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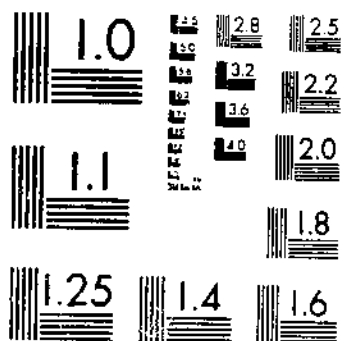
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MARKETING AND MANUFACTURING SERVICES AND MARGINS FOR TEXTILES

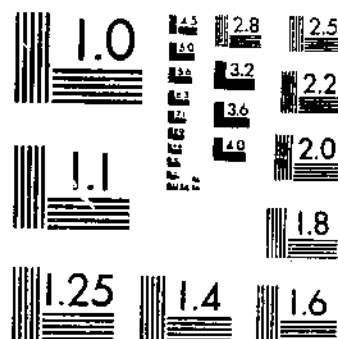
HOWELL, L. D.

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NATIONAL BUREAU OF STANDARDS-1963-A



**UNITED STATES
DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.**

Marketing and Manufacturing Services and Margins for Textiles¹

By L. D. HOWELL, *agricultural economist*
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INTRODUCTION

Cotton and wool produced in the United States are confronted with greatly increased competition. Market outlets for textiles during the recent war and postwar periods were adequate to absorb, at substantially advanced prices, all products made from cotton and wool that could be produced. But for many years before World War II, with the large increases in supplies of foreign-grown cotton and wool and rapid expansions in production of synthetic fibers and other competing products, the cotton and wool industries in the United States were handicapped because of inability to sell at remunerative prices all the products that could be produced.

When the defense emergency is over, and with further expansions in supplies of competing products in prospect, inadequate market outlets for cotton and wool may again greatly limit the cotton and wool industries in this country, unless prompt and effective actions are taken to maintain or expand these outlets. Prospective demands for textiles indicate the possibility of maintaining consumption of cotton and wool well above prewar levels, if all potential market outlets are fully exploited.

To exploit fully these outlets for cotton and wool would require: (1) Adequate and dependable supplies of suitable qualities of raw cotton and wool readily available to manufacturers at competitive prices; (2) a variety of suitable and attractive fabrics and finishes of good quality for use in industry and in fabricating apparel and household products; (3) suitable and attractive styling and good construction of apparel and household products made from cotton and wool fabrics; (4) the education of consumers regarding the quality, variety, and adaptability of these products; (5) timely adjustments in the manufacture and distribution of these products to meet consumer requirements; and (6) increased efficiency in the entire chain of marketing, manufacturing, and distributing procedures so that a variety of suitable and attractive products

¹ Submitted for publication May 16, 1952.

made from cotton and wool can be made readily available to consumers at attractive prices.

Cotton and wool derive their values almost exclusively from their usefulness as raw materials in the manufacture of textile products. The usefulness of these products to ultimate consumers depends mainly upon their manufacture into the forms required and upon the distribution of the products as required. Without this manufacturing and distribution, only a small portion of the cotton and wool usually produced could be sold at even a small fraction of the prices usually paid. But these products are highly important as raw materials for use in the manufacture of textile products.

The relative importance, from the viewpoint of costs, of marketing margins is indicated by data showing that gross margins for assembling and merchandising raw cotton and wool, manufacturing these products into yarns and fabrics, fabricating apparel and household textiles, and distributing the finished products to ultimate consumers account on the average for about seven-eighths of the consumer's dollar paid for apparel and household textiles made of cotton and wool. It is apparent from the width of these margins that they have an important bearing upon returns to farm producers, upon costs of finished products to ultimate consumers, and upon market outlets.

The size of these margins and the seriousness of the threat of increased competition from synthetics and other products emphasize the importance of information that will show the influence of the different factors on the efficiency and costs of marketing and that will indicate means of improvement. Research relating to marketing margins and costs constitutes an important part of the work provided for by the Agricultural Marketing Act of 1946 (RMA, Title II). This law authorizes and directs the Secretary of Agriculture, among other things, to determine costs of marketing agricultural products in their various forms and through the various channels, and to foster and assist in the development and establishment of more efficient methods, practices, and facilities for the purpose of bringing about more efficient and orderly marketing and of reducing the price spread between producers and consumers (9).

As shown in this report, marketing margins cover all the charges made for services rendered from the time the raw cotton and wool leave the farm until the finished textile products are delivered to the ultimate consumer. Detailed data are presented in this bulletin to show the margins or costs for the services rendered and the items of cost included at each important stage in the marketing procedure. These data are designed to show the relative importance of these services from the viewpoint of costs, to indicate some of the factors responsible for or associated with differences in margins or costs, and to serve as a basis for indicating means of improvement.

* Italic figures in parentheses refer to Literature cited, p. 290.

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MARKETING CHANNELS AND DIVISION OF CONSUMER'S DOLLAR

Information relating to marketing channels and division of the consumer's dollar for cotton and cotton products; wool and wool products; and for rayon, acetate, silk, and related products is presented in this bulletin. The data for cotton and wool begin with movements from the farm and with farm prices and those for rayon, acetate, silk, and related products begin mainly with the fibers delivered and prices to manufacturers of textile products.

COTTON AND COTTON PRODUCTS

Taking cotton from farms and delivering it in the form of finished clothing and household textiles to ultimate consumers require the services of many different types of middlemen, including handlers of raw cotton, manufacturers, and distributors of cotton products. These services begin when seed cotton is hauled from farms to gins where such services are rendered as conditioning and cleaning of seed cotton, separating the lint from the seed, and packing and wrapping the lint into bales of approximately 500 pounds.

MARKETING CHANNELS

Cotton usually moves from gins to compresses, where it is compressed to higher density, and then to warehouses, which may be operated in connection with compresses, where it is assembled and stored. From warehouses and compresses it usually moves to mills by railroad or motortruck or by some combination of truck, rail, and water transportation. Taking cotton from gins and delivering it to mills involves merchandising services such as assembling, compressing, storing, insuring, transporting, financing, and risk-bearing.

At mills the bales are opened and the cotton is cleaned, carded, combed (for fine yarns), and spun into yarn. On the average, about 4 percent of the gross weight of the bale usually is discarded as tare, about 7 percent usually is removed as nonspinnable waste, and most of the remainder, which amounts to about 89 percent, is made into yarn (fig. 1). According to census reports for 1947, for example, about 75 percent of the yarn was woven into cloth, 9 percent was used by the knit-goods industry, 9 percent in tire cords, and the remainder was used in making thread, carpets, cordage, twine, and other products.

Census reports indicate that in 1947, about 19 percent of the woven cotton cloth was used in the unfinished form, about 10 percent was colored yarn fabrics, and about 71 percent was finished from the gray (69). Finishing gray goods includes bleaching, dyeing, and printing. Of the total linear yardage finished in 1947, for example, about 52 percent was bleached and white-finished, 25 percent was plain dyed and finished, and 23 percent was printed

APPROXIMATE DISTRIBUTION OF A TYPICAL BALE OF COTTON, 1947

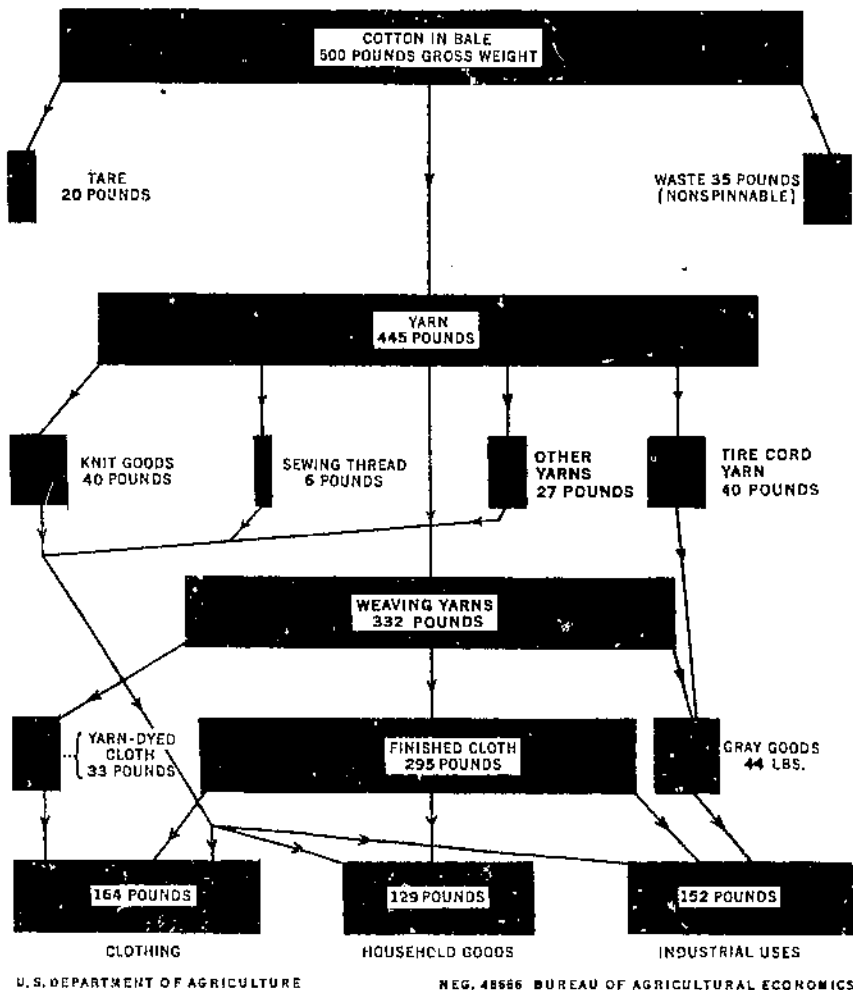


FIGURE 1.—Most of the cotton utilized in the United States is spun into yarn and the yarn is woven into cloth. In 1947 about 37 percent of the cotton consumed by cotton manufacturers, as reported by the Census, was used in the manufacture of clothing; about 29 percent in household goods; and about 34 percent for industrial uses.

and finished. In 1949 the corresponding proportions were 45, 31, and 24 percent, respectively (70). Styling and finish of a large part of the cotton cloth is controlled by converters but substantial proportions are controlled by mills, with or without the collaboration of the manufacturing user.

A large proportion of the finished cloth usually goes to cutters where it is made into wearing apparel and household goods. Estimates based on incomplete data indicate that of the total output of cotton manufactured in the United States during recent years, about 37 percent went into apparel, about 34 percent into industrial uses, and about 29 percent into household textiles (47). Clothing and household textiles usually go directly or indirectly through wholesalers, jobbers, or other agencies to retailers by whom they are distributed to ultimate consumers.

DIVISION OF CONSUMER'S DOLLAR

Charges for the many services performed in transforming raw cotton into finished cotton goods and in making them available to the consumer amount, in many instances, to a large share of the consumer's dollar paid for the finished cotton products. Data relating to retail values of a group of 42 cotton articles of clothing and household furnishings and to farm values of equivalent quantities of cotton indicate that from 1927 to 1950, returns to farm producers for the cotton used amounted on the average to about 10.6 percent of the consumer's dollar (fig. 2) (5). The portion

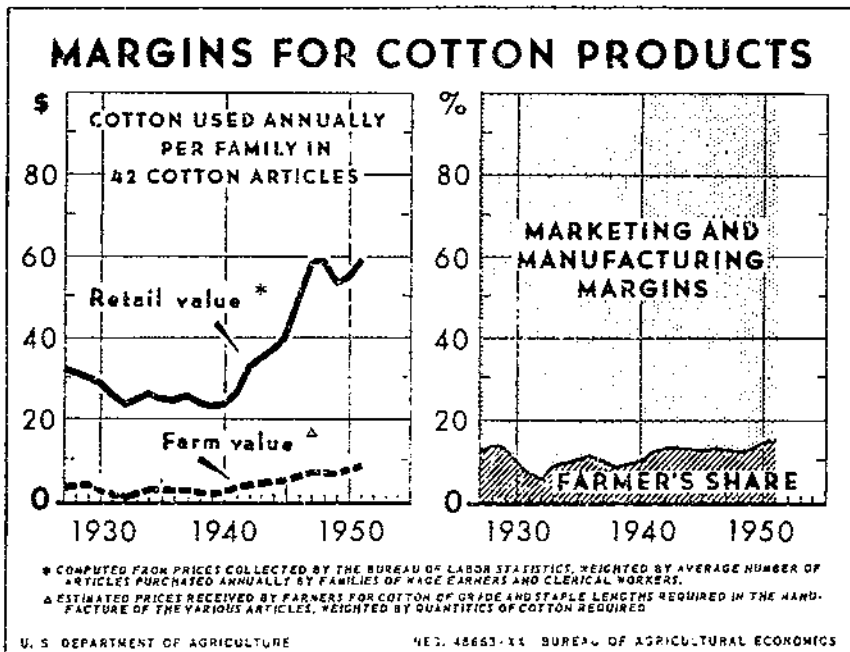


FIGURE 2.—The farm value of the cotton used in these articles usually varied directly with changes in the retail value of the articles, and the spread between these values usually varied directly with changes in the values of the products. Changes in the farm value of cotton usually were relatively greater than changes in the retail value of the finished products, and the portion of the consumer's dollar represented by the farm value of the cotton used usually varied directly with changes in farm prices of cotton.

of the consumer's dollar represented by the farm value of the cotton usually varied directly with the price of cotton. It ranged from about 5 percent in 1932, when farm prices of cotton averaged about 6 cents a pound, to 14 percent in 1950, when farm prices of cotton averaged about 40 cents a pound.

The fact that, on the average, almost 90 percent of each dollar paid by consumers for finished cotton goods is accounted for by marketing margins emphasizes the importance of break-downs to show the items included in these margins. Estimates, based on official data and other information, were made to show the average distribution of the consumer's dollar paid for apparel and household goods made of cotton in 1939, 1947, 1949, and 1950. Data available for this purpose are not complete and in some instances they are not strictly comparable. Consequently, some liberties were taken in approximating margins on the basis of these data and other information. Furthermore, the estimated margins were adjusted to approximate the farm-to-retail price spreads for 42 items of cotton clothing, household textiles, and yard goods, as calculated by the Bureau of Agricultural Economics.

Approximations were made to show the average distribution of the consumer's dollar paid for these products on the basis of the specific conversions made or the services rendered and on the basis of the agency making the conversions or rendering the services. Results show that charges for marketing services in terms of dollars increased markedly during the 1940's, but the portion of the consumer's dollar that went to cotton growers for farm production increased, on the average, from about 7.5 percent in 1939 to 13 percent in 1950. The proportions accounted for by margins for ginning, baling, and merchandising raw cotton; for spinning yarn, weaving cloth, and dyeing and finishing the fabrics; and for the manufacture of apparel and household textiles all decreased during the 1940's and in 1950 they averaged considerably less than in 1939. The proportions of the consumer's dollar accounted for by margins for wholesaling and retailing decreased somewhat during the 1940's but in 1950 they averaged only slightly less than in 1939 (fig. 3).

Different kinds of agencies engage in some of the same kinds of services. Consequently, the margins indicated for each type of service do not show specifically the charges made by each type of agency. Some textile manufacturers, for example, although they engage primarily in spinning and weaving, dye and finish some cloth, fabricate some of the cloth into household and other goods, and sell the products to wholesalers or retailers. The proportions of the consumer's dollar accounted for by average margins for cotton manufacturers who are primarily engaged in spinning, weaving, dyeing, and finishing cotton yarns and fabrics decreased from about 20 percent in 1939 to 18.5 percent in 1950. Similar proportions for manufacturers of apparel and household goods decreased from almost 31 percent in 1939 to slightly more than 29 percent in 1950 (fig. 4).

Manufacturers of apparel and household textiles sell large quantities of their products directly to retailers. The costs of these

selling services accounted for the fact that margins for these manufacturers were somewhat greater than total margins for manufacturing apparel and household goods. Regular wholesalers' margins, which amounted on the average to 4.9 percent of the retail price in 1939 and in 1950 and to 4.8 percent in 1947

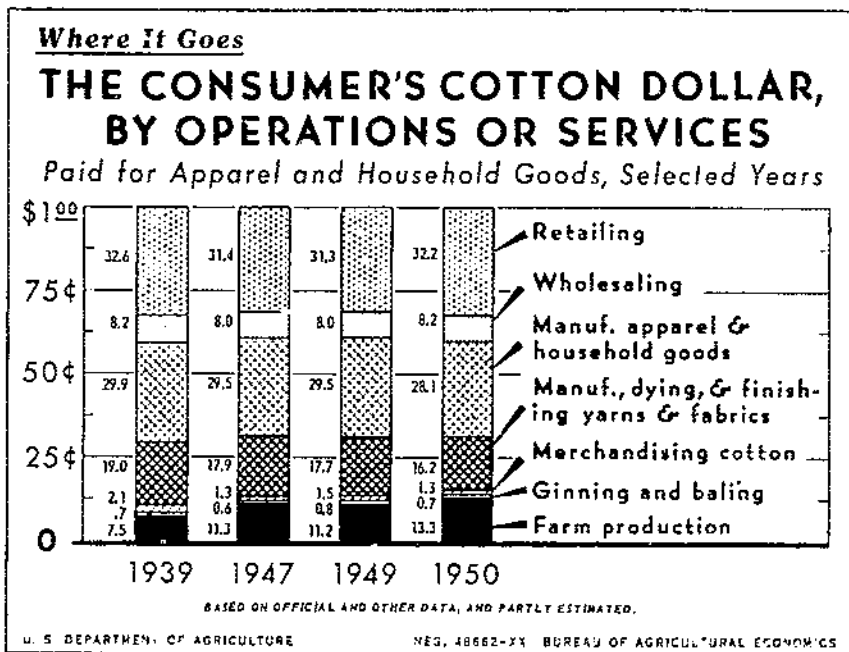


FIGURE 3.—The estimated proportions of the consumer's dollar paid for cotton clothing and household goods accounted for by returns to growers for farm production increased from 7.5 percent in 1939 to about 13 percent in 1950. The proportions accounted for by the manufacturers decreased from about 49 percent in 1939 to less than 45 percent in 1950. Gross margins for wholesale and retail distribution decreased somewhat during the 1940's, but in 1950 they were about the same as in 1939.

and 1949, were substantially less than the average margins for wholesaling because a large part of the wholesaling was done by agencies not primarily engaged in wholesaling.

Information relating to specific items of cost is not complete and in many instances data for the different agencies are not strictly comparable. But approximations based on available information indicate that salaries and wages account for more than half of the spread between retail prices of apparel and household goods made of cotton and returns to growers for the cotton used (fig. 5). The proportions of the consumer's dollar accounted for by wages and salaries ranged from 44 percent in 1947 to 48 percent in 1949. Those for net profits for all agencies combined ranged from 5.7 percent in 1939 to 14 percent in 1947 and averaged 11 percent in 1950. The proportions for advertising and for

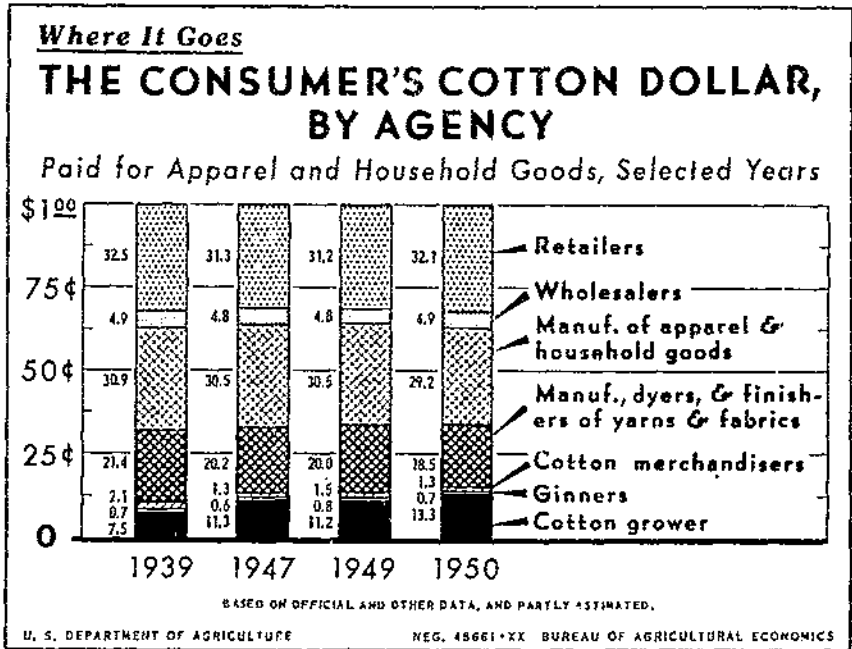


FIGURE 4.—Estimates indicate that the combined gross margins for manufacturers of yarns and fabrics and of apparel and household goods decreased from more than 52 percent in 1939 to less than 48 percent in 1950. Gross margins for wholesalers and retailers decreased during the 1940's but in 1950 they were only slightly less than in 1939.

other items decreased markedly after 1939. Salaries and wages for employees engaged in marketing cotton and cotton products average more than four times as much, and net profits to marketing agencies average almost as much, as returns to growers for farm production of the cotton.

These data relating to the distribution of the consumer's dollar paid for apparel and household goods made of cotton may serve to indicate the relative importance, from the viewpoint of costs, of increasing efficiency and of reducing costs for the different agencies and functions involved. Data show that the margins for ginning and baling, combined with those for all the merchandising services involved in taking cotton from gins and delivering it to mills amount, on the average, to only about 5 percent of the combined margins for manufacturing and finishing the cloth and for fabricating it into wearing apparel and household goods. They amount to only about 6 percent of the combined margins for wholesaling and retailing these products. Thus a reduction of only 3 percent in the margins for wholesaling and retailing, or for manufacturing and finishing cloth and fabricating it into apparel and household goods, would tend to reduce the spread between retail prices to consumers and prices to growers for the cotton

to a greater degree than would a 50-percent reduction in the margins for ginning, baling, and merchandising the raw cotton.

These differences in size of margins are important, but they may not reflect accurately the relative opportunities of making savings in marketing costs and charges that can be passed back to cotton growers or on to consumers of the finished products. A determination of the extent to which it would be feasible to reduce these margins would require detailed studies of each important segment of the marketing procedure to evaluate the influence of the factors affecting efficiency and costs, and to discover the most feasible means of increasing efficiency and of reducing costs for the various agencies. Results of such studies are not available for many agencies, but the available information relating to margins and costs and to means of reducing them is presented in this bulletin in about the order in which the marketing services are rendered, beginning with the movement of cotton from farms.

WOOL AND WOOL PRODUCTS

Wool utilized in the United States consists of two rather distinct kinds, known as apparel and carpet wools. Apparel wool includes the finer fibers used mainly in the manufacture of apparel yarns

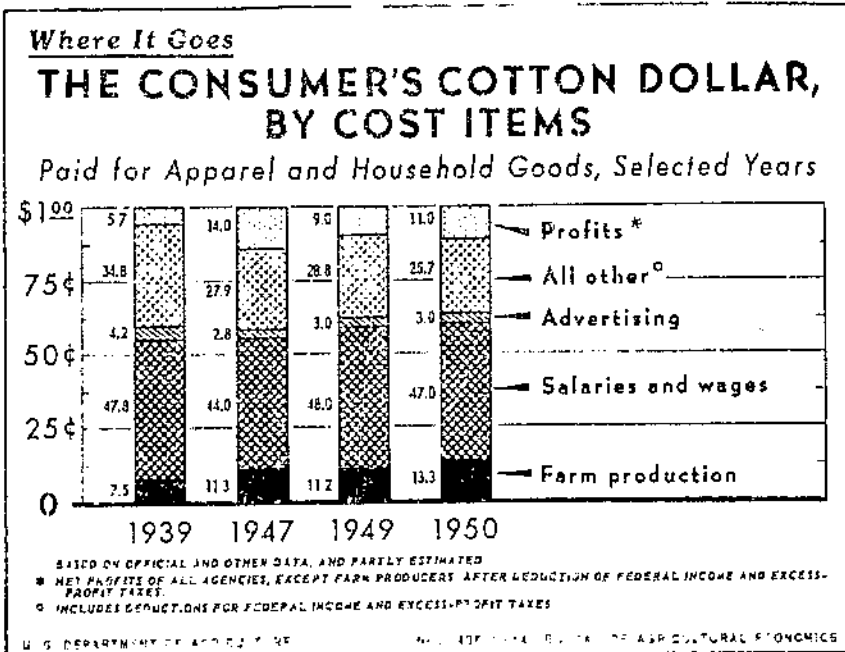


FIGURE 5.—Estimates indicate that the proportion of the consumer's dollar paid for apparel and household goods made of cotton represented by salaries and wages in 1950 was considerably greater than in 1947 but was slightly less than in 1939. The proportions accounted for by net profits ranged from 5.7 percent in 1939 to 14 percent in 1947 and averaged 11 percent in 1950.

and fabrics. Carpet wool consists of the coarser fibers used mainly in the manufacture of carpets and rugs. In 1950, apparel wool accounted for about 69 percent and carpet wool for about 31 percent of all wool consumed in the United States. All of the carpet wool and substantial quantities of the apparel wool were imported. About seven-eighths of the wool produced in the United States in 1950 was obtained from shearing live sheep. This is known as shorn wool. The remainder is obtained by pulling the wool from the skins of slaughtered sheep. It is known as pulled wool. Production of both kinds of wool is widely distributed throughout the United States.

MARKETING CHANNELS

Soon after the sheep are shorn fleeces are usually packed for shipment in bags weighing, when filled, from 200 to 400 pounds. Some of this wool is assembled by local merchants and resold to merchants in central markets, but many growers, particularly the large producers, sell directly to merchants in central markets. Most of the wool moves out of producing areas to central markets or to mills within a short time after it is clipped. Producers of pulled wool sort their products into uniform lots and put it in bags or bales which range in weight from 140 to 800 pounds. Much of it is sold directly to mills (26).

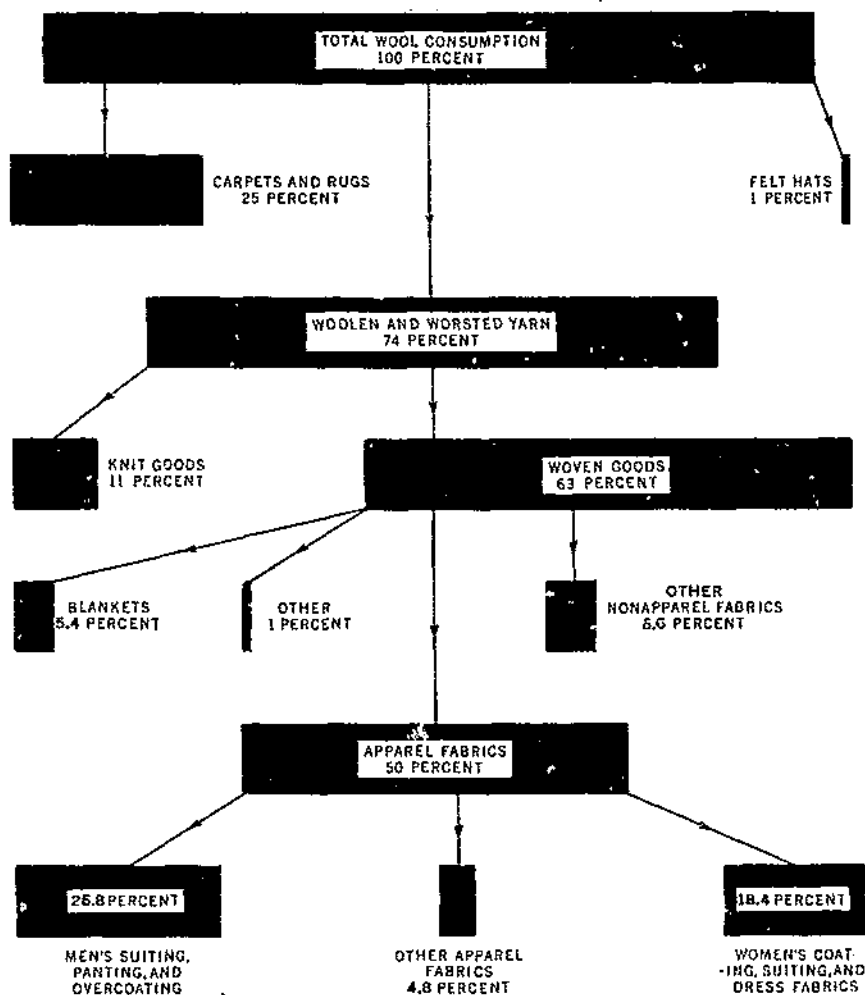
Most of the imported apparel wool goes directly to central markets in which it is handled by the same large merchants who handle the wool grown in the United States. Imported carpet wool also goes directly to central markets where it is handled by a specialized group of central market merchants, most of whom are located in Philadelphia.

Domestic and imported wools are concentrated in central markets, where they are divided into relatively uniform lots and stored until needed by manufacturers. Most of the wool requirements of manufacturers, particularly the worsted mills, are bought in the grease. But considerable quantities are bought in the scoured state, particularly by woolen mills. This wool usually is scoured by dealers or by packers.

The apparel-wool-manufacturing industry consists of two major branches, the worsted and the woolen. From 1945 to 1949, the worsted branch used about 59 percent and the woolen branch about 41 percent of the virgin apparel wool consumed in the United States. Worsted manufacturers sort, blend, and scour wool; convert it into semimanufactured products known as tops; and spin the tops into yarn. Woolen manufacturers do not make tops but they combine and mix the wool and other materials used, and card and spin it into yarn. If woolen manufacturers do not buy the wool on a scoured basis, they have it scoured.

Most of the woolen and worsted yarns are woven into fabrics, but a good deal of it goes into the knit-goods industry. Census data on manufactures show that in 1947 about 85 percent of the yarns produced by woolen and worsted manufacturers was weaving yarn and about 15 percent was knitting yarn (fig. 6). About 79 percent of the weaving yarn was used in making apparel fab-

APPROXIMATE DISTRIBUTION OF WOOL CONSUMED IN THE UNITED STATES, 1947



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FIGURE 6.—About 74 percent of the wool consumed by wool manufacturers in the United States in 1947 was used in woolen and worsted yarns. Manufacturers of carpets and rugs used about 25 percent and about 1 percent was used in felt hats. About 85 percent of the woolen and worsted yarns was used in woven goods and about 15 percent in knit goods. Almost four-fifths of the woven goods was used in apparel fabrics.

rics, about 19.5 percent was used in blankets and other nonapparel fabrics, and about 1.5 percent was used in making woven felts and other products.

Most of the worsted and woolen cloth is dyed and finished by manufacturers. Scoured wool is not usually dyed except in blends

made by woolen manufacturers. The more common method of coloring worsted is by dyeing the tops, although large quantities of worsted goods are dyed in the piece by applying dye to the woven fabrics. In finishing, the fabric in a moistened condition is subjected to heat, friction, and pressure, in order to shrink, thicken, and interlock the fibers. The fabrics are then napped and sheared (26).

Apparel fabrics are used chiefly for men's and women's outerwear. Census reports for 1947 show that about 53 percent of these fabrics was used in men's suiting, panting, overcoating, and top coating; about 37 percent in women's coating, suiting, and dress fabrics; and about 10 percent in other apparels, including bathrobes, shirts, snow suits, and interlinings, among others.

DIVISION OF CONSUMER'S DOLLAR

The value added to wool by processing, manufacturing, and the other marketing services rendered is so great that returns to growers for the raw wool amount to only a relatively small proportion of the prices paid by consumers for the finished products. Data relating to retail values of 20 representative wool products and to the farm value of the wool used in their manufacture show that during the 25 years from 1926 to 1950, returns to growers for the raw wool averaged about 1.1 percent of the retail prices to consumers for the finished products (fig. 7).² The proportion of the retail value of the wool products accounted for by the farm value of the wool used varied irregularly with the prices of wool, ranging from almost 18 percent in 1928 to about 6 percent in 1932, and averaged 16 percent in 1950.

Marketing margins for wool, or the spread between prices to farmers for the raw fibers and prices paid by consumers for the finished products, amounted on the average to about 86 percent of the consumer's dollar during the 25 years from 1926 to 1950. The proportions by years ranged from about 82 percent in 1928 to about 9.1 percent in 1932, and averaged 84 percent in 1950. The relative size of these margins emphasizes the importance of a break-down to show the amounts contributed by the various items included.

Rough approximations, based on official data and on other information, were made to show the average distribution of the con-

² Data were assembled by K. Parr and R. O. Been, for use in constructing farm-to-retail price spreads for 1926-41. The items included are men's overcoats, suits, sweaters (medium and expensive quality), jackets, topcoats, and trousers; women's coats, dresses, hats, flannel robes, and sports coats; boys' suits, overcoats, trousers, sweaters, and jackets; girls' coats and dresses; and blankets. The values shown were arrived at by weighting the retail price of each item by the number bought by the average wage earner's family, as reported by the BUREAU OF LABOR STATISTICS in MONEY DISBURSEMENT OF WAGE EARNERS AND CLERICAL WORKERS, 1937-38 (102). In arriving at the farm values of the wool used, the quantity and kind of wool required for each of the 20 items were estimated and weighted by the average number of the articles purchased per family. The arithmetical products thus obtained were multiplied by the average annual farm price of wool. Farm-to-retail price spreads for more recent years were estimated by the use of indexes for specific items, as reported by the Bureau of Labor Statistics.

sumer's dollar paid for clothing and household goods made of wool in 1939, 1947, 1949, and 1950. Data available for this purpose are not complete and in some instances they are not strictly comparable. Consequently, considerable liberty was taken in approximating margins on the basis of these data and other information. Furthermore, the estimated margins were adjusted to approximate the farm-to-retail price spreads for 20 items of woolen and worsted clothing and household goods, as calculated by the Bureau of Agricultural Economics.

Approximations were made to show the average distribution of the consumer's dollar paid for clothing and household goods made of wool on the basis of the services rendered. The results show that the portion of the consumer's dollar that went to growers for farm production of wool increased, on the average, from 11.4 percent in 1939 to about 16 percent in 1950. Corresponding proportions accounted for by margins for merchandising raw wool decreased from 2.7 percent in 1939 to 2.2 percent in 1950. Combined margins for the manufacture of yarns and fabrics, including dyeing and finishing, and for fabricating apparel and household

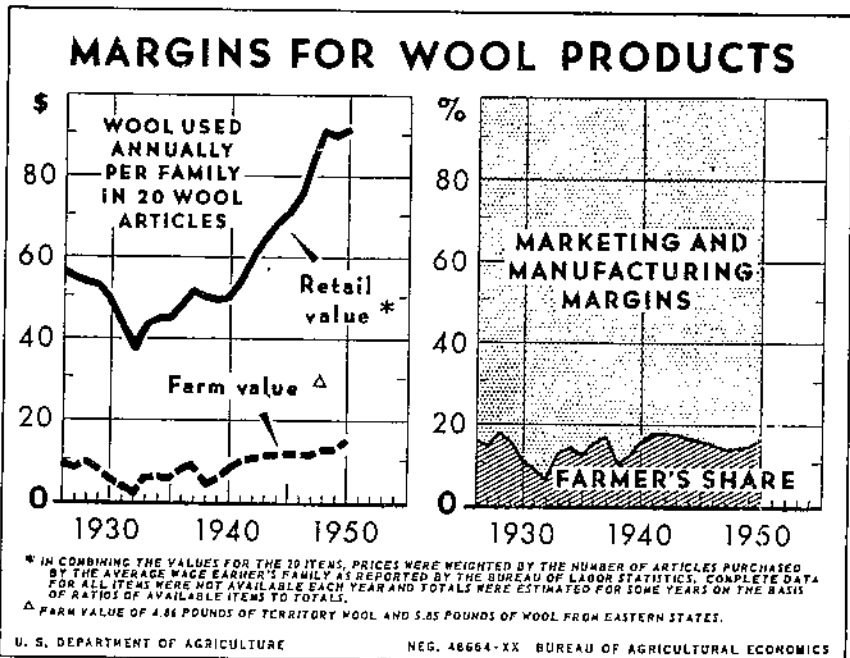


FIGURE 7.—From 1926 to 1941, changes in farm value of wool usually were relatively greater than changes in retail values of the finished products, and the proportions of the consumer's dollar represented by the farm value of wool varied directly with the changes in farm prices of wool. But since 1941 the farm value of wool has advanced relatively less than the retail value of the finished products with the result that the proportions of the consumer's dollar accounted for by farm prices decreased to 1949, then increased somewhat.

goods made of wool decreased from 48 percent of the consumer's dollar in 1939 to less than 45 percent in 1950. The proportions of the consumer's dollar accounted for by the wholesale and retail distribution of these products decreased somewhat in the 1940's, but in 1950 they averaged only slightly less than in 1939 (fig. 8).

The distribution of the consumer's dollar for both apparel and household goods made of wool differ somewhat from that indicated

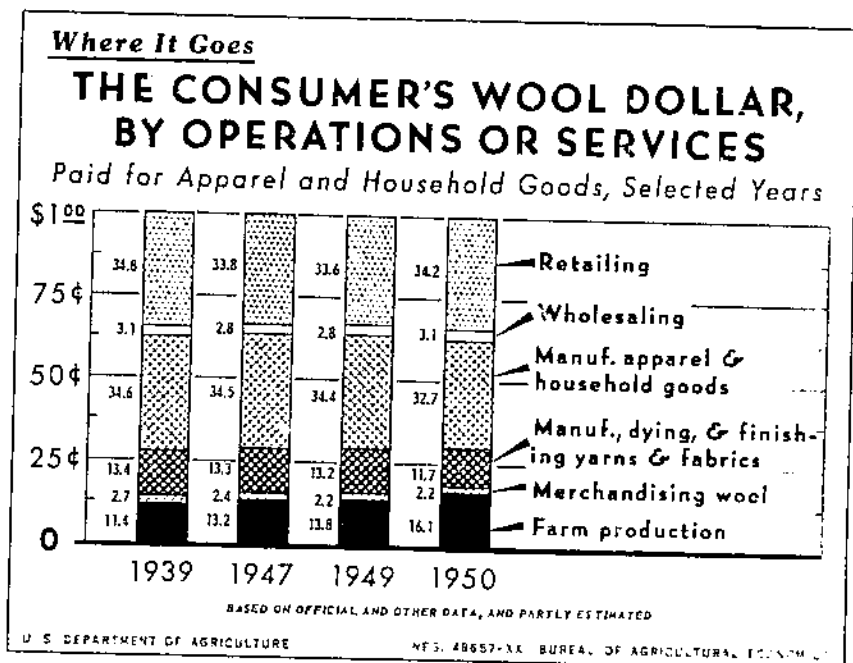


FIGURE 8.—Estimates indicate that the proportions of the consumer's dollar paid for apparel and household goods made of wool that were accounted for by gross returns to farm producers increased from 11.4 percent in 1939 to about 16 percent in 1950. Gross margins for manufacturing wool products decreased from 48 percent in 1939 to less than 45 percent in 1950. Gross margins for wholesaling and retailing wool products decreased during the 1940's but in 1950 they were only slightly less than in 1939.

for men's worsted suits. An analysis made by the Wool Bureau of the division of the consumer's dollar paid for a man's two-piece worsted suit, at the moderate price of \$50 during the 1949-50 season, show that about 10.9 percent was accounted for by the cost of the cleaned wool required, 16.9 percent by costs of manufacturing the fabric, 32.2 percent by costs of making the garment, and 40 percent by retail distribution (36).

Marketing agencies which are primarily engaged in performing specified kinds of services may also perform other related services. Consequently, the margins indicated for each type of service do not reflect accurately the charges made for each type of agency. Manufacturers of men's and boys' tailored clothing, for example,

usually sell most of their products to retailers but they sell some to consumers at retail. Average margins to manufacturers for performing all these services decreased from about 50 percent of the consumer's dollar in 1939 to 46.5 percent in 1950 (fig. 9). Less than two-thirds of the wholesaling was done by agencies primarily engaged in wholesaling, but most of the retailing was done by agencies primarily engaged in retailing.

Information relating to specific items of cost is incomplete. In many instances the data for these items are not comparable for the different agencies. But rough approximations, based on such data as are available, indicate that salaries and wages account for more than half of the spread between retail prices of finished clothing and household goods made of wool and returns to growers for the wool used, and that in recent years this proportion has increased (fig. 10). Costs of advertising are relatively small but combined net profits to all agencies, except farm producers, in some years average substantially more than returns to growers for farm production of the wool.

These data, which show approximately the proportions of the marketing margins for wool and wool products, indicate the relative importance, from the viewpoint of costs, of the different agencies and services involved. During 1939, 1947, 1949, and

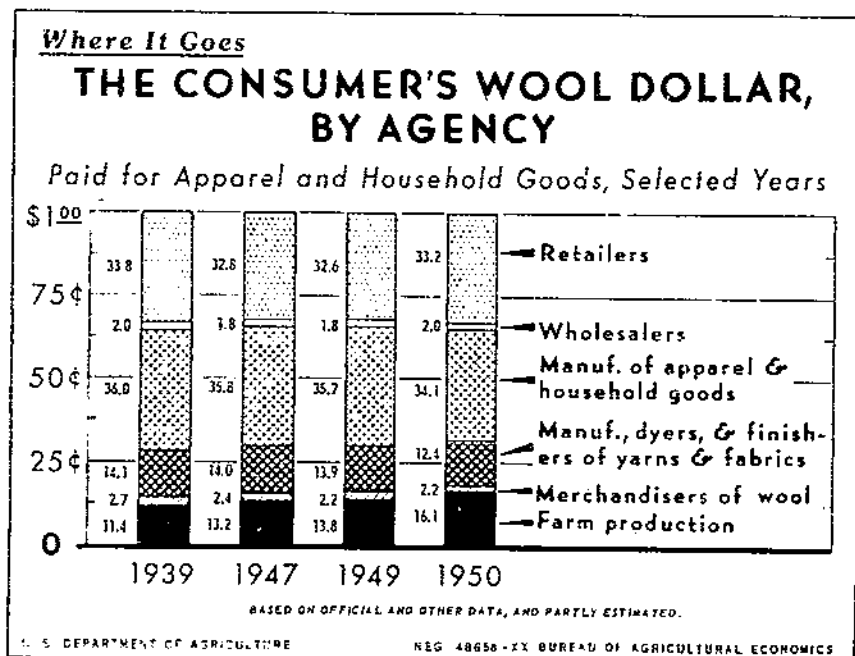


FIGURE 9.—Estimates indicate that the share of the consumer's dollar paid for apparel and household goods made of wool accounted for by gross margins for manufacturers decreased from about 50 percent in 1939 to 46.5 percent in 1950. Gross margins for wholesalers and retailers decreased during the 1940's but in 1950 they were only slightly less than in 1939.

1950, according to these data, margins for performing all the services involved in taking wool from farms and ranches and delivering it to mills, not including scouring, averaged about 5 percent of the combined cost of manufacturing wool products and about 6 percent of the costs of wholesale and retail distribution of these products. A reduction of 7 percent in margins of manufacturers, or of distributors of wool products, would have more influence in reducing the spread between retail prices to consumers for

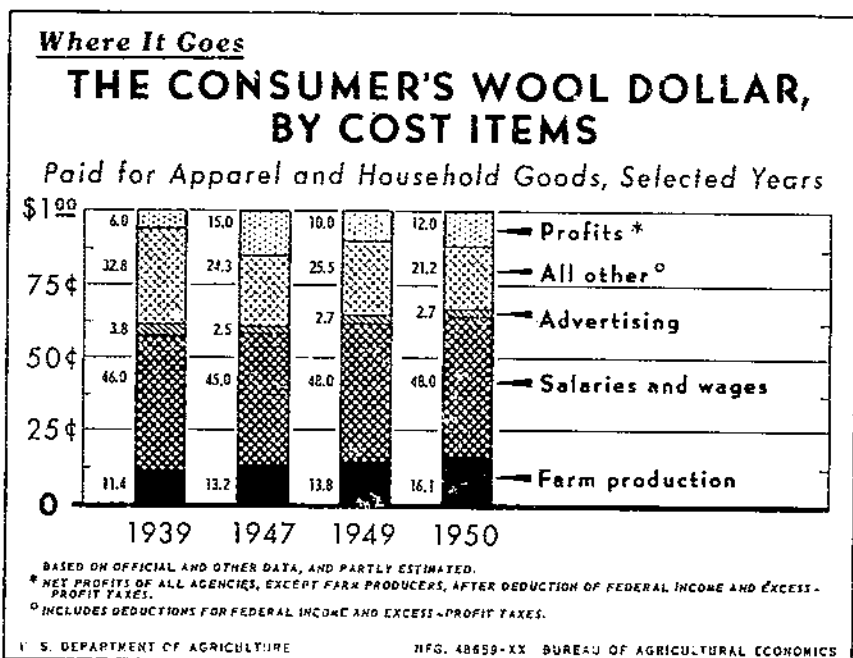


FIGURE 10.—Estimates indicate that about 48 percent of the consumer's dollar paid for apparel and household goods made of wool was accounted for by salaries and wages in 1950 compared with 46 percent in 1939. The proportions accounted for by advertising decreased somewhat. The proportions accounted for by the combined net profits of all agencies other than farm producers ranged from about 6 percent in 1939 to 15 percent in 1947, and averaged 12 percent in 1950.

the finished products and prices to growers for the raw wool used than would the complete elimination of all margins for merchandising raw wool.

These differences in size of margins are important but they may not reflect accurately the relative opportunities for making reductions in marketing margins that could be passed back to farm producers of wool or on to consumers of finished wool products. As indicated earlier in the case of cotton, a determination of the extent to which it would be feasible to reduce these margins would require detailed research relating to each important segment of the marketing procedure. This research would need to be designed to

evaluate the influences of the factors that affect efficiency and costs and to discover the most feasible means of improvement. Results of such research are not available for many agencies, but the available information relating to marketing margins and costs and to means of reducing them is presented in this bulletin in about the order in which the marketing services are rendered, beginning with the merchandising of raw wool.

MARKETING MARGINS FOR COTTON

Gross marketing margins for cotton include the costs or charges made for taking seed cotton from farms to gins and having it ginned and baled, as well as those for taking the baled lint from gins and delivering it to mills.

MARGINS INCLUDED IN FARM PRICES

Farm prices are those at which cotton is sold by growers, usually in farmers' local markets. They apply to cotton after it has been hauled from the farm to the gin, the lint separated from the seed, and the lint packed and wrapped in bales of about 500 pounds. Costs of this hauling, ginning, and baling are paid by the farm producer and are included in farm prices. But hauling seed cotton from farms to gins and processing it at gins are parts of the services performed in connection with the taking of seed cotton from farms and delivering the finished cotton apparel and household textiles to ultimate consumers.

HAULING FROM FARM TO GIN

Cotton usually is hauled from farms to gins by farm producers, although some is hauled by ginners and commercial truckers. The portion of the crop for the United States taken as a whole that was hauled to gins by farm producers decreased from 90 percent for the 1938 crop to 83 percent for the 1949 crop and amounted to 87 percent for the 1950 crop (108, 50, 21, 95, 106). The proportions that were hauled in wagons decreased from about 42 percent for the 1938 crop to 9 percent for the 1949 and 1950 crops. The portion hauled by farm producers by motortruck increased from 49 percent for the 1948 crop to 78 percent for the 1950 crop. Cotton hauled from farms to gins by ginner trucks decreased from almost 8 percent for the 1940 crop to 2 percent for the 1950 crop. Hauling by commercial truckers increased from less than 6 percent of the 1938 crop to 14 percent of the 1949 crop and amounted to 11 percent for the 1950 crop. Hauling by ginner trucks is of relatively greatest importance in the southeastern part of the Cotton Belt and hauling by commercial truckers is of relatively greatest importance in Texas and California.

CHARGES OR COSTS

Information relating to costs of hauling seed cotton from farms to gins is limited mainly to charges made by ginners and commercial truckers. In some instances, the costs of hauling by ginners

are included in charges for ginning but in most instances, particularly in recent years, separate charges for hauling and for ginning are made. These hauling charges for the Cotton Belt taken as a whole increased from 57 cents per bale for the 1940 crop to \$1.64 per bale for the 1950 crop. Charges made by commercial truckers increased from \$1.12 per bale for the 1939 crop to more than \$5.00 per bale for the 1949 and 1950 crops (108, 50, 21, 95, 106).

Charges made by commercial truckers probably reflect more accurately the actual costs of hauling seed cotton from farms to gins than those made by ginners. Apparently some ginners haul seed cotton as a means of attracting customers so as to increase their volume of ginning. That ginners are benefited by hauling seed cotton to their gins is indicated by the fact that some of them pay a part or all of the charges made by commercial truckers for a considerable portion of the seed cotton hauled to their gins. Furthermore, in some instances ginners reimburse farmers for hauling seed cotton to their gins.

MEANS OF REDUCING COSTS

Specific suggestions with regard to feasible means of reducing costs of hauling seed cotton from farms to gins would need to be based on results of detailed studies showing the influences of the different factors on the efficiency and costs of such hauling under actual operating conditions. Apparently some of the considerations involved would include adapting trucks or trailers to the specific requirements for hauling seed cotton, loading them fully when feasible for each trip to the gin, and obtaining return loads whenever possible and feasible.

GINNING AND BALING

Most of the seed cotton produced in the United States is taken to gins where the lint is separated from the seed and the lint is baled before it is sold by the farm producer. During recent years only about 2 or 3 percent of the crop in the United States was sold as seed cotton before it was ginned and a substantial proportion of this was made up of remnants harvested toward the end of the harvesting season. But in other major cotton-producing countries, where the practices in connection with production and marketing of cotton differ considerably from those in the United States, large proportions of the cotton are sold by farm producers before it is ginned.¹

CHARGES OR COSTS

Charges for ginning vary considerably from year to year with changes in general business conditions, in prices of cotton, and in

¹ In Egypt and India, for example, most of the cotton produced is sold by growers before it is ginned and in Brazil a large proportion of the cotton is sold in the seed. Apparently custom ginning is more highly developed or more generally practiced in the United States than in any other major cotton-producing country. Information as to cotton-selling practices in Egypt, India, and Brazil is based on observations by P. K. Norris, formerly Marketing Specialist, Bureau of Agricultural Economics, during his studies of production and marketing of cotton in these countries.

costs of bagging and ties. They vary also from one State or region to another with differences in kinds and amounts of services rendered. For the United States taken as a whole, average charges for ginning a 500-pound bale of American Upland cotton, including charges for bagging and ties, ranged from \$4.04 for the 1931 crop when farm prices of cotton averaged 5.66 cents per pound, to \$11.19 for the 1950 crop when farm prices averaged 40.07 cents a pound (table 1). The proportion of the farm value of the cotton accounted for by ginning charges ranged from 5 percent for the 1946 crop when farm prices averaged 32.64 cents a pound to 14 percent for the 1931 crop when farm prices averaged 5.66 cents a pound. For the 1950 crop, when farm prices averaged 40 cents a pound, this proportion averaged 5.6 percent.

Data by States show that during the 1950-51 season, for example, average charges for ginning a 500-pound bale of American Upland cotton, including charges for bagging and ties, ranged from \$7.24 in Virginia to \$17.51 in Missouri. The proportion of the farm value of the cotton accounted for by these ginning charges ranged from 3.5 percent in Virginia to almost 9 percent in Missouri (table 1).

Charges for ginning American Egyptian cotton are much higher than those for American Upland. Seasonal average charges for ginning and wrapping American Egyptian cotton increased from \$12.57 per bale of 500 pounds gross weight for the 1942 crop to \$21.06 for the 1950 crop, and from 1946 to 1950, they averaged about \$17.12 (50, 21, 95, 106).

FACTORS AFFECTING CHARGES OR COSTS

Many factors are responsible for or associated with changes in ginning charges from one period to another and with differences in these charges from one State or region to another.

GENERAL BUSINESS CONDITIONS.—Charges for ginning cotton usually vary directly with, but these variations usually are relatively less than, changes in general business conditions, in prices of cotton, and in farm wage rates (50). From the late 1920's to the early 1930's, reductions in average ginning charges were associated with relatively greater declines in the index of industrial production, in farm prices of cotton, and in farm wage rates. From the early 1930's to 1950, the substantial increases in average ginning rates were associated with relatively great variations in the index of industrial production, in farm prices of cotton, and in farm wage rates. The year-to-year changes showed some irregularities, although changes in ginning charges usually were associated with similar changes in the index of industrial production, in farm prices of cotton, and in farm wage rates.

VOLUME OF GINNING.—Average costs per bale for ginning cotton may be greatly influenced by the volume of ginning per gin plant. Differences in costs may result from differences in size of the gin plant when used to optimum capacity, in volume of ginnings per unit of gin equipment, or to some combination of both factors. Data as to the extent to which average ginning costs per bale are influenced by the size of the gin plant are inconclu-

TABLE 1.—Average charges per 500-pound gross weight bale, and proportion of farm value, for ginning Upland cotton, by States, United States, for specified years

State	Year beginning August—									
	1928	1931	1935	1930	1945	1946	1947	1948	1949	1950
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Alabama.....	4.49	2.67	3.30	3.17	5.15	6.74	7.08	7.35	7.22	8.00
Arizona.....	7.83	5.87	5.72	5.12	6.80	8.15	¹ 8.90	² 9.11	9.10	³ 9.52
Arkansas.....	5.69	3.98	5.39	5.21	7.35	8.94	9.50	10.23	10.48	12.73
California.....	6.83	5.05	6.00	4.61	6.91	8.08	¹ 8.40	² 9.40	³ 9.54	³ 10.15
Florida.....	4.64	3.37	5.06	4.63	5.68	7.18	7.13	7.31	7.59	8.72
Georgia.....	4.22	2.70	3.44	3.44	5.04	6.23	6.87	7.58	7.74	8.90
Louisiana.....	5.23	3.58	5.04	4.77	6.07	7.58	8.26	9.04	9.08	10.55
Mississippi.....	6.14	3.85	5.41	4.96	5.90	7.52	8.09	9.02	9.55	10.33
Missouri.....	7.51	5.85	8.10	5.97	9.73	12.19	12.11	13.24	13.70	17.51
New Mexico.....	8.34	5.39	7.64	5.24	7.43	7.97	9.21	10.77	11.70	11.14
North Carolina.....	4.29	2.60	3.43	3.16	5.00	6.28	7.39	8.36	8.31	9.38
Oklahoma.....	7.67	6.00	5.96	5.88	9.13	11.13	11.68	12.32	12.76	13.27
South Carolina.....	3.79	2.61	3.25	2.70	4.05	6.13	7.00	7.75	8.01	9.00
Tennessee.....	5.36	3.96	4.41	4.38	6.17	7.75	7.77	8.40	8.48	10.02
Texas.....	6.83	4.75	6.24	5.46	7.83	9.34	10.65	11.54	12.02	12.58
Virginia.....	4.91	3.41	4.51	4.05	5.08	5.35	6.72	8.00	7.57	7.24
United States.....	5.96	4.04	5.03	4.67	6.40	8.09	¹ 9.00	² 9.65	10.47	³ 11.19

Proportion of farm value

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Alabama	5.0	9.5	6.2	6.9	4.6	4.0	4.4	4.8	4.8	4.0
Arizona	6.8	16.1	9.1	9.1	5.8	5.4	5.9	6.0	6.6	4.4
Arkansas	6.3	14.4	9.6	11.8	6.5	5.5	6.1	6.8	7.5	6.4
California	7.2	16.4	10.3	9.6	6.2	5.2	5.0	6.0	6.8	4.9
Florida	5.3	12.3	9.8	9.7	5.4	4.4	4.5	4.8	5.1	4.6
Georgia	4.6	9.3	6.2	7.3	4.4	3.6	4.2	4.9	5.2	4.4
Louisiana	5.9	12.9	9.2	10.6	5.4	4.6	5.1	5.8	6.2	5.2
Mississippi	6.7	12.5	9.6	10.7	4.9	4.5	4.9	5.8	6.4	5.1
Missouri	8.5	24.2	14.5	13.4	9.1	7.9	7.9	9.1	9.7	8.9
New Mexico	8.8	18.7	12.9	11.1	6.0	4.7	5.5	6.7	7.9	5.1
North Carolina	4.6	8.7	6.0	6.6	4.3	3.8	4.5	5.4	5.7	4.6
Oklahoma	8.8	23.7	11.3	14.1	9.1	7.4	7.7	8.6	9.2	6.9
South Carolina	4.1	8.6	5.7	5.7	3.7	3.6	4.3	5.1	5.4	4.5
Tennessee	6.0	14.9	8.1	9.7	5.6	4.8	4.8	5.6	5.8	5.0
Texas	7.7	17.1	11.4	12.5	7.3	5.8	6.9	7.8	8.6	6.4
Virginia	5.5	12.2	7.5	8.8	4.5	3.3	4.2	5.2	5.2	3.5
United States	6.6	14.3	9.1	10.3	5.7	5.0	5.6	6.3	7.3	5.6

¹ Includes a separate charge per bale for drying seed cotton, averaging 52 cents a bale in California, 10 cents a bale in Arizona, and 3 cents a bale for the United States.

² Includes a separate charge per bale for drying seed cotton, averaging 75 cents a bale in California, 1 cent a bale in Arizona, and 5 cents a bale for the United States.

³ Includes a separate charge per bale for drying seed cotton, averaging 82 cents a bale in California and 6 cents a bale for the United States.

Adapted from reports of Production and Marketing Administration, Cotton Branch.

sive. Using the number of gin stands as a measure of size, data for cooperative gin plants with 4-, 5-, and 10-gin stands of 80 saws each, operated in Oklahoma and in Texas from 1932 to 1936, showed little if any consistent differences in average costs or expenses per bale for ginning on the basis of differences in size of the gin plants when the volume of ginning per gin stand was about the same (49). Data for gin plants with 4, 5, 8, and 10 stands of 70 saws each, operated in north central Texas during the season 1924-25, indicated that when the volume of ginnings per gin stand was about the same, average costs per 100 pounds for ginning varied inversely with the size of the gin plant (29). But these results apparently are not very well supported by the results of more recent studies on costs and profits of ginning in Texas (49). According to results of studies of costs of ginning in North Carolina and in the Yazoo-Mississippi Delta during the 1946-47 season and of expenses of operating cotton gins throughout the Cotton Belt during the seasons 1947-48 and 1948-49, ginning costs per bale did not vary consistently with size of gin plant, when the number of bales ginned per gin stand was about the same (51, 52, 101).

Average costs per bale of ginning cotton usually decrease considerably with increases in volume of cotton ginned per gin plant. Results of analysis of data for cotton gins in Texas from 1930 to 1938 indicate that by increasing the volume ginned per gin plant from 1,000 to 2,500 bales, for example, average ginning costs per bale could be reduced by about 40 percent (49). Data relating to costs of cotton-ginning services in North Carolina and in Mississippi for the 1946-47 season show substantial reductions in ginning costs with increases in volume of ginning (table 2). Results for 3-stand gins in North Carolina, for example, show that cost per bale averaged \$13.21 for plants that ginned less than 300 bales during the season, compared with average costs of \$7.40 per bale for plants of similar size that ginned 901 to 1,200 bales. Substantial reductions in costs per bale with increases in volume of ginnings are shown for Texas and California gins for the 1947-48 and 1948-49 seasons (40, 11, 39).

Data for cooperative cotton gins operated in Texas and Oklahoma during the 1932-36 seasons show that for gin plants with 5-gin stands of 80 saws each, for example, average expenses for ginning decreased from \$17.42 per bale for plants that ginned less than 500 bales per season to \$1.82 for those that ginned 1,500 to 2,000 bales and to \$3.35 for plants that ginned 3,000 to 3,500 bales (8). Data for larger and smaller plants show similar variations in cost with differences in volume of ginning. Results of operating cooperative cotton gins throughout the Cotton Belt in more recent years show substantial reductions in expenses per bale with increases in volume of ginning per gin stand (table 3).

Average expenses per bale for some items, particularly depreciation and other overhead costs, show relatively more decreases with increases in volume of ginning per gin stand than other cost items, but almost all items show decreases with increases in volume of ginning. Reductions in average expenses for cooperative

TABLE 2.—Average cost per bale for ginning cotton, by number of gin stands operated, and by volume of ginnings, North Carolina and Yazoo-Mississippi Delta, season 1946-47

NORTH CAROLINA						
Bales ginned (number)	2-stand gins			3-stand gins		
	Gins	Bales per gin	Cost per bale	Gins	Bales per gin	Cost per bale
	Number	Number	Dollars	Number	Number	Dollars
300 and under.....	9	194	14.03	5	254	13.21
301 to 600.....	10	478	8.52	11	445	10.17
601 to 900.....	5	679	7.40	7	733	8.79
901 to 1,200.....	3	1,092	6.35	6	998	7.40
1,201 and over.....				7	1,894	6.53

YAZOO-MISSISSIPPI DELTA						
Bales ginned (number)	3-stand gins			4-stand gins		
	Gins	Bales per gin	Cost per bale	Gins	Bales per gin	Cost per bale
	Number	Number	Dollars	Number	Number	Dollars
750 and under.....	5	464	14.64	2	479	14.62
751 to 1,500.....	14	1,153	7.27	12	1,178	9.68
1,501 to 2,250.....	2	2,167	6.97	8	1,828	7.64
2,251 to 3,000.....				11	2,522	7.08
3,001 and over.....				4	3,184	6.72

Adapted from ROSS, J. E. Jr., and LOONEY, Z. M. (51) and from ROSS, J. E. Jr., MONTGOMERY, R. A., and FORTENBERRY, W. H. (52).

cotton-gin plants with 5 stands of 80 saws each, for example, operated in Texas and Oklahoma from 1932 to 1935, from those with annual ginnings of 500 to 1,000 bales to those with ginnings of 2,500 to 3,000 bales were: \$2.41 to 72 cents per bale for depreciation, \$1.27 to 47 cents for taxes and insurance, \$1.24 to 45 cents for management, \$1.24 to 83 cents for labor, and \$1.93 to \$1.25 for all other expenses (8). Data on ginning costs in North Carolina, Mississippi, Texas, and California show substantial reductions in overhead, labor, and other items of cost with increases in volume of ginning during the 1946-47, 1947-48, and 1948-49 seasons (51, 52, 40, 11, 39). Results of analysis of expenses of cooperative cotton gins operated throughout the Cotton Belt in recent years show substantial reductions in most of the important items of cost with increases in volume of ginning per gin stand (table 3).

WEIGHT OF SEED COTTON PER BALE.—Charges for ginning vary considerably with the weight of seed cotton required to make a bale of standard weight. In the 1950-51 season the quantity of

seed cotton required to make a 500-pound gross-weight bale averaged about 1,525 pounds for American Upland cotton and about 1,606 pounds for American Egyptian cotton (108, 50). Ginning charges, including bagging and ties, averaged \$11.19 and \$21.06 per bale, respectively. But American Egyptian is extra-long-

TABLE 3.—Average cost per bale of ginning cotton by cooperative gins, by State or region and by volume per gin stand, United States, season 1948-49

ALABAMA AND EAST MISSISSIPPI

Bales per gin stand	Items of cost							
	Total	Salaries and wages	Bagging and ties	Power and fuel	Maintenance	Insurance and taxes	Interest on investment	Miscellaneous
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
300	9.31	2.57	2.09	.62	2.16	0.56	0.97	0.43
400	8.50	2.42	2.07	.60	1.78	.49	.75	.39
500	8.01	2.33	2.12	.59	1.55	.44	.62	.36
600	7.69	2.27	2.15	.58	1.40	.41	.53	.35
700	7.46	2.23	2.17	.58	1.29	.39	.47	.33
800	7.28	2.19	2.19	.57	1.21	.37	.42	.33
900	7.15	2.17	2.20	.57	1.15	.36	.39	.31
1,000	7.04	2.15	2.21	.57	1.10	.35	.36	.30

MISSISSIPPI DELTA

600	9.42	2.56	2.22	0.91	1.86	0.81	0.54	0.52
700	8.98	2.41	2.29	.90	1.69	.72	.50	.47
800	8.66	2.31	2.34	.89	1.57	.66	.48	.41
900	8.40	2.22	2.37	.88	1.48	.61	.46	.38
1,000	8.20	2.15	2.40	.88	1.40	.57	.43	.37
1,100	8.03	2.10	2.43	.87	1.34	.53	.43	.33
1,200	7.89	2.05	2.45	.87	1.29	.50	.41	.32
1,300	7.77	2.01	2.46	.87	1.24	.48	.40	.31
1,400	7.67	1.98	2.48	.86	1.20	.46	.39	.30

ARKANSAS

300	15.44	4.18	2.39	1.09	3.40	1.74	1.55	1.09
400	13.40	3.67	2.43	1.08	2.75	1.35	1.21	.91
500	12.17	3.37	2.45	1.08	2.36	1.12	1.00	.79
600	11.35	3.17	2.47	1.08	2.10	.97	.86	.70
700	10.76	3.02	2.48	1.08	1.92	.86	.76	.64
800	10.33	2.91	2.49	1.08	1.78	.77	.69	.61
900	9.97	2.83	2.50	1.08	1.67	.71	.62	.56
1,000	9.70	2.76	2.50	1.08	1.59	.66	.58	.53
1,100	9.49	2.70	2.51	1.08	1.52	.62	.55	.51
1,200	9.30	2.66	2.51	1.08	1.46	.58	.52	.49
1,300	9.14	2.62	2.51	1.08	1.41	.55	.49	.48
1,400	9.00	2.58	2.51	1.08	1.36	.53	.46	.48
1,500	8.88	2.56	2.52	1.08	1.33	.50	.44	.45
1,600	8.78	2.53	2.52	1.08	1.30	.49	.42	.44
1,700	8.70	2.51	2.52	1.08	1.27	.47	.42	.43

TABLE 3.—Average cost per bale of ginning cotton by cooperative gins, by State or region and by volume per gin stand, United States, season 1948-49—Cont.

Bales per gin stand	OKLAHOMA							
	Items of cost							
	Total	Salaries and wages	Bagging and ties	Power and fuel	Maintenance	Insurance and taxes	Interest on investment	Miscellaneous
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
100	28.49	8.76	2.48	1.37	8.20	3.01	3.67	1.00
200	18.30	5.78	2.50	1.03	4.57	1.76	1.80	.95
300	15.09	4.78	2.51	.92	3.37	1.33	1.24	.94
400	13.35	4.28	2.51	.86	2.76	1.13	.87	.94
500	12.34	3.98	2.51	.83	2.40	1.00	.69	.93
600	11.67	3.78	2.51	.80	2.16	.93	.56	.93
SOUTH TEXAS								
200	18.98	6.72	2.38	0.92	4.62	1.46	1.48	1.40
300	15.33	5.37	2.42	.74	3.43	1.14	1.24	.99
400	13.50	4.69	2.44	.66	2.83	.98	1.11	.79
500	12.41	4.29	2.45	.60	2.48	.88	1.04	.67
600	11.68	4.01	2.46	.57	2.24	.81	.99	.60
700	11.15	3.82	2.46	.54	2.07	.77	.95	.54
800	10.76	3.68	2.47	.52	1.94	.73	.92	.50
900	10.46	3.56	2.47	.51	1.84	.70	.91	.47
1,000	10.21	3.47	2.47	.50	1.76	.68	.88	.45
EAST CENTRAL TEXAS								
100	26.48	9.77	2.40	1.25	6.68	2.45	2.72	1.21
200	16.13	5.74	2.34	.86	3.70	1.31	1.42	.76
300	12.68	4.40	2.32	.74	2.70	.93	.98	.61
400	10.96	3.73	2.31	.67	2.21	.74	.77	.53
500	9.93	3.33	2.30	.63	1.91	.63	.64	.49
600	9.24	3.06	2.30	.61	1.71	.56	.55	.45
700	8.74	2.87	2.30	.59	1.57	.50	.48	.43
800	8.37	2.72	2.29	.57	1.46	.46	.44	.43
900	8.09	2.61	2.29	.56	1.38	.43	.41	.41

TABLE 3.—Average cost per bale of ginning cotton by cooperative gins, by State or region and by volume per gin stand, United States, season 1948-49—Cont.

See footnotes at end of table.

NORTHWEST TEXAS

Bales per gin stand	Items of cost							
	Total	Salaries and wages	Bagging and ties	Power and fuel	Maintenance	Insurance and taxes	Interest on investment	Miscellaneous
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
200	20.66	7.12	2.40	1.14	5.07	1.86	2.27	0.80
300	16.76	6.02	2.39	.86	3.81	1.42	1.53	.73
400	14.82	5.47	2.39	.73	3.19	1.20	1.17	.67
500	13.65	5.14	2.39	.64	2.81	1.06	.94	.67
600	12.87	4.92	2.39	.59	2.56	.96	.80	.65
700	12.31	4.76	2.38	.55	2.38	.91	.69	.64
800	11.90	4.64	2.38	.52	2.24	.87	.61	.64
900	11.57	4.55	2.38	.49	2.14	.83	.55	.63
1,000	11.31	4.48	2.38	.48	2.05	.80	.50	.62
1,100	11.10	4.42	2.38	.46	1.98	.78	.46	.62
1,200	10.92	4.37	2.38	.45	1.93	.75	.42	.62
1,300	10.77	4.33	2.38	.44	1.88	.73	.40	.61
1,400	10.64	4.29	2.38	.43	1.84	.72	.37	.61
1,500	10.53	4.26	2.38	.42	1.80	.71	.35	.61
1,600	10.43	4.23	2.38	.41	1.77	.70	.33	.61
1,700	10.37	4.21	2.38	.41	1.75	.69	.32	.61

WESTERN IRRIGATED

900	10.51	3.19	2.27	0.55	1.91	1.09	0.99	0.51
1,000	10.04	3.09	2.27	.56	1.74	1.04	.83	.51
1,100	9.65	3.00	2.27	.57	1.60	1.00	.70	.51
1,200	9.32	2.93	2.27	.58	1.47	.96	.59	.52
1,300	9.05	2.87	2.27	.58	1.38	.93	.50	.52
1,400	8.82	2.82	2.27	.58	1.29	.91	.43	.52
1,500	8.61	2.78	2.27	.58	1.22	.89	.35	.52
1,600	8.44	2.74	2.27	.58	1.16	.87	.30	.52
1,700	8.28	2.71	2.27	.58	1.10	.85	.25	.52
1,800	8.14	2.68	2.27	.58	1.06	.83	.20	.52

Adapted from WEAVER, OTIS T. and FETROW, WARD W. COSTS AND MARGINS OF COOPERATIVE GINS 1947-48 AND 1948-49 (101).

staple cotton and is ginned on roller gins, whereas Upland has a shorter staple and is ginned on saw gins. The kind of gin required and the length of staple both affect costs of ginning.

The average quantity of seed cotton required per 500-pound gross-weight bale of Upland cotton in 1950-51 ranged from about 1,316 pounds in Alabama to about 1,665 pounds in Missouri. Ginning charges, including bagging and ties, averaged \$8 and

\$17.21 per bale, respectively. But other factors also helped to account for differences in ginning charges.

The quantity of seed cotton required per 500-pound gross-weight bale is influenced considerably by the variety of cotton, by humidity and other conditions obtaining at the time of harvesting, and by method of harvesting. The longer-staple varieties usually give a smaller lint out-turn and they are somewhat more difficult to clean and to gin than the shorter staples. The quantity of seed cotton harvested by snapping that was required to make a 500-pound gross weight bale averaged 1,949 pounds in the 1950-51 season, compared with an average of 1,356 pounds for cotton harvested by hand picking (106). Ginning rates per 100 pounds of seed cotton harvested by snapping averaged about 14 percent higher in 1946-47 than those for cotton harvested by hand picking (50). By States, the proportions of the 1950 crop that were harvested by hand picking ranged from 15 percent in Oklahoma to 100 percent in South Carolina, Florida, and Virginia.

SUPPLEMENTARY EQUIPMENT.—Increases in the proportion of the cotton crop harvested by hand snapping, machine picking, and machine stripping in recent years necessitate the use of additional auxiliary ginning machinery. The kinds and amounts of supplementary equipment, such as dryers for conditioning green or damp seed cotton, cleaners for removing dirt and small particles of foreign matter, and extractors for removing burrs and other coarse materials, used to an increasing extent in connection with ginning, may influence considerably the cost of ginning. The proportions of gins having this supplementary equipment increased considerably from 1940 to 1945 (50). Further increases have doubtless occurred since 1945.

Such equipment is expensive to install and to operate and its use may add considerably to the quality and costs of the services performed. In the Southeast gins have less auxiliary equipment and also lower charges for ginning than those in other parts of the Cotton Belt, although factors other than the use of auxiliary equipment also help to account for the differences in ginning charges. Usually charges for the use of auxiliary equipment are included in the regularly established charges for ginning. Data for the 1946-47 season show that costs per bale of ginning in Mississippi, Texas, and California usually were considerably higher for specially equipped than for standard gins (52, 40, 11, 39). In California a separate charge is made for drying services. In the 1946-47 season, these charges amounted to \$1.61 per bale (39) and in 1949 they averaged about 82 cents per bale for all cotton ginned in California.

LABOR, POWER, AND OTHER ITEMS.—Costs of ginning are influenced considerably by the costs of labor, power, and other items of expense involved in operating and maintaining ginning and auxiliary equipment (49). Farm wages per day without board in 1946 averaged \$3.75 in North Carolina, \$2.95 in Mississippi, and \$4.45 in Texas, and labor costs per bale for ginning the 1946 crop averaged \$1.70 in the Coastal Plain area of North Carolina (51), \$1.17 in the Yazoo-Mississippi Delta (15), and \$2.80 in the High

Plains of Texas (40). In 1948 farm wages per day without board averaged \$3.25 in Alabama, \$3.30 in Mississippi, \$3.85 in Arkansas, and \$5.60 in Oklahoma. Labor costs per bale for ginning the 1948 crop, for 600 bales per gin stand, averaged \$2.27 in Alabama and east Mississippi, \$3.17 in Arkansas, and \$3.78 in Oklahoma (65, 101). In 1950 farm wage rates per hour without board averaged 38 cents in South Carolina, 45 cents in Mississippi, and 68 cents in Oklahoma. Average ginning charges were \$9.00, \$10.33, and \$13.27 per bale, respectively. Comparable wage rates in Missouri averaged 68 cents and ginning charges averaged \$17.51 per bale (65, 101). As previously indicated, factors such as volume of ginning per unit of equipment, type of bagging and ties used, mechanical condition of the gin plant, and supplementary equipment and the skill with which it is operated also influence the costs of ginning (50).

QUALITY OF SERVICES PERFORMED.—Ginning charges vary with quality as well as with amounts of services performed. The real costs of ginning services to producers are influenced by the quality of the services as well as by the charges made. Poor-quality ginning reduces the quality and value of the lint. The quality of ginning services performed is indicated by the proportion of the cotton that is rough-ginned. The proportion of rough-ginned cotton usually is greatest in states or areas in which ginning charges are relatively low (50). In the southeastern areas, ginning charges usually are substantially lower and the proportions of rough-ginned cotton usually are much greater than for other parts of the Cotton Belt. The proportion of rough-ginned cotton may be influenced considerably by weather during harvesting, staple length of the cotton, condition of the cotton at time of ginning, and the kind and amount of equipment used and method of its operation. The relatively large proportion of rough-ginned cotton in the Southeast apparently is accounted for mainly by lack of adequate auxiliary equipment, and the volume of ginnings for many of the operating units are so small that it is difficult to use economically the equipment needed to improve the quality of the ginning services (50).

BAGGING AND TIES.—Charges for bagging and ties make up more than a fourth of the total charges for ginning. In the Southeast, charges for these materials usually are substantially less than in other areas. These relatively low charges are accounted for chiefly by the fact that ginners in that area cover a considerable proportion of the cotton with second-hand materials, whereas in other areas ginners customarily use new bagging and ties (50). Types of bagging used include open-weave jute, sugar-bag cloth, and cotton bagging. Costs vary somewhat with the kind used. The proportion of the 1946 crop covered with open-weave jute bagging ranged from about 50 percent in the Southeastern region to about 92 percent in the far Western region, whereas the proportion covered with sugar-bag cloth, which included second-hand bagging, ranged from about 8 percent in the far Western region to 48 percent in the Southeast. Only a small proportion of the bales were covered with cotton bagging.

SUPPLEMENTARY SERVICES RENDERED.—Services rendered in connection with ginning, the charges for which are included with those for ginning, may also affect materially the charges for ginning. Such services may include hauling from gin to warehouse, cotton yard, or railroad platform; storing lint cotton in the gin yard and cottonseed at the gin; and advances of credit for producing and harvesting the crop. In addition, ginners buy on the average about a fourth of the lint ginned and most of the cottonseed crushed is bought by or through ginners. Prices paid may influence, or be influenced by, the charges for ginning. Ginners bought about 32 percent of the 1950 cotton crop.

MEANS OF REDUCING COSTS

Information relating to the general situation in the ginning industry and to factors that affect the costs of ginning supply some basis for indicating possible means of reducing these costs. But as conditions vary from one locality to another, specific information regarding the situation in each locality would be needed as a basis for indicating the means by which and the extent to which it would be feasible to reduce ginning charges in specific localities.

INCREASE IN VOLUME OF GINNINGS.—The fact that average costs per bale for ginning cotton are substantially less for gins with annual volumes of ginnings of 500 or more bales per gin stand than for gins with smaller volumes of ginnings, and the fact that the number of bales ginned per gin stand in the United States usually averages less than 300 bales, indicate that costs of ginning might be reduced considerably by increasing the volume of cotton per gin stand. This would require a reduction in number of gin stands operated. Such a reduction might well be brought about by discontinuing the use of old, badly worn, and obsolete equipment and by limiting the construction of new plants and new replacements, other than necessary repairs, in any locality to those required for efficient operations.

Possibilities of increasing the volume of ginnings per unit of ginning equipment by reducing excess ginning capacity may be indicated by data relating to the extent to which gin capacity is utilized. Bureau of the Census reports relating to the number and capacity of gins and to the number of bales ginned during the 1945-46 season indicate that if all gins had been operated at capacity on the basis of a 12-hour day, the 1945 United States crop could have been ginned in about 20 days (table 4). The number of days by States ranged from 11 in Oklahoma to about 55 in New Mexico. The 1945 crop was a small one, but the corresponding number of days required to gin the 1940 crop would have averaged about 24 days for the United States taken as a whole and the number by States would have ranged from less than 12 days in Virginia to more than 76 days in California.

The extent to which ginning capacity is utilized during the heaviest part of the ginning season perhaps supplies a better basis than number of days required at full capacity to gin the crop for estimating the extent to which it might be possible and feasible to increase the volume of ginning per unit of ginning equipment

TABLE 4.—Number of gins, number of gin saws, estimated capacity, and average number of days needed to gin crop, by States, 1935, 1940, and 1945

State	Gins			Gin saws		
	1935	1940	1945	1935	1940	1945
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Alabama.....	1,339	1,251	1,020	326,720	317,740	270,116
Arizona.....	50	62	55	15,970	22,510	20,040
Arkansas.....	1,232	1,199	1,066	311,450	313,860	288,120
California.....	78	112	110	30,970	49,850	46,580
Florida.....	61	51	26	9,610	8,120	4,160
Georgia.....	1,615	1,408	1,078	380,300	346,520	276,440
Louisiana.....	735	657	570	177,700	170,680	153,570
Mississippi.....	1,406	1,383	1,263	349,960	365,330	348,050
Missouri.....	158	191	184	41,810	52,960	53,060
New Mexico.....	46	44	42	15,730	15,620	14,950
North Carolina.....	1,199	1,009	793	238,545	212,700	178,590
Oklahoma.....	914	748	615	307,490	250,670	204,870
South Carolina.....	1,434	1,208	884	272,110	244,770	198,200
Tennessee.....	459	435	400	111,860	109,130	102,650
Texas.....	3,564	3,207	2,650	1,200,980	1,082,580	899,840
Virginia.....	111	93	99	14,190	12,390	10,220
All other.....	13	15	11	2,770	3,310	2,400
United States..	14,414	13,073	10,836	3,808,165	3,578,790	3,073,880
	Capacity in bales per 12-hour shift			Average days needed to gin crop		
	1935	1940	1945	1935	1940	1945
Alabama.....	50,856	49,750	42,279	20.3	15.4	21.4
Arizona.....	2,246	3,214	2,847	58.6	59.2	40.8
Arkansas.....	44,741	46,811	43,554	18.8	31.6	23.0
California.....	3,856	6,940	6,855	60.4	76.4	50.7
Florida.....	1,518	1,373	658	17.6	13.0	13.0
Georgia.....	57,837	53,096	43,431	18.2	19.0	15.3
Louisiana.....	29,135	27,006	24,261	18.6	16.6	15.5
Mississippi.....	50,913	55,794	54,616	24.1	22.2	27.8
Missouri.....	5,932	7,833	7,989	30.8	50.5	23.2
New Mexico.....	2,091	2,017	1,945	33.6	56.8	54.9
North Carolina.....	36,156	31,822	26,677	16.0	23.5	16.0
Oklahoma.....	40,078	31,156	25,790	14.0	24.5	11.0
South Carolina.....	40,366	38,518	31,091	18.3	24.6	21.0
Tennessee.....	16,283	15,939	16,419	19.4	31.5	27.3
Texas.....	163,733	147,954	122,182	17.4	21.0	14.2
Virginia.....	2,166	1,868	1,472	12.8	11.4	10.6
All other.....	358	457	300	20.7	32.8	25.1
United States..	548,265	521,448	452,486	19.0	23.6	19.5

Adapted from reports of Bureau of the Census (71).

by reducing excess ginning capacity, without providing additional storage space for seed cotton or changing harvesting practices. According to reports of the Bureau of the Census, about four-fifths of the United States crop is harvested during the 3 months from about the middle of August to the middle of November (72). The time of the peak load for ginning varies somewhat from one part of the Cotton Belt to another, but for most areas it comes in September or October.

Data relating to capacity of gins and to volume of cotton ginned during the period of largest volume of ginning by counties, for the 1945-46 season, show that, for the United States taken as a whole, about 47 percent of the counties used less than 30 percent of estimated total ginning capacity on the basis of a 12-hour day during the peak load of the ginning season (table 5). In about 66 percent of the counties, less than 40 percent of capacity and, in about 81 percent of the counties, less than 50 percent of estimated capacity was utilized during the peak ginning period. The proportion of the counties by States that utilized less than 20 percent of estimated capacity, on the basis of a 12-hour day during the peak-load period, ranged from about 7 percent in Mississippi to 50 percent in Texas, and the proportion that utilized less than 30 percent of estimated capacity ranged from 19 percent in Mississippi to 78 percent in South Carolina. The proportion of total estimated capacity on the basis of a 12-hour day by States utilized during the peak-load period varied from 21 percent in Texas to 41 percent in Alabama and Mississippi and to 96 percent in New Mexico. The proportion for the United States taken as a whole averaged 31 percent.

These data clearly indicate that substantial reductions in the amounts of ginning equipment used and corresponding increases in volume of ginning per unit of ginning equipment could be brought about in many parts of the Cotton Belt with little or no delay in harvesting and ginning, and with little or no increase in storage space required for seed cotton. Unfavorable weather, availability of cotton, necessity for repairing machinery, and other factors may make it impossible to operate gins continuously at full capacity on a 12-hour day basis for extended periods. But during the busiest part of the ginning season, gins may be, and many actually are, operated for considerably more than 12 hours each day. In some instances, gins are known to have been operated on a 24-hour-a-day basis for 6 or 7 days a week during considerable periods of time. Furthermore, the pressure on ginning facilities when the movement of cotton to gins is heaviest could be eased and the period during which gins can operate at more nearly full capacity extended somewhat by providing storage space for substantial quantities of seed cotton at the gins and by inducing farm producers to store more seed cotton on farms during the peak of the harvesting season. But additional costs of such storage and associated factors would also need to be taken into account.

Where gin plants are too small for most efficient operation, average costs per bale of ginning may be reduced by increasing

TABLE 5.—Distribution of counties on the basis of the proportion of full capacity of gins utilized during the period of largest volume of ginnings, by States, 1945

Percentage of ginning capacity utilized	Proportion of counties by States										
	Ala-bama	Arkan-sas	Georgia	Louis-i-ana	Missis-sippi	North Carolina	Okla-homa	South Carolina	Texas	Other	United States
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
0 to 9.....	1.6	8.6	3.8	8.1	4.1	6.8	10.2	9.5	23.2	3.5	8.9
10 to 19.....	7.8	32.8	19.2	21.7	2.7	11.3	32.7	26.2	27.2	7.0	18.2
20 to 29.....	15.6	17.3	32.7	18.9	12.2	27.3	26.5	42.9	17.2	10.5	20.3
30 to 39.....	20.3	8.6	21.2	21.6	20.3	27.3	10.2	19.0	13.2	14.0	18.5
40 to 49.....	20.3	20.7	15.4	.....	21.5	13.6	14.3	2.4	7.9	24.6	15.4
50 to 59.....	17.2	10.3	6.7	13.5	13.5	11.4	6.1	.....	2.6	22.8	9.5
60 to 69.....	11.0	.....	.....	10.8	16.2	2.3	.....	.....	4.0	10.5	5.3
70 to 79.....	3.1	1.7	.....	.....	5.4	.....	.....	.....	2.0	1.8	1.8
80 to 89.....	3.1	.....	1.0	2.7	2.7	.....	.....	.....	.7	.....	.9
90 and over.....	.....	.....	.....	2.7	1.4	.....	.....	.....	2.0	5.3	1.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Based on data from Bureau of the Census reports (72, 71). Full capacity, as used here, is about 47 bales per 12-hour day per 320 saws. The number of saws used is based on the total number of gins reported by the Bureau of the Census in 1945. Ginning periods used are those for which ginnings are reported

to the Bureau of the Census and they range in length from 13 to 17 days. The proportion used for each county in making up the distribution represents the period during which gin capacity was most nearly fully utilized during 1945.

the number of gin stands and the volume of ginning per gin plant. This might be accomplished by combining existing stands, preferably only the better ones, into fewer plants and by limiting construction of new plants to the larger and more efficient sizes. To be economically feasible, the savings in such ginning costs that are attributable to the greater efficiency of the larger plants would need to equal or exceed the expenses of making the combinations.

Reductions in costs of ginning by increasing the volume of ginnings per gin stand and per gin plant in some instances might be offset to some extent by increases in average distance of hauling, and possibly by some delays in getting cotton ginned, particularly during the peak of the harvesting season. But in many instances, increases in volume of ginnings per gin plant could be brought about by reducing the number of gin plants in specific villages or towns, where two or more gins are operated, without increasing appreciably the distances seed cotton would have to be hauled. In the 1917-18 season, for example, more than three-fourths of the seed cotton was hauled 6 miles or less to gins (54). This indicates that in most instances the volume could be considerably increased without making the distance from the farm to the gin very great.

Any further concentration of the movement of seed cotton from farms to gins as a result of expanding machine harvesting would tend to increase the difficulties involved in fully utilizing ginning equipment for longer periods each season. The feasibility of storing limited quantities of seed cotton at the gin, at the farm, or at both places have been considered as a means of reducing the peak-load demands for ginning services (101). But additional information is needed to indicate the possibilities of, and the limitations to, this means of more fully utilizing ginning facilities and labor and of reducing the costs of ginning.

Differences in costs that result from differences in volume of ginnings are not accurately reflected in differences in average charges from one State to another (table 6). In 1915, for example, the number of bales ginned per 320-saw gin averaged 1,051 in South Carolina and 2,290 in California. Charges for ginning services averaged \$1.05 in South Carolina and \$6.91 in California. Although gins in Oklahoma are subject to regulation by the State Corporation Commission, the volume of ginnings per 320-saw gin averaged lower than for any other major cotton-producing State and charges for ginning services averaged considerably higher than for the United States as a whole. But the condition of the cotton when it is ginned and the kinds and amounts of ginning services differ considerably from one area to another. Available information is not adequate for indicating the extent to which ginning charges are influenced by factors other than volume of ginnings.

CAREFUL HARVESTING AND CONDITIONING OF SEED COTTON.—Costs of ginning and damage to lint from cleaning and ginning might be reduced by picking the cotton carefully instead of snapping, stripping, or machine picking (28). But the feasibility of harvesting cotton by hand picking would depend upon the extent

TABLE 6.—Average number of bales ginned per 320-saw gins and average charges per bale of 500-pound gross weight for American Upland cotton, by States, 1945

State	Bales ginned per 320 saws (4-80) ¹	Average ginning charge per bale ²	State	Bales ginned per 320 saws (4-80) ¹	Average ginning charge per bale ²
	<i>Number</i>	<i>Dollars</i>		<i>Number</i>	<i>Dollars</i>
California.....	2,290	6.91	South Carolina.....	1,051	4.05
New Mexico.....	2,144	7.43	Louisiana.....	786	6.07
Arizona.....	1,555	6.80	Georgia.....	765	5.04
Tennessee.....	1,396	6.17	North Carolina.....	763	5.00
Mississippi.....	1,391	5.90	Texas.....	618	7.83
Arkansas.....	1,114	7.35	Florida.....	470	5.68
Missouri.....	1,087	9.73	Virginia.....	441	5.08
Alabama.....	1,066	5.15	Oklahoma.....	432	9.13

¹ Based on data compiled from Bureau of Census reports (71).

² Adapted from reports of Production and Marketing Administration, Cotton Branch.

to which costs of hand picking exceed costs of other methods of harvesting, taking into account field waste, reductions in quality, and differences in costs of ginning and related services. Data assembled for California show that, in 1949, harvesting costs for hand picking averaged substantially more than costs of machine picking, including field waste, grade loss, and additional ginning costs (2). Returns above harvesting and ginning costs for the 1948 crop in the High Plains of Texas averaged considerably more for cotton harvested by machine stripping than by snapping (103). Costs of mechanically harvesting cotton in the Yazoo-Mississippi Delta in 1947 were equivalent to costs of hand picking at \$2.65 per 100 pounds (17). Data relating to costs of harvesting cotton in North Carolina in 1947 indicate that costs of hand picking averaged somewhat less than costs by hand snapping and by mechanical stripping and picking, including loss in grade (58). Picking instead of snapping cotton delays harvesting and increases damage from exposure in the field.

EFFICIENCY IN ORGANIZATION AND OPERATION.—The kinds and amounts of ginning and auxiliary equipment, the condition or state of repair in which it is kept, and the method of organization and operation may also influence considerably the average costs of ginning. The choice of kinds of ginning equipment in establishments already set up may be limited, but it may be an important consideration in setting up new plants or in making replacements. Any reductions in costs from the use of auxiliary equipment might well be brought about by using efficiently the more suitable types and not by reductions in, or elimination of, their use when required to render the services needed. With adequate volume of cotton for efficient operation reasonably certain, the ginner probably would be more likely to use the proper kinds and amounts of equipment and to keep it in good condition in order to improve

the quality of the ginning services rendered, as well as to reduce the costs per bale of ginning. Careful selection and efficient utilization of labor, power, and other items of expense may also reduce ginning costs (49, 101).

The ginning business is integrated to a considerable extent in that substantial proportions of the cotton ginned and even larger proportions of the cottonseed are bought by the gin operator. Possibilities of further integration to include delinting and possibly other processing of cottonseed at the gin have been suggested as a means of more fully utilizing labor and power facilities at the gin (101). But the information available is inadequate to determine the conditions under which, and the extent to which, such integration would be feasible.

IMPORTANCE OF REDUCTION IN COSTS

Information available as to means of reducing costs of ginning indicates that by increasing the volume of ginning per unit of equipment, by using the better equipment more efficiently, and by other economies, net costs of ginning might, during a period of time, be reduced in many instances by as much as one-fourth or possibly more. The relative importance of such savings are apparent when it is understood that if such reductions had been reflected in prices to cotton growers in the 1950-51 season, the increase in their incomes resulting therefrom would have amounted to about \$2.80 per bale of 500 pounds or to about 1.4 percent of the farm value of cotton.

COTTON MERCHANTISERS' MARGINS

Merchandisers' margins are the differences between farm prices of cotton and costs of the raw cotton to mills. These margins include the costs of rendering the services incident to taking the cotton from gins and delivering it to mills at the time, in the quantities, and of the qualities desired. These services include receiving, sampling, weighing, classing, compressing, storing, insuring, transporting, financing, and risk bearing, among others.

RECEIVING AND RELATED SERVICES

Most of the cotton after leaving the gin is assembled in public warehouses or compresses where several services are rendered incident to its compression and concentration. These services usually include issuing warehouse receipts, weighing, sampling, marking or tagging, and storage up to 30 days.

CHARGES ON COSTS

In the 1950-51 season the average receiving charge in the United States was 65 cents a bale compared with 23 cents for the 1939-40 season and 41 cents for the 1945-46 season (table 7). Although receiving charges have increased greatly since 1939, they have not advanced proportionately as much as cotton prices. The proportion of the farm value of cotton represented by receiving charges decreased on the average from 0.5 percent during the 1939-40 season to 0.3 percent during the 1950-51 season.

Average receiving charges by States during the 1950-51 season ranged from 49 cents a bale in Georgia to 75 cents a bale in California, New Mexico, Oklahoma, and Texas. These variations in receiving charges may be accounted for largely by the fact that charges for these services are not well standardized. The storage period, for example, ranged from 0 to 30 days, and even if storage rates were all the same, this range would account for considerable differences in charges. Furthermore, the kinds and amounts of other services also vary and some compresses do not make a receiving charge if they compress the cotton.

TABLE 7.—Average receiving charges per bale at public cotton warehouses and compresses, by States, for specified years¹

State ²	Year beginning Aug. 1--								
	1932	1935	1939	1945	1946	1947	1948	1949	1950
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Alabama.....	34	30	30	38	50	47	52	57	56
Arkansas.....	25	25	15	42	55	55	55	56	55
California.....	29	30	22	36	50	50	75	75	75
Georgia.....	16	25	37	29	30	35	40	50	49
Louisiana.....	25	30	28	45	51	51	54	54	54
Mississippi.....	25	31	28	44	55	55	56	56	56
Missouri.....	25	25	17	41	55	55	55	55	55
New Mexico.....	25	25	25	36	50	50	67	71	75
Oklahoma.....	15	15	15	18	50	50	75	75	75
South Carolina.....	28	25	35	33	31	32	45	41	54
Tennessee.....	25	25	15	41	55	55	55	55	55
Texas.....	25	21	23	42	53	52	68	64	75
United States.....	24	25	23	41	53	52	62	63	65

¹ Based on published tariffs of major units of the public cotton warehouse industry chiefly represented by those with compress facilities.

² Data were insufficient for reporting charges in Arizona, Florida, North Carolina, and Virginia.

Adapted from reports of Production and Marketing Administration, Cotton Branch.

MEANS OF REDUCING COSTS

Costs of the services rendered in connection with receiving cotton may be reduced by minimizing unnecessary assembling and handling before shipment to mills and by rendering the necessary services more efficiently. Much of the cotton changes hands several times in the course of its movement through marketing channels and in many instances these changes are accompanied by duplicate sampling and additional handling. Such resampling means additional service charges, wastes the cotton used, damages the bagging, and exposes the cotton to further waste and damage. Such duplication and waste could be eliminated by the use of equipment for taking automatically adequate and authentic samples of cotton bales while the bales are being formed. An automatic sampler, which has been developed and tested on a com-

mercial scale and for which a public-service patent has been obtained, can be used with any standard gin equipment (27). The most effective use of such a sampling device would require some reliable means for the correct and permanent identification of the sample with the bale from which it was drawn and in recent years progress has been made toward the development of means for the permanent identification of bales (105). Savings might also be made by reducing or eliminating unnecessary duplications of such services as weighing, marking, and tagging.

Results of research relating to receiving operations indicate that labor and other costs of handling and weighing cotton could be substantially reduced through improved methods of operation, including temporary blocks, and through the use of improved handling and weighing equipment, including clamp trucks and mobile beam scales (104).

COMPRESSION OF COTTON

Cotton bales vary considerably in size, shape, and density. They include the square or flat gin bale, the standard-and high-density compressed bale, and, in earlier years, a relatively small number of round bales of high density. The square gin bale averages about 56 inches in length, 28 inches in width, and 45 inches in thickness; and the density averages about 12 pounds per cubic foot. The standard-density bale averages about 56 inches in length, 31 inches in width, and 22 inches in thickness, with the density averaging about 23 pounds per cubic foot. The high-density bale averages about 57 inches in length, 22 inches in width, and 21 inches in thickness, and the density averages about 32 pounds per cubic foot. These dimensions and densities vary considerably with the weight of the bale (107).

Most of the cotton crop in this country is put up at first in square gin bales and the charges for this service are included with those for ginning. Square bales are very bulky and, except in the Southeastern States where most of the cotton goes from gins directly to local mills, most of them are compressed to standard or high density to minimize costs of transportation and storage. In the 1937-38 season, for example, about 65 percent of the square bales were compressed to higher density and the proportion varied from about 10 percent in the Southeast to about 85 percent in the Mississippi Valley and the Southwest (106).

The proportions of cotton compressed to standard density and to high density vary considerably. In the 1937-38 season, for example, about 38 percent of the United States crop was compressed to standard density and the proportion by areas ranged from about 9 percent in the Southwest to about 69 percent in the Mississippi Valley. Almost all standard-density cotton was compressed from square gin bales. Proportions that were compressed to high density averaged about 62 percent for the United States and ranged from about 31 percent in the Mississippi Valley, to about 91 percent in the Southwest, where most of the cotton compressed was prepared for export. About 91 percent of the high-density cotton was compressed directly from the square bale and about 9 percent from standard-density bales (106).

CHARGES OR COSTS

Charges for compressing cotton in most instances are made on a per bale basis but in some instances they are based on actual weight. In the 1938-39 season, for example, charges for about four-fifths of the cotton were made on a per bale basis and about one-fifth were based on actual weights. Proportions differ widely from one State or area to another. In New Mexico, all, in Oklahoma almost all, and in Texas, California, and Tennessee considerable proportions of the charges were based on actual weight; whereas in Arizona, Florida, Georgia, Louisiana, Missouri, North Carolina, South Carolina, and Virginia all the charges were made on a per bale basis (106).

Rates charged for compression to high density usually are somewhat higher than those for standard density. In the 1950-51 season the United States average rate for standard density was \$1.17 per bale and the State averages ranged from \$1.00 per bale in Arkansas, Georgia, Missouri, South Carolina, and Tennessee to \$1.50 in New Mexico; whereas for high density the United States average rate was \$1.31 per bale and the averages by States ranged from \$1.00 in South Carolina to \$1.75 in New Mexico (table 8). United States average rates for standard-density compression increased from 62 cents per bale in 1939 to \$1.17 in 1950 and the rates for high-density compression increased from 77 cents in 1939 to \$1.31 in 1950.

During the 1937-38 season, almost a fourth of the cotton crop was compressed to standard density and about 40 percent to high density. With these proportions compressed at the rates charged during the 1950-51 season, total charges for compression would have amounted to the equivalent of about 82 cents a bale for the entire crop. Several other services, such as weighing, sampling, marking, insuring, reconditioning, and storing cotton are also performed by the compress industry. Of the total revenue of compress companies in 1932-33, for example, only about 30 percent was derived from compression of cotton, whereas 50 percent was obtained from storage and 20 percent from other services. It is apparent, therefore, that the extent to which compress charges can be reduced may be influenced considerably by efficiencies in the other services and the charges made for them.

MEANS OF REDUCING COSTS

Compression of cotton to greater density at the gins has been proposed as a means of reducing costs of compression. That would require more powerful equipment at the gins and this in turn would probably require increased volumes of ginning at individual gin plants to obtain the greatest benefits from the use of this equipment. The technological and economic feasibility of the use of the higher-density compresses at gins has been demonstrated. Savings likely to result from the installation and operation of such equipment are estimated at 30 to 50 cents per bale, depending upon the volume of ginnings per gin plant (107).

TABLE 8.—Average charges per bale for compressing cotton, by type of compression and by States, for specified years¹

State ²	Year beginning Aug.1—								
	1932	1935	1939	1945	1946	1947	1948	1949	1950
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Alabama.....	61	70	61	70	92	98	100	99	106
Arkansas.....	62	62	60	72	95	95	100	100	100
California.....	118	108	100	125	130	130	140	140	140
Georgia.....	60	60	50	70	100	100	100	100	100
Louisiana.....	68	75	61	78	95	96	102	103	107
Mississippi.....	61	62	60	74	95	95	100	101	101
Missouri.....	61	57	60	74	95	95	100	100	100
New Mexico.....	67	67	76	92	125	125	138	150	150
Oklahoma.....	66	60	76	78	99	100	120	125	125
South Carolina.....	60	75	50	75	93	93	95	100	100
Tennessee.....	62	60	60	74	95	95	100	100	100
Texas.....	68	62	76	92	100	101	122	128	131
United States.....	63	64	62	75	97	98	104	107	117

HIGH DENSITY

Alabama.....	70	75	70	95	100	100	100	102	113
Arkansas.....	75	75	75	88	115	115	125	125	125
California.....	108	103	100	125	130	130	140	140	150
Georgia.....	75	75	65	88	100	100	100	100	115
Louisiana.....	75	75	68	87	108	108	118	118	114
Mississippi.....	75	75	75	88	115	115	125	126	126
Missouri.....		75	75	88	115	115	125	125	125
New Mexico.....	75	79	79	97	125	150	150	175	175
Oklahoma.....	75	60	76	91	100	100	121	125	125
South Carolina.....	75	75	65	83	99	102	105	102	100
Tennessee.....	75	75	75	88	115	115	125	125	125
Texas.....	72	68	76	92	100	103	123	128	132
United States.....	74	72	77	93	106	110	125	129	131

¹ Based on published tariffs of major units of the public warehouse industry chiefly represented by those with compress facilities.

² Data were insufficient for reporting charges in Arizona, Florida, North Carolina, and Virginia.

Adapted from reports of Production and Marketing Administration, Cotton Branch.

STORAGE AND INSURANCE

Large quantities of cotton are held from the time they are ready for the market until they are needed by mills. Stocks of American cotton in the United States increased markedly during the late 1930's and from 1939 to 1943 they averaged considerably greater than the American crop. Although stocks have been greatly reduced in recent years, substantial quantities are held in

storage until they are needed by mills. Cotton in these stocks needs protection to avoid or minimize deterioration from weather and destruction by fire or other hazards. These services are performed by warehouses with or without compressing facilities.

CHARGES OR COSTS

Charges for storage and insurance vary considerably from year to year, from one State or region to another, and with the size of the bale (table 9). In the 1950-51 season, monthly charges for

TABLE 9.—Average monthly charges per bale for storing cotton, by States, for specified years¹

State ²	Year beginning Aug. 1—								
	1932	1935	1939	1945	1946	1947	1948	1949	1950
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Alabama.....	21	20	23	25	30	31	35	37	38
Arkansas.....	25	25	15	20	32	30	33	34	33
California.....	22	20	20	20	25	25	30	30	30
Georgia.....	20	20	22	25	30	30	35	35	40
Louisiana.....	25	18	20	22	30	30	31	32	31
Mississippi.....	25	25	10	22	31	30	33	33	33
Missouri.....	25	25	15	20	30	30	33	33	33
New Mexico.....	25	25	25	24	40	40	38	36	38
Oklahoma.....	15	15	15	24	31	30	40	40	45
South Carolina.....	26	25	25	28	33	32	35	38	35
Tennessee.....	25	25	15	20	30	30	33	33	33
Texas.....	24	23	23	26	33	32	36	36	37
United States ³	23	22	20	23	31	30	34	34	35

¹ Based on published tariffs of major units of the public cotton warehouse industry chiefly represented by those with compress facilities.

² Data were insufficient for reporting rates in Arizona, Florida, North Carolina, and Virginia.

³ Each season from three-fifths to three-fourths of all major storage companies included insurance in the storage charge.

Adapted from reports of Production and Marketing Administration, Cotton Branch.

uncompressed cotton or for compressed cotton for which no differential was provided averaged 35 cents per bale per month for the United States. Averages by States ranged from 30 cents in California to 45 cents in Oklahoma. Average charges for the United States increased from 20 cents in 1939 to 35 cents in 1950 but this increase was proportionately less than the advance in cotton prices.

Because of the differences in space required, the rates charged by most compresses are lower for compressed than for uncompressed bales. In the 1938-39 season, for example, about 17 percent of the compresses charged lower rates for compressed than for square bales and the charges made by these compresses averaged 17 cents a bale for compressed and 24 cents for uncom-

pressed cotton. Compress establishments that do not provide differential rates usually compress all cotton upon arrival or they reserve the right to compress the cotton in the event of a shortage of storage space (106).

The carry-over of American cotton during the late 1930's and early 1940's exceeded annual production or consumption and most of the cotton crop usually is ready for market during the first half of the crop year. Under such conditions the quantity of cotton ready for storage during the year averages considerably more than the crop. Although the carry-over was greatly reduced during the immediate postwar period, in 1950 it amounted to slightly less than the crop. During the 1950-51 season, it was less than two-thirds of mill consumption. The quantity of cotton ready for storage during that season averaged somewhat less than the 1950 crop. If this cotton were all stored and insured until needed by mills at the average monthly rate of 35 cents a bale, storage and insurance charges would have averaged about \$3.90 per bale for the 1950 crop. All cotton may not have been stored and insured all the time, but losses from not doing so probably about equaled the storage and insurance charges made by commercial warehouses.

MEANS OF REDUCING COSTS

Charges for storage and insurance may be reduced by one or more of several means. Storage space may be more efficiently utilized by compressing the cotton before it is stored. Data on average storage rates per bale in 1938-39 indicate that storage costs could be reduced by as much as 25 percent by compressing the cotton beforehand. In some instances, rates may be reduced considerably by increasing the length of the period of continuous storage. Avoidance of unnecessary changes may also minimize costs of handling. Substantial savings may result from the use of adequate machinery and equipment for handling, weighing, and stacking the cotton and a convenient system of arranging the cotton so that it can be shipped out with minimum handling (6, 55, 56, 104). As the services of storage and insurance are frequently rendered in connection with related services, such as receiving, sampling, marking, and compressing, any economies in organization or in operation of the combined business would make possible a reduction in charges for storage and insurance. The use of any excess storage space for other commodities might also be considered.

TRANSPORTATION

Cotton shipped from interior compress points goes chiefly to ports, to domestic mills, and to interior concentration points. During the 1937-38 season, about 53 percent of this cotton went to ports, 41 percent to mill points, and 6 percent to interior concentration points. These proportions vary considerably for compress points in different areas. In the Southeast 89 percent of the shipments went to mill points and 11 percent to ports. For compresses in the Mississippi Valley, 13 percent of the shipments

went to interior concentration points, 58 percent to domestic mills, and 29 percent to ports. For those in the Southwest about 10 percent of the shipments went to domestic mills and 90 percent to ports (106).

Most of the shipments from compress points were made by rail. During the 1937-38 season and for the United States taken as a whole, about 96 percent of the shipments were made by rail, about 2 percent by motortruck, and about 2 percent by a combination of truck, rail, and water. Transportation by truck was confined mostly to shipments from the Southeast to domestic mill points. Combined rail and water transportation was confined mainly to movements from the Mississippi Valley to domestic mills.

Rail shipments vary considerably in weight per carload. In the 1937-38 season, most shipments to interior concentration points were less than carload lots. Shipments to mill points were mostly carloads of 50,000 pounds; this was the minimum required to obtain the lowest rate. But a substantial portion of the shipments from compresses in the Southeast to domestic mills was made in less than carload lots. Shipments to ports, particularly from the Southwest and the Mississippi Valley, were limited mainly to carloads of 65,000 pounds minimum which carried the lowest available rates to ports and for which high-density compression usually was required.

CHARGES OR COSTS

Charges for transporting cotton are based on fixed schedules of rates relating to size of load and to distance shipped. Rates vary directly with the weight per carload. The distances shipped vary with the area in which produced and with the destination of the cotton. Information as to freight revenues and values of cotton transported on class 1 steam railroads in the United States indicates that the cost of transportation averaged about \$1.80 per bale in 1939, \$2.55 in 1947, \$2.90 in 1949, and \$3.10 in 1950.⁵ The average range of haul for cotton shipped by rail probably was considerably greater than that for cotton shipped by truck, but the freight revenues reported by class 1 steam railroads do not include costs of trucking cotton to the railroads.

Indexes of rail freight rates decreased from 159 in 1929 (July 1935-June 1939 = 100) to 93 in 1932 and 1933, advanced somewhat during the late 1930's, remained fairly steady during World War II at slightly above the average for the base period, and increased markedly in the late 1940's. In 1950 the index of freight rates for cotton averaged 147 compared with an average of 133 for fresh fruits, 142 for fresh vegetables, and 151 for wheat (78).

MEANS OF REDUCING COSTS

Means of reducing transportation costs include lowering freight rates, reduction or elimination when feasible of cross and back

⁵ Class 1 railroads are those with total gross revenues of 1 million dollars or more annually. Revenues as reported by Interstate Commerce Commission, Commodity Statistics, Annual Statements.

hauls, loading cars to capacity to obtain minimum rates, use of through-rate privileges whenever possible, and substitution of other transportation for rail when charges are lower. Data presented in a report issued by the Interstate Commerce Commission on gross freight carload revenues and on fully distributed costs for cotton show that the ratio of freight revenues from cotton to fully distributed costs, including losses and damages, passenger and less-than-carload deficits, and a 4-percent return to capital, was 132 percent in 1939 (92). It is apparent from these data that freight rates on cotton were relatively high in relation to distributed costs as indicated by this report. But factors other than distributed costs are important in determining the feasibility of reducing freight rates on cotton. Data on carload and less-than-carload rates on cotton from interior points to ports and to domestic mills indicate that less-than-carload rates vary up to 25 percent greater than carload rates.

FINANCING

Cotton merchants buy the large volumes of cotton sold by farm producers during the harvesting season and supply the demands of spinners for cotton throughout the year. This requires the financing of cotton from the time it is sold by the growers until it is needed by mills. Information as to the average length of time cotton is held is not complete, but the world carry-over of American cotton has ranged from more than the United States crop in the early 1940's to less than a fourth of the United States crop in the late 1940's. Most of the crop usually is sold by farm producers during the first half of the crop-year. The average quantity of cotton carried in stocks during the year may vary from somewhat more to considerably less than the size of the crop. The average length of time this cotton must be financed has ranged from considerably more to considerably less than 12 months.

CHARGES OR COSTS

Interest charges for financing the holding of cotton range from as low as 2 percent for the larger merchants to as much as 5 percent or more for the smaller local merchants who obtained funds from local bankers. In recent years substantial quantities of cotton have been carried as collateral for Commodity Credit Corporation loans to farm producers at an interest rate of about 3 percent. On the basis of an average interest rate of 4 percent, interest charges amounted on the average to about 15 cents a bale per month in the 1939-40 season, when farm prices averaged 9.09 cents a pound; to 53 cents in the 1947-48 season, when farm prices averaged 31.93 cents a pound; to about 48 cents in the 1949-50 season, when farm prices averaged 28.58 cents; and to about 67 cents in the 1950-51 season, when farm prices averaged 40.07 cents a pound. The length of time individual bales were financed ranged from a few to many months. Based on average financing periods of about 8, 10, and 7 months respectively, for the cotton consumed during the seasons, 1947-48, 1949-50, and 1950-51, the costs of financing this cotton during these seasons

are estimated at 0.89, 0.96, 0.95 cent a pound, respectively, compared with about 0.50 cent in the 1939-40 season.

MEANS OF REDUCING COSTS

As the cost of financing cotton is based on the interest rate charged, the value of the cotton, and the length of time financed, a decrease in interest rates, in value of cotton, or in length of time it is financed would reduce the costs of financing. Interest charges, particularly for the smaller local merchants, may be reduced by increasing the volume of business through combinations or other measures that will make possible the obtaining of money on terms comparable with those obtained by the larger merchants. The average length of time cotton is financed is influenced considerably by the size of the carry-over. The carry-over of 2,800,000 bales of American cotton on August 1, 1951, compared with 14,137,000 bales in 1939, was smaller than for any other recent year. It may not be feasible to attempt to reduce the carry-over of American cotton much below that for 1951.

OTHER SERVICES

Other marketing services for which charges are made include classifying and assembling the cotton for sale in even running lots; risk bearing, including risks from price changes, from losses in weight, and from rejection for failure to meet quality specifications; and selling, the cost of which may be included under "overhead".

Cotton usually is classified as a basis for sale from one to several times, and it may be assembled more than once, during its passage through commercial channels. Merchants, particularly the large ones, usually hedge their market interests in spot cotton by offsetting transactions in futures markets, but all the risks from price changes may not be offset by this means (33). The general practice is for buyers to make deductions for any failure of the cotton delivered to meet specifications as to weight and quality and usually no credit is allowed for overweight or for qualities above specifications.

Selling and incidental services involve selling commissions and several other items grouped under overhead costs, such as salaries and bonuses, traveling expenses, telephone and telegraph expenses, rents and taxes, supplies and stationery, interest and depreciation, membership dues and fees, and legal and other professional services. In addition to these and other merchandising costs already listed, cotton merchants normally include in their charges a margin for their profits.

CHARGES OR COSTS

Data relating to charges or costs for these other services in cotton marketing are incomplete. Calculated costs of shipping cotton from Texas points to southeastern mill points show that, during the 1944-45 season, commissions for interior buyers averaged 50 cents a bale, selling commissions 50 cents, charges for bank commissions 37 cents, and futures brokerage 15 cents (15). The merchant's remuneration for overhead and profits was listed

at \$2 a bale, of which 50 cents went for allowance for losses from the failure of cotton to meet weight specifications and from rejection for failure to meet quality specifications. Similar data for more recent years are not available but, in light of the fact that charges for ginning, receiving, compression, and storage have increased substantially since 1945, it would appear reasonable to suppose that charges or costs for these other services have also increased markedly.

MEANS OF REDUCING COSTS

The merchandising of raw cotton appears to be a highly competitive business. The possibilities of bringing about any substantial reductions in costs of the marketing services, without changing marketing methods and practices, may be limited. Much of the cotton is sold by growers on the basis of an inspection of samples taken from the bales at the local gin, cotton yard, or warehouse. In recent years, increased quantities of the cotton are sold in local markets on description on the basis of Government classification. The number of buyers in local markets ranges from one in some markets to a dozen or more in others. In many instances, sales necessitate resampling and reclassification for each change or proposed change of ownership. This repetition of services results in waste of cotton and increases in costs of marketing.

Apparently the marketing procedure could be simplified and the costs of the services reduced if cotton were sold on description throughout the marketing system on the basis of a dependable classification. Such a classification would require that the sample used be truly representative of the quality or qualities of the cotton in the bale and that it be correctly identified with the bale from which it was drawn; that the classifications be in accordance with uniform standards upon the basis of which the quality of cotton can be described for commercial purposes with a reasonable degree of accuracy; that the classifications be made by competent and reliable classifiers under conditions conducive to accurate classification; and that facilities be provided for assembling the sample, recording the classifications on convenient forms, and for making the information available in time for its use in selling the cotton (32).

All of these requirements are not likely to be met within the immediate future. But in recent years progress has been made toward the development of means of obtaining representative samples (27) and toward the permanent identification of bales (105). Official standards for grade and staple lengths have long been established and in general use, but lack of standards for the quality elements included under the term "character" limit the dependability and the usefulness of classifications based on official standards. The use of standards and classifications in marketing cotton has been expanded considerably and further progress is anticipated. Maximum contributions of these developments toward increasing the efficiency and reducing the costs of marketing would require a combination of these with other improvements in marketing methods and practices.

A principal limitation to further improvements in the marketing of cotton relates to the small volume of cotton handled in many local markets. In many instances the volume handled is so small that it is not feasible to develop facilities that are adequate for rendering efficiently such services as classification, assembling, compression, and storage. Apparently the marketing services could be improved and their costs per unit reduced by reorganizing and integrating cotton markets so the volumes handled would be adequate to make possible the effective use of modern facilities and equipment in rendering efficiently the essential marketing services. In addition, adjustments in the quality of cotton produced in accordance with mill requirements would facilitate improvements in marketing. Such adjustments might require further development in the measurement and standardization of the quality elements in cotton, in classification services available to growers, and in market news so that prices to growers would reflect, at least fairly accurately, the qualities of the cotton produced.

IMPORTANCE OF REDUCTIONS IN COSTS

Estimated charges or costs for the services involved in taking cotton from farms and delivering it to mills as desired have increased markedly in recent years, but the proportions of total costs to mills accounted for by these charges or costs have been substantially less in recent years than they were in 1939 (table 10). Although charges for ginning and baling increased from an average of about 0.8 cent a pound of lint in 1939 to 2 cents in 1950, the proportion of the average price to mills accounted for by these charges decreased from about 7 percent in 1939 to less than 5 percent in 1947 and 1950. Estimated margins for merchandising cotton increased from about 2.3 cents a pound in 1939 to about 3.7 cents in 1949 and in 1950, but the proportion of prices to mills accounted for by these margins decreased from about 20 percent in 1939 to less than 10 percent in 1950.

The relative importance of reductions in costs of ginning and baling and in merchandising cotton are apparent when it is understood that if charges for these services during the season 1950-51, for example, had been reduced by 10 percent, the reduction would have amounted to about 0.6 cent a pound, or about 1.5 percent of returns to growers for farm production and 0.02 percent of costs to consumers for the finished apparel and household goods made of cotton. Similar reductions in charges for ginning and baling would have amounted to about 0.2 cent a pound, or about 0.5 percent of returns to growers for farm production and 0.007 percent of costs to consumers of the finished apparel and household goods. Reductions of 10 percent in the merchandiser's margin would have amounted to about 0.37 cent a pound, or about 1 percent of returns to growers for farm production and 0.013 percent of costs to consumers of the finished apparel and household goods.

TABLE 10.—Approximate average gross margins per pound and proportion of total cost of producing and marketing American cotton, by items, for specified years

Item	Year beginning August—			
	1939	1947	1949	1950
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Farm production ¹	8.27	30.26	26.66	38.07
Ginning and bailing ².....	.82	1.57	1.92	2.00
Farm price.....	9.09	31.93	28.58	40.07
Receiving and related services ³.....	.05	.10	.13	.13
Compressing ³.....	.09	.14	.16	.17
Storage and insurance ⁴.....	.60	.51	.70	.46
Transportation ⁵.....	.36	.55	.61	.63
Financing ⁶.....	.50	.89	.96	.95
All other ⁷.....	.71	1.13	1.21	1.36
Total merchandising margins.....	2.31	3.32	3.77	3.70
Average cost to mill.....	11.40	35.25	32.35	43.77
	Proportion of cost to mill			
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Farm production ¹	72.5	86.1	82.4	86.9
Ginning and bailing ²	7.2	4.5	5.9	4.6
Farm price.....	79.7	90.6	88.3	91.5
Receiving and related services ³.....	.4	.3	.4	.3
Compressing ³.....	.8	.4	.5	.4
Storage and insurance ⁴	5.3	1.4	2.2	1.1
Transportation ⁵	3.2	1.6	1.9	1.4
Financing ⁶	4.4	2.5	3.0	2.2
All other ⁷	6.2	3.2	3.7	3.1
Total merchandising margins.....	20.3	9.4	11.7	8.5
Average cost to mill.....	100.0	100.0	100.0	100.0

¹ Includes hauling to gin.

² Based on data published by U.S. Department of Agriculture. Charges attributed to lint equal the charges for bagging and ties plus a pro rata share of other ginning charges based on the relative farm value of lint to seed.

³ Based on information reported by Production and Marketing Administrator.

⁴ Monthly rates from reports of Production and Marketing Administration multiplied by average number of months of storage per bale consumed.

⁵ Based on data reported by U.S. Department of Agriculture and Interstate Commerce Commission.

⁶ Based on average value of the cotton, interest at 4 percent per year, and average number of months financed per bale consumed.

⁷ Estimated.

MARKETING MARGINS FOR WOOL.

The wool industry in the United States consists of two rather distinct divisions—apparel and carpet. Apparel wool includes the finer fibers used mainly in the manufacture of apparel yarns and fabrics. Carpet wool consists of the coarser fibers used mainly in the manufacture of carpets and rugs. All the wool produced in the United States is apparel wool and large quantities of apparel wool are imported over rather high tariff duties. In 1950 about 248 million pounds of wool were produced in the United States and 551 million pounds of apparel wool and 166 million pounds of carpet wool were imported (78). Production of wool in this country decreased from 455 million pounds in 1942 to about 248 million pounds in 1949 and 1950. From 1916 to 1950 imports of apparel wool averaged 589 million pounds actual weight a year and ranged from 348 million pounds in 1949 to 924 million pounds in 1946. Carpet wool is admitted into this country free of duty and from 1916 to 1950 imports of this wool averaged 120 million pounds a year and ranged from 86 million pounds in 1949 to 166 million pounds in 1950.

Most of the wool produced in the United States is obtained by shearing live sheep and is known as "shorn wool." A considerable quantity is obtained by pulling the wool from skins of slaughtered sheep. This is known as "pulled wool." Very small quantities are obtained by detaching the wool from carcasses of sheep which have died on the range or farm; this is known as "dead" or "murrain" wool. During the 5 years 1946-50 about 84 percent of the total production of wool in the United States was shorn wool and about 16 percent was pulled wool.

Production of shorn and pulled wool is widely distributed over the United States. Every State produces some shorn wool. In 1950, production of shorn wool varied from a few thousand pounds in some States to about 53 million pounds in Texas. The 10 largest wool-producing States that year, listed in order, were Texas, Wyoming, California, Montana, Utah, Colorado, New Mexico, Idaho, Missouri, and Ohio. Production in these 10 States made up about 76 percent of the total for the United States in 1950. Pulled wool is produced mainly in large slaughtering and meat-packing plants at such centers as Chicago, San Francisco, New York, and Philadelphia. But considerable quantities are produced in independent wool pulleries located in various parts of the country. Reports indicate that in 1950 about 15 wool pulleries, independent of major slaughtering and meat-packing plants were located in 11 States, ranging from Massachusetts to California.⁶

METHODS AND PRACTICES

Marketing wool in the United States involves the handling of domestic shorn wool, domestic pulled wool, and foreign shorn and pulled wools. The combined total handled annually decreased from 1,392 million pounds in 1916 to 687 million pounds in 1949,

⁶ Data assembled by Bureau of Agricultural Economics.

and in 1950 it amounted to 1,069 million pounds (78). From 1946 to 1950, on the average, domestic shorn wool constituted 24 percent, domestic pulled wool about 5 percent, imported apparel wool 58 percent, and imported carpet wool 13 percent of the total wool handled by the wool trade (78). These proportions vary considerably from one year to another as a result of changes in domestic production and in imports.

Most of the domestic clip is shorn from February to July, inclusive, and usually a majority of the farm producers sell their wool at or soon after shearing time; hence, the greater proportion of shorn wool produced in the United States is sold by producers in the spring and summer. Data relating to farmer marketings indicate that in 1950 about two-thirds of the total clip was sold by farm producers from April to July, inclusive.⁷ But practices with regard to time of selling vary considerably. In all years some, and in some years a considerable quantity, of the wool is sold by growers well in advance of shearing. But in all years some, and in some years considerable proportions, of the clip is consigned by producers to dealers or to growers' cooperative associations and may not be sold for several months or for one or more years.

Selling wool on the sheep's back in advance of shearing is known as contracting. The contracts specify the tonnage to be delivered and the prices to be paid. These contracts are made in terms of prices of grease wool and, as it is difficult to estimate accurately the shrinkage of wool before it is sheared, considerable risks from shrinkage as well as from changes in price are involved. Therefore, buyers are necessarily conservative in the prices they offer. The volume of contracting varies considerably with the market situation and outlook. Demand for contracts is usually strongest and volume of sales greatest in the fall and winter following marketing seasons in which prices of wool advanced (26). In most years large quantities of wool in Texas are contracted. This form of sale accounted for about 25 percent of the Texas clip in 1949 and for a larger proportion in 1950.

In selling wool after it is shorn, marketing practices vary considerably from one area to another with differences in the size of individual clips and in other factors. In the territory or range States, where clips run large, most of the wool is sold at the ranch by the producer to agents or traveling buyers for central market dealers, more particularly those in Boston. When possible, these buyers inspect the clips at the shearing shed or warehouse during the shearing season as a basis for estimating shrinkage and quality, but when this inspection is not feasible, the wool is examined in the barn on the grower's ranch or is bought on the basis of knowledge of previous clips of the same producer. Some brokers with purchase orders from Eastern merchants or mills go west to buy specified quantities of specified types of wool to meet spe-

⁷ Estimate of Bureau of Agricultural Economics.

⁸ The loss in weight of raw wool when scoured or carbonized ranges from less than 40 to more than 60 percent.

cial requirements. Such buyers charge a brokerage of one-half cent to 1 cent per pound for purchasing.

In the farm or fleece-wool States, where clips usually are small, most of the wool is sold at the farm to country dealers who assemble the lots and either sell them to merchants or store them in their own warehouses. Many merchants in the larger cities, who specialize in wool and other products, buy the wool from country buyers and resell it to wool merchants in central markets such as Boston, Philadelphia, St. Louis, and Chicago as well as directly to mills (100). In many instances, wool is ungraded but in others it is roughly graded in three classes as fine, medium, and rejects. Central market dealers send their agents to small towns or to farmer-owned warehouses to buy the wool suited to their needs. The wool purchased is shipped to the larger concentration points where it is graded on the basis of mill requirements and sold to manufacturers (100).

The volume of wool consigned to dealers usually is greatest in years when prices at shearing time are relatively low, as the low prices lead growers to anticipate higher prices later (26). Such prices induce many growers in the territory States and in Texas, and many local buyers in the fleece-wool States, to carry substantial quantities of wool in storage in anticipation of higher prices. But the smaller producers in the fleece-wool States, other than members of cooperative associations and pools, usually sell their clip at shearing time regardless of price level. Growers who belong to cooperative associations usually consign their entire clip to the association each year during the life of the contract. The proportion of the United States production of shorn wool marketed cooperatively from 1930 to 1951, ranged from about 8 percent in 1939 to about 33 percent in 1930 and averaged about 22 percent during the 6 years, 1916-51.⁹

Some of the wool is bought directly from growers or country dealers by top makers and manufacturers. Such purchases, which constitute from 5 to 10 percent of the total clip, usually are made by sending buyers into the producing areas. Most direct buying by distant consumers occurs in Texas because of the uniformity of Texas wool, the high concentration of large production within limited areas, and the convenience of inspection of wool assembled at well-organized warehouses. Considerable direct buying by manufacturing consumers occurs in fleece-wool States partly because of the proximity of the supplies to consuming centers and partly because grease prices of fleece wool tend to be fairly uniform and to be fairly definitely established and are generally known within the limited areas so that purchases can be made with relative safety from a competitive standpoint.

In Texas, usually a large part of the wool is shipped to warehousemen for sale but some buyers go to ranches and buy directly from producers (10). Warehouses in Texas provide centers or facilities for concentrating wool in volumes large enough for efficient handling. The regular storage space of individual ware-

⁹ Data on quantity of wool handled by cooperative associations were supplied by Walter L. Hodde, Farm Credit Administration.

houses ranges from less than 200,000 pounds to more than 8 million pounds. In 1950, the regular storage space for the more than 100 warehouses in Texas combined totaled about 180 million pounds, or more than twice the quantity of wool produced in the State that year (10). In addition to providing storage, insurance, financing, and selling services, these warehouses prepare the wool by packing it in regular bags which weigh when filled from 140 to 250 pounds; weigh, mark, and stack these bags in storage; display sample bags for the inspection of buyers; and grade some of the wool as a basis for sale. Only about 7 percent of Texas wool is graded before it is sold. About a third of this amount is graded at shearing pens and the remainder is graded after it enters the warehouses (10). Usually a charge of 1 cent a pound is made to growers for such warehouse grading service (10).

The more common method of selling wool in Texas is by private treaty. Some warehouses use sealed-bid sales in conjunction with the private treaty methods but none uses the sealed-bid sales exclusively. More than a fourth of the warehouse operators buy some wool directly from producers who have small clips. A few warehouse operators buy, independently or on order, large quantities of wool each year. One independent buyer is reported to have handled on the average 10 percent of the Texas wool produced from 1920 to 1950 and in one year he handled about half of all Texas wool. Some of the clips were bought outright; others were handled on consignment (10).

Buyers in Texas include independents, representatives of eastern dealers and brokers, order buyers, and mill buyers. Of the estimated total of 80 buyers in Texas in 1950, about 30 were independent and at least 50 were representatives of dealers and brokers, order buyers, and mill buyers. Few permanent representatives of eastern dealers and brokers reside in Texas. Order buyers, who make up the largest number of wool buyers in the State buy on order from eastern firms, usually charging 1 cent per pound commission for their services. Independent buyers usually purchase wool from producers and sell it to any one who makes them a satisfactory offer (10).

Most of the wool produced in the United States, as well as that imported for consumption, is handled by dealers in central markets. Most of these dealers are in Boston. More than 350 wool dealers in Boston are listed in Davison's Textile Blue Book for 1951 and in 1950 about 78 of them were members of the National Wool Trade Association. These dealers vary greatly in size of organization and in kind and volume of wool handled. The wool is purchased by traveling buyers or through resident agents of dealers. It has been estimated that about 80 percent of the clip is handled by central market dealers, about 20 percent on consignment, and about 60 percent on outright purchase (26). Almost half of the outright purchases are made against orders in hand from consumers or on a quick turn-over basis. About a third of the clip usually is bought by dealers on their own account for holding until it is needed by consumers.

Domestic pulled wool usually is sold by packers, through their

Boston offices, direct to consumers. Offers and sales are based on small samples; a 2-pound sample represents 20,000 pounds of wool. If it is not equal in quality to the sample tendered at time of purchase the wool may be rejected. Some pulleries sell direct from their plant to consumers through traveling salesmen or by correspondence and others sell through commission agents in Boston.

Commercial grades of wool are based primarily on the fineness, or diameter, of the fibers. They may be designated either by the blood or American system or by the numerical or English system. Before World War I, small quantities of wool were graded as a basis for selling by the growers but during the 1920's and 1930's increased quantities of the wool handled in pools or on consignment were sold on the basis of grade. Strong Government support during the late 1940's and recognition that the selling of ungraded wool works to the disadvantage of farm producers have encouraged further developments in the grading of wool as a basis for selling it (100).

Wool is usually graded at warehouses located at concentration points such as Boston, Philadelphia, Chicago, St. Louis, and other cities in the Midwest and South, and in the west coast cities of Portland and San Francisco. Increasing quantities of wool are bought in original bags by large mills, mainly from a few range States in which clips are sufficiently uniform for marketing purposes without grading. Some dealers, in buying large quantities of ungraded wool directly from ranches, send out graders to grade the wool at the shearing pens. Samples of the graded wool may be sent to prospective customers for use as a basis for selling the wool before it is shipped or while in transit, thereby saving the expense of warehousing (100).

CHARGES OR COSTS

Data relating to prices of wool at Boston, to deductions for merchandising services, and to farm prices of wool supply a basis for indicating the margins or costs for merchandising wool. Information available for recent years relate mainly to wool handled by the Commodity Credit Corporation and by cooperative associations. A large part of the 1946 domestic clip was handled by the Commodity Credit Corporation and data relating to prices at Boston, to farm prices, and to deductions for merchandising services for this wool are fairly complete.

Data relating to 105,699,000 pounds of grease wool of fine and half-blood grades purchased by the Commodity Credit Corporation in original bags during 1946 show that shrinkage averaged 59.1 percent, the Boston price averaged 47.03 cents a pound, prices to growers averaged 41.31 cents, and merchandising margins averaged 5.69 cents a pound, or about 12 percent of the Boston price (table 11). Average shrinkage ranged from less than 56 percent for wool produced in some States to more than 66 percent for wool produced in other States. Boston prices of grease wool vary considerably with shrinkage and with quality of the wool. In 1946 they ranged from an average of 40 cents a pound or below for wool produced in Illinois, Kansas, and Missouri to more than 50

cents a pound for wool produced in Montana, North Dakota, and South Dakota. Total charges for merchandising services ranged from an average of 5.16 cents a pound, or about 12 percent of the Boston price, for wool produced in Wyoming to 7.03 cents a pound, or about 16 percent of the Boston price for wool produced in Oklahoma.

Merchandising margins for wool include all items of cost incident to taking the product from the ranch or farm and delivering it to the manufacturer. Services rendered include assembling, storing, transporting, handling, grading, appraisal, financing, insurance, et cetera. Usually scouring and other processing are not included in these services. Data concerning costs of rendering these services are not complete but information supplied by the Production and Marketing Administration relating to deductions made in arriving at average prices paid to farm producers of wool handled in connection with the 1946 wool-purchase program of the Commodity Credit Corporation indicate the amounts and relative importance of the items of expense included in merchandising margins. In arriving at these deductions, an attempt was made to approximate as closely as possible the actual costs of rendering the specific services required to take the wool from ranches or farms and deliver it to the Boston market, plus a reasonable profit for those rendering the services.

These data show that in 1946 primary handling charges for ungraded wool, including costs of insurance, showing or exhibiting wool to buyers, in and out handling, and profits, averaged 1.46 cents a pound, or about 26 percent of total merchandising margins and 3.1 percent of the Boston price (table 11). These charges ranged from 1.25 cents a pound for Texas wool to 1.75 cents a pound for wool produced in other States. Secondary handling charges, including payments for collecting the wool from farmers and putting it in bags, which were sometimes furnished by the handler, averaged 0.69 cent a pound for the United States and ranged from no charges in a few States to 2.25 cents a pound in most States. Charges for service and appraisal, including estimating shrinkage, storage for about 7 months, and interest at the rate of 3 percent per annum on the investment, averaged 1.125 cents a pound on wool from each of the States. Freight and trucking charges averaged 2.41 cents a pound for the United States, or about 42 percent of total merchandising margins and 5.1 percent of the Boston price. These charges ranged from an average of less than 1 cent a pound for wool from some States to more than 2.5 cents a pound for wool from other States (table 11).

Data relating to 169,441,000 pounds of graded wool purchased in the grease by the Commodity Credit Corporation in 1946 show that shrinkage averaged 53.3 percent, the Boston price averaged 50.05 cents a pound, prices to growers averaged 43.21 cents, and merchandising margins averaged 6.84 cents a pound, or about 16 percent of the Boston prices (table 12). Average shrinkage by States ranged from less than 42 percent in Arkansas, Kentucky, and some other States to more than 71 percent in New Mexico. Boston prices, which varied with shrinkage and with the quality

TABLE 11.—Volume, shrinkage, average prices per pound at Boston and to growers, and merchandising margins for grease wool purchased in original bags by Commodity Credit Corporation, by States, 1946 clip

State	Total volume handled	Shrinkage	Prices		Merchandising margins				
			At Boston	To growers	Total charges	Handling		Service and appraisal	Freight and trucking
						Primary	Secondary ¹		
	1,000 pounds	Percent	Cents	Cents	Cents	Cents	Cents	Cents	Cents
United States.....	105,699	59.1	47.03	41.34	5.689	1.46	0.69	1.125	2.414
Arizona.....	1,246	61.5	45.13	38.93	6.197	1.75	.75	1.125	2.572
Arkansas.....					6.791	1.75	2.25	1.125	1.666
California.....	8,986	59.1	47.21	40.26	6.947	1.75	1.50	1.125	2.572
Colorado.....	1,670	63.4	42.32	36.96	5.365	1.75		1.125	2.490
Idaho.....	216	62.7	43.37	37.92	5.447	1.75		1.125	2.572
Illinois.....	249	66.9	37.03	30.43	6.595	1.75	2.25	1.125	1.470
Indiana.....	4	60.0	45.82	39.37	6.451	1.75	2.25	1.125	1.326
Iowa.....	124	63.3	41.29	34.79	6.502	1.75	2.25	1.125	1.377
Kansas.....	198	65.2	39.32	32.48	6.842	1.75	2.25	1.125	1.717
Kentucky.....					6.450	1.75	2.25	1.125	1.325
Michigan.....	15	60.5	44.24	37.75	6.492	1.75	2.25	1.125	1.367
Minnesota.....					6.719	1.75	2.25	1.125	1.594
Missouri.....	178	67.2	36.86	30.31	6.554	1.75	2.25	1.125	1.429
Montana.....	5,802	57.3	50.60	45.20	5.896	1.75		1.125	2.521
Nebraska.....	179	63.3	41.92	34.96	6.955	1.75	2.25	1.125	1.830
Nevada.....	3,607	59.6	47.40	41.95	5.447	1.75		1.125	2.572
New Mexico.....	8,816	63.6	40.87	34.81	6.063	1.75	.75	1.125	2.438
New York.....	1	54.0	53.36	47.35	6.008	1.75	2.25	1.125	.883
North Dakota.....	132	55.8	52.33	46.09	6.236	1.75	1.50	1.125	1.861
Ohio.....	5	65.0	39.20	32.86	6.337	1.75	2.25	1.125	1.212
Oklahoma.....	2	62.0	43.57	36.54	7.028	1.75	2.25	1.125	1.903
Oregon.....	1,538	62.8	43.53	36.58	6.947	1.75	1.50	1.125	2.572
Pennsylvania.....	1	58.8	45.46	39.28	6.183	1.75	2.25	1.125	1.058

South Dakota.....	895	56.1	51.39	45.17	6.225	1.75	1.50	1.125	1.850
Tennessee.....	(²)	59.1	44.74	38.14	6.600	1.75	2.25	1.125	1.475
Texas.....	60,523	57.3	48.69	43.18	5.512	1.25	.75	1.125	2.387
Utah.....	3,188	64.2	41.87	36.47	5.396	1.75	-----	1.125	2.521
Virginia.....	2	57.1	46.73	40.45	6.276	1.75	2.25	1.125	1.151
Washington.....	287	63.0	42.93	36.98	5.947	1.75	.50	1.125	2.572
West Virginia.....					6.296	1.75	2.25	1.125	1.171
Wisconsin.....					6.440	1.75	2.25	1.125	1.315
Wyoming.....	7,653	63.7	42.83	37.67	5.159	1.75	-----	1.125	2.284
Louisiana and Mississippi.....	(²)	56.0	46.71	39.96	6.750	1.75	2.25	1.125	1.625
Maine, Massachusetts, New Hampshire, New Jersey, and Vermont.....	(²)	45.3	57.20	51.45	5.750	1.75	2.25	1.125	.625
Maryland and North Carolina.....	2	51.6	47.98	41.63	6.350	1.75	2.25	1.125	1.225
State of origin unknown:									
Fleece type.....	35	68.7	35.48	28.73	6.750	1.75	2.25	1.125	1.625
Territory type.....	145	62.6	45.66	39.31	6.350	1.75	1.00	1.125	2.475
Alaska.....					8.563	1.75	2.25	1.125	3.438
Hawaii.....					7.749	1.75	2.25	1.125	2.624

¹ Includes country service.

² Less than 500 pounds.

Adapted from data contained in a report on The Domestic Wool Clip Grades, Shrinkage, and Related Data Based on Pur-

chases from the 1946 Clip by the Commodity Credit Corporation prepared by, and from data on merchandising margins supplied by, the Livestock Branch, Production and Marketing Administration (96).

TABLE 12.—Volume, shrinkage, average prices per pound at Boston and to growers, and merchandising margins for graded wool purchased in the grease by Commodity Credit Corporation, by States, 1946 clip

State	Total volume handled	Shrinkage	Prices		Total charges	Merchandising margins				
			At Boston	To growers		Handling		Grading charge	Service and appraisal	Freight and trucking
						Primary	Secondary ¹			
	1,000 pounds	Percent	Cents	Cents	Cents	Cents	Cents	Cents	Cents	
United States.....	169,441	53.3	50.05	43.21	6.846	1.73	1.24	0.75	1.125	2.001
Arizona.....	279	59.3	42.13	35.18	6.947	1.75	.75	.75	1.125	2.572
Arkansas.....	108	41.1	56.73	49.19	7.541	1.75	2.25	.75	1.125	1.666
California.....	6,817	50.1	51.25	46.55	7.697	1.75	1.50	.75	1.125	2.572
Colorado.....	11,936	58.3	46.44	40.32	6.115	1.75	.....	.75	1.125	2.490
Idaho.....	9,633	52.9	49.64	43.44	6.197	1.75	.....	.75	1.125	2.572
Illinois.....	2,191	45.5	52.66	45.32	7.345	1.75	2.25	.75	1.125	1.470
Indiana.....	3,443	44.7	53.39	46.19	7.201	1.75	2.25	.75	1.125	1.326
Iowa.....	5,972	48.7	50.34	43.09	7.252	1.75	2.25	.75	1.125	1.377
Kansas.....	456	58.6	42.77	35.18	7.592	1.75	2.25	.75	1.125	1.717
Kentucky.....	4,514	41.8	57.15	49.95	7.200	1.75	2.25	.75	1.125	1.325
Michigan.....	3,840	48.6	64.02	56.78	7.242	1.75	2.25	.75	1.125	1.367
Minnesota.....	7,566	46.7	53.02	45.55	7.469	1.75	2.25	.75	1.125	1.594
Missouri.....	4,646	48.2	51.50	44.20	7.304	1.75	2.25	.75	1.125	1.429
Montana.....	13,601	58.0	47.78	41.63	6.146	1.75	.....	.75	1.125	2.521
Nebraska.....	506	54.9	45.80	38.10	7.705	1.75	2.25	.75	1.125	1.830
Nevada.....	551	58.1	44.88	38.68	6.197	1.75	.....	.75	1.125	2.572
New Mexico.....	1,184	71.2	39.91	33.10	6.813	1.75	.75	.75	1.125	2.438
New York.....	1,094	48.5	53.08	46.32	6.758	1.75	2.25	.75	1.125	.883
North Dakota.....	3,529	53.5	48.12	41.13	6.986	1.75	1.50	.75	1.125	1.861
Ohio.....	10,569	51.3	51.89	44.80	7.087	1.75	2.25	.75	1.125	1.212
Oklahoma.....	671	60.8	41.57	33.79	7.778	1.75	2.25	.75	1.125	1.903
Oregon.....	5,067	48.2	52.51	44.81	7.697	1.75	1.50	.75	1.125	2.572
Pennsylvania.....	1,763	52.4	52.37	45.44	6.933	1.75	2.25	.75	1.125	1.058
South Dakota.....	10,152	52.7	52.23	45.25	6.975	1.75	1.50	.75	1.125	1.850

Tennessee.....	350	46.1	51.77	44.42	7.350	1.75	2.25	.75	1.125	1.475
Texas.....	7,394	57.3	51.95	45.69	6,262	1.25	.75	.75	1.125	2.387
Utah.....	7,020	58.8	45.73	39.58	6,146	1.75	-----	.75	1.125	2.521
Virginia.....	1,974	40.1	58.62	51.59	7,026	1.75	2.25	.75	1.125	1.151
Washington.....	1,935	58.8	44.85	38.15	6,697	1.75	.50	.75	1.125	2.572
West Virginia.....	994	44.5	57.03	49.98	7,046	1.75	2.25	.75	1.125	1.171
Wisconsin.....	1,807	45.7	53.79	46.60	7,190	1.75	2.25	.75	1.125	1.315
Wyoming.....	11,741	60.9	43.87	37.96	5,909	1.75	-----	.75	1.125	2.284
Louisiana and Mississippi.....	346	55.4	52.24	44.74	7,500	1.75	2.25	.75	1.125	1.625
Maine, Massachusetts, New Hampshire, New Jersey, and Vermont.....	11	39.5	59.92	53.42	6,500	1.75	2.25	.75	1.125	.625
Maryland and North Carolina.....	207	43.2	54.20	47.10	7,100	1.75	2.25	.75	1.125	1.225
State of origin unknown:										
Fleece type.....	15,286	50.3	49.33	41.83	7,500	1.75	2.25	.75	1.125	1.625
Territory type.....	10,214	58.0	46.70	39.60	7,100	1.75	1.00	.75	1.125	2.475
Alaska.....	17	42.1	54.99	45.68	9,313	1.75	2.25	.75	1.125	3.438
Hawaii.....	57	52.2	53.33	44.83	8,499	1.75	2.25	.75	1.125	2.624

¹ Includes country service.

Adapted from data contained in a report on The Domestic Wool Clip by Grades, Shrinkage, and Related Data Based on Purchases from the 1946 Clip by the Commodity Credit Corpora-

tion prepared by, and from data on merchandising margins supplied by, the Livestock Branch, Production and Marketing Administration (96).

of the wool, ranged from about 40 cents a pound for wool from New Mexico to about 64 cents a pound for wool from Michigan. Total charges for merchandising services ranged from an average of 5.91 cents a pound, or about 13 percent of the Boston price for wool from Wyoming to 7.78 cents a pound, or about 19 percent of the Boston price, for wool from Oklahoma.

Merchandising margins for graded wool in each State, as indicated by deductions made by the Commodity Credit Corporation for the 1946 clip, exceeded those for ungraded wool by the amount of the charges for grading, which were listed at 0.75 cent a pound (table 12). Grading charges averaged 11 percent of total merchandising margins and 1.5 percent of the Boston price. Boston prices for graded wool averaged somewhat higher than those for the ungraded product and charges for specific marketing services represent somewhat larger proportions of the Boston price for ungraded than for graded wool.

Data relating to 6,418,000 pounds of scoured wool purchased by the Commodity Credit Corporation in 1946 show that Boston prices averaged \$1.08 a pound, prices to growers averaged 80.96 cents, and merchandising margins averaged 27.08 cents, or 25 percent of the Boston price (table 13).

Boston prices of scoured wool vary considerably with quality of the wool. In 1946 they ranged from an average of about 91 cents a pound for wool produced in Kentucky to \$1.20 a pound for wool produced in New Mexico. Total charges for merchandising services ranged from an average of about 22.8 cents a pound, or 22.7 percent of the Boston price for wool from Texas, to about 28.9 cents a pound, or about 30 percent of the Boston price for wool from Oregon.

Primary handling charges for scoured wool, as indicated by deductions made by the Commodity Credit Corporation in 1946, averaged 1.8 cents a pound, or 1.1 percent of the Boston price. These charges were listed as 3 cents a pound for Texas wool and 5 cents a pound for wool from each of the other States. Secondary handling charges averaged 3.1 cents a pound, or about 3 percent of the Boston price, and ranged from no charge in some States to 5.5 cents a pound for wool from many of the States. Charges for scouring and carbonizing averaged 11 cents a pound, or about 10 percent of the Boston price. They amounted to 12 cents a pound for wool from California and 10 cents a pound for wool from each of the other States. Charges for service and appraisal were listed at 2.8 cents a pound for wool from each State, or about 2.6 percent of the average Boston price. Charges for freight and trucking averaged 5.08 cents a pound, or 1.7 percent of the Boston price, and ranged from less than 2 cents a pound for wool from New York to 5.59 cents for wool from a number of Western States.

Wool handled by the Commodity Credit Corporation decreased markedly after 1946. In 1950 no domestic wool was purchased by this Corporation in connection with price-support programs. Estimates made of the deductions that would have been required for the 1949 and 1950 clips, if it had been handled by the Commodity Credit Corporation, indicate that charges for merchandising serv-

ices would have averaged about 8 cents a pound, or about 13 percent of the Boston price, in 1919 and in 1950.

Data relating to prices and to costs of handling wool sold through cooperative wool-marketing associations show that, for territory wool, net marketing costs averaged 5.01 cents a pound of grease wool, or 11 percent of the gross selling price in 1916 and 6.21 cents a pound, or 14 percent of the gross selling price in 1917 (table 14). Net marketing costs for fleece wool averaged 5.93 cents a pound, or 11.5 percent of the gross selling price in 1916 and 6.95 cents, or 14 percent of the gross selling price in 1917. These costs varied considerably from one State to another as indicated by the data presented in table 11.

More than half of the net marketing costs for fleece wool and about 90 percent of those for territory wool were accounted for by Boston deductions in 1916 and 1917 (table 15). Freight, service and appraisal, and commissions for the National Wool Marketing Corporation are the principal items of expense included in Boston deductions, but grading, particularly for territory wool, is also an important item of expense. The principal items of cost included in local association expense for fleece wool include warehouse expense, promotion and field work, and salaries and wages. For territory wool, salaries and wages and promotion and field work are the main items of expense.

Data relating to grease wool, of the 1917 clip handled by warehouses in Kansas City and St. Louis, Mo., for the Midwest Wool Marketing Cooperative indicate that grading expense, salaries and wages, rents, and depreciation are the principal items of cost included in warehouse expenses (table 16). Grading and salaries and wages accounted for about 75 percent of the total warehouse expenses. Rents accounted for about 6 percent and depreciation on buildings accounted for about 4 percent. The other 15 percent is accounted for by a number of relatively small items.

Marketing charges per pound of grease wool vary somewhat with size and type of sale. Data for the 1914 clip of Wyoming wool show that total charges per pound of grease wool averaged 6.23 cents for wool sold in lots of less than 5,000 pounds, and 5.25 cents for wool sold in lots of 5,000 pounds or more (table 17). These charges also vary somewhat with the type of sale, ranging from 4.73 cents a pound for graded wool with no grading charges, sold in lots of 5,000 pounds or more, to 7.48 cents a pound for miscellaneous and off-sorts with grading and relatively high secondary handling charges, sold in lots of 5,000 pounds or more (table 17). Costs of marketing Wyoming wool from 1914 to 1917 averaged 5.11 cents a pound for grease wool (8).

Deductions made to cover costs of marketing services for Wyoming wool of the 1911 clip handled under the Commodity Credit Corporation purchase plan ranged from 5.1 cents a pound for fine wool to 6 cents for common and braid wool and averaged 5.3 cents a pound for all wool handled (table 18). The fact that all three-eighths and one-quarter blood wool must be graded and is subject to a grading charge, while much of the fine and one-half blood wool can be sold in original bags, may help to account for the differences in deductions shown.

TABLE 13.—Volume, average prices per pound at Boston and to growers, and merchandising margins for scoured wool purchased by Commodity Credit Corporation, by States, 1946 clip

State	Total volume handled	Prices		Merchandising margins					
		At Boston	To growers	Total charges	Handling		Scouring and carbonizing	Service and appraisal	Freight and trucking
					Primary	Secondary ¹			
	1,000 pounds	Dollars	Cents	Cents	Cents	Cents	Cents	Cents	Cents
United States.....	6,418	1.0798	80.90	27.08	4.8	3.4	11.0	2.8	5.08
Arizona.....	336	1.1928	94.09	25.19	5.0	1.8	10.0	2.8	5.59
Arkansas.....				26.88	5.0	5.5	10.0	2.8	3.58
California.....	3,182	1.0771	78.82	28.89	5.0	3.5	12.0	2.8	5.59
Colorado.....	24	1.1437	91.16	23.21	5.0		10.0	2.8	5.41
Idaho.....	34	1.0960	86.21	23.39	5.0		10.0	2.8	5.59
Illinois.....	57	1.1023	83.75	26.48	5.0	5.5	10.0	2.8	3.18
Indiana.....	55	1.1104	84.92	26.12	5.0	5.5	10.0	2.8	2.82
Iowa.....	154	1.0902	82.92	26.10	5.0	5.5	10.0	2.8	2.80
Kansas.....	37	1.1403	87.03	27.00	5.0	5.5	10.0	2.8	3.70
Kentucky.....	10	.9147	65.35	26.12	5.0	5.5	10.0	2.8	2.82
Michigan.....	16	1.0662	80.40	26.22	5.0	5.5	10.0	2.8	2.92
Minnesota.....	48	1.0638	79.67	26.71	5.0	5.5	10.0	2.8	3.41
Missouri.....	114	1.1101	84.66	26.35	5.0	5.5	10.0	2.8	3.05
Montana.....	65	1.0689	83.61	23.28	5.0		10.0	2.8	5.48
Nebraska.....	78	1.0769	80.25	27.44	5.0	5.5	10.0	2.8	3.94
Nevada.....				23.39	5.0		10.0	2.8	5.59
New Mexico.....	350	1.2044	95.54	24.90	5.0	1.8	10.0	2.8	5.30
New York.....	12	1.0454	79.40	25.14	5.0	5.5	10.0	2.8	1.84
North Dakota.....	60	1.0511	77.81	27.30	5.0	5.5	10.0	2.8	4.00
Ohio.....	39	1.0776	81.89	25.87	5.0	5.5	10.0	2.8	2.57
Oklahoma.....	11	1.1389	86.49	27.40	5.0	5.5	10.0	2.8	4.10
Oregon.....	92	.9419	65.30	28.89	5.0	5.5	10.0	2.8	5.59

Pennsylvania.....				24.80	5.0	5.5	10.0	2.8	1.50
South Dakota.....	226	1.0780	80.56	27.24	5.0	5.5	10.0	2.8	3.94
Tennessee.....				26.45	5.0	5.5	10.0	2.8	3.15
Texas.....	810	1.0040	77.62	22.78	3.0	1.8	10.0	2.8	5.18
Utah.....	11	1.0917	85.89	23.28	5.0		10.0	2.8	5.48
Virginia.....				25.73	5.0	5.5	10.0	2.8	2.43
Washington.....	140	1.0094	85.35	24.59	5.0	1.2	10.0	2.8	5.59
West Virginia.....	35	1.0511	79.33	25.78	5.0	5.5	10.0	2.8	2.48
Wisconsin.....	43	1.1105	84.95	26.10	5.0	5.5	10.0	2.8	2.80
Wyoming.....	14	1.1093	88.19	22.74	5.0		10.0	2.8	4.94
Louisiana and Mississippi.....	68	.9512	68.33	26.79	5.0	5.5	10.0	2.8	3.49
Maine, Massachusetts, New Hampshire, New Jersey, and Vermont.....				24.30	5.0	5.5	10.0	2.8	1.00
Maryland and North Carolina.....				25.68	5.0	5.5	10.0	2.8	2.38
State of origin unknown:									
Fleece type.....	225	1.0782	81.03	26.79	5.0	5.5	10.0	2.8	3.49
Territory type.....	42	1.1101	85.33	25.68	5.0	2.5	10.0	2.8	5.38
Alaska.....	17	.9899	68.17	30.82	5.0	5.5	10.0	2.8	7.52
Hawaii.....	13	1.0795	78.83	29.12	5.0	5.5	10.0	2.8	5.82

¹ Includes country service.

Adapted from data contained in a report on The Domestic Wool Clip by Grades, Shrinkage, and Related Data Based on Purchases from the 1946 Clip by the Commodity Credit Corpora-

tion prepared by, and from data on merchandising margins supplied by, the Livestock Branch, Production and Marketing Administration (96).

TABLE 14.—Quantity sold, prices and net marketing costs per 100 pounds of grease wool, handled by cooperative wool marketing associations, United States, 1945-47

Association	Quantity sold			Gross selling price			Net marketing cost		
	1945	1946	1947	1945	1946	1947	1945	1946	1947
	1,000 pounds	1,000 pounds	1,000 pounds	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Territory wool:									
Arizona	1,311	1,165	1,107	45.41	44.52	41.25	4.53	4.43	5.14
Eastern Idaho	780	1,245	2,127	49.51	50.16	47.68	5.03	5.40	6.99
Wyoming	4,278	5,056	6,020	45.37	43.69	45.32	5.07	5.06	6.06
Utah	4,101	3,984	4,365	42.95	41.39	45.17	4.92	4.92	6.56
Colorado	3,631	3,634	3,395	47.44	46.87	44.27	5.29	5.41	6.24
Western Idaho	1,005	662	642	48.83	50.93	48.74	5.22	5.20	5.96
New Mexico	3,380	2,908	2,451	39.49	39.24	36.75	5.73	5.02	6.59
Oregon-Washington	721	703	737	44.11	46.73	43.54	5.73	5.08	6.30
Colorado-New Mexico	2,052	1,925	1,812	43.39	43.60	42.56	5.55	5.11	6.97
Montana	6,607	4,959	3,382	50.47	48.25	52.68	5.17	4.73	5.48
Nevada	283	230	583	44.38	46.07	47.54		4.41	4.50
Total or average	28,152	26,471	26,621	45.83	45.21	45.35		5.01	6.21
Fleece wool:									
United	939	968	1,264	58.23	57.46	57.10	4.83	5.69	6.17
Midwest	3,334	2,547	3,035	43.42	43.35	43.78	4.76	4.68	8.49
Michigan	658	915	1,285	50.01	51.66	50.67	5.87	5.60	6.55
Oklahoma	636	514	393	42.09	39.48	40.59	5.67	6.48	7.64
Wisconsin	1,210	1,277	1,303	55.15	53.85	53.88	6.02	7.24	6.95
Illinois	206	145	208	50.37	51.08	52.57		4.70	7.09
Indiana	388	366	663	50.52	51.38	52.91	6.64	5.50	8.46
Kentucky	609	684	817	57.51	57.49	54.56	5.78	5.85	6.72
Iowa	1,386	765	1,135	48.88	57.93	46.55		6.78	7.60
New York	146	194	188	53.54	52.10	57.39	5.11	5.16	6.72
South Dakota-Minnesota	1,633	11,294	12,838	51.85	52.88	52.14	6.02	5.86	6.43
North Dakota	1,632	1,655	2,252	48.82	47.51	49.81		7.44	7.72
Total or average	12,777	21,324	25,381	49.37	51.50	50.91		5.93	6.95

¹ Includes only part of freight charges.

Adapted from unpublished reports of Farm Credit Administration.

TABLE 15.—Selling price, net proceeds to growers, other revenues, deductions and expenses per 100 pounds of grease wool, for cooperative wool marketing associations, United States, 1946 and 1947¹

Item	1946			1947		
	Fleece wool	Territory wool	All	Fleece wool	Territory wool	All
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Selling price.....	51.44	45.22	47.87	50.91	45.35	48.06
Net proceeds paid growers.....	44.43	39.54	41.63	42.88	38.79	40.79
Retained for expenses.....	7.01	5.67	6.24	8.02	6.56	7.27
Other revenue.....	1.41	.56	.92	.80	.33	.56
Total available for expenses.....	8.42	6.23	7.17	8.82	6.89	7.83
Boston deductions:						
N.W.M.C. ² commissions.....	.89	.93	.91	.90	.92	.91
Grading ³.....	.04	.41	.25	.18	.51	.35
Freight.....	1.48	2.31	1.96	1.78	2.51	2.15
Trucking.....	.12	.12	.12	.09	.12	.11
Service and appraisal of C.C.C. ⁴	1.12	1.12	1.12	1.13	1.24	1.19
Scouring and sorting ⁵.....	.07		.03	.07		.03
Interest.....	.05	.08	.07	.02	.11	.07
Storage.....				.02	.14	.08
Other.....	.04	.04	.04	.16	.34	.25
Total.....	3.81	5.01	4.50	4.35	5.80	5.14
Local association expenses:						
Salaries and wages.....	.51	.15	.30	.48	.20	.34
Promotion and field work.....	.84	.14	.44	.90	.15	.57
Warehouse expense ³	1.33	.04	.59	1.37	.08	.71
Supply department.....	.07		.03	.03		.01
Directors' expense and per diem.....	.04	.01	.02	.04	.01	.03
Legal and auditing.....	.03	.001	.01	.03	(6)	.01
Advertising.....	.05	.01	.02	.03	.01	.02
Postage.....	.03	(6)	.01	.03	(6)	.01
Stationery, printing, and supplies.....	.04	.01	.02	.05	.01	.03
Telephone and telegraph.....	.03	.01	.02	.03	.01	.02
Insurance and taxes.....	.06	.01	.03	.04	(6)	.02
Travel.....	.11	.02	.06	.07	.04	.05
Freight.....	.01		.01	.01	(6)	.01
Depreciation.....	.03	.101	.01	.05	.01	.03
Heat, light, and power.....	.01		(6)	.01		.01
Rent.....	.02	.01	.02	.02	.02	.02

See footnotes at end of table.

TABLE 15.—*Selling price, net proceeds to growers, other revenues, deductions and expenses per 100 pounds of grease wool, for cooperative wool marketing associations, United States, 1946 and 1947¹—Cont.*

Item	1946			1947		
	Fleece wool	Territory wool	All	Fleece wool	Territory wool	All
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Interest.....	.07	.01	.01	.12	.01	.07
Annual meetings.....	.02	.01	.01	.02	(6)	.01
Dues and subscriptions.....	.01	(6)	(6)	.01	(6)	.01
Miscellaneous.....	.10	.11	.10	.06	.08	.07
Total.....	3.41	.54	1.71	3.40	.63	2.05
Total Boston and local expenses.....	7.22	5.55	6.24	7.75	6.52	7.19
Undistributed proceeds.....	1.20	.68	.93	1.07	.37	.64

¹ Based on operating results for 11 fleece wool marketing associations and 11 territory wool marketing associations.

² National Wool Marketing Corporation.

³ Larger proportions of fleece wool than of territory wool is graded at local warehouses.

⁴ Commodity Credit Corporation.

⁵ Costs of scouring and sorting some "off wools" and some lamb wools.

⁶ Less than 0.005 dollars.

Adapted from unpublished reports of the Farm Credit Association.

TABLE 16.—*Value of wool marketed and warehouse expenses, by items, Midwest Wool Marketing Cooperative, 1947 wool clip¹*

Item	Amount	
	Total	Per 100 pounds
	Dollars	Dollars
Value of wool marketed for patrons.....	1,328,992	43.78
Warehouse expense:		
Salaries and wages.....	26,006	.86
Supplies.....	944	.03
Repairs and maintenance.....	2,045	.07
Heat, light, power, and water.....	608	.02
Grading expense.....	26,522	.87
Depreciation:		
Buildings.....	2,902	.10
Equipment.....	374	.01
Rent.....	4,200	.14
Telephone and telegraph.....	220	.01
Travel.....	211	.01
Taxes and licenses.....	2,807	.09
Insurance.....	2,508	.08
Miscellaneous.....	377	.01
Total.....	69,814	2.30

¹ The data relate to grease wool handled by warehouses at Kansas City and St. Louis, Mo., and are adopted from accountants' report of audit to Midwest Wool Marketing Cooperative for the fiscal year ended March 31, 1948.

Adapted from unpublished data made available by the Farm Credit Administration.

TABLE 17.—Volume of sales, prices and charges per 100 pounds of grease wool, by size and type of sale, Wyoming, 1944

Size and type of sale	Sales	Gross price	Charges per 100 pounds							Net price
			Grading	Handling		C.C.C. ¹	Trucking	Freight	Total	
				Secondary	Primary					
	Pounds	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Lots under 5,000 pounds:										
Original bags	169,856	43.40		0.03	2.11	1.12	0.10	2.14	5.50	37.9
Original bags--grading charge on off-sorts	3,462	32.78	0.30	.09	2.13	1.12	.10	2.24	5.98	26.8
Graded	1,399,915	45.63	.75	.11	2.10	1.12	.10	2.15	6.33	39.3
Graded--no grading charge	11,796	51.84			2.06	1.12	.10	2.06	5.34	46.5
Miscellaneous off-sorts--no grading charge	9,644	33.62		.10	1.84	1.12	.10	2.16	5.32	28.3
Miscellaneous and off-sorts--grading charge	11,905	32.02	.75	.41	1.93	1.12	.10	2.21	6.52	25.5
Total or average	1,606,578	45.24	.66	.10	2.10	1.12	.10	2.15	6.23	39.0
Lots of 5,000 pounds or more:										
Original bags	11,835,186	43.78			1.54	1.12	.10	2.12	4.88	38.9
Original bags--grading charge on off-sorts	213,686	44.40	.02		1.75	1.12	.10	2.21	5.20	39.2
Graded	7,825,048	46.61	.72	.02	1.63	1.12	.10	2.22	5.81	40.8
Graded--no grading charge	132,582	44.33			1.51	1.12	.10	2.00	4.73	39.6
Miscellaneous off-sorts no grading charge	7,687	29.02			1.75	1.12	.10	2.25	5.22	23.8

See footnotes at end of table.

TABLE 17.—Volume of sales, prices and charges per 100 pounds of grease wool, by size and type of sale, Wyoming, 1944—Cont.

Size and type of sale	Sales	Gross price	Charges per 100 pounds							Net price
			Grading	Handling		C.C.C. ¹	Trucking	Freight	Total	
				Secondary	Primary					
	<i>Pounds</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Miscellaneous and off-sorts—grading charge.....	5,291	15.48	.75	1.75	1.75	1.12	.10	2.01	7.48	8.0
Total or average.....	20,019,480	41.95	.28	.01	1.58	1.12	.10	2.16	5.25	36.7
Grand total or average.....	21,626,058	44.9	.31	.02	1.62	1.12	.10	2.15	5.32	39.6

¹ Commodity Credit Corporation.

Adapted from report by J. Van Horn and H. H. Hulbert,

Marketing the 1944 Wyoming wool clip under the Commodity Credit Corporation purchase plan (99).

TABLE 18.—*Volume of sales, shrinkage, and prices and deductions per pound of grease wool, by grade, Wyoming, 1944*

Grade	Sales	Shrinkage	Gross ranch price	Deductions	Net ranch price
	<i>1,000 pounds</i>	<i>Percent</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Fine.....	14,611	62.6	44.2	5.1	39.1
¾ blood.....	3,237	58.7	48.7	5.7	43.0
¾ blood.....	1,778	53.8	49.7	5.8	43.9
¼ blood.....	783	49.5	49.6	5.9	43.7
Low ¼ blood.....	169	46.5	50.3	5.9	44.4
Common and braid.....	108	42.8	52.4	6.0	46.4
Irregular offs.....	58		34.6	5.6	29.0
Regular offs.....	882		25.8	5.5	20.3
Total or average.....	21,626		44.9	5.3	39.6

Adapted from report by J. Van Horn and H. H. Hulbert on Marketing the 1944 Wyoming Wool Clip under the Commodity Credit Corporation Purchase Plan (99).

MEANS AND IMPORTANCE OF IMPROVEMENT

A determination of the most feasible means of increasing the efficiency of marketing wool would need to be based on at least fairly complete information as to the necessary services involved, the agencies and facilities utilized, and the organization and operation of the marketing mechanism. This information should be complete enough to show the possibilities of improving the quality and increasing the efficiency of rendering essential marketing services, through changes in present methods and practices, and through the development of new and improved methods and practices. The development of such information would require detailed analysis to show the influence of the various factors on the quality of the services and on the efficiency and costs of rendering them at each important stage in the marketing procedure.

Data would need to be assembled and analyzed to show the comparative advantages and disadvantages of performing specific marketing services such as sorting, grading, storing, and scouring, at different locations, by different agencies, and through the use of different facilities and methods. Results of the analysis should show the influence of differences in location, in agencies, and in facilities and methods on costs of the services, on quality and adaptability of wool for further processing, and on costs of moving wool to centers of consumption. Such information now available is limited. Consequently, specific suggestions regarding means of improvement must be limited accordingly.

The marketing of wool might be improved by developing standards for quality and classification services so that the sale of wool on description could be expanded. Maximum benefits from such developments would require provisions for obtaining representative samples of the wool and correctly identifying them with the

wool from which they were drawn; uniform standards upon the basis of which quality of the wool can be described for commercial purposes with a reasonable degree of accuracy; the services of competent and reliable classers, facilities conducive to accurate classifications, and means for adequate supervision of the classifications by a competent and reliable agency; facilities for assembling the samples, recording the classification on convenient forms, and for making the information available to producers and to buyers in time for them to use it in selling and buying the product; and confidence on the part of producers and buyers in the adequacy of the classification service and their willingness to sell and buy wool on the basis of this information.

Some indications with regard to the importance, from the viewpoint of costs, of improving the marketing of wool may be indicated by the fact that in recent years gross merchandising margins have averaged less than one-sixth of the returns to growers for farm production of the wool, about 5 percent of the gross margins for manufacturing and finishing woolen and worsted cloth and fabricating it into apparel and household goods, about 6 percent of the gross margins for wholesale and retail distribution of the products, and 2.2 percent of the retail value of the finished apparel and household goods. It is apparent from these data that large proportional reductions in costs of merchandising raw wool would have relatively little influence on the total marketing margin, or spread between prices to farm producers and retail prices paid for finished apparel and household goods made of wool by ultimate consumers.

COTTON YARN MANUFACTURING

Establishments primarily engaged in spinning cotton yarns, weaving cotton fabrics, and finishing these products are included in the cotton-manufacturing industry. Census reports for 1947 show that this industry included 404 establishments primarily engaged in the manufacture of yarn, 89 thread mills, 602 establishments primarily engaged in the manufacture of cotton broad-woven fabrics, 479 narrow-fabric mills, and 641 plants for finishing textiles other than wool. This section of this bulletin is concerned mainly with the part of the cotton-manufacturing industry that is primarily engaged in the manufacture of cotton yarn.

NATURE, PRACTICES, AND EQUIPMENT

When cotton is delivered to mills the bales are opened and the lint is cleaned, carded, combed (for fine yarns) and spun into yarn. In 1947, according to census reports, 3,800,000,000 pounds of cotton yarn were produced in the United States, of which about 88 percent was carded and 12 percent was combed. Production of yarn in the United States usually is integrated with the operations of weaving, but considerable quantities of yarn are produced for sale. In 1947, yarns produced by establishments for their own

use accounted for about 83 percent, and that produced for sale accounted for about 17 percent, of the total. Some integrated mills sell surplus yarn not needed in their weaving departments.

SIZE AND ORGANIZATION OF PLANT

Number of spindles in place is customarily used to indicate the size of the plant or of the cotton textile industry. The total number of spindles in place in the world on July 31, 1951, was estimated at 125,994,000, of which about 18 percent was in the United States, 58 percent in Europe (including USSR), 18 percent in Asia and Oceania, and small proportions in South America, Africa, and countries other than the United States in North America (table 19). In most areas, the number of spindles decreased considerably from 1939 to 1950. European countries have a large number of mule spindles but in other countries the numbers of such spindles are small in relation to the number of ring spindles reported.

Spinning activity is indicated by the number of active spindles and by the number of spindle hours operated during a specified period. In the United States, the number of active spindles decreased from more than 35,000,000 in 1925 to less than 20,000,000 in 1949 and totaled 20,871,000 at end of July 1951 (table 20). Most of this decrease occurred in New England and other States outside the Cotton Belt. The proportion of the total number of active spindles in cotton-growing States increased from less than half in 1925 to about 81 percent in 1951, whereas the proportion in New England decreased from about 46 percent in 1925 to about 17 percent in 1951. The proportion of cotton consumed in cotton-growing States increased from 68 percent in 1925 to more than 90 percent in 1950 and the portion consumed in New England decreased from 26 percent in 1925 to 7.5 percent in 1950.

The rate of mill consumption of cotton varies directly with the number of active spindles, the proportion of total capacity utilized, and the coarseness of the yarns produced. The proportion of spinning capacity utilized in the United States, based on an 80-hour week, increased from 62.5 percent in 1925 to almost 134 percent in 1942, and mill consumption of cotton increased from 6,433,000 bales to 11,433,000 bales during the same period, despite a substantial decrease in number of active spindles (table 21). From 1942 to 1945 the percentage of the capacity utilized decreased about 11 percent, the number of active spindles decreased 3 percent, and mill consumption decreased about 20 percent. The increase in spindle activity from 124 percent of capacity in 1949 to 136 percent capacity in 1951 was associated with an increase in consumption of cotton from 7,873,000 bales in 1949 to about 10,037,000 bales in 1951.

Spindle activity and rate of cotton consumption in cotton-growing States during the 1949-50 season were high in relation to the totals for all other areas combined (table 22). Total spindle hours operated during this season averaged about 123 percent of total capacity, for an 80-hour week, for spindles in place on December 31, 1949, for cotton-growing States, compared with about 113

TABLE 19.—Number of cotton and rayon staple spinning spindles, by countries, 1939 and 1951¹

Country	SPINDLES					
	Spindles					
	Total		Mule		Ring	
	1939	1951	1939	1951	1939	1951
	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands
Europe:						
Czechoslovakia.....	3,330	2,355	1,205	400	2,125	1,955
France.....	9,794	8,035	2,303	1,245	7,491	6,790
Germany (Western).....	12,225	6,206	3,287	277	8,938	5,929
Italy.....	5,324	5,694	550	76	4,774	5,618
Spain.....	2,000	2,210	400	410	1,600	1,800
United Kingdom.....	36,322	28,252	25,847	17,905	10,475	10,347
U.S.S.R. (estimated).....	10,350	9,850	1,000	1,250	9,350	8,600
Other.....	9,637	9,855	1,630	772	8,007	9,083
Total.....	88,982	72,457	36,222	22,335	52,760	50,122
North America:						
Canada.....	1,159	1,138	35	14	1,124	1,124
Mexico.....	884	1,114	5	3	879	1,111
United States.....	25,911	23,183	213	273	25,698	23,110
Other.....	95	151	4	4	91	147
Total.....	28,049	25,586	257	94	27,792	25,492
South America:						
Argentina.....	329	590	.....	.....	329	590
Brazil.....	2,765	3,281	17	.....	2,748	3,281
Colombia.....	105	380	.....	.....	105	380
Peru.....	118	153	.....	.....	118	153
Other.....	124	368	.....	1	124	367
Total.....	3,441	4,772	17	1	3,424	4,771
Africa:						
Egypt.....	251	518	.....	.....	251	518
Other.....	39	253	.....	.....	39	253
Total.....	290	771	.....	.....	290	771
Asia and Oceania:						
Australia.....	114	252	.....	4	114	248
China (estimated).....	4,450	4,100	.....	.....	4,450	4,100
India.....	10,054	10,849	494	285	9,560	10,564
Japan.....	11,502	5,244	6	6	11,496	5,238
Korea.....	60	310	.....	.....	60	310
Manchuria (estimated).....	280	251	.....	.....	280	251
Turkey.....	104	383	.....	57	104	326
Other.....	322	1,019	.....	5	322	1,014
Total.....	26,886	22,408	500	357	26,386	22,051
World total.....	147,648	125,994	36,996	22,787	110,652	103,207

¹ Estimated number of spindles in 1939 as of Jan. 31 and those for 1951 as of July 31.

² Mule spindles totaling about 73,000 as reported in Davison's Textile Blue Book were subtracted from the number of ring spindles reported to International Cotton Federation.

Adapted from INTERNATIONAL COTTON STATISTICS.

TABLE 20.—Number of active spindles and proportion of cotton consumed, by areas, United States, 1925, 1930, 1935, and 1939-51

Year	ACTIVE SPINDLES ¹			
	United States	Cotton growing States	New England States	All other
	Thousands	Thousands	Thousands	Thousands
1925.....	35,032	17,292	15,975	1,765
1930.....	31,245	18,586	11,351	1,308
1935.....	26,701	18,212	7,763	726
1939.....	23,731	17,666	5,408	657
1940.....	23,586	17,641	5,270	666
1941.....	23,390	17,653	5,088	649
1942.....	23,608	17,800	5,138	670
1943.....	23,430	17,746	5,043	641
1944.....	23,018	17,652	4,784	582
1945.....	22,675	17,610	4,511	554
1946.....	21,578	16,869	4,173	536
1947.....	21,383	16,692	4,273	418
1948.....	21,328	16,832	4,085	411
1949.....	19,012	15,551	3,130	331
1950.....	21,525	16,580	3,603	342
1951.....	20,871	16,996	3,524	351

PROPORTION OF COTTON CONSUMED²

Year	PROPORTION OF COTTON CONSUMED ²			
	United States	Cotton growing States	New England States	All other
	Percent	Percent	Percent	Percent
1925.....	100.0	68.1	26.5	5.4
1930.....	100.0	77.8	18.7	3.5
1935.....	100.0	80.3	15.3	4.4
1939.....	100.0	84.7	12.5	2.8
1940.....	100.0	85.4	11.8	2.8
1941.....	100.0	85.5	11.8	2.9
1942.....	100.0	85.3	11.7	3.0
1943.....	100.0	86.9	10.4	2.7
1944.....	100.0	87.9	9.6	2.5
1945.....	100.0	88.4	9.3	2.3
1946.....	100.0	88.1	9.3	2.6
1947.....	100.0	87.5	9.7	2.8
1948.....	100.0	88.2	9.5	2.3
1949.....	100.0	89.6	8.3	2.1
1950.....	100.0	90.7	7.5	1.8

¹ Active any time during year to 1945 and active at end of July 1946-51.

² Consumption for year beginning August.

Adapted from Bureau of the Census reports.

percent for the United States as a whole. The quantity of cotton consumed per 100 spindles in place during the 1949-50 season averaged 4.21 pounds for cotton-growing States as compared with 3.94 pounds for the United States as a whole.

Most spinning mills are under corporate ownership and control.

TABLE 21.—Number of cotton spindles, spinning activity, and cotton consumption, United States, 1925, 1930, 1935, and 1939-51

Year	Spindles		Total spindle hours	Proportion of capacity ³	Cotton consumption		
	Total in place ¹	Total active ²			Total	Per active spindle	Per 100 spindle hours
	Thousands	Thousands	Millions	Percent	1,000 bales	Pounds	Pounds
1925	37,929	35,032	91,055	62.5	6,433	87.8	3.38
1930	34,024	31,245	87,515	67.3	5,378	83.7	2.99
1935	30,092	26,701	72,526	65.3	5,651	103.2	3.80
1939	25,261	23,731	87,096	88.8	7,370	152.9	4.14
1940	24,750	23,585	97,006	98.0	8,052	77.9	4.08
1941	24,335	23,389	111,775	114.9	10,586	222.0	4.65
1942	23,972	23,608	131,161	133.6	11,433	238.6	4.29
1943	23,401	23,429	129,709	133.1	10,666	225.0	4.06
1944	23,205	23,019	118,123	123.4	9,691	208.1	4.06
1945	23,123	22,675	111,904	118.6	9,141	199.2	4.04
1946	23,862	21,578	105,240	117.2	9,833	222.9	4.57
1947	23,832	21,383	114,811	129.1	9,546	218.1	4.06
1948	23,798	21,328	120,905	136.3	9,095	209.3	3.69
1949	23,500	19,007	98,168	124.2	7,873	202.0	3.91
1950	23,007	20,525	116,390	136.3	9,652	228.3	4.03
1951	23,133	20,871	118,235	136.2	10,037	240.5	4.24

¹ In place on July 31.

² Consuming 100 percent cotton and active any time during the year from 1925 to 1945 and on July 31 from 1946 to 1950.

³ Proportion of capacity for 80-hour week for active spindles.

⁴ Preliminary.

Adapted from Bureau of the Census reports.

Many of them are operated from central administrative offices. Only a few are owned and controlled by individuals, and an even smaller number is owned and controlled by partnerships and co-operatives. But the organization and management of some mills have undergone significant changes in recent years. Integration in the textile industry reached a high rate by the middle and late 1940's. Profit margins affected by price control during the war emergency, demand, and other factors led certain mills to integrate forward by buying or building finishing plants to take advantage of higher margins on converted goods. This, in turn, made it necessary for some converters and custom finishing plants to integrate by buying mills to insure a supply of goods and to secure business for their finishing plants. Some selling houses found it necessary to integrate by buying mills in order to control a full line of products for sale. Wholesale houses and mills that own their own sales agencies in some instances found it advisable to integrate both backward and horizontally to control their sources of goods and to take advantage of better margins. Some industrial firms, which use yarns and fabrics in the manufacture of other products, found it desirable to buy cotton mills to supply their requirements, either partially or fully (18, 41).

Such integrations in the textile industry apparently multiply with prosperity and decline with depression. The first real wave of mergers came with the boom following World War I, and was temporarily arrested by the depression that began in 1921. Absorption and purchases of businesses increased with improvements in business conditions in the middle 1920's and a peak reached in 1929 was followed by another let-up during the depression that began in the early 1930's. Increased interest in mergers began again in the early 1940's but the big changes in mill acquisition came during the middle and late 1940's (18, 41).

Integration in the cotton-textile industry may include vertical, horizontal, or both kinds of combinations. Vertical integration involves the combination under one management of establishments that represent two or more stages in the manufacture and distribution of products, such as spinning, weaving, finishing, fabricating, wholesaling, or retailing. Acquisitions of textile mills in connection with vertical integration increased markedly during the late 1940's (41). The ultimate in vertical integration would be a combined ownership and operation of establishments involving all stages from production of seed cotton on farms to retail distribution of the finished products.

TABLE 22.—*Number of cotton spindles, spindle activity, and cotton consumption, by areas, United States, 1949*

Area	Spindles in place ¹	Total spindle hours	Proportion of capacity ²	Cotton consumed	
				Total	Per 100 spindles
	Thousands	Millions	Percent	1,000 bales	Pounds
Cotton-growing States:					
North Carolina	5,931	27,721	112.4	2,434	4.27
South Carolina	5,671	31,726	134.5	1,953	3.00
Georgia	3,211	16,284	121.9	1,882	5.62
Alabama	1,686	9,143	130.4	1,088	5.78
All others	1,716	8,054	112.8	683	4.12
Total	18,215	92,928	122.6	8,045	4.21
New England States:					
Massachusetts	2,587	7,579	70.4	310	1.99
Maine	638	2,833	106.7	170	2.92
Rhode Island	700	2,383	81.8	69	1.41
All others	751	2,491	79.7	116	2.25
Total	4,676	15,286	78.6	665	2.11
Other States	450	1,224	65.4	100	6.33
United States	23,341	109,438	112.7	8,870	3.94

¹ Spindles in place on December 31, 1949.

² Proportion of capacity for 80-hour week for spindles in place on December 31, 1949.

Adapted from or based on Bureau of the Census reports.

Horizontal integration is the merging of two or more plants or establishments on the same level of production or distribution, such as two or more spinning, weaving, finishing, fabricating, wholesaling, or retailing establishments. Acquisitions of textile mills leading to horizontal integration also increased markedly during the late 1940's (41). The ultimate in horizontal integration would be the merger of all establishments of the same level of production or distribution. Many acquisitions of textile mills during the late 1940's represent both types of integration (41).

MANUFACTURING METHODS¹⁰

Cotton yarns are classified: (1) according to cleaning processes as carded, double carded, or combed; (2) according to twist or construction as warp, filling, knitting, ply, cord, sewing thread, or twine; and (3) according to yarn numbers as very coarse (under 8's), coarse (8's to 16's), medium (16's to 32's), medium fine (32's to 60's), fine (60's to 120's), and very fine (over 120's). The type of yarn and its number determine the type and number of processes required in its manufacture. The number of processes range from 4 to 16 for single yarns, but the usual number is from 8 to 12.

Conventional or regular-draft processing usually requires two more processes than the more modern long-draft processing. Production of plied yarns, sewing thread, tire cords, and other cable strands necessitates one or two additional processes known as twisting. Auxiliary processes needed by yarn mills for the preparation of yarns for twisting, for warps, or for sale, may be winders, spoolers, coners and beamers (warpers). Further steps may be those of bleaching, dyeing, gassing, and mercerizing.

The main processes involved in the manufacture of cotton yarn usually include the following:

OPENING AND CLEANING.—Bales of cotton of different densities usually are received at mills in lots of 100 bales or more from a number of sources. After the ties and bagging are removed from the bales, cotton from a few bales from each of a number of sources is blended to produce a uniform quality of material for further processing. This blending applies particularly to mills that produce staple fabrics and to those that maintain uniform standards of quality during extended periods.

Formerly, it was general practice to use a machine known as the bale breaker with a high rate of production to open and mix the cotton. The more modern practice is to feed portions of a few bales continually to each of several so-called blending hoppers and have the loosened cotton from each hopper fall onto a traveling lattice to provide mixing and to convey the material to the next machine in the cleaning line.

This cotton is conveyed, either by pneumatic or mechanical means or by both in combination, to the first of a series of cleaning machines. Finally, after it is cleaned, mainly of the heavier im-

¹⁰ Based mainly on COTTON GOODS PRODUCTION AND DISTRIBUTION TECHNIQUES, COSTS, AND MARGINS (91).

purities, by agitation, rotary beaters, and screens, it is delivered from the cleaners in a continuous rolled-up sheet known as a lap. These laps, weighing 10 to 50 pounds, are then placed in racks on wheeled platforms or conveyors and transferred to the carding department.

CARDING.—This operation disentangles the masses of fibers in a picker lap and cleans them further by removing most of the fine trash and other particles of foreign matter together with some short fibers. It transforms the bulky lap into a rope-like strand, which weighs 40 to 70 grains a yard and is called card sliver. This is coiled uniformly into a can.

COMBING.—This process is applicable to the longer-staple cottons that are used for products having fine yarn counts and for products that require high strength and smooth appearance. Its primary purpose is to remove short fibers and parallelize the longer fibers into an even sliver. Combing processes are among the most expensive operations in making yarns; they include sliver lapping, ribbon lapping, and combing. The sliver lapper combines several slivers into a sheet or ribbon and rolls it onto wooden cores, some after a small amount of drafting and others without drafting. Four or six ribbons or laps of slivers are fed to the ribbon lapper which further parallels the fibers and combines the resultant thin drafted sheets of fiber into one sheet or lap, then rolls the lap onto cores ready for use at the comber. Six or eight ribbon laps are fed to the comber, and a single sliver is produced. The comber removes from 10 to 20 percent of noil (waste) which contains many of the shorter fibers, fine particles of foreign matter, and tangled fibers, and delivers a clean sliver in which the fibers are highly parallelized. The product of this machine, comber sliver, is coiled neatly into cans and these cans are delivered to the next process, the drawing.

DRAWING.—The card or comber sliver is delivered to the drawing frames which combine 6 or 8 slivers for uniformity, drawing, or drafting the fibers to increase parallelism and to reduce the combined strands to approximately the size of a single strand being fed, and coils the drawing sliver systematically into cans.

THE ROVING PROCESS—SLUBBER, INTERMEDIATE, FINE OR SPEEDER, AND JACK.—These operations successively reduce the sliver from the drawing process to a much smaller strand of fiber, called roving, by the drafting action of the drawing rolls, which also adds to the parallelism of the fibers, inserts a slight amount of twist to give the strands sufficient strength for handling, and winds the strands onto a bobbin. Within the last few years these processes have been in a transition stage as a result of the development of so-called long-draft processes which enables one process to do the work formerly performed by two or more.

SPINNING.—The final process in the manufacture of yarn is the spinning. Here the roving from the last roving process is fed, either single—or double—strand, and drafted to the desired size, twisted to produce the correct hardness or other condition, and the product, yarn, is wound onto small bobbins.

SPOOLING OR WINDING.—Yarns produced from spinning are

necessarily in small packages or bobbins which contain relatively short lengths of yarn. Before this yarn is usable at other processes, except that of filling (spun directly for use in the shuttle or looms), it must be combined end to end from a number of bobbins to produce a considerably greater continuous length of yarn in the package. Many forms of winding are prevalent in the textile industry, some of which are cone, cheese, tube, spool, and doubler winding.

Winding also permits inspection of yarn, cleans it further, eliminates weak places and lumps, and with the use of knot-tying devices, either hand-operated or operated automatically as a part of the machine, produces small nonslip knots that do not give trouble at later processes. These conditions are necessary to permit economical operation of warpers, slashers, looms, and twisters.

WARPING OR BEAMING.—An auxiliary process to weaving and to some ply yarn twisting is the laying parallel of a large number of strands over the surface of a large beam (spool) and the winding of great lengths of the strand onto the beam. Often from 350 to 600 ends are woven uniformly as to spacing and tension, at a rate of from 400 to 900 yards a minute. This give a full beam containing 20,000 to 36,000 yards or more. A full beam may contain yarn equal to that produced from $1\frac{1}{2}$ to 2 bales of cotton.

TWISTING.—Twisting is necessary when ply yarns and cords are to be made. Cones, parallel tubes, cheeses, or spools of yarn produced on the winding machines are fed two or more strands together to make ply yarns. The further combining of ply yarns in later twisting produces cabled yarns or cords. These processes are also used in production of sewing thread.

MACHINERY AND EQUIPMENT

A good many changes have occurred during recent years in the number of the different kinds of machinery and equipment used in the manufacture of cotton yarn. Principal changes relate mainly to substantial increases in number of combs and of long-draft spindles and decreases in regular-draft spindles (table 23).

The kinds and conditions of machinery and equipment used in the manufacture of carded cotton yarn is indicated by the results of a survey made in 1950 of 15 representative carding cotton yarn mills. The results show that the buildings for 3 of these mills were new and modern, those for 12 of the mills were not new but were fairly well laid out in most respects and were in good condition, and those for 3 mills were not modern and appeared to need considerable alterations and repairs.

Floor spacing and arrangements of machinery and equipment for efficient flow of materials between products were considered good for 5 of these mills, fair for 7, and poor for 3 of the mills. Twelve mills had their cotton warehouses and wastehouses conveniently located with regard to the opening and packing room, the arrangements for 2 mills were only fair in this respect, and that for one was poor enough to materially reduce efficiency.

The type, amount, and condition of the opening and picking

TABLE 23.—Number of cards, combs, and spindles in the cotton, rayon, and related manufacturing industries, by type of machine, United States, 1942 and 1947

Type of machine	1942	1947	Increase or decrease (—)
	<i>Number</i>	<i>Number</i>	<i>Percent</i>
Cards.....	90,582	86,442	-4.6
Combs.....	7,245	9,138	26.1
Spindles:			
Roving:			
Long draft:			
Slubbers.....	335,138	523,272	56.1
Intermediate.....	188,660	309,636	64.1
Fine frames.....	349,188	295,292	-15.4
Jack frames.....	10,504	17,024	62.1
Total.....	883,400 ¹	1,145,224	29.6
Regular draft:			
Slubbers.....	302,391	184,789	-38.9
Intermediate.....	511,400	329,786	-35.5
Fine frames.....	1,613,680	1,006,083	-37.7
Jack frames.....	514,444	380,670	-26.0
Total.....	2,941,915	1,901,328	-35.4
Total roving.....	3,825,405	3,046,552	-20.4
Spinning:			
Rings pinnin ² :			
By type:			
Draft:			
Long.....	12,419,642	11,384,442	15.8
Regular.....	11,766,305	8,227,451	-30.1
Total.....	24,185,947	22,611,893	-6.5
Drive:			
Tape.....	12,199,641	12,676,074	3.9
Band.....	11,986,306	9,935,819	-17.1
Total.....	24,185,947	22,611,893	-6.5
By ring diameter— <i>inches</i> :			
1 $\frac{1}{8}$ and under.....	5,136,606	4,440,248	-13.6
1 $\frac{3}{8}$ to 1 $\frac{1}{2}$	9,457,361	7,619,801	-19.4
1 $\frac{5}{8}$ to 2 $\frac{1}{4}$	8,690,342	8,714,886	.3
2 $\frac{3}{8}$ and over.....	901,638	1,836,958	103.7
Total ring spinning.....	24,185,947	22,611,893	-6.5
Mule spinning.....	(³)	117,956	.....
Total spinning.....	24,185,947	22,729,849	-6.0
Doubling and twisting— <i>inches</i> : ³			
1 $\frac{3}{8}$ and under.....	507,788	513,063	1.0
1 $\frac{5}{8}$ to 2 $\frac{3}{8}$	1,233,423	1,186,054	-5.5
2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	1,219,017	1,266,481	3.9
3 $\frac{1}{2}$ and over.....	412,294	568,171	37.8
Brownell and not reported.....	54,771	0	.....
Total.....	3,427,293	3,513,774	2.5

¹ Includes mule-spinning spindles. ² Included in ring spindles. ³ Cotton system. Adapted from Bureau of the Census reports.

equipment used by 8 of the mills were good, equipment used by 4 of the mills was not of the most improved type but was in good condition, and that used by 3 mills was neither modern nor in very good condition. The breaker and the finisher draw frames for 10 of the mills were modern and in good condition, those for 2 of the mills were of improved types but were rather old, and those for 3 mills were quite old and were not in good condition. Five of the mills had modern fly frame equipment. That for 1 mill was fairly modern and that for 9 was not modern. Spinning equipment for 1 mill was good, one had a partial installation of modern spinning equipment, and that for the other 13 mills was not modern.

Although much of the equipment used in spinning cotton yarn is not modern and in good condition, substantial improvements are being made. Census reports indicate that expenditures for plant and equipment by manufacturers of yarn and thread mills, except wool, totaled \$36,647,000 in 1947, about \$26,907,000 in 1949, and \$27,316,000 in 1950. Of these amounts, \$22,778,000 in 1947, about \$22,379,000 in 1949, and \$20,864,000 in 1950 were spent for new machinery and equipment. The remainder was spent for new structures and additions to plants. Reports indicate that in 1951 close to a half billion dollars was spent on the building or modernization of hundreds of cotton and rayon mills, and that some three billion dollars have gone for that purpose since the end of the war (37). In the spring of 1951 textile mills apparently were spending at the rate of more than \$200,000,000 a year on new machinery, humidity controls, air conditioning, and other improvements for higher efficiency of production (38).

CHARGES OR COSTS INVOLVED

Yarn manufacturers' margins, or the spread between costs of the raw materials used and value of the products manufactured, vary with the kind of yarn produced, from one establishment to another, and from one year to another. Census reports relating to manufacturers of yarn in 1947 show that the spread between costs of the materials, supplies, parts and containers and the value of the yarns produced on the cotton system averaged 44.5 percent of the value of the yarn (table 24). Raw cotton accounted for most of the costs included under "materials, supplies, parts and containers" but the spread between the cost of the raw cotton and the value of the yarn was less than the proportion derived from census data. In 1939, similar margins for manufacturers of cotton yarn averaged 46.3 percent. Census reports on the value of products shipped and the value added by manufacture indicate that gross margins for yarn mills in the cotton system decreased further in 1949 and in 1950.

The proportions of net sales accounted for by gross margins of manufacturers of cotton yarns increased during the late 1930's and then decreased in the 1940's. Data relating to sales, costs, and profits for 28 manufacturers of carded cotton yarns show that the manufacturers' gross margins increased from an average of about 46 percent of net sales in 1936 to almost 56 percent in 1939.

then decreased to about 46 percent in 1944 (table 25). Similar data for 19 manufacturers of combed cotton yarns show that manufacturers' gross margins increased from an average of 53 percent of net sales in 1936 to 61 percent in 1941, then decreased to 52 percent in 1944 (table 26).

TABLE 24.—*Values, costs, and margins for yarn and thread manufactures, United States, 1939 and 1947*

Item	1939		1947			
	All mills ¹	All mills	Yarn mills		Yarn throwing mills	Thread Mills
			Cotton system	Silk system		
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products	343,712	1,004,111	771,547	12,056	64,225	155,683
Costs of materials, supplies, etc. ²	³ 185,452	526,377	428,369	5,361	15,088	77,559
Gross margin	158,260	477,734	343,178	7,295	49,137	78,124
Salaries and wages	88,292	241,717	176,152	3,924	28,401	33,240
Salaries	12,857	26,546	15,385	773	4,078	6,310
Wages	75,435	215,171	160,767	3,151	24,323	26,930
Fuel	1,943	3,683	1,950	86	407	1,240
Purchased electric energy	9,993	13,141	10,334	117	1,934	756
Contract and commission work	⁴ 702	10,028	1,911	1	774	7,342
All other ⁵	57,330	209,165	152,831	3,167	17,621	35,516
Proportion of value of products						
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products	100.0	100.0	100.0	100.0	100.0	100.0
Costs of materials, supplies, etc. ²	³ 54.0	52.4	55.5	42.4	23.5	49.8
Gross margin	46.0	47.6	44.5	57.5	76.5	50.2
Salaries and wages	25.7	24.1	22.8	31.0	44.2	21.4
Salaries	3.7	2.7	2.0	6.1	6.3	4.1
Wages	22.0	21.4	20.8	24.9	37.9	17.3
Fuel	.6	.4	.3	.7	.6	.8
Purchased electric energy	2.9	1.3	1.3	.9	3.0	.5
Contract and Commission work	⁴ .2	1.0	.3	(⁵)	1.2	4.7
All other ⁵	16.6	20.8	19.8	25.0	27.5	22.8

¹ Includes manufacturers of cotton yarn, cotton thread, silk yarn, and thread and rayon yarn and thread. ² Includes parts and containers. ³ Costs of same "Contract work" for cotton yarn were included with "Materials, supplies, etc." to avoid disclosing data reported by individual establishments. ⁴ Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses. ⁵ Less than 0.05 percent.

Adapted from census data on Cotton Manufacturers.

TABLE 25.—Sales, costs, and margins for 28 manufacturers of carded cotton yarn, United States, 1936, 1939, 1941, and 1944

Item	1936	1939	1941	1944
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Gross sales.....	21,353	19,631	36,276	55,036
Returns and allowances.....	94	26	30	6
Net sales.....	21,259	19,605	36,246	55,030
Net material cost.....	11,559	8,710	16,657	29,844
Cotton consumed.....	11,868	8,976	17,185	30,890
Waste consumed.....	80	14	21	38
Yarn and rayon purchased.....	2	8	66	106
Waste sales.....	391	288	605	990
Gross margins.....	9,700	10,895	19,579	25,186
Labor cost.....	4,560	4,396	7,043	10,920
Manufacturing expense.....	2,336	2,427	3,899	5,100
Selling expense.....	988	939	1,730	2,166
Freight.....	492	542	739	867
General administration expense.....	542	613	1,005	1,360
Net change in inventory.....	¹ 82	1,142	89	366
Net operating profit.....	864	836	5,074	4,407

Proportion of net sales

	Percent	Percent	Percent	Percent
Gross sales.....	100.0	100.0	100.0	100.0
Returns and allowances.....	.4	.1	.1	(²)
Net sales.....	100.0	100.0	100.0	100.0
Net material cost.....	54.4	44.4	46.0	54.2
Cotton consumed.....	55.8	45.8	47.4	55.7
Waste consumed.....	.4	.1	.1	.1
Yarn and rayon purchased.....	.2	.2	.2	.2
Waste sales.....	1.8	1.5	1.7	1.8
Gross margins.....	45.6	55.6	54.0	45.8
Labor cost.....	21.5	22.4	19.4	19.8
Manufacturing expense.....	11.0	12.4	10.8	9.3
Selling expense.....	4.6	4.8	4.8	3.9
Freight.....	2.3	2.8	2.0	1.6
General administration expense.....	2.5	3.1	2.8	2.5
Net change in inventory.....	¹ .4	5.8	.2	.7
Net operating profit.....	4.1	4.3	14.0	8.0

¹ Decrease.² Less than 0.05 percent.

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (91).

Wages account for a large proportion of yarn manufacturers' gross margins. In 1947, wages accounted for almost 21 percent, and salaries and wages combined accounted for almost 23 percent, of the value of yarns spun on the cotton system, according to census reports. Labor costs accounted for about one-fifth of net sales for manufacturers of carded cotton yarns and for about one-

fourth of net sales for manufacturers of combed cotton yarns (tables 25 and 26).

Gross margins for manufacturers of carded yarns usually are smaller than those for the fine combed yarns. Data relating to unit costs for manufacturing typical cotton yarns in 1944 show that net cotton costs for carded yarns averaged about two-thirds, and yarn conversion accounted for about one-third, of the total (table 27). Net cotton costs for combed yarns accounted for

TABLE 26.—Sales, costs, and margins for 19 manufacturers of combed cotton yarn, United States, 1936, 1939, 1941, and 1944

Item	1936	1939	1941	1944
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Gross sales	28,979	33,083	50,417	81,433
Returns and allowances	43	19	14	31
Net sales	28,936	33,061	50,403	81,399
Net material cost	13,634	13,356	21,791	39,209
Cotton consumed	12,781	13,196	22,110	39,889
Yarn and rayon purchased	2,564	1,565	2,199	3,167
Waste sales	1,714	1,405	2,518	3,757
Gross margin	15,302	19,708	34,612	42,190
Labor cost	6,687	8,570	13,137	21,490
Manufacturing expense	4,260	5,031	6,974	9,215
Selling expense	1,173	1,590	2,215	2,997
Freight	175	603	665	695
General and administrative expense	849	1,049	1,197	1,699
Net change in inventory	1263	797	1,711	691
Net operating profit	2,121	2,008	8,383	5,313
Proportion of net sales				
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Gross sales	100.1	100.1	100.0	100.0
Returns and allowances	1	1	(2)	(2)
Net sales	100.0	100.0	100.0	100.0
Net material cost	47.1	40.4	38.6	48.3
Cotton consumed	44.2	39.9	39.2	49.0
Yarn and rayon purchased	8.8	4.7	3.9	3.9
Waste sales	5.9	1.2	4.5	4.6
Gross margin	52.9	59.6	61.4	51.7
Labor cost	23.1	25.9	23.3	26.4
Manufacturing expense	14.7	15.4	12.4	11.3
Selling expense	4.1	4.8	3.9	3.7
Freight	1.6	1.8	1.2	.9
General and administrative expense	3.0	3.2	2.6	2.1
Net change in inventory	1.9	2.4	3.1	.8
Net operating profit	7.3	6.1	11.9	6.5

¹ Decrease.

² Less than 0.05 percent.

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (21).

TABLE 27.—Average costs and margins per pound for manufacturing carded cotton yarns, by kind of fabric for which they are used, United States, fourth quarter, 1944¹

Item	Print cloth of types—				Shade cloth	Twill	Pajama checks	All
	I	II	III	IV				
Average width in inches.....	36.7	38.2	37.5	39.2	44.2	39.0	38.8	38.7
Number of ends and picks.....	20 x 12	44 x 36	64 x 56	80 x 80	56 x 52	68 x 68	80 x 80	-----
Average yards per pound.....	22.5	8.7	5.8	4.0	5.7	4.5	4.1	6.7
Average pounds of cotton per pound of yarn.....	1.19	1.17	1.17	1.18	1.18	1.18	1.17	1.18
COST PER POUND OF YARN								
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Gross cotton cost.....	28.89	26.58	26.44	26.91	27.10	27.03	26.49	26.72
Net cotton cost ²	26.07	25.82	25.69	26.04	26.56	26.22	25.61	25.93
Warp-yarn conversion cost:								
Carding.....	3.54	4.09	4.21	3.96	4.60	4.41	4.21	4.15
Labor.....	2.51	2.83	2.86	2.63	3.08	3.16	2.80	2.81
Other expense.....	1.03	1.26	1.35	1.33	1.52	1.25	1.41	1.34
Spinning.....	5.22	6.59	6.75	6.17	6.35	6.66	6.14	6.41
Labor.....	3.59	4.55	4.63	4.10	4.29	4.76	4.09	4.36
Other expense.....	1.63	2.04	2.12	2.07	2.06	1.90	2.05	2.05
Spooling and warping.....	1.58	1.94	1.92	1.87	1.63	1.45	1.65	1.85
Labor.....	1.24	1.49	1.44	1.35	1.17	1.15	1.32	1.38
Other expense.....	.34	.45	.48	.52	.46	.30	.33	.47
Total.....	10.34	12.62	12.88	12.00	12.58	12.52	12.00	12.41
Labor.....	7.34	8.87	8.93	8.08	8.54	9.07	8.21	8.55
Other expense.....	3.00	3.75	3.95	3.92	4.04	3.45	3.79	3.86

Filling-yarn conversion cost:									
Carding.....	3.79	4.07	4.37	4.11	4.74	4.36	4.57	4.29	
Labor.....	2.70	2.81	2.96	2.71	3.18	3.12	3.10	2.91	
Other expense.....	1.09	1.26	1.41	1.40	1.56	1.24	1.47	1.38	
Spinning.....	8.98	10.01	9.67	8.79	9.14	7.38	9.25	9.41	
Labor.....	6.39	6.98	6.71	5.97	6.04	5.26	6.29	6.48	
Other expense.....	2.59	3.03	2.96	2.82	3.10	2.12	2.96	2.93	
Total.....	12.77	14.08	14.04	12.90	13.88	11.74	13.82	13.70	
Labor.....	9.09	9.79	9.67	8.68	9.22	8.38	9.39	9.39	
Other expense.....	3.68	4.29	4.37	4.22	4.66	3.36	4.43	4.31	
Total warp-yarn cost.....	36.41	38.44	38.57	38.04	38.14	38.74	37.61	38.34	
Total filling-yarn cost.....	38.84	39.90	39.73	38.94	40.44	37.96	39.43	39.63	

¹ Averages are based on reports on 4 to 45 yarns from 4 to 31 mills. In calculating the averages, each yarn was given a weight of 1. Tests show that differences between averages obtained by giving each yarn a weight of 1 and those obtained by weighting each yarn by the quantity produced usually are substantially less than the standard error of the mean.

² Differences between gross and net costs are accounted for by credits for waste sold.

Primary data assembled by Tariff Commission for Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

about half, and conversion costs accounted for about half, of the total (table 28). Costs of labor averaged 22 percent of total costs and 68 percent of conversion costs for carded yarns, and 32 percent of the total and 65 percent of conversion costs for combed yarns. These costs vary somewhat with the particular kinds of yarn, as shown in tables 27 and 28.

Yarn manufacturers' margins usually vary directly with prices of cotton and of yarn. Such variations may be indicated by data relating to prices of 36's and 40's combed peeler yarns and to prices of Middling 15/16-inch cotton, adjusted to the poundage required to produce 1 pound of yarn, for the period 1926-45 (table 29). Margins for 36's yarn as calculated from these data decreased from 31.9 cents per pound of yarn in 1926, when adjusted cotton prices averaged 20.1 cents and yarn prices averaged 52 cents, to 23.8 cents in 1932 when adjusted cotton prices averaged 7.2 cents and yarn prices averaged 31 cents. Following the low point reached in 1932, prices of both cotton and yarn advanced, and yarn manufacturers' margins increased irregularly. In 1945 the margins for 36's yarn averaged 38.1 cents, adjusted prices of cotton averaged 26 cents, and prices of 36's yarns averaged 64 cents. Changes in adjusted prices of cotton usually were relatively greater than changes in prices of yarn, and the proportions of the value of yarn accounted for by manufacturers' margins usually vary inversely with prices of the cotton and yarn. Similar results were indicated for 40's combed yarn.

Developments in recent years emphasize the increasing part that costs of labor play in the manufacture of cotton yarns. Data concerning employment and productivity in the cotton-textile industry show that the average hourly wage rate in this industry increased from 38.7 cents in 1939, to about \$1.10 in 1948 (14). Reports of the Bureau of Labor Statistics indicate that these rates continued to increase and that early in 1951 they averaged \$1.28. Production of fabric per man-hour decreased from an average of 10.58 yards in 1939 to 9.25 yards in 1948. These changes in wage rates and in production per man-hour apparently increased labor costs per yard by more than 200 percent. Since 1948 further increases have been made. These data apply to the cotton-textile industry as a whole, but it is believed that essentially the same trend applies to the yarn-manufacturing part of the industry.

Profits of yarn manufacturers increased markedly early in World War II, then declined in 1943 and 1944. Data relating to net sales and operating profits for 33 manufacturers of carded-cotton yarns from 1936 to 1944 show that, following the unfavorable year of 1938 when net operating results showed a loss which averaged 2.6 percent of net sales, average profits increased to 12.6 percent of net sales in 1941, then decreased to 8 percent of net sales in 1944 (21). Similar data for 19 manufacturers of combed-cotton yarns show similar trends, but the proportions of net sales accounted for by profits averaged somewhat greater for combed-than for carded-yarn mills.

TABLE 28.—Average costs and margins per pound for manufacturing combed cotton yarns, by kind of fabric for which they are used, United States, fourth quarter, 1944¹

Item	Lawns of types—			Voile	Pongee	Tracing cloth	All
	I	II	III				
Average width in inches.....	41.0	40.6	39.0	39.0	38.0	39.4	39.7
Number of ends and picks.....	76 x 72	88 x 80	96 x 100	60 x 52	72 x 100	84 x 90	-----
Average yards per pound.....	8.65	7.21	5.8	9.0	6.25	7.2	7.06
Average number of pounds of cotton:							
Per pound of warp yarn.....	1.549	1.519	1.505	1.509	1.531	1.491	1.516
Per pound of filling yarn.....	1.549	1.521	1.502	1.509	1.535	1.491	1.516
COST PER POUND OF YARN							
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Gross cotton cost for:							
Warp yarn.....	43.76	42.65	42.09	40.62	43.19	43.33	42.66
Filling yarn.....	44.77	41.54	41.29	38.88	43.33	41.73	42.02
Net cotton cost for: ²							
Warp yarn.....	39.65	38.57	38.13	36.43	39.17	40.70	38.80
Filling yarn.....	40.75	37.54	37.40	34.74	39.24	39.16	38.22
Warp-yarn conversion cost:							
Carding and combing.....	9.00	10.84	10.89	11.15	6.44	11.57	10.35
Labor.....	5.16	7.01	6.47	6.95	4.21	6.64	6.26
Other expense.....	3.84	3.83	4.42	4.20	2.23	4.93	4.09

See footnotes at end of table.

TABLE 28.—Average costs and margins per pound for manufacturing combed cotton yarns, by kind of fabric for which they are used, United States, fourth quarter, 1944¹—Cont.

Item	Lawns of types			Voile	Pongee	Tracing cloth	All
	I	II	III				
Spinning.....	22.61	21.68	18.23	16.01	23.82	22.24	20.54
Labor.....	14.43	13.58	10.67	9.96	15.45	12.99	12.57
Other expense.....	8.18	8.10	7.56	6.05	8.37	9.25	7.97
Spooling and warping.....	4.77	4.95	5.26	5.58	4.98	6.26	5.24
Labor.....	3.83	4.09	4.00	4.61	4.22	4.79	4.15
Other expense.....	.94	.86	1.26	.97	.76	1.47	1.09
Other.....					2.00		.13
Labor.....					1.34		.09
Other expense.....					.66		.04
Total.....	36.38	37.47	34.38	32.74	37.24	40.07	36.26
Labor.....	23.42	24.68	21.14	21.52	25.22	24.42	23.07
Other expense.....	12.96	12.79	13.24	11.22	12.02	15.65	13.19
Filling yarn conversion cost:							
Carding and combing.....	9.32	11.16	12.30	13.04	6.33	13.16	11.27
Labor.....	5.29	7.14	7.41	8.32	4.08	7.82	6.85
Other expenses.....	4.03	4.02	4.89	4.72	2.25	5.34	4.42

Spinning.....	36.52	28.91	26.86	17.54	19.49	31.93	28.64
Labor.....	23.70	18.76	16.23	11.20	13.87	19.89	18.14
Other expenses.....	12.82	10.15	10.63	6.34	5.62	12.04	10.50
Other.....	.10				2.10		.16
Labor.....	.06				1.36		.10
Other expenses.....	.04				.74		.06
Total.....	45.94	40.07	39.16	30.58	27.92	45.09	40.07
Labor.....	29.05	25.90	23.64	19.52	19.31	27.71	25.09
Other expenses.....	16.89	14.17	15.52	11.06	8.61	17.38	14.98
Total warp-yarn cost.....	76.03	76.04	72.51	69.17	76.41	80.77	75.06
Total filling-yarn cost.....	86.69	77.61	76.56	65.32	67.16	84.25	78.29

¹ Averages are based on reports on 4 to 20 yarns from 4 to 12 mills. In calculating the averages, each yarn reported was given a weight of 1. Tests show that differences between averages obtained by giving each yarn reported a weight of 1 and those obtained by weighting each yarn by the quantity produced usually are substantially less than the standard error of the mean.

² Differences between the gross and net cotton costs are accounted for by credits for waste sold.

Primary data assembled by Tariff Commission for Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

TABLE 29.—Average yearly combed cotton-yarn prices, margins, and cotton prices, 1926-45

Year	Combed peeler yarn				Prices of cotton	
	36s		40s		Actual ¹	Adjusted ²
	Price per pound	Margin	Price per pound	Margin		
	Cents	Cents	Cents	Cents	Cents	Cents
1926	52	31.9	58	37.9	17.5	20.1
1927	52	32.0	55	35.0	17.4	20.0
1928	52	29.6	54	31.6	19.5	22.4
1929	53	31.7	54	32.7	18.6	21.4
1930	45	29.9	47	31.9	13.2	15.2
1931			37	27.5	8.3	9.5
1932	31	23.8	31	23.8	6.3	7.2
1933			41	31.3	8.5	9.8
1934	48	33.8	46	31.8	12.4	14.3
1935	43	29.1	45	31.1	12.1	13.9
1936	40	25.8	42	27.8	12.4	14.3
1937	43	29.5	44	30.5	11.8	13.6
1938	34	23.8	35	24.8	8.9	10.2
1939	35	24.3	37	26.3	9.3	10.7
1940	37	25.3	38	26.3	10.2	11.7
1941	47	31.1	49	33.1	13.9	16.0
1942	53	30.9	56	33.9	19.3	22.2
1943	54	30.4	56	32.4	20.6	23.7
1944	55	30.7	54	29.7	21.2	24.4
1945	64	38.1	62	36.1	22.6	26.0

¹ Cotton prices, Middling Spot, $1\frac{1}{16}$ -inch cotton in 10 markets.

² Cotton prices adjusted to poundage required to produce 1 pound of yarn (1.15 factor).

Adapted from BACKMAN and GAINSBURGH, ECONOMICS OF THE TEXTILES INDUSTRY (4).

MEANS AND IMPORTANCE OF IMPROVEMENT

Improvements in the manufacture of cotton yarn may result from using the qualities of cotton that are relatively best adapted, physically and economically, to production of the various products, and from increasing the efficiency of the manufacturing operations. Better adjustments in qualities of cotton used would need to be based on rather detailed analysis of mill operations, under more or less controlled conditions, to show the differences in value for mill purposes of cotton of different qualities though physically usable in the production of specified products. Differences in value for mill purposes are made up of a combination of differences in processing costs and in quality of products, as a result of differences in the quality of the cotton used. Data showing such differences in value for mill purposes, along with data showing differences in costs of cotton as a result of differences in quality, would need to be combined to show the quality of cotton relatively best adapted to the production of specified products.

Progress has been made in developing some of the information needed for use as a basis for adjusting the quality of cotton used to mill requirements (42). But, for best results, these adjustments would need to be based on more nearly complete information designed to show more specifically the influence of the differences in quality of cotton on its value for use in the manufacture of specified products, on costs to mills, on costs of producing the cotton, and on prices to farm producers. Differences in costs of cotton to mills as a result of differences in quality, over extended periods, may reflect differences in costs of production. But the market mechanism may be such that prices to growers may reflect only a part of the differences in value for mill purposes as a result of differences in quality of the cotton. Under such conditions price incentives to growers would be at variance with the best adjustments in quality of cotton produced to mill requirements, in accordance with the principle of comparative advantage.

This information concerning differences in value for mill purposes, in costs of production, and in prices on the basis of quality, if reasonably complete and integrated, would supply a basis for arriving at approximations to the best adjustments in quality of cotton to mill requirements. But developments in technology, in plant breeding, and in other factors may result in considerable changes in the qualities of cotton relatively best adapted to the production of particular products.

The principal methods for obtaining the qualities of cotton desired by mills are by description in terms of the official standards for grade and staple length, by matching private types, by fiber laboratory tests, and by variety or area of growth. During the 1950-51 season, about 72 percent of the purchases for grade and 88 percent of those for length of staple were made on description in terms of official cotton standards. Smaller proportions of the purchases were made on the basis of private type, laboratory tests, variety, and area of growth (80).

Possibilities of making substantial reductions in manufacturing costs are indicated by the results of a study of the carded-cotton-yarn industry. The study was designed to show how manufacturers of cotton-yarn could increase efficiency and reduce costs. It was made for the United States Department of Agriculture on contract by the Ralph E. Loper Co., a textile-costs engineering firm, with the cooperation and assistance of the Carded Yarn Association, Inc. Detailed costs data for a representative sample of manufacturers of carded cotton yarn were assembled and analyzed to show the influences of various factors on efficiency and costs at each important stage or process in the manufacture of specified kinds of yarn under actual operating conditions. Detailed specifications, based on cost engineering data and other information, were prepared for model low-cost establishments for manufacturing typical kinds of carded cotton yarn. The more desirable buildings, floor plans, machinery and equipment, labor requirements, draft programs, and production data, were shown along with data relating to costs for the different processes and operations. Conclusions regarding the possibilities of, and the

most feasible means for, increasing the efficiency and reducing the costs of manufacturing carded cotton yarn were based on the results of the analyses for the representative sample of establishments, on the results indicated for the model low-cost establishments, and on the contractor's best cost engineering knowledge of, and experience with, the industry.

Results show that total costs of manufacturing 10s yarn, for example, by the mills surveyed ranged from 12.88 cents a pound to 17.78 cents and averaged 15.05 cents. Similar costs indicated for the model mill totaled 10.54 cents a pound. They were 4.51 cents, or about 30 percent, lower than the average for all mills and 7.24 cents, or about 40 percent, lower than for the mill with the highest costs (table 30). Differences in costs for mills spinning 20s and 30s yarns followed much the same pattern. Such differences in manufacturing costs apparently indicate that eco-

TABLE 30.—Average cost per pound to manufacturers of specified kinds of carded cotton yarns, by specified mills, United States, May 1950¹

Mill	10s hosiery yarn					
	Total cost ²	Net cotton cost ³	Manufacturing cost			
			Total	Labor ⁴	Overhead	Other ⁵
	Cents	Cents	Cents	Cents	Cents	Cents
B.....	55.75	30.15	15.60	9.76	3.67	2.17
F.....	53.24	38.64	14.60	8.52	4.06	2.02
H.....	52.68	36.88	15.80	8.24	4.78	2.78
J.....	52.03	39.15	12.88	7.52	2.87	2.49
K.....	52.73	38.62	14.11	8.02	3.66	2.43
N.....	52.79	38.45	14.34	7.50	4.34	2.50
R.....	52.62	38.24	14.38	9.01	2.83	2.54
S.....	53.09	36.21	16.88	11.00	3.36	2.52
T.....	54.96	37.18	17.78	11.37	3.78	2.63
V.....	52.96	38.75	14.21	7.59	3.83	2.79
Average ⁶	53.28	38.23	15.05	8.85	3.72	2.48
Model.....	50.06	39.52	10.54	4.50	3.78	2.26
	20s hosiery yarn					
B.....	60.33	40.15	20.18	12.71	5.23	2.24
F.....	57.89	38.64	19.25	11.22	5.90	2.13
H.....	59.17	36.88	22.29	11.97	7.31	3.01
I.....	57.51	37.19	20.32	10.44	7.44	2.44
J.....	57.30	39.15	18.15	11.27	4.19	2.69
K.....	57.99	38.62	19.37	11.28	5.51	2.58
N.....	59.17	38.45	20.72	11.27	6.73	2.72
O.....	57.45	38.85	18.60	10.22	6.15	2.23
R.....	57.63	38.24	19.39	12.45	4.24	2.70

See footnotes at end of table.

TABLE 80.—Average cost per pound to manufacturers of specified kinds of carded cotton yarns, by specified mills, United States, May 1950¹—Cont.

Mill	20s hosiery yarn					
	Total cost ²	Net cotton cost ³	Manufacturing cost			
			Total	Labor ⁴	Overhead	Other ⁵
	Cents	Cents	Cents	Cents	Cents	Cents
T.....	59.22	37.18	22.04	14.01	5.30	2.73
U.....	62.46	39.94	22.52	12.97	6.67	2.88
Average ⁶	58.74	38.48	20.26	11.80	5.88	2.58
Model.....	55.97	39.92	16.05	7.05	6.64	2.36

¹ Data are for 15 mills selected to constitute as nearly as possible a representative cross section of the various types of conditions of carded cotton-yarn mill operations.

² Selling expenses are not included. These expenses averaged 2.68 percent of sales.

³ Cotton costs adjusted for waste sold. Cotton used by the mills surveyed ranged from Strict Low Middling to Strict Middling in grade and from $1\frac{1}{16}$ inch to $1\frac{1}{2}$ inches in length of staple; whereas, the cotton specified for model mills was Middling 1 inch for 10s yarn and Middling $1\frac{1}{2}$ inches for 20s yarn. Gross waste for the mills surveyed (percentage of cotton opened) averaged 13.43 percent for 10s hosiery yarn and 13.40 percent for 20s hosiery yarn. Net waste (after credit for value of waste) averaged 10.03 percent for 10s hosiery yarn and 9.85 percent for 20s hosiery yarn. For model mills a gross waste of 14 percent and a net waste of 10.8 percent were used.

⁴ Includes all labor on payroll except superintendence which is included in overhead costs.

⁵ Includes costs of social security and old-age benefits, vacation pay, packing materials, and freight.

⁶ Straight or simple average.

Adapted from COSTS OF MANUFACTURING CARDED COTTON YARN AND MEANS OF IMPROVEMENT (79).

conomic applications by some manufacturers of carded cotton yarn are lagging far behind technological developments within the industry. The result is that manufacturing costs are substantially higher than would be the case if the economic benefits of technological developments were fully utilized (79).

These differences in manufacturing costs are largely accounted for by differences in costs of labor. Costs of labor for 10s yarn, for example, range from 7.50 cents a pound to 11.37 cents and average 8.85 cents for the mills surveyed, compared with 4.50 cents for the model mill. That these differences in costs of labor are accounted for mainly by differences in quantity of yarn produced per man-hour, is indicated by the fact that production of 10s hosiery yarn per man-hour by the mills surveyed ranged from 41 to 66 percent and averaged 55 percent of that indicated for the model mill (table 81). Average costs of labor by departments for

the mills studied exceeded those indicated for the model mills by amounts ranging from 43 percent for drawing to 181 percent for fly frames, for 10s hosiery yarn; and from 14 percent for opening and picking to 147 percent for fly frames, for 20s yarn (table 32.)

Such differences in unit labor costs emphasize the importance of making adjustments to increase efficiency and to reduce costs.

TABLE 31.—Average production per man-hour, wage rate, and labor cost to manufacturers of carded cotton yarn, by mills and by kind of yarn, United States, May 1950¹

Mill	10s hosiery yarn		
	Production per man-hour	Average hourly wage rate	Average labor cost per pound
	Pounds	Dollars	Cents
B.....	9.56	0.9331	9.76
F.....	11.68	.9952	8.52
H.....	13.71	1.1325	8.21
J.....	14.39	1.0822	7.52
K.....	13.30	1.0667	8.02
N.....	13.79	1.0339	7.59
R.....	11.16	1.0059	9.01
S.....	9.81	1.0787	11.00
T.....	9.55	1.0856	11.37
V.....	15.16	1.1508	7.59
Average ²	12.73	1.0617	8.34
Model.....	23.08	1.0384	4.50
20s hosiery yarn			
B.....	7.34	0.9331	12.71
F.....	8.87	.9952	11.22
H.....	9.46	1.1325	11.97
J.....	9.39	.9802	10.44
K.....	9.60	1.0822	11.27
N.....	9.46	1.0667	11.28
O.....	9.17	1.0339	11.27
R.....	9.28	.9486	10.22
S.....	8.08	1.0059	12.45
T.....	7.75	1.0856	14.01
U.....	9.60	1.1674	12.97
Average ²	8.99	1.0524	11.71
Model.....	14.72	1.0376	7.05

¹ Data are for 15 mills selected to constitute as nearly as possible a representative cross section of the various types of conditions of operations in carded cotton-yarn mills.

² Weighted average.

Adapted from COSTS OF MANUFACTURING CARDED COTTON YARN AND MEANS OF IMPROVEMENT (79).

If adjustments were made so that costs of labor for each department in each of the mills surveyed approximated that for the operator with the lowest cost for that department, total costs of labor for 10s yarn, for example, would be reduced 15 percent for the lowest-cost mill, 44 percent for the highest-cost mill, and 28 percent on the average for all mills combined. Adjustments to approximate the conditions indicated for model mills would result in even greater reductions. Such adjustments probably would require the use of new and improved machinery and equipment, and the additional costs involved might offset some of the savings in costs of labor.

Some of the more promising means of increasing the efficiency and reducing the costs of manufacturing cotton yarns, as indicated by the results of the study relating to the carded-yarn industry, include increased use of new and modern machinery, especially opening and picking equipment, long-draft fly frames, and long-draft larger-package spinning machines; some rearrangement of machinery for better flow of the work and more efficiency operations, better lighting, evaporative cooling, and better humidification; increased machine assignments and the equalization of reasonable work loads for machines and employees; and adjustments in size of mills and in number of counts spun.

The relative importance of such improvements, from the viewpoint of costs, may be indicated by the fact that a reduction of 25 percent in gross margins for manufacturing cotton yarn would result in savings which would average more than total costs of ginning and baling, more than half of total merchandising costs for the raw cotton used, almost 10 percent of returns to growers for farm production of the cotton used, and about 1 percent of the costs to consumers of the finished apparel and household textiles made of cotton. Such savings might be used to increase returns to farm producers, reduce costs to consumers, and to expand market outlets.

COTTON FABRIC MANUFACTURING

This section of the report is concerned mainly with manufacturers of cotton broad-woven fabrics more than 12 inches in width, but some data are presented for establishments primarily engaged in weaving or braiding fabrics 12 inches or narrower in width of cotton, silk, rayon or other synthetic fibers. Among important cotton broad-woven fabrics are included duck, osnaburgs, sheetings, print cloth, yarn fabrics, nap fabrics, colored yarn fabrics, fine cotton goods, and bed spread, drapery, and upholstery fabrics.

NATURE, PRACTICES, AND EQUIPMENT

Census reports indicate that establishments primarily engaged in weaving cotton fabrics usually consume more than three-fourths of the cotton yarn produced in the United States, and that in 1947 they produced more than four-fifths of the yarn consumed.

TABLE 32.—Average overhead and labor costs per pound for 10s hosiery carded cotton yarn, by mills and by departments, United States, May 1950¹

Department and item of cost	Mill											Average	Model
	B	F	H	J	K	N	R	S	T	V			
Roving:													
Handling and storage:													
Overhead.....	<i>Cents</i> 0.10	<i>Cents</i> 0.07	<i>Cents</i> 0.24	<i>Cents</i> 0.06	<i>Cents</i> 0.10	<i>Cents</i> 0.13	<i>Cents</i> 0.06	<i>Cents</i> 0.06	<i>Cents</i> 0.04	<i>Cents</i> 0.05	<i>Cents</i> 0.09	<i>Cents</i> 0.06	<i>Cents</i> 0.06
Labor.....	.24	.14	.52	.50	.34	.36	.34	.25	.21	.20	.31	.17	.17
Total.....	.34	.21	.76	.56	.44	.49	.40	.31	.25	.25	.40	.23	.23
Opening and picking:													
Overhead.....	.44	.40	.46	.27	.50	.36	.29	.30	.38	.34	.37	.37	.37
Labor.....	.79	.43	.41	.29	.49	.26	.41	.54	.34	.41	.44	.24	.24
Total.....	1.23	.83	.87	.56	.99	.62	.70	.84	.72	.75	.81	.61	.61
Carding:													
Overhead.....	.76	.93	1.13	.67	.90	.97	.73	.75	.84	.79	.85	1.17	1.17
Labor.....	1.30	.99	1.07	.93	1.04	.81	1.06	1.23	1.07	.87	1.04	.62	.62
Total.....	2.06	1.92	2.20	1.60	1.94	1.78	1.79	1.98	1.91	1.66	1.89	1.79	1.79
Drawing:													
Overhead.....	.33	.30	.32	.19	.22	.24	.18	.29	.28	.22	.26	.29	.29
Labor.....	.67	.48	.41	.44	.46	.39	.35	.97	.78	.36	.53	.37	.37
Total.....	1.00	.78	.73	.63	.68	.63	.53	1.26	1.06	.58	.79	.66	.66
Fly frames:													
Overhead.....	.35	.60	.47	.28	.54	.49	.38	.18	.62	.62	.45	.26	.26
Labor.....	1.10	1.57	.85	.95	1.26	.94	1.44	.59	2.29	1.06	1.21	.43	.43
Total.....	1.45	2.17	1.32	1.23	1.80	1.43	1.82	.77	2.91	1.68	1.66	.69	.69

Total roving cost:													
Overhead.....	1.98	2.30	2.62	1.47	2.26	2.19	1.64	1.58	2.16	2.02	2.02	2.15	
Labor.....	4.10	3.61	3.26	3.11	3.59	2.76	3.60	3.58	4.69	2.90	3.52	1.83	
Total.....	6.08	5.91	5.88	4.58	5.85	4.95	5.24	5.16	6.85	4.92	5.54	3.98	
Spinning:													
Overhead.....	.95	1.08	1.52	1.01	1.05	1.42	.80	1.17	1.10	1.48	1.16	1.29	
Labor.....	2.72	2.57	2.62	2.41	2.47	2.62	2.53	3.60	3.77	2.45	2.78	1.40	
Total.....	3.67	3.65	4.14	3.42	3.52	4.04	3.33	4.77	4.87	3.93	3.94	2.69	
Winding:													
Overhead.....	.65	.63	.46	.35	.29	.59	.33	.52	.47	.28	.46	.28	
Labor.....	2.55	2.18	1.91	1.73	1.66	1.69	2.59	3.33	2.63	2.02	2.23	1.10	
Total.....	3.20	2.81	2.37	2.08	1.95	2.28	2.92	3.85	3.10	2.30	2.69	1.38	
Packing and shipping:													
Overhead.....	.09	.05	.18	.04	.06	.14	.06	.09	.05	.05	.08	.06	
Labor.....	.39	.16	.45	.27	.30	.43	.29	.49	.28	.22	.33	.17	
Total.....	.48	.21	.63	.31	.36	.57	.35	.58	.33	.27	.41	.23	
Total cost:													
Overhead.....	3.67	4.06	4.78	2.87	3.66	4.34	2.83	3.36	3.78	3.83	3.72	3.78	
Labor.....	9.76	8.52	8.24	7.52	8.02	7.50	9.01	11.00	11.37	7.59	8.85	4.50	
Total.....	13.43	12.58	13.02	10.39	11.68	11.84	11.84	14.36	15.15	11.42	12.57	8.28	

¹Data are from a survey of 15 mills selected to constitute as nearly as possible a representative cross section of the various types of conditions of operations in carded cotton-yarn mills.

Adapted from COST OF MANUFACTURING CARDED COTTON YARN AND MEANS OF IMPROVEMENT (79).

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USDA TECHNICAL BULLETINS

UPDATA

MARKETING AND MANUFACTURING SERVICES AND MARGINS FOR TEXTILES

HOWELL, L. D.

2 OF 4

Data on distribution of manufacturer's sales for recent years are not available, but census reports for 1939 indicate that of the broad-woven fabrics 59 percent was sold in the gray, 29 percent in finished form, and 12 percent as fabricated products. Most of the narrow fabrics were sold in finished form.

SIZE AND ORGANIZATION OF PLANT

In 1942 the number of weaving mills manufacturing cotton and rayon broad-woven fabrics totaled 973, according to census reports. Data by size group, as indicated by the number of looms in place, show that about 31 percent of these mills had 100 or fewer looms in place, 31 percent had 101 to 400 looms, 23 percent had 401 to 1,000 looms, and 15 percent had more than 1,000 looms. The proportion of the establishments primarily engaged in the manufacture of cotton broad-woven fabrics that were included in large-size groups, as indicated by the number of employees, increased considerably from 1939 to 1947, according to census reports.

The number of broad looms in place has decreased greatly since 1927. In 1950, according to census reports, the looms totaled about 49 percent less than in 1927 and 18 percent less than in 1939. But increases in number of pounds of yarn consumed and in yards of fabrics produced per loom in place were relatively greater than the decreases in number of looms, with the result that total consumption of yarn and total production of fabrics were substantially greater in 1950 than in the early 1930's (table 33). The number of narrow fabric mills increased considerably from 1939 to 1947, according to census reports.

Many cotton and rayon broad looms are located in the cotton-growing States. In 1949 South Carolina, North Carolina, and Georgia led in total number of looms in the order listed (table 34). The number of broad looms decreased from 1942 to 1949 in each region, with the exception of the Middle Atlantic States which showed a slight increase.

Manufacturers of woven fabrics have been integrated to some extent for many years but, as indicated earlier in connection with the discussion of manufacturers of cotton yarn (p. 72), textile-mill acquisitions reached new high rates during the middle and late 1940's. These acquisitions represented horizontal, interfiber, and vertical integrations. They were brought about mainly through the purchase of assets, mergers, and consolidations (41).

MANUFACTURING METHODS¹¹

Weaving of gray goods in combined spinning and weaving mills necessitates the preparation of warp. Winding and warping are usually the functions of yarn departments or of yarn mills, but slashing and drawing in the warp are functions of weaving departments or weaving mills. Combining several warper beams, each of which contains from 350 to 600 ends of yarns, into a single sheet for weaving, and coating the yarn with a size consist-

¹¹ Based mainly on COTTON GOODS PRODUCTION AND DISTRIBUTION TECHNIQUES, COSTS, AND MARGINS (91).

TABLE 33.—Number of broad looms for cotton, pounds of cotton yarn consumed, and yards of broad-woven cotton goods produced, United States, for specified years to 1950

Year	Broad looms in place ¹	Yarn consumed		Broad-woven goods produced	
		Total	Per loom in place	Total	Per loom in place
	Number	Million pounds	Pounds	Million sq. yds	Square yards
1927	715,046			8,980	126
1931	588,128	2,056	3,496	6,095	119
1935	508,496	2,194	4,315	7,135	140
1939	442,698	2,501	5,649	9,045	204
1945	412,243	3,459	8,391	9,779	237
1946	400,849	3,476	8,672	10,171	254
1947	397,101	3,649	9,191	11,083	279
1948	390,112	3,496	8,964	10,863	279
1949	380,862	3,064	8,064	9,537	251
1950	382,299	3,648	9,542	10,013	262
1951	393,369	3,872	9,843	10,073	256

¹ In place at end of quarter.

² Linear yards.

Adapted from Bureau of Census reports. Facts for Industry.

ing of starches, gums, softeners, penetrants, preservatives, and sometimes of inert loading agents, is an important step in preparing for weaving.

Warp yarns, for fabrics from the sheerest to heaviest, if of single yarns, are given warp sizing or slashing. The main purpose is to increase loom production by giving the warp yarn a protective coating so that it can withstand the chafing action of the loom parts and adjacent strands of yarn. Sizing is sometimes applied to give additional weight to the fabric.

The crosswise thread of a fabric must be on relatively small bobbins to fit into the shuttle, the device used to carry the filling back and forth between and across the warp threads. In combined spinning and weaving mills, most filling is spun directly onto bobbins that are suitable for the shuttle. Weaving mills that buy their yarns usually buy their filling in large packages and rewind it onto filling bobbins. The fairly recent introduction of automatic filling winders has made it desirable for many combined yarn and weaving mills to spin their filling yarns on larger packages, and rewind it onto filling bobbins. This helps to increase production in the weaving room, as the bobbins are cleaner and more uniformly wound. Often filling is given a steam or wetting treatment just before it goes to the loom to eliminate the tendency to kink, to make it run better, and to bring its moisture content up to a standard.

Fabrics are woven with one of three foundation weaves—plain, satin, and twill—or with some combination of these weaves.

Special types include leno weave for such fabrics as marquisette, curtain goods, men's summer shirtings, women's dress goods, and special bags, as those for fruits and laundries, and the terry weave for turkish towels and other uses of terry pile. The cam or plain automatic loom is used for most gray goods and other goods of the plain weave and up to five harness for twill and satin weaves.

Weaving consists of interlacing the crosswise or filling threads with many lengthwise or warp threads. In automatic weaving this is done at a high speed. The loom does not stop unless a warp end breaks, a filling supply gives out, or a part breaks. A loom may run many days without stopping, and yet produce first-quality goods all the time. The quality of the warp yarn is an influential factor in preventing loom stoppage.

Speed of operation depends upon the type of loom, its width, and the construction of cloth being made. The narrower looms can be operated at faster speeds than the wider ones; plain looms, faster than fancy ones; and light-construction fabrics, faster than heavy-construction fabrics.

TABLE 34.—Number of cotton and rayon looms in place, by State and region, 1942 and 1949

State and region	Looms in place		
	February 28, 1942	December 31, 1949	Percentage increase or decrease
Cotton-growing States	<i>Number</i>	<i>Number</i>	<i>Per cent</i>
Alabama	34,870	30,050	83.8
Georgia	54,104	54,208	1
North Carolina	85,383	81,635	9
South Carolina	144,770	135,682	93.3
Other cotton-growing States	43,949	44,431	101.1
Total	363,376	346,009	95.0
New England States			
Massachusetts	56,790	54,951	96.8
Rhode Island and Conn.	35,029	25,506	72.8
Maine, New Hampshire, Vermont	25,201	22,707	90.1
Total	117,020	103,164	88.1
Middle Atlantic States ¹	39,483	39,573	100.2
Midwestern States ²	2,248	2,151	95.7
United States	522,127	492,837	94.4

¹ Includes Arkansas, California, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas, and Virginia.

² Includes Delaware, Maryland, New Jersey, New York, and Pennsylvania. No looms reported in Delaware in 1949.

³ Includes Illinois, Indiana, Michigan, Ohio, and Wisconsin.

Adapted from Bureau of the Census reports. Facts for Industry.

Construction is a term indicating type of weave, width of fabric, warp ends per inch, filling picks (ends) per inch, and weight per yard. One common print-cloth construction requires 2,488 separate warp ends, but only a single filling end. Filling yarn is inserted in producing the fabric at a rate of 80 to 260 picks a minute. For a loom operating at 180 picks per minute, fabric production for print cloth would approximate 5 yards an hour.

Fabrics produced usually are rolled automatically by the loom onto large rolls on wooden or steel cores. The length depends upon the space under the loom, the weight of the cloth, and the length of cut used by the mill. The rolls of fabric are removed, often without stopping the looms, and taken to the cloth room, where they are sewed end to end, rolled into large rolls, cleaned (brushed or sheared) and inspected. These rolls are either shipped directly to finishing plants, or cut into specific length pieces, folded and baled for shipment.

MACHINERY AND EQUIPMENT

Data relating to the number of looms in the cotton, rayon, and related manufacturing industries, by type of machine, show considerable changes from 1942 to 1947 (table 35). The number of most kinds of plain looms decreased but a substantial increase was shown for plain automatic looms with drop box. The total number of dobby and jacquard looms increased.

The number of plain looms in place decreased from 1947 to 1950, then increased in 1951. The number of dobby looms increased from 1947 to 1951. The number of box and jacquard looms increased from 1947 to 1948, then decreased (table 36). The activity of these looms, as indicated by the number active at the end of the first, second, and third shifts, and by the average number of hours per week operated, increased from a low point reached in 1949.

Many of the looms in operation in the United States are not of the most improved type. Some are apparently not in the best of condition. But expenditures for new plants and equipment have increased greatly in recent years. Census reports indicate that expenditures for plant and equipment by manufacturers of cotton and rayon broad-woven fabrics increased from \$121,653,000 in 1947, to \$161,682,000 in 1949, and to \$206,109,000 in 1950, compared with \$30,570,000 in 1939. Expenditures for new machinery and equipment alone totaled \$85,102,000 in 1947, about \$129,741,000 in 1949, and \$173,576,000 in 1950, compared with about \$21,112,000 in 1939. As mentioned earlier, reports indicate that in 1951 about a half billion dollars was spent on building and modernizing hundreds of cotton and rayon mills, and that some 3 billion dollars had gone for that purpose since the end of World War II (38).

CHARGES OR COSTS INVOLVED

Margins for manufacturers of broad-woven fabrics, or the spread between the cost of the raw materials, supplies, parts, and containers, and the value of the products, decreased from about 54 percent of the wholesale value of the products in 1939 to 50 per-

TABLE 35.—Number of looms in the cotton, rayon, and related manufacturing industries, by type of machine, United States, 1942 and 1947

Type of machine	Looms			
	1942		1947	
	Actual	Proportion	Actual	Proportion
Plain:				
With drop box:				
Automatic	14,963	2.9	44,152	9.2
Nonautomatic	8,446	1.6	4,221	.9
Total	23,409	4.5	48,373	10.1
Without drop box:				
Automatic	371,923	71.2	289,908	60.5
Nonautomatic	15,926	3.1	4,515	.9
Total	387,849	74.3	294,423	61.4
Total plain	411,258	78.8	342,796	71.5
Dobby:				
With drop box:				
Automatic			36,314	7.6
Nonautomatic			12,262	2.5
Total	39,870	7.6	48,576	10.1
Without drop box:				
Automatic			69,297	14.5
Nonautomatic			2,978	.6
Total	57,249	11.0	72,275	15.1
Total doobby	97,119	18.6	120,851	25.2
Jacquard:				
With drop box:				
Automatic			5,562	1.2
Nonautomatic			3,897	.8
Total			9,459	2.0
Without drop box:				
Automatic			4,594	1.0
Nonautomatic			1,466	.3
Total			6,060	1.3
Total jacquard	13,750	2.6	15,519	3.3
Total all types	522,127	100.0	479,166	100.0

Adapted from Bureau of the Census reports.

cent in 1947, according to census reports (table 37). Data relating to the value of products manufactured and to the value added by manufacture indicate that these proportions decreased further

TABLE 36.—Average number of looms in place, number active at end of specified shifts, and average hours per week operated, by kind of loom, for the cotton-manufacturing industry, United States, 1947-51

Year	MS IN PLACE				
	Kind of loom				
	All	Plain	Dobby	Box	Jacquard
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1951.....	393,369	322,580	34,924	24,931	10,934
1950.....	379,936	311,229	32,955	23,278	10,474
1949.....	380,862	311,869	32,222	20,197	10,574
1948.....	390,112	320,657	31,303	27,029	11,123
1947.....	397,101	331,633	30,773	24,200	10,495
	ACTIVE AT END OF FIRST SHIFT				
1951.....	372,164	309,025	32,057	22,028	8,154
1950.....	365,377	301,610	31,162	23,907	8,698
1949.....	352,382	291,684	29,202	23,503	7,933
1948.....	378,496	313,265	30,179	25,882	9,170
1947.....	383,840	321,024	29,715	23,202	8,999
	ACTIVE AT END OF SECOND SHIFT				
1951.....	363,264	302,985	31,537	22,219	6,524
1950.....	355,282	295,115	30,536	22,781	6,850
1949.....	337,656	281,261	27,829	22,163	6,403
1948.....	359,523	299,375	28,165	24,847	7,136
1947.....	362,934	306,346	27,163	22,259	7,166
	ACTIVE AT END OF THIRD SHIFT				
1951.....	278,944	239,782	24,195	12,605	2,361
1950.....	255,359	219,024	21,752	12,002	2,581
1949.....	210,168	182,838	16,552	8,864	1,914
1948.....	267,361	179,339	15,454	10,550	2,018
1947.....	169,266	147,569	12,780	6,947	1,970
	AVERAGE HOURS PER WEEK OPERATED ¹				
1951.....	132	136	130	115	71
1950.....	106	109	104	87	56
1949.....	90	93	86	77	47
1948.....	99	102	94	91	56
1947.....	95	97	90	89	67

¹ Per loom in place.

Adapted from Bureau of Census reports. Facts for Industry.

TABLE 37.—*Values, costs, and margins for cotton broad-woven and narrow fabric manufactures, United States, 1939 and 1947*

Item	Broad-woven cotton fabrics		Narrow fabrics ¹	
	1939	1947	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	869,354	3,282,872	82,150	209,273
Cost of materials, supplies, etc. ²	399,190	1,651,704	34,994	93,575
Gross margin.....	470,164	1,631,078	47,156	115,698
Salaries and wages.....	251,180	764,532	27,410	63,286
Salaries.....	26,005	64,661	7,027	12,241
Wages.....	225,175	699,871	20,383	51,045
Fuel.....	8,860	14,983	660	973
Purchased electric energy.....	22,706	32,683	895	1,265
Contract and commission work.....	267	32,827	221	5,303
All other ³	187,151	786,053	17,970	44,871
Proportion of value of products				
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products.....	100.0	100.0	100.0	100.0
Cost of materials, supplies, etc. ²	45.9	50.3	42.6	44.7
Gross margin.....	54.1	49.7	57.4	55.3
Salaries and wages.....	28.9	23.3	33.4	30.2
Salaries.....	3.0	2.0	8.6	5.8
Wages.....	25.9	21.3	24.8	24.4
Fuel.....	1.0	.5	.8	.5
Purchased electric energy.....	2.6	1.0	1.1	.6
Contract and commission work.....	.1	1.0	.2	2.5
All other ³	21.5	23.9	21.9	21.5

¹ Includes cotton, rayon, and silk.

² Includes parts and containers.

³ Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from census data on cotton manufacturers.

to 1950. These margins vary with the raw materials used and the operations involved. Some manufacturers buy cotton yarn and weave it into cloth. Others buy cotton, spin it into yarn, and weave the yarn into cloth. Still others may buy cotton, spin it into yarn, weave the yarn into cloth, and finish or fabricate the cloth into forms ready for ultimate consumers.

Data assembled by the Federal Trade Commission show that during the first half of 1936, for example, gross margins for 67 weaving companies averaged 46 percent of net sales of the cloth

produced and that similar margins for 264 combined spinning and weaving companies averaged 55 percent of net sales (89). Differences in average margins may be accounted for by the fact that raw materials used by exclusively weaving companies are mainly purchased yarns and that these companies limit their processing chiefly to weaving; whereas, the raw materials for combined spinning and weaving companies are largely raw cotton and these companies both spin and weave. Data for 33 textile-manufacturing corporations in 1939 and for 56 in 1940 show that gross margins for individual corporations ranged from less than 40 percent of net sales for those producing mostly coarse gray goods to more than 70 percent for corporations producing the finer products or finished goods and fabricated products (31).

Gross margins for the same manufacturers of cotton fabrics vary considerably from one period to another. Data relating to net sales, costs, and margins for 21 manufacturers of cotton-print cloth show that the manufacturers' gross margins increased from 56 percent of net sales in 1936 to 64 percent in 1941 and then decreased to about 55 percent in 1944 (table 38). Labor and other manufacturing expenses accounted for much larger proportions of net sales during the later 1930's than during the early 1940's, but net operating profits increased early in the 1940's. The proportions of net sales accounted for by gross margins and by labor costs averaged somewhat more, and profits averaged less, for the smaller than for the larger mills. In 1949 and in 1950, the proportions of net sales of broad-woven cotton fabrics accounted for by salaries and wages averaged somewhat greater than in 1947 but less than in 1939, according to census reports.

Gross margins for manufacturers of narrow fabrics decreased from about 57 percent of the value of the products in 1939 to 55 percent in 1947 (table 37). Census reports relating to the value of products and to the value added by manufacture indicate that the proportion of the value of the products accounted for by gross margins for manufacturers of narrow fabrics was less in 1950 than in 1947. Costs of labor accounted for about 30 percent of the value of the products in 1947 and in 1950. Narrow fabrics are made of cotton, silk, rayon, and other synthetic fibers but the manufacturers' margins and costs for those made of cotton are about the same as those made of other fibers (table 39).

Gross margins for manufacturers of cotton cloth vary considerably with changes in prices (table 40). These margins represent the average spread between the value of 17 constructions of unfinished cloth obtainable from a pound of raw cotton and the price of the cotton used (81). The 17 constructions do not include any fine goods for which manufacturers' margins usually are much wider than those for coarse constructions. Prices of cotton used are based on those quoted in central markets and they may average somewhat lower than those paid for cotton delivered to mills in even-running lots.

Manufacturers' gross margins for the 17 constructions, when expressed in cents per pound, usually vary directly with prices of the cloth and of the cotton used, but when expressed as propor-

tions of the prices of the cloth they vary irregularly with prices of cotton and of cloth.

Average margins for the 17 constructions decreased from 16.03 cents per pound of cotton in the 1925-26 season, when prices of cotton averaged 20.45 cents, to 9.43 cents in 1931-32, when prices of cotton averaged 6.26 cents. These margins increased with advances in prices and averaged 56.80 cents in 1947-48, when prices of cotton averaged 34.30 cents, and averaged 46.08 cents in 1950-51, when prices of cotton averaged 42.59 cents (table 40). The proportions of the wholesale value of the unfinished cloth accounted for by these margins ranged from about 41 percent in

TABLE 38.—*Net sales, costs, and margins for 24 manufacturers of cotton print cloth, United States 1936, 1939, 1941, and 1944*

Item	1936	1939	1941	1944
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Net sales	41,341	37,131	65,082	83,956
Net material cost	18,335	15,101	23,279	37,848
Cotton consumed	19,241	15,022	24,154	38,126
Yarn and rayon purchased	3	752	398	1,311
Waste sales	909	673	1,273	1,589
Gross margin	23,006	22,030	41,803	46,108
Labor cost	10,329	9,940	14,691	20,895
Manufacturing expense	6,926	6,860	9,493	11,642
Selling expense	996	866	1,577	2,039
General and administrative expense	886	963	1,114	1,688
Net change in inventory	902	2,288	1,819	1,137
Net operating profit	2,967	1,113	12,779	9,981

Proportion of net sales

	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales	100.0	100.0	100.0	100.0
Net material cost	44.3	40.7	35.8	45.1
Cotton consumed	46.5	40.5	37.1	45.4
Yarn and rayon purchased	.2	2.0	.6	1.6
Waste sales	2.2	1.8	1.9	1.9
Gross margin	55.7	59.3	64.2	54.9
Labor cost	25.0	26.7	22.6	24.9
Manufacturing expense	16.8	18.5	14.6	13.9
Selling expense	2.4	2.3	2.1	2.4
General and administrative expense	2.1	2.6	2.2	2.0
Net change in inventory	2.2	6.2	2.8	1.2
Net operating profit	7.2	3.0	19.6	11.9

¹ Decrease.

² Less than 0.05 percent.

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (91).

TABLE 39.—*Net sales, costs, and margins for manufacturers of narrow fabrics, United States, 1936-39, 1944, and 1945*¹

Item	Cotton and other materials						Cotton, 1945
	1936	1937	1938	1939	1944	1945	
Net sales	<i>1,000 dollars</i> 7,074	<i>1,000 dollars</i> 7,742	<i>1,000 dollars</i> 5,211	<i>1,000 dollars</i> 7,178	<i>1,000 dollars</i> 21,354	<i>1,000 dollars</i> 26,242	<i>1,000 dollars</i> 10,358
Material used	3,209	3,618	2,626	3,735	12,025	14,865	5,963
Gross margin	3,865	4,124	2,585	3,443	9,329	11,377	4,395
Direct labor	840	977	719	900	2,542	2,878	1,408
Indirect labor	475	603	434	566	1,680	1,771	563
Overhead	1,082	943	562	550	1,206	2,068	829
Net change in inventory	² 3	80	177	40	122	196	81
Advertising and publicity	30	42	29	32	65	77	31
Other selling expense	465	375	329	438	718	746	155
General and administrative expense	640	644	553	566	1,129	1,066	424
Operating profit	336	460	³ 218	351	1,867	2,575	904
Other income and deductions	⁴ 14	⁴ 12	⁴ 57	⁴ 16	⁴ 155	⁴ 60	⁴ 23
Profit before income taxes	322	448	³ 275	335	1,712	2,515	881
Income taxes	98	48	8	55	1,090	1,674	543
Net profit after income taxes	224	400	³ 283	280	622	841	338

See footnotes at end of table.

TABLE 39.—*Net sales, costs, and margins for manufacturers of narrow fabrics, United States, 1936-39, 1944, and 1945¹—Cont.*

Item	Proportion of net sales						Cotton, 1945
	1936	1937	1938	1939	1944	1945	
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Material cost.....	45.4	46.7	50.4	52.0	56.3	56.6	57.6
Gross margin.....	54.6	53.3	49.6	48.0	43.7	43.4	42.4
Direct labor.....	11.9	12.6	13.8	12.5	11.9	11.0	13.6
Indirect labor.....	6.7	7.8	8.3	7.9	7.9	6.8	5.4
Overhead.....	15.3	12.2	10.8	7.7	5.6	7.9	8.0
Net change in inventory.....	(⁵)	1.0	3.4	.6	.6	.7	.8
Advertising and publicity.....	.4	.6	.6	.4	.3	.3	.3
Other selling expense.....	6.6	4.9	6.3	6.1	3.4	2.8	1.5
General and administrative expense.....	9.0	8.3	10.6	7.9	5.3	4.1	4.1
Operating profit.....	4.7	5.9	³ 4.2	4.9	8.7	9.8	8.7
Other income and deductions.....	⁴ .2	⁴ .1	⁴ 1.1	⁴ .2	⁴ .7	⁴ .2	⁴ .2
Profits before income taxes.....	4.5	5.8	³ 5.3	4.7	8.0	9.6	8.5
Income taxes.....	1.4	.6	.1	.8	5.1	6.4	5.2
Net profit after income taxes.....	3.1	5.2	³ 5.4	3.9	2.9	3.2	3.3

¹ Reports for each year are for 12 or 13 mills as reported by the Office of Price Administration. Most of the fabrics were woven but some braided fabrics were also included.

² Reduction in inventory.

³ Loss.

⁴ Deduction.

⁵ Less than 0.05 percent.

FROM COTTON GOODS PRODUCTION AND DISTRIBUTION TECHNIQUES, COSTS, AND MARGINS (91).

TABLE 40.—*Prices of unfinished cloth, prices of raw cotton, and mill margins per pound, United States, 1926-51*

Year ending July 31	Cloth prices ¹	Cotton prices ²	Mill margins	
			Actual	Proportion of cloth prices
	Cents	Cents	Cents	Percent
1926	36.48	20.45	16.03	43.94
1927	30.57	15.16	15.41	50.41
1928	34.55	20.33	14.22	41.16
1929	32.82	19.23	13.59	41.41
1930	29.71	16.52	13.19	44.40
1931	22.35	10.18	12.17	54.45
1932	15.69	6.26	9.48	60.10
1933	17.52	7.45	10.07	57.48
1934	29.13	15.18	13.95	47.89
1935	28.72	16.89	11.83	41.19
1936	26.40	13.77	12.63	47.84
1937	30.02	13.43	16.59	55.26
1938	21.35	9.20	12.15	56.91
1939	19.54	9.10	10.44	53.43
1940	22.86	10.18	12.68	55.47
1941	27.47	11.12	16.35	59.52
1942	38.91	18.36	20.55	52.81
1943	40.62	19.99	20.63	50.79
1944	40.68	20.48	20.20	49.66
1945	42.48	21.59	20.89	49.18
1946	46.94	25.62	21.32	45.42
1947	77.98	34.46	43.52	55.81
1948	91.10	34.30	56.80	62.36
1949	65.62	31.78	33.84	51.57
1950	67.13	31.82	35.31	52.15
1951	88.67	42.59	46.08	51.97

¹ 17 constructions of unfinished cloth. Prices per yard converted to approximate quantity obtainable from a pound of cotton.

² Average prices in the 10 designated markets for the quality of cotton assumed to be used in each kind of cloth.

Compiled from COTTON PRICE STATISTICS, Production and Marketing Administration, U. S. Department of Agriculture.

1927-28 and 1934-35 to about 62 percent in 1947-48. In the 1950-51 season, they averaged about 52 percent.

Manufacturers' margins also vary with the kind of cotton cloth produced. Data for combined spinning and weaving mills as reported by the Federal Trade Commission, show that during the first half of 1936 manufacturers' gross margins ranged from an average of 51 percent of the selling price for cotton duck to 66 percent for fine cotton goods, such as cambrie, dimities, and lawns (89). Data for specific kinds of coarse goods, representing averages of three or more constructions produced by two or more mills, show that in 1941 manufacturers' gross margins ranged from less than 53 percent for army duck to more than 68 percent for jeans of the net wholesale value of the products. Similar data

for fine goods show variations from less than two-thirds for combed broadcloth to 79 percent for piques (31).

Detailed data relating to selling prices, costs, and profits for specified kinds of carded- and combed-yarn fabrics in 1944 show that, of the average selling price of 52.12 cents a pound for carded-yarn fabrics, about 46 percent was accounted for by the net cost of cotton, 23 percent by yarn-conversion costs, 21 percent by weaving-shed costs, 3 percent by selling commissions, and 7 percent by net profits (table 41). Of the average selling price of \$1.23 a pound for combed-yarn fabrics, 31 percent was accounted for by net costs of cotton, 30 percent by yarn-conversion costs, 23 percent by weaving-shed conversion costs, 3 percent by selling commissions, and 8 percent by net profits (table 42). Labor accounted, on the average, for 63 percent of the weaving costs for carded-yarn fabrics, and 68 percent for combed-yarn fabrics. Costs and prices varied considerably from one fabric to another as shown by the data presented in tables 41 and 42.

Data relating to costs and margins for specified kinds of duck show that in 1911 manufacturers' gross margins averaged 33.5 percent of net sales and ranged from 29 percent for hose and belting duck to 43 percent for double-filled duck (table 43). Similar data for 1945 show that manufacturers' gross margins averaged 34.6 percent of net sales. Costs of direct and indirect labor accounted for about 70 percent of the manufacturers' gross margins each year.

Manufacturers' gross margins and items of cost for cotton print differ considerably from those for cotton voile (table 44). Data on the distribution of costs of manufacturing textile products in 1950, as prepared by Barnes Textile Associates, Inc., show that, for cotton print, cost of material accounted for 50 percent and cost of labor for 28 percent of the total; whereas, for cotton voile, cost of material accounted for 34 percent and cost of labor 34 percent of the total cost. These differences result mainly from the fact that finer counts of yarn and more labor are required for voile than for print cloth (3).

Net sales and operating profits for manufacturers of cotton textiles increased markedly early in World War II but some reductions were made before the end of the war. A substantial proportion of the increases in profits was absorbed by income taxes (21). Net profits of cotton cloth mills (after adjustments for depreciation, reserves for Federal income and excess-profit taxes, bad debts, miscellaneous reserves and adjustments, but before dividends or withdrawals) increased from 3 percent of net sales in 1945 to almost 10 percent in 1947 and averaged about 5 percent in 1950 (22).

MEANS AND IMPORTANCE OF IMPROVEMENT

The large proportion of the gross margins for manufacturers of cotton fabrics accounted for by costs of labor and the increases in wage rates in recent years emphasize the importance of utilizing labor more efficiently in any attempt at increasing the efficiency and of reducing the costs of manufacturing cotton fabrics.

Hourly wage rates in the cotton-manufacturing industry increased from about 39 cents in 1939 to \$1.29 in December 1951, an increase of about 230 percent. Improvements might be made through increased use of improved machinery and through more efficient organization and operation of the manufacturing establishments.

Indications with regard to the possibilities of, and most feasible means for, increasing the efficiency and of reducing the costs of manufacturing cotton fabrics would need to be based on information similar to that developed for manufacturers of carded cotton yarns as indicated on pages 88 to 93 (79). To obtain such information for manufacturers of cotton fabrics would require the assembly and analysis of detailed cost data for a representative sample of manufacturers to show the influence of the different factors on costs of labor, overhead, and other items at each stage or process in the manufacture of specified kinds of fabrics under actual operating conditions. In addition, detailed specifications for model low-cost establishments for manufacturing typical kinds of cotton fabrics would need to be prepared, on the basis of cost-engineering data and other information. These specifications would show the more desirable buildings, machinery and equipment, floor plans, labor requirements, operating programs, and production data. Detailed cost data for the different processes and operations would need to be developed for the model mill.

Information relating to costs under actual operating conditions for manufacturers of cotton fabrics, along with detailed specifications and operating results for model mills for manufacturing typical fabrics, no doubt would indicate possibilities of, and feasible means for, bringing about substantial improvements in the manufacture of cotton fabrics. Similar information for manufacturers of carded cotton yarn indicates the possibilities of reducing manufacturing costs by amounts ranging up to more than a fourth of the total for some mills. It is reported that cotton-spinning mills are among the industry's most progressive mills, that the average spinning mill is fumbling along with costs and efficiency on a level 10 to 20 years behind the times, and that a similar study in other branches of the industry very likely would turn up an even more startling picture (64). This situation apparently indicates that economic applications are lagging far behind technological developments in the cotton textile-manufacturing industry. As a result costs of manufacturing are substantially higher than would be the case if the economic benefits of technological developments were fully utilized.

In light of the results from the study of manufacturers of carded cotton yarn and from other information, apparently some of the more promising means of increasing efficiency and reducing costs of manufacturing cotton fabrics would include increased use of new and modern machinery, especially of the automatic types; some modernization of buildings and arrangement of machinery for more direct flow of work and more efficient operation; full machine assignments and equalization of reasonable work loads for employees; and adjustments in size of operating units and in variety of fabrics produced.

TABLE 41.—Manufacturers' average selling prices, costs, and profits per pound for specified kinds of carded-yarn cotton fabrics, United States, fourth quarter, 1944¹

Item	Print cloth of types—				Shade cloth	Twill	Pajama checks	All
	I	II	III	IV				
Average width in inches.....	36.7	38.2	37.5	39.2	44.2	39.0	38.8	38.9
Number of ends and picks.....	20 x 12	44 x 36	64 x 56	80 x 80	56 x 52	68 x 68	80 x 80	-----
Average yards per pound.....	22.5	8.7	5.8	4.0	5.7	4.5	4.1	6.7
Average number of pounds of:								
Warp yarn per pound of cloth.....	.651	.576	.559	.530	.559	.503	.536	.560
Filling-yarn per pound of cloth.....	.283	.356	.368	.392	.385	.441	.389	.369
Cost per pound of cloth:	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Net cotton cost.....	24.34	24.05	23.83	24.02	25.01	24.76	23.71	24.11
Warp-yarn conversion cost ²	6.97	7.28	7.19	6.37	7.05	6.29	6.44	6.96
Filling yarn conversion cost ²	3.78	5.01	5.18	5.07	5.31	5.18	5.42	5.06
Conversion cost, weaving shed:								
Slashing and drawing.....	1.61	1.50	1.52	1.35	1.55	1.23	1.19	1.46
Labor.....	.68	.64	.64	.51	.56	.56	.50	.59
Other expense.....	.93	.86	.88	.84	.99	.67	.69	.87
Weaving.....	6.27	8.28	8.39	8.13	9.69	7.59	8.40	8.15
Labor.....	4.35	5.56	5.53	5.43	6.79	5.30	5.80	5.46
Other expense.....	1.92	2.72	2.86	2.70	2.90	2.29	2.60	2.69
Cloth room cost.....	1.85	1.26	.98	.74	1.44	.71	.75	1.05

Labor.....	1.11	.86	.63	.50	1.00	.44	.48	.69
Other expense.....	.74	.40	.35	.24	.44	.27	.27	.36
Total.....	9.73	11.04	10.89	10.22	12.68	9.53	10.34	10.66
Labor.....	6.14	7.06	6.80	6.44	8.35	6.30	6.78	6.74
Other expense.....	3.59	3.98	4.09	3.78	4.33	3.23	3.56	3.92
Total conversion cost.....	20.48	23.33	23.26	21.66	25.04	21.00	22.20	22.68
Total mill cost (cotton and conversion).....	44.82	47.38	47.09	45.68	50.05	45.76	45.91	46.79
Ceiling price.....	53.50	52.50	51.55	50.50	57.75	53.00	52.50	52.12
Less selling, commission, etc.....	1.31	1.40	1.48	1.45	1.63	1.43	1.38	1.45
Net selling (ceiling) price.....	52.19	51.10	50.07	49.05	56.12	51.57	51.12	50.67
Net profit.....	7.37	3.72	2.98	3.37	6.07	5.81	5.21	3.88

¹ Averages are based on reports on 4 to 45 fabrics from 4 to 31 mills. In calculating the averages, each fabric reported was given a weight of 1. Tests show that differences between averages obtained in this way and those obtained by weighting each fabric by the quantity produced usually are substantially less than the standard error of the mean.

² See table 27, p. 82, for details.

Primary data were assembled by Tariff Commission for Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

TABLE 42.—Manufacturers' average selling prices, costs, and profits per pound for specified kinds of combed yarn cotton fabrics, United States, fourth quarter, 1944¹

Item	Lawns of types			Voile	Pongee	Tracing cloth	All
	I	II	III				
Average width in inches	41.0	40.6	39.0	39.0	38.0	39.4	39.7
Number of ends and picks	76 x 72	88 x 80	96 x 100	60 x 52	72 x 100	84 x 90	
Average yards per pound	8.65	7.21	5.8	9.0	6.25	7.2	7.06
Average number of pounds of:							
Warp yarn per pound of cloth	.581	.554	.543	.533	.364	.508	.535
Filling yarn per pound of cloth	143	440	479	441	637	471	465
Cost per pound of cloth:	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
Net cotton cost	39.97	37.92	38.69	34.65	39.25	39.10	38.57
Warp yarn	23.10	21.41	20.77	19.35	14.25	20.07	20.79
Filling yarn	16.87	16.51	17.92	15.30	25.00	18.43	17.78
Warp-yarn conversion cost ²	21.11	20.62	17.92	17.46	13.69	20.30	19.10
Filling-yarn conversion cost ²	18.68	17.23	17.17	13.50	17.81	21.24	17.80
Weaving shed, conversion cost:							
Slashing and drawing	3.46	3.39	3.66	2.79	2.13	3.53	3.39
Labor	1.90	2.09	1.98	1.62	1.25	1.89	1.89
Other expense	1.56	1.30	1.68	1.17	.88	1.73	1.50
Weaving	28.54	25.74	23.78	20.25	24.69	32.00	26.12
Labor	19.38	17.95	15.43	13.59	18.38	22.68	17.74
Other expense	9.16	7.79	8.35	6.66	6.31	10.22	8.38

Cloth room	2.86	2.60	6.32	3.06	1.81	6.77	4.42
Labor	2.51	2.17	4.20	2.34	1.56	5.40	3.34
Other expense	.35	.43	2.03	.72	.25	1.37	1.08
Dyeing, mercerizing, etc.			.75				.25
Labor			.46				.15
Other expense			.29				.10
Total	31.86	31.73	31.51	26.10	28.63	43.20	34.18
Labor	23.79	22.21	22.16	17.55	21.19	29.88	23.12
Other expense	11.07	9.52	12.35	8.55	7.44	13.32	11.06
Total conversion cost	74.65	69.58	69.60	57.06	60.13	81.74	71.08
Total mill cost (cotton and conversion)	114.62	107.50	108.29	91.71	99.38	123.84	109.65
Ceiling price	118.25	113.34	120.99	103.50	108.06	164.02	122.54
Less selling commissions, etc.	3.72	3.24	2.96	2.52	3.88	6.84	3.71
Net selling (ceiling) price	114.53	110.10	118.03	100.98	104.18	157.18	118.83
Net profit	-.09	2.60	9.74	9.27	4.80	33.34	9.18

¹ Averages are based on reports for 4 to 12 mills. In calculating the averages each fabric reported was given a weight of 1. Tests show that differences between averages obtained by giving each fabric a weight of 1 and those obtained by weighting each fabric by the quantity produced usually are substantially less than the standard error of the mean.

² See table 28, p. 85, for details.
Primary data assembled by Tariff Commission for Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

TABLE 43.—Average selling prices, costs, and margins per pound to manufacturers of duck, by specified kinds, United States, 1944-45¹

Item	1944								
	Numbered duck	Single fill-ing	Hose and belting	Chafes fabric	Army duck	Enamel-ing duck	Double filled	Other	Total
Net selling price ²	<i>Cents</i> 42.82	<i>Cents</i> 38.78	<i>Cents</i> 37.52	<i>Cents</i> 40.10	<i>Cents</i> 44.17	<i>Cents</i> 42.37	<i>Cents</i> 42.60	<i>Cents</i> 47.74	<i>Cents</i> 41.48
Cost of cotton in fabric	28.83	26.21	26.78	27.52	28.10	27.68	24.09	28.21	27.60
Gross margin	13.90	12.57	10.74	12.58	16.07	14.69	18.51	19.53	13.88
Direct labor	7.14	8.13	6.81	7.75	11.78	9.90	10.39	9.60	8.38
Indirect labor	2.11	.93	1.07	1.12	1.33	1.06	1.19	2.74	1.47
Administrative	1.37	.72	.54	.65	.32	.86	.73	2.19	.91
Officers' salaries	.54	.40	.41	.41	.52	.34	.57	.78	.48
Loss on seconds	.71	.54	.69	.70	.44	.51	.53	.52	.61
All other	4.17	4.29	2.73	3.41	2.19	2.95	5.05	3.65	3.54
Net margin	³ 2.05	³ 2.44	³ 1.51	³ 1.46	³ .51	³ .93	.05	³ .25	³ 1.51

1945

Net selling price ²	44.69	40.47	39.15	41.85	46.09	44.22	44.45	49.80	43.29
Cost of cotton in fabric.....	29.57	26.89	27.47	28.23	28.82	28.39	24.71	28.88	28.31
Gross margin.....	15.12	13.58	11.68	13.62	17.27	15.83	19.74	20.92	14.98
Direct labor.....	7.78	8.86	7.42	8.44	12.83	10.79	11.32	10.85	9.13
Indirect labor.....	2.30	1.01	1.17	1.22	1.45	1.15	1.30	2.95	1.60
Administrative.....	1.44	.76	.57	.68	.34	.90	.76	2.31	.96
Officers' salaries.....	.57	.42	.43	.43	.54	.36	.60	.84	.50
Loss on seconds.....	.74	.57	.72	.74	.46	.53	.56	.52	.64
All other.....	4.38	4.50	2.87	3.58	2.30	3.10	5.30	3.85	3.72
Net margin.....	³ 2.09	³ 2.54	³ 1.50	³ 1.47	³ .65	³ 1.00	³ .10	³ .40	³ 1.57

¹ The averages are for 4 or more companies and 8 or more fabrics reported for each kind of duck listed. In all, 438 fabrics with a total production of 110,457,000 pounds were included in the survey. The averages for 1945 are adjusted for costs as of Sept. 24, 1945.

² Net selling prices are gross selling prices less commissions on sales and discounts on sales.

³ Loss.
Primary data were assembled by the Office of Price Administration and made available for use only as industry summaries (91).

TABLE 44.—*Cost to manufacturers of cotton print and cotton voile, United States, 1950*

Item	Unit	Cotton print	Cotton voile
Width	Inch	40	39
Sley	Number	80	60
Pick	do	80	52
Warp	do	31s	50s
Filling	do	40s	50s
Cost per yard:			
Materials	Cents	9.86	5.99
Labor	do	5.58	5.95
Administration	do	.45	.46
Expense	do	3.10	3.51
Social security, etc.	do	.19	.70
Selling	do	.42	.51
Defectives	do	.03	.19
Idle equipment	do		.10
Total	do	19.66	17.41

Adapted from materials prepared by Barnes Textile Associates, Inc., and published in *Textile World* (8).

The development and use of improved equipment for manufacturing cotton fabrics were delayed as a result of the war but in recent years substantial progress has been made. According to census reports, expenditures for plant and equipment by manufacturers of cotton and rayon broad-woven fabrics increased from \$30,570,000 in 1939 to \$206,109,000 in 1950. Expenditures for new machinery and equipment alone increased from \$21,442,000 in 1939 to \$173,576,000 in 1950. Trade reports indicate that in 1951 about a half billion dollars were spent on the building and modernization of hundreds of cotton and rayon mills, and that some 3 billion dollars had gone for that purpose since the end of the war (38).

Advances in wage rates emphasize the importance of further increases in the use of automatic and higher-speed machines in the manufacture of cotton fabrics. Mechanical and automatic means of handling materials offer opportunities for substantial reductions in costs. Although the installation of modern materials-handling systems would be expensive for many mills, they are being used and their use apparently could be extended to advantage in cotton-fabric manufacturing for moving yarn to winding and weaving rooms, for moving heavy warps from warpers to slashers and on to weaving rooms, and for bringing rolls of fabrics from weaving rooms to cloth rooms (91).

Information concerning the relationship between size of the operating unit, as indicated by the value of net annual sales, and operating costs and profits of manufacturers indicate possibilities for improvement through increases in size of operating units. Data for 1936, 1939, 1941, and 1944 show that gross operating expenses and labor costs per dollar of sales averaged somewhat greater, and net operating profits averaged less, for manufacturers

of print cloth with annual sales of less than \$1,500,000 in 1936 than for manufacturers with annual sales of more than \$1,500,000 in that year (91). These differences may help to account for the great increases in rate of integration in the textile industry during recent years.

The relative importance of increasing the efficiency of manufacturing cotton fabrics, including dyeing and finishing, may be indicated by data which shows that during recent years gross margins for rendering these services averaged over 50 percent more than gross returns to growers for farm production of the cotton used, about nine times as great as total costs of ginning and merchandising the raw cotton, and almost a fifth of the costs to consumers of finished apparel and household goods.

WOOL MANUFACTURING

Establishments primarily engaged in the manufacture of wool products, which are considered in this section of the bulletin, include scouring and combing plants, yarn mills, manufacturers of woolen and worsted fabrics, finishing plants for wool textiles, manufacturers of wool carpets and rugs, and manufacturers of wool-felt hats and hat bodies.

SCOURING AND COMBING PLANTS.—These establishments are primarily engaged in processing textile fibers to prepare them for spinning. Important processes included in this industry are scouring, carbonizing and blending of wool, and manufacturing tops.

YARN MILLS, WOOL SYSTEM, EXCEPT CARPET.—These establishments are primarily engaged in spinning, twisting, winding, or spooling yarn, except carpet and rug yarns, on the woolen or worsted system. Both weaving and knitting yarns, made by the woolen, Bradford, and French systems, are included. In the main, establishments in this industry are spinning mills, but those primarily engaged in winding or spooling yarn that is spun elsewhere and those that sell yarn spun by others on contract or commission are also included.

MANUFACTURERS OF WOOLEN AND WORSTED FABRICS.—These establishments are primarily engaged in weaving woolen and worsted fabrics more than 12 inches in width. Important products of this industry include woolen and worsted apparel fabrics, household fabrics, industrial and mechanical fabrics, and woven felts and hair cloth.

FINISHERS OF WOOL TEXTILES.—These establishments are primarily engaged in dyeing and finishing woven or worsted fabrics, or in dyeing wool, tops, or yarn. These establishments include those primarily engaged in dyeing or finishing on a commission basis materials owned by others and those primarily engaged in dyeing or finishing their own materials. Most wool yarns and fabrics are dyed or otherwise finished in the spinning or weaving plants in which they are manufactured.

MANUFACTURERS OF WOOL CARPETS, RUGS, AND CARPET YARN.—These establishments are primarily engaged in manufacturing

carpets and rugs made wholly or in part of woolen or worsted yarn and those primarily engaged in spinning woolen or worsted yarns for use in carpets and rugs.

MANUFACTURERS OF WOOL-FELT HATS AND HAT BODIES.—These establishments are primarily engaged in manufacturing wool-felt hat bodies from raw wool and wool waste, in manufacturing wool-felt hats from hat bodies produced in the same establishment, and in manufacturing men's and boys' finished hats from purchased hat bodies.

NATURE, PRACTICES, AND EQUIPMENT

Census reports for 1947 show that 74 wool-scouring and combing plants produced 316,868,000 pounds of tops, of which about 50 percent was for use in their own plants. Two hundred yarn mills, wool systems, except carpet, produced 591,937,000 pounds of yarn, of which about 75 percent was for use in their own plants. About 57 percent of this yarn was spun on the woolen system and 43 percent on the Bradford and French systems. Weaving yarn accounted for about 85 percent and knitting yarn for about 15 percent of the total. About 495 manufacturers of woolen and worsted fabrics produced 464,503,000 pounds of fabrics, exclusive of woven felts, of which about 80 percent was apparel fabric. Most wool yarns and fabrics are dyed or otherwise finished in the spinning or weaving plants in which they are manufactured. "Value of dyeing and finishing" shown for the 59 finishers of wool textiles reported reflect almost exclusively the value of the finishing done by establishments which finish purchased wool materials, and by those which finish materials produced in affiliated spinning and weaving mills. Reports for manufacturers of carpet yarn, carpets, and rugs show 95 plants in 1947 and a total production of 91,160,000 square yards of carpets and rugs. Manufacturers of wool-felt hats and hat bodies constitute a relatively small industry.

SIZE AND ORGANIZATION OF PLANT

The number of combs, spindles, and looms in place may be used to indicate the size or capacity of the wool-manufacturing industry. Census reports show 2,761 worsted combs, 1,786,086 worsted spinning spindles, 1,196,910 woolen spinning spindles, and 34,148 woolen and worsted looms in place in January 1952. Since 1939 the number of looms and spinning spindles has decreased, and the number of combs increased to 1951 (table 45).

The numbers of combs, spindles, and looms active in April 1951 were somewhat greater than in 1950 but were less than in 1947. In 1950 the comb, spindle, and loom hours operated, and the pounds of tops and yarns and linear yards of fabrics produced were substantially greater than in 1939 (table 45). Production of tops per comb hour and of fabrics per loom hour was slightly less, and production of yarn per spindle hour was greater in 1950 than in 1939.

The size of wool-manufacturing companies, as indicated by the number of combs, spindles, or looms in place, varies considerably

TABLE 45.—Average number of looms, spindles, and combs in place; hours operated; and production, for the woolen and worsted manufacturing industry, United States, 1939 and 1947-51

Item	Unit	1939	1947	1948	1949	1950	1951
Woolen and worsted looms in place	Number	42,724	38,572	36,909	36,775	35,934	34,749
Loom hours operated	Thousands	95,198	127,041	127,244	101,452	124,800	109,668
Fabric produced	1,000 pounds	359,775	515,843	497,561	414,382	428,516	367,052
Per 100 loom hours	Yards	378	406	391	408	343	335
Spinning spindles in place:							
Woolen	Thousands	1,777	1,561	1,535	1,443	1,329	1,236
Spindle hours operated	Millions	3,723	4,879	4,852	4,137	4,348	3,768
Yarn spun	1,000 pounds	298,708	338,189	358,131	342,623	358,014	348,695
Per 1,000 spindle hours	Pounds	80	69	74	83	82	93
Worsted	1,000	2,083	1,921	1,863	1,844	1,813	1,792
Spindle hours operated	Millions	4,344	6,103	5,839	4,201	5,535	4,666
Yarn spun	1,000 pounds	188,235	253,748	241,783	181,520	247,664	221,573
Per 1,000 spindle hours	Pounds	43	42	41	43	45	47
Worsted combs in place	Number	2,592	2,656	2,679	2,727	2,750	2,807
Comb hours operated	Thousands	6,968	11,554	11,284	7,540	10,660	7,956
Tops produced	1,000 pounds	207,628	316,868	304,198	201,162	291,528	224,702
Per comb hour	Pounds	30	27	27	27	27	28

Adapted from Bureau of Census reports. Facts for Industry.

TABLE 46.—Number of companies¹ with specified number of indicated kinds of wool manufacturing machinery, United States, at end of 1942, 1945, 1947, and 1949

Number in place	At or near the end of December			
	1942	1945	1947	1949
	Number	Number	Number	Number
Worsted combs:				
100 or more.....	4	4	4	5
50 to 99.....	12	10	11	11
25 to 49.....	11	15	14	13
10 to 24.....	27	26	29	27
Less than 10.....	38	40	38	34
Total.....	92	95	96	90
Spinning spindles French system:				
30,000 or more.....	6	6	6	4
20,000 to 29,000.....	5	5	5	6
10,000 to 19,000.....	9	9	9	10
Less than 10,000.....	6	6	5	9
Total.....	26	26	25	29
Bradford system:				
30,000 or more.....	10	9	10	10
20,000 to 29,000.....	3	3	2	2
10,000 to 19,000.....	19	20	20	21
5,000 to 9,999.....	28	25	26	26
Less than 5,000.....	50	69	62	56
Total.....	110	126	120	115
Woolen:				
15,000 or more.....	8	7	6	6
10,000 to 14,999.....	6	4	5	6
5,000 to 9,999.....	66	61	58	51
3,000 to 4,999.....	75	76	69	69
2,000 to 2,999.....	64	63	66	47
1,000 to 1,999.....	65	77	63	68
Less than 1,000.....	67	60	62	61
Total.....	351	348	329	308
Woolen and worsted broad looms:				
500 or more.....	11	12	12	11
400 to 499.....	4	3	3	6
300 to 399.....	7	7	7	6
200 to 299.....	8	8	9	9
100 to 199.....	46	42	40	43
50 to 99.....	117	100	106	100
25 to 49.....	98	115	111	99
Less than 25.....	117	117	113	109
Total.....	408	404	401	383

¹ Firms operating more than 1 mill filed consolidated reports on machinery activity and each report is counted as a company.

Adapted from BULLETIN OF THE WOOL MANUFACTURERS.

but the distribution by size groups did not change greatly from 1942 to 1949 (table 46).

Census reports relating to size of establishment, as indicated by average number of employees, show wide variations (table 47). Of the total number of wool-manufacturing establishments in 1947, 23 percent averaged less than 20 employees, 29 percent averaged 20 to 99 employees, 39 percent averaged 100 to 499 employees, and 9 percent averaged 500 or more employees. The proportions vary considerably from one segment of the industry to another (table 47).

Most of the wooler and worsted manufacturing establishments are operated under corporate ownership and control. Many of them are operated as independent single units but substantial numbers are operated from central administrative offices. The wool-manufacturing industry is integrated to a considerable extent, as indicated by the fact that large proportions of the tops and yarns produced are for use in the same plants, and that large proportions of the yarns and fabrics are dyed or otherwise finished by the spinning or weaving plants in which they are manufactured. The organization and management of some establishments may have undergone significant changes in recent years for, as indicated in connection with the discussion of manufacturers of cotton yarn (p. 72), integration in the textile industry reached new high rates during the middle and late 1940's (41).

TABLE 47.—*Number of wool-manufacturing establishments with specified numbers of wage earners employed, United States, 1947*

Number of wage earners per establishment	Scouring and combing	Spinning, twisting, winding ¹	Weaving	Dyeing and finishing	All
	Number	Number	Number	Number	Number
2,500 and over			8		8
1,000 to 2,499		2	16	1	19
500 to 999	5	14	27	1	47
250 to 499	5	29	82	2	118
100 to 249	13	45	137	12	207
50 to 99	10	32	66	13	121
20 to 49	10	30	60	16	116
10 to 19	8	11	42	6	67
5 to 9	2	24	22	3	51
1 to 4	1	13	35	5	54
Total	74	200	495	59	828

¹ Except establishments making or processing carpet and rug yarns.

² Includes 20 establishments which carry on no production operations whatever and sell products fabricated on contract or commission.

Adapted from BUREAU OF THE CENSUS, CENSUS OF MANUFACTURES.

MANUFACTURING METHODS¹²

When wool reaches the mill it is sorted, scoured, and carbonized; that used in woollens is blended, carded, and spun into yarn; that used in worsted is carded, combed, made into tops, and spun into yarn; the woolen and worsted yarns are woven into cloth; and the cloth is finished ready for fabricators of apparel, household goods, and industrial products.

WOOL SORTING.—Raw wool reaches the mills in the form of fleeces which usually have been classed and graded and which are loosely packed and shipped in bales or bags weighing, when filled, about 225 to 350 pounds each. As each fleece is made up of wool that differ widely in quality, it is necessary, for best results, to divide or sort the wool in these fleeces on the basis of its spinning quality. This dividing or sorting of the wool in the fleece into different sorts or grades is the first process which grease wool undergoes after it is bought by the manufacturer. Sorting is done on the basis of the fineness, length, soundness, color, and amount of vegetable matter included, and all fibers with similar characteristics are placed in one group. Manufacturers' requirements are used as a guide in sorting and these requirements vary with the type of yarn and cloth to be produced. The higher the quality of the goods to be produced, the more carefully the sorting is done.

WOOL-SCOURING.—Grease wool contains large proportions of impurities which account for wide variations in shrinkage. These impurities are divided into three categories: (1) Natural impurities, including the various oils and fats secreted by the sebaceous glands in the animal skin, referred to as wool fat, and the water-soluble salts from dried perspiration, which are designated as suint; (2) acquired impurities, including sand, dirt, burs, pollen, and other forms of vegetable matter picked up by the sheep from its environment; (3) applied impurities, consisting of tar, pitch, and paint which are used in small quantities for identification purposes, or chemicals which are utilized as preventives of, or treatments for, disease.

Impurities are removed from raw wool by the detergent process through scouring, which is an intricate and important operation. Many difficulties involved in dyeing, carding, combing, drawing, spinning, and finishing processes are attributable to improperly or over-scoured wool. Grease wool is scoured mainly by the soap-alkali process or the solvent process. Most of the wool processed in this country is scoured by the use of alkaline detergents. Technological and operational difficulties have prevented the solvent process from attaining widespread use, despite its acknowledged advantages in both physical and chemical conditions of the scoured products.

BUR-PICKING AND CARBONIZING.—Wool contains varying quantities of vegetable matter, referred to as burs, including burs, seeds, twigs, leaves, or straw, picked up by the sheep in grazing. If these burs are not removed from the wool after it is scoured,

¹² Based mainly on AMERICAN WOOL HANDBOOK (100).

they are broken up into small pieces during succeeding operations, mainly in carding. When present in large quantities, they cause difficulties in manufacturing processes and reduce the quality of the products. Because of these influences, it is highly desirable to remove all vegetable matter from wool at the earliest possible stage of manufacturing. Such removals may be made directly after scouring and drying by the mechanical or bur-picking method or by the chemical method. The choice of methods depends upon the purpose for which the wool is to be used. If wool is to be blended with vegetable fibers, such as cotton or rayon, the chemical method is used. But if it is to be blended with other wools, it may be sufficient to remove most of the vegetable matter by the mechanical or bur-picking method.

Removal of vegetable matter from wool by chemical means is known as carbonizing. Vegetable matter is reduced to carbon by means of acids such as sulfuric or hydrochloric, or by salts such as aluminum chloride. After it is so reduced, it is removed from the wool by mechanical action. The chemical method is superior to the bur-picking method because every trace of the vegetable matter can be removed by carbonizing.

BLENDING AND WOOLEN CARDING.—Virgin wools and other raw materials such as noils, reused and reprocessed wools, rayon staple fibers, and cotton and silk noils must be obtained and properly prepared for wool carding and spinning operations. These preparations may include such operations as bur picking for burry wool, opening for tacky wools or other materials, dusting of dirty or dusty stocks, oiling, mixing or blending, and garnetting for thread waste, depending upon the nature and condition of the stocks. The purpose of blending or mixing is to amalgamate such proportions of the different raw materials used as are required to produce a satisfactory yarn or cloth. Stocks of wool or mixtures of wool and other fibers are oiled to minimize breakage of the wool fibers in opening processes such as rag picking and carding; to reduce fly, waste, and static electricity in carding; and to increase the cohesion of the fibers in loose slivers, thus facilitating drafting, condensing, and spinning. The purpose of garnetting is to break up hard-twisted waste to be included in woollen mixtures by opening the twist in the thread completely, by blending the fibers perfectly, and by delivering the stock in a fluffy, opened condition ready for mixing.

After these stocks have been thoroughly mixed, cleaned, oiled, garnetted, and otherwise properly prepared, they are ready for the carding process. The principal functions of woollen carding are further to open the stocks as a whole, disentangle locks and bunches, straighten the individual fibers so far as required to remove natural impurities, further to mix the stocks and the component parts, and to deliver the stocks in convenient form for transfer to the next card or spinning machine such as laps or roving. These purposes are accomplished by the three card systems generally used in United States mills.

SPINNING WOOLEN YARN.—When wool stocks are converted into roving by the carding processes, they are ready for spinning

into yarn of the required run or cut. Woolen spinning involves three principal operations: (1) Drafting, or final drawing out concerns the last reduction or attenuation of the roving itself to that weight or thickness required in the final woolen yarn. In the mule this is accomplished by a so-called spindle draft instead of a roller draft, as is done on the woolen ring spinner, or in worsted spinning; (2) twisting, or insertion of twist, in the drafted roving gives the yarn sufficient strength for use in knitting or in weaving. On the mule this process is partly combined with drafting, but it is mainly accomplished by spindle twisting. On the woolen ring frame twisting is accomplished by the use of a ring or traveler, and is termed ring twisting; (3) winding-on, or packaging, consists of putting the spun yarn into a form such as cops or bobbins suitable for weaving or knitting operations.

WORSTED CARDING.—When the wool used in worsted has been graded, sorted, scoured, dried, and otherwise properly prepared, it is ready for the carding processes. Worsted carding goes further than woolen carding and is designed mainly: (1) To straighten and separate and, in general, to make long wool fibers lie parallel; (2) to clean the fibers by removing burs, shives, and other extraneous vegetable matter; (3) to blend, distribute, and mix the different lengths and qualities of fibers harmoniously into one uniform quality; and (4) to arrange the fibers into a continuous and convenient sliver of definite weight and thickness. The worsted carder emphasizes the importance of paralleling fibers. He is more interested in the long fibers, whereas the woolen carder is more concerned with sufficient blending.

Worsted carding is performed on one long card as contrasted with the three different cards used in the woolen system. Three types of worsted cards in general use in the United States are: (1) the single-cylinder worsted card, with four licker-ins for long-staple wool (Bradford system); (2) the double-cylinder worsted card, with two licker-ins and dividers for medium cross-bred wools (French and Bradford systems); and (3) the double-cylinder worsted cards, with Burr Breast workers and strippers for fine burry wool (French system). Worsted mills in the United States prefer the double-cylinder card for fine and cross-bred wools, irrespective of the system of drawing or spinning used. The delivery mechanism at the end of the carding process is designed to put the sliver from the doffer of the worsted cards into a convenient form for efficient handling in the processes associated with combing.

WORSTED COMBING.—Card slivers may be backwashed to remove impurities, oiled, and otherwise prepared for the combing operations. The functions of worsted combing are: (1) to remove and separate the short wool fibers below a pre-determined length, (2) to straighten and make the retained long wool fibers lie as parallel as possible, and (3) to remove foreign impurities. In such combing the long fibers are retained, made into comb slivers, and later into worsted top, whereas the shorter fibers are separated out as a fibrous mass known as noils and used as raw material in the manufacture of woolen yarns and fabrics.

TOP FINISHING.—Card slivers from the combing operations may lack uniformity in arrangement of different lengths of fibers and in weight per yard, and the combs may have dried out the wool. The operations known as top gilling or top finishing are necessary to produce a commercial top of standard weight, length, and condition. The specific functions of these operations are: (1) to accomplish thorough blending of all lengths of fibers which the combs do not effect evenly, (2) to continue the straightening and paralleling of the combed wool fibers, (3) to condition the wool for the purpose of restoring the natural amount of moisture to the top, (4) to give the sliver a uniform weight, yard after yard, and (5) to wind it into a ball of convenient size for future handling or sale. Tops finished in this way usually are stored in cellars or in moist storerooms until the wool has had a chance to age.

WORSTED DRAWING.—Worsted drawing constitutes a series of operations designed to convert top slivers into rovings small enough to be spun conveniently into fine, even yarns on spinning machines. Parallelization of the wool fibers is continued in these operations. Drafting operations are used to the extent necessary to reduce the slivers gradually so they can be spun readily into single worsted yarns. Doubling is extensively done to equalize irregularities in thickness or weight of the slivers, which otherwise would result in uneven yarn. Open, cone, and porcupine drawing are systems of drawing generally recognized in the United States. Regardless of the system used, however, all drawing processes depend upon two or more pairs of drafting rolls and packaging the reduced sliver.

WORSTED SPINNING.—The types and sequences of operations involved in worsted spinning, regardless of the system employed, include final drawing-out or drafting, insertion of twist, and winding-on or packaging. The main functions of this spinning is the production, from rovings prepared from drawing operations, of uniform yarns of the desired thickness, requisite strength, surface, handling and appearance, put up in convenient forms such as bobbins, spools, cops, or packages for later manipulation, inspection and use for knitting or weaving.

WEAVING WOOLENS AND WORSTEDS.—Woolen and worsted yarns spun for weaving purposes may require certain preparatory processes which include among others rewinding, beam warping, warp slashing and sizing, reeding the warp, twisting in, and drawing-in before they are ready for weaving operations. The functions of weaving are the formulation of cloth or fabrics by interlacing, at right angles to each other, of two sets of yarns, one running lengthwise in the loom and termed the "warp," and the other running crosswise in the loom and termed the "filing" or "weft." These fabrics are made up of weaves in a variety suitable for specified uses such as men's and women's wear fabrics. To establish and correct any imperfection in woolen fabrics, they are subject to numbering, perching, picking, burling, and mending before they are dyed and otherwise finished.

DYEING AND FINISHING.—In their natural state wool fibers contain pigments which must be removed, either by bleaching or by

ting, to obtain a clear white product. Most worsted and woolen fabrics are especially colored. Grease wool is never dyed and dyeing of scoured wool is limited mainly to blends made by woolen manufacturers. In the manufacture of worsteds, the more common method of coloring is by dyeing the tops, although large quantities of worsted goods are dyed "in the piece" by applying dye to woven fabrics.

Woolen and worsted goods are subjected to further finishing processes which are designed to enhance their quality and attractiveness to purchasers. Types of finishes include the clear, face, and modifications of these two finishes. Both wet- and dry-finishing processes are involved. In wet finishing, operations include dry cleaning, singeing, crabbing, piece scouring, filling, carbonizing, scutching, beaming, wet decating, blowing, and raising. In dry finishing they include extracting, drying or tenting, shearing, brushing, dry decating, damping, pressing, steaming, sponging, examining, stamping, measuring, weighing, folding, inspecting, and shipping.

CARPETS AND RUGS.—Wools used in the manufacture of carpets and rugs are imported from countries where the native sheep have coarse, wiry, tough fleeces. Several grades of this wool are blended to obtain the desired characteristics of the yarn and to keep these characteristics constant from one period to another. Woolen and worsted yarns used in the pile of carpets and rugs are much heavier in size than those used in wearing apparel. Yarns made of cotton, woolen, and linen are used in the back structure of carpets and rugs. Filling, warp, and "stuffer" yarns form the back structure and constitute the weave. After weaving, carpets and rugs receive several finishing processes before they are shipped from the mill.

MACHINERY AND EQUIPMENT

Some indication of the machinery used in wool manufacturing industries may be obtained from census reports showing the number of different kinds of woolen and worsted machinery in place in recent years (table 48). These data show that most of the worsted combs and spinning spindles are of the Bradford system but that recently the number of combs of the French system has increased considerably. Large numbers of the woolen spinning spindles are in woolen mills; the proportion in knitting mills has decreased in recent years. Most woolen and worsted looms are of the broad automatic type. Numbers of broad non-automatic and narrow looms have decreased markedly since 1939.

Most of the looms, spinning spindles, and combs in place for the wool manufacturing industry are located in the New England and Middle Atlantic States, although in recent years numbers in the South have increased considerably (table 49). The South's proportion of the total number of woolen and worsted looms in place increased from about 6 percent in 1939 to more than 12 percent in 1949. The corresponding proportions for woolen and worsted spinning spindles in place increased from 5 percent in 1939 to 8 percent in 1949.

Machinery and equipment in use in the woolen and worsted manufacturing industries is not all of the most improved type or in good condition. Much of it was overworked during World War II and the replacing of badly worn and obsolete machinery and equipment with new and improved types was delayed by shortages. In the postwar period attempts at improvements have been made. Census reports show that expenditures for plants and equipment for woolen and worsted manufactures totaled \$52,053,000 in 1947, \$40,591,000 in 1949, and \$35,500,000 in 1950, compared with about \$9,307,000 in 1939. Of the total expenditures in 1947, \$25,088,000 were for new machinery and

TABLE 48.—Number of machines in place, by kind of machine, for the woolen and worsted manufacturing industries, United States, 1939, 1947, 1949, 1950, and 1951¹

Kind of machine	1939	1947	1949	1950	1951
Woolen and worsted looms:	Number	Number	Number	Number	Number
Pile and jacquard	2	1,700	1,546	1,712	1,730
Broad:					
Automatic	26,816	28,703	28,375	28,817	28,124
Nonautomatic	15,908	6,509	7,523	4,729	4,081
Total	42,724	35,212	35,898	33,546	32,205
Narrow	5,075	1,600	1,331	676	814
Total	47,799	36,812	36,775	35,933	34,749
Carpet and rug looms:					
Broad 8' and up		2,329	2,307	2,332	2,243
Narrow 6'4" and under		3,354	2,901	2,546	2,219
Total		5,683	5,208	4,878	4,462
Woolen spinning spindles:					
Woolen mills	1,464,000	1,281,311	1,183,101	1,076,776	990,715
Knitting mills	145,060	128,900	99,016	91,140	88,426
Carpet mills	168,000	150,981	160,969	158,163	156,968
Total	1,777,000	1,561,192	1,443,086	1,326,079	1,236,109
Worsted spinning spindles:					
Bradford	1,428,000	1,277,551	1,200,735	1,185,024	1,100,106
French	655,000	642,988	643,434	628,342	573,680
Other					117,848
Total	2,083,000	1,920,539	1,844,169	1,813,366	1,791,634
Worsted combs:					
Bradford	1,777	1,681	1,662	1,625	1,643
French	815	975	1,065	1,125	1,164
Total	2,592	2,656	2,727	2,750	2,807

¹ At end of December.

² Probably included in broad nonautomatic looms.

Adapted from UNITED STATES BUREAU OF THE CENSUS, FACTS FOR INDUSTRY.

equipment, \$14,921,000 for new constructions, and \$2,044,000 for used plants, equipment, and land. Expenditures for new plants and equipment totaled \$3,254,000 for scouring and combing plants, \$6,950,000 for yarn mills, \$40,913,000 for manufacturing woolen and worsted fabrics, and \$936,000 for plants finishing wool textiles.

Reports of the Textile World indicate that expenditures and commitments for improvements made by woolen mills increased from less than \$60,000,000 in 1946 to more than \$120,000,000 in 1948, then decreased to less than \$40,000,000 in 1950 (53). Total expenditures and commitments for the textile industry as a whole reached new high levels in 1950 but woolen and worsted mills spent relatively less on expansion and improvement than any other major branch of the industry (53). However, great revolutionary developments are reported in worsted-yarn processing for 1950. Pin drafters were replacing drawing machines in the Bradford, French, and American systems. A number of long-draft systems were set up in the roving and spinning operations, the most sensational of which was the Ambler Superdraft. These develop-

TABLE 49.—Number of looms, spindles, and combs in place in wool manufacturing industry, by geographic division, 1939 and 1949

Geographic division	Woolen and worsted looms ¹		Woolen spinning spindles ²	
	1939	1949	1939	1949
United States	Number 49,679	Number 37,493	Thousands 1,811	Thousands
New England	31,146	21,695	936	750
Middle Atlantic	9,058	8,090	464	339
South	3,095	4,654	154	166
North Central	2,870	2,532	175	139
West	510	522	32	30
	Worsteds spinning spindles		Worsteds combs	
United States	Thousands 2,141	Thousands 1,837	Number 2,592	Number 2,720
New England	1,564	1,267	1,823	671
Middle Atlantic	485	414	674	1,915
South	40	96	95	134
North Central	41	46		
West	11	19		

¹ Includes pile-fabric looms; excludes carpet looms.

² Includes woolen spinning spindles in knitting and carpet mills.

Adapted from UNITED STATES BUREAU OF THE CENSUS, FACTS FOR INDUSTRY, WOOL MANUFACTURING EQUIPMENT IN THE UNITED STATES.

ments are so promising that it is predicted that pin drafters, long-draft spinning, and pot spinning will dominate the new worsted machinery markets in the immediate future (12).

Developments in the combing field have been less sensational but interesting developments in this section of the industry are expected (12). As the Ambler system has shown that twist is helpful in achieving long draft and that it is the best method of fiber control, other long-draft mechanisms may be built on these principles. With new and improved machinery, considerable savings could be made and lower production costs could be realized by proper selection and use of this machinery (12).

CHARGES OR COSTS INVOLVED

In 1947 gross margins, or the spread between the value of the products and the costs of materials, supplies, parts, and containers averaged about 47 percent for all manufacturers combined and ranged from 38 percent for scouring and combing plants to about 83 percent for finishing plants (table 50). Census reports as to value of products produced and value added by manufacture indicate that gross margins for woolen and worsted manufacturers in 1949 and 1950 were less than in 1939 and 1947. Wages and salaries accounted on the average for 23.5 percent of the value of the products in 1947 and ranged from about 13 percent for scouring and combing plants to 56 percent for finishing plants. Census reports indicate that wages and salaries represented a smaller proportion of the value of the products in 1950 than in 1947.

Margins, taken by manufacturers of woolens and worsteds, vary with the manufacturing processes and with the kind of product turned out. A report on the woolen and worsted textile industry for 1935 shows that margins for 59 spinning companies averaged about 40 percent; those for 27 weaving companies, 33 percent; and those for 153 combined spinning and weaving companies averaged 53 percent of net sales. Margins for 10 companies spinning woolen yarns averaged 39 percent, those for 22 companies spinning worsted yarns averaged 37.5 percent, and margins for 14 companies weaving worsted cloth averaged 40 percent of the selling price. For combined spinning and weaving companies, margins averaged about 52 percent for 4 companies making men's worsted wear, 57 percent for 8 companies making men's woolen wear, and 53 percent for 11 companies making women's woolen wear. The proportion of the manufacturers' gross margins accounted for by costs of labor ranged from 45 percent for combined spinning and weaving companies that produced women's wear fabrics to 55 percent for weaving companies that produced worsted cloth (90).

Information relating to selling prices, costs, and margins for wool tops shows that in 1942, manufacturers' gross margins averaged about 31 percent of the average selling price (table 51). Almost 70 percent of the top-makers' margins were accounted for by conversion costs; more than 9 percent by overhead, general, and administrative expenses; and about 21 percent by other items.

TABLE 50.—*Values, costs, and margins for woolen and worsted manufactures, United States, 1939 and 1947*

Item	1939		1947			
	All plants	All plants	Scouring and combing plants	Yarn mills, except carpet	Woolen and worsted fabric	Finishing wool textile
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	735,905	1,941,846	207,312	336,401	1,369,239	28,894
Cost of materials, supplies, etc. ¹	² 432,882	1,030,645	127,789	198,324	699,547	4,985
Gross margin.....	303,023	911,201	79,523	138,077	669,692	23,909
Salaries and wages.....	172,605	456,731	26,475	75,056	338,928	16,272
Salaries.....	29,111	62,836	5,273	8,873	44,966	3,224
Wages.....	143,494	394,895	21,202	66,183	293,962	13,048
Fuel.....	9,597	19,382	1,193	1,685	15,098	1,406
Purchased electric energy.....	4,584	9,780	1,158	2,825	5,500	297
Contract and commission work.....	² 4,338	60,321	18,949	5,725	35,530	117
All other ³	111,809	364,987	31,748	52,786	274,636	5,817
Proportion of value of products						
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products.....	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, supplies, etc. ¹	58.8	53.1	61.6	59.0	51.1	17.3
Gross margin.....	41.2	46.9	38.4	41.0	48.9	82.7
Salaries and wages.....	23.5	23.5	12.8	22.3	24.8	56.3
Salaries.....	4.0	3.2	2.6	2.6	3.3	11.2
Wages.....	19.5	20.3	10.2	19.7	21.5	45.1
Fuel.....	1.3	1.0	.6	.5	1.1	4.9
Purchased electric energy.....	.6	.5	.6	.8	.4	1.0
Contract and commission work.....	.6	3.1	9.1	1.7	2.6	.4
All other ³	15.2	18.8	15.3	15.7	20.0	20.1

¹ Includes parts and containers.

² A small amount of "Contract work" was included with "Materials, supplies, etc." to avoid disclosing data reported for individual establishments.

³ Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from census data on woolen and worsted manufactures (69).

TABLE 51.—Average selling price, cost, and margin per pound, for wool tops, United States, second quarter, 1942

Item	Grades					
	64's	62's	58's	56's	Other	All
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Average selling price.....	1.564	1.489	1.239	1.238	1.436	1.483
Average cost of wool.....	1.074	1.024	.880	.875	.995	1.024
Gross margin.....	.490	.465	.359	.363	.441	.459
Conversion costs—total.....	.342	.331	.265	.264	.297	.319
Sorting.....	.023	.021	.017	.022	.017	.039
Combing.....	.154	.157	.140	.124	.158	.145
Loss on noils.....	.090	.076	.052	.066	.064	.071
Loss on wastes.....	.058	.064	.052	.052	.046	.051
Loss on off sorts.....	.017	.013	.004	.....	.012	.013
Overhead, general, and administrative.....	.042	.043	.030	.033	.043	.042
Other.....	.106	.091	.064	.066	.101	.098
	Proportion of average selling price					
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Average selling price.....	100.0	100.0	100.0	100.0	100.0	100.0
Average cost of wool.....	68.7	68.8	71.0	70.7	69.3	69.0
Gross margin.....	31.3	31.2	29.0	29.3	30.7	31.0
Conversion costs—total.....	21.8	22.2	21.4	21.3	20.7	21.5
Sorting.....	1.5	1.4	1.4	1.8	1.2	2.6
Combing.....	9.8	10.5	11.3	10.0	11.0	9.8
Loss on noils.....	5.7	5.1	4.2	5.3	4.5	4.8
Loss on wastes.....	3.7	4.3	4.2	4.2	3.2	3.4
Loss on off sorts.....	1.1	.9	.3	.....	.8	.9
Overhead, general, and administrative.....	2.7	2.9	2.4	2.7	3.0	2.9
Other.....	6.8	6.1	5.2	5.3	7.0	6.6
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Reports.....	50	27	4	5	43	129

Computed from primary data assembled by the United States Tariff Commission for the Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

About 8.5 percent of the gross margins was accounted for by the cost of sorting, 31.6 percent by combing, 15.5 percent by losses on noils, 11 percent by losses on waste, and 3 percent by losses on off sorts.

Data relating to average costs of manufacturing specified kinds of woolen and worsted fabrics in 1942 and in 1946 show that the

proportions of total costs accounted for by costs of material ranged from about 49 percent for men's woolen coating to about 58 percent for women's dress goods and suiting in 1942. In 1946, the proportions ranged from 44 percent for men's worsted shirting and suiting to 60 percent for women's woolen dress goods and suiting (table 52). Total costs of yarn, including conversion costs, averaged about two-thirds of the total in 1942 and somewhat less than two-thirds in 1946. Costs of overhead, weaving, burling and mending, finishing, and other items vary considerably from one fabric to another, as shown in table 52.

Gross margins for manufacturers of olive drab military serge, during the last half of 1941 and the first half of 1942, averaged about a fifth of the selling price (table 53). A detailed breakdown of these margins shows that more than half of the total was accounted for by costs of labor. Most of the remainder was accounted for by overhead costs and by profits.

Data relating to the distribution of costs of manufacturing textile products in 1950, as prepared by Barnes Textile Associates, Inc., show that materials accounted for 46 percent of the total costs for wool covert and 53 percent for worsted twill (table 54). Labor costs accounted for about 30 percent of the total for wool covert and 29 percent for worsted twill. The corresponding proportions for selling expense are 7 and 6 percent, respectively.

MEANS AND IMPORTANCE OF IMPROVEMENT

The manufacture of woolen and worsted yarns and fabrics may be improved by using qualities of wool that are relatively best adapted, physically and economically, to production of particular products, and by increasing the efficiency of manufacturing operations. Better adjustments in the qualities of wool used would need to be based on at least fairly complete information designed to show specifically the influences of the differences in the quality of wool on its value for use in the manufacture of specified products, on the costs of the wool to mills, on the costs of producing the wool, and on prices to farm producers. If this information were available, it would supply a basis for approximating the best adjustments in quality of wool to mill requirements, but developments in technology, in wool production, and in other factors may result in considerable changes in qualities of wool that are relatively best adapted to the production of specified products (see p. 88).

Adequate information to be used as a basis for indicating specifically all the means by which and the extent to which it would be possible and feasible to increase the efficiency and to reduce the costs of manufacturing woolen and worsted fabrics is not available. Development of such information would require the assembly and analysis of detailed cost data for a representative sample of operators in each important segment of the industry to show the influence of such factors as kinds of equipment and techniques used, size and organization of the business units, kinds of raw materials used, and other factors on the efficiency and unit costs of labor, and overhead, at each important stage or process under

TABLE 52.—Average cost per yard of manufacturing specified kinds of worsted and woolen fabrics, United States, 1942 and 1946¹

Item	1942					1946				
	Men's wear		Women's dress goods and suiting			Men's wear		Women's dress goods and suiting		
	Shirting and suiting		Coating woolen	Worsted	Woolen	Shirting and suiting		Coating woolen	Worsted	Woolen
	Worsted	Woolen				Worsted	Woolen			
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Material cost.....	1.081	0.706	0.740	0.857	0.791	1.103	0.803	0.954	0.908	0.846
Yarn conversion cost.....	.295	.190	.253	.175	.191	.481	.299	.273	.266	.173
Total yarn cost.....	1.376	.896	.993	1.032	.982	1.584	1.102	1.227	1.174	1.019
Other costs:										
Yarn preparation.....	.032	.016	.012	.055	.015	.051	.024	.017	.071	.015
Weaving.....	.116	.085	.082	.058	.039	.169	.112	.112	.076	.084
Burling and mending.....	.106	.042	.070	.048	.009	.180	.067	.105	.092	.016
Finishing.....	.068	.053	.012	.057	.024	.110	.084	.017	.082	.038
Piece dyeing.....	.007	.005	.006	.031	.004	.011	.007	.008	.035	.006
Shipping.....	(²)			.006	(²)	(²)			.008	.001
Overhead.....	.280	.170	.196	.177	.187	.381	.246	.360	.223	.152
Loss on seconds.....	.002		.061	.033	.002	.004		.051	.036	.004
Selling expense.....	.013		.069	.098	.076	.024		.084	.117	.070
Total other cost.....	.624	.371	.508	.563	.386	.930	.540	.754	.740	.386
Total all cost.....	2.000	1.267	1.501	1.595	1.368	2.514	1.642	1.981	1.914	1.405

See footnotes at end of table.

TABLE 52.—Average cost per yard of manufacturing specified kinds of worsted and woolen fabrics, United States, 1942 and 1946¹—Cont.

Item	1942					1946				
	Men's wear		Women's dress goods and suiting			Men's wear		Women's dress goods and suiting		
	Shirting and suiting	Coating woolen	Worsted	Woolen		Shirting and suiting		Coating woolen	Worsted	Woolen
						Worsted	Woolen			
Proportion of total cost										
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Material cost.....	54.0	55.7	49.3	53.7	57.8	43.9	48.9	48.1	47.4	60.2
Yarn conversion cost.....	14.8	15.0	16.9	11.0	14.0	19.1	18.2	13.8	13.9	12.3
Total yarn cost.....	68.8	70.7	66.2	64.7	71.8	63.0	67.1	61.9	61.3	72.5
Other costs:										
Yarn preparation.....	1.6	1.3	.8	3.4	1.1	2.0	1.5	.9	3.7	1.1
Weaving.....	5.8	6.7	5.4	3.6	5.1	6.7	6.9	5.6	4.0	6.0
Burling and mending.....	5.3	2.3	4.7	3.0	.7	7.2	4.1	5.3	4.8	1.1
Finishing.....	3.1	4.2	.8	3.6	1.8	4.4	5.1	.9	4.3	2.7
Piece dyeing.....	.4	.4	.4	1.9	.3	.4	.4	.4	1.8	.4
Shipping.....	(³)			.4	(³)	(³)			.4	.1
Overhead.....	14.0	13.4	13.0	11.1	13.5	15.2	14.9	18.2	11.7	10.8
Loss on seconds.....	.1		4.1	2.1	.1	.1		2.6	1.9	.3
Selling expense.....	.6		4.6	6.2	5.6	1.0		4.2	6.1	5.0
Total other costs.....	31.2	29.3	33.8	35.3	28.2	37.0	32.9	38.1	38.7	27.5
Total all cost.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

¹ Averages are based on data obtained by survey for 7 woolen and worsted manufacturers. Production by these manufacturers totaled about 15.8 million yards in 1942 and 173 fabrics were reported.

² Less than 0.0005 dollars.

³ Less than 0.05 percent.

Primary data were assembled by Tariff Commission for Office of Price Administration and made available by the latter agency for use only as industry summaries (97).

actual operating conditions. Detailed specifications, based on cost-engineering data and other information, for model low-cost establishments for manufacturing typical kinds of products would need to be prepared to show the more desirable buildings, machinery and equipment, floor plan, labor requirements, operating program, and production data. Detailed costs data for the various processes and operations would also need to be developed.

TABLE 53.—Average selling price, costs, and margins per yard to manufacturers of olive drab military serge, United States, 1941-42¹

Item	Amount per yard	
	Dollars	Percent
Selling price	3.0682	100.0
Net material cost	2.4692	80.5
Purchased yarn	1.4874	48.5
Manufactured yarn .....	.9916	32.3
Less credit for waste .....	.0098	.3
Manufacturers' margins .....	.5990	19.5
Yarn conversion cost .....	.0591	1.9
Warp yarn .....	.0420	1.4
Labor .....	.0268	.9
Overhead .....	.0152	.5
Filling yarn .....	.0171	.5
Labor .....	.0101	.3
Overhead .....	.0070	.2
Weaving cost .....	.1788	5.8
Labor .....	.1065	3.5
Overhead .....	.0723	2.3
Burling, sewing, etc .....	.1082	3.5
Labor .....	.0857	2.8
Overhead .....	.0225	.7
Finishing cost .....	.1522	5.0
Material .....	.0079	.3
Labor .....	.0876	2.9
Overhead .....	.0567	1.8
Shipping cost .....	.0128	.4
Net profit .....	.0879	2.9

¹ Most of the data are for the last half of 1941 and the first half of 1942, but one of the 27 contracts included began in October 1940 and one began in April 1941. Averages are for 5 companies.

Primary data assembled by Accounting Division of Tariff Commission for the Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

TABLE 54.—*Cost to manufacturers of wool covert and worsted twill, United States, 1950*

Item	Unit	Wool covert	Worsted twill
Width.....	Inch.....	58.....	58.5
Sley.....	Number.....	50.....	71.6
Pick.....	do.....	22.....	60
Warp.....	do.....	4 run.....	2/40s
Filling.....	do.....	3 run.....	2/40s
Cost per yard:			
Material.....	Dollars.....	0.9521.....	2.5915
Labor.....	do.....	0.6112.....	1.4185
Administration.....	do.....	.....	.1553
Expense.....	do.....	0.2971.....	.2748
Social security, etc.....	do.....	0.0189.....	.0742
Selling.....	do.....	0.1440.....	.2832
Defectives.....	do.....	0.0280.....	.0677
Total.....	.....	2.0513.....	4.8052

Adapted from materials prepared by Barnes Textiles Associates, Inc., and published in *Textile World* (3).

This information, which would show the influence of the different factors on costs per unit under actual operating conditions, along with detailed specifications and cost data developed for model low-cost operating units, apparently would supply a reasonably adequate base for indicating the most feasible means by which and the extent to which improvements could be made. As operators in the segment of the industry under consideration are in a particularly favorable position to suggest the kinds of information that would be of greatest usefulness to them in reducing their costs, their advice and assistance may be used to advantage in planning and developing the research required. The nature of the woolen and worsted manufacturing industry is such that best results from research of this kind would require the services of competent personnel with broad training and experience in cost engineering relating to the particular segments of the industry under consideration (79).

The importance of using labor more efficiently is emphasized by the fact that wages account on the average for more than 40 percent of the gross margins for manufacturers of woolen and worsted fabrics, and that average hourly earnings of laborers in the woolen and worsted manufacturing industry increased from about 53 cents in 1939 to \$1.55 in December 1951. Apparently labor might be used more efficiently, and unit costs of labor reduced, by extending the use of improved automatic machinery and through more effective adjustments in the organization and operations of the manufacturing establishments.

That progress is being made in the use of more automatic machinery is indicated by data showing that the proportion of the total number of woolen and worsted looms in place that was accounted for by broad automatic looms increased from about 63 percent in 1939 to about 80 percent in 1950. Furthermore, large

increases in expenditures for new machinery and equipment in the postwar period indicate that considerable amounts of badly worn and obsolete machinery and equipment have been replaced in recent years by new and improved equipment. Trade reports indicate important developments in worsted-yarn processing in 1950, but woolen and worsted mills apparently spent relatively less on expansions and improvements in that year than any other major branch of the textile industry (53).

The relative importance of reducing costs of manufacturing woolen and worsted fabrics may be indicated by data showing that gross operating margins for manufacturers of these products averaged, during 1939, 1947, 1949, and 1950, about 14 percent of the consumer's dollar paid for finished apparel and household goods made of wool. These margins amounted to about as much as returns to growers for farm or ranch production of the wool used and to more than five times as much as total costs of merchandising the raw wool.

RAYON, ACETATE, AND SILK MANUFACTURING

Consumption of cellulose by the United States rayon and acetate industries in the manufacture of rayon and acetate totaled 1,181 million pounds in 1950, of which 912 million pounds were obtained from wood pulp and 269 million pounds from cotton linters (table 55). Production of rayon and acetate totaled 1,260 million pounds, of which 954 million pounds were filament yarn and 306 million pounds were staple and tow. Consumption of cellulose and production of rayon and acetate increased from less than 300 million pounds in 1935 to about 1,200 million pounds in 1950 (table 55). The proportion of the cellulose obtained from wood pulp ranged

TABLE 55.—Consumption of cellulose and production of rayon and acetate, United States, by specified years

Year	Cellulose consumption			Rayon and acetate produced		
	Wood pulp	Linters pulp	Total	Filament yarn	Staple fibers	Total
	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds
1935.....	172	102	274	257	5	262
1937.....	264	88	352	321	20	341
1939.....	290	90	380	320	51	380
1941.....	420	146	575	451	122	573
1945.....	594	206	800	624	168	792
1947.....	791	162	956	747	228	975
1948.....	870	209	1,079	856	268	1,124
1949.....	697	256	953	801	195	996
1950.....	912	269	1,181	954	305	1,259
1951.....	1,031	202	1,233	958	336	1,294

Adapted from Rayon Organon (61, 60).

from 56 percent in 1934 to 88 percent in 1942. In 1950 it was 77 percent. The proportion of the total rayon and acetate fiber produced that was accounted for by staple and tow increased from less than 2 percent in 1935 to about 24 percent in 1950.

Net deliveries of raw silk to United States mills totaled about 8.4 million pounds in 1950 compared with about a half million pounds in 1945. During the first 2 months of 1951, net deliveries of raw silk delivered to United States mills totaled 1.57 million pounds, compared with about 1.15 million pounds for the corresponding period in 1950. Japanese statistics indicate that 38,895 bales of 132.25 pounds each, or about 45 percent of the total raw silk, and 8,368 bales, or 92 percent of the Dupioni silk, exported in 1950 went to the United States (62).

Data relating to rayon and acetate filament yarn indicate that, of the total domestic shipment of 949 million pounds in 1950, about 8 percent was for knit goods, 58 percent for woven goods, 32 percent for tires and related uses, and 2 percent for miscellaneous uses. The proportions accounted for by tires and related uses and by broad-woven goods increased markedly during the 1940's (61).

NATURE, PRACTICES, AND EQUIPMENT

Production of rayon and acetate filament yarns and staple used in the manufacture of textile mill products represents a rapidly expanding industry in the United States. In 1951 the output of this industry was about 10 times as great as in 1930 and about 2½ times as great as in 1940. During the middle 1940's this industry was composed of 15 concerns, the largest 4 of which accounted for about three-fourths of the rayon produced (91).

The relative importance of rayon, acetate, and other man-made fibers has increased markedly in recent years (table 56). The proportion of the total raw poundage of "apparel-type" textile fibers (cotton, wool, silk, and rayon and other man-made fibers) consumed by United States mills that was accounted for by rayon and acetate increased from 6.9 percent in 1937 to 19.7 percent in 1950. Other man-made fibers increased from 0.2 percent in 1941 to 2.1 percent in 1950. Adjusting raw poundages for differences in waste involved indicate that the "utility poundage" of man-made fibers accounted for about 25.5 percent of the total in 1950 (61). In addition to increases in quantities, man-made fibers apparently have improved in quality, although no accurate measure of the extent of this improvement is available.

Some indications of the changes in relative importance of rayon, acetate, and other man-made fibers in the manufacture of apparel, household fabrics, and industrial products may be obtained from data relating to consumption of the different fibers in these products (62). These data show that the proportion of the total quantity of fibers consumed in each of these end-use products that is accounted for by man-made fibers increased markedly from 1937 to 1949. The increase for men's and boys' apparel was from 4.2 percent in 1937 to 10.5 percent in 1949; that for women's and children's apparel, from 24.5 percent to 36.5 percent; that for

TABLE 56.—Mill consumption of specified fibers, United States, by specified years

Year	Cotton	Wool	Man-made		Silk	Total
			Rayon and Acetate	Others		
	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds
1935	2,754.7	417.5	259.1		62.3	3,493.6
1937	3,657.1	380.8	304.7		53.6	4,396.2
1939	3,629.7	396.5	458.8		47.3	4,532.3
1941	5,187.3	648.0	591.8	13.0	23.4	6,463.5
1945	4,511.3	645.1	769.9	52.0	.5	5,978.8
1947	4,668.1	708.3	987.9	50.0	2.0	6,416.3
1948	4,461.2	704.5	1,149.0	75.0	7.4	6,397.7
1949	3,828.2	511.0	992.1	92.0	4.4	5,437.7
1950	4,680.1	647.0	1,351.4	145.0	8.4	6,831.9
1951	4,908.1	489.4	1,276.3	210.0	5.8	6,889.4
Proportion of total						
	Percent	Percent	Percent	Percent	Percent	Percent
1935	78.9	11.9	7.4		1.8	100.0
1937	83.2	8.7	6.9		1.2	100.0
1939	80.1	8.8	10.1		1.0	100.0
1941	80.3	10.0	9.1	0.2	.4	100.0
1945	75.4	10.8	12.9	.9	(1)	100.0
1947	72.8	11.0	15.4	.8	(1)	100.0
1948	69.7	11.0	18.0	1.2	.1	100.0
1949	70.6	9.4	18.2	1.7	.1	100.0
1950	68.5	9.5	19.8	2.1	.1	100.0
1951	71.2	7.1	18.5	3.1	.1	100.0

¹ Less than 0.05 million pounds.

Adapted from Rayon Organon (61).

household textiles, from 2.8 percent to 6 percent; and that for industrial and miscellaneous products, from 2.2 percent to 21.8 percent (62).

These increases in the proportion of total fibers consumed that was accounted for by man-made fibers were accompanied by substantial reductions in the price ratios of rayon to cotton and wool. The price ratios of rayon viscose staple fibers in relation to average prices of middling $1\frac{5}{16}$ inch cotton in the 10 markets declined from about 283 percent in 1935 to about 93 percent in 1947. In 1950 they averaged 99 percent. Comparable price ratios of rayon staple in relation to prices of territory wool (scoured basis), grades 64's, 70's, 80's (fine combing) at Boston, decreased from 45 percent in 1935 to about 18 percent in 1950. Prices of cotton and wool yarns have advanced much more in recent years than have prices of rayon yarns. The price ratios of viscose rayon yarns, 150 denier, declined from about 158 percent of the price of cotton yarns, combed 30's, in 1939 to 76 percent in 1947. In

1950, it was 78 percent. The price ratios for similar rayon yarns to prices of worsted yarns, Bradford "32's, declined from 50 percent in 1935 to 22 percent in 1950.

SIZE AND ORGANIZATION OF PLANT

Manufacturers of rayon, acetate, and silk products include yarn-throwing mills; yarn-spinning mills, silk system; and manufacturers of rayon, acetate, and related broad-woven fabrics. In addition, manufacturers of tire fabrics, narrow fabrics, thread, and carpets and rugs also use silk, rayon, acetate, and other synthetic fibers. Census reports for 1947 show that 122 establishments were primarily engaged in throwing or twisting filament yarn of silk, rayon, acetate, or other synthetic fibers; that 43 establishments were primarily engaged in spinning yarn on the silk system from silk, rayon, acetate, or other synthetic staples; and that 507 establishments were primarily engaged in weaving fabrics of more than 12 inches in width, except tire fabrics, of silk, rayon, acetate, or other synthetic fibers.

Census data relating to size of establishments, as indicated by average number of employees, show that in 1947 about 14 percent of the yarn-throwing mills had less than 20 employees, 43 percent had 20 to 99 employees, 40 percent had 100 to 499 employees, and 3 percent had 500 or more employees. Similar data for yarn mills, silk system, show 58 percent with fewer than 20 employees, 30 percent with 20 to 99 employees, and 12 percent with 100 to 499 employees. Of the 507 establishments primarily engaged in manufacturing rayon, acetate, and related broad-woven fabrics, about 28 percent had fewer than 20 employees, 36 percent had 20 to 99 employees, 24 percent had 100 to 499 employees, and 12 percent had 500 or more employees.

The census of manufactures for 1947 does not show the type of ownership and operations of rayon and silk manufacturing establishments but reports for 1939 show that more than 80 percent of the establishments primarily engaged in manufacturing rayon and acetate broad-woven goods were owned or controlled by corporations, that about half of them were operated as independent single units, and that half of them were operated from central administrative offices as parts of plural units. About 52 percent of the manufacturers of silk broad-woven goods were owned or controlled by corporations and more than two-thirds were operated independently as single units. Most of the establishments primarily engaged in throwing and spinning rayon and silk yarns were owned or controlled by corporations. Most of the rayon-manufacturing establishments were operated as independent single units, but most of those manufacturing silk were operated from central administrative offices as parts of plural units (69).

As indicated earlier in this bulletin (p. 72), textile-mill acquisitions reached new high rates during the middle and late 1940's. Information available is not adequate for indicating to what extent these developments resulted in changes in size and organization of plants primarily engaged in the manufacture of silk, rayon, acetate, and other synthetic fibers.

MANUFACTURING METHODS

Information relating to the methods involved in the manufacture of rayon and acetate yarns and staples, and to other developments in connection with synthetic fibers, is presented in a report on "The Rayon Industry" by the United States Tariff Commission (98), and no attempt is made to summarize this information in this bulletin. Rayon and acetate staples are processed on the cotton, worsted, and woolen systems and the methods employed in these systems were outlined in an earlier section of this bulletin (pp. 74 and 122). Differences in uniformity of staple, in content of foreign matter, and in other characteristics of rayon and acetate as compared with natural fibers require, for best results, some differences in manufacturing methods. Furthermore, throwing operations for continuous-filament involving doubling and twisting of these filaments into yarns of various sizes in preparation for looms, also differ from operations in processing cotton and wool products. Detailed information relating to the processes involved in the manufacture of rayon and acetate products are presented in "Rayon Technology—A Handbook for Textile Mills", (63) and no attempt is made to repeat them here.

MACHINERY AND EQUIPMENT

As indicated in the sections on cotton yarn and fabric manufacturing (pp. 69 and 96), the numbers of cards, combs, spindles, looms, and other machinery and equipment used in the cotton, rayon, acetate, and related manufacturing industries have changed considerably in recent years. The average number of rayon and acetate spinning spindles in place increased from 1,083,000 in 1947 to 1,240,000 in 1950. This was an increase of almost 15 percent in 4 years, but some decreases were made in 1951 (table 57). Consumption of staple and production of rayon and acetate yarn per spindle hour increased more than 70 percent during these 4 years. The average number of twisting and throwing spindles increased from 1,122,000 in 1947 to 1,612,000 in 1951, an increase of 43 percent (table 57).

The total number of looms in place for the rayon-manufacturing industry increased from 103,914 in 1947 to 117,088 in 1951, an increase of about 13 percent (table 58). Decreases in numbers of plain and jacquard looms were more than offset by increases in dobby and box looms. From 1947 to 1951, a substantial proportion of these looms were active at the end of the second and third shifts. The number of hours per week operated in 1951 averaged 100 for all looms combined and ranged from 46 hours for jacquard to 116 hours for dobby looms.

Apparently substantial improvements in machinery and equipment used in the rayon-manufacturing industry have been made in recent years. Census reports show that in 1947 expenditures for plant and equipment for the manufacture of rayon and related broad-woven fabrics totaled \$44,500,000, or about six times as much as in 1939. Of the total expenditures in 1947, 61 percent went for new machinery and equipment, 30 percent for new construction, and 9 percent for used plants and equipment. Expendi-

TABLE 57.—Average number of rayon and acetate spindles in place, number active by shifts, hours operated, and fibers consumed, United States, 1947-51¹

Spindles and activity	Unit	1947	1948	1949	1950	1951
Spindles:						
Spinning:						
In place.....	Thousand..	1,083	1,174	1,233	1,240	1,218
Active at end of—						
First shift.....	do.....	1,041	1,122	1,122	1,182	1,138
Second shift.....	do.....	993	1,103	1,071	1,140	1,104
Third shift.....	do.....	749	904	819	938	994
Hours operated:						
Aggregate.....	Million.....	6,546	6,551	5,871	6,759	6,777
Per week ²	Number.....	116	107	92	89	95
Fiber consumed.....	Million.....	³ 192	246	212	341	324
Per 1,000 spindle hours..	Pound.....	³ 29	38	36	50	48
Twisting:						
In place.....	Thousand	⁴ 1,122	1,224	1,261	1,526	1,612
Active at end of—						
First shift.....	do.....	⁴ 1,066	1,133	1,039	1,408	1,247
Second shift.....	do.....	⁴ 1,042	1,099	1,018	1,386	1,230
Third shift.....	do.....	⁴ 965	1,024	957	1,318	1,174
Hours operated: Aggregate..	Million..	³ 6,574	7,470	6,393	9,333	2,273

¹ Spindles in place and active at end of specified shifts are averages of the numbers at end of 3-month periods.

² Average number hours per spindle in place.

³ Based on rate for last half of year.

⁴ Based on last quarter of year.

Adapted from BUREAU OF THE CENSUS REPORTS. FACTS FOR INDUSTRY.

tures for plant and equipment by yarn-throwing and yarn-spinning mills, silk system, were more than three times as great in 1947 as in 1939. Most of these expenditures were for new machinery and equipment. Reports on expenditures and commitments for improvements made since the end of World War II indicate that these expenditures and commitments for rayon-weaving mills increased from about \$60 million in 1946 to about \$180 million in 1950 (59).

CHARGES OR COSTS INVOLVED

Census reports relating to value of products and costs for rayon, acetate, and silk manufacturers show that in 1947 manufacturers' gross margins, or the spread between the value of the products and the costs of materials, supplies, parts, and containers, for broad-woven fabrics, averaged 52.4 percent, compared with 39.4 percent in 1939 (table 59). Data relating to the value of the products and to the value added by manufacture indicate that gross margins for manufacturers of broad-woven rayon, acetate, and silk fabrics averaged less in 1949 and in 1950 than in 1947, but greater than in 1939. Salaries and wages, the largest item of cost, averaged about 23 percent of the value of the products in 1939 and in 1947, and census reports indicate that in 1949 and 1950 these proportions were about the same as in 1947.

Manufacturers' gross margins for narrow fabrics, many of which are made of rayon, acetate, and silk, averaged about 55 percent of the value of the products in 1947, compared with an aver-

TABLE 58.—Average number of looms in place, number active at end of specified shifts, and average hours per week operated, by kind of loom, for the rayon and acetate manufacturing industry, United States, 1947-50

Year	LOOMS IN PLACE				
	Kind of loom				
	All	Plain	Dobby	Box	Jacquard
	Number	Number	Number	Number	Number
1951.....	117,068	26,648	48,785	38,024	3,631
1950.....	116,670	29,017	45,836	38,105	3,712
1949.....	112,337	28,645	42,917	36,905	3,870
1948.....	110,930	31,868	38,614	36,446	4,002
1947.....	103,914	31,144	34,862	33,797	4,111
ACTIVE AT END OF FIRST SHIFT					
1951.....	104,302	22,991	45,975	32,975	2,361
1950.....	109,216	27,525	44,302	34,713	2,676
1949.....	102,584	26,364	40,950	32,554	2,716
1948.....	104,505	30,048	37,311	34,028	3,118
1947.....	97,331	29,496	33,460	30,893	3,482
ACTIVE AT END OF SECOND SHIFT					
1951.....	98,937	21,900	45,548	29,875	1,615
1950.....	104,978	26,249	44,139	32,589	2,001
1949.....	97,049	24,708	40,531	29,797	2,010
1948.....	97,601	28,640	36,633	30,434	1,894
1947.....	89,868	27,767	32,428	27,071	2,102
ACTIVE AT END OF THIRD SHIFT					
1951.....	84,380	17,400	43,428	22,828	724
1950.....	88,654	22,147	42,019	23,630	858
1949.....	76,482	18,151	37,402	20,000	929
1948.....	69,478	18,875	31,581	18,373	649
1947.....	60,385	15,961	27,102	16,619	703
AVERAGE HOURS PER WEEK OPERATED ¹					
1951.....	100	91	116	85	46
1950.....	106	107	119	95	56
1949.....	96	95	108	87	55
1948.....	104	102	119	95	56
1947.....	98	94	114	92	59

¹ Per loom in place.

Adapted from BUREAU OF THE CENSUS REPORTS, FACTS FOR INDUSTRY.

TABLE 59.—*Values, costs, and margins for broad-woven rayon, acetate, and silk fabric manufactures, United States, 1939 and 1947*

Item	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	314,855	1,033,995
Cost of materials, supplies, etc. ¹	190,792	477,472
Gross margin.....	124,063	526,523
Salaries and wages.....	73,736	232,072
Salaries.....	8,850	27,081
Wages.....	64,886	204,991
Fuel.....	1,223	3,147
Purchased electric energy.....	1,343	8,178
Contract and commission work.....	3,482	26,078
All other ²	41,279	257,648
	Proportion of value of products	
	<i>Percent</i>	<i>Percent</i>
Value of products.....	100.0	100.0
Cost of materials, supplies, etc. ¹	60.6	47.6
Gross margin.....	39.4	52.4
Salaries and wages.....	23.4	23.1
Salaries.....	2.8	2.7
Wages.....	20.6	20.4
Fuel.....	.4	.3
Purchased electric energy.....	1.4	.8
Contract and commission work.....	1.1	2.6
All other ²	13.1	25.6

¹ Includes parts and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from census data on cotton manufactures.

age of about 57 percent in 1939 (table 37, p. 102). The proportion of the value of the products accounted for by these margins in 1950 apparently was somewhat less than in 1947. Costs of labor accounted for about 30 percent of the value in 1947 and in 1950.

Census reports show that in 1947 gross margins for yarn mills, silk system, averaged 57.6 percent and those for yarn-throwing mills averaged 76.5 percent of the value of the products (table 24, p. 79). Data relating to manufacturers' selling prices, costs, and margins for rayon yarns made from viscose staple fibers show that, in 1942, selling prices averaged 68.93 cents a pound, costs of material averaged 27.55 cents, and the manufacturers' gross margins averaged 41.38 cents, or 60 percent of the selling price

(table 60). Costs of manufacturing averaged 18.24 cents a pound, of which 11.88 cents, or 65 percent, were accounted for by labor costs. Put-up costs averaged 4.38 cents a pound, selling expenses, 3.58 cents, and net margins 15.18 cents. Selling prices, costs, and margins vary considerably with the number and ply of the yarn as shown in table 60.

Data relating to maximum selling prices, costs, and profits for rayon and acetate fabrics show that in 1943 gross margins for manufacturers of specified kinds of rayon and acetate gray goods averaged 35 percent of the maximum selling prices and ranged from 27 percent for combination crepes to 47 percent for spuns (table 61). Costs of material shown for these manufacturers are mostly for yarns used, including costs of throwing. Labor and other manufacturing expenses averaged 26 percent, selling expenses and losses on seconds averaged 1 percent, and profits averaged 5 percent of maximum selling prices. These proportions vary considerably from one fabric to another, as shown in table 61.

Some manufacturers of rayon and acetate fabrics throw some or all of the yarn used. Data on costs of manufacturing rayon crepes show that, in 1943, average throwing costs ranged from 8 percent of the maximum selling price for French crepes to 22 percent for combination crepes (table 62). Costs of labor and overhead ranged from about 21 percent of the maximum selling price for combination crepe to 21 percent for flat crepe. Selling, seconds, discounts, and profits were relatively small items of cost.

The distribution of costs to manufacturers of typical rayon-twill fabrics, based on average costs in profitable mills, shows that in 1950 materials accounted for 60 percent, labor 15 percent, selling 3 percent, defectives 1 percent, and all other expenses 12 percent of the total cost of 28.79 cents a yard (3).

MEANS AND IMPORTANCE OF IMPROVEMENT

As rayon and acetate staple fibers are processed on cotton, woolen, and worsted systems, suggestions made as to improvements in cotton- and wool-manufacturing industries would apply, to some extent, to rayon and acetate manufacturers. The rayon- and acetate-manufacturing industry is relatively new and increases in expenditures for new machinery and constructions from 1939 to 1947 were proportionally much greater for manufacturers of broad-woven rayon and acetate fabrics than for manufacturers of broad-woven cotton, woolen, and worsted fabrics. This and other information indicate that the need for replacing worn and obsolete with new and modern machinery is not so great in the rayon and acetate as in the cotton- and wool-manufacturing industries. Yet expenditures for research designed to bring about improvements apparently represent larger proportions of the total value of products for rayon and acetate than for cotton and wool.

The relative importance of bringing about improvements in the manufacture of products made from rayon, acetate, and silk may be indicated by data showing that gross margins for manufacturers of broad-woven fabrics increased from about 10 percent of

the value of the products in 1939 to 52 percent in 1947. These margins accounted for about 10 percent of the retail value of apparel and household goods made of these materials in 1939 and to considerably more than 10 percent in 1947.

TABLE 60.—Manufacturers' average selling price per pound, costs, and margins for spun viscose rayon yarn, by yarn number and ply, United States, first quarter of 1942¹

Item	Yarn No. and ply				
	9/1— 18/1	30,1	20/2 and 24/2	30/2 and 40/2	All
	Cents	Cents	Cents	Cents	Cents
Selling price.....	61.44	68.05	68.36	81.48	68.93
Material cost.....	27.40	26.84	28.52	27.39	27.55
Gross margin.....	34.04	41.21	39.84	54.09	41.38
Manufacturing cost:					
Opening and picking.....	.74	.72	.90	.64	.75
Labor.....	.43	.42	.45	.36	.42
Overhead.....	.31	.30	.45	.28	.33
Carding.....	1.06	.99	1.32	1.10	1.11
Labor.....	.61	.60	.68	.61	.62
Overhead.....	.45	.39	.64	.49	.49
Drawing.....	.87	.87	.74	.91	.85
Labor.....	.60	.60	.50	.63	.58
Overhead.....	.27	.27	.24	.28	.27
Roving.....	2.41	4.87	4.20	5.09	3.92
Labor.....	1.71	3.39	2.92	3.56	2.75
Overhead.....	.70	1.48	1.28	1.53	1.17
Spinning.....	4.59	7.51	6.68	10.05	6.89
Labor.....	3.01	4.80	4.18	6.29	4.38
Overhead.....	1.58	2.71	2.50	3.76	2.51
Spooling.....			3.23	4.30	1.74
Labor.....			2.36	3.12	1.27
Overhead.....			.87	1.18	.47
Twisting.....			4.81	8.12	2.98
Labor.....			3.02	5.03	1.86
Overhead.....			1.79	3.09	1.12
Total.....	9.67	14.96	21.88	30.21	18.24
Labor.....	6.36	9.81	14.11	19.60	11.88
Overhead.....	3.31	5.15	7.77	10.61	6.36

See footnotes at end of table.

TABLE 60.—Manufacturers' average selling price per pound, costs, and margins for spun viscose rayon yarn, by yarn number and ply, United States, first quarter of 1942¹—Cont.

Item	Yarn No. and ply				
	9/1— 18/1	30/1	20/2 and 24/2	30/2 and 40/2	All
	Cents	Cents	Cents	Cents	Cents
Put up cost:					
Reeling.....	.78		.27	4.09	1.28
Labor.....	.64		.19	2.98	.96
Overhead.....	.14		.08	1.11	.32
Winding.....	2.59	4.49	2.01	.31	2.30
Labor.....	1.93	3.25	1.61	.25	1.73
Overhead.....	.66	1.24	.40	.06	.57
Packing.....	.82	.67	.98	.72	.80
Labor.....	.20	.22	.24	.23	.22
Overhead.....	.62	.45	.74	.49	.58
Total.....	4.19	5.16	3.26	5.12	4.38
Labor.....	2.77	3.47	2.04	3.46	2.91
Overhead.....	1.42	1.69	1.22	1.66	1.47
Selling expense.....	3.19	2.98	3.98	4.26	3.58
Net margin.....	16.99	18.11	19.72	14.50	15.18

¹ Averages are for 5 to 10 yarns reported by 4 or 5 manufacturing companies. In calculating the averages, each yarn reported was given a weight of 1.

Primary data assembled by Tariff Commission for Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

DYEING AND FINISHING

As they come from the mills fabrics are either gray goods made of unbleached yarns or colored goods made in whole or in part of dyed yarns. Census reports indicate that from 1946 to 1950 colored-yarn fabrics accounted for about 8 percent of the total linear yardage of cotton-woven goods more than 12 inches wide, exclusive of tire cords and fabrics, produced in the United States. Gray goods may be finished by bleaching, mercerizing, dyeing, printing, or in other ways. Of the total linear yardage of cotton broad-woven goods, except tire fabrics, produced in this country from 1946 to 1950, about 48 percent was bleached and white finished, 28 percent was plain dyed and finished, and 24 percent was printed and finished. Similar data for rayon and related broad-woven goods show that, during this period, about 9 percent of the

linear yardage was bleached white and finished, 74 percent was plain dyed and finished, and 17 percent was printed and finished.

Styling and finishing of this cloth are controlled by converters

TABLE 61.—Average selling prices, costs, and margins per yard to manufacturers of rayon and acetate gray goods, United States, first quarter of 1943¹

Fabric	Maximum selling price	Material cost	Gross margin	Cost of---		Profit
				Labor and manufacturing	Selling and seconds	
	Cents	Cents	Cents	Cents	Cents	Cents
Taffetas.....	20.02	12.30	7.72	5.90	0.81	1.01
Twills.....	21.97	14.16	7.81	5.44	.89	1.48
Satins.....	32.08	20.45	11.63	9.34	1.34	.95
Flat crepe.....	28.72	17.87	10.85	6.87	1.11	2.87
French crepe.....	30.03	19.16	10.87	8.13	1.23	1.51
Sheers.....	27.13	17.26	9.87	5.43	1.04	3.40
Marquissettes, ninons, voiles.....	18.90	10.54	8.45	6.42	.76	1.27
Combination crepes.....	35.33	25.85	9.48	7.01	1.48	.99
Poplin.....	24.90	16.17	8.73	5.70	.98	2.05
Spuns.....	31.90	16.77	15.13	9.99	1.20	3.94
Novelty.....	33.63	22.72	10.91	6.66	1.32	2.93
Miscellaneous.....	36.23	23.02	13.21	10.20	1.50	1.51
Average.....	28.90	18.69	10.21	7.46	1.18	1.57
Proportion of selling price						
	Percent	Percent	Percent	Percent	Percent	Percent
Taffetas.....	100.0	61.4	38.6	29.5	4.1	5.0
Twills.....	100.0	64.5	35.5	24.8	4.0	6.7
Satins.....	100.0	63.7	36.3	29.1	4.2	3.0
Flat crepe.....	100.0	62.2	37.8	23.9	3.9	10.0
French crepe.....	100.0	63.8	36.2	27.1	4.1	5.0
Sheers.....	100.0	63.0	36.4	20.0	3.8	12.6
Marquissettes, ninons, voiles.....	100.0	55.5	44.5	33.8	4.0	6.7
Combination crepes.....	100.0	73.2	26.8	19.8	4.2	2.8
Poplin.....	100.0	64.9	35.1	22.9	4.0	8.2
Spuns.....	100.0	52.6	47.4	31.3	3.8	12.3
Novelty.....	100.0	67.0	32.4	19.8	3.9	8.7
Miscellaneous.....	100.0	63.5	36.5	28.2	4.1	4.2
Average.....	100.0	64.7	35.3	25.8	4.1	5.4

¹ The survey made by the Office of Price Administration to obtain these data included 10 New England, 6 Pennsylvania, and 10 Southern mills. Production of 57,797,180 yards covered by this survey represents about 16 percent of the total for the industry in the United States during January, February, and March 1943.

Primary data assembled by the Office of Price Administration were made available for use only as industry summaries (91).

TABLE 62.—Average selling price, cost, and margin per yard to manufacturers for specific kinds of rayon crepe, United States, first quarter of 1948¹

Item	Flat crepe		Combination crepe		French crepe	
	Amount per yard	Proportion of selling price	Amount per yard	Proportion of selling price	Amount per yard	Proportion of selling price
Maximum selling price.....	<i>Cents</i> 27.19	<i>Percent</i> 100.0	<i>Cents</i> 32.45	<i>Percent</i> 100.0	<i>Cents</i> 26.00	<i>Percent</i> 100.0
Material cost.....	15.01	55.2	18.00	55.5	14.94	57.5
Gross margin.....	12.18	44.8	14.45	44.5	11.06	42.5
Throwing cost.....	2.49	9.2	7.03	21.7	2.17	8.3
Labor and overhead.....	6.48	23.8	6.75	20.8	6.01	23.1
Selling, seconds, and discounts.....	1.08	4.0	1.43	4.4	1.04	4.0
Profit or loss.....	2.13	7.8	2.76	2 2.4	1.84	7.1

¹ The data are from Rayon Grey Goods Survey made by the Office of Price Administration. Averages for flat crepe are for 4 Southern and 1 Pennsylvania mill; those for French crepe are for 3 Northern and 1 Southern mill.

² Loss.

From primary data assembled by the Office of Price Administration and made available for use only as industry summaries (91).

or mills, with or without collaboration of the manufacturing users. In 1947, according to census reports, 641 establishments were primarily engaged in dyeing and finishing textiles, except woolen and worsted. Some establishments were owned by or affiliated with spinners, knitters, weavers, or converters. Reports indicate increasing interest in further integration (18).

Converters occupy a key position in styling and finishing cloth. They buy gray goods from mills and have them finished to their order in many designs, styles, and finishes. A large percentage is bleached in various finishes from soft to hard; some are dyed in various colors, tints, and shades; and substantial proportions, particularly print cloth, are finished in many colors or designs. Converters keep in close touch with the fluctuating requirements of the market and, within the limits of changes in fashion, they influence the seasonal drift of style goods (97).

NATURE, PRACTICES, AND EQUIPMENT

The industry that furnishes textiles, except wool, comprises establishments primarily engaged in bleaching, dyeing, printing, finishing, or otherwise converting fabrics, yarn, thread, or raw stocks, other than woolen and worsted. These establishments include those which finish on a commission basis fabrics, yarn, or raw stocks owned by others; and those which finish their own

materials. In 1947, according to census reports, the value of finishing (the difference between the value of the gray goods, yarn, or raw stock when it enters the finishing process and the finished value of such material) by those who owned the materials totaled \$181,652,000 and receipts for contract finishing totaled \$443,427,000. The combined amounts increased to \$597,000,000 in 1949 and to \$674,085,000 in 1950.

SIZE AND ORGANIZATION OF PLANT

Establishments primarily engaged in finishing textiles, except wool, totaled 641 in 1947 compared with 468 in 1939, according to census reports. In 1947, about 21 percent of these establishments had less than 10 employees each, 57 percent had less than 50, about 30 percent had 100 or more, and about 6 percent had 500 or more.

The Census of Manufactures for 1947 does not show type of organization or control for dyeing and finishing establishments separately from those for other industries, but reports for 1939 show that 85 percent of the establishments primarily engaged in dyeing and finishing cotton, rayon, silk, and linen textiles were operated under corporate, and 15 percent under noncorporate, ownership or control. About 70 percent of the corporate and more than 95 percent of the noncorporate establishments were operated as independent, single units; the others were operated as plural units.

Dyeing and finishing establishments were involved in the increases in integration in the textile industry which reached relatively high rates during the middle and late 1940's (41). As pointed out earlier (p. 72), profits margins, as affected by price control during the war emergency, demand, and other factors led certain mills to integrate forward by buying or building finishing plants to take advantage of higher margins on converted goods. This, in turn, made it necessary for some converters and custom-finishing plants to integrate by buying mills to insure a supply of goods and to secure business for their finishing plants. Apparently some of this integration extended through selling (41).

METHODS AND PRACTICES¹³

All treatments or processing received by cotton textiles to fit them for consumer use, after their mechanical structure has been completed, are included in the general field of finishing. Although details of the processing may vary somewhat in different plants, and although they are necessarily influenced by the different construction and physical characteristics of the textiles handled, the common purpose of all finishing operations is to convert the raw material represented by manufactured yarns or fabrics into products that are suitable for specific end uses. In the case of cotton textiles, this usually involves a preliminary cleaning to remove both natural and extraneous impurities, followed by the application of specialized treatments, such as mercerizing, dyeing, print-

¹³ Based mainly on COTTON GOODS PRODUCTION AND DISTRIBUTION TECHNIQUES, COSTS, AND MARGINS (91).

ing, starching, and others, which are designed to improve both the attractiveness and the usefulness of the final product.

The greater part of all cotton yarns and fabrics are given some degree of finishing before they are sold to consumers. In the case of yarns the treatments involved are relatively simple. Little more than cleaning and dyeing is required for yarn that is to be a component in colored-yarn woven goods, although some additional handling such as mercerizing, polishing, and spooling may be required for the part sold as sewing thread.

Finishing cotton fabrics, however, is a rather complicated process, particularly in regard to those intended for wearing apparel. This group includes woven and knitted cloths of many different constructions, which in turn may receive a wide range of special finishes. No attempt is made here to discuss in detail the diversified types of processing that are used in modern finishing plants. But an outline of the more important treatments usually given to a representative woven-garment fabric, such as a broadcloth or high-grade print cloth, in converting it from the loom to the finished state, is given for illustrative purposes.

When gray goods are received at the finishing plant, they are made up into lots of perhaps 40,000 yards by sewing together the individual pieces or cuts shipped from the mill. The cloth is then passed in open width at high speed over gas flames to burn off loose fiber ends. It then goes through a quenching bath which contains an enzyme solution that converts to water-soluble products the starch used in warp sizing. After steeping for a few hours in the enzyme solution, the cloth is washed and run into large cylindrical steel tanks or kiers, in which it is boiled under pressure with a caustic alkali solution. Next, the cloth is thoroughly washed and then bleached white by treatment with an oxidizing agent, usually sodium hypochlorite or hydrogen peroxide. At this stage purification is completed, and the goods, after being dried, are ready for the final finishing operations.

If the goods are to be mercerized in order to increase the luster and dye affinity, the cloth is passed in open width through a concentrated solution of caustic soda and held briefly under tension to complete the mercerizing reaction. After this the caustic soda is removed by washing and neutralization.

If intended for sale in the white state, the cloth is next lightly starched or softened, calendered, sanforized to reduce residual shrinkage, folded, inspected, and packed. If it is to be dyed or printed, these operations usually follow mercerization. After that the handling is substantially the same as for white goods.

Modern finishing practice has tended to the continuous processing of cotton goods by eliminating intermittent or batch treatments whenever possible. Along with this development has gone a more complete mechanization of plants, with substitution of mechanical for manual operations. Although much progress has been made in this direction, with resulting improvement in uniformity of treatment and speed of production, the many types of processing required by the wide demand apparently will not permit the adoption of straight production-line methods throughout the finishing industry.

Several special finishes or finishing processes developed during recent years are of interest because of their importance in improving quality and extending the utility of cotton textiles. Sanforizing is particularly important in the field of garment fabrics. It is a process by which uneven tensions in the yarns of woven fabrics are mechanically corrected and the shrinkage of garments when they are laundered is practically eliminated. Durable finishes of a modified cellulose type improve the appearance and handling qualities of cotton fabrics. At the same time they increase their resistance to abrasion and washings. Resistance to musing or creasing may be increased by the use of synthetic resin finishes which slightly stiffen the cloth so that it tends to maintain or regain its original shape instead of creasing (?). Water-repellent finishes that will resist many launderings are widely used, and a finish that, by a chemical modification of the cotton, renders it resistant both to flame and to biological rotting has lately appeared on the market. Additional useful products may be expected as the result of research now being carried on by many organizations.

Application of color to cotton yarns and fabrics, although only a specialized process in cotton finishing, is in itself a complex and highly developed business, which requires its own particular equipment and techniques. Several different classes of dyes are commonly used on cotton. They range from the ordinary direct colors of cotton to the very fast vats and azoics. Each class requires special methods of application. A recent development in color technique is the application to cotton fabrics of insoluble but finely dispersed pigments by the use of film-forming resins as the binding medium which attaches the color particles to the fibers. This method of mechanically applying color in dyeing or printing avoids problems of dye affinity, and promises to be increasingly important in the textile industry. Cotton yarns are dyed in skeins, in package form, on beams, or continuously as chain warps, while knitted or woven fabrics may be dyed in the rope or in open width, employing a considerable variety of dyeing machines. The tendency has been to develop continuous dyeing methods, with resulting savings in material and labor costs.

MACHINERY AND EQUIPMENT

Census reports do not contain data relating to the number and kinds of machinery and equipment used in dyeing and finishing textiles, except wool. Consequently, changes in the number of the various kinds of machinery and equipment used in this industry are not indicated. But, according to census reports, expenditures for new plants and equipment increased from \$7,059,000 in 1939 to \$29,668,000 in 1947 and to \$37,088,000 in 1949 and amounted to \$24,427,000 in 1950. Expenditures for new machinery alone increased from \$4,922,000 in 1939 to \$22,068,000 in 1947 and to \$23,421,000 in 1949 and in 1950 they amounted to \$19,969,000. It is apparent from these data that considerable improvements have been made in recent years.

CHARGES OR COSTS INVOLVED

Census reports on manufactures for 1947 as they relate to finishing textiles, except wool, show neither the value of the gray goods or yarns finished during the year nor the value of the finished products. Consequently these data are not adequate for calculating the finishers' gross margins, or the spread between the value of materials used and the value of finished products.

Reports of the Federal Trade Commission on textile dyeing and finishing (except woolen and worsted) corporations show that gross margins for these corporations averaged about 48 percent of total sales in 1939 and 1940 (87, 88). The kind of dyeing, finishing, and other services vary considerably from one corporation to another and average margins ranged from less than 30 to more than 80 percent of the value of the products. Data for the 19 corporations reported in 1939 and the 27 reported in 1940, when combined, show that gross margins for more than 30 percent of the corporations averaged less than 40 percent and that margins for about 39 percent of the corporations averaged more than 70 percent of the value of the finished products.

Production wages and salaries accounted for about 45 percent of the dyers' and finishers' margins in 1939 and about 37 percent in 1940. The proportion of total sales in 1940 accounted for by the various items of cost averaged 18 percent for production wages and salaries, 3 percent for depreciation, 3 percent for selling expenses, 20 percent for other expenses, and 4 percent for profits. These proportions varied considerably from one corporation to another (87, 88).

Data relating to costs of cotton gray goods, finishing costs, and selling prices of finished fabrics from 1942 to 1944 show that converters' gross margins average 29 percent of selling prices for bleached, 35 percent for dyed, and 43 percent for printed fabrics (table 63). These proportions varied irregularly from one year to another but usually averaged less in 1944 than in 1942. During the 3 years finishing costs averaged 10 percent of the selling price for bleached, 17 percent for dyed, and 23 percent for printed fabrics. In 1944, proportions for bleached and dyed cloth averaged about the same as, and those for printed cloth averaged somewhat greater than, in 1942. Converters' costs, other than those for finishing, averaged 19 percent of the selling price for bleached, 18 percent for dyed, and 20 percent for printed cloth.

Converters' gross margins and finishing costs varied considerably from one kind of cotton fabric to another. From 1942 to 1944 the proportions of the selling price accounted for by converters' gross margins for bleached cloth ranged from an average of 22 percent for duck, drills, and twills to 35 percent for colored-yarn fabrics; for dyed cloth, they ranged from 26 percent for duck to 49 percent for marquisette; and for printed cloth, they ranged from 36 percent for combed broadcloth to 49 percent for colored-yarn fabrics. Costs of finishing for bleached cloth ranged from 8 percent of the selling price for duck and colored-yarn fabrics to 14 percent for marquisette; for dyed cloth, they ranged

from 12 percent for colored-yarn fabrics to 28 percent for marquette; and for printed cloth, they ranged from 7 percent for colored-yarn fabric to 25 percent for osnaburg.

TABLE 63.—Average selling price, cost, and converters' margin per yard for cotton fabrics, by type of finish, United States, average 1942-44

Fabric	Quantity finished	Selling price	Gray-goods costs	Converters' margins		
				Total	Finishing costs	Other costs
	1,000 yards	Cents	Cents	Cents	Cents	Cents
Bleached and finished:						
Batiste, etc.	2,245	20.38	14.83	5.55	2.28	3.27
Combed broadcloth	3,693	26.14	19.34	6.80	2.32	4.48
Carded broadcloth	3,783	16.78	12.48	4.30	1.74	2.56
Colored-yarn fabrics	7,298	29.91	19.52	10.39	2.29	8.10
Drills, twills, etc.	2,046	33.32	22.92	10.40	4.23	6.17
Duck	27	9.15	7.15	2.00	.68	1.32
Marquette-serim	33	16.84	11.94	4.90	2.33	2.57
Osnaburg	229	19.72	13.00	6.72	2.02	4.70
Poplin, rep, piques	4,845	23.18	16.42	6.76	2.43	4.33
Print cloth	10,804	13.30	10.04	3.26	1.55	1.71
Sateen	136	32.40	21.99	10.41	4.11	6.30
Sheeting	1,857	16.13	11.47	4.66	2.09	2.57
Oxford	1,458	22.51	15.65	6.86	2.45	4.41
Other cottons	756	23.13	16.41	6.72	2.04	4.68
Total or average	39,210	21.44	15.17	6.27	2.17	4.10
Dyed and finished:						
Batiste, etc.	962	20.81	13.63	7.18	3.34	3.84
Combed broadcloth	1,652	28.98	18.49	10.49	5.67	4.82
Carded broadcloth	3,574	19.66	12.69	6.97	3.37	3.60
Colored-yarn fabrics	594	16.67	11.14	5.53	2.05	3.48
Drills, twills, etc.	18,020	26.88	17.92	8.96	4.21	4.75
Duck	668	37.53	27.77	9.76	5.16	4.60
Marquette-serim	7	4.59	2.33	2.26	1.29	.97
Osnaburg	744	19.01	12.32	6.69	3.39	3.30
Poplin, rep, piques	7,854	23.47	14.63	8.84	4.44	4.40
Print cloth	9,033	16.23	9.67	6.56	3.36	3.20
Sateen	784	28.19	19.25	8.94	3.82	5.12
Sheeting	3,733	20.06	13.51	6.52	3.20	3.32
Oxford	726	25.50	15.77	9.73	4.45	5.28
Other cottons	1,941	23.49	15.69	7.80	3.57	4.23
Total or average	49,692	23.26	15.12	8.14	3.98	4.16
Printed and finished:						
Batiste, etc.	16,420	21.08	11.77	9.31	5.02	4.29
Combed broadcloth	811	29.67	19.06	10.61	5.02	5.59
Carded broadcloth	16,734	18.92	11.37	7.55	4.03	3.52
Colored-yarn fabric	156	14.33	7.26	7.07	.98	6.09
Drills, twills, etc.	6,951	24.16	13.11	11.05	5.81	5.21
Marquette-serim	370	18.13	10.08	8.05	4.28	3.77
Osnaburg	464	18.49	11.32	7.17	4.58	2.59
Poplin, rep, piques	11,981	22.68	13.35	9.33	4.59	4.74
Print cloth	105,405	17.19	9.75	7.14	4.06	3.38

TABLE 63.—Average selling price, cost, and converters' margin per yard for cotton fabrics, by type of finish, United States, average 1942-44.—Cont.

Fabric	Quantity finished	Selling price	Gray-goods costs	Converters' margins		
				Total	Finishing costs	Other costs
	1,000 yards	Cents	Cents	Cents	Cents	Cents
Sateen.....	1,864	26.50	15.60	10.90	5.67	5.23
Sheeting.....	15,107	18.08	10.68	7.40	4.08	3.32
Oxford.....	3,776	15.59	9.42	6.17	3.31	2.86
Other cottons.....	3,668	27.51	16.18	11.33	5.57	5.76
Total or average	183,707	18.88	10.82	8.06	4.33	3.73

Data were derived from a survey of 50 firms approved by the Bureau of the Budget as a representative sample of the industry. The data were compiled and summarized by the Office of Price Administration from individual reports and made available for use only as industry summaries (91).

Similar data relating to costs of rayon and acetate gray goods, finishing costs, and selling prices show that, from 1942 to 1944, converters' gross margins averaged 37 percent of the selling price for dyed and 51 percent for printed fabrics (table 64). These margins increased with advances in selling prices of the products and the proportion of the selling prices of the fabrics accounted for by converters' gross margins averaged somewhat greater in 1944 than in 1942. Costs of finishing during the 3 years averaged 14 percent of the selling price for dyed and 26 percent for printed fabrics, and the corresponding proportions for other costs to converters averaged 23 for dyed and 25 percent for printed fabrics.

TABLE 64.—Average selling price, cost, and converters' margin per yard for rayon and acetate fabrics, by type of fabric, United States, average 1942-44

Fabric	Quantity finished	Selling price	Gray-goods costs	Converters' margins		
				Total	Finishing costs	Other costs
	1,000 yards	Cents	Cents	Cents	Cents	Cents
Dyed and finished:						
Tuffetas.....	9,048	29.75	19.86	9.89	3.53	6.36
Twills and serges.....	9,506	28.76	19.51	9.25	3.44	5.81
Satins.....	7,506	36.38	26.49	9.89	3.54	6.35
Flat crepes.....	2,979	44.38	28.52	15.86	5.59	10.27
French crepes.....	2,325	45.04	31.48	13.56	4.82	8.74
Sheers.....	455	45.22	29.84	15.38	4.85	10.53
Marquisettes, etc.....	591	35.97	26.23	9.74	3.83	5.91
Combination crepes.....	5,688	54.79	32.42	22.37	7.15	15.22
Cross-dye tuffetas.....	1,785	35.46	24.33	11.13	4.31	6.82
Sandweave.....	873	33.72	23.87	9.85	2.52	7.33
Sharkskin.....	724	25.12	16.77	8.35	2.51	5.84

TABLE 64.—Average selling price, cost, and converters' margin per yard for rayon and acetate fabrics, by type of fabrics, United States, average 1942-44—Cont.

Fabric	Quantity finished	Selling price	Gruy-goods costs	Converters' margins		
				Total	Finishing costs	Other costs
Dyed and finished—Cont.	1,100 yards	Cents	Cents	Cents	Cents	Cents
Filament and spuns	8,287	46.36	29.07	17.29	6.28	11.01
Spunflake, challis, etc.	2,035	37.72	21.97	15.75	7.51	8.24
100-percent twills, coverts, gabardine	2,425	49.19	28.74	20.45	8.72	11.73
100-percent plied suitings	1,116	64.28	37.31	26.97	10.61	16.36
All other spun rayons	5,725	34.09	20.39	13.70	5.03	8.67
Spun rayon and cotton	4,846	35.91	20.35	15.56	5.64	9.92
Spun rayon and wool	598	68.86	36.44	32.42	12.30	20.12
Spun rayon and aralac	1,260	46.18	24.06	22.12	9.52	12.60
Filament rayon and cotton	1,832	46.47	20.32	17.15	5.70	11.45
Other filament rayon	1,117	59.28	37.66	21.62	6.85	14.77
Jersette	65	23.46	14.75	8.71	3.26	5.45
Total or average	80,795	40.99	25.71	15.28	5.71	9.57
Printed and finished:						
Taffetas	8,589	39.39	18.86	20.53	10.02	10.51
Twills and serges	398	12.50	6.05	6.45	3.30	3.15
Satins	746	47.92	25.97	21.95	9.72	12.23
Flat crepes	921	64.35	29.28	35.07	16.00	19.07
French crepes	555	55.03	22.52	32.51	17.77	14.74
Sheers	3,398	51.64	30.32	21.32	11.68	9.64
Marquisettes, etc.	204	30.97	19.15	11.82	5.32	6.50
Combination crepes	54	72.34	32.64	39.70	17.60	22.10
Cross dyed crepes	376	14.63	8.08	6.55	3.41	3.14
Sandweave	1	9.17	7.83	1.34	2.00	— .66
Sharkskin	111	13.62	6.83	6.79	3.78	3.01
Filament and spuns	2,913	49.16	23.23	25.93	12.83	13.10
Spunflake, challis, poplin, etc.	3,488	32.15	15.52	16.63	8.42	8.51
100-percent twills, coverts, gabardine	37	39.37	17.34	22.03	8.25	13.78
All other spun rayons	3,228	42.17	18.86	23.31	11.69	11.62
Spun rayon and cotton	18,851	33.49	13.55	19.94	7.08	12.86
Spun rayon and wool	22	10.16	5.35	4.81	2.71	2.10
Spun rayon and aralac	394	42.81	18.13	24.68	12.14	12.51
Filament rayon and cotton	1,417	37.67	20.63	17.04	8.77	8.27
Other filament rayon	938	51.11	23.38	27.73	13.29	14.44
Jersette	260	44.38	21.31	23.07	11.37	11.70
Total or average	46,811	36.76	18.02	18.74	9.44	9.30

Data were derived from a survey of 50 firms approved by the Bureau of the Budget as a representative sample of the industry. The data were compiled and summarized by the Office of Price Administration from individual reports and made available only as industry summaries (91).

Gross margins for converters and costs of finishing varied considerably from one kind of rayon or acetate fabric to another (table 64). Data for 1942 to 1944 combined show that converters' gross margins for dyed fabrics ranged from 27 percent of the selling price for satins and marquisettes to 48 percent for spun rayon and aralac, and those for printed fabrics ranged from 15 percent of the selling price for sandweave to 60 percent for spun-rayon and cotton fabrics. Finishing costs for dyed fabrics ranged from 7 percent of the selling price for sandweave to 21 percent for spun rayon and aralac, and those for printed fabrics ranged from 17 percent for marquisettes to 32 percent for French crepes.

Data relating to costs of specified kinds of cloth in regular mill finish and to costs of sanforizing, shrinkage, selling, and total costs of the cloth sanforized show that in 1942 sanforizing accounted for about 26 percent, shrinkage 38 percent, loss on sec-

TABLE 65.—*Cost per yard in regular mill finish, sanforizing, shrinking, and selling, and of sanforized cloth by specified kinds, United States, November 1942*

Item	Costs per yard					
	Mill finish	Sanforizing	Shrink-ing	Loss on seconds	Selling	Total
<i>Deamius</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
White back	7.47	0.65	0.86	0.32	0.55	9.85
Fancy stripes	7.84	.57	.98	.37	.57	10.38
Hickory stripes	7.78	.65	1.00	.37	.58	10.38
Express stripes	8.48	.48	1.13	.15	.58	10.82
Olive drab	9.17	.61	.21	.62	.32	10.93
Chambrays	5.06	.63	.62	.24	.80	7.35
Coverts	7.51	.70	1.33	.42	.68	10.64
Whipcord	8.01	1.09	1.20	.25	1.22	11.77
All	7.66	.65	.96	.31	.50	10.17
Proportion of total cost						
<i>Deamius</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
White back	75.8	6.6	8.7	3.3	5.6	100.0
Fancy stripes	75.0	5.5	9.5	3.6	5.5	100.0
Hickory stripes	75.0	6.3	9.6	3.5	5.6	100.0
Express stripes	78.1	4.4	10.4	1.4	5.4	100.0
Olive drab	83.0	5.6	1.9	5.7	2.9	100.0
Chambrays	68.8	8.6	8.4	3.3	10.9	100.0
Coverts	70.6	6.6	12.5	3.9	6.4	100.0
Whipcord	68.0	9.3	10.2	2.1	10.4	100.0
All	75.0	6.4	9.4	3.4	5.8	100.0

Primary data assembled by the U. S. Tariff Commission for the Office of Price Administration and made available by the latter agency for use only as industry summaries (91).

onds 13 percent, and selling 23 percent of the total margin or spread between the costs of the cloth in mill finish and the selling price of the sanforized cloth (table 65). The proportions of the total costs accounted for by each of these items varied considerably from one kind of cloth to another. Sanforizing ranged from 4.4 percent of the total cost for express striped denims to 9.3 percent for whipcord.

New York market quotations for commission finishers' charges for representative fabrics in 1946 show that finishing charges ranged from a cent a yard for a mediumweight print cloth in plain white finish to 12.3 cents a yard for a heavy work-clothes twill, vat-dyed and sanforized (table 66). These finishing charges range from about 9 percent of the cost of the gray goods for plain white print cloth and sheeting to about 49 percent of the cost of gray goods for heavy twill.

Median profits to converters of cotton goods and those to converters of rayon and silk goods, after reserves for Federal income and excess-profit taxes and for renegotiation in the case of war contracts, increased in the early 1940's (table 67). These profits

TABLE 66.—Costs of gray goods and finishing charges, per yard, to commission finishers, by type of finish for specified construction of gray cloth, New York 1946¹

Gray cloth construction	Type of finish	Gray goods cost	Finishing charges
		Cents	Cents
39"—68 x 72—4.75 yard print cloth	Plain white handkerchiefs	11 26	1 00
Do	Bleached, printed (short pattern)	11 26	2 50
37"—100 x 60—4.10 yard broadcloth	White, mercerized, sanforized	12 92	2 50
Do	Vat-dyed (shirting shade), mercerized, sanforized	12 92	4 00
40"—48 x 44—2.50 yard sheeting	Bleached, chased	18 20	1 75
40"—56 x 56—3.60 yard sheeting	Direct-dyed, shirting	13 33	2 10
39"—72 x 60—2.00 yard drill	Vat-dyed, mercerized, sanforized work clothes		6 10
39"—66 x 64—2.85 yard jean	do		6 20
30"—2.85 yard jean	Vat-dyed (heavy shade), sanforized work clothes	15 96	7 50
38½"—2.40 yard twill	do	20 00	10 70
31"—90 x 56—1.55 yard tent twill	do	25 20	12 30
37"—2.05 yard twill	do	21 50	12 50
37"—1.82 yard drill	do	23 90	12 50

¹These are finishers' charges as quoted in the New York market for representative fabrics.

From COTTON GOODS PRODUCTION AND DISTRIBUTION TECHNIQUES, COSTS, AND MARGINS (91).

to converters of cotton goods varied considerably during the war and postwar periods. In 1950, they averaged about 2.4 percent of net sales and 12 percent of tangible net worth. Profits to converters of rayon and silk goods varied considerably. In 1948, the last year for which data are available, they averaged 2.7 percent of net sales and 7 percent of tangible net worth.

TABLE 67.—*Median net profits for converters of cotton and of rayon, acetate, and silk goods as proportions of net sales and of tangible net worth, United States, 1931-50¹*

Year	Net profits ² as proportions of—			
	Net sales ³		Tangible net worth ⁴	
	Cotton	Rayon and silk ⁵	Cotton	Rayon and silk ⁵
	Percent	Percent	Percent	Percent
1931.....	0.45	0.33	2.19	2.46
1932.....	.17	.71	.94	4.83
1933.....	2.00	.80	11.19	4.73
1934.....	6.44	6.36	11.83	2.52
1935.....	.65	.15	4.04	1.03
1936.....	1.98	1.19	11.57	7.05
1937.....	6.06	.08	6.48	.41
1938.....	.12	.18	.63	.88
1939.....	2.02	.52	9.30	2.71
1940.....	1.45	.44	4.84	3.43
1941.....	3.68	1.95	18.06	15.18
1942.....	3.85	1.80	19.35	8.30
1943.....	2.78	3.34	11.96	13.54
1944.....	3.27	3.14	9.75	7.54
1945.....	2.99	2.93	4.53	9.35
1946.....	4.00	1.59	5.67	16.38
1947.....	3.87	7.36	12.07	21.70
1948.....	1.74	2.73	8.20	7.30
1949.....	2.31	(7)	7.34	(7)
1950.....	2.41	(7)	12.18	(7)

¹ The number of concerns included in 1948 totaled 33 for cotton goods and 11 for rayon, silk, and acetate piece goods.

² Profit after full depreciation on buildings, machinery, equipment, furniture, and other assets of a fixed nature; after reserves for Federal income and excess-profit taxes; after reductions in the value of the inventory to cost or market, whichever is lower; after charge-offs for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals.

³ The dollar volume of business transacted for 365 days net after deductions for returns, allowances, and discounts from gross sales.

⁴ The sum of all outstanding preferred or preference stocks (if any) and outstanding common stocks, surplus, and undivided profits, less any intangible items in the assets, such as good-will, trade-marks, patents, copyrights, leaseholds, mailing lists, treasury stocks, organization expenses, and underwriting discounts and expenses.

⁵ Exclusively rayon and acetate from 1942 through 1945.

⁶ Loss.

⁷ Not available.

Adapted from reports by Roy A. Foulke (22, 23, 24, 25).

MEANS AND IMPORTANCE OF IMPROVEMENT¹⁴

Operating efficiency in the dyeing and finishing industry apparently could be increased most effectively through perfecting and expanding continuous processing methods. In bleaching cotton-piece goods, for example, it is possible to move gray cloth steadily forward through specially designed machines that complete the cleaning and bleaching processes in a few hours, as compared with the several days usually required. Similar advances have been made in dyeing with the fast-vat colors, the installation of special equipment making it possible to dye fabrics by a continuous method. The results are more uniform shades and reduction in costs of material and labor. Improved processing methods of this kind should eventually mean more uniform products, probably at relatively lower costs to consumers.

Progress has been made in producing finishes designed to impart increased attractiveness and utility to textiles, and significant improvements in standards of quality may reasonably be expected. Better mercerizing and calendaring techniques are now employed to improve luster and other qualities of fine-grade fabrics. Much attention is devoted to the problem of developing a practicable and effective crease-resistant finish for piece goods, a process that would immensely improve the appearance and usefulness of the fabrics, particularly in the garment field. Specific suggestions with regard to the most effective means by which, and the extent to which, it would be feasible to increase the efficiency and to reduce the costs of these services probably would need to be based on detailed data relating to costs, as indicated for other segments of the textile industry (79).

The relative importance of increasing the efficiency of dyeing and finishing may be indicated by data showing that in 1939, for example, charges for dyeing and finishing averaged less than 10 percent of the cost of the finished cotton products to ultimate consumers, but that these charges averaged greater than the returns to growers for farm production of the cotton used, and that they were about three times as great as the costs of ginning and baling the cotton plus all charges incident to taking cotton from gins and delivering it to mills. It is apparent from these differences that even moderate increases in efficiency and reductions in charges of dyeing and finishing cotton fabrics, along with improved standards of quality for finishes, would be an important contribution to the cotton-textile industry.

KNIT-GOODS MANUFACTURING

The knit-goods industry is made up of plants that knit rather than weave textile products. These establishments use knitting machines and consume yarns made from basic material such as cotton, wool, rayon, silk, or nylon, or a mixture of these fibers. Census data show that in 1947, for example, machine-knitting

¹⁴Based mainly on COTTON GOODS PRODUCTION AND DISTRIBUTION TECHNIQUES, COSTS AND MARGINS (91).

yarns accounted for 340,779,000 pounds of yarn spun on the cotton system, or 8.5 percent of the total produced and 76,260,000 pounds of woolen and worsted yarn, or 13 percent of the total produced. Additional machine-knitting yarns that year included about 93,800,000 pounds of filament rayon yarn (60) and 17,026,000 pounds of filament nylon yarn (69).

The knitting industry is integrated to some extent with yarn manufacturing. Census reports show that in 1947, for example, shipments of sales yarn and interplant transfers accounted for 86 percent of the machine-knitting yarns that were spun on the cotton system, and 67 percent of the knitting woolen and worsted yarns produced (69). Apparently about 14 percent of machine-knitting yarns that were spun on the cotton system and 33 percent of the machine-knitting woolen and worsted yarns were retained by the manufacturers for their own use.

Principal products of the knit-goods industry are hosiery, knitted underwear, knitted outerwear, knitted cloth, and knitted gloves. In 1947 total value of the products of this industry, according to census reports, was about \$1,718,000,000, of which about 50 percent was accounted for by hosiery, 19 percent by knit underwear, 17 percent by knit underwear, 12 percent by knitted cloth, and 2 percent by knit gloves. Information relating to manufacturer outlets for these products in recent years are not available, but census reports on the distribution of manufacturers' sales in 1939 show that, for all knit products combined, about 42 percent went to retailers, 36 percent to wholesalers and jobbers, 10 percent to industrial users, 9 percent was distributed through the manufacturers' own sales offices, and small proportions went to consumers at retail and to export (74).

NATURE, PRACTICES, AND EQUIPMENT

In 1947, according to census reports, the knit-goods industry in the United States was made up of 3,126 establishments. These establishments are distributed over 38 or more States but more than half of them are located in the Middle Atlantic States and more than a fourth are in the Southern States. States with the largest numbers of establishments in order are New York, Pennsylvania, North Carolina, New Jersey, and Tennessee. In value of products, Pennsylvania and North Carolina outrank New York.

SIZE AND ORGANIZATION OF PLANT

Knit-goods manufacturers range in size, as indicated by the number of employees, from less than 5 to more than 1,000 employees, according to census reports. In 1947, establishments with less than 5 employees made up about 16 percent of the total number and accounted for about 1 percent of the value added by manufacture. Establishments with 500 or more employees each made up less than 3 percent of the total number but they accounted for more than a fourth of the total value added by manufacture. The proportion of the establishments with specified numbers of employees vary widely (table 68). For all industry groups combined, about 31 percent of the establishments had less than 10

employees, 38 percent had 10 to 49, 24 percent had 50 to 249, and almost 7 percent had 250 or more employees each.

The average value added by manufacture per employee in 1947 varied considerably from one industry group to another and from one size group to another (69). For all industry groups combined, the average value added by manufacture per employee was substantially greatest for establishments with less than 10 and smallest for establishments with 50 or more employees (table 68).

Data relating to ownership or control of knit-goods manufacturers show that in 1939 about 66 percent were owned or controlled by corporations, 13 percent by partnerships, and 21 percent by private individuals. The proportion varied considerably from one industry group to another (table 69). More than 80 percent of the establishments were operated as single units and less than 20 percent as multi-units (table 69). These proportions also varied considerably from one industry group to another.

TABLE 68.—*Number of establishments, proportion with specified number of employees, and average value added by manufacture per employee, for knit goods manufacturers, by industry group, United States, 1947*

Industry	All establishments	Proportion of establishments with specified number of employees			
		Less than 10 ¹	10 to 49	50 to 249	250 or more
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Hosiery:					
Full-fashioned	735	26.2	35.8	29.5	8.5
Seamless	617	16.1	36.6	35.5	11.8
Knit outerwear	1,201	11.0	44.4	13.8	.8
Knit underwear	172	.6	18.0	54.7	26.7
Knit gloves	16	13.0	28.3	45.7	13.0
Knit fabrics	308	17.9	34.8	13.3	4.0
Other knitwear	44	50.0	36.4	13.6	0
All	3,126	30.7	38.1	21.5	6.7
		Average value added by manufacture per employee			
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Hosiery:					
Full-fashioned	1,500	6,579	4,855	4,571	4,459
Seamless	2,528	2,199	2,282	2,444	2,636
Knit outerwear	1,193	6,021	4,383	3,790	4,311
Knit underwear	3,342	1	3,121	3,162	3,381
Knit gloves	2,826	4,067	2,322	2,335	3,165
Knit fabrics	5,015	8,616	5,711	5,069	4,563
Other knitwear	4,383	4,450	4,031	4,608	0
All	3,707	6,042	4,076	3,584	3,623

¹ Included in 10 to 49 group.

² Group 10 to 19 included in group less than 10.

Adapted from CENSUS OF MANUFACTURES: 1947.

TABLE 69.—Number of knit goods, manufacturers by kind of goods, and by type of ownership and control, United States, 1939

Type of ownership and control	Kind of knit goods manufacturer						
	All	Hosiery		Knitted			
		Full-fashioned	Seamless	Outerwear	Underwear	Glove	Fabric
Type of ownership or control:	Number	Number	Number	Number	Number	Number	Number
Corporate	1,374	402	305	334	165	15	153
Partnership	280	45	52	141	14	3	25
Individual	132	50	76	234	19	2	51
Other	3	2	0	0	1	0	0
Total	2,089	499	433	709	199	20	229
Type of operation:							
Single-unit:							
Corporate	1,015	242	211	314	113	10	117
Noncorporate	684	83	121	374	30	3	73
Total	1,699	325	340	688	143	13	190
Multunit:							
Corporate	359	160	80	20	52	5	36
Noncorporate	51	14	7	1	4	2	3
Total	410	174	93	21	56	7	39
Total	2,089	499	433	709	199	20	229

Adapted from CENSUS OF MANUFACTURES: 1939.

MANUFACTURING METHODS²⁵

Machine-knitting is the process of constructing a fabric or article from yarn by the formation of connected loops produced on a series of needles. New loops or "stiches" are drawn through those already formed on the needles until the desired length of knit material has been attained. In knitted fabric (of simple stitch) the rows of loops running lengthwise and having the appearance of chains of loops are called "wales," rows formed by the same loops across the fabric, visualized at right angles to the wales, are called "courses." In plain knitting, each active needle in the machine forms a wale, and every complete action of all the needles forms a course. The number of wales determines the width of the fabric, the number of courses determines its length.

Knitted fabrics are generally classified according to type, such as weft knit or warp knit. The terms "nylon tricot" and "rayon

²⁵ Credit is due Evelina K. Southworth, U.S. Tariff Commission, for contributions to this section.

jersey" are becoming more widely used when referring to certain warp-knit fabrics. The weft knit is the more common. Fabrics are also described as latch-needle or spring-needle knit, depending upon the type of needles employed in the knitting machines. Although spring-needle fabrics are usually considered slightly superior to latch-needle fabrics, needles of the latter type have been widely used in this country, especially in the manufacture of coarser fabrics. The inherent nature of the latch-type needle with its positive action in forming loops in some instances may damage delicate yarns.

Either weft-knitting or warp-knitting machines equipped with two sets of needles can make fabrics in which some of the wales appear on the front and some on the back to form ribbed fabrics. Certain types of flat machines having two sets of needles can be equipped to knit plain-stitch tubular instead of ribbed fabric.

As knitted fabrics are made of one or a series of yarns, the extensive intermingling effect of yarns that tend to cover up irregularities in woven goods is not present. It is, therefore, necessary to have good-quality yarn of uniform construction to prevent readily apparent irregularities in knitted fabrics. A common practice in production of quality knitted goods is to use ply yarns. Plying partially compensates for the irregularities that occur in single yarns and makes a stronger yarn with greater resistance to wear.

Lisle is an example of a plied yarn that is widely used for knitting hosiery. It is made of relatively long-staple combed cotton and spun into fine counts that are plied and frequently mercerized. Two-ply mercerized yarn made from long-staple cotton is another example of plied yarns used in manufacturing of knitted goods.

In addition to uniformity or evenness of yarns, knitting requires flexible yarn that will readily conform to the serpentine shape required to form the series of loops. Harsh-fibered cottons are avoided except for coarse fabrics, as they do not readily form into loops and they tend to kink and form distorted loops of irregular sizes. Flexibility in knitting yarns is obtained by using relatively flexible raw cotton and inserting a soft twist at the spinning frame. A twist multiplier of 2.75 is widely used for manufacturing knitting yarns. This results in 16.5 turns per inch in 36s yarn, whereas approximately 25 turns per inch might be required to spin the same cotton into the same yarn count having maximum strength. Although this lower twist sacrifices some yarn strength, it results in a more pliable and, within certain limits, a more elastic knitted fabric. The better grades of knitting yarns are spun from combed stock and may be gassed and mercerized to give a more attractive appearance.

A survey of cotton mills by the United States Department of Agriculture regarding the grade and staple length of cotton used in the 1944-45 season shows the proportions of knitting yarn and of all yarns made of cotton of specified grades and lengths of staple (table 70). The survey included more than 300 mills having an annual consumption of about 4.5 million bales, and the results from one phase showed that manufacturers of knitting

TABLE 70.—Grade and staple length of cotton consumed in the manufacture of knitting yarn and in all yarns combined, United States, year beginning August 1944

Item	Knitting yarn		All yarn
	Carded	Combed	
Grade:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Low middling and below.....	4	0	8
Strict low middling and middling.....	60	64	84
Strict middling and above.....	36	36	8
Total.....	100	100	100
Staple length:			
Below 1 inch.....	20	0	21
1 inch through 1 $\frac{1}{16}$ inches.....	75	33	65
1 $\frac{1}{32}$ and 1 $\frac{1}{8}$ inches.....	5	35	7
1 $\frac{1}{16}$ inches and above.....	0	32	7
Total.....	100	100	100

Data based on a survey of 300 domestic cotton mills by U. S. Department of Agriculture in 1945.

yarns use better grades of raw cotton than the average used for all types of yarn. Only 4 percent of the raw cotton used in carded knitting yarns graded Low Middling and below, and all raw cotton consumed in combed knitting yarns graded above Low Middling. But 8 percent of the cotton consumed in all types of yarn graded Low Middling or below. Raw cotton that graded Strict Middling or above accounted for 36 percent of the total consumption for knitting yarn, but only 8 percent of the yarns spun for all purposes were made from cotton which graded that high.

Cotton consumed in the manufacture of knitting yarn, especially combed yarns, averaged longer in staple than that used in other yarns (table 70). None of the combed yarns was made of cotton shorter than 1 inch and about two-thirds of this yarn was made of cotton with staples longer than 1 $\frac{1}{16}$ inches. About a fifth of the carded yarns and of all yarns combined was made of cotton shorter than 1 inch and small proportions were made of cotton longer than 1 $\frac{1}{16}$ inches. Results of a study of market outlets for cotton in knit goods show that, from 1948 to 1950, about 97 percent of the cotton used by manufacturers of carded knitting yarn was of staples 1 inch and longer and that 71 percent of the cotton used in the manufacture of combed knitting yarn was of staples 1 $\frac{1}{32}$ inches and longer (44).

MACHINERY AND EQUIPMENT

Classified according to arrangement of needles, the types of knitting machines employed in the United States knitting industry are circular machines, straight-bar machines, and flat machines. Circular machines, having the needles set in the circum-

ference of a cylinder, knit tubular fabrics which vary in width according to the diameter of the cylinder. Some circular machines knit seamless hosiery, others knit wide fabric for overcoating. Straight-bar machines (for example, full-fashioned hosiery machines) and flat machines, having the needles arranged in a straight line, usually produce a flat fabric with selvages. Certain types of flat machines, however, are sometimes used to produce tubular fabric. Needles on a straight-bar machine operate simultaneously; those on circular or flat machines operate individually.

Gage is the term usually employed by the knit-goods industry to indicate the number of needles in a given length of the needle bed or bar. When applied to full-fashioned hosiery machines, gage indicates the number of needles in 1.5 inches of the needle bar and runs in multiples of 3 such as 45, 48, 51. When the term "gage" is applied to most other types of knitting machines it is used to designate the number of needles per inch. Unfortunately, a uniform system for designating gage has not yet been adopted by manufacturers of all types of knitting machinery.

Two fundamentally different principles of machine knitting are (1) weft knitting and (2) warp knitting. Weft knitting, the oldest form, is not usually identified by special designation. In principle, a weft-knitting machine can produce fabric from a single end of yarn fed to the different needles in the machine. Actually, for purposes of speed or decoration, weft-knitting machines are usually built to utilize numerous ends of yarn simultaneously. For example, a circular machine 20 inches in diameter is made to knit 64 ends of yarn into 64 courses at every revolution of the machine.

Warp-knitting machines (of many types) are straight-bar machines on which gage designates the number of needles to the inch. Production of warp-knit fabrics requires multiple yarn ends. A plain single-bar fabric knit on a machine 80 inches wide, with 28 needles to an inch, requires 2,240 ends of yarn. Only one course is knit at each revolution of the machine. If each needle operated always on the same yarn end, the machine would produce 2,240 separate chains. Fabric is formed, however, by moving all the warp ends over at each course for two or three needles in one direction and back in the other direction. Two sets of warps (4,480 ends on this machine) can be used to make a practically run-proof fabric. One set of warps uses one guide bar to direct the yarn to the needles and the resultant fabric is called "single-bar" fabric. Two guide bars are necessary to utilize two sets of warps for two-bar fabric.

Indications with regard to improvements in knitting machinery and equipment may be obtained from census reports which show that total expenditures for plant and equipment by knitting mills increased from \$25,140,000 in 1939 to \$84,983,000 in 1947 (table 71). Expenditures for new constructions increased from \$4,326,000 in 1939 to \$16,957,000 in 1947 and expenditures for new machinery and equipment increased from \$18,839,000 to \$64,808,000 during the same period. Expenditures for new plants and equip-

TABLE 71.—Total expenditures for plant and equipment by manufacturers of knit goods by industry groups, United States, 1939 and 1947

Industry	1947			
	Expenditures for---			
	Total	New Equipment	New plant	All other
Hosiery:	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Full-fashioned	40,441	31,315	7,273	1,853
Seamless	17,604	13,637	3,485	482
Knit outerwear	6,659	5,101	626	332
Knit underwear	7,228	5,573	1,280	375
Knit gloves	671	629	22	20
Knit fabrics	12,877	8,476	4,255	146
Other	103	77	16	10
Total	84,983	64,808	16,957	3,218
	1939			
Hosiery:				
Full-fashioned	14,709	12,217	1,720	772
Seamless	5,024	3,330	1,181	513
Knit outerwear	1,959	907	762	290
Knit underwear	2,074	1,427	378	269
Knit gloves	192	97	53	42
Knit fabrics	1,182	861	232	89
Total	25,140	18,839	4,326	1,975

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

ment by knitting mills totaled \$101,802,000 in 1949 and \$58,460,000 in 1950, according to census reports.

CHARGES OR COSTS INVOLVED

In 1947 gross margins for knitting mills, according to census reports, averaged about 55 percent of the value of the finished product, compared with about 53 percent in 1939. Data relating to the value of knit goods and to the value added by manufacture indicate that the manufacturers' gross margins in 1949 and in 1950 averaged proportionally somewhat less than in 1947 and about the same as in 1939. Gross margins for knitting mills in 1947 ranged from an average of about 40 percent of the value of the products for knit cloth to 67 percent for full-fashioned hosiery (tables 72, 73).

Wages and salaries are the principal items included in gross margins for manufacturers of knit goods. Census reports indicate that wages and salaries accounted for about 28 percent of the value of the products and 51 percent of the gross margins in 1947

and 34 percent of the value of the products and 65 percent of the gross margins in 1939. The proportions of the value of the products accounted for by wages and salaries in 1947 ranged from 18 percent for knit cloth to 33 percent for full-fashioned hosiery (tables 72, 73). According to census reports, the proportion of

TABLE 72.—*Values, costs and margins for hosiery and knit outerwear manufactures, United States, 1939 and 1947*

Item	Hosiery				Knit Outerwear	
	Full fashioned		Seamless		1939	1947
	1939	1947	1939	1947		
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of product.....	277,170	529,824	188,665	329,739	104,191	319,761
Cost of materials, etc. ¹	112,329	175,531	63,342	147,268	51,797	146,338
Gross margin.....	164,841	354,293	75,323	182,471	52,394	173,423
Salaries and wages.....	117,443	177,090	48,873	104,818	26,489	78,586
Salaries.....	16,668	21,717	7,011	13,699	7,773	20,974
Wages.....	100,775	155,373	41,862	91,119	18,716	57,612
Fuel.....	1,158	1,968	858	1,660	241	631
Purchased electric energy.....	2,033	2,100	881	1,137	550	981
Contract and commission work.....	5,603	31,508	1,494	11,610	6,292	32,626
Other ²	38,604	141,627	23,217	63,246	18,822	60,599
	Proportion of value of product					
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of product.....	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹	40.5	33.1	33.7	44.7	49.7	45.8
Gross margin.....	59.5	66.9	54.3	55.3	50.3	54.2
Salaries and wages.....	42.4	33.4	25.9	31.8	25.4	24.6
Salaries.....	6.0	4.1	3.7	4.2	7.5	6.6
Wages.....	36.4	29.3	22.2	27.6	17.9	18.0
Fuel.....	.4	.4	.5	.5	.2	.2
Purchased electric energy.....	.7	.4	.5	.3	.5	.3
Contract and commission work.....	2.0	6.0	0.8	3.5	6.1	10.2
Other ²	14.0	26.7	12.5	19.2	18.1	18.9

¹ Includes parts, containers, and supplies.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

TABLE 73.—*Values, costs, and margins for knit underwear, gloves, and cloth manufactures, United States, 1939 and 1947*

Item	Knit Underwear		Knit Gloves		Knit Cloth	
	1939	1947	1939	1947	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of product.....	113,353	301,615	12,386	26,673	68,663	210,388
Cost of materials, etc. ¹	59,217	154,774	4,693	9,551	41,480	127,358
Gross margin.....	54,136	146,841	7,693	17,122	27,183	83,030
Salaries and wages.....	36,163	80,520	4,384	9,222	14,043	38,300
Salaries.....	8,758	12,530	545	1,019	3,877	8,511
Wages.....	27,405	67,990	3,839	8,203	10,166	29,789
Fuel.....	847	1,349	54	119	721	1,278
Purchased electric energy.....	564	908	33	63	556	911
Contract and commission work.....	987	6,390	218	2,116	1,448	5,026
Other ²	15,575	57,674	3,004	5,572	10,415	37,515
Proportion of value of product						
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of product.....	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹	52.2	51.3	37.9	35.8	60.4	60.5
Gross margin.....	47.8	48.7	62.1	64.2	39.6	39.5
Salaries and wages.....	31.9	26.7	35.4	34.6	20.4	18.2
Salaries.....	7.7	4.2	4.4	3.8	5.6	4.0
Wages.....	24.2	22.5	31.0	30.8	14.8	14.2
Fuel.....	7	5	4	4	1.1	.6
Purchased electric energy.....	5	3	3	2	.8	.4
Contract and commission work.....	9	2.1	1.8	8.1	2.1	2.4
Other ²	13.8	19.1	24.2	20.9	15.2	17.9

¹ Includes supplies, parts, and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

the value of the products for hosiery manufacturers accounted for by wages and salaries in 1950 averaged about the same as in 1947 and substantially less than in 1939.

Gross margins for 28 manufacturers of cotton hosiery increased from an average of 55 percent of net sales in 1936 to 58 percent in 1939, then decreased to about 54 percent in 1942, 1943, and 1944 (table 74). The proportions of net sales accounted for by

TABLE 74.—Sales, costs, and margins for 28 hosiery manufacturers, United States, 1936-44

Item	1936	1937	1938	1939	1940	1941	1942	1943	1944
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Gross sales.....	17,094	17,643	15,465	18,461	18,301	24,862	31,692	34,772	34,438
Discounts and allowances.....	676	629	547	609	696	812	954	1,076	932
Net sales.....	16,418	17,014	14,918	17,852	17,605	24,050	30,738	33,696	33,506
Material cost.....	7,428	7,611	6,465	7,541	7,518	10,774	14,004	15,487	15,280
Gross margin.....	8,990	9,403	8,453	10,311	10,087	13,276	16,734	18,209	18,226
Direct labor cost.....	5,216	5,411	4,875	5,645	5,491	6,962	7,872	8,646	8,284
Other manufacturing expense.....	2,178	2,617	2,227	2,897	3,043	3,791	4,456	4,787	4,420
Selling expense.....	138	195	183	222	220	272	329	221	229
General and administrative expense.....	764	781	755	781	712	864	1,106	1,200	1,281
Net operating profit.....	694	369	413	766	621	1,384	2,971	3,355	4,012
Proportion of net sales									
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Gross sales.....	104.1	103.7	103.7	103.4	104.0	103.4	103.1	103.2	102.8
Discounts and allowances.....	4.1	3.7	3.7	3.1	4.0	3.4	3.1	3.2	2.8
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Material cost.....	45.2	44.7	43.3	42.2	42.7	44.8	45.6	46.0	45.6
Gross margin.....	54.8	55.3	56.7	57.8	57.3	55.2	54.4	54.0	54.4
Direct labor cost.....	31.8	32.0	32.7	31.6	31.2	28.9	25.6	25.6	24.7
Other manufacturing expense.....	13.3	15.4	14.9	16.2	17.3	15.8	14.4	14.2	13.2
Selling expense.....	.8	1.1	1.2	1.3	1.3	1.1	1.1	.7	.7
General and administrative expense.....	4.7	4.6	5.1	4.4	4.0	3.6	3.6	3.6	3.8
Net operating profit.....	4.2	2.2	2.8	4.3	3.5	5.8	9.7	9.9	12.0

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (91).

costs of direct labor decreased from about 32 percent during the late 1930's to 25 percent in 1944. The proportions of net sales accounted for by other manufacturing, selling, and general and administrative expenses decreased during the early 1940's. Operating profits increased from less than 3 percent of net sales in the late 1930's to 12 percent in 1944.

The relative importance of the items of cost to manufacturers vary considerably with the kinds of hosiery produced. Data assembled for about 40 companies that were engaged in manufacturing and selling cotton hosiery (50 percent or more of cotton) show that in 1944 costs of yarn averaged 48 percent of total costs of manufacturing and selling the various kinds of hosiery combined. These costs ranged from about 36 percent for children's hosiery to 59 percent for cotton work socks and to 64 percent for those made on Government contract (table 75). Costs of direct and indirect labor combined averaged 30 percent of the total for all kinds of hosiery and ranged from about 22 percent for hosiery made on Government contract to almost 38 percent for children's and infant's hosiery. The proportions of total costs that were accounted for by factory overhead, selling expenses, general and administrative expenses, and loss on imperfects each varied from one kind of hosiery to another, as shown in table 75.

Data relating to net sales, costs, and margins for manufacturers of women's full-fashioned rayon hosiery show that from 1939 to 1942 the proportions of net sales accounted for by manufacturers' gross margins averaged wider for branded than for unbranded mills and that margins for both groups of mills increased considerably from 1939 to 1942 (table 76). Most of the increases are accounted for by increases in net profits. The proportions of net sales accounted for by labor and other items of cost varied irregularly. Annual production of women's full-fashioned rayon hosiery has decreased since World War II and in 1951 less than 1,200,000 pairs of rayon, of a total of 614,400,000 pairs of all women's full-fashioned hosiery, were produced.

Costs and margins for manufacturers of women's full-fashioned rayon hosiery differ considerably from those shown for manufacturers of cotton hosiery. Costs of materials to manufacturers of cotton hosiery increased from 42 percent of net sales in 1939 to 45 percent in 1942; whereas costs of material for manufacturers of women's full-fashioned rayon hosiery decreased from 48 percent of net sales in 1939 to 34 percent in 1942 for unbranded mills, and from 38 percent of net sales in 1939 to 31 percent in 1942 for branded mills. From 1939 to 1942, costs of direct labor averaged 29 percent of net sales for manufacturers of cotton hosiery, 29 percent for manufacturers of women's full-fashioned rayon hosiery in unbranded mills, and 26 percent for manufacturers of women's full-fashioned rayon hosiery in branded mills. Selling expenses and net profits were relatively greater for manufacturers of women's full-fashioned rayon hosiery than those for manufacturers of cotton hosiery.

Data relating to costs of manufacturing nylon hosiery show that in 1941 the proportions of total costs accounted for by costs

of materials for nylon hosiery averaged substantially less than the corresponding proportions for cotton and rayon hosiery (table 77). Costs of direct labor were also relatively less for nylon than for cotton and rayon hosiery. Overhead, selling, and advertising costs for manufacturers of nylon were high in relation to those for cotton hosiery. The proportions of total costs of nylon hosiery

TABLE 75.—Cost of manufacturing and selling cotton hosiery (50 percent or more of cotton) for about 40 companies, United States, 1944

Item	Women's full length ¹	Cotton work socks	Men's ²	Children's and infants' ³	Government	Total
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Yarn cost.....	1,786	1,243	4,535	4,680	3,722	15,966
Direct labor.....	581	420	2,042	3,823	924	7,790
Indirect labor.....	186	103	532	1,137	343	2,301
Selling expense.....	65	69	321	651	88	1,194
Factory overhead.....	307	199	929	1,946	437	3,818
General and administrative expense.....	164	51	312	648	159	1,334
Loss on imperfects.....	167	15	278	284	167	911
Total operating expense.....	3,256	2,100	8,949	13,169	5,840	33,314
Officers' salaries included in expense.....	108	40	158	387	88	781
Proportion of total expense						
	Percent	Percent	Percent	Percent	Percent	Percent
Yarn cost.....	54.9	59.2	50.7	35.5	63.7	47.9
Direct labor.....	17.9	20.0	22.8	29.0	15.8	23.4
Indirect labor.....	5.7	4.9	5.9	8.6	5.9	6.9
Factory overhead.....	9.4	9.5	10.4	14.8	7.5	11.5
Selling expense.....	2.0	3.3	3.6	5.0	1.5	3.6
General and administrative expense.....	5.0	2.4	3.5	4.9	2.7	4.0
Loss on imperfects.....	5.1	.7	3.1	2.2	2.9	2.7
Total operating expense.....	100.0	100.0	100.0	100.0	100.0	100.0
Officers' salaries included in expense.....	3.3	1.9	1.8	2.9	1.5	2.3
Pounds of yarn used.....	Thous. 2,171	Thous. 2,988	Thous. 5,700	Thous. 6,794	Thous. 3,341	Thous. 20,994
Dozens produced.....	1,436	1,750	5,396	9,858	2,311	20,751

¹ Women's seamless full-length hosiery.

² Men's cotton half hose, slacks, and crew socks.

³ Children's and infants' hosiery, including anklets and ribbed hose.

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (91).

TABLE 76.—*Net sales, costs, and margins for manufacturers of women's full-fashioned rayon hosiery, United States, 1939-42*

Item	10 branded mills				19 unbranded mills			
	1939	1940	1941	1942	1939	1940	1941	1942
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Net sales.....	29,713	28,725	30,854	26,611	21,502	20,791	22,273	21,596
Material cost.....	11,191	28,977	10,092	8,167	10,379	11,026	9,684	7,292
Gross margin.....	18,522	17,748	20,762	18,444	11,123	9,765	12,589	14,304
Direct labor.....	8,165	7,848	7,796	6,579	6,883	6,112	5,967	6,178
Indirect labor.....	1,415	1,539	1,676	1,639	910	925	896	1,107
Manufacturing expense.....	2,308	2,252	2,474	2,260	1,782	1,657	1,739	1,788
Change in inventory.....	625	923	696	428	1,492	182	205	176
Selling expense.....	2,234	2,123	2,072	1,381	624	682	832	939
Advertising expense.....	674	586	471	296	33	29	22	10
Administrative expense.....	716	685	736	642	374	372	426	483
Officers' salaries.....	417	396	550	548	302	272	415	521
Other income and deductions.....	111	165	132	67	135	150	83	80
Net profit ²	1,979	1,461	4,323	4,604	572	1,616	2,008	3,022

See footnotes at end of table.

TABLE 76.—*Net sales, costs, and margins for manufacturers of women's full-fashioned rayon hosiery, United States, 1939-42—Continued*

Items	Proportion of net sales							
	10 branded mills				19 unbranded mills			
	1939	1940	1941	1942	1939	1940	1941	1942
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Material cost	37.6	38.2	32.7	30.7	48.3	53.0	43.5	33.8
Gross margin	62.4	61.8	67.3	69.3	51.7	47.0	56.5	66.2
Direct labor	27.5	27.3	25.3	24.7	32.0	29.1	26.8	28.6
Indirect labor	1.8	5.4	5.4	6.2	4.2	4.5	1.0	5.1
Manufacturing expense	7.8	7.8	8.0	8.5	8.3	7.9	7.8	8.3
Change in inventory	2.1	3.2	2.3	1.6	12.3	.9	.9	.8
Selling expense	7.5	7.1	6.7	6.2	2.9	3.3	3.7	4.3
Advertising expense	2.3	2.0	1.5	1.1	.2	.1	1.1	.1
Administrative expense	2.4	2.4	2.4	2.4	1.7	1.8	1.9	2.2
Officers' salaries	1.4	1.1	1.8	2.1	1.4	1.3	1.9	2.4
Other income and deductions	(3)	1.2	1.1	.2	.6	.7	.4	.4
Net profit ²	6.6	5.1	14.0	17.3	2.7	12.9	9.0	14.0

¹ Loss.² Before Federal income taxes.³ Less than 0.05 percent.

These data were obtained through a survey by the Office of

Price Administration of manufacturers of women's full-fashioned hosiery and the results were made available for use only as industry summaries so as not to disclose the identity of any individual concern (91).

to manufacturers accounted for by costs of materials decreased from 1941 to 1945, those for direct labor remained approximately unchanged, those for overhead and administrative expenses increased, and those for selling decreased.

Data relating to net sales, costs, and margins for 11 manufacturers of knitted underwear for 1942-45 show that manufacturers' gross margins averaged about 47 percent of net sales (table 78). The combined costs of direct and indirect labor averaged about a fourth of net sales each year from 1942 to 1945, inclusive. Some changes in the proportions for other items included in gross margins are shown but no very marked trends are indicated.

The information presented in table 78 represents both integrated and nonintegrated mills. Data for the four integrated mills included in that table are shown separately in table 79. Net

TABLE 77.—Average cost per dozen of manufacturing nylon hosiery, United States, 1941 and 1945

Item of cost	1941			1945
	51 page, 30 dollar	45 page, 40 dollar	45 page, 40 dollar	45 page, 40 dollar
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Material cost	2 482	2 505	2 537	2 288
Direct labor	2 270	2 210	2 193	2 534
Finishing	927	557	610	595
Overhead	1 284	1 213	1 312	1 786
Loss on seconds and integrations	379	221	196	519
Mark-down	603	611	624	603
Advertising	622	465	684	1 135
Selling	452	492	684	321
Administrative expense	237	398	566	666
Other charges	672	418	429	212
Total cost	8 025	7 864	8 651	8 857
Proportion of total cost				
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Material cost	30.9	31.8	31.5	25.8
Direct labor	28.3	28.1	25.2	28.6
Finishing	11.6	7.1	7.6	6.7
Overhead	16.6	15.1	14.2	20.2
Loss on seconds and integrations	4.2	2.8	2.4	3.6
Mark-down	7.5	2	1	1
Advertising	7.3	4.3	4.9	4.5
Selling	5.6	6.3	8.5	3.6
Administrative expense	3.0	5.1	5.7	7.5
Other charges	1	1.9	1.5	2.4
Total cost	100.0	100.0	100.0	100.0

¹ Less than 0.05 percent.

The data were assembled through a cost survey of nylon and rayon hosiery made by the Accounting Department of the Office of Price Administration. Averages are for 5 or 6 companies and were made available for use only as industry summaries (91).

TABLE 78.—*Net sales, costs, and margins for manufacturing knitted underwear, United States, 1942-45*¹

Item	1942	1943	1944	1945
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Net sales.....	17,742	17,346	19,200	17,484
Material cost.....	9,140	9,242	10,166	9,154
Gross margin.....	8,602	8,104	9,034	8,330
Direct labor.....	3,880	3,839	4,116	3,690
Indirect labor.....	570	515	605	575
Factory overhead.....	824	724	962	979
Pay-roll taxes.....	169	160	188	150
Make-up, vacation pay, and overtime.....	254	409	539	503
Selling expense.....	731	742	807	707
General and administrative expense.....	623	608	590	588
Net operating profit.....	1,551	1,107	1,227	1,138

Proportion of net sales

Item	Percent	Percent	Percent	Percent
	100.0	100.0	100.0	100.0
Net sales.....	100.0	100.0	100.0	100.0
Material cost.....	51.5	53.3	52.9	52.4
Gross margin.....	48.5	46.7	47.1	47.6
Direct labor.....	21.9	22.1	21.4	21.1
Indirect labor.....	3.2	3.0	3.2	3.3
Factory overhead.....	4.6	4.2	5.0	5.6
Pay-roll taxes.....	1.0	.9	1.0	.8
Make-up, vacation pay, and overtime.....	1.4	2.3	2.8	2.9
Selling expense.....	4.1	4.3	4.2	4.0
General and administrative expense.....	3.5	3.5	3.1	3.4
Net operating profit.....	8.8	6.4	6.4	6.5

¹ These data were obtained by a knitted underwear survey conducted by the Office of Price Administration accountants in May 1946. 11 companies were included.

The data were made available by the Office of Price Administration for use only as industry summaries (91).

sales for integrated mills averaged much greater than those for nonintegrated mills. The proportions of net sales accounted for by manufacturers' gross margins and by net operating profits averaged less, and the proportions accounted for by costs of direct labor averaged somewhat more, for integrated than for nonintegrated mills each year from 1942 to 1945.

Data for a representative sample of manufacturers of light-weight and heavyweight underwear, including 11 integrated, 20 nonintegrated, and 4 cut-sew mills, show that in 1944 manufacturers' ceiling prices, costs, and gross mill margins varied widely. Materials used included cotton, rayon, and wool. Amounts of

yarn used per dozen garments averaged about 4 pounds for all items combined and ranged from less than 1 pound per dozen for children's rayon underwear and infants' pants to about 16 pounds for men's heavyweight union suits. Ceiling prices averaged \$7.61 per dozen for all groups combined and ranged from \$1.88 for infants' training pants to \$14.04 for men's knitted sleeping garments. Costs and margins usually varied directly with ceiling prices but not in the same proportions (91).

TABLE 79.—*Net sales, costs, and margins for manufacturers of knitted underwear produced by integrated mills, United States, 1942-45¹*

Item	1942	1943	1944	1945
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Net sales	12,188	11,471	12,804	12,355
Material cost, total	6,396	6,333	6,950	6,645
Yarn cost	5,374	5,498	5,986	5,797
Trimming	1,013	830	945	828
Freight in	9	5	19	20
Gross margin	5,792	5,138	5,944	5,710
Direct labor, total	2,920	2,746	3,076	2,825
Winding and knitting	401	374	388	385
Washing, bleaching, and dyeing	142	162	180	192
Cutting and sewing	2,097	1,993	2,265	2,047
Examining and boxing	280	217	243	201
Manufacturing overhead, total	1,091	1,165	1,520	1,517
Indirect labor	263	317	386	378
Factory overhead	528	483	669	682
Pay-roll taxes	108	162	131	118
Make-up, vacation pay, and overtime	192	263	334	339
Selling expense	371	395	446	432
General and administrative expense	399	369	361	380
Net operating profit	1,011	463	541	556
Proportion of net sales				
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales	100.0	100.0	100.0	100.0
Material cost, total	52.5	55.2	53.9	53.8
Yarn cost	44.1	47.9	46.4	46.9
Trimming	8.3	7.2	7.3	6.7
Freight in	1	.1	.2	.2

See footnotes at end of table.—Cont.

TABLE 79.—*Net sales, costs, and margins for manufacturers of knitted underwear produced by integrated mills, United States, 1942-45¹—Cont.*

Item	1942	1943	1944	1945
	Proportion of net sales			
	Percent	Percent	Percent	Percent
Gross margin	47.5	44.8	46.1	46.2
Direct labor, total	24.0	23.9	23.9	22.8
Winding and knitting	3.3	3.3	3.0	3.1
Washing, bleaching, and dyeing	1.2	1.4	1.4	1.5
Cutting and sewing	17.2	17.3	17.6	16.6
Examining and boxing	2.3	1.9	1.9	1.6
Manufacturing overhead, total	9.0	10.2	11.8	12.3
Indirect labor	2.2	2.8	3.0	3.1
Factory overhead	4.3	4.2	5.2	5.5
Pay-roll taxes	.9	.9	1.0	1.0
Make-up, vacation pay, and overtime	1.6	2.3	2.6	2.7
Selling expense	3.0	3.5	3.4	3.5
General and administrative expense	3.2	3.2	2.8	3.1
Net operating profit	8.3	4.0	4.2	4.5

¹ Data were made available by the Office of Price Administration for use only as industry summaries (91). These data were obtained by a knitted-underwear survey conducted by accountants in May 1946. Data for these 4 integrated mills are included in the totals for the 11 mills shown in table 78, p. 176.

Manufacturers' gross margins, or the spread between costs of yarn plus trimming and ceiling prices of the products, averaged about 42 percent of the ceiling prices for men's wear, 43.5 percent for boys' wear, 45.5 percent for women's and misses' wear, 52.5 percent for children's and infants' wear, and 44 percent for all groups combined. Proportions within each group ranged widely. Direct labor costs averaged about a fifth of the ceiling price for men's and boys' wear, 16 percent for women's and misses' wear, 22 percent for children's wear, 18 percent for infants' wear, and 20 percent for all groups combined. Net operating results show average profits of 2 percent of the ceiling price for men's wear, 5 percent for boys' wear, 6 percent for women's, misses' and children's wear, 10 percent for infants' wear, and 4.5 percent for all groups combined. Indirect labor, factory overhead, and general and administrative expenses accounted for substantial proportions of the manufacturers' gross margins. These proportions vary considerably from one kind of underwear to another (91).

Ceiling prices for products of integrated mills were in most

instances lower than those for products of the same kind manufactured by nonintegrated mills. Ceiling prices for products of cut-sew mills were higher for some kinds of underwear and lower for other kinds than those for nonintegrated and integrated mills. Manufacturers' gross margins averaged 39 percent of the ceiling prices for integrated, 49 percent for nonintegrated, and 46 percent for cut-sew mills. Costs of direct labor averaged 21 percent of the ceiling price of the products for integrated, 17 percent for nonintegrated, and 14 percent for cut-sew mills. Profits averaged 1 percent of the ceiling prices for integrated mills, 10 percent for nonintegrated mills, and 13 percent for cut-sew mills (91).

Data relating to net sales, costs, and margins for 59 manufacturers of knitted underwear show that the manufacturers' gross margins were reduced from 46 percent of net sales in 1940 to 44 percent in 1942, then increased to 47 percent in 1944 (table 80). Costs of direct labor decreased from 17 percent of net sales in 1940 and 1941 to 15 percent in 1944. Proportions of net sales accounted for by manufacturing expenses, selling and advertising, and general and administrative expenses each decreased from 1940 to 1941, but proportions accounted for by profits increased (91).

TABLE 80.—*Net sales, costs, and margins for manufacturers of knitted underwear, United States, 1940-44¹*

Item	1940	1941	1942	1943	1944
	<i>1,000</i> dollars	<i>1,000</i> dollars	<i>1,000</i> dollars	<i>1,000</i> dollars	<i>1,000</i> dollars
Net sales	12,848	16,544	22,670	27,184	28,189
Material and trimming cost	6,936	9,001	12,724	14,817	14,938
Gross margin	5,912	7,543	9,946	12,367	13,251
Direct labor	2,262	2,862	3,513	4,283	4,268
Indirect labor, make-up, over-time	405	507	680	901	1,092
Manufacturing expense	659	824	1,000	1,230	1,213
Inventory adjustment	-104	-276	-109	29	1
Freight out	104	132	135	129	138
Selling expense	1,013	1,227	1,419	1,520	1,603
Advertising	284	312	243	225	309
General and administrative expense	1,043	1,309	1,583	1,725	1,902
Net operating profit	306	646	1,473	2,235	2,722
Nonoperating income and expense	-68	20	-22	-13	-21
Net profit before income taxes	238	675	1,451	2,222	2,701
Officers' salaries and bonuses	503	657	867	904	928
Net profits before officers' salaries and bonuses	741	1,332	2,318	3,126	3,629

See footnotes at end of table.

TABLE 80.—*Net sales, costs, and margins for manufacturers of knitted outerwear, United States, 1940-44*¹—Cont.

Item	1940	1941	1942	1943	1944
	Proportion of net sales				
	Percent	Percent	Percent	Percent	Percent
Net sales.....	100.0	100.0	100.0	100.0	100.0
Material and trimming cost.....	54.0	54.4	56.1	54.5	53.0
Gross margin.....	46.0	45.6	43.9	45.5	47.0
Direct labor.....	17.1	17.3	15.5	15.8	15.1
Indirect labor, make up, over- time.....	3.2	3.1	3.0	3.7	3.9
Manufacturing expense.....	5.1	5.3	4.4	4.5	4.3
Inventory adjustment.....	-.8	-1.7	-.5	.1	(²)
Freight out.....	.8	.8	.6	.5	.5
Selling expense.....	7.9	7.4	6.3	5.6	5.7
Advertising.....	2.2	1.9	1.1	.8	1.1
General and administrative ex- pense.....	8.1	7.9	7.0	6.3	6.7
Net operating profit.....	2.4	3.9	6.5	8.2	9.7
Nonoperating income and ex- pense.....	-.5	.2	-.1	(²)	-.1
Net profit before income taxes.....	1.9	4.1	6.4	8.2	9.6
Officers' salaries and bonuses.....	3.9	4.0	3.8	3.3	3.3
Net profits before officers' sal- aries and bonuses.....	5.8	8.1	10.2	11.5	12.9

¹ These data are for knitted outerwear manufactured by 59 manufacturers. Most of this outerwear was for civilian use but some was manufactured for the Government. Knitted outerwear accounted for about five-sixths of the total output of these manufacturers during this period and the data presented are limited to those for knitted outerwear.

² Less than 0.05 percent.

These data were assembled by the Office of Price Administration and made available for use only as industry summaries (91).

Median profits¹⁰ of hosiery manufacturers increased from 2.5 percent of net sales in 1939 to 6.6 percent in 1948. In 1950 they were 6.5 percent of net sales. Median profits as proportions of tangible net worth increased from about 6.7 percent in 1939 to 24 percent in 1946 and amounted to more than 10 percent in 1950. Similar data for manufacturers of knitted outerwear show that median profits increased from 1.3 percent of net sales in 1939 to 5.3 percent in 1946, decreased to 1.7 percent in 1949, and amounted to 3.4 percent in 1950. These profits, as proportions of tangible net worth, increased from 5.3 percent in 1939 to 25 percent in 1946 and amounted to about 11.6 percent in 1950, according to reports of Dun and Bradstreet, Inc. (20, 22).

¹⁰ Profits after full depreciation on buildings, machinery, equipment, furniture, and other assets of a fixed nature; after reserves for Federal income and excess profit taxes; after reductions in the value of inventory to cost or market, whichever is lower; after charge-offs for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals.

MEANS AND IMPORTANCE OF IMPROVEMENT

The large part of manufacturers' gross margins that is accounted for by wages emphasizes the importance of the most effective utilization of labor to increase efficiency and to reduce costs in the knit-goods industry. According to reports of the Bureau of Labor Statistics, average hourly wage rates for the knit-goods industry increased from about 48 cents in November 1939, to \$1.27 in November 1951, an increase of about 165 percent. Labor may be more efficiently utilized and costs of labor reduced by increased use of improved machines and more automatic controls.

Reports indicate that substantial progress is being made in the development of high-speed, automatic knitting machines (91). That considerable improvements have been made in recent years is indicated by census data showing that total expenditures for plant and equipment by knitting mills increased from \$25,140,000 in 1939 to \$101,802,000 in 1949 and totaled \$58,460,000 in 1950. Manufacturing efficiency may be facilitated through improvements in plant lay-out, in organization, and in operation, as well as through the use of improved machinery and equipment. But the information available is inadequate for indicating the most effective means by which and the extent to which it would be feasible to increase efficiency and to reduce costs for manufacturers of knit goods. Detailed data relating to costs for these manufacturers, similar to those indicated for other segments of the textile industry, are needed for this purpose (79).

Introduction of high-speed machines has focused attention upon the need for research designed to develop yarns of improved knitting qualities which are required for most efficient use of this equipment. Research designed to indicate fiber properties relatively best adapted for use in the various types of yarn might well be carried on in conjunction with that relating to manufacturing techniques so that combined results would indicate the most desirable combinations of fiber properties and construction of yarn. Improved yarns, relatively trouble free, developed to minimize stoppages attributable to such factors as excessive accumulations of lint on machines, and tangled and broken yarns are necessary for most effective utilization of labor and high-speed machines.

Manufacturers of knit goods sell a large proportion of their products as finished apparel and a substantial proportion is sold directly to retailers. Developments in recent years indicate that further integration may mean more economical operation. In some instances, groups of smaller manufacturers of knit goods might find it advantageous to form federations for the purpose of consuming the entire output of a spinning mill. Economies in the purchase of yarns would be favorable to such federations, but equally or perhaps more important would be the advantages of greater efficiency in sales organizations. Increased sales might be expected to result from increased promotional advertising which would be facilitated by federation. Combinations might also be made in such a way that the centralized sales agency could offer retailers a greater variety of products. According to Dun & Bradstreet's figures for underwear manufacturers, profit ratios

from 1926 to 1942 generally favored those firms that had the greater volume of sales. Data from the same source also show that profits after taxes were more than 30 percent greater for firms that spin and knit than for those that buy yarns (20).

The relative importance of increasing the efficiency and of reducing the costs of manufacturing knit goods are indicated by data showing that in 1947 gross margins for manufacturers of these goods averaged more than twice as much as the farm value of the cotton and wool used and many times greater than total costs of merchandising the raw fibers.

MANUFACTURING FABRICATED PRODUCTS

Textile products may be grouped, on the basis of the uses made of them, into three classes which are designated as consumers' goods, industrial goods, and cutters' goods. The distinctions among these three classes are based chiefly upon differences in the users and less upon the characteristics of the goods themselves. The same kind of goods may be included in each group. It has been estimated that drills, for example, are used for no fewer than 40 purposes and that they may be classed as consumers', industrial, or cutters' goods according to who uses them (16).

Consumers' goods come from manufacturing establishments ready for sale to ultimate consumers. They include piece goods, sheets and pillow cases, bedspreads and blankets, tablecloths and napkins, rugs, towels, bath mats, washrags, and diapers. In addition, many knit-goods, such as hosiery and knitted outerwear and underwear, leave the mills as completed consumers' goods.

Textile products included in the industrial-goods group come from manufacturing establishments ready for use by business houses outside the textile industry. Most of these products are woven fabrics. They include many types of ducks, osnaburgs, so-called multiple fabrics, and leno fabrics; a considerable part of the output of sheeting, twills, drills, and sateen; and small proportions of fine goods, such as voiles, organdies, lawns, broadcloths, and print cloths. Industrial fabrics are incorporated directly into finished products such as sails, tarpaulins, tents, awnings, bags, and upholsteries. They are consumed in processes of various kinds, such as filters and screens, and buffing-wheel devices for inking, moistening, pressing, and steaming. In addition, they are combined with other materials to make new products, such as hose, tires, rubber footwear, imitation leather, and abrasives (16).

Cutters' goods are practically all finished fabrics. They are used mainly in the manufacture of wearing apparel and household products by establishments which characteristically cut and sew purchased fabrics. Data for 1949 show that apparels requiring cut and sew operations were designated as the end use for more than two-thirds of the cotton and rayon woven goods produced that year. Similar data for wool products show that more than four-fifths of the woven fabrics containing 25 percent or more of wool, produced in 1949, was apparel fabrics. About 5 percent was nonapparel fabrics designated for use in blankets (16).

The quantities of finished knit goods sold to cutters apparently are relatively small. Some finished knitted fabrics, made chiefly of rayon but to some extent of cotton and silk, are sold to cutters. These fabrics are used in making such products as gloves, underwear, scarfs, bathing suits, and occasionally dresses, although the quantities used for these purposes are relatively small. Wool knitters also sell some fabrics to cutters, but the bulk of the industry's output is sold as finished garments (16).

NATURE, PRACTICES, AND EQUIPMENT

Information relating to the fabrication of textile products is not complete enough to show differences among products made of cotton, wool, rayon, and silk. Apparently large proportions of the silk, wool, and rayon fabrics go into products for which style is an important consideration. But many fabricated products are made of two or more kinds of fabrics and many fabrics are made of two or more kinds of fibers. Consequently, the data relating to fabricated products, as presented in this section of this bulletin, are not segregated to show separately those made from cotton, wool, rayon, silk, or some combination of these fabrics.

SIZE AND ORGANIZATION OF PLANT

Fabricators of textile products range from large companies operating several establishments, as is common in the manufacture of work shirts, to small "family shops". Census reports show that in 1947 almost 24 percent of the 30,960 establishments in the apparel and related-products industry had less than 5 employees each; whereas in 1939, about 29 percent of the 20,206 establishments in that industry had less than 6 employees each. The proportion of the establishments in 1947 that had less than 10 employees each was more than 40 percent for this industry as a group and the proportions by kind of product ranged from about 6 percent for work shirts to about 56 percent for household furnishings (table 81). The proportions with 50 or more employees each ranged from less than 5 percent for manufacturers of women's skirts to 69 percent for those of work shirts and averaged 17 percent for the industry as a whole. Less than half of one percent of the establishments had 500 or more employees each.

Many establishments primarily engaged in the manufacture of apparel and related products are located in the Middle Atlantic States. Census reports for 1947 show that about three-fifths of the manufacturers of men's and boys' wear, more than three-fourths of the manufacturers of women's and misses' outerwear and of women's and childrens' wear, and about 46 percent of the manufacturers of all other fabricated products combined were located in these States (table 82). Small proportions are located in New England, North Central, Southern, and other States.

Data relating to type of ownership or control of manufacturers of apparel and related products show that in 1947 about 45 percent of the establishments were operated by corporations, 29 percent by partnerships, and about 26 percent by private individuals

TABLE 81.—*Proportion of fabricating establishments employing specified numbers of wage earners, by industry, United States, 1947*

Industry	Total establishments	Proportion of establishments employing—		
		Less than 10 wage earners	10-49 wage earners	50 or more wage earners
Men's and boys' wear:				
Men's and boys' suits and coats.....	1,816	35.0	30.7	34.3
Men's dress shirts and nightwear.....	1,065	26.0	29.8	44.2
Men's and boys' underwear.....	103	24.3	35.9	39.8
Men's and boys' neckwear.....	413	47.7	39.2	13.1
Men's and boys' cloth hats and caps.....	313	54.9	37.4	7.7
Separate trousers.....	978	38.4	31.7	29.9
Work shirts.....	85	5.9	24.7	69.4
Other men's and boys' clothing.....	1,001	23.7	37.3	39.0
Women's and misses' outerwear:				
Blouses and waists.....	1,361	35.9	51.7	12.4
Dresses, unit price.....	4,202	22.4	61.2	16.4
Dresses, dozen price.....	917	28.7	43.4	27.9
Women's suits and coats.....	2,477	29.2	56.7	14.1
Women's skirts.....	493	41.2	54.3	4.5
Women's neckwear and scarfs.....	166	54.8	38.0	7.2
Other women's outerwear.....	469	33.3	52.0	14.7
Women's and children's wear:				
Women's and children's underwear.....	1,516	37.7	41.3	21.0
Corsets and allied garments.....	535	25.4	40.8	33.8
Children's dresses.....	664	31.0	50.9	18.1
Children's coats.....	506	36.2	51.8	12.0
Other children's outerwear.....	517	41.0	43.9	15.1
Miscellaneous products:				
Fabric and combination dress gloves.....	130	36.9	35.4	27.7
Fabric and combination work gloves.....	144	11.8	36.1	52.1
Robes and dressing gowns.....	376	34.0	51.9	14.1
Waterproof outer garments.....	247	36.4	45.8	17.8
Handkerchiefs.....	159	40.9	44.6	14.5
Curtains and draperies.....	397	54.9	34.3	10.8
Other house furnishings.....	1,283	56.8	31.9	11.3
Textile bags.....	233	34.0	33.0	33.0

Adapted from CENSUS OF MANUFACTURES: 1947.

(table 83). Around 93 percent of the establishments were operated as single units and almost 7 percent as multiunits. About 80 percent of the multiunit and about 43 percent of the single-unit establishments were operated as corporations. The average number of production workers per establishment and the average value added by manufacture per production worker were substantially greater for establishments operated by corporations than for other establishments. Single-unit establishments had a smaller average number of production workers, but the average value added by manufacture was greater than for those operated as multiunits. From 1939 to 1947, the total number of establishments increased markedly, the average number of production

workers per establishment decreased, and average value added by manufacture per production worker increased greatly (table 83).

MANUFACTURING METHODS¹⁷

Methods employed in fabricating textile products vary with the nature of these products. No attempt is made to describe in this bulletin all the processes employed in fabricating the different kinds of products, but methods employed in the manufacture of men's dress (business) shirts are outlined briefly for illustrative purposes. The processes involved include: (1) cutting the shirt parts from purchased yard goods, (2) sewing or joining the parts into the complete shirt, (3) folding and pressing, and (4) boxing the shirts for shipping (77). Fully integrated shirt plants usually are organized into four departments on the basis of these proc-

TABLE 82.—*Proportion of fabricating establishments by geographic divisions and by industry, United States, 1947*

Industry	Estab-lish-ments	Geographic division					All Other
		New Eng-land	Middle Atlan-tic	North Cen-tral	South-ern		
Men's and boys' wear:							
Men's and boys' suits and coats.....	1,816	7.2	62.7	14.0	10.7	5.4	
Men's dress shirts and night-wear.....	1,065	6.6	58.1	7.3	19.6	8.4	
Men's and boys' neckwear.....	413	7.8	68.0	11.6	7.0	5.6	
Separate trousers.....	976	8.1	54.0	15.4	15.7	6.8	
Women's and misses' outerwear:							
Blouses and waists.....	1,361	3.7	79.0	4.4	2.6	10.3	
Dresses, unit price.....	4,202	4.7	82.1	7.1	1.8	4.3	
Dresses, dozen price.....	917	8.8	51.6	25.1	8.7	5.8	
Women's suits and coats.....	2,477	5.4	76.8	7.2	1.6	9.0	
Women's and children's wear:							
Corsets and allied garments.....	535	9.5	67.5	9.7	4.5	8.8	
Women's and children's underwear.....	1,516	5.0	82.3	5.1	4.8	2.8	
Children's dresses.....	664	3.2	80.4	4.5	6.2	5.7	
Children's coats.....	506	3.8	87.5	3.6	1.0	4.1	
Other children's outerwear.....	517	4.8	73.1	7.0	8.5	6.6	
Other fabricated textile products:							
Robes and dressing gowns.....	376	6.1	72.6	6.7	9.0	5.6	
Waterproof outer garments.....	247	14.6	71.7	8.9	1.6	3.2	
Curtains and draperies.....	397	19.9	50.1	12.6	4.5	12.9	
Other house furnishings.....	1,233	5.7	47.6	14.8	25.9	6.0	
Textile bags.....	233	9.9	30.5	22.3	30.0	7.3	
Canvas products.....	902	11.4	27.4	32.9	16.0	12.3	

Adapted from CENSUS OF MANUFACTURES: 1947.

¹⁷ Based mainly on reports of Bureau of Labor Statistics relating to Man-Hours Expended per Dozen Men's Dress Shirts, 1939 to 1947 (77) and Productivity of Labor in Cotton-Garment Industry (57). See also Production Team Report on Men's Clothing by Anglo-American Council on Productivity (1).

TABLE 83.—*Number of establishments, average number of production workers per establishment, and average value added by manufacture per production worker for manufacturers of apparel and related products, by type of ownership and operation, United States, 1939 and 1947*

Type of ownership and control	Establishments		Average production worker per establishment		Average value added by manufacture per production worker	
	1939	1947	1939	1947	1939	1947
Type of ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Dollars</i>	<i>Dollars</i>
Corporate.....	9,065	14,031	56	48	1,915	4,779
Partnership.....	4,777	8,941	26	22	1,839	4,406
Individual.....	6,322	7,913	18	13	1,500	3,461
Other.....	42	75	33	29	1,681	4,692
All.....	20,206	30,960	37	31	1,838	4,567
Type of operation:						
Single unit:						
Corporate.....	7,634	12,362	39	36	2,119	5,224
Noncorporate.....	10,762	16,527	20	17	1,708	4,139
All.....	18,396	28,889	28	25	1,949	4,805
Multunit:						
Corporate.....	1,431	1,669	148	139	1,623	3,932
Noncorporate.....	379	402	74	49	1,432	3,349
All.....	1,810	2,071	132	122	1,601	3,887
All.....	20,206	30,960	37	31	1,838	4,567

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

esses or functions but in many establishments the pressing and boxing operations are performed in one combined department.

CUTTING DEPARTMENT

After the cloth is inspected, sorted, and matched for color, it is spread on cutting tables which are about 4 feet in width and range from 100 to 200 feet in length. The cloth is spread in layers by hand or by some type of machine spreader. The number of layers depends upon the thickness of the cloth and whether hand or machine cutting is used. The maximum number of layers for hand cutting is about 48 but for machine cutting the usual number is from 250 to 400 and in some establishments the number may be as great as 500 layers. Different types and colors of cloth may be included in the lay, with each type separated by tissue paper, markers, or stamped for identification purposes.

When the cloth is spread on the cutting tables, patterns are marked or stenciled on the top ply. Traced-paper top layers or brass-bound fiber patterns are used as a guide to cutters. The cloth is cut either with a short hand knife or with an electrically-

driven cutting machine. Hand cutting is confined mainly to high-grade shirts and to small-lot work. Electric knife cutters are used for large-ply lays. Many plants employ a combination of hand and machine cutting, utilizing hand knives when only a few shirts of a particular type are required. Small parts such as collars, yokes, and cuffs are cut by hand knives, by die stamping machines which cut up to 60 ply, or by small rapid-action "clicker" presses which handle up to 25 ply.

The lot number, size, type, and other identifying marks are customarily stamped on the shirt parts, after they are cut, either with power-driven or hand-operated machines. In plants that use the bundle system for all or a portion of the sewing operations, the shirt parts are sorted, classified, and tied into bundles containing parts for as many as 50 shirts. Each bundle is marked as to size, lot, and style for identification purposes and then taken by hand carts or sent through chutes to the sewing department. In some establishments regular bundles are not made up for the parts of the shirt which are to be sewed on a line-assembly basis, but the shirt parts are classified according to lot, size, and type.

SEWING DEPARTMENT

Shirt parts from the cutting room are joined together in the sewing department to form the finished shirts. Large and small parts are sewed together, necessary linings are sewed in, button-holes made, and buttons attached. These operations, which involve an extended series of separate steps, are usually organized into a number of major shirt-assembly sections, such as collars, cuffs, yokes, sleeves, and shirt-body backs and fronts. These sections are joined in a sequence of final assembly operations.

The number of individual sewing operations into which the manufacture of shirts is divided varies considerably from one plant to another and depends upon considerations which include size of plant, type of shirt, physical facilities, and production system in use. Usually the number of operations is somewhat greater in establishments which use the straight-line system for all or a major part of their production sequence than in those which use some form of the bundle system.

Four principal systems or methods of production organization are in use in sewing departments. These are the bundle, the progressive bundle, the straight-line, and the combination systems. The particular system in use determines almost entirely the layout of the physical facilities of the sewing department and the flow of work.

The bundle system is the oldest production method and until recently it was the most popular. Bundles, composed of groups of parts of a number of shirts bundled together and appropriately identified, serve as work units. Each operator performs a designated number of operations in the assembly of the shirts. The number of operations into which the work of the sewing department is divided ranges from 20 to 35. Sewing machines are not necessarily arranged in the order of flow of work, but, in most of the establishments that use this system, the machines are set up side by side on long benches which run the entire length or

width of the sewing room. This arrangement—the only practicable one for machines powered from a central shaft—is not necessarily followed with individually powered machines.

Methods of supplying bundles to operators vary widely. In some plants the girls go to a central location to pick up bundles; in others they pick them up from the operators who precede them in the sequence of assembly operations. Some establishments employ boys to move bundles to operators and in some instances the supervisors, or floor ladies, supply the bundles to the proper operators. In establishments that use the bundle system, bundles must make from 20 to 40 separate moves and they rarely travel in accordance with any predetermined flow of work. In many establishments operators are required to move about the plant to procure their own bundles in order to provide a break in the steady routine of the sewing operations.

The bundle system requires more handling of materials than any other, both in the moving of bundles and on the part of operators in taking shirt sections out of the bundles, in positioning them for work, in removing work tickets, and in replacing parts in the bundle. The system is flexible so that changes in production organization and in type of work performed can be readily made. Temporary shortages of materials or employees affect the average efficiency very little. Individual operators are not limited in their output by the slowness of others in the shop and under an incentive pay system they tend to work rapidly.

The progressive bundle system is, in effect, an adaptation of the bundle system to straight-line production principles. The unit of work is the bundle, which moves from one operator to another in accordance with the sequence of work. Each operator performs only one or two assigned tasks on the units included in the bundle, which is then routed to the next operator in the work sequence. Machines are grouped or aligned to permit the flow of the bundles from each operator to the next successive one. This arrangement necessitates the use of individually powered machines.

This system shares to a considerable extent in the saving in man-hours that is inherent in the line system, as the bundles flow smoothly from one operation to another, traveling the smallest possible distance en route. It is often possible to utilize labor-saving troughs or chutes down which the bundles travel from one operator to another. But the progressive-bundle system shares with the bundle system the requirements that operators withdraw parts from the large bundle, position them at the machines, and then replace them in the bundle. It shares with the line system the disadvantages of rigidity and the reliance of each operator upon completion of work by the preceding operator in the sequence. Balancing the operations to provide a steady, smooth flow of work from one operator to another is important.

The straight-line system, which was developed in 1932, substitutes a single garment for the bundle as the basic unit of work. Under this system, the sewing machines, individually driven, are arranged in groups of from one to four in accordance with a care-

fully predetermined sequence of operations and the units of work move along troughs or chutes from one work station to the next. Assembly of the shirts is usually subdivided into a greater number of operations under the straight-line than under the bundle or progressive-bundle systems. The work flows in the single units to a designated station beside each operator's machine table and the operator picks up the unit, performs her operations, then shoves it along a chute or on to the next operator's work space.

Reductions in handling on the part of operators, minimizing the movement of work within the plant, and greater division of labor are the major factors that lead to savings in man-hour requirements under the line system. The rigidity of the straight-line system, which makes it difficult to adjust or to balance the time requirements for all operators in the sequence, has prevented this system from developing the savings in man-hour requirements which were expected of it. Productivity in the line system depends chiefly upon the smooth flow of materials and the regular attendance of all operators. The balance of the line may be upset and many of the operators may have periods of enforced idleness by a temporary shortage of materials or by the absence of an operator. Each operator in the line depends upon the individual efficiency of all the others. The slowest worker serves as a bottleneck and limits the possible output of the entire line, regardless of the potential efficiency of the other workers.

The combination system, as generally applied, involves the manufacture of parts such as cuffs, collars, yokes, and bodies by either the bundle or progressive-bundle method and the final assembly of these parts into the shirt by the straight-line method. Considerable variations exist in the proportions of the total operations allotted to the line and to the bundle systems.

Many believe that the combination system, when properly applied, provides many of the benefits inherent in the line system and avoids most of its limitations. The combination system is more flexible than the line type of organization and is more readily adapted to changes in the style or type of shirt produced. Introduction of inexperienced employees does not present as severe a problem as with the line system, as they can be assigned to and can gain experience in the area of production that is under the bundle systems. As only a small proportion of the total operations and employees are under straight-line methods, substitute employee assignments may readily be made.

PROCESSING AND BOXING

When the shirts have been completed, assembled, and inspected in the sewing room, they are moved by truck, chute, or conveyor to the "laundry" where they are pressed, folded, given a final inspection, and boxed. Methods of operation and machinery used vary widely. In some of the smaller establishments the entire pressing and folding operations are performed by hand by one operator. In the larger plants, pressing and boxing are divided into several operations with a number of workers performing each task. Machines are widely used to press collars and cuffs and

to a more limited extent the body of the shirt as well. In some establishments the shirts move through the sequence of pressing operations on conveyors and this practice, although not widely used as yet, is being expanded.

In the simplest and more widely used form of team specialization, one worker machine presses collar and cuffs, another presses the shirt body by hand, a third buttons and folds the shirt, and a fourth gives it the final inspection. In most establishments, all of these operations, with the exception of machine pressing of collars and cuffs, are performed on a bench, with the work passing from one worker to another along the bench. After the final stages of folding and inspection, the shirts are moved to the boxing section, either by hand, by mobile carts or trucks, or by conveyors. They are then sorted, classified, and boxed. From one to six shirts are packed in each box.

MACHINERY AND EQUIPMENT

Spreading, cutting, and sewing machines and supplementary facilities make up the basic equipment used in the manufacture of men's shirts and other apparel. In recent years spreading machines have been more widely employed and the trend toward the increased use of electric knife cutting and the replacement of some types of hand cutting by the use of die or clicker cutting for small pieces have been continued. Overhead rails have been more generally employed over the cutting tables to increase the flexibility of the cutting machines and to permit the use of more cutting machines at the same time.

In the sewing department, basic equipment consists of sewing machines of various types which are mounted either on individual tables or on long benches placed in parallel rows the length of the sewing room. These are supplemented by special-purpose equipment, which includes collar and cuff trimmers, collar turners, inspection tables, and marking devices. Specialization of machines for production in the sewing department has been attained at high levels. A considerable portion of the work performed on machines is designed especially for one operation. Typical examples are those for sewing on buttons, making buttonholes, attaching labels, and double-needle machines for center pleats. In addition, many special attachments are designed for use on standard-type production machines which adapt them for particular operations.

Operators, not machines, largely determine the volume of output in the sewing department. The necessity for exact positioning of work in the sewing machine and frequent stopping during the course of the operations to make adjustments in the position of the cloth, mean that the machines are run less than a third of the total working time. Consequently, improvements in the speed of machines may influence output per man-hour a great deal less than changes in methods of handling and positioning the cloth in process and improvements in the moving of work from one operator to another.

No revolutionary changes in machinery and equipment in the sewing department have occurred in recent years but a number

of mechanical improvements have been widely adopted throughout the industry. Use of self-oiling, high-speed sewing machines capable of running up to 5,000 revolutions per minute has increased and the use of double-needle machines has been extended. Automatic or manually controlled thread-cutting and clipping machines have been used in many cases as replacements for the cruder methods of cutting thread.

Special guides and attachments have been widely introduced throughout the industry to simplify and speed up the sewing operations. Turning and folding machines have been improved, use of automatic ruffling machines has increased, and the practice of using buttonhole or button-sewing machines in tandem has become more general in recent years. Other improvements which have been expanded include the use of glass table tops with fluorescent lighting underneath to facilitate inspection, the more frequent use of chutes and bins to improve work and reduce handling, improvements in interior lighting to eliminate shadows, and provision of more electrical outlets to make more flexible the arrangement of machines.

Relatively few changes in pressing and boxing equipment have been made in recent years. Pressing machines have been more widely utilized and conveyor systems have been introduced in a few plants. Attention has been given in many plants to improvement of plant lay-out and to flow of work in the pressing and boxing operations.

Some indication of the extent of improvement in machinery and equipment used in the manufacture of apparel and related products may be obtained from census data showing that total expenditures for plant and equipment by these manufacturers increased from about \$14,000,000 in 1939 to more than \$80,000,000 in 1947 (table 84). Most of the expenditures were for new equipment but substantial amounts were expended for new plants. According to census reports, expenditures for new plants and equipment by manufacturers of apparel and related products totaled \$53,712,000 in 1949 and \$62,558,000 in 1950. Expenditures for new machinery and equipment totaled \$39,792,000 in 1949 and \$48,279,000 in 1950 and those for new structures and additions to plants totaled \$13,920,000 in 1949 and \$14,279,000 in 1950.

CHARGES OR COSTS INVOLVED

Gross margins for manufacturers of apparel and household textiles (the spread between the costs of the materials used and the wholesale value of the products) include such costs as salaries, wages, fuel, electricity, contract work, depreciation, interest, insurance, rent, taxes, and profits. According to census reports, these margins for manufacturers of men's and boys' clothing, furnishings, and allied garments averaged almost 55 percent of the value of the products in 1947, compared with about 50 percent in 1939 (tables 85 and 86). Reports on the value of the goods produced and on the value added by manufacture indicate that these margins in 1950 averaged proportionally less than in 1947 and about the same as in 1939.

TABLE 85.—*Values, costs, and margins for manufacturers of men's and boys' clothing and furnishings, United States, 1939 and 1947*

Item	Tailored clothing				Neckwear		Cloth hats and caps		Hat and cap materials	
	1939	1947			1939	1947	1939	1947	1939	1947
		All	Suits and coats	Suit and coat findings						
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Value of products.....	598,273	1,448,719	1,410,312	38,407	46,392	113,933	11,605	37,535	4,687	12,329
Cost of materials, etc. ¹	270,697	581,411	559,058	22,353	25,546	58,468	5,477	16,237	2,812	6,650
Gross margin.....	327,576	867,308	851,254	16,054	20,846	55,465	6,128	21,298	1,875	5,679
Salaries and wages.....	170,319	399,971	391,416	8,555	10,955	25,367	3,766	12,379	1,057	3,002
Salaries.....	30,591	66,466	64,732	1,734	3,609	6,882	889	1,924	314	902
Wages.....	139,728	333,505	326,684	6,821	7,346	18,485	2,877	10,455	743	2,100
Fuel.....	795	1,434	1,418	16	24	47	17	28	2	12
Purchased electric energy.....	1,707	2,512	2,436	76	147	197	82	115	23	29
Contract and commission work.....	61,357	183,804	183,727	77	881	4,268	135	470	103	18
All other ²	93,398	279,587	272,257	7,330	8,839	25,586	2,128	8,306	690	2,618

Proportion of value of product

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Value of products.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹	45.2	40.1	39.6	58.2	55.1	51.3	47.2	43.3	60.0	53.9
Gross margin.....	54.8	59.9	60.4	41.8	44.9	48.7	52.8	56.7	40.0	46.1
Salaries and wages.....	28.5	27.6	27.8	22.3	23.6	22.3	32.5	33.0	22.6	24.3
Salaries.....	5.1	4.6	4.6	4.5	7.8	6.1	7.7	5.1	6.7	7.3
Wages.....	23.4	23.0	23.2	17.8	15.8	16.2	24.8	27.9	15.9	17.0
Fuel.....	.1	.1	.1	(³)	.1	(³)	.1	.1	(³)	.1
Purchased electric energy.....	.3	.2	.2	.2	.3	.2	.7	.3	.5	.2
Contract and commission work.....	10.3	12.7	13.0	.2	1.9	3.7	1.2	1.2	2.2	.2
All other ²	15.6	19.3	19.3	19.1	19.0	22.5	18.3	22.1	14.7	21.3

¹ Includes parts, supplies, and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

³ Less than 0.05 percent.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

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USDA TECHNICAL BULLETINS

UPDATA

MARKETING AND MANUFACTURING SERVICES AND MARGINS FOR TEXTILES

HOWELL, L. D.

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TABLE 86.—Values, and costs, and margins for manufacturers of men's and boys' furnishings, work clothing, and allied garments, United States, 1939 and 1947

Item	Dress shirts and nightwear		Underwear		Work shirts		Separate trousers		Other clothing ¹	
	1939	1947	1939	1947	1939	1947	1939	1947	1939	1947
Value of product.....	1,000 dollars 192,366	1,000 dollars 741,645	1,000 dollars 16,693	1,000 dollars 49,938	1,000 dollars 35,672	1,000 dollars 95,919	1,000 dollars 60,985	1,000 dollars 335,380	1,000 dollars 184,223	1,000 dollars 546,949
Cost of materials, etc. ²	98,365	338,974	9,291	24,689	20,636	52,287	31,717	145,114	108,133	308,150
Gross margin.....	94,001	402,671	7,402	25,249	15,036	43,632	29,268	190,266	76,090	238,799
Salaries and wages.....	53,666	161,497	4,313	11,330	8,475	16,609	16,487	91,426	48,122	126,876
Salaries.....	8,724	25,896	585	1,483	1,206	2,751	3,646	15,993	11,325	24,629
Wages.....	44,942	135,601	3,728	9,847	7,269	13,858	12,841	75,433	36,797	102,247
Fuel.....	337	645	24	38	50	78	108	407	331	1,049
Purchased electric energy.....	700	1,298	69	104	156	165	220	766	697	1,079
Contract and commission work.....	9,237	95,045	893	4,574	577	9,636	2,768	29,485	3,383	18,341
Other ³	30,061	144,186	2,103	9,265	5,778	17,144	9,685	68,182	23,557	91,454

Proportion of value of product

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Value of product.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ²	51.1	45.7	55.7	49.4	57.8	54.5	52.0	43.3	58.7	56.3
Gross margin.....	48.9	54.3	44.3	50.6	42.2	45.5	48.0	56.7	41.3	43.7
Salaries and wages.....	27.9	21.8	25.8	22.7	23.8	17.3	27.0	27.3	26.1	23.2
Salaries.....	4.5	3.5	3.5	3.0	3.4	2.9	6.0	4.8	6.1	4.5
Wages.....	23.4	18.3	22.3	19.7	20.4	14.4	21.0	22.5	20.0	18.7
Fuel.....	.2	.1	.1	.1	.2	.1	.2	.1	.2	.2
Purchased electric energy.....	.4	.2	.4	.2	.4	.2	.4	.2	.4	.2
Contract and commission work.....	4.8	12.8	5.4	9.2	1.6	10.0	4.5	8.8	1.8	3.4
Other ³	15.6	19.4	12.6	18.4	16.2	17.9	15.9	20.3	12.8	16.7

¹ Includes work, sport, and other clothing, not elsewhere classified.

² Includes supplies, parts, and containers.

³ Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

TABLE 87.—*Values, costs, and margins for manufacturers of women's and misses' outerwear, United States, 1939 and 1947*

Item	Blouses and waists		Dresses, unit price		Dresses, dozen price (Housedresses, etc.)		Women's suits, coats, and skirts		Women's neckwear and scarfs	
	1939	1947	1939	1947	1939	1947	1939	1947	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	41,730	264,411	506,261	1,324,083	113,698	350,956	313,997	1,067,288	11,948	51,061
Cost of materials, etc. ¹	18,607	103,017	218,079	501,015	57,981	169,776	160,097	448,202	6,267	26,459
Gross margin.....	23,123	161,394	288,182	823,068	55,717	181,180	153,900	619,086	5,681	24,602
Salaries and wages.....	10,164	63,420	143,810	360,529	31,289	89,003	72,628	274,165	2,681	6,963
Salaries.....	2,771	13,046	35,410	75,272	7,283	21,714	16,211	54,003	1,003	3,134
Wages.....	7,393	50,379	108,400	285,257	24,006	67,289	56,417	220,162	1,678	3,829
Fuel.....	10	98	153	457	110	286	218	482	4	23
Purchased electric energy.....	150	547	2,019	2,851	520	717	1,001	1,923	38	58
Contract and commission work.....	6,110	43,385	67,677	226,878	6,563	25,533	35,324	153,624	891	7,671
Other ²	6,689	53,939	74,523	232,353	17,235	65,641	44,729	188,892	2,067	9,887

Proportion of value of product

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Value of products.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹	44.6	39.0	43.1	37.8	51.0	48.4	51.0	42.0	52.5	51.8
Gross margin.....	55.4	61.0	56.9	62.2	49.0	51.6	49.0	58.0	47.5	48.2
Salaries and wages.....	24.4	24.0	28.4	27.2	27.5	25.3	23.1	25.7	22.4	13.7
Salaries.....	6.7	4.9	7.0	5.7	6.4	6.2	5.2	5.1	8.4	6.2
Wages.....	17.7	19.1	21.4	21.5	21.1	19.1	17.9	20.6	14.0	7.5
Fuel.....	(³)	(³)	(³)	(³)	.1	.1	.1	(³)	(³)	(³)
Purchased electric energy.....	.4	.2	.4	.2	.5	.2	.3	.2	.3	.1
Contract and commission work.....	14.6	16.4	13.4	17.2	5.8	7.3	11.3	14.4	7.5	15.0
Other ²	16.0	20.4	14.7	17.6	15.1	18.7	14.2	17.7	17.3	19.4

¹ Includes supplies, parts, and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

³ Less than 0.05 percent.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

In 1947 manufacturers' gross margins ranged from an average of about 44 percent of the value of the products for work, sport, and other clothing not elsewhere classified to 60 percent for men's and boys' coats and suits (tables 85 and 86). Salaries and wages, the largest items of operating cost, averaged 25 percent of the value of the products and ranged from 17 percent for work shirts to 33 percent for cloth hats and caps. In 1939 salaries and wages averaged 27 percent of the value of the products and ranged from less than 23 percent for hat and cap materials to 32.5 percent for cloth hats and caps. Census reports on the value of the goods produced and on salaries and wages indicate that the proportion of the value of the products accounted for by salaries and wages in 1950 averaged more than in 1947 and about the same to somewhat more than in 1939.

Census reports show that in 1947 manufacturers' gross margins for women's, misses', and children's wear averaged 58 percent of the value of the products. They ranged from 48.2 percent for women's neckwear and scarfs to 63.3 percent for corsets and allied garments (tables 87 and 88). In 1939, they averaged about 52 percent of the value of the products and ranged from 41 percent for women's and children's underwear to 60.4 percent for children's dresses. Census reports for more recent years indicate that in 1950 the proportion of the value of products accounted for by manufacturers' gross margins averaged less than in 1947.

Salaries and wages, the largest items of operating costs for these manufacturers, averaged about 25 percent of the value of the products in 1947. They ranged from 14 percent for women's neckwear and scarfs to 29 percent for corsets and allied products (tables 87 and 88). In 1939 these proportions averaged 26 percent for all products combined and ranged from less than 22 percent for children's coats to 30 percent for corsets and allied garments. The proportion of the value of these products accounted for by salaries and wages in 1950 apparently averaged considerably more than in 1947 and somewhat more than in 1939.

In 1947, according to census reports, gross margins for manufacturers of miscellaneous textile products averaged 38 percent of the value of the products, and ranged from 20 percent for textile bags to 64 percent for lace goods (tables 89, 90, and 91). In 1939 these margins averaged 39 percent of the value of the products and ranged from 23 percent for textile bags to 66 percent for lace goods. Census data for more recent years indicate that in 1950 manufacturers' gross margins accounted for about the same proportion of the value of the products as in 1947.

The proportions of the value of the products accounted for by salaries and wages, the largest items of operating costs for manufacturers of miscellaneous textile products, averaged 18 percent in 1947, according to census reports. They ranged from 8 percent for textile bags to 35 percent for wool-felt hats and hat bodies (tables 89, 90, and 91). In 1939 these items averaged 22 percent of the value of the products, and ranged from 12 percent for textile bags to 45 percent for lace goods. Census data for more

recent years indicate that salaries and wages accounted for a somewhat larger proportion of the value of miscellaneous textile products in 1950 than in 1947.

Manufacturers' margins vary with the prices of the products. Data relating to women's cotton, rayon, and wool dresses for 1940, 1941, and 1942 show that the spread between the costs of the materials and trimming used and net sales of the products averaged 54 percent of net sales for all price lines combined. This spread ranged from less than 48 percent for dresses priced up to \$3.75 to 64 percent for dresses priced at \$29.76 and up (table 92). Cost of direct labor averaged almost half of the manufacturers' gross margins for all price lines combined and ranged from 34 percent of these margins for dresses priced at \$29.76 up to 57 percent for those priced up to \$3.75. The proportions of net sales accounted for by direct labor averaged about the same for the higher as for the lower-priced dresses. However, the proportions for material and trimming costs decreased and the proportions for other expenses increased from the lower to the higher-priced dresses. The greater risks involved in the production of more advanced fashions and the smaller volume of output for the higher than for the lower-priced dresses may account for at least a part of the differences in costs and margins shown.

Gross margins and costs for manufacturers of women's dresses vary irregularly with size of establishment. Data relating to women's cotton, rayon, and wool dresses for 1940 to 1942 show that for the lower-priced dresses the proportion of net sales accounted for by manufacturers' gross margins averaged greater for the smaller than for the larger establishments. But for the higher-priced dresses these proportions varied irregularly with size of establishment (table 92). The proportions of net sales accounted for by direct labor usually varied inversely with, and the proportions accounted for by indirect labor and manufacturing expenses usually varied directly with, size of establishment. Other expenses and profits varied irregularly with size of establishment.

Gross margins for manufacturers of women's, children's, and infants' underwear and nightwear in 1941 and in 1942 varied somewhat irregularly with net volume of sales per firm, although usually they averaged somewhat less for firms with the larger than for those with the smaller volumes of net sales. Direct labor costs averaged 47 percent of the gross margins in 1941 and 44 percent in 1942 but these proportions varied little with differences in volume of net sales. The proportions of net sales accounted for by officers' salaries decreased with increases in volume of net sales. Other items of expense varied irregularly with volume of net sales. Profits accounted for somewhat larger proportions of net sales for the larger than for the medium-sized and smaller firms (91).

Information assembled relating to men's dress shirts in 1942 shows that manufacturers' gross margins averaged 50 percent of net sales for shirts with soft collars and 49 percent for those with fused collars. These proportions showed little, if any, consistent

TABLE 88.—Value, costs, and margins for manufacturers of women's and children's undergarments and children's outerwear, United States, 1939 and 1947

Item	Women's and children's underwear		Corsets and allied garments		Children's dresses		Children's coats		Children's outerwear, n.e.c.	
	1939	1947	1939	1947	1939	1947	1939	1947	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of product.....	152,421	571,404	84,418	285,770	50,584	171,842	26,918	135,210	18,983	87,263
Cost of materials, etc. ¹	89,945	291,334	38,618	104,764	20,048	72,597	14,064	58,570	8,868	39,426
Gross margin.....	62,476	280,070	45,800	181,006	30,536	99,245	12,854	76,640	10,115	47,777
Salaries and wages.....	34,171	112,395	25,147	82,427	13,952	38,794	5,845	33,229	5,350	22,973
Salaries.....	7,987	28,301	9,413	24,169	3,289	9,407	1,512	7,330	1,169	4,926
Wages.....	26,184	84,094	15,734	58,258	10,663	29,387	4,333	25,899	4,181	18,047
Fuel.....	71	466	96	247	32	117	13	73	13	51
Purchased electric energy.....	492	980	232	555	207	361	95	291	81	240
Contract and commission work.....	5,313	48,978	1,160	16,745	4,758	23,007	3,194	17,911	1,489	6,743
Other ²	22,429	117,251	19,165	81,032	11,587	36,966	3,707	25,136	3,182	17,770

Proportion of value of product

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Value of product.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹	59.0	51.0	45.7	36.7	39.6	42.2	52.2	43.3	46.7	45.2
Gross margin.....	41.0	49.0	54.3	63.3	60.4	57.8	47.8	56.7	53.3	54.8
Salaries and wages.....	22.4	19.7	29.8	28.8	27.6	22.6	21.7	24.6	28.2	26.3
Salaries.....	5.2	5.0	11.1	8.4	6.5	5.5	5.6	5.4	6.2	5.6
Wages.....	17.2	14.7	18.7	20.4	21.1	17.1	16.1	19.2	22.0	20.7
Fuel.....	.1	.1	.1	.1	.1	.1	(³)	.1	.1	.1
Purchased electric energy.....	.3	.1	.3	.2	.4	.2	.4	.2	.4	.3
Contract and commission work.....	3.5	8.6	1.4	5.9	9.4	13.4	11.9	13.2	7.8	7.7
Other ²	14.7	20.5	22.7	28.3	22.9	21.5	13.8	18.6	16.8	20.4

¹ Includes supplies, parts, and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

³ Less than 0.05.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

TABLE 89.—Values, costs, and margins for manufacturers of miscellaneous apparel and accessories, United States, 1939 and 1947

Item	Work gloves and mittens		Dress gloves and mittens		Robes and dressing gowns		Waterproof outer garments		Handkerchiefs	
	1939	1947	1939	1947	1939	1947	1939	1947	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	22,457	77,588	7,703	29,715	39,830	103,024	11,304	77,020	21,601	53,106
Cost of materials, etc. ¹	11,757	41,467	3,434	11,935	22,772	47,735	6,288	34,983	12,164	26,065
Gross margin.....	10,700	36,121	4,269	17,780	17,058	55,289	5,016	42,037	9,437	27,041
Salaries and wages.....	6,642	17,979	2,806	8,378	8,280	23,353	2,673	19,561	4,574	9,054
Salaries.....	979	2,016	508	1,380	2,579	5,723	799	4,570	1,254	2,751
Wages.....	5,663	15,963*	2,298	6,998	5,701	17,630	1,874	14,991	3,320	6,303
Fuel.....	36	105	13	65	18	63	6	87	30	48
Purchased electric energy.....	117	159	44	84	142	228	40	179	57	81
Contract and commission work.....	18	47	148	3,721	2,751	12,435	749	9,796	1,748	6,223
Other ²	3,887	17,831	1,258	5,532	5,867	19,210	1,548	12,414	3,028	11,635

Proportion of value of product

	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹	52.4	53.4	44.6	40.2	57.2	46.3	55.6	45.4	56.3	49.1
Gross margin.....	47.6	46.6	55.4	59.8	42.8	53.7	44.4	54.6	43.7	50.9
Salaries and wages.....	29.6	23.2	36.4	28.2	20.8	22.7	23.7	25.4	21.2	17.0
Salaries.....	4.4	2.6	6.6	4.6	6.5	5.6	7.1	5.9	5.8	5.2
Wages.....	25.2	20.6	29.8	23.6	14.3	17.1	16.6	19.5	15.4	11.8
Fuel.....	.1	.1	.2	.2	(³)	.1	.1	.1	.1	.1
Purchased electric energy.....	.5	.2	.6	.3	.4	.2	.3	.3	.3	.2
Contract and commission work.....	.1	.1	1.9	12.5	6.9	12.1	6.6	12.7	8.1	11.7
Other ²	17.3	23.0	16.3	18.6	14.7	18.6	13.7	16.1	14.0	21.9

¹ Includes supplies, parts, and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

³ Less than 0.05 percent.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

TABLE 90.—Value, costs, and margins for manufacturers of miscellaneous fabricated textile products, United States, 1939 and 1947

Item	House furnishings				Textile bags		Canvas products (except bags)		Miscellaneous textile products n.e.c.	
	1939	All	Curtains and draperies	All other	1939	1947	1939	1947	1939	1947
Value of products.....	139,433	589,570	99,201	490,369	121,702	360,904	24,408	79,568	31,640	189,393
Cost of materials, etc. ¹	89,182	396,489	64,717	331,772	93,335	288,830	12,845	42,542	16,436	106,519
Gross margin.....	50,251	193,081	34,484	158,597	28,367	72,074	11,563	37,026	15,204	82,874
Salaries and wages.....	27,516	90,439	15,684	74,755	14,531	28,363	7,429	21,159	7,965	41,351
Salaries.....	9,187	19,952	5,379	14,573	4,528	7,317	3,808	7,145	3,176	11,374
Wages.....	18,329	70,487	10,305	60,182	10,003	21,046	3,621	14,014	4,789	29,977
Fuel.....	176	1,462	22	1,440	148	280	73	188	86	248
Purchased electric energy.....	554	1,474	148	1,326	282	312	102	230	143	467
Contract and commission work.....	1,797	7,899	2,400	5,499	42	503	9	772	372	2,075
Other ²	20,208	91,807	16,230	75,577	13,364	42,616	3,950	14,677	6,638	38,733

Proportion of value of product

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Value of products-----	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹ -----	64.0	67.3	65.2	67.7	76.7	80.0	52.6	53.5	51.9	56.2
Gross margin-----	36.0	32.7	34.8	32.3	23.3	20.0	47.4	46.5	48.1	43.8
Salaries and wages-----	19.7	15.3	15.8	15.3	11.9	7.8	30.4	26.6	25.2	21.8
Salaries-----	6.6	3.4	5.4	3.0	3.7	2.0	15.6	9.0	10.1	6.0
Wages-----	13.1	11.9	10.4	12.3	8.2	5.8	14.8	17.6	15.1	15.8
Fuel-----	.1	.2	(³)	.3	.1	.1	.3	.2	.3	.1
Purchased electric energy-----	.4	.3	.2	.2	.3	.1	.4	.3	.4	.3
Contract and com- mission work-----	1.3	1.3	2.4	1.1	(³)	.2	.1	1.0	1.2	1.1
Other ² -----	14.5	15.6	16.4	15.4	11.0	11.8	16.2	18.4	21.0	20.5

¹ Includes supplies, parts, and containers.

² Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

³ Less than 0.05 percent.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

TABLE 91.—*Values, costs, and margins for manufacturers of miscellaneous textile goods, United States, 1939 and 1947*

Item	Carpets and rugs etc. (except wool)		Fur-felt hats and hat bodies		Wool-felt hats and hat bodies		Felt goods n.e.c.		Lace goods	
	' 1939	1947	1939	1947	1939	1947	1939	1947	1939	1947
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	9,758	54,580	63,579	131,711	16,991	26,830	23,574	59,929	24,138	68,579
Cost of materials, etc. ¹	4,156	23,850	30,227	67,935	8,561	11,785	² 12,447	33,735	8,228	24,441
Gross margin.....	5,602	30,730	33,352	63,776	8,430	15,045	11,127	26,194	15,910	44,138
Salaries and wages.....	3,039	14,378	20,747	36,433	5,103	9,394	4,870	14,177	10,792	21,346
Salaries.....	923	2,822	4,643	7,879	746	1,830	1,013	3,068	2,685	3,601
Wages.....	2,116	11,556	16,104	28,554	4,357	7,564	3,857	11,109	8,107	17,745
Fuel.....	75	282	684	910	180	275	361	710	341	610
Purchased electric energy.....	83	244	288	339	89	144	240	367	89	177
Contract and commission work.....	54	197	988	465	0	226	(³)	71	127	871
Other ³	2,351	15,629	10,645	25,629	3,058	5,006	5,656	10,869	4,561	21,134

Proportion of value of product

	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products-----	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. ¹ -----	42.6	43.7	47.5	51.6	50.4	43.9	² 52.8	56.3	34.1	35.6
Gross margin-----	57.4	56.3	52.5	48.4	49.6	56.1	47.2	43.7	65.9	64.4
Salaries and wages-----	31.1	26.3	32.6	27.7	30.0	35.0	20.7	23.7	44.7	31.1
Salaries-----	9.4	5.1	7.3	6.0	4.4	6.8	4.3	5.1	11.1	5.3
Wages-----	21.7	21.2	25.3	21.7	25.6	28.2	16.4	18.6	33.6	25.8
Fuel-----	.8	.5	1.1	.7	1.1	1.0	1.5	1.2	1.4	.9
Purchased electric energy-----	.8	.5	.5	.2	.5	.5	1.0	.6	.4	.3
Contract and commission work-----	.6	.4	1.6	.3	-----	.9	⁽²⁾	.1	.5	1.3
Other ³ -----	24.1	28.6	16.7	19.5	18.0	18.7	24.0	18.1	18.9	30.8

¹ Includes supplies, parts, and containers.

² Cost of "Contract work" included with "Materials, etc." to avoid disclosing data reported by individual establishments.

³ Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from CENSUS OF MANUFACTURES: 1939 and 1947.

relation to prices of the shirts, but they varied considerably with materials used and from one manufacturer to another. Direct costs of labor averaged about two-fifths of the manufacturers'

TABLE 92.—*Net sales, costs, and gross margins for manufacturers of women's cotton, rayon, and wool dresses, by price range and volume of net sales, average 1940-42*

Item	Proportions for manufacturers with annual net sales (in thousands of dollars) of—					
	Less than 300	300 to 599	600 to 899	900 to 1,499	1,500 and over	All
Prices up to \$3.75:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0
Costs of material and trimming.....	54.5	57.1	57.2	57.5	59.2	57.6
Gross margin.....	45.5	42.9	42.8	42.5	40.8	42.4
Direct labor.....	25.7	24.8	23.3	24.4	23.4	24.1
Indirect labor and manufacturing expense.....	7.5	7.0	9.5	8.2	9.1	8.4
Selling, advertising, and administration.....	8.2	6.9	6.7	6.8	6.2	6.7
Officers' salaries and profits.....	4.1	4.2	3.3	3.1	2.1	3.2
Prices, \$3.76 to \$5.75:						
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0
Costs of material and trimming.....	53.0	53.9	54.2	51.3	54.6	53.6
Gross margin.....	47.0	46.1	45.8	48.7	45.4	46.4
Direct labor.....	27.6	25.6	25.4	24.8	23.7	25.0
Indirect labor and manufacturing expense.....	6.3	8.2	9.5	12.0	10.6	9.7
Selling, advertising, and administration.....	8.7	8.3	7.3	8.0	7.4	7.8
Officers' salaries and profits.....	4.4	4.0	3.6	3.9	3.7	3.9
Prices, \$5.76 to \$10.75:						
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0
Costs of material and trimming.....	47.2	47.6	47.8	47.7	47.6	47.6
Gross margin.....	52.8	52.4	52.2	52.3	52.4	52.4
Direct labor.....	27.4	26.5	25.2	26.4	23.7	25.9
Indirect labor and manufacturing expense.....	8.7	10.4	12.4	12.2	13.1	11.5
Officers' salaries and profits.....	5.4	5.0	4.8	4.0	7.5	5.1
Selling, advertising, and administration.....	11.3	10.5	9.8	9.7	8.1	9.9

TABLE 92.—*Net sales, costs, and gross margins for manufacturers of women's cotton, rayon, and wool dresses, by price range and volume of net sales, average 1940-42—Cont.*

Item	Proportions for manufacturers with annual net sales (in thousands of dollars) of—					
	Less than 300	300 to 599	600 to 899	900 to 1,499	1,500 and over	All
Prices, \$10.76 to \$16.75:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0
Costs of material and trimming.....	41.5	41.6	39.9	42.9	39.0	40.9
Gross margin.....	58.5	58.4	60.1	57.1	61.0	59.1
Direct labor.....	27.0	26.1	26.4	24.2	28.0	26.2
Indirect labor and manufacturing expense.....	13.7	14.5	16.9	15.3	13.9	15.0
Selling, advertising, and administration.....	13.4	13.3	11.2	12.2	14.6	12.9
Officers' salaries and profits.....	4.4	4.5	5.6	5.4	4.5	5.0
Prices, \$16.76 to \$29.75:						
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0
Costs of material and trimming.....	39.2	39.0	40.4	38.8	34.9	39.2
Gross margin.....	60.8	61.0	59.6	61.2	65.1	60.8
Direct labor.....	28.0	25.9	24.7	24.4	23.9	25.4
Indirect labor and manufacturing expense.....	9.4	16.2	14.1	18.1	23.3	15.8
Selling, advertising, and administration.....	17.2	14.8	15.6	13.2	13.2	14.8
Officers' salaries and profits.....	5.3	4.1	5.2	5.5	4.7	4.8
Prices, \$29.76 and up:						
Net sales.....	100.0	100.0	100.0	100.0	.....	100.0
Costs of material and trimming.....	35.9	40.2	31.9	40.6	.....	36.4
Gross margin.....	64.1	59.8	68.1	59.4	.....	63.6
Direct labor.....	25.8	21.5	21.8	16.8	.....	21.8
Indirect labor and manufacturing expense.....	16.0	18.9	23.0	15.8	.....	19.5
Selling, advertising, and administration.....	15.6	14.8	15.5	19.3	.....	15.8
Officers' salaries and profits.....	6.7	4.6	7.8	7.5	.....	6.5

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (91).

gross margins. Of these total direct costs of labor, about 12 percent was accounted for by cutting, 63 percent by stitching, 21 percent by boxing, and 4 percent by inspection. Net profits and selling expenses each averaged about 7 percent and all other expenses averaged about 15 percent of net sales (31).

Data relating to manufacturers' average selling prices, costs, and margins for men's and boys' shirts, shorts, and pajamas show that in 1944 manufacturers' gross margins averaged about half of the selling price and ranged from 49 percent for men's pajamas to 56 percent for men's shorts (table 93). Direct labor costs averaged about 38 percent of the gross margins and ranged from 30 percent for men's shorts to 47 percent for boys' dress shirts. More than two-thirds of the direct labor cost is accounted for by the labor used in stitching. Net operating profits averaged 7 percent of net sales for all manufacturing companies combined and ranged from 4 percent for manufacturers of men's and boys' dress shirts to 18 percent for manufacturers of men's shorts. Costs of selling and advertising and other items included in manufacturers' margins are also important (table 93).

Manufacturers' gross margins for men's work shirts averaged somewhat less than those for dress shirts. Data relating to selling prices, costs, and margins for men's work shirts show that in 1943 manufacturers' gross margins averaged 45 percent of the selling price and ranged from 40 percent for twill shirts to 53 percent for chambray shirts (table 94). Direct labor costs averaged 15 percent of the selling price and about a third of the manufacturers' gross margins. Net profits averaged almost as much as direct costs of labor. Other items of cost are shown in table 94.

Information, assembled by the Federal Trade Commission, relating to corporations manufacturing men's and boys' apparel show that manufacturers' margins vary with the outlets through which the products are distributed. In 1940 manufacturers' gross margins averaged 63 percent of total sales for all products combined and ranged from 58 percent for products sold to the trade to 68 percent for those sold through the manufacturers' own retail stores. Production wages and salaries averaged about a fourth of net sales and ranged from 18 percent for products sold through the manufacturers' own retail stores to 32 percent for those sold to the trade. Selling expenses averaged 14 percent of net sales for all products combined and ranged from 6 percent for those sold to the trade to 21 percent for those sold through the manufacturers' own retail stores. Profits averaged 6 percent of net sales and ranged from less than 1 percent for goods sold to the trade to 11 percent for those sold through the manufacturers' own retail outlets. Other items of expense also varied with the outlets for the product (85, 86).

In 1943 gross margins for manufacturers of men's work pants averaged about 42 percent of the selling price and ranged from 34.5 percent for those sold to chain stores and wholesalers to 47 percent for those with union labels sold to retailers (table 95). Selling prices for men's work pants with union labels averaged higher than prices for those without such labels. The proportions

TABLE 93.—Average selling price, costs, and margins per dozen to manufacturers of men's and boys' shirts, shorts, and pajamas, United States, 1944

Item	Dress shirts		Sport shirts		Shorts men's	Pajamas		Night-shirts men's	All
	Men's	Boys'	Men's	Boys'		Men's	Boys'		
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Net selling price.....	17.65	12.34	26.81	14.07	5.63	21.89	14.85	14.73	16.97
Net material (fabric) cost.....	7.48	5.04	11.99	5.68	2.15	10.26	6.78	6.52	7.33
Trimming (material) cost.....	1.38	1.05	1.47	.81	.32	.90	.67	.46	1.12
Lining.....	.48	.34	.30	.20					.30
Thread.....	.13	.15	.17	.11	.05	.15	.11	.13	.12
Buttons.....	.34	.28	.50	.25	.11	.16	.08	.04	.30
Labels.....	.07	.05	.10	.06	.04	.09	.04	.09	.07
Boxes.....	.21	.16	.27	.15	.07	.20	.14	.14	.19
Other.....	.15	.07	.13	.04	.05	.30	.30	.06	.14
Gross margin.....	8.79	6.25	13.35	7.58	3.16	10.73	7.40	7.75	8.52
Freight in.....	.07	.08	.07	.05	.04	.10	.09	.11	.07
Direct labor.....	3.55	2.93	4.87	3.24	.95	3.53	3.15	2.65	3.25
Cutting.....	.38	.32	.52	.31	.07	.40	.37	.35	.34
Stitching.....	2.38	1.97	3.44	2.34	.66	2.49	2.26	1.84	2.23
Other.....	.79	.64	.91	.59	.22	.64	.52	.46	.68

TABLE 93.—Average selling price, costs, and margins per dozen to manufacturers of men's and boys' shirts, shorts, and pajamas, United States, 1944—Continued

Item	Dress shirts		Sport shirts		Shorts men's	Pajamas		Night-shirts men's	All
	Men's	Boys'	Men's	Boys'		Men's	Boys'		
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Manufacturing overhead	2.13	1.30	2.36	1.19	.51	1.62	1.15	1.27	1.76
Make-up	.18	.11	.11	.08	.04	.11	.08	.21	.13
Overtime	.09	.09	.15	.08	.01	.10	.09	.07	.08
Vacation pay	.18	.06	.09	.08	.01	.09	.06	.05	.12
Pay-roll taxes	.15	.10	.22	.12	.03	.16	.09	.11	.14
Indirect labor	.54	.41	.89	.33	.11	.62	.41	.49	.51
Other	.99	.53	.90	.50	.31	.54	.42	.34	.78
Selling and advertising	1.41	.86	1.90	.82	.40	1.38	.87	1.09	1.26
General and administrative expense	.70	.36	1.00	.44	.13	.76	.38	.52	.63
Officers' salaries and bonuses	.29	.27	.62	.29	.11	.28	.34	.26	.30
Net operating profit	.64	.45	2.53	1.55	1.02	3.06	1.42	1.85	1.25
	Number	Number	Number	Number	Number	Number	Number	Number	Number
Companies reported	24	8	25	7	11	15	10	5	105
Production in 1,000 dozen	2,351	98	615	169	769	450	92	3	4,547

Data were assembled and summarized by the Office of Price Administration and made available for use only as industry summaries (91).

of the selling prices accounted for by labor and other expenses averaged greater, and the proportions accounted for by net profits averaged less, for men's work pants with union labels than for those without union labels. Prices, margins, and costs for men's work pants sold to chain stores and to wholesalers averaged considerably less than those for pants sold to retailers.

Data relating to net sales, margins, and costs for 13 manufacturers of men's and boys' tailored clothing show that the manufacturers' gross margins increased from 46 percent of net sales

TABLE 94.—Average selling prices, costs, and margins per dozen for manufacturers of men's work shirts, by kinds of materials, United States, 1943¹

Item	Material used				
	Chambray	Covert	Jean	Twill	All
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Selling price per dozen	11.28	12.21	15.09	21.38	14.99
Material and freight cost	4.80	5.70	8.02	12.38	7.72
Trimming cost	.54	.42	.51	.48	.49
Gross margin	5.94	6.09	6.56	8.52	6.78
Direct labor cost	2.65	2.33	2.10	2.05	2.31
Indirect labor and manufacturing expense	.95	1.01	.97	1.16	1.02
Selling and advertising	.71	.73	1.59	1.26	.95
General and administrative expense	.27	.38	.40	.60	.41
Net profit	1.36	1.61	1.91	3.45	2.09
	Proportion of selling price				
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Selling price per dozen	100.0	100.0	100.0	100.0	100.0
Material and freight cost	42.6	46.7	53.1	57.9	51.5
Trimming cost	4.8	3.4	3.4	2.2	3.3
Gross margin	52.6	49.9	43.5	39.9	45.2
Direct labor cost	23.5	19.1	14.5	9.6	15.4
Indirect labor and manufacturing expense	8.4	8.3	6.4	5.4	6.8
Selling and advertising	6.3	6.0	7.2	5.9	6.3
General and administrative expense	2.4	3.1	2.6	2.8	2.7
Net profit	12.0	13.1	12.8	16.2	14.0

¹ Prices, costs, and margins are for shirts sold by manufacturers to retailers. Averages are for reports from 4 to 9 companies for shirts made of each kind of material listed. The survey for men's work shirts was a part of a larger survey of work clothes made by the Office of Price Administration.

Primary data assembled by the Office of Price Administration and made available for use only as industry summaries (91).

TABLE 95.—*Selling prices, costs, and margins per dozen for manufacturers of men's work pants, United States, 1943*¹

Item	Sales to—			
	Retailers		Chain stores and wholesalers	All ²
	Union label	Non-union		
	Dollars	Dollars	Dollars	Dollars
Selling price per dozen.....	21.90	18.56	16.25	18.90
Material costs, total.....	11.56	10.83	10.65	11.01
Material (cloth) cost.....	9.47	8.78	8.35	8.86
Freight in.....	.12	.14	.12	.13
Trimming cost.....	1.97	1.91	2.18	2.02
Gross margin.....	10.34	7.73	5.60	7.89
Direct labor.....	3.94	3.18	2.68	3.27
Indirect labor.....	.77	.55	.50	.61
Manufacturing expense.....	.83	.50	.42	.58
Selling expense.....	1.58	.83	.22	.88
Advertising expense.....	.16		.01	.06
General and administrative expense.....	.58	.40	.14	.37
Officers' salaries.....	.48	.42	.20	.36
Net profit.....	2.00	1.85	1.43	1.76
	Proportion of selling price			
	Percent	Percent	Percent	Percent
	100.0	100.0	100.0	100.0
Selling price per dozen.....				
Material costs, total.....	52.8	58.4	65.5	58.3
Material (cloth) cost.....	43.3	47.3	51.4	46.9
Freight in.....	.5	.8	.7	.7
Trimming cost.....	9.0	10.3	13.4	10.7
Gross margin.....	47.2	41.6	34.5	41.7
Direct labor.....	18.0	17.1	16.5	17.3
Indirect labor.....	3.5	2.9	3.1	3.2
Manufacturing expense.....	3.8	2.7	2.6	3.1
Selling expense.....	7.2	4.5	1.3	4.6
Advertising expense.....	.7		.1	.3
General and administrative expense.....	2.7	2.1	.9	2.0
Officers' salaries.....	2.2	2.3	1.2	1.9
Net profit.....	9.1	10.0	8.8	9.3

¹ Averages are for 6 to 15 companies and 40 to 100 reports.² Simple average.

Primary data assembled by Office of Price Administration in work-clothing survey and made available for use only as industry summaries (91).

in 1936 to 56 percent in 1943, then decreased somewhat in 1944 (table 96). Direct and indirect costs of labor increased from 28 percent of net sales in 1936 to 36 percent in 1943. The proportions of net sales accounted for by selling expenses decreased and those accounted for by net profits increased during the early 1940's. Changes in other items are shown in table 96.

A comprehensive cost analysis for a man's two-piece worsted suit, made to sell at \$50 during the 1949-50 season, shows that the cost of the cleaned wool required amounted to about 11 percent of the retail price. Costs of manufacturing and finishing the fabric accounted for 17 percent, the garment manufacturers' cost

TABLE 96.—*Net sales, costs, and margins for 13 manufacturers of men's and boys' tailored clothing, United States, for specified years to 1944*¹

Item	1937	1939	1941	1942	1943	1944
	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>
	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>
Net sales	30,601	28,671	39,845	41,253	42,507	45,325
Material cost	16,331	14,340	19,603	18,760	18,720	21,035
Gross margin	14,220	14,331	20,239	22,493	23,877	24,290
Direct labor cost	8,647	8,683	11,749	12,337	13,480	12,827
Indirect labor	400	534	1,384	1,558	1,838	2,398
Other manufacturing expense	1,240	1,208	1,115	1,871	1,772	1,575
Selling expense	1,770	1,721	1,842	1,824	1,809	2,073
General and administrative expense	1,250	1,309	1,006	2,278	2,119	2,225
Net operating profit	904	876	1,943	2,616	2,799	3,192
Nonoperating income and expense	² 135	² 200	² 82	6	199	169
Net profit before income taxes	769	676	1,861	2,622	2,998	3,361
Proportion of net sales						
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales	100.0	100.0	100.0	100.0	100.0	100.0
Material cost	53.5	50.0	49.2	45.5	43.9	46.4
Gross margin	46.5	50.0	50.8	54.5	56.1	53.6
Direct labor cost	28.3	30.3	29.5	29.9	31.6	28.3
Indirect labor	1.3	1.9	3.5	3.8	4.3	5.3
Other manufacturing expense	4.1	4.2	3.5	4.5	4.2	3.5
Selling expense	5.8	6.0	4.6	4.4	4.4	4.6
General and administrative expense	4.1	4.6	4.8	5.6	5.0	4.9
Net operating profit	2.9	3.0	4.9	6.3	6.6	7.0
Nonoperating income and expense	² .4	² .7	² .2	(³)	.4	.4
Net profit before income taxes	2.5	2.3	4.7	6.3	7.0	7.4

¹ Sales by these manufacturers were made mostly to retailers including department stores.

² Net expense.

³ Less than 0.05 percent.

Primary data assembled by accountants of Office of Price Administration and made available for use only as industry summaries (91).

for 32 percent, and the cost of retail distribution for 40 percent of the retail price. Grade 4 or good-grade labor was used and costs of labor to fabrics and garment manufacturers accounted for about 28 percent of the retail price of the suit (36).

Gross margins for 29 manufacturers of heavy outerwear increased from 34.5 percent of net sales in 1941 to 48 percent in 1943 (table 97).¹⁸ Data for 10 companies show that, during the

TABLE 97.—*Net sales, costs, and margins for manufacturers of heavy outerwear, United States, 1940-43 and first half of 1946¹*

Item	29 companies				10 companies, 1946 ²
	1940	1941	1942	1943	
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Net sales.....	9,354	12,253	17,651	15,220	6,256
Material and trim cost.....	5,877	8,031	9,918	7,967	3,945
Gross margin.....	3,477	4,222	7,733	7,262	2,311
Direct labor.....	1,709	2,458	3,180	3,415	1,252
Indirect labor.....	259	535	688	685	164
Manufacturing expense.....	352	481	603	595	415
Selling expense.....	415	446	585	526	276
Advertising.....	36	28	21	25	
General and administrative expense.....	382	410	542	442	182
Officers' salaries.....	298	333	428	423	139
Net change in inventory.....	³ 160	³ 1,074	502	³ 160	³ 544
Net profit.....	126	605	1,175	1,311	427
	Proportion of net sales				
	Percent	Percent	Percent	Percent	Percent
Net sales.....	100.0	100.0	100.0	100.0	100.0
Material and trim cost.....	62.8	65.5	56.2	52.3	63.1
Gross margin.....	37.2	34.5	43.8	47.7	36.9
Direct labor.....	18.0	20.1	18.1	22.4	20.0
Indirect labor.....	2.6	4.2	3.6	4.3	2.6
Manufacturing expense.....	3.8	3.9	3.4	3.9	6.6
Selling expense.....	4.3	3.6	3.3	3.4	4.5
Advertising.....	.4	.2	.1	.2	
General and administrative expense.....	4.1	3.3	3.1	2.9	2.9
Officers' salaries.....	3.2	2.7	2.4	2.8	2.2
Net change in inventory.....	³ 1.4	³ 8.5	3.1	³ .8	³ 8.7
Net profit.....	1.3	5.0	6.7	8.6	6.8

¹ Each company included derived more than two-thirds of its total net sales in 1943 from fall and winter outerwear.

² First 6 months of 1946.

³ Increase in inventory.

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (97).

¹⁸ Heavy outerwear includes leather coats and jackets; wool and leather coats for men and boys; wool and leather jackets; swaggers, fingertips, and longer coats; mackinaw coats; wool loafer coats; wool jackets; cotton shell coats and jackets; corduroy coats and jackets; men's and boys' wool shirts; cotton shell vests, wool pants, coats, jackets, vests and pants, and outerwear clothing; ski and skating outerwear; and unclassified articles.

first half of 1946, gross margins averaged 37 percent of net sales. Direct and indirect labor costs increased from 21 percent of net sales in 1940 to almost 27 percent in 1943. Net profits increased from 1 percent of net sales in 1940 to more than 8 percent in 1943. Changes in other items are shown in table 97.

Median profits for manufacturers of apparel and household textiles (after full depreciation on buildings, machinery, equipment, furniture, and other assets of a fixed nature; after reserves for Federal income and excess-profit taxes; after reductions in the value of inventory to cost or market, whichever is lower; after charge-offs for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals) increased from an average of about 1 percent of net sales in 1939 to about 5 percent in 1946, then decreased to about 2 percent in 1949. In 1950, they averaged about 3 percent (table 98). As proportions of tangible net worth these profits were considerably greater than, but the trends from 1939 through 1950 were similar to, those as proportions of net sales.

MEANS AND IMPORTANCE OF IMPROVEMENTS

Census reports indicate that wages and salaries paid by manufacturers of apparel and other finished textile products average more than half of the gross operating margin and more than a fourth of the gross sales of these manufacturers. According to reports of the Bureau of Labor Statistics, average hourly earnings of wage workers in the apparel and other finished-textile-products industry increased from about 53 cents in 1939 to \$1.28 in December 1951. These data emphasize the importance of making full use of technological developments and of improvements in organization and operation in increasing the efficiency and in reducing the costs, particularly of labor, of manufacturing apparel and household textiles.

Results of time studies may be used to advantage in developing means for bringing about improvements. Other means might include the development of mutual understanding and cooperation on the part of labor and management in formulating and carrying out plans for the modernization and operation of plants. Modernization might include the installation of improved machinery and equipment, organization of the plant so as to utilize the machinery and equipment to best advantage, and development of improved working conditions so as to attract and hold competent workers. Modernization of plants might well be supplemented by in-service training programs to improve the skill of employees; by assigning the right men to the right jobs, so as to utilize fully the natural capacities and developed skills of the employees; by systematic advancements in accordance with ability and demonstrated performance, to encourage initiative and efficiency; and by prompt and effective means for allocating and removing causes of labor turn-over and costly slow-ups in production. Modernization of plants and utilization of workers to their full potentialities, to the mutual benefit of workers and management, apparently offer

TABLE 98.—Median net profits for manufacturers of apparel and household textiles as proportions of net sales and of tangible net worth, by kind of products, United States, 1939-50¹

Item	Net profits ² as proportion of net sales ³											
	Average 1935-39	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Children's dresses and wash suits.....	0.69	1.15	1.67	2.09	1.85	3.49	1.82	3.81	1.31	1.24	0.91	1.25
Women's coats and suits.....	.14	.75	1.42	1.93	2.06	4.74	4.00	7.26	3.95	3.13	3.50	2.64
Dresses, rayon and silk.....	.37	.49	.74	1.75	2.08	3.07	3.27	4.46	2.77	1.29	1.03	.96
Men's and boys' clothing.....	.61	1.07	2.04	2.13	2.59	2.77	4.05	5.01	3.19	2.47	1.38	2.09
Men's shirts, underwear and pajamas.....	.70	.83	1.79	1.68	2.93	3.74	2.26	5.74	4.38	.56	1.51	2.75
Overalls and work clothing.....	1.04	.56	3.84	3.20	3.87	5.82	3.56	5.02	2.62	1.22	1.82	2.87
Knitted outerwear.....	.79	.97	2.18	3.13	2.85	3.60	3.96	5.27	4.22	2.06	1.66	3.36
Hosiery.....	1.65	2.40	3.35	3.69	3.14	4.01	3.42	6.26	5.69	6.65	2.14	6.46
Curtains, draperies and bedspreads.....	.72	.35	3.62	2.84	4.90	5.32	6.35	8.32	4.06	2.98	2.74	4.06

Net profits as proportion of tangible net worth

Children's dresses and wash suits	3.99	6.68	10.70	9.00	9.96	17.51	13.27	20.70	7.50	7.89	6.41	6.94
Women's coats and suits	1.15	4.78	9.56	16.12	16.54	27.81	21.96	22.30	19.37	13.00	13.52	10.51
Dresses, rayon and silk	2.75	3.34	8.57	13.84	15.58	20.52	17.85	26.66	16.38	10.50	6.41	8.06
Men's and boys' clothing	2.93	5.22	10.79	12.17	13.18	13.60	16.04	18.02	12.30	10.10	5.15	8.28
Men's shirts, underwear and pajamas	3.35	2.61	9.68	10.67	12.01	14.05	10.73	21.18	16.25	2.81	5.92	12.14
Overalls and work clothing	3.14	1.67	14.49	14.00	14.83	14.32	11.80	20.58	11.45	7.02	9.49	3.56
Knitted outerwear	2.99	3.46	10.70	16.52	21.85	21.80	17.41	24.96	13.20	8.51	5.09	11.59
Hosiery	4.04	5.38	11.90	12.53	10.45	11.19	10.75	24.11	15.63	10.41	5.74	10.48
Curtains, draperies and bedspreads	3.03	1.74	15.91	17.76	12.84	18.31	18.60	30.45	14.00	11.27	8.88	11.06

¹ The number of concerns reported for 1948 ranged from 24 for fur garments to 224 for men's and boys' clothing.

² Profit after full depreciation on buildings, machinery, equipment, furniture, and other assets of a fixed nature; after reserves for Federal income and excess-profit taxes; after reductions in the value of inventory to cost or market, whichever is lower; after charge-offs for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals.

³ The dollar volume of business transacted for 365 days net after deductions for returns, allowances, and discounts from gross sales.

⁴ Aprons and dresses, cotton.

⁵ The sum of all outstanding or preference stocks (if any) and outstanding common stocks, surplus and undivided profits, less any intangible items in the assets, such as good will, trademarks, patents, copyrights, leaseholds, mailing lists, treasury stock, organization expenses, and underwriting discounts and expenses.

Adapted from reports by Roy A. Foulke (22, 23, 24, 25).

important means of reducing costs of manufacturing apparel and household textiles.

A report from the research department of the Amalgamated Clothing Workers of America indicates that improvements in management represent the easiest road to increased efficiency, as the garment industry is not highly mechanized (91). Training and maintenance of an adequate staff of "utility" operators who are skilled in a number of operations was suggested as one of the improvements needed. Through the use of such operators, a high rate of production can be maintained despite the high rate of turn-over of employees and the specialized training needed.

Many manufacturing establishments apparently are too small to make full use of the more efficient methods and equipment. Census reports show that in 1947 about 24 percent of the establishments in the apparel and related-products industry had fewer than 5 employees, more than 40 percent had fewer than 10 employees, about 60 percent had fewer than 20 employees, and about 80 percent had fewer than 50 employees. It is apparent from these data that the size of many of the establishments would have to be increased before they could fully utilize improvements in technology and in methods. But large mechanized factories operated on a mass-production basis are limited by the demands of fashion, particularly for women's wear, which require wide ranges in, and frequent changes of, styles.

Some indications of the effects of styling on costs of women's dresses, for example, may be obtained from data showing that, from 1940 to 1942, average gross margins for manufacturers ranged from about 42 percent of the value of the products for price lines up to \$3.75, for which styling was of relatively small importance, to more than 60 percent for price lines \$29.76 and above, for which styling was of relatively great importance. Style is also an important consideration in connection with men's and boys' clothing, girls' and children's wear, and other apparel and household textiles. Designers and manufacturers constantly create new styles but it is reported that only about 15 to 25 percent of the new designs in women's garments sell in quantity and that fully half represent pure waste (13). Manufacturers are said to defend this waste as a variety of research that is necessary to find out what consumers want. If consumers were willing to use products made on the same pattern in large quantities and to change styles only at infrequent intervals, substantial reductions in costs of manufacturing would be possible.

Little information is available with regard to the possibilities of reducing costs through integrations in the manufacture of apparel and household textiles. Apparently opportunities for integrations in the women's ready-to-wear industries are limited by the pyramiding of style risks and the inability to provide the variety demanded by retailers (19). Even in the case of house dresses, which are made on a relatively large scale, integration of the converters and fabricators is difficult because the amounts used of any one fabric design seldom justify the garment manufacturer in entering the converting field.

Manufacturers of shirts have had more success in combining converting with cutting than have manufacturers of dresses. Variety in styles and patterns of shirts are less important and the converting of plain and bleached fabrics has been undertaken with relatively small risk. Large cutters of branded shirts particularly have been able to control both cost and quality by converting their own gray goods. Mills producing fabrics have had less success in their attempt in forward integration as competition in the new market is keen and margins are small. However, a few textile companies that sell a variety of fabrics have gone into shirt making as a side line. The most difficult problems reported thus far have been in distribution rather than in manufacture.

In the overall manufacturing industry, integration has seldom been successful (19). A widely different scale of operations must be held to in production of the fabric and in cutting the garments. To produce denim at low cost mills must be of considerable size—too large to establish plants that would be able to use the fabric produced. An additional problem is faced by the cutter as, because of the nature of denim, integration cannot be limited to converting as in the shirt industry, but must include both weaving and spinning facilities. Apparently this problem is not insurmountable but a substantial additional investment is required as well as sufficient managerial skill to cover the wide range of operations (19).

Vertical integration has been infrequent in the garment industry, but it does exist in the manufacture of many household textiles (19). Whether the firm is integrated or specialized depends mainly upon the importance of variety in the product and how this variety is obtained. Integration is common in the sheet industry, as variety is of little importance and no distinctive features are added in the fabrication. The jacquard-bedspread industry is almost entirely integrated at the mill. Jacquard spreads are varied, but this is not a result of fabricating. The variety is obtained during preceding processes. Other household textiles in which this is true are blankets, towels, table linens, and lace curtains (19).

A different situation is found in the manufacture of a few household textiles, such as novelty curtains, tailored bedspreads, and draperies. Little integration is found in these firms as the distinctive features desired are added after the weaving and converting processes (19).

It is apparent from the foregoing that available information is not adequate to indicate specifically the most effective means by which and the extent to which it would be feasible to increase the efficiency and to reduce the costs of manufacturing apparel and household textiles. Detailed analyses of cost data for a representative sample of the establishments in each important segment of the industry are needed to show the influence of the various factors on the costs of labor, overhead, and other items at each stage or process of manufacturing specified kinds of products under actual operating conditions. In addition, detailed specifica-

tions need to be prepared, on the basis of cost engineering data and other information, for model low-cost establishments for manufacturing typical kinds of apparel and household textiles, showing the most desirable buildings, machinery and equipment, floor plans, labor requirements, operating programs, and production data, and detailed cost data for the processes and operations involved would need to be developed.

Results of the analysis of detailed data relating to costs of manufacturing specified products under actual operating conditions, along with the detailed specifications and operating results developed for model low-cost establishments, should supply a basis for indicating the changes and adjustments needed to increase efficiency and to reduce costs. As this information is mainly for the use of operators in the particular segment of the industry involved, their advice regarding the kinds of information that would be of greatest usefulness to them and their assistance in planning and developing the research required may be used to advantage. The nature of the industry for manufacturing apparel and household textiles is such that the best results from such research would require the services of competent personnel with broad training and experience in cost engineering relating to the particular segment of the industry under consideration. The approach proposed was used in research relating to manufacturers of carded cotton yarn (79). Results indicate that the methods and techniques developed, with appropriate modifications, may be applicable to other segments of the textile industry.

The relative importance, from the viewpoint of costs, of increasing efficiency and of reducing costs for manufacturers of apparel and household textiles may be indicated by data showing that for the years 1939, 1947, 1949, and 1950 the manufacturers' gross margins averaged more than 30 percent of the consumer's dollar paid for the finished products, more than two and one-half times the returns to growers for farm production of the cotton and wool used; and more than 12 times total costs of merchandising the raw fibers. A reduction of 10 percent, for example, in these margins would amount to more than an increase of 25 percent in returns to growers for farm production of the cotton and wool used, and to more than total costs of merchandising the raw cotton and wool, including the ginning and baling of cotton but not the scouring of wool.

WHOLESALE TEXTILE PRODUCTS

Textile products are distributed from spinning and weaving mills, dyers and finishers, manufacturers of knit goods, and manufacturers of apparel and household goods through a number of different combinations of agencies to consumers. An important channel of distribution, particularly in earlier years, was from manufacturers to wholesalers to retailers to consumers. But in recent years the services of manufacturing and distributing textile products have been integrated to a considerable extent. Price and production regulations during World War II apparently favored the extension of unified control (43), and integrations in

the textile industry are said to have reached new high rates during the middle and late 1940's (41).

Wholesale distribution of textile products relate to intermediate or partially manufactured products, as well as to those that are in forms for distribution to ultimate consumers. Information relating to wholesaling methods, practices, charges, and costs is presented separately for partially manufactured products and for products for ultimate consumption. This grouping is not entirely satisfactory because the same wholesalers may handle both kinds of products and in many instances the information available is not adequate to indicate differences in methods, practices, charges, and costs for the different kinds of products.

PARTIALLY MANUFACTURED PRODUCTS

Intermediate or partially manufactured textile products include some yarns, thread, and fabrics, but other yarns, thread, and fabrics are ready for distribution to ultimate consumers when they leave the mill. The information relating to partially manufactured products, as presented in this section of this bulletin, is limited mainly to the wholesale distribution services of manufacturers, finishers, and wholesalers. Some of these agencies also handle products that are in form for distribution to ultimate consumers and any differences in methods, practices, charges, and costs in distributing the two kinds of products are not always clearly indicated.

METHODS AND PRACTICES

Information regarding methods and practices in distributing yarn, thread, and fabrics, as intermediate textile products, is given in the order listed.

YARN.—Census data indicate that shipments of sales yarn in 1947 totaled 821,110,000 pounds of yarns spun on the cotton system, 8,503,000 pounds of thrown yarns, and 1,584,000 pounds of yarn spun on the silk system. In addition, production of woolen and worsted yarns other than for the manufacturers' own use totaled 144,875,000 pounds. About 42 percent of the combined amount of these yarns was weaving yarn, 38 percent was knitting yarn, and the remaining 20 percent was used for tire cord, thread, and for other purposes. Integrated weaving mills maintain a balance in their manufacturing operations by buying yarns needed in addition to their spinning capacity or by selling surplus yarns produced. Knitting mills can operate economically when they are too small to use all the yarn turned out by an efficient spinning mill. Consequently, most of the knitters find that they can buy yarn more cheaply than they can make it. In addition, some types of yarns require specialized skills (16).

Sales yarns usually are manufactured in larger quantities of uniform quality than is required by individual customers. A basic problem of marketing is to break up these large lots into smaller lots needed by customers and to distribute to users small quantities of the types and grades needed. To make such distributions economically, substantial stocks of yarn, made up of a great many

different types and grades, are brought together under the control of one marketing agency. This arrangement tends to reduce the trouble and costs to the customer by enabling him to obtain his requirements from one or a few sellers. It is also beneficial to the seller in that it may reduce the costs of selling by enabling one seller to handle yarns from many spinners.

Procedures and agencies involved in distributing sales yarn include: (1) direct sales by spinners to those who use it through their own sales staffs and offices with or without the services of brokers; (2) sales to merchants or dealers who in turn resell to consumers. Such sales are more commonly made to spinners who are not strong financially or who have only small quantities of yarn to sell; (3) sales by spinners exclusively through agents who maintain offices and sales staffs in the central marketing centers; (4) distribution through a combination of sales through agents and direct sales to users.

Producers of sales yarns usually do not limit themselves to any one basis of operation. They use different agencies and procedures in dealing with the different purchasers (16).

Information with regard to channels of distribution for sales yarn is not complete for recent years. But census reports relating to distribution of manufacturers' sales show that in 1939 about 60 percent of the cotton yarn, 88 percent of the silk yarn, and 67 percent of the rayon yarn were sold to industrial users; about 19 percent of the cotton yarn and 5 percent of the rayon yarn were sold to converters; and 18 percent of the cotton yarn, 7 percent of the silk yarn, and 27 percent of the rayon yarn were sold to wholesalers and jobbers and through manufacturer-owned and operated outlets. Small quantities were sold to exporters and to retailers. About four-fifths of these manufacturers confined their sales to one type of outlet; the others sold through two or more types (73).

Census data relating to sales negotiated through agents, brokers, and commission houses indicate that the volume of sales made through these intermediaries in 1939 totaled 23 percent for cotton yarn, 18 percent for silk yarn, and less than 1 percent for rayon yarn and thread. Wholesalers' purchases accounted for about 14 percent of the cotton yarn, 1 percent of the silk yarn and thread, and 5.4 percent of the rayon yarn and thread.

Sales of yarns (industrial) by merchant wholesalers in 1948, according to census reports, were made mainly to industrial users and to wholesale organizations, although small quantities were sold to retailers, household consumers, and for export. About 97 percent of these sales were on credit and losses from bad debts amounted to less than one-tenth of one percent of sales. Cash-credit analysis of sales of cotton yarn by wholesalers in 1939 indicate that for service and limited-function wholesalers, about two-thirds of the yarn was sold on credit for more than 30 days, 28 percent on credit for 11 to 30 days, and small proportions on short-time credit or for cash. For cotton yarns sold through the manufacturers' sales branches, about 12 percent was sold on credit for more than 30 days, 78 percent was sold on credit for 11 to 30 days, and about 10 percent on credit for 10 days or less (67).

THREAD.—Census reports show that in 1949 the value of thread shipped from manufacturers totaled \$151,999,000. This represents a relatively small part of the products of textile manufacturers. Thread usually is bleached, dyed, and finished before it is sold by mills. Reports indicate that three large firms account for about 85 or 90 percent of the net sales of thread (46). This concentration results mainly from the success of these firms in producing thread of superior quality and selling it under trademark.

Thread for home use is put up on spools ready for sale to ultimate consumers, whereas that for the industrial market is put up on cones and sold on a poundage basis. Census reports relating to the distribution of manufacturers' sales of cotton thread show that in 1939 sales valued at 35 percent of the total went to industrial users, 27 percent to retailers, 23 percent was distributed to or through manufacturer-owned and operated outlets, and about 15 percent was sold to wholesalers and jobbers. Less than 2 percent of these sales was made through agents, brokers, and commission houses (74).

Most manufacturers of thread distribute their products through two or more of these outlets. Census reports indicate that in 1939 about 74 percent of the establishments distributed their products through two or more outlets and 26 percent confined their sales to only one outlet. The average annual volume of sales per establishment that was distributed to retailers and through manufacturer-owned and operated outlets was much greater than that distributed through any other agency. In 1939 the volume per establishment averaged \$1,279,000 for sales to retailers including chains, \$1,054,000 for products distributed through manufacturer-owned and operated outlets, \$294,000 for sales to industrial users, \$397,000 for sales to wholesalers and jobbers, and \$29,000 for sales to other agencies.

FABRICS.—Most of the cloth when it leaves the mill represents intermediate products ready for converters, fabricators, or industrial users, but some is fabricated by mills or sold as piece goods ready for the ultimate consumer. Manufacturer outlets for textile fabrics are largely accounted for by sales to industrial users, converters, and wholesalers and jobbers but considerable proportions, particularly of piece goods and fabricated products, are sold to retailers, including chains, and through manufacturer-owned and operated outlets.

Census reports relating to the distribution of manufacturers' sales show that in 1939 sales valued at 29 percent of the total for broad-woven cotton fabrics were distributed to converters, almost 26 percent to industrial users, 10 percent to retailers including chains, 9.5 percent through manufacturer-owned and operated outlets, and small proportions to export and to consumers at retail. For rayon broad-woven goods, about 54 percent went to converters, 18 percent to wholesalers and jobbers, 17 percent through manufacturer-owned and operated outlets, 10 percent to industrial users, and small proportions to export and to consumers at retail. For woolen and worsted manufacturers, 60 percent went to industrial users, 24 percent to wholesalers and jobbers, 10 percent

through manufacturer-owned and operated outlets, 5 percent to retailers, and small proportions to export and to consumers at retail. About 59 percent of the establishments for cotton goods, 87 percent for rayon goods, and about 60 percent for woolen and worsted manufacturers distributed their products through only one of these outlets and 31, 13, and 40 percent, respectively, distributed their products through two or more of them.

Manufacturers' sales of woven cloth are made directly by the sales staff of the manufacturers, or through agents, brokers, and commission merchants, or by a combination of both means. Census reports indicate that in 1939 about 55 percent of the manufacturers of cotton broad-woven goods, 22 percent of the manufacturers of rayon broad-woven goods, and 48 percent of the manufacturers of woolen and worsted goods sold through agents, brokers, and commission merchants, and about 34, 14, and 19 percent, respectively, sold exclusively through these intermediaries. The value of the products sold through these intermediaries totaled 45, 21, and 33 percent, respectively, of total manufacturers' sales.

In 1939 knitted cloth accounted for about 9 percent of total sales by manufacturers of knit goods, according to census reports. About 71 percent of this cloth was sold to industrial users, 16 percent to wholesalers and jobbers, 8 percent to retailers, and 5 percent through other outlets. Gray-goods markets for knit goods are relatively unimportant, as most of the knit goods are finished by the mills before they are sold. Piece dyeing was developed for full-fashioned hosiery as early as 1918, but a gray-goods market for these products was not developed until the early 1930's. In recent years, considerable proportions of the full-fashioned hosiery have been finished by mills other than those that do the knitting, but only a small part of the finishing is done through converters. Most of the unfinished hosiery is sold to, or knit on commission for, other mill operators who usually finish it in their own plants, but some hosiery is sold unfinished to converters and others who have it finished on commission. Gray-goods markets for seamless hosiery are limited mainly to relatively small quantities knit on commission for hosiery mills. Some knit underwear fabrics are sold in the gray, but the volume is relatively small (16).

Large proportions of cotton and rayon broad-woven goods are sold in the gray to converters, but usually woolen and worsted fabrics are finished before they are sold by the manufacturer. The marketing of gray cloth to converters is mostly concentrated in the hands of a relatively few selling agents and brokers whose main offices are in New York City. Sales to converters usually are made by selling agents, or mill-selling offices, through cloth brokers. The function of these brokers is to bring the converters and mill-selling representatives together. Mill sales of gray goods to industrial users usually are made directly by mills or through agents on the basis of specifications.

Gray goods usually are bleached, mercerized, dyed, printed, or finished in other ways before they are used by cutters and others. A large part of this finishing is done by or for the manufacturer before the fabrics are sold. But considerable quantities of cotton

and rayon gray goods, and some woolen and worsted fabrics, are finished by establishments primarily engaged in finishing operations. Census reports show that in 1939 about 48 percent of the sales of establishments primarily engaged in dyeing and finishing textiles (except woolen and worsted) was to industrial users (including apparel and household goods manufacturers), 28 percent to wholesalers and jobbers, 16 percent through the establishments' own sales offices, and small proportions to others. About 68 percent of the sales outlets for establishments primarily engaged in dyeing and finishing woolen and worsted fabrics was to wholesalers and jobbers (including own wholesale branches or offices), 24 percent to industrial users, and 8 percent to retailers.

About three-fourths of the establishments primarily engaged in dyeing and finishing fabrics, other than woolen and worsted, and about 70 percent of those primarily engaged in dyeing and finishing woolen and worsted fabrics, sold exclusively through one outlet and about 25 and 30 percent, respectively, sold through two or more outlets. Of the dyers and finishers of fabrics other than woolen and worsted 19 percent sold through agents, brokers, and commission houses and 12 percent sold exclusively through these agencies. The value of the sales through these agencies totaled about 24 percent of the total distributed sales. Similar data for finishers of woolen and worsted fabrics in 1939 are not available.

Census reports relating to sales of wholesalers by class of customers indicate that in 1948 substantial proportions of some textile products, particularly piece goods, were sold to industrial users and to wholesale organizations. Of the total sales of \$1,133,000,000 worth of textiles in the piece or bolt by merchant wholesalers in 1948, about 30 percent was to industrial users, 26 percent to retailers, 22 percent to wholesale organizations, 21 percent to export, and a small proportion to household consumers. The distribution of \$1,003,000,000 worth of these products by manufacturer sales branches (with stocks) show that 72 percent went to industrial users, 18 percent to wholesaler organizations, 8 percent to retailers, and small proportions to others. Sales of more than \$600,000,000 worth of piece goods by manufacturers' sales offices (without stocks) show 59 percent distribution to industrial users, 26 percent to wholesale organizations, 12 percent to retailers and small proportions to others.

Data relating to sales of piece goods totaling \$2,999,000,000 in 1948 by agents and brokers show that 61 percent went to industrial users, 22 percent to wholesale organizations, 12 percent to retailers, and small quantities to others. The sales distribution of \$1,764,000,000 in 1948 by wholesalers who buy textiles in the gray or unfinished form and have them dyed and finished by others, usually on a contract basis, shows that 49 percent went to industrial users, 28 percent to wholesale organizations, 17 percent to retailers, and small proportions to others. It is apparent from these data that substantial quantities of textiles in the form of intermediate products are handled by wholesalers.

Cash-credit analysis of sales of piece goods by wholesalers show that in 1948 about 94 percent of the sales were made on credit and that in 1939 most of them were made on credit for more than 30

days (67). For service and limited-function wholesalers, about 75 percent of total sales in 1939 of about \$744,000,000 was on credit for more than 30 days, 19 percent on credit for 11 to 30 days, and 6 percent on credit for 10 days or less or for cash. Of the total sales of about \$131,000,000 manufacturers' sales branches in 1939, about 71 percent was on credit for more than 30 days, 21 percent for 11 to 30 days, and 8 percent on credit for 10 days or less or for cash.

CHARGES OR COSTS INVOLVED

Information relating to charges or costs involved in the wholesale distribution of yarn, thread, and fabrics, as intermediate textile products, is presented in the order listed.

YARN.—Charges or costs involved in wholesale distribution of yarn usually cover the selling expenses of yarn manufacturers, including commissions for selling agents, brokers, and commission merchants, as well as margins for wholesalers, including wholesale merchants, manufacturers' sales branches and offices, and other intermediaries. Data on distribution of manufacturers' sales in 1948 are not available, but according to census reports for 1939 more than four-fifths of the cotton yarn, more than 90 percent of the silk yarn and thread, and more than two-thirds of the rayon yarn and thread were distributed by manufacturers to industrial users, converters, exporters, and retailers. Data for 113 spinning companies show that selling expenses of manufacturers, including bad debts and commissions to agents, brokers, and commission merchants, averaged about 4.7 percent of net sales in 1936 (89). These expenses ranged from an average of 4.3 percent of net sales for spinning mills that make carded cotton yarns 40's or coarser to an average of 6.9 percent for mills that spin combed-cotton yarns finer than 40's.

Data for 28 manufacturers of carded cotton yarns show that selling expenses increased from 4.6 percent of net sales in 1936 to 4.8 percent in 1939 and 1941, then decreased to 3.9 percent in 1944 (table 25, p. 80). Similar data for 19 manufacturers of combed cotton yarns show that selling expenses increased from 4.1 percent of net sales in 1936 to 4.8 percent in 1939, then decreased to 3.7 percent in 1944 (table 26, p. 81). These expenses apparently include commissions paid to agents and brokers by some manufacturers. Agents' commissions vary with the number and kinds of service performed but the most usual commission paid for a combination of selling and financial services is said to be about 5 percent of the selling price of the yarn (16). Brokers' commissions ordinarily amount to about 2 percent of the selling price. Manufacturers' selling expenses for spun-rayon yarns made of viscose staple fibers averaged 3.5 percent of net sales during the first quarter of 1942 (table 60, p. 146).

Information relating to variations in selling expenses on the basis of the size of yarn manufacturers is not complete. But data for 28 manufacturers of carded cotton yarn and for 19 manufacturers of combed cotton yarn show that, for the years 1936, 1939, 1941, and 1944, selling expenses as proportions of net sales were somewhat less for the smaller than for the larger manufacturers

of carded cotton yarns and somewhat greater for the smaller than for the larger manufacturers of combed cotton yarn (tables 25, 26, pp. 80, 81).

According to census reports, operating expenses of merchant wholesalers, as proportions of sales of yarn, averaged 6.9 percent in 1948 compared with 8.3 percent in 1939 (table 99). These expenses ranged in 1948 from 5 percent or less of sales for establishments with annual sales of \$2,000,000 or more to 23 percent for those with annual sales of less than \$50,000. These operating expenses include no compensation for active proprietors of unincorporated businesses or profits. Administrative and selling expenses are the most important items included and the proportion of net sales accounted for by these and other items tend to vary inversely with the volume of annual sales (table 100).

TABLE 99.—*Number of establishments, volume of sales, and operating expenses for wholesalers of yarn, by size group, United States, 1939 and 1948*

Sales-size group (Dollars)	1939			
	Establish- ments	Total sales	Operating expenses as proportion of sales ¹	Active proprie- tors ²
	Number	1,000 dollars	Percent	Number
All.....	157	65,134	8.3	108
2,000,000 and over.....	6	27,370	5.5	-----
1,000,000 to 1,999,999.....	7	10,329	6.9	4
500,000 to 999,999.....	19	12,749	8.7	6
300,000 to 499,999.....	16	6,470	11.1	13
200,000 to 299,999.....	13	3,331	17.0	9
100,000 to 199,999.....	13	1,661	13.7	15
50,000 to 99,999.....	24	1,982	17.1	15
10,000 to 49,999.....	43	1,138	19.8	31
Under 10,000.....	16	104	21.2	15
1948				
All.....	210	144,652	6.9	127
5,000,000 and over.....	4	32,935	4.1	7
2,000,000 to 4,999,999.....	16	49,926	5.0	4
1,000,000 to 1,999,999.....	12	14,962	6.9	7
500,000 to 999,999.....	30	20,960	9.9	17
300,000 to 499,999.....	31	12,213	10.0	14
200,000 to 299,999.....	19	4,739	13.5	13
100,000 to 199,999.....	38	5,556	12.4	25
50,000 to 99,999.....	35	2,087	14.6	24
Under 50,000.....	25	674	23.3	16

¹ Operating expenses include no compensation for active proprietors of unincorporated businesses.

² Active proprietors of unincorporated businesses.

Abstracted from CENSUS OF BUSINESS, WHOLESALE TRADE (78, 67).

TABLE 100.—Number of establishments, volume of sales, and average operating expenses of wholesale yarn merchants, by sales-size group and by kind of business, United States, 1939 and 1948

Kind of business and sales-size group (dollars)	Estab-lish-ments	Volume of sales	Operating expenses, including payroll, as proportion of sales ¹							Active proprietors ²
			Total	Admin-istrative	Selling	Delivery	Ware-house	Occu-pancy	Other	
	Number	1,000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Number
All	45	47,952	7.8	3.2	1.8	0.7	0.3	0.8	1.0	33
1,000,000 and over	10	33,679	6.0	2.8	1.4	.3	.1	.4	1.0	2
500,000 to 999,999	12	8,121	9.8	3.7	2.1	1.4	.3	1.3	1.0	6
300,000 to 499,999	7	2,807	13.5	4.1	4.0	1.1	.9	1.7	1.7	8
200,000 to 299,999	9	2,352	16.4	5.5	3.5	1.9	1.8	2.7	1.0	7
100,000 to 199,999	7	993	17.2	4.6	4.6	2.9	2.1	1.7	1.3	10
1948										
All	95	126,361	6.6	3.3	1.7	0.6	0.2	0.6	0.2	49
5,000,000 and over	4	32,935	4.1	1.9	1.5	.4	(⁴)	.3	(⁴)	7
1,000,000 to 4,999,999	26	(³)	5.5	2.6	1.4	.6	.2	.4	.3	11
Corporate	20	(³)	6.1	3.1	1.4	.6	.3	.4	.3	11
Noncorporate	6	13,701	3.2	.9	1.3	.3	(⁴)	.5	.2	11
500,000 to 999,999	25	(³)	11.6	5.6	2.8	1.3	.3	1.2	.4	14
Corporate	17	11,839	13.7	7.4	2.6	1.5	.4	1.4	.4	14
Noncorporate	8	(³)	6.9	1.5	3.2	.9	(⁴)	.9	.4	14
200,000 to 499,999	40	13,932	11.3	5.7	2.6	1.0	.2	1.2	.6	17
Corporate	26	9,322	13.0	7.5	2.8	1.0	.3	1.0	.4	17
Noncorporate	14	4,610	8.0	2.2	2.2	1.0	(⁴)	1.8	.8	17

¹ Operating expenses include no compensation for active proprietors of unincorporated businesses. ² Active proprietors of unincorporated businesses. ³ Withheld to avoid disclosure.

⁴ Less than 0.05 percent.
Abstracted from CENSUS OF BUSINESS, WHOLESALE TRADE (63, 67).

THREAD.—Information regarding the charges or costs involved in distributing thread is confined chiefly to limited data on selling expenses and bad debts for thread-manufacturing companies. Reports of the Federal Trade Commission show that during the first half of 1936, selling expenses, including commissions and bad debts, averaged 13.3 percent of net sales for 18 cotton-thread-manufacturing companies and 9 percent for 14 finishing and spooling companies. Information is not complete enough to show similar expenses for more recent years or to indicate the services for which these charges are made and the relation of these services and charges to the size and organizational set-up of the companies.

FABRICS.—Any evaluation of the charges or costs of distributing textiles involves consideration of the marketing agencies involved, the kinds of goods distributed, and the marketing services performed. Selling expenses of textile manufacturers include those for selling gray goods to converters, industrial users, wholesalers, and others; those for selling finished fabrics to industrial users, wholesalers, retailers, and others; and those for selling fabricated products to wholesalers, retailers, and others. As reported by the Federal Trade Commission, selling expenses averaged 2.9 percent of total sales in 1939 and 3.1 percent in 1940 for cotton-textile manufacturing corporations, 3.7 percent of total sales in 1939 and 3.5 percent in 1940 for woolen and worsted-manufacturing corporations, and 2.1 percent of total sales in 1939 and in 1940 for rayon-manufacturing corporations (82, 85, 86).

Data for 24 manufacturers of cotton-print cloth show that selling expenses averaged about 2.1 percent of net sales and that this proportion did not change much from 1936 to 1941 (table 38, p. 104). Reports for manufacturers of narrow fabrics show that selling expenses decreased from about 7 percent of net sales in 1936 to about 3 percent in 1945 (table 39, p. 105). Similar data for manufacturers of rayon gray goods show that selling expenses and losses on seconds averaged about 4 percent of the maximum selling price during the first quarter of 1943 (table 61, p. 148). Data relating to costs to manufacturers of worsted and woolen fabrics show that in 1946 selling expenses accounted for 1 percent of total costs for men's worsted shirting and suiting, 4 percent for men's woolen coating, 5 percent for women's woolen dress goods and suiting, and 6 percent for women's worsted dress goods and suiting (table 52, p. 134).

The proportions of the net selling prices of coarse cotton fabrics accounted for by selling expenses of manufacturers in 1941 ranged from 2.6 percent for cheesecloth, print cloth, broadcloth, and jeans to 5.6 percent for army duck. For fine fabrics, the proportions ranged from 2.4 percent for lawns to 3.8 percent for filling sateen (31). In 1945, selling expenses of manufacturers accounted for 4.3 percent of the selling price of 9-ounce sateen (31). The portions of the total costs of the finished articles accounted for by selling expenses of manufacturers in 1942 averaged about 4.2 percent for sheets and pillowcases and about 4.4 percent for bolster cases (31).

The kinds and amounts of marketing services performed by

textile manufacturers and the relative importance of the items of cost included cannot be ascertained from the information available. Many of these manufacturers make use of selling agents, brokers, and commission merchants. Reports indicate that agents' commissions usually vary with the services performed, from 2 to 5 percent of the selling price of the goods. Brokers' commissions usually range from 0.5 to 1 percent of the sales value of the products (16).

Charges or costs involved in distributing textile fabrics include those for converters and merchant wholesalers of piece goods, as well as selling expenses of manufacturers. Large quantities of woven fabrics are sold by cotton and rayon manufacturers to converters who finish them and in turn resell them to industrial users, wholesalers, and others. Selling expenses for textile dyeing and finishing (except woolen and worsted) corporations averaged about 3 percent of total sales in 1939 and 1940 (84). Information as to costs of specified kinds of fabrics in regular mill finish and costs of sanforizing, shrinking, and selling shows that in 1942 finishers' selling costs averaged 5.8 percent of the total costs and ranged from about 3 percent for olive drab denims to about 11 percent for chambrays (91).

Census reports indicate that in 1948 operating expenses of wholesalers of piece goods averaged 3.5 percent of total sales for manufacturers' sales branches, 8.9 percent for converters, and 10.4 percent for service wholesalers-jobbers (table 101). These proportions averaged somewhat less than in 1939 (75, 76).

Operating expenses per dollar of sale for wholesalers of piece goods varied considerably and inversely with the size of the business unit, as indicated by dollar volume of annual sales (table 102). In 1948 these expenses for manufacturers' sales branches ranged from less than 1 percent of sales for establishments with annual volumes of sales of \$5,000,000 or more to more than 20 percent for those with annual sales of less than \$200,000. These proportions for converters ranged from less than 8 percent for establishments with annual sales of \$5,000,000 or more to about 15 percent for those with annual sales of less than \$100,000. For service wholesalers-jobbers, these expenses ranged from less than 7 percent for establishments with annual sales of \$5,000,000 or more to more than 15 percent for those with annual sales of less than \$100,000.

Census reports show that administrative and selling expenses are the principal items included in total operating expenses of service wholesalers of piece goods (table 102). In 1948 these two items accounted for about 80 percent of total operating expenses for converter-wholesalers and 77 percent for jobber-wholesalers. Operating expenses of corporate wholesalers were substantially greater than those for noncorporate wholesalers, particularly for the medium and smaller establishments. These differences may be accounted for, at least in part, by the fact that these expenses do not include compensation for active proprietors of unincorporated businesses.

TABLE 101.—Number of establishments, volume of sales, and operating expenses for wholesalers of piece goods, by kind of wholesaler and size group, United States, 1948

Business-size group (dollar sales)	Manufacturers' sales branches			
	Establishments	Total sales	Operating expenses as proportion of sales ¹	Active proprietors ²
	Number	1,000 dollars	Percent	Number
All	64	1,003,444	3.5	7
5,000,000 and over	24	960,383	3.2	
2,000,000 to 4,999,999	8	24,471	9.7	
1,000,000 to 1,999,999	8	10,587	14.3	
500,000 to 999,999	4	3,318	13.6	4
300,000 to 499,999	7	2,541	15.5	2
200,000 to 299,999	5	1,258	16.9	
100,000 to 199,999	5	749	23.0	1
Under 100,000	3	137	29.9	
	Converters ³			
All	1,134	1,764,143	8.9	487
5,000,000 and over	70	822,549	7.6	12
2,000,000 to 4,999,999	140	423,711	9.3	51
1,000,000 to 1,999,999	171	240,898	10.2	60
500,000 to 999,999	219	157,538	10.4	84
300,000 to 499,999	166	65,720	11.6	73
200,000 to 299,999	104	25,677	12.9	48
100,000 to 199,999	138	20,576	12.3	86
50,000 to 99,999	82	6,241	18.6	36
Under 50,000	44	1,233	30.1	31
	Service wholesalers-jobbers			
All	2,075	911,352	10.4	1,516
5,000,000 and over	8	176,515	6.4	4
2,000,000 to 4,999,999	56	170,342	9.2	16
1,000,000 to 1,999,999	103	141,969	10.1	50
500,000 to 999,999	243	172,178	11.5	163
300,000 to 499,999	261	101,029	12.5	176
200,000 to 299,999	213	52,578	14.0	150
100,000 to 199,999	427	62,306	13.2	343
50,000 to 99,999	315	22,808	15.1	274
Under 50,000	449	11,627	17.4	370

¹ Operating expenses include no compensation for active proprietors of unincorporated businesses.

² Active proprietors of unincorporated businesses.

³ Wholesale establishments that buy textiles in the gray or unfinished form, have them dyed and/or finished by others, usually on a contract basis, and sell to garment makers, wholesalers, or retailers.

Abstracted from CENSUS OF BUSINESS, WHOLESALE TRADE (67).

TABLE 102.—Number of establishments, volume of sales, and average operating expenses of service wholesalers of piece goods, by kind of wholesaler, kind of business, and sales-size group, United States, 1948

Kind of business and sales-size group (dollars)	Converters									
	Establishments	Volume of sales	Operating expenses, including payroll, as proportion of sales ¹							Active proprietors ²
			Total	Administrative	Selling	Delivery	Warehouse	Occupancy	Other	
	Number	1,000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Number
All	763	1,634,420	8.8	4.2	2.9	0.5	0.1	0.6	0.5	293
5,000,000 and over	69	(³)	7.6	3.7	2.6	.3	.1	.4	.5	12
Corporate	64	(³)	7.6	3.7	2.6	.3	.1	.4	.5	-----
Noncorporate	5	34,502	7.4	3.8	2.4	.2	(⁴)	.3	.7	12
1,000,000 to 4,999,999	290	621,125	9.6	4.3	3.3	.6	.1	.7	.6	111
Corporate	245	536,092	10.0	4.6	3.5	.6	.1	.6	.6	-----
Noncorporate	45	85,033	6.8	2.6	2.4	.5	(⁴)	.8	.5	111
500,000 to 999,999	179	130,160	10.7	5.6	3.0	.7	(⁴)	.9	.5	66
Corporate	142	103,691	11.4	6.3	3.1	.6	(⁴)	.9	.5	-----
Noncorporate	37	26,469	8.0	3.3	2.6	.8	(⁴)	.8	.5	66
200,000 to 499,999	225	(³)	12.2	6.8	2.8	.8	(⁴)	1.1	.7	104
Corporate	159	55,117	13.4	8.0	2.9	.7	(⁴)	1.1	.7	-----
Noncorporate	66	(³)	9.2	4.2	2.5	.9	.1	1.0	.5	104

Jobbers

All	776	761,055	9.9	4.4	3.2	0.8	0.1	0.9	0.5	485
5,000,000 and over	8	176,515	6.4	1.5	3.6	.5	(⁴)	.5	.3	4
1,000,000 to 4,999,999	150	299,856	9.6	4.4	2.9	.8	.2	.8	.5	59
Corporate	122	252,448	10.2	4.8	3.1	.8	.2	.8	.5	59
Noncorporate	28	47,408	6.4	2.5	2.0	.7	(⁴)	.6	.6	50
500,000 to 999,999	217	153,999	11.7	5.6	3.4	.9	.1	1.2	.5	149
Corporate	137	98,874	13.9	7.1	3.9	1.0	.1	1.2	.6	149
Noncorporate	80	55,125	7.6	2.8	2.6	.7	(⁴)	1.1	.4	149
200,000 to 499,999	401	130,685	13.1	6.5	3.4	1.1	.1	1.5	.5	273
Corporate	233	76,556	15.6	8.5	3.8	1.1	.1	1.6	.5	273
Noncorporate	168	54,129	9.5	3.6	2.8	1.1	.1	1.5	.4	273

¹ Operating expenses include no compensation for active proprietors of unincorporated businesses.

² Active proprietors of unincorporated businesses.

³ Withheld to avoid disclosure.

⁴ Less than 0.95 percent.

Abstracted from CENSUS OF BUSINESS, WHOLESALE TRADE (67).

MEANS AND IMPORTANCE OF IMPROVEMENTS

Means of increasing the efficiency and of reducing the costs of distributing partially manufactured textile products would include methods of increasing the general efficiencies of individual agencies and the concentration of services in the hands of the agencies or combination of agencies that are relatively best adapted to perform them. Methods of increasing the general efficiency of individual establishments would include, among others, problems of organization and operation, selection and management of personnel, location of places of business, selection and arrangement of facilities and equipment used, kinds of services performed and volume of operation, and purchases and sales policies. Detailed information with regard to the influence of each important factor on efficiency and costs would be needed to indicate the extent to which and the most effective means by which it would be feasible to bring about improvements. Only a part of the information needed for this purpose is now available.

The smaller proportions of total sales accounted for by operating expenses of the larger than of the smaller wholesalers indicate that costs of distributing intermediate textile products might be reduced somewhat if the volume of business for many wholesalers were increased. Census reports show that in 1948, for example, total operating expenses of wholesale yarn merchants ranged from an average of less than 5 percent of total sales for concerns with annual sales of \$2,000,000 or more to 23 percent for concerns with annual sales of under \$50,000. Similar data for piece goods show that operating expenses of service wholesalers ranged from less than 9 percent of total sales for concerns with annual sales of \$2,000,000 or more to 17 percent for concerns with annual sales of less than \$50,000. For manufacturers' sales branches, these proportions ranged from less than 4 percent for establishments with annual sales of \$5,000,000 and over to more than 23 percent for establishments with annual sales of less than \$200,000. But it is not known to what extent these differences in operating expenses may be accounted for by differences in services performed or in other factors.

A comparison of the expenses of wholesaling yarn and piece goods through different agencies indicates the possibility of making some reductions in costs of wholesale distribution through integration of the manufacturing and distributing functions. According to census reports, operating expenses for wholesaling yarn in 1939, for example, averaged about 4 percent of net sales for manufacturers' sales offices, 7 percent for manufacturers' sales branches, and 9 percent for service and limited-function wholesalers. Operating expenses for wholesaling piece goods in 1948 averaged 3.5 percent of net sales for manufacturers' sales branches, 3.7 percent for manufacturers' sales offices, and 10.2 percent for merchant wholesalers. But the information available is not adequate for ascertaining to what extent these differences are accounted for by differences in kinds of products and in services performed.

Possibilities of reductions in unnecessary handling of products, of use of quality standards as a basis for sales on description, of

vertical and horizontal combinations, and of other considerations would need to be taken into account and evaluated in ascertaining the more feasible means of increasing efficiency and of reducing the cost of distributing intermediate textile products. Additional information would be needed for use in this connection to show the influence of the various factors on unit-labor and other costs for each important process or service involved in distributing these products. Means of obtaining such information are presented in another section of this bulletin (p. 89).

The importance of increasing efficiency and of reducing costs of distributing intermediate textile products on the retail value of finished products is relatively small in comparison with the expenses of manufacturing and retailing. But costs of distributing piece goods are substantially greater than the combined costs of ginning and baling the cotton used. In some instances, they may be as great as or greater than the combined costs of ginning and merchandising the raw cotton used.

PRODUCTS FOR ULTIMATE CONSUMERS

Textile products for ultimate consumers include sewing thread and a wide variety of knitting, crocheting, and other yarns used by household consumers; gray goods, yarn-dyed goods, and finished goods for sale in the piece to consumers, such as print cloth, sheeting, drill, chambray, and shirting; household furnishings, such as sheets and pillowcases, bedspreads and blankets, towels and bath mats, rugs, tablecloths and napkins; and wearing apparel for men, women, and children. Most of the thread, yarns, piece goods, and household furnishings are ready for consumers when they leave the manufacturing establishments. In addition, most knit goods products in hosiery and underwear factories leave the mills as completed consumers' goods.

Men's, women's, and children's apparel are mainly the products of the cutting trade. The terms "cutters" and "cutting-up trade" may be applied to all branches of the textile industry that characteristically perform cut-and-sew operations on purchased fabrics (46). The cutting-up trade includes several thousand manufacturers of many kinds. They range from very large companies that operate several factories, as is common in the manufacture of men's shirts or work clothing, to small "family shops", which are common in the manufacture of mattresses and some other household products. These establishments are widely scattered throughout the industrial districts of the country, although in some instances manufacturers of particular products are closely concentrated in relatively small areas.

Data relating to the distribution of apparel and other fabricated products usually are not reported separately from those made of cotton, wool, rayon, and other fabrics. Furthermore, many fabricated products are made of two or more kinds of fabrics and many fabrics are made of two or more kinds of fibers. Consequently, most of the data on distribution of products for ultimate consumers are not segregated to show those made of cotton, wool, silk, synthetics or a combination of these fibers.

METHODS AND PRACTICES

Wholesale distribution of textile products for ultimate consumers involves the services of manufacturers and of wholesalers.

MANUFACTURERS.—Census data relating to the distribution of manufacturers' sales in 1939 indicate that goods amounting to about two-thirds of the total value of all finished apparel and household textiles combined were sold to retailers, 14 percent to wholesalers and jobbers, 10 percent through outlets owned and operated by the manufacturer, 7.5 percent to industrial users, and small quantities to consumers at retail and to export. These proportions vary considerably from one product to another. The quantities sold to retailers ranged from less than 10 percent for embroideries and textile bags not made in textile mills to more than 90 percent for children's and infants' coats and women's and misses' blouses and waists. Quantities sold to wholesalers and jobbers ranged from less than 7 to more than 70 percent and those sold to industrial users ranged from negligible quantities for several products to more than 80 percent for others (31).

Sales of about 78 percent of the manufacturers were confined exclusively to one outlet. Quantities ranged from less than 60 percent for men's and boys' undershirts, work shirts, canvas products, handkerchiefs, work gloves and mittens, and miscellaneous fabricated products to more than 90 percent for women's and misses' blouses and waists, women's and misses' dresses, and embroideries (74).

Some manufacturers of apparel and household goods sell their products through agents, brokers, and commission merchants (exclusive of the manufacturers' own sales force), but the quantities distributed in this way usually are small. Census reports show that in 1939 the proportions of the manufacturers' sales of apparel and other finished products made through these intermediaries averaged 3.5 percent of total sales for all products combined and ranged from less than 1 to more than 15 percent (73). Less than 1 percent of the establishments reported that they sold exclusively through agents, brokers, and commission merchants.

Most knit goods leave manufacturers as finished consumers' goods. Census reports on the distribution of manufacturers' sales of knit goods in 1939 show that of all products combined about 12 percent was sold to retailers, almost 36 percent to wholesalers and jobbers, about 10 percent to industrial users, 9 percent through the manufacturers' own sales offices, and small quantities to consumers at retail and to export (74). Retailers and wholesalers supplied the principal outlets for each kind of product except knitted cloth. As indicated in connection with intermediate products (p. 228) about 71 percent of this cloth was sold to industrial users. More than 11 percent of the full-fashioned hosiery and of knitted underwear were distributed through the manufacturers' own sales offices. About 62 percent of the manufacturers confined their sales to only one outlet. The other 38 percent sold through 2 or more outlets (74). The proportion that sold exclusively through one outlet ranged from 30 percent for knitted gloves to 73 percent for other knitted outerwear.

Many manufacturers of knitted goods sell their products directly, not through other agencies. Census reports show that in 1939 about 28 percent of these manufacturers sold through agents, brokers, and commission merchants (excluding manufacturers' own sales force) and 15 percent sold through these intermediaries exclusively. The proportion of the total value of distributed sales made through these agencies averaged about 21 percent for all knit goods combined and ranged from 2 percent for knitted gloves to 42 percent for seamless hosiery.

WHOLESALESAERS.—Most of the finished textile products flow directly from manufacturers, or indirectly through wholesalers, to retailers for distribution to ultimate consumers. Wholesalers to whom textile manufacturers sell goods are of several types, chief of which are merchant wholesalers. These wholesalers buy textile products outright from producers in comparatively large quantities and sell large proportions of them to retailers in comparatively small quantities. These wholesalers usually maintain a convenient place of business and provide facilities for storage and handling of the goods. In many instances they extend credit and make deliveries to customers.

Census reports show that wholesale distribution of textile apparel in 1948 involved the operations of more than 10,000 merchant wholesalers, 381 manufacturers' sales branches (with stocks), 583 manufacturers' sales offices (without stocks), and 2,882 agents and brokers. Sales totaled \$5,219,577,000 for merchant wholesalers, \$1,449,371,000 for manufacturers' sales branches, \$1,318,368,000 for manufacturers' sales offices, and \$1,679,897,000 for agents and brokers.

The annual volume of sales per establishment for all products combined averaged \$522,000 for merchant wholesalers, \$3,704,000 for manufacturers' sales branches, \$2,400,000 for manufacturers' sales offices, and \$1,879,000 for agents and brokers. For clothing and furnishings alone, annual volume of sales per establishment averaged \$303,000 for merchant wholesalers, \$1,619,000 for manufacturers' sales branches, \$1,517,000 for manufacturers' sales offices, and \$1,021,000 for agents and brokers.

Some sales by wholesalers are made through agents, brokers, and commission merchants, but most of them are made without these services. Census reports show that in 1939, about 7 percent of the service and limited-function wholesalers of dry goods and of clothing and furnishings sold through agents, brokers, and commission merchants. The proportions for dry goods ranged from about 4 percent for general lines to 12 percent for cotton piece goods, and for clothing and furnishings from 4.5 percent for general lines to 9 percent for women's and children's clothing. A somewhat larger proportion of manufacturers' sales branches used the services of agents, brokers, and commission merchants, but smaller proportions of net sales were made through these intermediaries than for service and limited-function wholesalers.

Large proportions of these sales were made to retailers, but substantial proportions were made to industrial users, wholesale organizations, and to others (table 103). The proportions of sales to retailers were relatively greatest for clothing and furnishings.

hosiery and underwear, and general-line dry goods. Large quantities of piece goods were sold to industrial users and to wholesale organizations.

According to census reports, credit sales in 1948 made up more than 95 percent of the total but losses from bad debts amounted to less than one-tenth of one percent of sales. Data relating to the length of time for which credit was extended in 1948 are not available but census reports relating to cash-credit analysis of

TABLE 103.—Number of wholesalers of textile apparel, total sales, and proportion of sales to specified customers, by kind of business, United States, 1948

MERCHANT WHOLESALERS

Kind of business	Estab-lish-ments	Total sales	Proportions of sales to—			
			Re-tailers	Indus-trial users	Wholesale organizations	Other
	<i>Number</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Dry goods, piece goods, notions.....	5,466	2,405,040	50.5	21.7	15.4	12.4
General line.....	182	457,242	90.6	3.3	2.4	3.7
Hosiery and underwear.....	702	208,443	80.4	1.7	10.0	7.9
Piece goods (jobbers).....	2,441	1,133,056	26.3	29.9	22.1	21.7
Other.....	2,141	606,299	55.0	27.3	14.5	3.2
Clothing and furnishings.....	3,469	1,050,394	85.7	4.0	4.9	5.4
General line.....	379	179,233	78.8	3.4	4.8	13.0
Men's and boys'.....	1,454	402,531	85.9	3.1	6.2	4.8
Women's and children's.....	1,435	424,697	90.0	3.4	3.7	2.9
Work clothing.....	201	43,933	71.2	20.3	5.9	2.6
Piece goods converters.....	1,134	1,764,143	17.0	49.4	27.9	5.7
Total or average.....	10,069	5,219,577	46.3	27.5	17.5	8.7

MANUFACTURERS' SALES BRANCHES (WITH STOCKS)

Dry goods, piece goods, notions.....	220	1,188,731	14.9	65.1	18.1	1.9
Hosiery and underwear.....	35	62,306	92.0	.1	1.7	6.2
Piece goods.....	64	1,003,444	7.9	72.2	18.2	1.7
Other dry goods, notions.....	121	122,981	31.6	41.4	25.7	1.3
Clothing and furnishings.....	161	260,640	92.3	3.1	4.4	.2
Men's and boys'.....	85	175,388	94.1	.6	5.1	.2
Women's and children's.....	60	54,500	94.0	1.0	4.8	.2
Other.....	16	30,752	78.6	21.1	.1	.2
Total or average.....	381	1,449,371	28.8	54.0	15.6	1.6

TABLE 103.—Number of wholesalers of textile apparel, total sales, and proportion of sales to specified customers, by kind of business, United States, 1948—Continued

MANUFACTURERS' SALES OFFICES (WITHOUT STOCKS)

Kind of business	Establishments	Total sales	Proportions of sales to—			
			Retailers	Industrial users	Wholesale organizations	Other
Dry goods, piece goods, notions.....	Number 294	1,000 dollars 941,997	Percent 28.0	Percent 50.3	Percent 20.0	Percent 1.7
Hosiery and underwear.....	73	135,080	90.7	.8	8.0	.5
Piece goods.....	94	605,178	12.2	59.2	26.4	2.2
Other.....	127	201,739	33.4	56.8	8.9	.9
Clothing and furnishings.....	268	406,471	82.3	.7	14.8	2.2
Men's and boys'.....	118	204,141	86.5	1.2	8.1	4.2
Women's and children's.....	133	133,181	86.2	.2	13.2	.4
Work clothing.....	17	69,149	62.1	-----	37.8	.1
Total or average.....	562	1,348,468	44.4	35.3	18.4	1.9

AGENTS AND BROKERS

Dry goods, piece goods, notions.....	1,063	3,223,128	15.7	56.8	23.5	4.0
Hosiery and underwear.....	225	223,685	58.2	.8	39.0	2.0
Piece goods.....	838	2,999,443	12.5	61.0	22.3	4.2
Clothing and furnishings.....	1,427	1,456,769	84.8	2.2	11.3	1.7
General line.....	245	519,560	84.5	.7	12.0	2.2
Men's and boys'.....	358	215,723	78.1	2.5	17.3	2.1
Women's and children's.....	824	721,486	87.1	3.1	8.6	1.2
Total or average.....	2,490	4,679,897	37.2	39.8	19.7	3.3

Adapted from CENSUS OF BUSINESS, WHOLESALE TRADE: 1948.

sales of service and limited-function wholesalers of dry goods and of clothing and furnishings show that in 1939 about two-thirds of total sales were made on credit for more than 30 days. Sales on credit for 11 to 30 days averaged 25 percent and small proportions were sold on credit for 10 days or less, or for cash. A somewhat smaller proportion of the sales by manufacturers' sales branches were made on credit for more than 30 days and a somewhat larger proportion was made on credit for 11 to 30 days than the proportions shown for service and limited-function wholesalers.

Wholesalers supply a ready market outlet to manufacturers' for products in rather large volume and relieve the manufacturer of making the many contacts necessary to sell directly to retailers. The large-lot purchases made by wholesalers and the assembly services they perform make possible a reduction in transportation costs by permitting large-lot shipments over long distances. Wholesalers reduce storage costs and the credit risks of manufacturers by advance buying, particularly for goods of seasonal demand. Occasionally, wholesalers may help finance manufacturers by advancing funds. They also relieve them of some of the financial risks which arise in dealing with retailers, whose rate of failure is relatively high.

Wholesalers also perform important services for the retailer. The assembly services they render enable retailers to obtain their supplies from relatively few sources. The readily available supplies made available by wholesalers to retailers enable them to reduce their overhead costs by the use of small stocks and more rapid turn-over. Total costs of storage are reduced because large-scale storage in a wholesaler's warehouse is cheaper than storage on the relatively high-rent shelves of retailers. In addition, wholesalers provide credit and other services to retailers.

Wholesalers are criticized for not relieving manufacturers of their storage burdens and their price risks by ordering greater quantities in advance. They are criticized for not reducing transportation and selling costs as much as they might because they insist upon buying in small lots at frequent intervals. They are criticized for not doing adequately the work of assembling because they refuse to carry as large lines of merchandise as they might, for impeding rather than aiding the introduction of new products by manufacturers, and for keeping many incompetent retailers in business by undue generosity in granting credit to individuals who give no real indication of developing into competent store-keepers (16).

CHARGES OR COSTS INVOLVED

Costs involved in distribution of finished textile products to ultimate consumers include those of manufacturers, wholesalers, and retailers. But information relative to the kind and extent of the services performed by the different agencies and to the charges made for these services is incomplete. Data relating to costs to manufacturers and to wholesalers in many instances are not complete enough to show costs for finished consumer goods separate from those for intermediate products.

MANUFACTURERS.—Data relating to charges or costs, as given in this section of the report, are limited mainly to selling expenses of manufacturers of knit goods and of apparel and other finished products made of woven fabrics.

Data for 28 manufacturers of cotton hosiery show that selling expenses averaged about 1 percent of net sales each year from 1936 to 1944 (table 74, p. 170). From 1939 to 1942, selling expenses for manufacturers of women's full-fashioned rayon hosiery, which by 1951 were virtually obsolete, averaged 7 percent of net

sales for 10 branded mills and 4 percent for 19 unbranded mills (table 76, p. 173). Selling expenses of manufacturers of nylon hosiery averaged about 3.6 percent of net sales in 1945 (table 77, p. 175). From 1942 to 1945, selling expenses for manufacturers of knitted underwear averaged about 4 percent of net sales and little, if any, trend was indicated (table 78, p. 176). Similar data for knitted outerwear show that, from 1940 to 1944, selling expenses for manufacturers averaged about 6 percent of net sales (table 80, p. 179).

Selling expenses for manufacturers of apparel and household goods made of woven fabrics vary from one kind of product to another and from one period to another. Data for manufacturers of women's, children's, and infants' underwear and nightwear show that, from 1936 to 1942, selling expenses averaged about 5 percent of net sales and ranged from less than 4 percent in 1936 to almost 6 percent in 1942 (86). Similar data for men's and boys' shirts, shorts, and pajamas show that, in 1944 and 1945, selling expenses for manufacturers averaged about 7 percent of net sales (table 93, p. 213). In 1943 selling expenses for manufacturers averaged about 6 percent for men's work shirts and about 5 percent for men's work pants (tables 94, 95, pp. 215, 216). Data for 13 manufacturers of men's and boys' tailored clothing show that selling expenses decreased from an average of 6 percent of net sales during the late 1930's to less than 5 percent in the early 1940's (table 96, p. 217). Selling expenses of manufacturers of heavy outerwear averaged 4.5 percent of net sales in 1946 (table 97, p. 218).

Manufacturers' selling expenses vary with the price of the products and with the size of the manufacturer. The proportion of net sales accounted for by selling expenses for manufacturers of men's dress shirts in 1942 averaged somewhat less for the lower than for the higher-priced shirts (31). During the same year, the proportions of net sales of manufacturers of women's, children's, and infants' underwear and nightwear that were accounted for by selling expenses averaged somewhat less for the larger than for the medium-sized and smaller establishments (91).

WHOLESALEERS.—Substantial quantities of finished textile goods are distributed by wholesalers. According to census reports, operating expenses of these wholesalers in 1948 averaged 11.6 percent of net sales for merchant wholesalers, 5.8 percent for manufacturers' sales branches, 5.6 percent for manufacturers' sales offices, and 3.1 percent for agents and brokers (table 104). These proportions varied considerably from one kind of product to another and in some instances they were higher and in others lower than in 1939.

Information relating to operating gross margins for wholesale dry-goods houses, obtained from reports of the Wholesale Dry Goods Institute, Inc., shows that these margins increased from 16.1 percent of net sales in 1939 to 18.7 percent in 1942, decreased to 15.4 percent in 1949, and averaged 17.2 percent in 1950 (table 105). Total operating expenses decreased from 14.4 percent in 1939 to 11.1 percent in 1946, increased to 13.9 percent in 1949, and averaged 13.3 percent in 1950.

Operating expenses of wholesalers per dollar of sale usually average less for establishments with large volumes of sales than for those with small volumes. In 1948, according to census reports, operating expenses of wholesale merchants for handling men's and boy's clothing and furnishings, for example, averaged 13.1 percent of total sales for establishments with annual sales of \$1,000,000 or more and 15.6 percent for those with sales of \$200,000 to \$500,000 (table 106). Similar data for clothing and

TABLE 104.—*Number of establishments, total sales, and operating expenses as proportions of total sales for specified kinds of textile products, United States, 1939 and 1948*

MERCHANT WHOLESALERS

Kind of product	Establishments		Total sales		Operating expenses as proportion of sales	
	1939	1948	1939	1948	1939	1948
	Number	Number	1,000 dollars	1,000 dollars	Per cent	Per cent
Dry goods, piece goods, notions.....	4,097	5,466	1,188,451	2,405,040	12.3	12.3
General line.....	222	182	206,983	457,242	11.8	13.0
Hosiery and underwear.....	422	702	86,204	208,443	11.0	10.8
Piece goods.....	2,147	2,441	743,843	1,133,056	10.5	10.2
Other dry goods and notions.....	1,306	2,141	151,421	606,299	18.5	16.3
Clothing and furnishings.....	2,736	469	442,117	1,050,394	15.0	14.5
General line.....	446	379	64,127	179,233	14.9	13.8
Men's and boys'.....	1,180	1,454	152,944	402,531	14.2	14.2
Women's and children's.....	1,110	1,435	225,046	424,697	15.6	15.3
Work clothing.....		201		43,933		11.4
Piece goods converters.....		1,134		1,764,143		8.9
Total or average.....	6,833	10,069	1,630,568	5,219,577	13.1	11.6

MANUFACTURERS SALES BRANCHES (WITH STOCK)

Dry goods, piece goods, notions.....	213	220	210,082	1,188,731	11.2	4.9
Hosiery and underwear.....	33	35	28,893	62,306	16.0	13.9
Piece goods.....	74	64	130,693	1,003,444	9.1	3.5
Other dry goods, notions.....	106	121	50,494	122,981	14.0	11.9
Clothing and furnishings.....	235	161	167,499	260,640	13.6	9.8
Men's and boys'.....	130	85	124,214	175,388	13.3	8.8
Women's and children's.....	94	69	39,145	54,500	15.1	11.9
Clothing and furnishings, n.e.c.....	11	16	4,140	30,752	10.7	12.1
Total or average.....	448	381	377,581	1,449,371	12.3	5.8

TABLE 104.—Number of establishments, total sales, and operating expenses as proportions of total sales for specified kinds of textile products, United States, 1939 and 1948—Cont.

MANUFACTURERS SALES OFFICES (WITHOUT STOCKS)

Kind of product	Establishments		Total sales		Operating expenses as proportion of sales	
	1939	1948	1939	1948	1939	1948
	<i>Number</i>	<i>Number</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>Per cent</i>	<i>Per cent</i>
Dry goods, piece goods, notions.....	131	294	220,664	941,997	5.4	4.4
Hosiery and underwear.....	27	73	26,041	135,080	6.1	7.0
Piece goods.....	68	94	182,566	605,178	4.6	3.7
Other dry goods and notions.....	36	127	12,057	201,739	16.0	4.9
Clothing and furnishings.....	209	289	109,064	437,610	10.4	8.2
Men's and boys'.....	96	118	58,328	204,141	9.2	8.9
Women's and children's.....	102	133	46,641	133,181	11.6	9.2
Work clothing.....		17		69,149		5.0
Clothing and furnishings, n.e.c.....	11	21	4,095	31,139	14.6	6.6
Total or average.....	340	583	329,728	1,379,607	7.1	5.6
AGENTS AND BROKERS						
Dry goods.....	1,497	1,455	1,652,811	3,848,719	2.4	3.2
General line.....	356	392	200,614	625,591	1.8	2.3
Hosiery and underwear.....	193	225	104,343	223,685	4.0	4.6
Piece goods.....	948	838	1,257,854	2,999,443	2.4	3.2
Clothing and furnishings.....	1,009	1,427	365,204	1,456,769	3.1	3.0
General line.....	184	245	65,085	519,560	2.9	2.2
Men's and boys'.....	220	358	55,877	215,723	4.6	4.3
Women's and children's.....	605	824	244,242	721,486	2.8	3.3
Total or average.....	2,506	2,882	2,018,015	5,305,488	2.5	3.1

Adapted from CENSUS OF BUSINESS 1939 and 1948.

furnishings (general line), women's and children's clothing and furnishings, and hosiery and underwear show similar differences.

From 1939 to 1950, operating expenses of wholesale dry-goods houses, as reported by the Wholesale Dry Goods Institute, Inc., averaged 12.4 percent of net sales for houses with annual sales of more than \$2,000,000 and 14.8 percent for those with annual sales of less than \$500,000 (table 105). The corresponding proportions for wholesalers' gross margins averaged 16.8 and 19 percent, respectively.

TABLE 105.—Averages of gross margins, operating expenses, and profits for wholesale dry-goods houses, expressed as proportions of net sales, United States, 1939-50

Item	Sales under \$500,000											
	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Gross margin.....	Percent 18.44	Percent 17.55	Percent 23.72	Percent 21.12	Percent 20.50	Percent 19.72	Percent 20.97	Percent 17.48	Percent 14.61	Percent 18.11	Percent 17.69	Percent 17.74
Total operating expense.....	16.76	17.40	16.05	14.22	14.41	11.59	14.28	11.76	12.85	16.40	16.68	15.77
Administrative.....	5.88	4.87	5.38	5.01	5.63	5.18	7.64	4.71	7.88	7.84	6.13	6.59
Buying.....	.87	.83	.60	.39	.54	.31	.32	.21	.15	.85	.71	.08
Selling.....	7.56	9.16	7.73	7.07	6.79	4.36	4.77	5.53	3.52	6.06	7.33	6.84
Receiving and shipping.....	1.08	1.19	1.23	1.09	.74	.81	.66	.58	.46	.89	1.55	1.57
Occupancy.....	1.37	1.35	1.11	.66	.71	.93	.89	.73	.84	.76	.96	.69
Profit ¹	1.68	.15	7.67	6.90	6.09	8.13	6.69	5.72	1.76	1.71	1.01	³ 1.97
	Sales \$500,000 to \$1,000,000											
Gross margin.....	16.69	16.59	19.42	18.84	18.92	17.04	16.97	16.60	16.30	17.72	17.78	16.53
Total operating expense.....	15.16	14.86	14.24	12.45	10.82	11.82	12.85	12.43	12.02	13.22	13.14	13.57
Administrative.....	4.89	4.59	4.16	4.31	3.58	4.26	4.84	4.84	4.44	4.62	5.14	4.82
Buying.....	1.09	1.01	.83	.54	.73	.57	.80	.33	.33	.25	.81	.48
Selling.....	6.86	7.09	7.37	6.17	5.33	5.56	5.20	5.40	5.44	6.23	5.72	6.06
Receiving and shipping.....	.96	1.04	.88	.55	.71	.67	1.03	.90	.90	1.22	.80	.91
Occupancy.....	1.36	1.13	1.00	.88	.47	.76	.98	.96	.91	.90	.67	1.30
Profit ¹	1.53	1.73	5.18	6.39	8.10	5.22	4.12	4.17	4.27	4.50	4.64	² 2.96

Sales \$1,000,000 to \$2,000,000												
Gross margin.....	15.33	15.39	17.94	18.88	17.24	17.08	15.62	16.99	15.17	15.03	14.64	17.61
Total operating expense..	13.78	13.86	13.43	12.42	12.25	11.58	12.71	11.24	11.63	12.87	14.54	13.85
Administrative.....	4.10	3.87	4.06	3.73	3.59	3.54	4.28	3.66	3.91	3.93	4.77	4.52
Buying.....	.90	1.01	1.00	.74	.90	.86	1.09	.93	.78	1.05	1.04	1.08
Selling.....	6.99	7.24	6.69	6.49	5.97	5.66	5.73	5.26	5.31	5.90	6.43	6.28
Receiving and ship- ping.....	.88	.87	.86	.65	.92	.77	.85	.85	.90	1.13	1.29	1.02
Occupancy.....	.91	.87	.82	.81	.87	.75	.75	.54	.73	.86	1.01	.95
Profit ¹	1.55	1.53	4.51	6.46	4.99	5.50	2.91	5.75	3.54	2.16	.10	² 3.76
Sales of more than \$2,000,000												
Gross margin.....	16.08	16.17	16.89	18.53	18.75	17.93	18.07	16.20	15.62	15.66	15.29	16.99
Total operating expense..	14.34	13.78	12.47	11.97	11.03	11.28	12.12	10.72	11.81	12.33	13.80	13.10
Administrative.....	3.46	3.64	3.06	3.02	3.01	3.28	3.33	2.98	3.27	3.20	3.82	3.65
Buying.....	1.53	1.32	1.20	1.09	.96	.92	1.03	.84	.67	.80	.92	1.00
Selling.....	7.25	6.81	6.36	6.08	5.44	5.53	5.99	5.28	6.07	6.55	6.94	6.48
Receiving and ship- ping.....	1.14	1.12	1.06	.99	.84	.84	.99	.93	1.06	1.07	1.25	1.22
Occupancy.....	.96	.89	.79	.79	.78	.71	.78	.69	.74	.71	.87	.75
Profit ¹	1.74	2.39	4.42	6.56	7.72	6.65	5.95	5.48	3.81	3.33	1.49	² 3.89

See footnotes at end of table.

TABLE 105.—Averages of gross margins, operating expenses, and profits for wholesale dry-goods houses, expressed as proportions of net sales, United States, 1939-50—Cont.

Item	Weighted averages for all stores ³											
	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Gross margin.....	Percent 16.06	Percent 16.05	Percent 17.66	Percent 18.73	Percent 18.42	Percent 17.70	Percent 17.35	Percent 16.74	Percent 15.67	Percent 15.72	Percent 15.37	Percent 17.16
Total operating expense.....	14.41	14.08	13.06	12.20	11.36	11.40	12.37	11.05	11.70	12.46	13.88	13.29
Administrative.....	3.99	3.90	3.57	3.37	3.21	3.45	3.78	3.13	3.37	3.33	4.06	3.85
Buying.....	1.24	1.16	1.08	.93	.93	.87	1.02	.88	.66	.87	.93	.98
Selling.....	7.15	7.04	6.61	6.25	5.58	5.54	5.83	5.40	5.93	6.39	6.79	6.52
Receiving and shipping.....	1.03	1.01	.97	.86	.85	.81	.95	.94	1.02	1.11	1.23	1.15
Occupancy.....	1.03	.94	.83	.80	.79	.73	.79	.70	.72	.76	.87	.79
Profit ¹	1.65	1.97	4.60	6.53	7.06	6.30	4.98	5.69	3.97	3.26	1.40	² 3.87

¹ As reported for wholesale dry-goods houses, some before and some after Federal income taxes.

² Before Federal income taxes.

³ Weighted by number of houses and by volume of sales reported.

Derived from unpublished reports of the Wholesale Dry Goods Institute, Inc.

Census reports show that operating expenses of wholesalers of textile products account, on the average, for a larger proportion of total sales for establishments operated as corporations, particularly those in the medium and smaller sales-size group, than for those not incorporated (table 106). These differences may be accounted for, at least in part, by the fact that the operating expenses include no compensation for active proprietors of unincorporated businesses.

Principal items of cost included in gross margins for wholesalers of textile products are administrative and selling expenses. Census reports show that in 1948 these two items accounted for about 10 percent of total sales and for about three-fourths of total operating expenses for wholesalers of textile products (table 106). Administrative expenses per dollar of sale averaged less for wholesalers of the larger than for those of the medium and smaller sales-size group. The proportions of total sales accounted for by administrative expenses usually average less for noncorporate than for corporate wholesalers. This difference may be accounted for, at least in part, by the failure of census reports to include in operating expenses compensation for active proprietors of unincorporated businesses. Selling expenses per dollar of sale vary irregularly with sales-size groups and usually they average more for corporate than for noncorporate wholesalers. Shipping and delivery, warehouse, occupancy, and other expenses usually are relatively small items.

Reports relative to operating results of wholesale dry-goods houses show that, from 1939 to 1950, selling expenses accounted for about 6 percent of net sales, 50 percent of total operating expenses, and 87 percent of gross operating margins (table 105). Administrative expenses averaged 3.6 percent of net sales, 28 percent of total expenses, and 21 percent of gross operating margins. The proportions of net sales accounted for by administrative expenses were substantially smaller for the larger than for the smaller establishments.

Profits reported for wholesale dry-goods houses increased from an average of less than 2 percent of net sales in 1939 to about 7 percent in 1943, then decreased to less than 2 percent in 1949 (table 105). In 1950 profits before Federal income taxes averaged almost 4 percent of net sales. From 1939 to 1950 profits averaged about 4.3 percent of net sales, 34 percent of total operating expenses, and 25 percent of gross operating margins.

Median profits of wholesalers of apparel and household textiles, after Federal income and excess-profit taxes, as proportions of net sales and of tangible net worth, increased from the late 1930's to the middle 1940's, then decreased to 1949 (table 107). In 1950 these profits ranged from 1.3 percent of net sales for women's wear, coats, suits, and dresses to 4.9 percent for men's furnishings.

MEANS AND IMPORTANCE OF IMPROVEMENT

Most of the considerations involved in increasing the efficiency and in reducing the cost of distributing intermediate textile

TABLE 106.—*Number of establishments, volume of sales, and operating expenses of service wholesalers of textile products, by kind of business and by sales-size group, United States, 1948*

Kind of business and sales-size group (dollars)	Men's, boys' clothing, furnishings									
	Establishments	Volume of sales	Operating expenses, including payroll, as proportion of sales ¹							Active proprietors ²
			Total	Administrative	Selling	Shipping-delivery	Warehouse	Occupancy	Other	
	Number	1,000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Number
All	366	279,330	14.1	5.7	4.9	1.1	0.4	1.4	0.6	243
1,000,000 and over	61	150,138	13.1	5.4	5.0	.9	.4	.8	.6	14
Corporate	55	139,730	13.3	5.5	5.1	.9	.4	.8	.6	-----
Noncorporate	6	10,399	9.8	3.3	3.6	1.0	.4	1.0	.5	14
500,000 to 999,999	81	56,707	15.0	6.5	4.8	1.1	.5	1.5	.6	44
Corporate	58	40,612	16.1	7.1	5.0	1.1	.5	1.6	.8	-----
Noncorporate	23	16,095	12.3	4.3	4.5	1.2	.6	1.5	.2	44
200,000 to 499,999	224	72,485	15.6	6.1	4.9	1.4	.3	2.3	.6	185
Corporate	114	37,633	18.9	8.5	5.6	1.3	.3	2.6	.6	-----
Noncorporate	110	34,852	12.1	3.7	4.2	1.4	.3	2.0	.5	185

Women's, children's clothing, furnishings

All	457	315,162	15.0	5.8	5.2	1.7	0.2	1.5	0.6	327
1,000,000 and over	71	150,960	14.3	4.9	5.5	2.1	.1	1.2	.5	44
Corporate	60	(³)	13.8	4.9	5.3	1.8	.2	1.2	.4	
Noncorporate	11	(³)	17.2	5.1	5.4	3.7	(⁴)	1.4	1.6	27
500,000 to 999,999	105	71,943	15.4	6.1	5.2	1.4	.3	1.6	.8	86
Corporate	63	(³)	17.6	7.8	5.5	1.4	.3	1.8	.8	
Noncorporate	42	(³)	12.0	3.6	4.7	1.3	.2	1.5	.7	86
200,000 to 499,999	281	92,259	15.6	6.7	4.9	1.4	.1	1.9	.6	231
Corporate	155	53,129	17.4	8.0	5.3	1.4	(⁴)	1.9	.8	
Noncorporate	126	39,130	13.3	5.1	4.3	1.4	.2	1.9	.4	231

Clothing and furnishings (general line)

All	170	121,114	13.2	5.0	4.5	1.4	0.4	1.5	0.4	152
1,000,000 and over	30	60,084	12.7	4.3	4.9	1.6	.3	1.2	.4	29
Corporate	20	45,551	12.3	4.7	5.1	.9	.2	.9	.5	
Noncorporate	10	14,533	13.7	3.0	4.0	3.8	.6	2.1	.2	29
500,000 to 999,999	49	32,767	13.2	5.2	4.2	1.1	.6	1.7	.4	33
Corporate	32	(³)	13.4	5.6	4.0	1.1	.6	1.7	.4	
Noncorporate	17	(³)	12.7	4.4	4.6	1.1	.4	1.8	.4	33
200,000 to 499,999	91	28,263	14.4	5.8	4.4	1.4	.5	1.9	.4	90
Corporate	44	13,360	18.5	8.0	5.4	1.7	.7	2.2	.5	
Noncorporate	47	14,903	10.7	3.9	3.5	1.0	.3	1.6	.4	90

See footnote at end of table, p. 254.

TABLE 106.—Number of establishments, volume of sales, and operating expenses of service wholesalers of textile products, by kind of business and by sales-size group, United States, 1948—Cont.

Kind of business and sales size group (dollars)		Hosiery, underwear								
		Establishments	Volume of sales	Operating expenses, including payroll, as proportion of sales ¹						Active proprietors ²
				Total	Administrative	Selling	Shipping-delivery	Warehouse	Occupancy		Other
Number	1,000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Number	
All	210	144,787	10.6	4.7	3.4	0.9	0.2	1.0	0.4	175
1,000,000 and over	40	72,719	9.7	4.3	3.4	.9	.2	.6	.3	33
Corporate	27	50,980	11.4	5.0	4.1	1.1	.2	.6	.4	-----
Noncorporate	13	21,739	5.6	2.2	1.8	.6	.1	.7	.2	33
500,000 to 999,999	48	31,268	11.4	4.4	3.9	.8	.3	1.4	.6	37
Corporate	23	14,898	13.1	6.0	4.1	.6	.2	1.6	.3	-----
Noncorporate	25	16,370	9.8	3.1	3.4	1.0	.3	1.1	.9	37
200,000 to 499,999	122	40,800	11.5	5.4	3.0	.9	.4	1.4	.4	105
Corporate	57	18,983	14.3	7.8	3.3	1.0	.4	1.4	.4	-----
Noncorporate	65	21,817	9.1	3.6	2.6	.8	.4	1.4	.3	105

¹ Operating expenses include no compensation for active proprietors of unincorporated businesses.

² Active proprietors of unincorporated businesses.

³ Withheld to avoid disclosure.

⁴ Less than 0.05 percent.

Abstracted from CENSUS OF BUSINESS, WHOLESALE TRADE, 1948 (67).

TABLE 107.—Median net profits of wholesalers of apparel and household textiles as proportions of net sales and of tangible net worth, by kind of product, United States, average 1935-39, annual 1940-50¹

Line of business	Net profits ² as proportion of net sales ³											
	1935-39	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent
Dry goods.....	1.08	1.14	2.95	2.07	2.46	2.92	3.18	4.33	2.95	1.47	0.77	2.94
Men's furnishings.....			2.68	3.45	5.55	7.58	7.33	7.58	2.28	1.26	2.00	4.88
Hosiery and underwear.....	.74	.87	3.97	2.90	4.80	6.59	6.85	7.34	4.13	3.07	2.43	2.59
Knitted outerwear.....	1.00	.70			2.82	3.21	3.36	4.79	2.08	4.14	2.32	1.46
Women's wear, coats, suits, and dresses.....	.56	.48	2.50	1.66	4.30	6.68	5.85	4.28	1.42	2.84	.44	1.31
	Net profits as proportion of tangible net worth ⁴											
Dry goods.....	4.24	4.54	13.08	11.88	13.81	12.70	10.17	14.13	11.75	7.63	4.02	10.97
Men's furnishings.....			11.77	13.17	25.53	16.10	22.20	22.25	11.35	4.57	5.79	11.32
Hosiery and underwear.....	3.02	3.85	14.67	13.68	18.23	16.85	18.40	20.19	15.55	9.59	5.84	8.63
Knitted outerwear.....	4.88	3.25			22.49	13.57	14.15	14.71	6.42	15.45	7.88	6.11
Women's wear, coats, suits and dresses.....	3.57	3.07	13.59	12.59	27.14	44.87	31.80	12.40	5.13	13.46	2.32	8.94

¹ The number of concerns reported for 1950 ranged from 27 for knitted outerwear to 151 for dry goods.

² Profit after full depreciation on buildings, machinery, equipment, furniture, and other assets of a fixed nature; after reserves for Federal income and excess-profit taxes; after reductions in the value of inventory to cost or market, whichever is lower; after charge-offs for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals.

³ The dollar volume of business transacted for 365 days net

after deductions for returns, allowances, and discounts from gross sales.

⁴ The sum of all outstanding preferred or preference stocks (if any) and outstanding common stocks, surplus, and undivided profits, less any intangible items in the assets, such as good-will, trademarks, patents, copyrights, leaseholds, mailing lists, treasury stock, organization expenses, and underwriting discounts and expenses.

Adapted from reports by Roy A. Foulke (22, 23, 24, 25).

products (p. 238) are also important in connection with improvements in the distribution of finished textile products. Information relating to operating expenses of existing agencies indicate that costs of wholesale distribution of finished textile products might be reduced considerably by concentrating a larger proportion of the services in the hands of the larger and more efficient concerns.

The possibility of reducing operating expenses of wholesalers of finished textile products by increasing the volume of business appears to be supported by census data relating to the wholesale trade in 1948. Based on these data, comparisons were made of the proportions of total sales represented by operating expenses for wholesalers with annual volumes of sales of \$1,000,000 or more and for those with annual volumes of \$200,000 to \$500,000. Results show that average expenses of wholesalers with the smaller volumes exceeded those of wholesalers with larger sales volumes by 13 percent for those handling clothing and furnishings (general-line), 19 percent for those handling men's and boy's clothing and furnishings, 9 percent for those handling women's and children's clothing and furnishings, and 18 percent for those handling hosiery and underwear.

Information relating to operating expenses of wholesale dry-goods houses, from 1939 to 1950, shows that total operating expenses per dollar of sale for houses with annual sales of less than \$500,000 averaged about a fifth greater than those for houses with annual sales of more than \$2,000,000. Although factors other than differences in size may also be involved, it would appear reasonable to assume that at least some of these differences in operating expenses may be attributed to differences in efficiency arising from differences in volume of sales. If this assumption is justified, apparently per unit costs might be reduced by increasing the proportions of the total volume of finished textiles handled by the larger wholesalers or by increasing the volume handled by the smaller wholesalers.

Comparisons of operating expenses for the different kinds of wholesalers indicate that some reductions in costs might be made, in some instances at least, by integration of the manufacturing and distribution functions. In 1948, according to census reports, operating expenses of wholesaling men's and boys' clothing and furnishings averaged 14.2 percent of net sales for merchant wholesalers and less than 9 percent for manufacturers' sales offices and branches. For women's and children's clothing and furnishings, these expenses averaged 15.3 percent of net sales for merchant wholesalers, about 10 percent for manufacturers' sales branches, and 9.2 percent for manufacturers' sales offices. Similar results are shown for most other products. But information available is not adequate for indicating to what extent these differences are accounted for by differences in the services rendered.

An adequate appraisal of the most effective means by which, and the extent to which, it would be feasible to increase the efficiency and to reduce the costs of wholesaling finished textile products would need to be based on additional data showing the

influences of the various factors on costs. Detailed cost data for a representative sample of each type of wholesaler would be needed to show, under actual operating conditions, the nature and extent of the services rendered, the influence of the various factors on the efficiency and cost of performing each important service, and the items of cost included. In addition, it might be helpful to have detailed specifications for model low-cost operating establishments for handling specified products developed on the basis of cost engineering and other information. These specifications would show the kinds and amounts of facilities and equipment needed, the organization and operation of the concern, and detailed costs along with the cost items included for each major service performed (79).

Such data showing the influence of the various factors on efficiency and costs under actual operating conditions, along with detailed specifications and operating results for model low-cost establishments, should supply a basis for indicating the more feasible means of improvements. But analyses to evaluate the influences of the various factors on costs under actual operating conditions, the preparation of detailed specifications, and the development of detailed cost data for model low-cost establishments, would require specialized training and experience relating to the particular kinds of operations involved. Well-informed operators are in a particularly favorable position to suggest the kinds of information that would be of greatest usefulness to them in reducing their costs, and their advice and assistance may be used to advantage in planning and developing the research required to obtain the information needed.

The relative importance of increasing the efficiency and of reducing the costs of wholesaling textile products may be indicated by data showing that, during the years 1939, 1947, 1949, and 1950, gross margins for wholesaling cotton products averaged about 8 percent of the retail value of the finished apparel and household goods, almost three-fourths of the returns to growers for farm production of the cotton used, and more than three times as much as total costs of ginning and merchandising the raw cotton. Gross margins for wholesaling finished products made of wool were relatively somewhat less than those indicated for cotton products.

RETAILING TEXTILE PRODUCTS

Retailers represent the final stage in the movement of textile products from farm producers to ultimate consumers. They assemble the products primarily for the benefit of consumers by bringing together, at places convenient to them, varied stocks of goods which satisfy the needs and tastes of the community. Retailers also collect and pass back to wholesalers and to manufacturers information as to the demands of consumers for use as guides to further production. Retailers perform some of the services of storage, assume some of the risks involved in holding goods until they are needed by consumers, and extend credit to consumers who cannot afford to pay cash for the goods they buy. In addition, they render delivery and other services to consumers.

METHODS AND PRACTICES

In 1948, the number of retailers included in the general merchandise and apparel groups totaled 167,790, according to Census reports. This compared with 157,226 in 1939. The value of their sales totaled \$25,778,575,000, compared with \$8,924,000,000 in 1939. Volume of sales per establishment averaged about \$153,600 in 1948 compared with \$57,000 in 1939 and in 1948 they ranged from less than \$2,000 to more than \$1,000,000 (table 108). Less than 2 percent of the establishments had an annual volume of sales of more than \$1,000,000 but almost half of the total sales was accounted for by these establishments. About 30 percent of the establishments had annual sales of less than \$20,000 each and less than 2 percent of total sales was accounted for by them.

TABLE 108.—Number of retail stores and volume of sales by kind of business and by sales size, United States, 1948

Annual volume of sales (dollars)	Stores		Sale	
	Total	Proportion	Total	Proportion
	Number	Percent	1,000 dollars	Percent
All.....	52,544	100.0	15,975,357	100.0
1,000,000 or more.....	2,043	3.9	10,915,857	68.3
500,000 to 999,999.....	2,026	3.8	1,415,111	8.9
300,000 to 499,999.....	2,462	4.7	946,658	5.9
100,000 to 299,999.....	8,606	16.4	1,507,201	9.4
50,000 to 99,999.....	8,679	16.5	613,282	3.9
30,000 to 49,999.....	7,757	14.8	301,097	1.9
20,000 to 29,999.....	5,375	10.2	131,538	.8
10,000 to 19,999.....	7,051	13.4	103,570	.6
5,000 to 9,999.....	4,074	7.8	29,954	.2
2,000 to 4,999.....	2,712	5.2	9,104	.1
Less than 2,000.....	1,759	3.3	1,082	0
Apparel				
All.....	115,246	100.0	9,803,218	100.0
1,000,000 or more.....	801	.7	1,943,501	19.8
500,000 to 999,999.....	1,418	1.2	961,330	9.8
300,000 to 499,999.....	2,411	2.1	916,134	9.4
100,000 to 299,999.....	17,721	15.4	2,823,335	28.8
50,000 to 99,999.....	24,734	21.5	1,751,234	17.9
30,000 to 49,999.....	19,321	16.8	755,270	7.7
20,000 to 29,999.....	12,977	11.2	318,199	3.3
10,000 to 19,999.....	16,262	14.1	237,626	2.4
5,000 to 9,999.....	9,592	8.3	70,594	.7
2,000 to 4,999.....	6,450	5.6	21,896	.2
Less than 2,000.....	3,559	3.1	4,099	0

Adapted from CENSUS OF BUSINESS, RETAIL TRADE: 1948.

Information relating to the legal form of organizational set-up for general merchandise and apparel groups of retail stores shows that in 1939 and 1948, those operated as corporations accounted for less than a fourth of the total number and for more than three-fourths of the total sales (table 109). Stores operated as individual proprietorships accounted for more than half of the total number and for about one-fourth of total sales. The proportion of the total number and of total sales accounted for by partnerships increased from 1939 to 1948. Their average annual volume of sales was substantially greater than that for individual proprietorships but substantially less than that for corporations.

Considerable proportions of the sales by retailers in the general merchandise and apparel groups are made on credit. In 1948, according to census reports, about 30 percent of the sales by stores in the general-merchandise group and 23 percent of those in the apparel group were made on credit, compared with 31 and 28 percent, respectively, in 1939. In 1948 proportions averaged 19 percent for men's and boys' furnishings stores, 32 percent for family clothing, 29 percent for women's ready-to-wear and custom

TABLE 109.—*Number of retail stores, and average annual sales, by kind of business and legal form of organization, United States, 1939 and 1948*

Kind of business and legal form of organization	Stores		Average annual sales per store	
	1939	1948	1939	1948
General merchandise	<i>Number</i>	<i>Number</i>	<i>Dollars</i>	<i>Dollars</i>
Individual proprietorships.....	30,360	27,801	13,600	34,000
Partnerships.....	5,754	9,120	40,700	80,700
Corporations.....	13,923	15,536	359,800	919,400
Other legal forms.....	230	87	33,100	115,600
Total.....	50,267	52,544	112,700	304,000
Apparel				
Individual proprietorships.....	67,281	65,303	14,600	37,500
Partnerships.....	12,849	23,365	29,700	76,300
Corporations.....	25,937	26,423	72,600	210,300
Other legal forms.....	902	155	12,000	104,400
Total.....	106,959	115,246	30,500	85,100
Both				
Individual proprietorships.....	97,641	93,104	14,300	36,400
Partnerships.....	18,593	32,485	33,100	77,600
Corporations.....	39,860	41,959	172,900	472,800
Other legal forms.....	1,132	242	16,300	108,100
Total.....	157,226	167,790	56,800	153,600

Adapted from CENSUS OF BUSINESS (66).

tailors, and 60 percent for fur shops. About 43 percent of the sales by stores reporting credit sales were made on credit. On an average in 1948 about 72 percent of the credit sales was on open account and about 28 percent was on installment.

It has been said that retailers are too numerous and that many of them are grossly inefficient (16). Whatever the merits of these criticisms, the last half century has witnessed a continued development of types of mercantile organizations which combine functions of wholesalers and retailers under one management, thus eliminating one sales-purchase transaction through which goods pass on their way from producers to consumers (16). Much of this development may be attributed to changes brought about in connection with the continued concentration of population in the larger cities and towns, the increased use of automobiles and good roads, the spread of style consciousness, and developments in management methods which increase the effectiveness of operations from one central office. Establishments that have grown up in response to these developments include department stores, chain stores, mail-order houses, and cooperative buying and selling systems.

Department stores are large retail establishments which combine under one roof and one management several divisions, each equivalent to a specialized store. These stores take over some, but not all, of the functions of wholesalers in that they buy some of their products directly from producers, although orders received by mills from these stores usually average substantially less than those from wholesalers and cutters. In 1948, according to census reports, 2,580 stores in the United States were classed as department stores, as compared with 4,074 in 1939. The volume of sales totaled \$10,644,747,000 in 1948 as compared with \$3,974,998,000 in 1939 and sales per store averaged \$4,126,000 and \$976,700, respectively. Although their aggregate volume of sales is large, few department stores apparently are large-scale buyers of individual commodities from producers. This is accounted for in part, at least, by the fact that the number of items handled usually is large and that the volume of sales of specific items may be no larger than those of other independent retailers with whom they compete.

Chain stores consist of four or more units of the same general kinds of business owned and operated jointly with central buying and usually supplied from one or more central warehouses. Usually the operation of each store is in the hands of a manager who is not identified as an owner. In 1948, according to census reports, the number of stores operated as one of four or more store units totaled 12,727, or about 24 percent of the total for the general-merchandise group, and 14,515, or about 13 percent of the total for the apparel group (table 110). Volume of sales per store averaged substantially greater for chains than for single-unit stores.

The total number of retail chain stores decreased from 123,195 in 1939 to 105,108 in 1948, but the proportion of total sales accounted for by chain stores increased from almost 22 percent

TABLE 110.—Number of retail stores and volume of sales by kind of business and by number of store units, United States, 1948

GENERAL MERCHANDISE				
Store units	Stores		Sales	
	Total	Proportion	Total	Average per store
	Number	Percent	1,000 dollars	Dollars
All.....	52,544	100.0	15,975,357	304,000
Single.....	36,615	69.7	5,719,356	156,000
Multiuunits:				
2 or 3.....	3,202	6.1	1,505,240	470,000
4 or 5.....	973	1.9	751,186	772,000
6 to 10.....	1,079	2.0	486,499	451,000
11 to 25.....	1,132	2.1	1,014,897	897,000
26 to 50.....	991	1.9	258,532	260,000
51 to 100.....	768	1.5	204,666	266,000
101 or more.....	7,781	14.8	6,034,981	776,000
Total.....	15,929	30.3	10,256,001	644,000
APPAREL				
All.....	115,246	100.0	9,803,218	\$5,000
Single.....	91,596	79.5	5,954,132	65,000
Multiuunits:				
2 or 3.....	9,135	7.9	1,120,487	123,000
4 or 5.....	2,303	2.0	402,440	175,000
6 to 10.....	2,455	2.1	442,519	180,000
11 to 25.....	2,703	2.4	586,713	217,000
26 to 50.....	1,576	1.4	321,367	204,000
51 to 100.....	2,570	2.2	445,745	173,000
101 or more.....	2,908	2.5	529,815	182,000
Total.....	23,650	20.5	3,849,086	163,000

Adapted from CENSUS OF BUSINESS, RETAIL TRADE: 1948.

in 1939 to about 23 percent in 1948. Chain stores, with their centralized buying, take over some but not all of the wholesalers' functions. Some chains operate several thousand stores, but many have only a few stores. The large chains, in procuring essentially similar merchandise for a large number of stores, buy from manufacturers on a scale comparable with that of wholesalers, but many of the smaller chains are supplied mainly through wholesalers (16).

The total number of mail-order houses in operation increased from 434 in 1939 to 880 in 1948, according to census reports, and the total volume of sales increased from \$537,413,000 in 1939 to

\$1,485,352,000 in 1948. The proportion of total retail sales accounted for by mail-order houses amounted to less than 2 percent each year. The number of mail-order houses operated as department stores decreased from 24 in 1939 to 22 in 1948, and the proportions of total sales for all mail-order houses accounted for by these stores were 86 and 84 percent, respectively. Census reports relating to specified kinds of business show that catalogue sales of mail-order houses in 1948 totaled \$51,198,000 for dry-goods and general-merchandise stores, \$25,726,000 for women's ready-to-wear stores, \$7,323,000 for men's and boys' clothing and furnishings stores, \$5,646,000 for family clothing stores, and \$7,813,000 for other stores (exclusive of department stores) that handle apparel.

Much of the aggregate business done by mail-order houses is accounted for by a few large companies that do a Nation-wide business of selling to consumers by mail (16). These are large-scale buyers and they do most of their buying direct from manufacturers. The smaller mail-order houses buy larger proportions of their requirements from wholesalers.

CHARGES OR COSTS INVOLVED

Gross margins, or the spread between merchandise costs and net sales, for department and specialty stores increased from 35.5 percent of net sales in 1935 to 38.9 percent during World War II, decreased to 35.3 percent in 1949, then increased to 36.9 percent in 1950 (table 111). These margins represent typical performance of department and specialty stores, as reported by the National Retail Dry Goods Association. In arriving at these margins, adjustments were made in the cumulative mark-on, for mark-downs, stock shortages, work-room costs, and cash discounts. In 1950, typical gross margins ranged from about 32 percent of sales for domestics—muslins, sheetings, and others—and men's clothing to about 40 percent for handkerchiefs and curtains (table 112) and from about 27 percent for domestics to 39 percent for handkerchiefs in 1949 (table 113).

Data relating to the operating results of department stores, as reported by the Harvard Bureau of Business Research, show that gross margins increased from about 33 percent of sales in 1932 to about 38 percent during World War II, decreased to 35 percent in 1949, then increased to more than 36 percent in 1950 (table 114). Total operating expenses decreased from almost 40 percent of sales in 1932 to about 28 percent in 1945, then increased to more than 32 percent in 1949 and 1950.

Payroll expense, which comprises salaries, wages, and bonuses for all employees, including executives, but excludes pensions and payroll taxes, was by far the largest single item of expense for department stores. The proportion of net sales accounted for by payroll expenses decreased from 18.7 percent in 1932 to 15.4 percent in 1945. It was more than 17.5 percent in 1949 and in 1950. Real estate costs, advertising, and other expenses, as proportions of net sales, have also increased in recent years. Net operating results show improvements from losses of more than

6 percent of net sales in 1932 to profits of almost 10 percent of net sales in 1945. In the postwar period profits decreased and in 1950 they averaged 4.3 percent of sales.

Similar data relating to operating results in 1939 for 1,722 retailers who were handling textile and related products show that gross margins averaged 28.1 percent of net sales for 564 dry-goods and general-merchandise stores; 30.6 percent for 298 family clothing stores; 30.5 percent for 333 women's ready-to-wear stores; 35.8 percent for 75 lingerie, hosiery, millinery, and accessory stores; 31.8 percent for 320 men's clothing stores; 50.2 percent for 32 fur stores; 63.2 percent for 25 custom tailors; and 30.8 percent of sales for all stores combined (45).

TABLE 111.—*Merchandising data for typical performance of department and specialty stores, United States, 1935-50¹*

Year	Reports	Cumulative	Mark-	Stock	Work-	Cash	Gross
		mark-on	down	shortage	room	discount	margin
	Number	Percent	Percent	Percent	Percent	Percent	Percent
1935		38.1	7.1	1.1	0.5	2.8	35.5
1936		38.7	6.6	1.0	.6	2.9	36.1
1937	274	39.0	7.0	1.0	.6	2.8	36.1
1938	290	39.0	7.2	1.0	.6	2.8	36.0
1939	268	39.2	6.7	.9	.6	2.9	36.7
1940	286	39.1	6.3	.9	.5	2.9	36.8
1941	281	40.1	5.3	.7	.6	3.0	38.3
1942	277	40.1	4.7	.9	.6	2.8	38.7
1943	290	39.9	4.2	1.0	.5	2.8	38.9
1944	288	39.9	4.3	1.1	.5	2.8	38.9
1945	278	39.6	4.5	1.0	.5	2.8	38.6
1946	279	39.0	6.2	1.0	.6	2.8	36.7
1947	323	39.3	7.2	1.1	.7	2.7	36.2
1948	335	38.9	7.1	1.1	.7	2.7	35.8
1949	333	38.8	7.6	1.1	.8	2.7	35.3
1950	323	39.4	6.2	.9	.8	2.7	36.9

¹ Data for 1935 to 1944 are for stores with annual sales of \$500,000 or more and those for 1945-50 are for stores with annual sales of \$1,000,000 or more. Cumulative mark-on is the ratio of difference between accumulated merchandise costs and accumulated merchandise retails, expressed in terms of retail amount. Others are expressed as percentage of sales.

Adapted from reports of National Dry Goods Association. Departmental Merchandising and Operating Results of Department Stores and Specialty Stores. Report for 1950 (48).

Retailers' gross operating margins vary considerably with the kind of product, with price lines, and from one establishment to another. Data relating to typical costs to retailers and to retail prices to consumers, obtained by the Bureau of Labor Statistics from about 2,600 retail stores in about 150 cities of differing sizes distributed throughout the United States, show that in September 1942, average retailers' gross margins for yard goods and domestics, for example, ranged from about 28 percent of the retail price for bed sheets to about 39 percent for rayon yard goods. Similar

TABLE 112.—Merchandising data for typical performance of department stores with annual sales of more than \$1,000,000 by departments, United States, 1950¹

Item	Cumulative mark-on	Mark-down at retail	Stock shortage at retail	Work-room net cost	Cash discount	Returns	Gross margin	News-paper cost	Sales-people's salaries	Other expense and profits
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Silks, velvets, and synthetics	41.2	8.0	1.7	0.2	1.7	1.1	37.0	2.3	7.0	27.7
Woolen dress goods	40.5	6.4	2.1	.1	.5	1.1	36.1	2.4	6.3	27.4
Wash goods and linings	40.3	6.6	1.4	0	1.5	.7	37.4	2.1	6.8	28.5
Linens (including towels)	39.6	3.8	.4	.2	1.7	4.6	38.5	2.3	5.6	30.6
Domestics—muslins, sheetings, etc.	33.1	2.8	.6	0	1.8	3.4	32.1	1.4	4.2	26.4
Blankets, comforters, and spreads	38.7	3.7	.5	0	1.6	8.7	37.2	2.7	4.7	29.8
Neckwear and scarfs	38.7	6.6	1.5	.1	5.1	5.8	38.7	2.3	7.9	28.5
Handkerchiefs	41.2	3.8	1.1	.2	1.9	.8	40.0	2.3	8.3	29.4
Children's hosiery	38.4	3.1	.5	0	1.3	1.8	37.5	1.2	7.8	28.5
Women's hosiery	39.5	3.3	.6	0	.2	2.1	37.6	1.5	5.3	30.8
Knit underwear (all materials)	40.3	3.5	.8	0	1.3	7.3	39.4	1.6	5.9	31.9
Silk and muslin underwear and slips	37.7	5.0	.9	.1	4.8	7.9	38.7	2.5	5.8	30.4
N negligees and robes	38.7	6.9	.9	.2	5.2	11.8	39.0	3.1	5.4	30.5
Infant's apparel	38.3	5.5	.7	.1	3.8	5.9	38.5	2.1	6.6	29.8
Women's and misses' coats	39.6	10.9	.5	1.0	5.5	13.6	37.4	3.2	5.0	29.2
Women's and misses' suits	39.8	11.4	1.4	1.4	5.6	12.0	36.0	3.8	5.0	27.2
Junior miss coats and suits	39.6	12.5	1.5	.9	5.7	11.8	35.5	3.1	5.5	26.9
Junior miss dresses	39.4	14.5	1.3	.7	5.6	11.3	34.8	3.5	6.0	25.3

Women's and misses' inexpensive dresses.....	38.4	11.2	.8	.9	5.5	13.2	35.4	3.8	6.2	25.4
Women's and misses' better dresses.....	41.1	18.1	1.4	1.9	5.7	13.8	33.0	3.4	6.5	23.1
Blouses.....	38.0	9.4	1.0	.2	5.5	11.1	36.9	2.3	6.7	27.9
Skirts and other sportswear.....	39.1	10.8	1.9	.4	5.4	12.2	36.1	3.3	6.2	26.6
Girls' wear.....	37.9	8.2	.9	.2	5.0	8.3	37.0	2.9	6.5	27.6
Teen-age apparel.....	38.0	11.8	1.6	.3	5.5	9.6	35.3	3.2	6.6	25.5
Aprons, housedresses, and uniforms.....	36.9	8.3	.9	.2	5.5	12.3	36.1	3.5	6.2	26.4
Men's clothing.....	39.6	5.6	.8	4.8	1.1	5.6	32.3	2.4	5.7	24.2
Men's furnishings.....	39.6	4.5	1.0	.3	1.8	5.3	37.9	2.2	6.1	29.6
Boys' clothing.....	38.4	5.7	1.4	2.4	2.4	7.9	34.3	3.1	6.3	24.9
Boys' furnishings.....	37.9	4.7	.8	.4	1.9	4.9	36.1	2.5	6.8	26.8
Curtains.....	42.0	5.6	1.2	.4	1.9	15.3	39.7	3.2	5.9	30.6
Draperies and upholstery.....	42.8	6.5	.9	1.7	1.6	11.0	38.2	2.4	7.1	28.7
Total main store.....	39.7	6.3	.9	.8	2.6	8.0	37.0	2.3	6.5	28.2

¹ Cumulative mark-on is the ratio of difference between accumulated merchandise costs and accumulated merchandise retails, expressed in terms of the retail amount. Other items are expressed as percentage of sales.

Adapted from reports of National Dry Goods Association. Departmental Merchandising and Operating Results of Department Stores and Specialty Stores. Report for 1950 (48).

TABLE 113.—*Merchandising data for typical performance of department stores with annual sales of more than \$1,000,000 by departments, United States, 1949¹*

Item	Cumulative mark-on	Mark-down at retail	Stock shortage at retail	Work-room net cost	Cash dis-counts	Re-turns	Gross margin	Sales peoples' salaries	Other expense and profits
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Silks, velvets, and synthetics.....	40.8	9.5	2.2	0.3	1.6	1.0	35.7	6.8	28.9
Woolen dress goods.....	40.0	7.2	2.6	.3	.5	1.2	34.2	6.2	28.0
Wash goods and linings.....	39.8	8.3	1.8	-----	1.5	.6	35.2	6.8	28.4
Linens (including towels).....	38.4	5.3	.9	.3	1.8	4.8	36.2	5.9	30.3
Domestics—muslins, sheetings, etc.....	29.7	5.5	.9	.2	1.9	3.2	26.6	4.8	21.8
Blankets, comforters, and spreads.....	36.7	5.2	.8	-----	1.6	8.6	34.7	5.1	29.6
Neckwear and scarfs.....	38.1	7.2	1.2	.1	5.2	5.9	37.7	8.0	29.7
Handkerchiefs.....	40.9	4.7	1.1	.2	1.9	.9	39.1	8.1	31.0
Children's hosiery.....	37.9	3.4	.8	-----	1.3	1.5	36.9	7.3	29.6
Women's hosiery.....	38.2	4.2	.8	.1	.2	2.0	35.6	5.5	30.1
Knit underwear (all materials).....	39.5	4.4	.8	-----	1.4	7.0	38.3	6.0	32.3
Silk and muslin underwear and slips.....	36.9	6.2	1.0	.1	5.1	7.6	37.3	5.7	31.6
Negligees and robes.....	38.0	7.5	1.0	.2	5.3	11.8	37.7	5.4	32.3
Infants' apparel.....	37.8	6.1	1.0	.1	3.6	6.4	37.0	6.5	30.5
Women's and misses' coats.....	39.0	12.8	.8	1.0	5.4	13.3	35.0	4.6	30.4
Women's and misses' suits.....	39.4	13.4	1.8	1.4	5.5	12.2	34.0	4.9	29.1
Junior miss coats and suits.....	38.9	14.7	1.7	.9	5.7	11.8	33.8	5.3	28.5
Junior miss dresses.....	39.1	14.3	1.4	.8	5.6	11.0	34.1	5.7	28.4

Women's and misses' inexpensive dresses.....	38.1	10.7	1.0	.9	5.5	12.1	35.3	5.9	29.4
Women's and misses' better dresses.....	40.7	18.5	1.4	1.9	5.6	13.5	32.1	6.2	25.9
Blouses.....	37.9	10.4	1.5	.2	5.5	11.2	35.7	6.6	29.1
Skirts and other sportswear.....	38.5	11.2	1.9	.4	5.4	13.5	35.6	6.2	29.4
Girls' wear.....	37.6	9.0	1.0	.1	4.9	8.9	35.8	6.5	29.3
Teen-age apparel.....	37.5	13.1	1.6	.3	5.6	9.2	33.4	6.4	27.0
Aprons, housedresses, and uniforms.....	36.7	8.4	.9	.3	5.5	12.3	35.8	6.2	29.6
Men's clothing.....	38.7	8.0	1.1	4.5	1.1	5.7	29.9	6.0	23.9
Men's furnishings.....	39.1	5.4	1.2	.3	1.9	5.3	36.8	6.1	30.7
Boys' clothing.....	37.8	7.2	1.5	2.5	2.7	7.8	32.6	6.3	26.3
Boys' furnishings.....	37.4	6.0	.9	.4	2.1	4.8	35.1	6.6	28.5
Curtains.....	40.8	6.7	1.7	.4	1.9	14.7	37.2	5.8	31.4
Draperies and upholstery.....	41.6	7.4	1.6	2.1	1.6	10.2	36.3	6.9	29.4
Total main store.....	38.7	7.5	1.2	.7	2.7	7.3	35.2	6.5	28.7

¹ Cumulative mark-on is the ratio of difference between accumulated merchandise costs and accumulated merchandise retails, expressed in terms of the retail amount. Other items are expressed as percentage of sales.

Adapted from reports of National Dry Goods Association. Departmental Merchandising and Operating Results of Department Stores and Specialty Stores. Report for 1949 (48).

TABLE 114.—Average costs, margins, and profits for department stores expressed as proportions of net sales, United States, for specified years to 1950

Item	1929	1932	1939	1941	1945	1947	1948	1949	1950
Net sales.....	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0
Merchandise cost.....	66.5	66.9	63.1	61.8	62.4	63.6	64.4	64.8	63.5
Gross margin.....	33.5	33.1	36.9	38.2	37.6	35.4	35.6	35.2	36.5
Total expense ¹	32.3	39.5	35.4	33.4	27.8	30.1	31.1	32.6	32.2
Total pay roll ¹	16.8	18.7	17.8	17.3	15.4	16.9	17.3	18.0	17.6
Real estate costs.....	3.9	6.5	4.4	3.6	2.5	2.2	2.4	2.6	2.6
Advertising.....	3.3	4.0	3.6	3.2	2.2	2.4	2.6	2.6	2.6
All other expense ¹	8.3	10.3	9.6	9.3	7.7	8.6	8.8	9.4	9.4
Operating profit ¹	1.2	² 6.4	1.5	4.8	9.8	5.3	4.5	2.6	4.3
Other income ¹	3.1	4.0	2.5	2.5	1.7	2.0	2.2	2.3	2.6
Gain before taxes ³	4.3	² 2.4	4.0	7.3	11.5	7.3	6.7	4.9	6.9
Federal income taxes.....			.6	3.2	⁴ 7.9	2.8	2.5	1.8	3.1
Gain after taxes ³			3.4	4.1	⁴ 3.6	4.5	4.2	3.1	3.8
Reports.....	Number 527	Number 428	Number 428	Number 407	Number 398	Number 383	Number 351	Number 354	Number 349

¹ Figures for these items were revised for the years 1939 and 1945 for comparability with results for subsequent years in order to reflect uniformly the 4-percent interest-rate charges on selected assets.

² Loss.

³ Federal income taxes.

⁴ Federal income taxes for 1945 include taxes on excess profits net of the 10-percent postwar refund and debt-retirement credit. For 1942, however, details on such credits were not requested; hence, the excess-profits tax figures included for that year may not reflect such deductions.

Abstracted from OPERATING RESULTS OF DEPARTMENT AND SPECIALTY STORES IN 1944 AND 1950 (48).

margins for apparel ranged from less than 23 percent to more than 40 percent (91).

Data for the different price lines for several of the commodities were arrayed from the lowest to the highest reported, then divided into four groups of approximately the same number of price lines. Retailers' gross margins for these groups, when expressed as proportions of the retail price, ranged from an average of about 34 percent for the lowest price-line group to almost 39 percent for the highest price-line group (91). These margins vary considerably among different retailers of the same commodity and price line. Most of the margins shown by the data assembled in 1942 came within the range of 30 to 45 percent of the retail price, but many retailers of yard goods, bath towels, cotton-knit undershirts and union suits, and men's work socks had gross margins of less than 30 percent and many retailers of women's \$10.98 dresses, cotton-knit shirts, and men's work socks had gross margins of more than 45 percent of the retail price (91).

Gross operating margins for department and specialty stores usually are relatively greater for stores with large than for those with small volumes of annual sales. In 1950, for example, gross margins for department stores ranged from 31.4 percent of net sales for stores with annual sales of less than \$250,000 to more than 36 percent for those with sales of more than \$1,000,000 (table 115). Average operating expenses range from about 28 percent of sales for stores with annual sales of \$250,000 to \$500,000 to almost 33 percent of sales for stores with sales of \$20,000,000 to \$50,000,000. These differences in expenses may be accounted for in part by more wholesaling and other services performed by the larger than by the smaller operators. The proportions of net sales accounted for by payroll and most other items of expenses, and by net profits, varied irregularly, but those accounted for by advertising increased, with increases in volume of annual sales. Results for specialty stores are similar in most respects to those indicated for department stores, except that the annual volume of sales are a great deal larger for department than for specialty stores (table 116).

Data relating to typical operating ratios of dry-goods and general-merchandise stores, as reported by Dun & Bradstreet, Inc., show that in 1949, retailers gross margins, or the differences between net sales and costs of the goods sold, averaged 27.5 percent of net sales (table 117). Similar data relating to typical operating ratios for women's accessory and specialty stores, also as reported by Dun & Bradstreet, show that in 1949, retailers gross margins averaged 32.1 percent of net sales (table 118). These margins for dry-goods and general-merchandise stores and for women's accessory and specialty stores varied irregularly with annual volume of sales and with the population of the city in which they were located. Stores privately owned and operated, those in the neighborhood, and those with small proportions of sales on credit had smaller average margins than those operated by corporations, those downtown, and those with larger proportions of the sales on credit.

TABLE 115.—Costs, expenses, and profits of department stores expressed as proportions of net sales, by volume of sales, United States, 1950

Item	Volume of net sales in thousands of dollars								
	Less than 250	250 to 499	500 to 999	1,000 to 1,999	2,000 to 4,999	5,000 to 9,999	10,000 to 19,999	20,000 to 49,999	50,000 or more
Net sales.....	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0
Merchandise costs.....	68.6	66.8	65.0	63.9	63.7	63.9	63.9	63.1	63.5
Gross margin.....	31.4	33.2	35.0	36.1	36.3	36.1	36.1	36.9	36.5
Total expense.....	29.5	28.1	31.5	31.6	32.0	31.2	32.4	32.9	31.6
Total pay roll.....	17.3	17.0	18.1	17.5	17.65	17.1	17.2	18.1	17.45
Real estate cost.....	2.9	2.8	2.6	3.0	2.8	2.85	2.95	2.6	2.25
Advertising.....	1.8	1.9	2.5	2.65	2.8	2.8	3.25	2.6	2.45
Taxes.....	.9	.9	.95	.95	.95	.95	1.05	1.1	1.05
Interest.....	1.6	1.15	1.3	1.25	1.25	1.25	1.3	1.35	1.2
Supplies.....	1.3	1.3	1.55	1.5	1.75	1.65	1.7	1.75	1.55
Service purchased.....	.75	.7	.7	.75	.75	.8	1.05	1.1	1.5
Losses from bad debts.....	.05	.05	.15	.15	.1	.15	.15	.15	.2
Other unclassified.....	.7	.45	.9	.95	1.2	1.1	1.15	1.4	1.45
Traveling.....	.3	.4	.45	.5	.4	.4	.35	.35	.2
Communication.....	.35	.3	.5	.45	.45	.4	.45	.45	.45
Repairs.....	.3	.15	.3	.4	.4	.45	.5	.5	.55
Insurance ¹.....	.55	.5	.45	.4	.35	.3	.25	.25	.15
Depreciation.....	.5	.35	.55	.55	.6	.55	.55	.6	.55
Professional service.....	.2	.15	.5	.6	.55	.45	.5	.6	.6

Net operating profit.....	1.9	5.1	3.5	4.5	4.3	4.9	3.7	4.0	4.9
Net other income.....	1.8	1.4	1.9	2.2	2.1	2.3	2.7	2.7	2.5
Net gain before taxes.....	3.7	6.5	5.4	6.7	6.4	7.2	6.4	6.7	7.4
Federal income taxes.....	(2)	(2)	1.4	2.6	2.7	3.0	2.7	3.0	3.4
Net gain after taxes.....	(2)	(2)	4.0	4.1	3.7	4.2	3.7	3.7	4.0
Reporting firms.....	<i>Number</i> 37	<i>Number</i> 22	<i>Number</i> 41	<i>Number</i> 42	<i>Number</i> 58	<i>Number</i> 47	<i>Number</i> 44	<i>Number</i> 40	<i>Number</i> 18

¹ Except on real estate.

² Usable data not available.

Abstracted from OPERATING RESULTS OF DEPARTMENT AND SPECIALTY STORES IN 1950 (48).

TABLE 116.—Costs, expenses, and profits of specialty stores expressed as proportions of net sales, by volume of sales, United States, 1950

Item	Volume of net sales in thousands of dollars				
	Less than 250	250 to 499	500 to 999	1,000 to 4,999	5,000 or more
Net sales.....	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0	Percent 100.0
Merchandise costs.....	64.7	63.6	62.6	61.9	62.3
Gross margin.....	35.3	36.4	37.4	38.1	37.7
Total expense.....	34.4	33.8	35.4	35.3	35.2
Total payroll.....	17.6	17.9	18.9	19.0	18.2
Real estate cost.....	4.1	4.0	3.7	3.4	3.9
Advertising.....	3.0	2.9	3.6	3.9	3.75
Taxes.....	1.05	1.0	.85	1.0	.85
Interest.....	1.15	1.25	1.25	1.1	1.15
Supplies.....	1.15	1.3	1.2	1.7	2.0
Service purchased.....	.95	.8	1.1	.85	1.1
Losses from bad debts.....	.15	.15	.2	.15	.1
Other unclassified.....	.9	.8	.7	1.25	1.2
Traveling.....	1.4	.8	.8	.6	.55
Communication.....	.55	.45	.55	.5	.55
Repairs.....	.35	.25	.4	.3	.35
Insurance ¹.....	.45	.7	.6	.4	.3
Depreciation ¹.....	.6	.6	.95	.5	.6
Professional service.....	1.0	.9	.6	.65	.6
Net operating profit.....	.9	2.6	2.0	2.8	2.5
Net other income.....	1.8	1.7	2.0	1.9	1.9
Net gain before taxes.....	2.7	4.3	4.0	4.7	4.4
Federal income taxes.....	(2)	(2)	(2)	1.8	2.1
Net gain after taxes.....	(2)	(2)	(2)	2.9	2.3
Reporting firms.....	Number 21	Number 16	Number 13	Number 23	Number 16

¹ Except on real estate.

² Usable data not available.

Abstracted from OPERATING RESULTS OF DEPARTMENT AND SPECIALTY STORES IN 1950 (48).

Operating ratios for 273 stores that retail children's and infants' wear, as reported by Dun & Bradstreet, Inc., show that in 1950 the retailer's gross margins averaged 32.5 percent of net sales (table 119). These margins varied inversely with annual volume of sales per store. They varied directly with the proportion of sales made on credit and with the proportion of net profits to net sales. Salaries, wages, and occupancy were the principal items of expense. Net profits before Federal income taxes averaged 3.6 percent of net sales.

Information relating to net sales, costs, and margins for 56 men's and boys' retail clothing stores show that the retailers' gross margins increased from about 36 percent in 1938 to 38

TABLE 117.—Typical operating ratios of dry-goods and general-merchandise stores, by kind and location, United States, 1949

Item	Stores reported	Net sales per store	Proportion of net sales								Net Profit ¹
			Cost of goods sold	Gross margin	Expenses					Net Profit ¹	
					Total	Salaries	Wages	Occupancy	Advertising			Other
	Number	1000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
All stores	214	66.7	72.5	27.5	24.7	8.2	7.2	3.4	0.8	5.1	2.8
By sales volume—dollars:											
Under 50,000	82	32.8	72.5	27.5	23.6	9.6	5.0	4.1	.5	4.4	3.9
50,000—99,000	61	69.9	72.1	27.9	25.9	8.8	8.1	3.5	.8	4.7	2.0
100,000 and over	71	176.4	72.7	27.3	25.2	6.5	9.0	2.8	1.3	5.6	2.1
By population of city:											
Under 20,000	77	61.2	74.1	25.9	21.8	8.0	5.8	2.6	1.0	4.4	4.1
20,000—199,000	61	64.3	70.0	30.0	27.4	8.5	8.8	3.4	1.0	5.7	2.6
200,000 and over	76	68.4	72.1	27.9	26.2	8.5	7.8	4.1	.6	5.2	1.7
By form of organization:											
Proprietorship	97	49.1	73.4	26.6	23.5	8.1	7.1	3.3	.6	4.4	3.1
Partnership	68	69.1	73.1	26.9	22.5	8.4	5.9	3.0	.6	4.6	4.4
Corporation	48	151.4	69.5	30.5	29.0	7.7	9.2	3.8	1.3	7.0	1.5
By shopping location:											
Neighborhood	45	61.4	71.8	28.2	25.4	8.9	7.7	4.0	.5	4.3	2.8
Secondary	54	58.1	71.9	28.1	26.3	8.8	7.7	3.9	.7	5.2	1.8
Downtown	30	140.4	69.6	30.4	29.5	7.6	8.9	4.7	1.6	6.7	.9
Other ²	77	61.2	74.1	25.9	21.8	8.0	5.8	2.6	1.0	4.4	4.1
By proportion of credit sales:											
5 percent or less	120	64.1	73.0	27.0	24.9	8.4	7.2	3.8	.8	4.7	2.1
6 to 25 percent	43	56.1	72.2	27.8	24.1	8.1	7.6	2.9	.9	4.6	3.7
Over 25 percent	50	84.9	71.2	28.8	25.6	7.6	7.2	3.0	1.0	³ 6.8	3.2

¹ Before Federal income taxes. ² Consists of small towns having only 1 shopping area. ³ Includes 0.2 percent bad debt losses.

Adapted from DRY GOODS AND GENERAL MERCHANDISE STORES, OPERATING RESULTS IN 1949 (59a).

TABLE 118.—Typical operating ratios for women's accessory and specialty stores, by kind, size, and location, United States, 1949

Item	Concerns reported	Typical net sales per store	Proportion of net sales								Net profit ¹
			Cost of goods sold	Gross margin	Expenses					Net profit ¹	
					Total	Salaries	Wages	Occupancy	Advertising			Other
	Number	1,000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
All stores.....	168	39.5	67.6	32.4	29.4	9.8	6.4	6.5	1.0	5.7	3.0
By sales volume—dollars:											
Under 30,000.....	58	18.5	67.1	32.9	30.5	13.8	1.1	8.7	.9	6.0	2.4
30,000—59,000.....	62	40.8	67.0	33.0	29.9	9.9	6.9	6.4	1.1	5.6	3.1
60,000 and over.....	48	109.4	68.3	31.7	28.4	6.2	9.0	5.9	1.2	6.1	3.3
By population of city:											
Under 100,000.....	49	44.4	68.4	31.6	28.0	9.2	7.1	5.1	1.5	5.1	3.6
100,000—999,000.....	56	46.8	65.8	34.2	32.3	9.2	8.1	7.4	1.2	6.4	1.9
1,000,000 and over.....	53	35.8	68.4	31.6	29.7	11.0	4.6	7.9	.5	5.7	1.9
By form of organization:											
Proprietorship.....	79	35.2	68.8	31.2	28.2	9.6	6.4	6.3	.8	5.1	3.0
Partnership.....	57	34.0	67.3	32.7	29.5	11.0	5.1	7.0	1.1	5.3	3.2
Corporation.....	31	81.9	65.8	34.2	33.1	7.3	9.4	5.9	1.8	8.7	1.1
By shopping location: ²											
Neighborhood.....	36	36.1	69.2	30.8	28.4	11.3	5.4	5.7	.8	5.2	2.4
Secondary.....	58	33.4	67.2	32.8	30.0	9.7	6.0	6.7	.7	6.9	2.8
Downtown.....	49	46.8	63.7	36.3	33.2	10.0	7.2	8.2	1.5	6.3	3.1
By proportion of credit sales:											
Less than 5 percent.....	111	35.5	67.7	32.3	29.1	10.3	5.4	7.2	.8	5.4	3.2
10 percent and over.....	54	53.0	67.4	32.6	30.2	9.2	7.8	5.7	1.5	6.0	2.4

¹ Before Federal income taxes.² Stores in places of less than 20,000 population were excluded from this tabulation.

Adapted from Women's Accessory and Specialty Stores, Operating Results in 1949 (59b).

TABLE 119.—*Typical operating ratios for children's and infants' wear stores, by kind and location, United States, 1950*

Item	Stores reported	Net sales per store	Proportion of net sales									Net ¹ profit
			Cost of goods sold	Gross margin	Expenses						Net ¹ profit	
					Total	Salaries	Wages	Occupancy	Advertising	Buying			Other
Number	1,000 dollars	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
All stores.....	273	43,600	67.5	32.5	28.9	8.9	5.9	7.5	1.5	0.5	4.6	3.6
By sales volume—dollars:												
Under 30,000.....	85	21,300	67.0	33.0	29.7	12.8	1.2	9.3	1.2		5.1	3.3
30,000 to 59,000.....	98	43,200	67.2	32.8	28.4	8.8	5.7	7.3	1.5	.7	4.4	4.4
60,000 and over.....	90	87,400	68.1	31.9	28.5	7.6	7.6	6.4	1.6	.7	4.6	3.4
By population of city:												
Under 50,000.....	76	42,200	68.8	31.2	27.3	9.1	5.7	6.2	1.7	.8	3.8	3.9
50,000 to 499,999.....	89	46,900	66.0	34.0	30.6	8.4	6.5	7.6	1.7	.8	5.6	3.4
500,000 and over.....	105	45,100	67.8	32.2	28.5	9.2	5.4	8.3	1.1	.1	4.4	3.7
By form of organization:												
Proprietorship.....	136	43,200	67.9	32.1	27.9	7.9	6.0	7.4	1.4	.4	4.8	4.2
Partnership.....	119	41,400	67.8	32.2	28.6	10.0	4.6	7.4	1.6	.5	4.5	3.6
By shopping location:												
Neighborhood.....	67	40,100	66.9	33.1	28.8	8.5	5.3	8.5	1.2	.4	4.9	4.3
Secondary.....	67	34,600	67.8	32.2	27.5	9.2	5.6	6.5	1.2	.2	4.8	4.7
Downtown.....	51	62,600	66.1	33.9	31.6	8.3	7.0	8.5	1.8	.8	5.2	2.3
By proportion credit sales:												
None.....	142	39,500	68.1	31.9	28.3	9.2	5.1	7.7	1.2	.3	4.8	3.6
1 to 19 percent.....	66	46,400	67.3	32.7	29.4	9.4	6.3	7.3	1.8	.7	3.9	3.3
20 percent and over.....	64	52,800	66.6	33.4	29.5	8.0	7.6	6.6	1.7	.9	4.7	3.9
By profit on net sales:												
Under 1 percent.....	80	35,700	69.4	30.6	33.2	10.1	6.3	8.5	2.0	.5	5.8	² 2.6
1 to 5.9 percent.....	101	52,700	67.0	33.0	29.7	9.1	6.5	7.2	1.5	.6	4.8	3.3
6 percent and over.....	91	41,400	65.9	34.1	24.4	7.7	4.7	6.7	1.3	.3	3.7	9.7

¹ Before Federal income taxes. ² Loss. Adapted from Children's and Infants' Wear Stores, Operating Results in 1950 (59).

percent in 1945 (table 120). The proportions of net sales accounted for by selling, general, and administrative expenses increased during this period and the proportion accounted for by profits before income taxes decreased.

Data for men's furnishing stores show no consistent relationships between gross margins as proportions of net sales and annual volume of sales per store (table 121). These results are similar to those indicated for dry-goods, general-merchandise, women's accessory, and specialty stores (p. 269), but department stores with the larger volume of annual sales usually have wider gross margins than those with smaller volumes of annual sales (p. 270). Expenses of occupancy usually represent a smaller proportion of net sales for stores with the larger volume of annual sales, and for those in the smaller towns, than for those with the smaller volume of sales, or for those in the larger towns and cities. The proportions of net sales accounted for by advertising tend to vary directly with volume of annual sales.

Salaries and wages are the chief items included in gross margins for retailers of textile products. Data for 1949 show that wages and salaries accounted for more than half of the gross margins for department stores and for dry-goods and general-merchandise stores (tables 114 and 117). Payrolls for department stores in 1950 and for most other recent years averaged somewhat less than half of gross operating margins. Data relating to other expenses show that in 1950 real estate costs accounted for 7 percent, advertising 7 percent, all other expenses 25 percent, and operating profits 12 percent of the gross margins for department stores. For dry-goods and general-merchandise stores in 1949, occupancy accounted for about 12 percent, advertising 3 percent, other expenses 19 percent, and net profits 10 percent of gross margins.

Median profits, after Federal income and excess-profits taxes, as proportions of net sales and of net worth for department stores and other retailers of apparel increased considerably from 1939 through the middle 1940's, decreased in the late 1940's and increased early in the 1950's (table 122). Simple averages of the proportions shown in table 122 show increases in average profits from 2.5 percent of net sales in 1939 to 6.9 percent in 1946, decreased to 3.7 percent in 1948, and then increased to 4.7 percent in 1950. Similar data for median profits as proportions of net worth show increases from 5.5 percent in 1939 to 19 percent in 1946, decreased to 8.2 percent in 1949, then increased to 10.3 percent in 1950.

Reports indicate that various types of cooperative plans have been worked out in recent years by retailers and wholesalers in an effort to improve efficiency in buying and selling (16). One phase of this development is said to be group or syndicate buying under which department stores and other retailers, with relatively small individual purchases of individual commodities, combine to establish a buying organization that will buy for them directly from manufacturers rather than through wholesalers. Some wholesalers have also formed such buying syndicates. But avail-

TABLE 120.—*Net sales, costs, and margins for 56 men's and boys' retail clothing stores, United States, 1936-39, 1941, and 1945*

Item	1936	1937	1938	1939	1941	1945
	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>
	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>
Net sales	23,303	24,125	21,809	21,876	30,399	49,140
Cost of goods sold	14,686	15,580	14,038	13,846	19,044	30,520
Gross margin	8,617	8,545	7,771	8,030	11,355	18,611
Selling expenses						
General and administrative expense	7,808	8,633	8,038	7,653	12,830	3,980
Net profit from operations	809	212	1,267	377	16,344	9,123
Nonoperating income (net)	102	144	100	80	1	104
Profit before income taxes	911	356	1,167	457	2,182	5,612
Proportion of net sales						
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales	100.0	100.0	100.0	100.0	100.0	100.0
Cost of goods sold	63.0	63.8	64.4	63.3	62.7	62.1
Gross margin	37.0	36.2	35.6	36.7	37.3	37.9
Selling expense						
General and administrative expense	33.5	35.3	36.8	35.0	9.3	8.1
Net profits from operations	3.5	.9	1.2	1.7	20.9	18.6
Nonoperating income (net)	.4	.6	.6	.1	7.1	11.2
Profit before income taxes	3.9	1.5	1.6	2.1	(2)	2
					7.1	11.4

¹ Loss.² Less than 0.05 percent.

Primary data assembled by Office of Price Administration and made available for use only as industry summaries (91).

able data are not sufficiently adequate to indicate to what extent the "traditional" channel, from producers to wholesalers to retailers, has been affected by these developments.

MEANS AND IMPORTANCE OF IMPROVEMENT

Reductions in costs of retailing textile products may involve increasing the general efficiency of existing agencies, concentration of services in the hands of agencies or combinations of agencies that can perform them most efficiently, and reductions in "unnecessary" services. A determination of the most feasible means of improving the existing agencies would involve consideration of the facilities and equipment used, organization and operation of the business units, selection and management of personnel, location of places of business, number and kinds of commodities handled, volume of operation, and purchase and sales policies, among other factors. But the information available is not com-

plete enough to indicate all the more effective means by which and the extent to which it would be feasible to reduce the costs of these agencies.

Large retail distributive organizations, such as mail-order houses, department-store chains and large specialty retail chains, are said to have demonstrated their ability to handle large-volume items on relatively small margins (43). Some economies may result from buying large volumes directly from manufacturers. In 1939, according to census reports, about two-thirds of apparel and other textile products was distributed from manufacturers directly to retailers. A part of the economies may be attributed to other savings from handling large volumes. Additional savings might be made through further combinations and increases in volumes handled, particularly by the smaller establishments.

Efficiency of the smaller retailers may be increased through expansions in the activities of large organizations which provide purchasing and merchandising services to the smaller independently owned and operated stores (43). These services, by helping smaller operators to obtain better selections of merchandise, better control of stocks, and increased rate of turn-over, may enable them to approximate the merchandising efficiency of the larger distribution outlets. Such increased efficiency would tend to react favorably on returns to retailers, on costs to consumers, and on returns to farm producers of cotton and wool.

A combination of two or more of the successive links in the chain of the manufacture and distribution of textile products may be an effective means of achieving economies in production and

TABLE 121.—Costs, margins, and profits for men's furnishing stores, as proportions of net sales, by sales volume, United States, 1944

Item	Net sales volume in thousands of dollars				
	All	Over 100	50-99	30-49	Under 30
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Net sales	100.0	100.0	100.0	100.0	100.0
Costs of goods sold	66.7	65.0	67.7	67.5	65.7
Gross margin	33.3	35.0	32.3	32.5	34.3
Owners' salaries	9.0	5.3	8.0	9.0	13.0
Employees' wages	5.6	8.3	6.1	4.2	2.3
Occupancy expense	1.9	5.0	4.5	4.7	6.6
Advertising	.6	1.3	.6	.5	.6
All other expenses	4.1	4.7	4.8	3.7	4.0
Net profits ¹	9.1	10.4	8.3	10.4	7.8
Concerns reporting	<i>Number</i> 230	<i>Number</i> 46	<i>Number</i> 75	<i>Number</i> 60	<i>Number</i> 40

¹ Net profits before taxes.

Abstracted from Retail Operating Ratios; New Figures for Men's Furnishings (31).

TABLE 122.—Median net profits of retailers of apparel and household textiles as proportions of net sales and of tangible net worth, by kind of products, United States, 1939-50¹

Line of business	Net profits ² as proportion of net sales ³											
	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Department stores.....	Percent 2.03	Percent 2.50	Percent 3.49	Percent 3.43	Percent 4.05	Percent 3.26	Percent 3.36	Percent 5.94	Percent 4.22	Percent 4.12	Percent 2.55	Percent 3.77
Men's and boys' clothing.....	2.39	3.33	4.02	3.87	3.92	4.57	6.47	8.06	5.76	4.06	4.72	5.48
Clothing, installment.....	3.80	5.42	4.81	1.13	4.18	4.58	5.40	7.28	6.56	4.19	5.39	4.12
Men's furnishings.....	2.70	2.18	3.88	5.99	7.26	6.85	5.68	7.29	3.82	2.42	4.91	6.94
Women's specialty shops.....	1.31	1.34	2.82	2.85	2.95	4.37	3.42	5.98	4.73	3.58	2.80	3.11
	Net profits as proportion of tangible net worth ⁴											
Department stores.....	5.57	6.37	10.45	10.85	13.05	12.38	11.48	22.20	16.10	12.40	6.77	11.20
Men's and boys' clothing.....	5.67	7.42	11.64	11.58	12.40	13.14	18.75	21.72	16.53	10.47	7.55	10.75
Clothing, installment.....	5.77	9.95	10.79	10.01	11.94	8.23	10.25	13.90	17.10	12.80	10.11	9.74
Men's furnishings.....	6.00	4.50	10.10	10.07	20.30	22.61	18.52	19.94	17.20	5.29	8.47	11.94
Women's specialty shops.....	4.64	4.65	11.80	11.37	14.54	17.26	15.02	17.36	15.80	14.45	8.16	7.89

¹ The number of concerns reported for 1950 ranged from 51 for men's furnishings to 367 for department stores.

² Profit after depreciation on buildings, machinery, equipment, furniture, and other assets of a fixed nature; after reserves for Federal income and excess-profit taxes; after reductions in the value of inventory to cost or market, whichever is lower; after charge-off for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals. ³ Dollar volume of business transacted for 365 days net after deductions for returns, allowances, and discounts from gross sales.

⁴ Clothing, men's and women's.

⁵ The sum of all outstanding preferred or preference stocks (if any) and outstanding common stocks, surplus, and undivided profits, less any intangible items in the assets, such as goodwill, trade-marks, patents, copyrights, leaseholds, mailing lists, treasury stock, organization expenses, and underwriting discounts and expenses.

Adapted from reports by Roy A. Foulke (22, 23, 24, 25).

distribution, and a closer linkage between production planning and ultimate consumer demands (43). Such integration may afford better control of the qualities of finished goods made available to consumers. It may facilitate sales through standardization of products, branding or informative labeling, and educational advertising. Experiences before World War II indicated both possibilities of and limitations to integration in the textile industry (16). Price and production regulations during the war apparently were favorable at certain points to the extension of unified control (43), and developments during the 1940's indicate continuing and perhaps growing interests in the possibilities of further combinations (41).

Considerable savings in costs of retailing might be made if such services as credit, free delivery, return privileges, and perhaps others were limited to those willing to pay the necessary costs of performing them. This would necessitate a differential pricing system which might be difficult to operate, especially if competing stores did not adopt a similar policy. Some progress has been made in this direction by some stores concentrating on cash-and-carry sales while others sell on credit and make deliveries. Retailers have experimented with differential pricing on the basis of the services performed, but available information is not complete enough for an appraisal of the results. Progress has been made in reducing the cost of delivery by setting up minimum sizes of packages that will be delivered and in limiting the return of products purchased for credit. But if restrictions on these services are to be feasible, all competing retailers in the same city probably would have to follow similar practices.

Advertising is generally recognized as an effective means of expanding market outlets for particular makes or brands as well as the total for all textile products. Such increases in volume may make possible some reductions in average per unit costs of distribution. Perhaps the least effective advertising, for the industry as a whole, is that designed mainly to induce consumers to use one particular brand or make instead of another of about the same quality and generally referred to as competitive advertising (82). If advertising were confined more to informative and less to strictly competitive features, and were placed on a more efficient basis it possibly would be more effective in expanding market outlets and in reducing costs of distribution.

Style and changes in fashion are important elements in cost of distributing textile products as well as in their manufacture. The large number of styles and frequent changes in fashion increase the costs of retailing by necessitating frequent purchases of relatively small lots of the styles in fashion at the time. The alternative is to bear the risks of substantial losses on stocks of out-of-fashion goods on hand. Data relating to distributors' margins for women's dresses by price lines show that retailers' margins per dollar of sale for handling the higher-priced dresses, for which style was an important consideration, were in some instances more than 25 percent greater than those for handling lower-priced lines for which style and changes in fashion were relatively unim-

portant (16). These data, along with other information, indicate that retailers' margins might be reduced considerably if the number of styles and the frequency of changes in fashion were greatly reduced. But an adequate variety of styles and changes in fashion stimulate increases in consumer demand.

Developments in recent years indicate that retailers' margins for textile products might be considerably reduced by simplification of the selling process to permit and encourage some degree of self-selection and self-service by consumers. These services may be facilitated by open display of merchandise, arrangement on the basis of the consumer's primary interests, and an arrangement for completing the transaction by making payment at a convenient desk set up for that purpose (30). The feasibility of simplifying the selling process for textile products is indicated by the fact that self-service and self-selection methods are used to some extent by department stores in selling men's furnishings, boys' wear and underwear, infants' wear, children's wear, sportswear, linens, curtains, towels, and other textile products (91).

Self-service makes possible a reduction in retail margins mainly by reducing pay-roll costs, which average about half of the total operating expenses of retailers. Although information available is not adequate for an accurate appraisal, indications are that by the use of self-service, operated under favorable conditions, retailers' margins for textile products might be reduced by amounts up to 10 percent or more. Accurate labeling to show the quality and size of the products on the bases of adequate standards and other economies in retailing would make possible substantial reductions in cost of distributing textile products to the advantage of distributors, producers, and consumers.

Additional information is needed for use in indicating more specifically the most effective means by which and the extent to which it would be feasible to increase efficiency and to reduce costs of retailing textile products. This information would include results of the analysis of detailed cost data for a representative sample of retailers to show the influences of the various factors on the unit costs of labor, overhead, and other items for each important service rendered under actual operating conditions. In addition, it might be helpful to have detailed specifications for model low-cost units for retailers of specified types, based on cost-engineering data and other information, to show the more desirable buildings and equipment, floor plans and arrangements for display, purchase and sales policies, operating methods and labor requirements, and the kinds of products handled; and to have developed for these model units detailed costs for each major process or service.

Such information showing the influences of the various factors on the costs of retailing textile products under actual operation conditions, along with detailed specifications and operating results for model low-cost units for typical retailers, should supply at least a fairly adequate basis for indicating the more feasible means of improvements. But the nature of the business of retailing is such that an accurate evaluation of the influences of the various

factors on efficiency and costs under actual operating conditions, the preparation of detailed specifications and the development of data to show operating results to be expected, would require the services of personnel having specialized training and experience in this kind of business. Well-informed operators are in a particularly favorable position to suggest the kinds of information that would be of greatest usefulness to them in reducing their costs, and their advice and assistance may be used to advantage in planning and developing the research needed.

Some indications of the importance of reducing the costs of retail distribution of textile products may be obtained from data showing that, during the years 1939, 1947, 1949, and 1950, gross margins for retailing apparel and household textiles averaged almost a third of the cost of the products to consumers, more than 10 times as much as the total costs of merchandising the raw cotton and wool used, and almost three times as much as total returns to growers for farm production of the cotton and wool used. A reduction of 10 percent in retailers' gross margins would result in savings greater than the total costs of merchandising the raw cotton and wool used, including ginning and baling the cotton but excluding scouring for wool. Such savings would amount to more than a fourth of the total returns to growers for farm production of the cotton and wool used.

SUMMARY AND CONCLUSIONS

The cotton and wool industries are confronted with greatly increased competition. But prospective demands for textiles indicate the possibility of maintaining consumption of these products well above prewar levels, if all potential market outlets are fully exploited. Cotton and wool derive their value mainly from their usefulness as raw materials in the manufacture of textile products. Market outlets for these fibers depend mainly upon their manufacture into forms desired and upon the distribution of the products as required, so that a variety of suitable and attractive products made of cotton and wool can be made available to consumers at attractive prices.

Most of the cotton utilized in the United States is spun into yarn and the yarn is woven into cloth. In recent years, about 37 percent of the cotton consumed by domestic mills has been used in the manufacture of clothing, about 29 percent in household goods, and 34 percent for industrial purposes. In 1947 about 74 percent of the wool consumed by manufacturers in the United States was used in woolen and worsted yarns. Manufacturers of carpets and rugs used about 25 percent and about 1 percent was used in felt hats. About 85 percent of the woolen and worsted yarns was used in woven goods and about 15 percent in knit goods. Almost four-fifths of the woven goods was used in apparel fabrics.

Data relating to marketing margins for textiles are basic to the most effective treatment of the problems involved in reducing

costs and in expanding market outlets. These margins cover charges made for assembling and merchandising raw cotton and wool, manufacturing these products into yarns and finished fabrics, fabricating apparel and household textiles, and distributing the finished products to ultimate consumers. The relative importance of these margins, from the viewpoint of costs, may be indicated by data showing that, from 1926 to 1950, the proportion of the consumer's dollar paid for finished apparel and household textiles made of cotton that were accounted for by these margins ranged from 86 percent in 1950 to 95 percent in 1932, and averaged 89.4 percent. Similar proportions for wool products ranged from 82 percent in 1928 to 94 percent in 1932 and averaged 86 percent.

The size of these margins emphasizes the importance of information to show the distribution of the consumer's dollar among the important agencies, services, and costs items. Estimates, based on official data and other information, were made to show the average distribution of the consumer's dollar paid for textile products in 1939, 1947, 1949, and 1950. Data for the agencies and services available for this purpose are not complete, and in some instances they are not strictly comparable. Consequently, some liberties were taken in approximating average margins on the basis of this information. Furthermore, the estimated margins for the different agencies and services were adjusted to approximate the farm-to-retail price spreads as calculated by the Bureau of Agricultural Economics.

Margins for the different agencies were broken down to show the relative importance of the cost items included. Grouping of those items varied considerably from one type of agency to another and some liberties were taken in estimating and combining the cost items. Results show that, in recent years, wages and salaries paid by manufacturers and distributors accounted on the average for about 48 percent of the consumer's dollar and for considerably more than half of the operators' gross margins. Advertising accounted for about 3 percent and other costs to the operators accounted, on the average, for about 25 percent of the consumers' dollar for cotton and about 20 percent for wool. Profits to marketing agencies, after Federal taxes, ranged from less than 6 percent of the consumer's dollar in 1939 to about 14.5 percent in 1947 and averaged about 11.5 percent in 1950.

Marketing margins for raw cotton, including ginning and baling, have increased markedly in recent years, but the increases have been relatively much less than the advances in prices of cotton. Charges for ginning and baling increased from an average of about 0.8 cent a pound of lint in 1939 to 2 cents in 1950, but the proportion of the average cost of raw cotton to mills accounted for by these charges decreased from about 7 percent in 1939 to 5 percent in 1950. Estimated margins for merchandising cotton increased from about 2.3 cents a pound in 1939 to 3.7 cents in 1950, but the proportion of the costs of raw cotton to mills accounted for by these margins decreased from about 20 percent in 1939 to less than 10 percent in 1950.

Marketing margins for wool in 1946 averaged 5.69 cents a pound, or about 12 percent of the Boston price, for grease wool sold in original bags; 6.84 cents a pound, or 16 percent of the Boston price, for graded wool bought in the grease; and 27.08 cents a pound, or 25 percent of the Boston price, for scoured wool. With the advances in prices of wool, these margins have increased considerably in recent years. In 1950 they averaged about 8 cents a pound, or about 13 percent of the Boston price.

Results show that returns to growers for farm production of the fibers averaged, during the 4 years, about 11 percent for cotton and 14 percent for wool of the consumer's dollar paid for the finished goods. These proportions usually vary directly with changes in farm prices of the fibers. The proportions accounted for by margins for merchandising the raw fibers, including ginning and baling for cotton but not including the scouring of wool, averaged about 2.2 percent for cotton and 2.4 percent for wool. These proportions decreased somewhat with advances in farm prices of the fibers. The proportion of the consumer's dollar accounted for by the combined margins for spinning yarns, weaving cloth, and dyeing and finishing the cloth averaged about 18 percent for cotton and 13 percent for wool, and these proportions have decreased in recent years. Proportions for manufacturing apparel and household goods averaged 29 percent for cotton and 34 percent for wool. For wholesaling and retailing they averaged about 40 percent for cotton and 37 percent for wool.

Gross margins for manufacturing cotton yarn have increased in recent years with advances in wage rates and increases in other costs, but the proportion of the wholesale value of the yarn accounted for by these margins decreased from about 46 percent in 1939 to 44.5 percent in 1947 and further decreases to 1950 are indicated. In 1947, wages and salaries accounted for more than half of the yarn-manufacturers' gross margins, and the proportions have increased in more recent years with further advances in wage rates.

Margins for manufacturing cotton fabrics have also increased markedly in recent years with advances in wages and other items of costs, but the proportion of the wholesale value of the products accounted for by the manufacturers' gross margins decreased from about 54 percent in 1939 to 50 percent in 1947. Further decreases to 1950 are indicated. Average hourly wage rates in the cotton-textile industry increased from about 39 cents in 1939 to \$1.28 early in 1951. The proportion of the manufacturers' gross margins accounted for by wages and salaries increased from about 50 percent in 1947 to 60 percent in 1950. Net profits of cotton cloth mills increased from 3 percent of net sales in 1945 to almost 10 percent in 1947 and averaged about 5 percent in 1950.

Wool manufacturers' gross margins for scouring the wool, manufacturing yarns and fabrics, and finishing the wool textiles, in 1947, averaged about 47 percent of the value of the products for all manufacturers combined and ranged from 38 percent for scouring and combing plants to about 83 percent for finishing plants. In 1949 and 1950 these margins apparently accounted,

on the average, for smaller proportions of the value of the products than in 1939 and 1947. The proportions of the manufacturers' gross margins accounted for by wages and salaries decreased from about 57 percent in 1939 to 50 percent in 1947. Further decreases to 1950 are indicated.

Rayon and silk manufacturers' margins, in recent years, have increased more than the value of the materials used. The proportion of the value of the products accounted for by gross margins of manufacturers increased from about 39 percent in 1939 to 52 percent in 1947 and the proportions in 1949 and 1950 were somewhat less than in 1947 but were larger than in 1939. Salaries and wages, the largest item of cost, averaged about 23 percent of the value of the products in 1939 and 1947, and census reports indicate that these proportions in 1949 and 1950 were about the same as in 1947.

Dyers' and finishers' gross margins, from 1942 to 1944, for cotton fabrics averaged 6.27 cents a yard, or 20 percent of the selling price of the fabrics, for bleaching and finishing; 8.14 cents a yard, or 35 percent of the selling price, for dyeing and finishing; and 8.06 cents a yard, or 43 percent of the value of the finished fabrics, for printing and finishing. Similar data for rayon fabrics show that gross margins averaged 15.28 cents a yard, or 37 percent of the value of the finished fabrics, for dyeing and finishing, and 18.74 cents a yard, or 51 percent of the value of the finished fabrics, for printing and finishing. Median net profits for converters of cotton fabrics increased from about 2 percent of net sales in 1939 to 4 percent in 1946. In 1950 they averaged 2.4 percent.

Gross margins for manufacturing knit-goods averaged about 55 percent of the wholesale value of the finished products in 1947, compared with about 53 percent in 1939. Corresponding proportions in 1949 and 1950 were somewhat less than in 1947 and about the same as in 1939. Wages and salaries accounted for about 28 percent of the value of the products and 51 percent of the gross margins in 1947. In 1939 they accounted for 34 percent of the value of the products and 65 percent of the gross margins. The proportion of the value of the products for hosiery manufacturers that was accounted for by wages and salaries in 1950 averaged about the same as in 1947 and substantially less than in 1939. Median profits of hosiery manufacturers increased from 2.5 percent of net sales in 1939 to 6.6 percent in 1948 and averaged 6.5 percent in 1950.

Gross margins for manufacturing fabricated products in 1947 averaged about 55 percent of the wholesale value of men's and boys' clothing, furnishings, and allied garments; 58 percent for women's, misses', and children's wear; and 38 percent for miscellaneous textile products, including house furnishings, handkerchiefs, work gloves, and textile bags, among others. These proportions averaged somewhat greater than in 1939 and also greater than in 1950. Wages and salaries apparently accounted, on the average, for about half of the manufacturers' gross margins in 1950, slightly less than half in 1947, and somewhat more than

half in 1939. Median profits to manufacturers of apparel and household textiles increased from about 1 percent of net sales in 1939 to 5 percent in 1946, decreased to 2 percent in 1949, and averaged 3 percent in 1950.

Gross margins for wholesale dry-goods houses increased from an average of 16 percent of net sales in 1939 to almost 19 percent in 1942, decreased to about 15 percent in 1949, and averaged 17 percent in 1950. Census reports for 1948 indicate that operating expenses of wholesalers of finished textile goods averaged 11.6 percent of net sales for merchant wholesalers, 5.8 percent for manufacturers' sales branches, 5.6 percent for manufacturers' sales offices, and 3.1 percent for agents and brokers. Per dollar of sale these expenses usually average less for establishments with large than for those with small volumes of sales. They also vary considerably with the kind of product sold. Profits of wholesale dry-goods houses increased from about 2 percent of net sales in 1939 to 7 percent in 1943 and averaged almost 4 percent in 1950.

Retailers' gross margins, as indicated by data for department stores, increased from about 33 percent of net sales in 1932 to about 38 percent during World War II, decreased to 35 percent in 1949, and averaged more than 36 percent in 1950. Total operating expenses decreased from almost 40 percent of net sales in 1932 to about 28 percent in 1945, then increased to more than 32 percent in 1950. Pay-roll expense, the largest item of cost, decreased from 18.7 percent of net sales, or about 56 percent of the gross margins, in 1932 to 15.4 percent of net sales, or 41 percent of gross margins, in 1945. In 1950, it was 17.6 percent of net sales, or 48 percent of the gross margins. Operating profits increased from less than 2 percent of net sales in 1939 to almost 10 percent in 1945. In 1950, they averaged 4.4 percent.

Improvements in the manufacture of textile products may result from using the qualities of raw materials relatively best adapted, physically and economically, to production of specified products and by increasing the efficiency of manufacturing operations. Better adjustments in qualities of cotton and wool used, for example, would need to be based on rather detailed analysis of mill operations, under more or less controlled conditions, to show the differences in value for mill purposes of cotton and wool of different qualities but physically usable in the production of specified products. Differences in value for mill purposes are made up of a combination of differences in processing costs and in quality of the products as a result of differences in quality of the cotton and wool used. Data showing such differences in value for mill purposes, along with data showing differences in costs of the raw cotton and wool as a result of differences in quality would need to be combined to show the quality of cotton and wool relatively best adapted to the production of specified products.

Progress has been made in developing some of the information needed in adjusting quality to mill requirements. But, for best results, these adjustments would need to be based on more nearly

complete information designed to show more specifically the influences of the differences in quality of cotton and wool, for example, on their value for use in the manufacture of specified products, on costs to mills, on costs of production on the farm, and on prices to farm producers. If reasonably complete and integrated, such information, would supply a basis for arriving at approximations to the best adjustments in the quality of cotton and wool to mill requirements. But developments in technology, in farm production, in marketing, and in other factors may result in considerable changes in qualities of cotton and wool that are relatively best adapted to the production of specified products.

Possibilities of making substantial improvements in manufacturing operations are indicated by the results of research relating to the carded-cotton-yarn industry. This research was designed to show how manufacturers of carded-cotton yarn could increase their efficiency and reduce their costs. Detailed cost data for a representative sample of manufacturers were assembled and analysed to show the influences of the various factors on efficiency and costs at each major stage or process in the manufacture of specified kinds of yarn under actual operating conditions. Detailed specifications, based on cost engineering and other information, were prepared for model low-cost establishments for manufacturing typical kinds of carded-cotton yarn, showing the more desirable buildings, floor plans, machinery and equipment, labor requirements, draft programs, and production data, along with cost data for the different processes and operations. Conclusions regarding the possibilities of, and the most feasible means for, increasing the efficiency and reducing costs were based on the results of the analysis of the data for the representative sample of establishments, on the results indicated for the model low-cost establishments, and on extensive cost-engineering knowledge of, and experiences with, the industry.

Results indicate possibilities of making substantial improvements, particularly in costs of labor. Possible reductions in manufacturing costs for individual establishments range up to more than a third of the total. Some of the more promising means of improvement include increased use of new and modern machinery, especially opening and picking equipment, long-draft fly frames, and long-draft larger-package spinning machines; some rearrangement of machinery in most of the buildings now in use, installation of evaporative cooling systems, including more modern humidifying systems, and better lighting equipment; increased machine assignment and an equalization of reasonable work loads as determined by competent specialists; and adjustments in size of mills and in number and counts spun. In some instances, needed adjustments may require considerable time (79).

Similar information is needed for each important segment of the textile-manufacturing industry as a basis for indicating the more effective means by which and the extent to which it would be feasible to increase the efficiency and to reduce the costs of the manufacturing operations. Reports indicate that results of sim-

ilar studies of other segments of the textile industry would be likely to present an even more startling picture than those presented for manufacturers of carded cotton yarn. This situation apparently indicates that economic applications are lagging far behind technological developments in the textile-manufacturing industry, with the result that manufacturing costs are substantially higher than would be the case if the economic benefits of technological developments were fully utilized.

The fact that wages and salaries account for more than half of the gross margins for manufacturing and distributing textile products emphasizes the importance of utilizing improved equipment, techniques, and methods as a means of reducing unit labor costs. Means of increasing the efficiency and of reducing the costs of labor include development of labor-relations programs that will enlist the cooperation of both labor and management in formulating and carrying out plans to modernize operating units for efficient operation. One purpose of such a plan might be to improve working conditions so as to attract and hold competent employees. Modernization of plants might well be supplemented by in-service training programs for improving the skill of employees. Utilization of employees to their full potentialities, to the mutual benefit of employees and management, may be the most effective means of reducing the costs of manufacturing and distributing textile products.

Combining two or more of the successive links in the chain of manufacturing and distributing processes for textile products may be an important means of achieving economies and a closer linkage between production planning and ultimate consumer requirements. Developments during World War II were in some respects favorable to the extension of unified control. The high rate of integration in the textile industry during the middle and late 1940's apparently indicate a continuing and perhaps growing interest in the possibilities of further combinations. But additional information relating to the economic possibilities of and limitations to both horizontal and vertical integration is needed as a basis for accurate appraisals.

Means of reducing costs of distributors of textile products include methods of increasing the general efficiency of existing agencies, concentration of services in the hands of agencies or combinations of agencies that can render them most efficiently, and reductions in "unnecessary" services. Improvements in general efficiency of the agencies involve problems of organization and operation, selection and management of personnel, location of places of business, number and kinds of commodities handled, volume of operation, and purchase and sales policy, among others. Detailed information with regard to the influences of each important factor on efficiency and costs is needed to indicate the extent to which and the most effective means by which it would be feasible to bring about improvements. Research of the type indicated for carded-cotton yarn, with appropriate modifications, should supply the information needed (79).

Average costs of wholesaling textile products may be reduced

by increasing to more nearly optimum the volumes handled by the smaller operators and by concentrating a larger proportion of the services in the hands of the larger and more efficient establishments. In 1948 expenses of wholesale merchants for handling piece goods ranged from less than 7 percent of net sales for operators with annual sales of \$5,000,000 or more to more than 15 percent for those with annual sales of less than \$100,000. Corresponding expenses for handling men's and boys' clothing and furnishings averaged 13 percent of net sales for establishments with annual sales of \$1,000,000 or more to almost 16 percent for those with annual sales of \$200,000 to \$500,000. Although factors other than differences in size may also be involved, it would appear reasonable to assume that at least a part of these differences in operating expenses may be attributed to differences in efficiency that arise from differences in volume of sales.

Retailers' margins may be reduced by simplifying the selling process so as to permit and encourage self-selection and self-service by customers. This simplification may be facilitated by open display of merchandise, arranged on the basis of consumers' primary interests, and by arrangements for completing the transaction by making payment at a convenient desk set up for that purpose. Such simplification makes possible reductions in retail margins mainly by reducing pay-roll costs, which average more than half of the total operating expenses of retailers. Accurate labeling to show the quality and size of the products on the basis of adequate standards would facilitate self-service methods. These and other economies in retailing would make possible substantial reductions in costs of distributing textile products, to the advantage of farm producers and of consumers.

The relative importance, from the viewpoint of costs, of increasing efficiency and of reducing the margins for manufacturing and distributing textile products may be indicated by data showing that a reduction of 10 percent, for example, in these combined margins, during 1939, 1947, 1949, and 1950, would have amounted to about 8.5 percent of the costs of the finished products to ultimate consumers, to about two-thirds of the gross returns to farmers for the cotton and wool used, and to more than three times the total costs of marketing the raw fibers, including ginning and baling cotton but excluding the scouring of wool. Such a reduction in manufacturing textiles, including the fabrication of apparel and household textiles, would have amounted to about 4.7 percent of the costs of the finished products to consumers, to more than a third of the gross returns to farmers for the cotton and wool used, and to about twice the total costs of marketing the raw fibers. A reduction of 10 percent in costs of retailing, during this period, would have amounted to more than total costs of marketing the raw fibers used and to more than a fourth of the gross returns to farmers for the cotton and wool used.

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