72x80 4.70 yd. Tobacco cloths 36" 20x12 23.00 yd. 36" 24x20 17.00 yd. Cheese cloths 40" 32x28 10.80 yd.	Prices for selected constructions pub. in trade papers; e.g., *Daily News Record, Journal of Commerce* For most constructions *Daily News Record* series go back to 1923 when compilation of the Fairchild price index was begun, and as far back as 1913 on some constructions. *Journal of Commerce,* pub. since 1823, has carried prices on textile items for many years. The publishers' file for years prior to 1930 has been given to the N. Y. Public Library. Both papers issue annual summaries of prices: *Journal of Commerce,* January 2; *News Record,* 3d week of January	Daily prices, f.o.b. mill quoted on a linear yd. basis. Terms net 10 days. Conditions of sale covering all gray goods transactions and so specified in the sale note are stated in full in 'Worth Street Rules'	Imports and exports comp. by BFDC Mfrs. margins comp. by Bureau of Agricultural Economics for 17 constructions, and by various private agencies incl. a weekly series since 1924 by N. Y. Cotton Exchange Data on orders, production, shipments, and stocks for numerous types of gray goods comp. by Cotton Textile Institute on a confidential basis for the use of members only
Narrow sheetings and allied fabrics Narrow sheetings 40" 48x48 2.85 yd. 37" 48x48 4.00 yd. 36" 48x40 5.50 yd. 36" 56x60 4.00 yd.			
Narrow drills 37" 2.75 yd.		37" 2.35 yd. 30" 2.85 yd.	30" 2.50 yd.

Four leaf twills
37" 84/88x40/44 2.85 yd.
37" 84/88x40/44 2.00 yd.
Heavy warp sateens
34" 104/108x56 3.00 yd.
Osnaburgs
30" 40x30 7 oz.
36" 32x28 2.85 yd.
40" 32x28 3.50 yd.
Jeans
39" 96x64 2.85 yd.
Three leaf twills
39" 68x76 4.00 yd.

Fine cotton goods
Marquisettes
38½" 44x18, plain

Lawns
40" 96x100 7.00 yd.
40" 88x80 8.50 yd.
40" 76x72 9.00 yd.
Combed broadcloths
37" 136x60 4.00 yd.
Voiles
39" 60x52 slack twist
40" 60x56 ordinary twist
40" 68x76 70s Pima
Piques
38" 176x100 3.55 yd.
Carded filling sateens
37½" 64x88 4.70 yd.
37½" 64x104 4.37 yd.

Cotton duck
Army duck
28½" 54x40 8 oz.
Flat duck, single filling
29" 76x30 8 oz.

Wide duck
36" No. 8

Napped fabrics (in the gray)
Canton flannels
33" 8 oz. (mitten flannel)
Wide industrial fabrics
Sheetings
46" 42x38 6.00 yd.
52" 48x48 3.85 yd.
54" 1.55 yd.
54" 1.30 yd.
60" 48x48 3.30 yd.
Drills
59" 68x40 1.85 yd.
59" 2.25 yd.
Twills
56" 1.10 yd.

Sateens
54" 104x64 1.30 yd.
54" 1.55 yd.

Tire cord and fabrics
Cords, on cones
23/5/3
15/3/3
Woven cord
23/5/3
13/3/3
Square woven fabrics
Builders, 10/4

Wide bed sheeting fabrics
Wide brown sheeting
90" 56x58
90" 64x64
90" 68x72

B RAYON BROAD GOODS

Prices for selected constructions pub. in trade papers; e.g., *Daily News Record, Journal of Commerce*

Daily prices f.o.b. mill

Data on mill activity available in monthly reports of the National Rayon Weavers Association and National Federation of Textiles. Additional data on production, unfilled orders, shipments, and stocks comp. on a confidential basis for the use of members only. Imports and exports comp. by BFDC

Box loom dress goods
48" 96x50 200d gamsa
48" 44x36 2 ply alpaca
48" 52x44/46 romaine
45" 135x64 100d 2x2 canton crepe

Satins
42" 200x72 75/100 acetate
40" 140x56 100d/40f 150d/40f viscose
40" 110x52 150d/40f viscose

Taffetas
39" 110x48 150d/40f acetate
40½" 92x68 100/150 pigment
40½" 72x56 150 pigment
39" 68x44 150d/40f
39" 108x46 150d/40f faille

Twills
38" 112x68
40½" 92x64
40½" 72x52

TABLE 15—*(Continued)*

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	NATURE OF PRICES QUOTED	RELATED DATA
	C SILK BROAD GOODS		
Flat crepes 43″ 55x84 'A' for pure dye 43″ 55x72 for wtg. *Lingerie satin* 44″ 50x100 2x2 for pure dye 43″ 45x84 silk-Bemberg mixture	Prices for selected constructions pub. in trade papers; e.g., *Daily News Record, Journal of Commerce*		Imports and exports comp. by BFDC
	D JUTE FABRICS		
Jute Burlap 10½ oz. 40″ 8 oz. 40″	Prices pub. in *Journal of Commerce* and *Daily Mill Stock Reporter*	Daily prices in the N. Y. market	Imports comp. by BFDC

One or more of these may simply be implied. In the case of cotton drills and certain other fabrics, the number of threads per inch in the warp and filling may vary somewhat from one mill to another, making the weight the sole determining factor. Also, while for cotton gray goods the grade of cotton is not specified, for rayon fabrics the process and denier of the yarn used are always stated and frequently the number of turns per inch. Similarly the grade of raw silk and the number of threads combined to form the warp are given. With this specification of raw material or yarn it is possible to link up readily silk and rayon gray goods with the preceding stage of manufacture. For cotton it is not so easy since there is greater latitude in the grade and staple length of cotton that may be used for a given construction. One mill may use a grade or staple somewhat better or poorer than another mill. For purposes of general analysis, however, typical grades and staple lengths of cotton that may be used in the manufacture of the different classifications of fabrics vary somewhat, as is indicated in the comparison of several basic groups of fabrics.

TYPE OF FABRIC	TYPICAL GRADE AND STAPLE OF COTTON USED		APPROXIMATE RANGE OF YARNS	
			Warp	*Filling*
Combed voile	Strict middling	1 3/16″	50s–60s	50s–60s
Print cloths	Strict middling	1″	27s–32s	36s–44s
Sheetings				
Class A	Middling	7/8″	10s–14s	12s–16s
Class B	Middling	15/16″	16s–21s	16s–22s
Class C	Middling	15/16″	21s–28s	22s–29s
Drills	Middling	7/8″	10s–20s	12s–22s
Ducks, flat	Strict low middling	7/8″	8s–14s	4s–14s

Whereas cotton gray goods may either pass directly into use as gray goods or be converted into finished goods, all rayon and silk fabrics necessarily pass through the finishing process for resale in finished goods markets. The uses of rayon and silk fabrics are pretty much determined at the time they are woven by the construction itself. There is, of course, some leeway; satins are used in small amounts for dress goods as well as for underwear; plain weave taffetas

may be used for a variety of things; and so on, but in a general sense the range of uses is relatively limited by the construction itself and the price at which the fabric must sell. This is also true for certain types of cotton goods, such as colored yarn fabrics and combed cotton fabrics, but for the other types the uses are extremely broad. For example, one market analyst has found over two hundred uses for ounce duck alone. The chart shows some of the major lines of flow of fabrics, but is, of course, not intended to be complete. However, since price analysis will in most instances start at the retail or use stage and work back in tracing some particular fabric, this diversity of use, which increases in the later stages of manufacture, will not necessarily be an obstacle to price research.

THE GRAY CLOTH MARKETS

Efficiency in the highly active gray cloth markets, in the absence of formal organization, is achieved through concentration of the actual marketing in the hands of relatively few selling agents and brokers, whose main offices are in New York City: cotton gray goods in the Worth Street district; silk in the Seventh Avenue district; rayon in both; and burlap, linen, and other imported fabrics, with importers. In the largest gray cloth markets, about twenty selling houses handle most of the goods sold, and in some markets, less than a half dozen. Instead of lessening competition, as some people unfamiliar with the industry might believe would be the case, this concentration intensifies competition by making quick price adjustments possible. Some selling agents, for example, may represent several mills producing the same fabrics, and if one mill will not accept a buyer's bid, it can be passed to another. Similarly a leading brokerage house will know at all times what prices most important mills will accept for a given type of goods and can at any given time tell prospective buyers what the market 'price' is.

The markets in which gray goods prices are made are thus essentially brokers' markets. There are no list prices. Quo-

tations are on a bid and asked basis, and when there is a meeting of minds, the resulting price is the market price. In inactive markets the asked price is usually the quoted price. To get a continuous price series both market and asked prices may have to be used.

Differences in published quotations for the same fabric for the same day are not infrequent. They may arise from preference for a given mill make and willingness to pay a premium. Or they may come from ignorance on the part of either buyer or seller of what the 'market' is asking. In the absence of a formally organized market such situations are bound to develop. But they are most likely to arise from differences in sources. One paper may get its price for the day from a gray goods broker; another from a selling agent. Prices quoted by brokers tend to be lower than those quoted by selling agents, since the latter are more likely to report asked prices, and the former to report prices for which goods can actually be purchased. Such differences tend to be small and in time balance themselves out.

As in most commodity markets, selling of gray goods may be on either a spot or future delivery basis. For the more widely used standard constructions or staples, as they are sometimes called, mills customarily make goods for stock, so that normally some goods for spot delivery are available in the market. On special constructions at all times, and on staple goods during times of extensive forward buying, mills sell for future delivery. Contracts are usually based upon the expected production of a certain number of looms. Novelty goods are usually delivered 10 per cent weekly, the first delivery being made three to four weeks or more after the contract has been signed (depending on how long it takes to convert the raw material purchased to cover the contract into cloth). The amount of staple goods deliverable weekly may vary widely depending upon the extent to which the mills' capacity is sold ahead, the number of looms available, and the customers' requirements.

Variations between spot and future delivery prices follow in a general way variations in prices of raw materials. Future

delivery contracts may be priced either at a premium or a discount, depending upon such factors as the outlook for the cotton crop or raw silk production. When one price alone is given, it is usually for spot delivery goods, except when mills are sold well ahead, in which case it is the contract price.

FINISHED GOODS

Finished goods markets are of two broad types: markets for converted gray goods and markets where the cloth reaches the point of sale for the first time as finished goods. To these may be added the group of composition fabrics, in which a fabric is combined with other substances to produce a finished fabric with entirely new properties. Under the first are included a large proportion of all cotton, rayon, and silk fabric markets; under the second practically all woolen and worsted fabrics, colored yarn cotton goods, and such specialties as upholsteries, pile and narrow fabrics. Both types of markets have this in common, that standardization of constructions is less prominent than at the preceding levels of production.[19] This arises inevitably from two facts: (1) finished goods contain decoration, which can impart to the cloth a wide range of values both intrinsic and subjective, quite irrespective of the value of the cloth per se; (2) the finishing process tends to blur the construction of the cloth as it was woven so that it is difficult to determine from a finished sample just what the original construction was.

In printed designs on converted goods, one pattern may be more intricate and therefore more expensive to execute in both engraving and printing, as well as having greater color coverage.[20] Similarly a group of patterns averaging four or five rollers per pattern and printed in small runs would represent a greater intrinsic value than one with

[19] An important exception is colored yarn cotton goods such as denims, which resemble gray goods more nearly than finished goods.

[20] Color coverage is usually expressed as the percentage of the area of the cloth covered by the printed design.

fewer colors and printed in large volume per pattern. The wide variation in cost of dyes makes it possible also for a printer or converter willing to take a chance on consumer rejection to use inferior dyes. Furthermore, there is the enormously important factor of style, which though subjective, adds to the value of finished goods. Thus, the gray cloth construction no longer tells the whole story of the value of the finished cloth. It is now only a part of the total value, though for the great majority of cloths still the dominant part.

The same situation, of course, applies to woolen and worsted goods where the pattern is woven into the cloth, either in the texture alone or in color and texture combined. The more novel the yarns of the weave, the more difficult is it to classify a fabric according to standards of construction. Where one is dealing with a fiber of such great variation in quality as raw wool, or where reworked fibers also may be present, to give merely the number of picks and ends in the cloth tells practically nothing by itself, unless one could know the grade of raw wool and much other information about its processing—facts one would be unlikely to possess and would probably have difficulty relating to any possible set of standards. This is generally true also of other fabrics that appear for the first time in the finished goods market,[21] such as pile fabrics where the details of construction are intricate to begin with.

[21] Narrow fabrics are a case by themselves and fall in between gray goods and fabricated products. The narrow fabrics industry may be subdivided on the basis of products into four branches:

a) woven nonelastic fabrics, such as tapes, labels, ribbons, upholstery, and drapery trimmings
b) woven elastic fabrics, such as elastic hose supporters
c) braided non-elastic fabrics, such as shoe laces
d) braided elastic fabrics

Like thread these products are used incidentally in the production of other articles. The range of possible uses is exceptionally large. For example, there are hundreds of different sizes and constructions of ribbons, with various fibers employed in many different proportions, including metal, cellophane, etc. Many of the products of the industry, such as garment labels, are necessarily made according to the buyer's specifications.

Prices for narrow fabrics tend to be quoted on a list basis. The unit of

A further cause that lessens the importance of standard constructions in finished goods lies in the changes in cloth during the finishing process. As cloth is woven on the loom it is naturally under considerable tension in respect of both the warp and the filling. During the finishing operation this stretch may be increased warp-wise as a result of the cloth being pulled through the finishing processes in rope form with resulting shrinkage in the filling. Also if the cloth is woven with highly twisted yarns such as crepe-twist yarns, the resulting shrinkage may be very great, up to 20 or 25 per cent of the original width and length. Even if the cloth is put through a preshrinking process to prevent subsequent shrinkage, the resulting count of ends and picks per inch may have no readily determinable relation to the original gray construction of the cloth. Similarly, because of differences in weaving tension, the finished construction will not be exactly the same on two successive lots of goods, or even at the two ends of the same lot. The best that can be done so far as standards of construction are concerned is to sell finished converted goods on the basis of the gray constructions from which they were derived. From woolens and worsteds, constructions are omitted altogether and the fabrics are sold simply by the width and the weight of the cloth —so many ounces per linear yard—although in worsteds the grade of top used is frequently mentioned, as a 64s cloth, a 3/8 blood fabric, etc.

For those types of converted goods where the gray construction represents a widely recognized standard of quality, its use for identifying the quality of the finished fabric works out reasonably well. Sometimes, however, there is a tendency for a certain type of converter to use sub-count constructions, i. e., constructions with slightly fewer ends or picks per inch than in the more generally used market

quantity varies, although there is uniformity in the trade for any given item. Variations in prices between a product of one mill and that of another may be offset by lower prices on other items the same customers would use. The quality of each firm's products also tends, as in the case of thread, to be more important to the customer than minor price differentials. Price data for the industry are not reported in the trade press.

constructions. Or he may use narrower gray goods than the standard and 'hold out' the goods in the final finishing process so that the cloth has about the same finished width as cloth of similar construction actually woven two or three inches wider. In this case the finished goods or the garments into which they are made, will, of course, shrink upon the first washing that much more, although this cannot be known to the customer at the time of purchase.

Practices of this sort have been most common in the rayon and silk industry, particularly in new types of cloth or new constructions in the early stages of development. By progressive debasement in small degrees, by taking out a few ends here or a few picks there—something that cannot be readily detected by users—new cloths have been gradually reduced to lower constructions until some sort of minimum is reached which, if the popularity of the cloth survives, comes to be recognized more or less as a standard construction. Novelty goods are most subject to this type of treatment, whereas in staple goods the 'chiseling' more frequently takes the form of a reduction in gray width. In short, comparability of prices for finished goods, even for goods of ostensibly the same quality, is at best uncertain and must be based either upon such broad qualifications as simply the weight of the cloth or upon the construction of the gray cloth, which cannot always be checked with complete certainty.

The finishing operation, whether performed by a job finishing plant acting upon instructions from a converter or within an integrated mill organization, is the final stage in cloth manufacture. It imparts to the cloth the particular characteristics required for the specific purpose for which it will be used. These characteristics of design, color, and finish should be added to the designation of the cloth itself for the complete identification of the finished goods:

1) Width, finished—distinct from gray width

2) Gray construction for converted goods; weight, either finished or gray, for colored yarn goods

3) Type of cloth or weave

TABLE 16

Selected Sources of Prices of Finished Fabrics and Related Data

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	RELATED DATA
	A CONVERTED FABRICS	
	1 Cotton Woven Goods	
Print cloth yarn market 35/36" percale (38½" 64x60 5.35 yd.) Bleached Plain dyed, fast to washing colors Printed, fast to washing colors 35/36" printed percale (39" 80x80 4.00 yd.) Fast to washing colors 35/36" carded broadcloth (36½" 80x60 5.00 yd.) Bleached Plain dyed commercial colors Printed, fast to washing colors 35/36" carded broadcloth (37" 100x60 4.10 yd.) Bleached Plain dyed, vat colors	Occasional quotations in *Daily News Record* and *Journal of Commerce;* prices for certain fabrics, obtained from converters and selling agents, available in reports of Wholesale Price Division, BLS (see Ap. I)	Imports and exports comp. by BFDC. Data on production and stocks comp. on a 13–month basis by National Association of Finishers of Textile Fabrics
Narrow sheetings and allied fabrics 35/36" printed cretonne (36" 48x40 5.50 yd.) commercial colors 35/36" vat dyed jeans (39" 96x64 2.85 yd.) 35/36" vat dyed khaki (37" 2.00 yd. four leaf twill)		
	Fine cotton goods 36" printed lawn (40" 76x72 9.00 yd.), vat colors 36" bleached lawn (40" 96x100 7.00 yd.) 39" printed voile (40" 60x56 ordinary twist) 36" bleached broadcloth (37" 136x60, or 128x68) 35/36" printed sateen (37½" 64x88 4.70 yd.), commercial colors	
	2 Rayon Broad Goods	
Same fabrics, finished, as shown on gray goods list		Imports and exports comp. by BFDC

Same fabrics, finished, as shown on gray goods list 39″ transparent velvet	Imports and exports comp. by BFDC

B FINISHED FABRICS SOLD BY WEAVING OR KNITTING MILLS

1 Cotton Woven Goods

Colored yarn fabrics Gingham 32″ 64x52 5.50 yd. Denims 28″ 2.20 yd. unshrunk 28″ 2.20 yd. fully shrunk Chambrays and cheviots, plain shades 36″ 3.90 yd. (fine yarn) 36″ 3.20 yd. Shirting coverts 36″ 3.90 yd. (fine yarn) 36″ 3.20 yd. Cottonades and heavy coverts 28″ 2.40 yd. 30″ 2.00 yd. Bed tickings 32″ 2.00 yd.	Prices pub. occasionally in *Daily News Record* and *Journal of Commerce;* prices for certain fabrics, obtained from mills and selling agents, available in reports of Wholesale Price Division, BLS	Imports and exports comp. by BFDC. Data on orders, production, shipments, and stocks comp. by Cotton Textile Institute on a confidential basis for the use of members only
Outing flannels Bleached and solid colors 36″ 4.50 yd. Fancies 36″ 4.40 yd. printed		

TABLE 16—*(Continued)*

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	RELATED DATA
Pile fabrics	Prices pub. occasionally in *Daily News Record* and *Journal of Commerce;* prices for certain fabrics, obtained from mills and selling agents, available in reports of Wholesale Price Division, BLS	Imports and exports comp. by BFDC
Velveteens		
36″ twill back		
36″ plain back		
Corduroys		
Men's wear		
Ladies' wear		
Jacquard woven fabrics		
Table damask 58″ 66x56		
2 *Woolen and Worsted Goods*		
Suiting, standard mixture 56″ serge, 12 oz., ⅜ blood quality, per yd.	Prices pub. occasionally for specific companies in the *Daily News Record* and *Journal of Commerce;* prices for certain fabrics, obtained from mills and selling agents, available in reports of Wholesale Price Division, BLS	Data on orders, production, cancellations, shipments, and stocks comp. by National Association of Wool Manufacturers. Imports and exports comp. by BFDC
Suiting, serge, with 56–58″ 15 oz. per yd.		
Suiting, serge, width 58″ 16 oz. per yd.		
Suiting, uniform serge, 12 oz. fine grade, per yd.		
Suiting, uniform serge, 12 oz. medium grade, per yd.		
Suiting, unfinished, worsted, 13 oz. per yd.		
French serge, all wool, 54″ 7 oz. per yd.		
Overcoating, melton, 28 oz. per yd.		
Broadcloth, women's dress goods, 9¼ oz. 54–56″, worsted and wool, per yd.		
Crepe, all worsted, 54″ 5.2 oz. per yd.		
Flannel, all wool, 54″ 6 oz. per yd.		
Flannel, all wool, 54″ 7 oz. per yd.		
Sicilian cloth, cream, 54″ cotton warp, 6.2 oz. per yd.		
Trousering, 36″ cotton warp, worsted filled, 6 oz. per. yd.		

Rayon, plain stitch, circular knit 150d viscose yarn, per lb.	Prices pub. occasionally in trade papers	Data on production, stocks, shipments, and orders comp. monthly by Census
Rayon, plain stitch, warp knit		
Men's light topcoating, knitted, 17 oz., 55" finished		
Milanese fabric, knitted from 20/22 pure silk, weighted 3–pass, finished to give approx. 11.00 sq. yd. to lb. computed on greige weight, priced by the sq. yd.		
Tricot fabric, one bar made from 100d viscose type rayon, knitted to finish approx. 5.50 sq. yd. to lb. computed on greige weight, priced by the sq. yd.		

C COMPOSITION FABRICS

Artificial Leather, Oilcloth

Artificial Leather, per yd. Heavy Light	Prices pub. in reports of Wholesale Price Division, BLS (see Ap. I)	Imports and exports comp. by BFDC
Oilcloth, per piece, factory Shelf, 12", per 24 yd. Table, 5/4, per 12 yd. Wall, 5/4, plain tints, per 12 yd.		Data on production, unfilled orders, and shipments of pyroxylin coated textiles comp. monthly by Census

4) Grade of colors
5) Character of decoration or process
6) 'Finish'

Construction details of the cloth as quoted in the market, particularly yarn count for converted goods and colored yarn cotton goods, are usually those of the gray cloth, except that the width specified is that of the finished cloth. This allows for normal shrinkage during finishing. Widths tend to become standardized in order to fit the cutting patterns of the fabricating trades. For other finished goods sold directly by mills, construction details are usually those of the finished cloth.

The name of the cloth gains importance in finished goods. It may or may not be related to the name of the gray cloth, as will be seen from the list of finished goods selected for price study in Table 16. In the finished state, fabrics of wide diversity in use, such as print cloths, have a great variety of names or forms, of which the two or three listed are merely representative. Similarly, names with promotional significance and brand names of individual manufacturers begin to appear here in large number. The importance of such names in influencing decisions by the trade as to the price varies considerably. Well established names probably command preference and occasionally a premium, provided styles and other factors are equal.

To a considerable degree the type of cloth itself determines its use, and by the same token, the finishing characteristics that will be imparted to it. These include the decorative design, applied after weaving to bleached, dyed, and printed fabrics, and in the weaving process itself to other types of finished goods. Bleaching constitutes the first stage in finishing of practically all converted cotton textiles. It is preceded by a singeing operation, in which the gray cloth is passed quickly over a live flame or hot plate which burns away surface lint. Cotton goods that are to be dyed or printed must first be bleached to remove lint, warp sizing materials, natural oils, and other substances that would prevent even penetration or registration of the dyes. Also

about a third of all finished cotton goods are used in the bleached state. Similar processes preparatory to dyeing or printing are used in rayon and silk, but are gentler in their action; e. g., simply a scouring operation to remove warp sizing for rayon and the 'boiling off' of the natural gum in silk.

The range of dyestuffs that may be employed in plain and yarn dyed and printed fabrics is literally enormous. Every year new improved colors are produced. Hence the quality of colors has improved steadily for some twenty years, whereby consumers have been receiving more and more in wearability for their money. Two distinct terminologies are applied to classes of colors: one, in consumer terms based upon performance, is used in the dry goods trades; one, in technical terms based upon the nature of the dyes or methods of application, is used in the textile and dyestuffs industries. The consumer terms all imply certain

Consumer Classification

1) Guaranteed fast colors
2) Fast to washing colors
3) Fast to chlorine colors
4) Fast to sunlight colors
5) Commercial colors

Technical classification

1) Vat and naphthol dyes
2) Developed dyes ('d and d')
3) Sulphur dyes
4) Direct dyes
5) Basic dyes

standards of performance. Yet within any group of dyestuffs there is wide variation in fastness from one color to another. Furthermore, important variations can be introduced in the application of the dye to the cloth, since in many instances the given color is produced by chemical reaction within the fiber. The methods used by consumers to cleanse the cloth and the conditions of use will further influence importantly the performance of the dye. Hence mere specification of the type of dyestuff according to the technical

classification carries no necessary connotation as to performance of the color according to consumer standards.

Furthermore, dyestuffs do not affect all fibers uniformly. Fibers have varying receptiveness to dyes. Wool, for example, is the most reactive of all fibers to dyes, combining directly with most dyestuffs, and yielding as a rule colors that are much faster than those obtained with the same dyestuffs on other fibers. Hence obtaining fastness of color or making the dyestuff remain in the fiber is much less a problem than with cellulose fibers like cotton and rayon. Likewise, dyes that react readily on one fiber frequently do not have a similar effect on others.

There is finally the 'finishing' operation itself, that is, the imparting to the cloth of a definite 'finish' or 'hand' through processing it over certain machinery, usually with the addition of materials that aid in producing the desired effect. The range of these processes is very great, embracing many different purposes and producing wide variations in effect—napping, shearing, brushing, fulling, beetling, mercerizing, plisse printing, waterproofing, resin-impregnation for anti-creasing, moth-proofing, preshrinkage, imparting of a permanent finish, and ultimately a final finishing operation, which is most frequently calendering or ironing.

The primary function of the final finishing operation is to give the cloth a pleasing 'hand', one that will not break down before the made-up articles or piece goods have passed through the distribution process to the consumer. In some cases permanent finishes may be used, but these are hard to obtain and quite expensive. The type of finish regarded as satisfactory varies widely with the cloth. Wool goods, for example, require a different surface effect than rayon or cotton—one that requires napping, shearing, and brushing; whereas rayon takes an oil, gum, or soap finish, and cotton most frequently a starch finish. In any event the proper finish enables the cloth to maintain its appearance in the store without soiling or mussing excessively. Low construction cotton cloths, used for articles to sell at the lowest prices, do not have enough body to carry them through the

cutting-up processes; consequently, starch and mineral fillers that will give the necessary body are added.

PILE AND JACQUARD FABRICS

In addition to the complexities of standards for finished goods outlined above many fabrics have features peculiar to themselves, especially fabrics produced on specialized types of machinery, such as pile and jacquard fabrics. Here the possibility for combination of two or more different fibers within the same fabric in an intricate construction adds to the difficulties of determining standards and maintaining continuous price series.

Jacquard fabrics are used chiefly in tapestries, draperies, and upholsteries; certain amounts are used also for neckwear and dress fabrics. The units of sale are very small, usually no more than 60 or 100 yards of a pattern, and diversity in pattern and construction are emphasized. Since design is what matters most, prices tend to have more relation to it than to intrinsic construction. The establishment of standard grades for price study purposes is consequently extraordinarily difficult, although it might be possible to work from the bases upon which costs and prices are figured.

A special situation applies to pile fabrics in that production is entirely in the hands of about half a dozen mills having the necessary machinery to produce velvets, velveteens, velours, duvetyns, plushes, and corduroys. Pile fabrics may be made from any of the fibers, although most commonly they are made from silk, rayon, mohair, and cotton. Usually one fiber is used for the back and another for the face. Thus silk velvets are usually made with a silk, rayon, or cotton back, and with spun silk yarns in the pile. Variations in construction as well as possibilities for fiber manipulation make comparative price analysis here, as for other specialized types of fabrics, quite difficult.

COMPOSITION FABRICS

Giving a specific finish to cloth may go beyond simply processes applied to the fabric itself, and may involve the

combination of the cloth with other substances in such a way as to produce an entirely different article. These composition fabrics constitute a field of their own, partly in textiles and partly in the chemical industries. The more familiar types include pyroxylin-coated goods, artificial leather, oilcloth, and hard surface floor coverings, linoleum and felt base (Table 16). Many other types may be suggested, however, moving out into the field of industrial fabrics. The list is merely suggestive and is given to indicate lines of possible research through linking up products of this type with fabrics and raw materials.

Coated Fabrics

1) Artificial leather
   pyroxylin-coated
   non-pyroxylin coated
2) Oilcloth
3) Hard surface floor coverings
4) Abrasive fabrics
5) Gummed cloth
6) Surgical adhesive tape

Impregnated Fabrics

1) Rubberized fabrics
2) Fabrics for oiled clothing
3) Window hollands
4) Tracing cloth
5) Book cover cloth
6) Plastics combined with cloth
7) Typewriter ribbons
8) Brattice cloth

Mechanical Rubber Goods combined with Cloth

Automobile and Bicycle Tires

THE FINISHED GOODS MARKETS

The finished goods markets, like the gray goods, are markets of price adjustment. This applies both to converted fabrics, which have already passed through a gray goods market, and to finished goods, which go on sale for the first time. For the latter, all the price adjustment must be taken up in the finished goods market; for the former, there are two mar-

kets to cushion price changes. The method of adjustment turns on both changes in the construction of the cloth, as described above for gray goods, and the quality of the elements added in the finishing process. There is thus some additional leeway in finished goods for adjusting to the price requirements of the retail trades, revolving around efficiencies of operation and the cutting of corners here and there in the finishing process. On the whole, finished goods prices tend less to follow the violent fluctuations of raw material prices than gray goods, without at the same time having the rigidity characteristic of fabricated products and retail prices.

The finished goods markets differ from the preceding markets in the type of customers comprising the demand side of the market and their pricing requirements. Many contrasts could be drawn between the processors at the earlier stages of manufacture and the typical operator in the cutting trades. From the price standpoint the two most significant are the latter's definite orientation to retail pricing methods and the limitation upon his financial resources, which has resulted in a system of buying that allows his speculating in cloth without using his own capital.

The merchandising of finished goods and of textile fabricated products is based upon the preparation of a 'line', which comprises an assortment of fabrics, colors, and designs broad enough to contain some units that should appeal to all firms in the trades solicited. Part of the line is based upon fabrics carried over from one season to the next, and part upon fabrics that are run for a single season. Each fabric in the seller's line or garment in the cutter's line is planned and designed for sale in definite retail price lines. This 'line' may be changed frequently, but it is usually preserved intact until the entire trade to be solicited has been covered at least once, and possibly one or two times more for re-orders. This may take from three to five months. The fabricator finds it undesirable to change his prices on the line during that time. Having sold some of his accounts at the old price, to cut the price before the

goods have actually gone on sale throughout his trade would be demoralizing to his customers and would result in little net gain to him. The same is true of price increases which are very difficult to make effective in the middle of a season, since all the firm's customers will want to be covered at the low prices.

Thus prices of textile fabricated products tend to remain stable during a 'season'. The timing of seasons varies from one trade to another, or one cutter to another, of course, but at certain dates the prices of finished goods can be adjusted with least disturbance to the fabricated product and retail markets. These occur from two to four times a year when finished goods producers are introducing their new range of patterns or fabrics. Prices must naturally be adjusted at other times as well, but the tendency is to make the changes all at once, at least in the list prices. This method of pricing ties in with retail merchandising procedures, where selling conforms to the seasonal cycle and pricing is stratified in a few price lines. These price lines tend to be maintained, except for sale purposes, where a lower mark-on is accepted temporarily in order to stimulate demand. The concept of the rigid retail price level being maintained for the duration of the season, until the closeout period, directly parallels the aim of the fabricator to keep his price intact until the season is well advanced. Finished goods operators are thus in between this tendency on the retail side toward price stability and the opposite tendency coming from the fiber markets toward price fluctuations.

This situation is made more difficult for the finished goods seller by the inability or unwillingness of the typical fabricator to carry a fair share of the price risk. Cutters are typically underfinanced, partly from choice, since they can borrow what funds they need from factors and their earnings upon their own capital are thus correspondingly larger. Thus a garment cutter with $20,000 capital may do an annual business of $300,000 by having his account factored.

If he then earns a profit of 7 per cent on his sales, he has an annual profit of over 100 per cent on his capital.

Under the existing structure of the industry fabricators, by buying from hand to mouth and demanding immediate delivery of what goods they require, can pass a large part of the merchandise risk to converters and mills. This forces the finished goods house to carry a large stock, part of it in slowly moving goods that may have to be closed out at a loss. All this financial weakness on the part of fabricators contributes instability to the market—lack of demand when prices are weak and excessive speculative demand when prices are rising.

Goods may also be purchased for future delivery in the form of a blanket order placed with the vendor and calling for delivery by some specified date. Blanket orders of this kind are useful to the cutting-up and distributing trades because they provide a certain protection or guarantee against price advances before the specified delivery date. In this way a cutter may 'cover' on part of his expected cloth requirements for the season without definitely selecting patterns to be applied against the order. The vendor will usually allow him a definite period for his selection, based upon his early selling activity and the response accorded his 'line' by his customers. Acceptance of a blanket order by a vendor involves further risk since he does not know what patterns will actually be selected. If his sales are well distributed, however, this risk tends to be minimized and he will be able to go ahead finishing up a quantity of goods about which he would otherwise have had no assurance at all concerning their salability. On the whole, sales of finished goods on a future basis tend to be unsatisfactory since purchasers are frequently unwilling to recognize the validity of blanket orders during a declining market, however valid they may regard them during a rising market. Forcing acceptance of goods purchased on a blanket order basis is frequently made difficult by credit limitations of the purchasers and the unwillingness of finished goods

houses to run the risk of losing the goodwill of important outlets.

In contrast to 'market' quotations on gray goods, finished goods are by and large sold from list prices. As indicated above, these price lists tend to be maintained for the duration of the season, or at least on highly seasonable goods, until after the peak of the season. As the season draws to an end, prices are marked down to close out goods that cannot be carried into the next season's offering. During the season minor changes tend to be taken care of by 'trading' off the list, particularly on large quantities of goods, rather than by repricing the list. Trading off the list raises a major problem in price analysis in all industries. Probably it is less of a problem in textiles than in some other industries where list prices are employed.

Finished goods, like gray goods, are priced on a per linear yard basis for goods of specified width. Usually there are two or more prices for the same goods, one for manufacturer's fold and one for piece goods fold, for over-the-counter trade. Prices on piece goods fold may be quoted for either the jobbing or retail trade. The same firm rarely quotes for both trades, but if it does, a differential of 10 to 20 per cent is usually included in the retail price. For price record purposes, quotations in manufacturer's fold are to be preferred, as they tend to be slightly more flexible than prices for piece goods fold. The lack of uniformity in the way quotations are made in many lines renders direct comparison difficult, and for purposes of price analysis lessens considerably the significance of a quoted price unless the terms of sale are known.

Terms of sale vary widely but, in contrast to net prices on gray goods, nearly always involve discounts for prompt payment. In the cotton and worsted industries the terms of sale are usually 2/10 60 extra, and for the sale of piece goods to retail stores, 3/10 e.o.m. Goods are sold f.o.b. mill with occasional exceptions, as when sales are made f.o.b. New York City. In the silk and rayon trades, selling terms are frequently longer and less uniform; 8/10

e.o.m. being the most generally quoted terms to both the cutting-up and retail trades. The uniformity in the cotton trade, which has been arrived at by agreement among the various trades concerned and is covered in detail in the Worth Street Rules, makes possible direct price comparisons between the quotations of different converters.

Continuity of price series becomes a serious problem on finished goods, because of the difficulty of establishing comparability between fabrics offered during two successive seasons, and because of continual shifts in consumer preference. For goods that come on sale for the first time as finished goods, such as woolens and worsteds, this is particularly difficult since variations in quality are frequently employed to stabilize the selling price at a given level. In the case of woolens this may take the form of variations in construction, and in the grade of wool used, or the use of wool substitutes such as reworked wool or rayon waste. The range of possible quality variations in worsteds is somewhat less, although even there rayon can be and has been used successfully as a substitute for price increases. Because of the free market and standard merchandise of practically uniform quality, current prices on a wide range of gray goods are widely quoted. In contrast, prices on finished goods are not extensively published in primary sources, as the trade papers, partly because they change less frequently, and hence there would be no significance in continuous daily quotations. Furthermore, because of the special characteristics they regard as attached to their merchandise many vendors are unwilling to have their prices openly quoted. Consequently, aside from a quite small range of fabrics, those interested in the study of finished goods prices must use price quotations of selected firms as shown in their files of orders or correspondence.

FABRICATED TEXTILE PRODUCTS

Textiles reach consumers in four distinct forms: (1) as piece goods, sold to consumers for fabrication in the home; (2) as fabricated articles ready for use; (3) in non-textile

articles, such as shoes or automobiles, where they play a secondary role to other raw materials; (4) as part of the production costs of a great many industrial and agricultural products, in the manufacturing or distribution of which textiles are used. The fourth group represents consumption in processes as in conveyor belts, as containers, as tyings, and many other uses that constitute to the consumer merely a minor part of the total cost of some product or service not connected in his mind with textiles at all. Similarly, the third type of use, in non-textile products, represents a group of special situations requiring study not so much as textiles as in the form in which they actually reach the consumer, i.e., as a part of price analysis conducted in fields outside textiles. Textiles sold as piece goods include both gray and finished goods, principally the latter, and pass directly from the mill or converter in one form or another to the distributing trades.

Today most textiles used as such by consumers reach them as fabricated products. This term is used here to designate the product of a final manufacturing operation in which definite shape, size, and design is imparted to it to fit it for a specific use.

SPECIAL PRICE CHARACTERISTICS OF FABRICATED PRODUCTS

The student of prices approaching the study of fabricated textile products is at once struck by the importance of five factors, which although present at other levels of manufacture have much deeper significance here.

1) The tendency of prices at this level to conform to retail price lines
2) The tendency toward standardization of price rather than of quality
3) The enormous variety in design and construction available for any given use
4) The impermanence and frequent change of design
5) The sale of fabricated products not to manufacturers but entirely to distributors, wholesalers, and retailers

Each of these factors affecting prices for fabricated prod-

ucts creates new barriers to the effective study of prices beyond those encountered at the fiber stage and the intermediate levels of manufacturing. Together they go a long way toward explaining why textile prices as a whole have not been studied to better effect.

Perhaps the greatest influence upon prices of fabricated products lies in retail pricing methods. Just as raw material prices have an immediate bearing upon prices of products close to the fiber stage, so products ready for distribution to consumers come directly under the influence of retail pricing and inventory procedures.

During the last decade or so [22] retail stores in seeking to increase their turnover, maintain properly balanced assortments, simplify the tasks of sales people, aid customers in selecting what they want, and generally cut distribution costs through increased efficiency of operation, have limited their lines more and more to the price ranges that show the largest volume and profits. Thus, instead of offering an assortment of some item at every half dollar from, say, $2.00 to $10.00, a total of 17 price lines, a store offers goods at perhaps only three price levels, $2.00, $5.00, and $10.00. Such pricing is based on the assumption that sales volume is largest at about those levels, and that they fit into the general buying pattern of the clientele to which the store as a whole seeks to appeal.

Offsetting the advantages of this system of merchandising and stock control is the disadvantage that once a store has set its price lines, it may be unwilling to adjust them freely, and may tend to merchandise at fixed prices instead of to standard qualities; i.e., in order to maintain its price lines, it may vary the quality of its goods. This practice is less of a disadvantage to the retail trader than to consumers and to the textile manufacturing trades. The average consumer cannot know how, when, or to what extent retail prices

[22] In the early 'twenties the development of the model stock plan by E. A. Filene focused attention upon this method of merchandising. It has since come to be applied in one form or another throughout American dry goods merchandising.

should change in keeping with raw material or other costs. Then too, the consumer frequently has an idea of about how much she can afford to pay for an article or she may literally have a certain amount of money to spend for it. For articles purchased only infrequently, she may not know how to judge relative values for different grades. Retail store price lines help in the selection by concentrating attention upon styles in her price range. On the other hand, the customer has no reliable gauge of value in relation to prices last month or last year, since the prices are always about the same level. Inflexible retail price lines together with flexibility of quality tend to obscure from the consumer the real value of the article.

The disadvantage of this merchandising method to the manufacturer is that he must consider first of all, not what quality will best serve a given need, but what quality of fabric, when made up into an appropriate article, will fit into some particular retail price line. For the production of a woman's dress to retail for a dollar, a cutter can pay no more than about 12½ cents per yard for cloth. If raw material costs are such that the most desirable fabric for that purpose cannot be sold for less than 13½ cents there will be almost no demand for it. It cannot be used in the dollar range, and the price is too low to justify inclusion in the next higher price lines having general acceptance in the retail trade at $1.59 or $1.95. For these price lines the manufacturer and retailer would want a higher priced fabric. If the cloth were used, the consumer would be paying half again or twice as much for her dress, simply because there are no widely used intervening price lines, whereas actually the additional price should be no more than about 10 cents. By the same token, the intrinsic value of the article sold at a particular price will vary widely over a period as raw material costs fluctuate and the same fabric could be sold one month at 12 cents and later at 10, 9, or 8 cents. The consumer still pays $1.00 for her dress, regardless of the cost of the cloth, although at the lower cloth price levels the manufacturer is probably giving her more

for her money in the form of better workmanship, more expensive trimming, and perhaps more yardage.

Full consideration of this particular problem of quality change would require detailed study of the effects of retail pricing upon a wide range of products at preceding levels of manufacture. Since textiles constitute, of course, only part of the merchandise sold at both wholesale and retail under fixed price lines, the problem must be viewed as much broader than textiles alone. Formidable as it is, the additional problem created by variety is still not wholly insurmountable. Passing over such an obviously difficult field as women's apparel, consider for a moment the variety in a seemingly simple standard product like men's shirts. Besides the basic distinction between collar-attached and neck-band styles, there is the wide variety of collar styles—high, low, long-pointed, tab, button-down, Duke of Kent, and still others; there are various cuff styles, different qualities and number of buttons, different lengths of tails, variation in number of stitches per inch in the sewing, differences in quality of cloth, an almost unlimited variety of patterns in woven-figured or printed fabrics; and different sleeve lengths and collar sizes. All these variables add up to an appalling number of assortments and combinations. Fortunately, in this field, it is fairly easy to spot the styles, sizes, and types that constitute the central tendency of consumer demand; for example, since the early 'twenties the collar-attached white broadcloth shirt has constituted from a half to two-thirds of the entire shirt market.

Careful inquiry into many other markets would indicate similar central tendencies in consumer demand. In some markets, however, the variety is so great that a common denominator is difficult to find. Women's apparel tends to be of that type, although some analysis is undoubtedly possible for investigators thoroughly conversant with the industry.

The frequency of change in design complicates the selection of representative grades or standards even further. Long term analyses in a large part of the fabricated prod-

uct field are almost out of the question at present because of difficulties arising from such frequent change. Short term periods, on the other hand, seem to offer some opportunities for analysis where direct comparisons can be made.

A further factor of predominant importance in the markets for fabricated products is that they are sold entirely to distributors. At all the preceding textile market levels, the chief purchasers are manufacturers buying raw material for further processing. These manufacturers have to know a great deal about construction, finish, and design because these elements influence directly the construction of their own product. The retailers and wholesalers who purchase fabricated products have, on the other hand, only one major concern: will the product sell. Distributors tend to view price not so much in terms of production costs as in terms of what they can get for an article when properly promoted and sold in the right kind of surroundings. This situation contributes much to the wide differences in retail prices between one store and another for the same article.

TYPES OF FABRICATED PRODUCTS

Textile fabricated products consist basically of two types: made-up articles produced by (1) textile mills which combine in some way the fabricating process with preceding manufacturing operations; (2) the cutting trades. This is essentially a difference arising from integration of the fabricating process with cloth manufacture, although in some cases, as in hosiery manufacture, the operations of fabric formation and product fabrication are performed simultaneously. Textile fabricated products may be grouped under five classes. The largest proportion come from the cutting trades.

1) Products of the cutting trades
2) Products characteristically fabricated by textile mills
   a) Sheets, towels, blankets, and similar products made by weaving mills, requiring only a minimum of fabrication
   b) Floor coverings

c) Knitted underwear, outerwear, and hosiery produced by knitting mills and requiring only a minimum of fabrication [23]

d) Hats

PRODUCTS OF THE CUTTING TRADES

The term 'cutting-up trade' or 'cutting trade' may be applied to all branches of the textile industry that characteristically perform 'cut-and-sew' operations on purchased fabrics. Firms making men's, women's, and children's apparel comprise by far the largest proportion of the total.

SPECIFICATIONS FOR PRICE ANALYSIS

For products of the cutting trades, the setting up of specifications for price recording and analysis clearly constitutes the dominant price problem. At preceding levels of manufacture specifications of grade and quality can be dealt with by recourse to standards inherent in the markets themselves. For cotton, for example, it is possible to select a standard market quality, having official approval by the Department of Agriculture and the organized exchanges, involving measurable qualities of grade, color, staple length, and character. For gray cloth again, there are measurable factors of width, count, and weight. For finished goods, measurement of quality to establish standard grades becomes less easy as more variables are added to the products: design, color fastness, and so on; yet within certain limits, standards of grade that can be continued over a reasonable period can usually be worked out.

For fabricated textile products developing standards of grade and quality becomes much more difficult, especially for products of the cutting trades where of all textiles the concept of standardization is weakest and the whole tendency on the part of manufacturers and consumers is to

[23] Knitted cloth, including underwear tubing, warp-knit fabrics for underwear, outerwear and gloves, knitted elastic fabrics, beef tubing and stockinette, and knitted work glove fabrics, are to be regarded as gray or finished fabrics, as are fabrics woven on looms.

move as far as possible in the opposite direction. Yet, despite these difficulties, the student of prices cannot pass over fabricated products since it is the last 'wholesale' price before goods reach the consumer. It is here that the most vital information is to be found about the effect of consumer demand upon manufacturers' prices and vice versa.

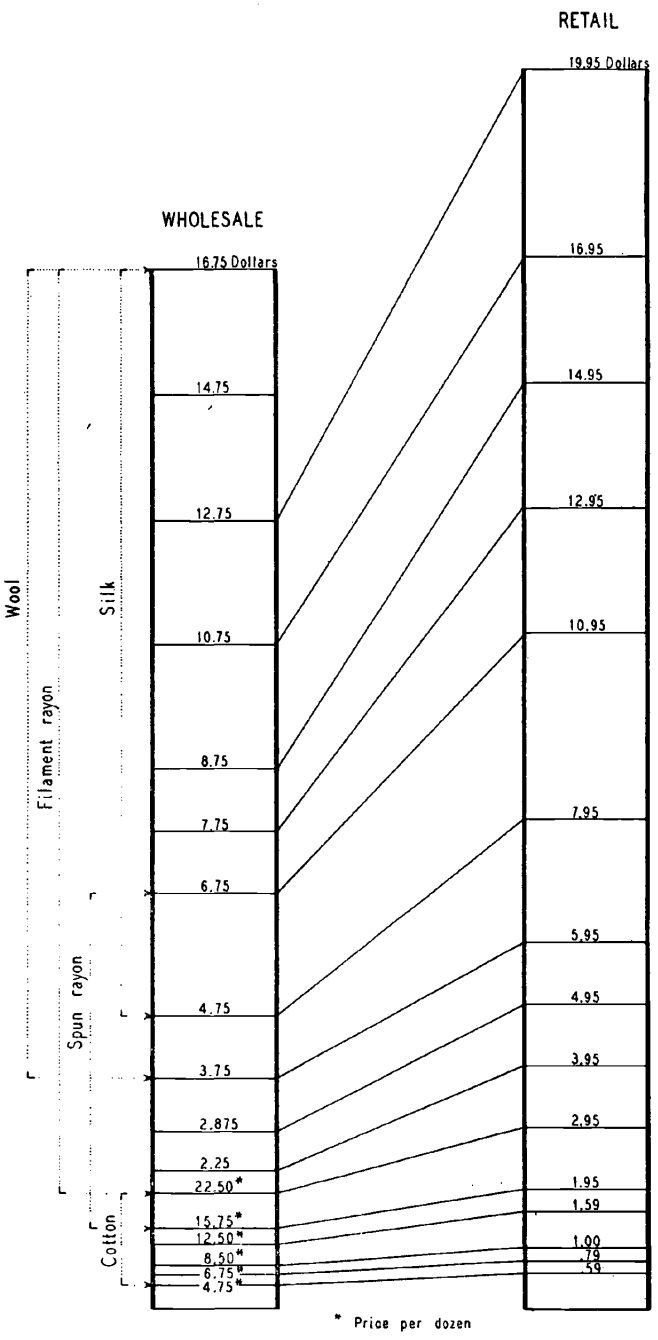
Of the factors mentioned above as applying to all fabricated textile products, variety is most characteristic of the cutting trade. The nature of the cutting-and-sewing operation makes possible the fashioning of almost any conceivable product out of cloth. The range of products is so broad that no attempt is made to list them here. The reader is referred to Appendix I for representative items. Furthermore, types of garments tend to overlap, with continual shifting of definition as style developments give new names to old types of garments or lead to others that do not fit readily into existing classifications. Establishing adequate specifications for pricing cutting trade products is a major research project in itself. Many new techniques must be worked out and a great deal of study is needed before satisfactory prices can be obtained from this field. Currently, the Bureau of Labor Statistics is studying specifications for textile products to be included in its wholesale price index, as part of a general revision of its list of textile wholesale prices. The Retail Division of the Bureau has already progressed far toward dealing with standard specifications for a wide range of apparel articles in connection with its Cost of Living studies. While it is under the necessity of keeping these specifications confidential, its experience indicates that specifications can be set up for a very large part of the textile apparel field.

Specifications for pricing purposes should be regarded in a different light than those currently termed 'consumer specifications'. The latter term is used rather loosely for a wide range of ideas identified with the general endeavor to enable the consumer to judge merchandise values better. Consumer specifications range all the way from simple marking of the fiber content of the fabric to detailed

information as to the construction of the fabric and of the garment itself. Adequate specifications for products of the cutting trades must necessarily be complex and, except for technical experts, checking them against a specific lot of goods is quite difficult. Possibly the classification of textile products into grades or according to a simple terminology may make it possible for the public to buy according to complex standards, but that of course is different from supplying it detailed information it must be able to interpret and apply. Adequate specifications for pricing a typical product of the cutting trade, such as women's dresses, would need to take account of: the price line for which the garment is produced; the basic fabric; trimmings; size; type of styling; workmanship.

Price Lines. For women's dresses priced to retail under $30.00, there are sixteen generally accepted price lines (chart). In the cutting trades these price levels have a high degree of rigidity. The competition among cutters to give as good values as possible for what retailers can pay, and the merchandising and mark-on policies of retailers together tend to solidify wholesale prices at these market levels. The corresponding retail levels are less distinct, one important reason being that certain types of retail stores may have much lower distribution costs than others, and may accordingly sell regularly at lower mark-ons. Then of course there are sales, special events, and clearances, which may result in marking down a dress from its regular price line. Thus while the wholesale price may be firm at $3.75, the retail price may vary from $5.95, the normal resale level, to $5.00 or less, depending upon the store, or even within the same store on occasion. Of course, there is nothing to prevent a cutter from cheapening his dress to make possible a lower retail price, by using cheaper cloth and trimmings, for example. The tendency, however, is strongly for cutters to hold within existing levels, where the buyer can compare value against competitive offerings, and the seller can distribute his product to more than just one

WOMEN'S DRESS PRICE LINES



store, i.e., price it so that it will fit into the price lines of a large number of potential distributors.

The Basic Fabric. While the wholesale price line seems to be the same year after year, the fabrics vary, sometimes within a single season. Thus, when the 92x68 pigment taffeta was introduced in 1936, it sold finished for 52½¢ per yard—a price at which it could be used for $3.75 dresses and to some extent in dresses at higher prices. Under the stress of competition rayon yarn prices fell, and the price of the cloth as well, until it was selling finished two years later at about 27½ cents per yard. At that price it could be used in $1.87½ dresses with about the same leeway for labor. Thus in a general sense, the price of this dress could be said to have declined from the $5.95 retail price line to $2.95, whereas the dress sold at $5.95 in the two years had different materials, the second of much greater intrinsic value than the first.

The basic fabric used in a dress, as indicated above in the discussion of finished fabrics, can be specified with a fair degree of precision. In popular priced lines, large numbers of cutters are likely to use the same basic fabric, partly because of the difficulty under competitive stress of varying the quality very much, and partly because retail buyers specify the fabric desired if it is receiving reasonably good consumer acceptance.

Trimmings. Specification of incidental fabrics, such as linings or facings and trimmings, is more difficult, since they may vary widely in both amount and quality. With the cut of the dress they are, of course, part of the style factor. Cost analysis of garment production would undoubtedly indicate that, while important in setting the final price, the cost of trimmings is usually proportionately too small to require precise specification for pricing purposes.

Size. Size adds a further complication to specifications beyond what is involved at earlier stages of manufacture. Yet, since we are dealing with the market, that is, all women in the country taken together as a whole, average sizes can be easily selected for pricing purposes. For special studies

account might need to be taken of special size lines, such as stouts or misses' sizes.

Range in Styling. Without going into all that may be involved here, we point out that garments tend to be styled for definite uses. A sleeveless dress for summer wear in street length represents a distinct type of styling. Further refinement of such specifications as may be needed for special purposes may be attempted. The broader matter of styling as it affects the distance of the hem from the ground, type of cut, fullness in the skirt, etc., presents problems to the student of price specification that can be evaluated only after careful research.

Workmanship. Next to the basic fabric used, the most important item of cost is labor. In terms of specifications this is to be judged according to the quality of workmanship, which, however, is hard to evaluate according to any fixed standard. What is good workmanship to one person may be quite differently evaluated by another, even for the same general price range. Here also further study is needed to determine how much importance should be attached to this factor and how to evaluate it in reporting prices.

CHANGES IN PRODUCTIVITY

Changes in productivity have had an important bearing upon costs and prices in many textile industries during the last decade, but nowhere have these been more spectacular than in certain of the cutting trades, particularly in the mass production of staple articles of clothing. Generally speaking, three principal methods of garment production can be differentiated: the tailor system, the bundle system, and the straight line or progressive system. The tailor system, where each sewing machine operator sews an entire garment, still persists in the production of women's coats and suits, and in higher priced dresses. Under the bundle system, the first adaptation of cut-and-sew operations to mass production, sewing is divided into thirty, forty, or sixty operations, a single operator performing no more than a few operations. Upon completion of a particular operation

for two or three dozen garments, the bundle is carried to the next operator, and so on through the entire series of operations. This system is utilized at present for practically all types of garments.

Since 1932 the situation has been radically changed by the introduction of the straight line or progressive system, which is coming to be utilized more and more widely in the production of staple articles of apparel, such as wash clothing, shirts, and trousers. Under this system the unit of goods in process is reduced from the bundle to a single garment. It is essentially the Ford belt system applied to a garment factory. Instead of being passed from one machine operator to another on a moving conveyor belt, however, garments in process move along a stationary chute. A single garment goes through thirty or forty operations and is completed in a few minutes. Thus the sewing machine operator performs a single operation on a garment as it is passed on from the operator in the preceding position on the line along the route of the garment's progress to the succeeding operator. The straight line system of mass production, adaptable only to the more staple types of garments, has had a pronounced effect upon the amount of inventory in process, thereby reducing carrying charges, as well as lowering labor costs. It some instances the line system has proved profitable even though labor costs were not thereby lessened. Recognition of this situation is important to the interpretation of price movements for such articles.

SEASONAL OPERATIONS

The seasonal problem provides the driving force behind the cutting markets. In the gray goods markets, and to a considerable degree in finished goods markets, buying movements tend to conceal the seasonal pattern. For cutters, however, manufacturing operations must be keyed to the progression of the seasons. The extraordinary rigidity with which the retail trade conforms to this seasonal pattern forces upon the textile trades a similar seasonal pattern at the fabricating stage which is almost as inflexible,

so far as seasonal peaks and valleys are concerned, as the pattern of retail distribution itself. Owing to the relative shortness of seasons, two to four months of actual production at most, it is difficult for the average cutter to adjust his prices radically during the season. Some new items are of course added almost daily or at least weekly, but a complete restyling and repricing is seldom undertaken oftener than five times a year, and usually only two or three times. While a 'line' is on sale there is a great deal of resistance to price changes of other than a trading nature.

APPAREL AND RELATED MARKETS

The census statistics (see Table 1) of the number of cutting establishments and the value of production show clearly the small size of the average cutting establishment. Large numbers of small firms, maintaining a precarious existence by their wits and by aggressive sales tactics, characterize all these markets. On the other side of the market there are even more retailers, who tend to concentrate their demand increasingly in central buying offices. The growth of chain store distribution also tends to place larger aggregations of buying power in the hands of relatively few buyers in contrast to the large number of sellers.

A detailed description of these markets is not required here.[24] What is important to keep in mind is the effect of such a market structure upon prices and risks at other levels. Thus a small cutter may become caught in the maelstrom of these conflicting forces and go through bankruptcy. The effect upon the market and the market price is negligible. The business may lose a few thousand dollars. Its merchandise creditors, however, are likely to be involved for five or ten times as much. They are the firms who have large investments in machinery and mills. The cutter's loss is small, and a few months later he may be in business again under a new name, 'Rosemary Frocks' instead of 'Rosebud Dresses', with a few thousand dollars of new capital bor-

[24] For an analysis of one cutting trade market, see Walton H. Hamilton, *Price and Price Policies,* The Dress Industry (McGraw-Hill, 1938).

rowed from friends. Perhaps this time he will be phenomenally successful. But he is still as insecure as ever, for one bad season may put him out of business. His insecurity and the speculative tendencies that are part and parcel of it exert an influence upon prices both for fabrics and fabricated products that should not be underestimated.

Where such conditions are typical of sellers, the significance of quoted prices is open to question. There are countless ways of giving special concessions. Trade discounts may not be uniform, transportation charges may be prepaid, price protection may be guaranteed, the customer may be allowed to return unsold goods after a certain number of days, or he may return them anyway and the cutter raise no objection, and so on. The custom of entertaining, gifts, and countless other ways of influencing a buyer all enter into the price. At no preceding level of manufacture are there so many factors of this sort, constituting part of the real price of the article. The cotton textile merchants, for example, have their 'Worth Street Rules', in which uniform trade practices have been laid down in minute detail. Little regulation of that kind exists in the cutting-up trades, despite repeated attempts to arrive at uniform practices, for example, with respect to returned goods. Similarly, terms of sale, while nominally uniform at 8-10 e.o.m., are frequently varied as a means of price trading where stores demand longer discounts.

Most garment manufacturers mail circulars to their trade giving list prices for their products. These quoted prices may differ substantially from actual bargained prices. Unpublished day to day prices at which the garment manufacturer sells the wholesaler or retailer tend to be related to changes in the price of raw materials. A department store buyer, knowing of a substantial drop in the price of cotton during the preceding week, may feel his way in bargaining with the garment manufacturer for a purchase, for example, of a thousand dozen shirts at 25 or 37½ cents per dozen below the quoted price.

Since the sale of practically all textile merchandise is on

a seasonal basis, buying to cover a season's requirements may involve purchasing a fairly large proportion of the total at the opening of the wholesale season. Thus for the spring retail season on curtains, a buyer would place a third or more of his season's requirements at the curtain show in January although most of that merchandise would not be sold at retail until the week after Easter. Meanwhile, the cutter would be able to manufacture the goods. Similarly in many lines of merchandise the amount of advance buying and the duration of the period are inversely proportional to the style character of the goods.

In general, retail buyers do not have enough leeway to make the extreme speculative forward commitments common at other levels, although at times the barriers are let down by their merchandise offices and they are allowed to buy large quantities of goods for distant deliveries. The tendency in the retail trade in recent years has been to increase turnover by hand-to-mouth buying rather than to seek profits by long term speculative operations. For cutters, the effect of hand-to-mouth operation is to increase retail seasonal peaks even more, in some cases, enabling cutters and converters to get higher than list prices at the peak of the season for spot goods.

SHEETS, TOWELS, BLANKETS, AND SIMILAR PRODUCTS MADE BY WEAVING MILLS

This group of products is distinguished from those made by the cutting trade chiefly by the integration of weaving and finishing with fabrication, which eliminates preceding fabric markets and enables mills to merchandise and sell their product directly to retailers in a form ready for immediate consumption. In addition, this group of products is made on specialized machinery which imparts unique characteristics to each cloth—of weave, as in terry towels, in width, as in sheets, in multiple fabrics as in blankets, jacquard design in bedspreads, and so on. Fabrication of these products by mills rather than by cutters has accord-

ingly come about not just by accident, but is directly related to the character of the products.

Products made by weaving mills which require only a minimum of fabrication include principally sheets and pillow cases, towels, blankets, woven bedspreads, laces and lace curtains. On the whole, these products are subject to a rather high degree of specification. Fabrication of most of them consists of no more than a simple cutting or tearing operation and hemming or binding the raw edges. They thus resemble finished goods in respect of specifications, except for the factor of size and in that they are designed for a specific use. Products of the lace industry are an important exception, for machine production of lace is a manufacturing operation like the knitting of hosiery, in which the final shape, design, and size are imparted to the product in its manufacture. Such finishing operations as are entailed in the preparation of the product for sale are essentially minor, however, being of the same nature as the fabrication of sheets, towels, and the other products listed above.

To the above list, which includes only household textile articles, might be added several industrial textile items which are in part produced by mills and in part by independent cutters. In this group are such items as bags, where some of the large manufacturers have integrated backward and acquired their own cloth mills.

FLOOR COVERINGS

Floor coverings are primarily of two types—soft surface, such as carpets and rugs, which are made wholly from textile fibers, and hard surface, such as linoleum and felt-base, made by combining textile and non-textile materials. While for the most part each type has specialized uses for which different types of one or the other compete, there are also some uses as in business and public buildings where soft surface and hard surface floor coverings compete directly.

Floor coverings also are an interesting example of competition not so much between two textiles as between a

textile item and a non-textile. Carpets and rugs are one of several major articles for the house, the cost of which is too large for the average consumer to be able to purchase more than one at a time, except through the use of installment credit. Hence if one is purchased it may be to the exclusion of the others. The relation between the prices of carpets and rugs and these other household items is indicated in a general way by the accompanying table based upon prices featured during 1935-36 in retail store advertisements in representative cities.

Competitive Popular Price Ranges, Household Articles, 1935-1936

	MOST POPULAR PRICE	PERCENTAGE OF TOTAL OFFERINGS IN RETAIL STORE ADVERTISEMENTS
Oriental rugs (9x12)	$140–250	63
Domestic rugs (9x12)	22– 60	74
Dining room suites	50–160	71
Living room suites	40–100	69
Bed room suites	40– 90	61
Occasional living room chairs	9– 42	74
Radio sets	16– 80	69
Mechanical refrigerators	90–180	71
Electric washing machines	34– 80	76

Domestic carpets and rugs thus fall near the average for the group of household items, a factor of considerable importance in determining the extent of consumer demand in relation to fluctuations in consumer purchasing power.

The three principal textile fibers used in the carpet and rug industry are wool, cotton, and jute.[25] Wool, being the most important raw material in respect of value, is usually used for the pile of the rug, while yarns of jute and cotton are woven in the warp and weft and form the back of the rug. Carpet-class wool, which is used in this industry, is the coarsest wool available and is all imported. Either worsted or woolen spun yarns may be used, although today worsted types are of minor importance. The most impor-

25 Rayon staple fiber has been successfully used in place of wool in carpet manufacture in other countries and may ultimately be important in American industry.

tant classification of wool carpets and rugs is according to types of weave. The predominant weaves at present are Axminster, Velvet, Wilton, and Chenille.

Axminster is produced on a type of loom that makes it possible for practically all the wool to appear in the pile. Accordingly the amount of wool used per square yard in proportion to other fibers is lower than for other types of carpet fabric. The type of loom used makes possible unlimited variety in design.

In *Wilton* carpet fabric, the yarn is supplied from frames in such a way that the yarn from one or more frames always appears in the pile while the rest is buried in the body of the rug. Wiltons are made on jacquard looms. While in general the Wilton type of construction should be higher priced than Axminster, some reduced constructions of Wilton, made from two or three frames, may be obtained at prices comparable with, or below, the medium grade of Axminster or plain velvet.

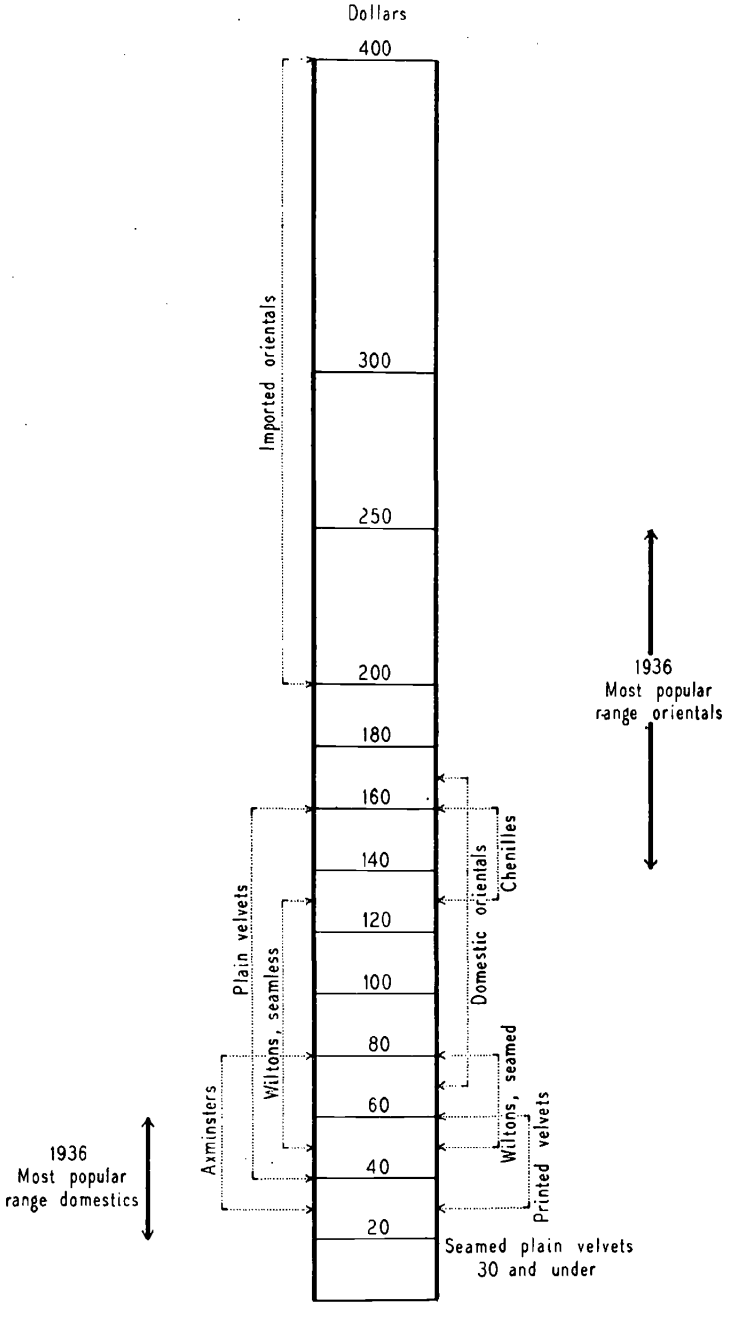
Velvet carpet fabrics are woven on the same type of loom as Wilton but from beams of yarn, either printed or plain and without the jacquard attachment. In most velvets, the proportions of wool between the pile and the body is about the same as for Axminster. The four types of velvet distinguished in the market, arranged in the order of their current importance, are: (1) plain color velvets; (2) plain color twist velvets; (3) printed velvets; (4) printed and plain tapestry.

Chenille is the most expensive of all domestically manufactured types. It is made with a depth of pile up to one and one-half inches and in a wide range of design and color. Chenille can be woven in any shape and up to thirty feet in width. Its high price is to be accounted for by the weaving process, which practically amounts to double weaving.

Sheen-type (luster, domestic washed Oriental) designates a type of weave that has been washed or chemically treated to produce a sheen effect on the pile of the rug. Domestic orientals have this type of finish.

The relative importance of these types, as indicated by

RETAIL PRICE LINES OF CARPETS, SPRING 1937, SIZE 9 x 12



current industry percentages, is: Axminster 45; Plain velvet 28; Wilton 11; Printed velvet 6; Sheen type 2; Chenille, tapestry, etc. 5.

Two types of weave of considerable importance in the past were Brussels and Ingrain. *Brussels* is really the same as the Wilton weave, except that it has a looped or uncut pile. The market for this type of carpet has become insignificant in the last 15 or 20 years.

Ingrain, a type also very popular thirty years ago but no longer produced in any volume, was woven without pile, being little more than a heavy wool fabric. Costs of production were obviously less than for pile carpetings.

Some additional classification characteristics need brief mention because of their wide promotion in recent years. *Narrowloom* designates rugs and carpets made on looms not exceeding 54″ in width, most of it being produced on 36″ looms. *Broadloom* simply indicates that the fabric—of any construction—was manufactured on looms over 54″ wide, or, more commonly, over 36″ wide; that is, in a single width without the seams formerly needed when broad carpeting was made by sewing together strips of narrow fabric. Most of the plain broadloom carpets produced today are made on wide velvet looms, although the largest volume of broadloom carpets is made in figured goods.

The accompanying table indicates the relative importance of the principal price lines of domestic and imported wool rugs and carpets. Standardization of constructions of carpets and rugs in the volume ranges is characteristic of this field as of practically all other textiles. The more im-

Percentage Distribution of Carpets and Rugs by Price Lines

RUGS (9X12)		CARPETS (PER SQ. YD.)	
Price Range	*Percentage*	*Price Range*	*Percentage*
$24–32	10	Up to and incl. $3	6
32–40	28	3–4	14
40–50	26	4–5	25
50–60	15	5–6	23
60–70	9	6–7	16
Over 70	12	Over 7	16

TABLE 17

Selected Sources of Prices of Floor Coverings

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	RELATED DATA
A CARPETS AND RUGS		
Axminster 4⅔ rows 9x12 rug 5½ to 5⅔ rows 9x12 rug 6⅔ to 7¼ rows 9x12 rug *Wilton* 252 to 253 pitch 7⅔ rows, 3½ frame 9x12 rug 256 pitch 8½ row, 3½ frame 9x12 rug *Wilton ¾ carpet* 256 pitch 8–9 rows, 3 frame woolen 256 pitch 10–11 rows, 3 frame worsted *Plain velvet broadloom carpet* 216 pitch 8–9 rows 216 pitch 9 rows 216 pitch 7½–8½ rows twist 216 pitch 8½-9 rows twist *Plain velvet narrow ¾ carpet* 216 pitch 8–9 rows	Prices pub. in trade journals	Imports and exports comp. by BFDC. Data on production and related data comp. by the Carpet Institute on a confidential basis for the use of members only
B LINOLEUM AND FELT BASE FLOOR COVERING		
Linoleum, per sq. yd. Inlaid, standard gauge Plain, ⅛" *Felt base* 8/4, heavy and light weight yd. goods avg. 9x12 heavy and light weight rugs avg.	Prices pub. in trade journals and by Wholesale Price Division, BLS (see Ap. I)	Imports and exports comp. by BFDC

portant constructions for pricing purposes are shown in Table 17.

The variety of qualities and sizes requires the use of price lists which are freely distributed in the trade. Pricing is for the duration of a season, but is, of course, subject to adjustment in line with changes in raw material or other costs during the season. Such changes may be either in the form of new price lists or trading off the list. Adjustment of qualities to meet new price situations is accomplished through shifts in emphasis from one standard construction to another.

Rug prices are based upon the 9x12 size, from which other sizes are figured. Actually, with the increase in consumer demand for over-size rugs, this size has greatly diminished in consumer importance. Today less than half of the rugs sold are of this size. Broadloom carpets are sold by the square yard; narrowloom carpeting under 27″ in width (¾ carpeting), used particularly in institutions, is priced by the linear yard.

KNITTED UNDERWEAR, OUTERWEAR, AND HOSIERY PRODUCED BY KNITTING MILLS

The fabricated products of the knitting industries fall into three general groups: hosiery, knitted underwear, and knitted outerwear.[26] In many respects they bear a close resemblance to woven fabrics. Hosiery and knitted underwear, for example, are produced much like gray goods and, as they come from the knitting machine, must be bleached and dyed just as woven goods must. Similarly, knitted outerwear, which includes such items as sweaters, bathing suits, skirts, and coats, may be produced like woven wool fabrics, either as gray goods for subsequent dyeing in the piece or from previously dyed stock or yarn.

As a matter of fact, the knitting machine is essentially as much a producer of cloth as a loom is, but by a different method. Thus the warp knitting machine produces a flat

[26] Garments made from knitted cloth should be considered as made in the cutting industries.

TABLE 18

Selected Sources of Prices of Knit Goods and Related Data

REPRESENTATIVE PRICE SPECIFICATIONS	SOURCES	RELATED DATA
Hosiery Rayon Men's seamless, plain, 200–220 needle Men's seamless, fancy, 200–220 needle Women's seamless, 240–260 needle Women's seamless, 280–300 needle Silk Men's seamless, 240 needle, 11–12 thread Women's full-fashioned, 39 gauge, 7 thread Women's full-fashioned, 42 gauge, 4 thread, ringless Women's full-fashioned, 45 gauge, 4 thread, ringless Cotton Men's seamless, dress, cotton, medium quality, mercerized lisle or rayon mixed, 240 needle, black and colors approx. 1½ lb. per doz. Children's seamless sock, cotton, size 7½, mercerized lisle; medium quality rib knit tops, reinforced toe and heel, approx. ⅝ to ⅞ length Women's seamless anklets, cotton, size 7½, mercerized lisle, medium quality, rib knit tops, reinforced toe and heel Men's seamless sock, work, cotton, medium quality, medium weight, reinforced toe and heel, approx. 2 lb. per doz.	Prices pub. in *Daily News Record* and *Journal of Commerce;* prices for certain items, obtained from mills and selling agents, available in reports of Wholesale Price Division, BLS (see Ap. I)	Data on production, stocks, and unfilled orders reported monthly to Census of Manufactures. Data on production and stocks comp. on a 13–month basis by National Association of Hosiery Manufacturers
Underwear Men's 14 lb. carded cotton ribbed union suits Boys' 10 lb. carded cotton ribbed union suits Men's 2 lb. combed cotton pull-over athletic shirts Men's carded woven broadcloth shorts Women's circular knit rayon (150 denier) bloomer, weighing approx. 2¼ lb. per doz. on 'Medium' size Women's warp knit pure silk bloomer, approx. 12–14 yd. of fabric per doz. *Outerwear* Men's sweater, wool, pull-over style, Shaker type, weight 19 lb. net, per doz., sizes 36–46 Men's sweater, wool, coat style, weight 10 lb. net per doz., sizes 36–46		Data on production, stocks, and unfilled orders reported monthly to Census of Manufactures

fabric much like woven fabric. The circular knitting machine, on the other hand, produces a tubular fabric, which in many instances is adapted to the size and shape of the ultimate product. Such cutting and sewing operations as are needed to produce the finished product are sufficiently incidental for these industries to have characteristically integrated them. Accordingly, knit goods, even though they frequently involve little if anything in the way of fabrication beyond the product turned out by the knitting machine, are properly classed as fabricated products in that they are shaped and sized for specific consumer uses, and exhibit the price characteristics of fabricated products.

Similarly, knitted garments made from fibers that lend themselves to standardization of quality, as silk, rayon, and cotton, tend to conform to construction standards that in some instances, e.g., hosiery, are fully as precise as any developed for woven fabrics. The terminology is different, however. Width does not have the same significance for a loosely knitted fabric as for a tightly interlaced woven fabric. For most types of fabric the number of needles or the count of wales per inch, and the courses per inch, give the construction corresponding to the number of ends and picks per inch in woven goods. The proper tension to apply to the cloth in making this count introduces a complicating factor. The universal common denominator in knit goods is weight, usually expressed in weight per dozen garments. And since we are dealing here with fabricated garments, which must be produced in definite sizes, size is a further common measure. This factor is in turn closely related to style—style not simply in the sense of variety in design, but in type of garment, as for example the various types of women's underwear. In Table 20 is shown a representative list of knit goods products for which prices are now collected by the Wholesale Price Division of the Bureau of Labor Statistics. Hosiery, it will be noted, is divided into two general types: full-fashioned and circular knit or seamless. The latter is knit on a circular knitting machine in tubular form, the shaping accomplished by tightening

the stitches during knitting. Full-fashioned hosiery, on the other hand, is knitted flat and requires a seam to join the two selvage edges together. The distinguishing marks of full-fashioned hosiery are this seam down the back and the fashion marks at various points in the back where the number of wales is reduced by removing needles from the knitting operation, thereby narrowing the fabric without reducing the size of the stitches. These two characteristics can, however, be closely simulated in circular knit hosiery, so that their mere presence does not necessarily indicate that a given pair of hose is full-fashioned.

Construction of hosiery, as indicated, is specified in terms of the fiber used, amount of twist in the yarn, thread weight, gauge, number of needles or courses per inch, and possibly also the amount of reinforcement in heel and toe.

In knitted underwear the dominant bases of classification are the type of garment and the fiber or mixture of fibers used in the yarn. Subclassifications are of course by use, whether for men, women, or children, and by size. Since a large proportion of such garments are produced on circular knitting machines where the sole satisfactory unit of measure is weight, exact specification is seldom possible except in such broad terms as number of pounds per dozen.

This situation also holds for knitted outerwear. In this field also the range of products is large: sweaters, women's knit dresses, bathing suits, infants' wear, neckties, and a multitude of accessories. Here also specifications must be in terms of weight per dozen. Designation of the fiber used is more difficult, for of all textile fields this is the only one where complex fiber blends in yarn are the rule rather than the exception. Worsted spun are the most widely used, but outerwear knitters use also appreciable amounts of other fibers, either by themselves or in complex blends, such as cotton, angora, camel hair, rayon filament, yarn and staple fiber.