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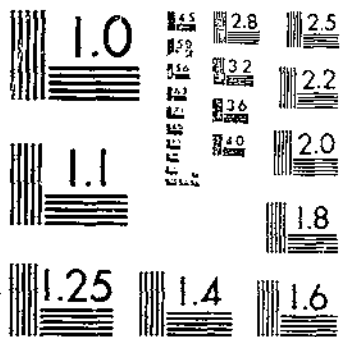
UPDATA

CHANGES IN AMERICAN TEXTILE INDUSTRY: COMPETITION-STRUCTURE-FACILITIES

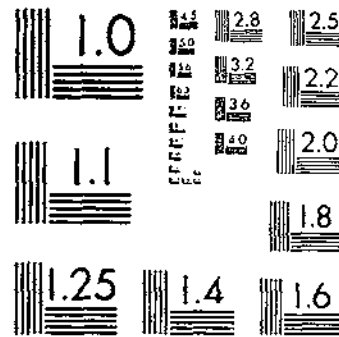
HOWELL, L. D.

1 OF 4

# START



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

**Changes in**

**American  
Textile  
Industry**

- *Competition*
- *Structure*
- *Facilities*
- *Costs*

By L. D. Howell  
Agricultural Economist

R 630 153-1 no. 1210-1223

Marketing Research Division  
Agricultural Marketing Service

UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D.C.

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## PREFACE

This report, prepared by the Agricultural Marketing Service, U.S. Department of Agriculture, extends and brings up to date the information in Technical Bulletin 891, "Marketing and Manufacturing Margins for Textiles," published in 1945 and now out of print, and in Technical Bulletin 1062, "Marketing and Manufacturing Services and Margins for Textiles," published in 1952.

The data were compiled mainly from secondary sources, including governmental and private reports. Data made available by the Bureau of the Census, the Bureau of Labor Statistics, Federal Trade Commission, Farm Credit Administration, U.S. Tariff Commission, Wholesale Dry Goods Institute, Inc., National Retail Dry Goods Association, Dun & Bradstreet, Inc., and National Cotton Council of America were especially useful in the preparation of this report.

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## SUMMARY AND CONCLUSIONS

Cotton and wool produced in the United States are confronted with greatly increased competition from other fibers. Among the factors that adversely affect market outlets for these products are increased supplies of foreign-grown cotton and wool and of man-made fibers, improvements in the quality or suitability of these fibers, and increased availability of the competing products at attractive prices.

**Prospective demands for textiles** indicate the possibility of maintaining or expanding consumption of our cotton and wool, if all potential market outlets are fully exploited. To exploit these outlets fully would require that adequate and dependable supplies of suitable qualities of cotton and wool and their products be made readily available to users or consumers at competitive prices. To meet these requirements, improvements are needed in the adequacy and efficiency of the services involved in producing and marketing cotton and wool and in manufacturing and distributing the products.

**Data relating to marketing margins for textiles** supply a basis for evaluating 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 fabrics, fabricating apparel and household textiles, and distributing the finished products to ultimate consumers. Combined margins for these services for cotton products decreased from about 91 percent of the consumer's dollar in 1938 to about 84 percent in 1951, and amounted to about 85 percent in 1958. Similar margins for wool products decreased from about 88 percent in 1939 to 86 percent in 1957.

**The size of these margins emphasizes** the importance of information to show the distribution of the consumer's dollar among important services and cost items. Estimates, based on official data and other information, were made to show average distribution of the consumer's dollar paid for textile products in 1939, 1947, 1954, and 1957. Data available for this purpose are not complete, and some liberties were taken in making these estimates. Furthermore, the combined margins for the different services were adjusted to approximate the farm-to-retail price spread as calculated by the Agricultural Marketing Service.

**The farmer's share of the consumer's dollar** paid for apparel and household textiles made of cotton increased in recent years, with advances in prices, from about 9 percent in 1939 to 15 percent in 1954 and it amounted to 14 percent in 1957. The farmer's share for wool increased from 12 percent in 1939 to 14 percent in 1957. Gross margins for merchandising the raw fibers, including ginning and baling for cotton but not including the scouring of wool, increased in recent years, and averaged about 3 percent of the consumer's dol-

lar in 1957. Combined gross margins for spinning yarns, weaving fabrics, and dyeing and finishing cloth decreased in recent years, and in 1957 averaged about 12 percent for cotton and 14 percent for wool. Similar proportions for fabricators of clothing and household textiles increased in recent years, and averaged about 30 percent in 1957. Margins for wholesale and retail distribution increased since 1947, and in 1957 averaged about 41 percent of the consumer's dollar.

**Marketing margins for raw cotton** increased from an average of about 2.6 cents a pound of lint in 1939 to 6.5 cents in 1957. Charges for ginning and baling increased from about 0.8 cent a pound of lint in 1939 to 2.6 cents in 1957. Charges for other merchandising services increased from 1.8 cents a pound in 1939 to 3.8 cents in 1957. The proportion of the cost of cotton to mills accounted for by these margins decreased from about 24 percent in 1939 to 12 percent in 1947, then increased to 19 percent in 1957.

**Means of improving the marketing of cotton** include (1) more general use of suitable conditioning, cleaning, and ginning equipment, well organized and operated; (2) utilization of this equipment to nearer full capacity for a longer time per year; (3) more use of improved automatic samplers and higher density presses at gins; (4) increased use of improved facilities and equipment for handling cotton at compresses and warehouses; (5) improved bagging and handling practices for bales to reduce contamination of lint; and (6) development of more adequate and dependable classification and market information services upon the basis of which the sale and purchase of cotton on description can be expanded.

**Marketing margins for wool** in 1946 averaged 5.7 cents a pound, or about 12 percent of the Boston price, for grease wool sold in original bags; 6.8 cents a pound, or 16 percent of the Boston price, for graded wool bought in the grease; and 27.1 cents a pound, or 25 percent of the Boston price, for scoured wool. These margins increased with advances in prices and costs, and in 1956 and 1957 they averaged about two-thirds greater than 10 years earlier.

**Means of improving the marketing of wool** include: (1) More and improved preparation of wool for marketing and manufacture at or near points of origin; (2) increased use of improved facilities and equipment for handling, preparing, and storing wool at warehouses; (3) improved packaging of wool, including compressing into suitable bales, to facilitate handling, transportation, and storage; and (4) development of more adequate and dependable classification and market information services upon the basis of which the sale and purchase of wool on description can be expanded.

**An adequate classification and market information service** would require: (1) That differences in all important quality elements of wool be ascertained and evaluated; (2) that the sample used be truly representative of the quality or qualities of wool included in the lot and that it be correctly identified with the lot from which it was taken; (3) that the evaluations be in accordance with uniform standards upon the basis of which differences in all important quality elements of wool can be described for commercial purposes with reasonable accuracy; (4) that the evaluations be made by competent and reliable classifiers under conditions conducive to accurate evaluation; and (5) that facilities be provided for assembling the samples, recording the evaluations on convenient forms, and making this information available in time for its use in selling the wool.

**Mergers and acquisitions in the textile industry** in recent years have changed the organization and management of many operating units. These changes were associated with some decrease in average size of textile manufacturing establishments as measured by number of employees. Census data for 1954, issued in 1957 and 1958, show that 38 percent of the mills processing cotton, rayon, and related fibers, with less than 11 percent of the looms, did weaving only. Half of the mills, with 74 percent of the looms and 84 percent of the spindles, had spinning and weaving machinery or throwing, spinning, and weaving machinery. Only about 12 percent of the mills had weaving and finishing machinery or spinning, weaving, and finishing machinery. In wool manufacture, about 75 percent of the mills, with more than 75 percent of the looms, had both spinning and weaving equipment.

**Gross margins of manufacturers of yarns and fabrics**, as proportions of the wholesale value of the products, decreased on the average from about 49 percent in 1947 to 44 percent in 1954 and apparently did not change much in the later 1950's. They varied considerably from one type of product to another. With advances in wage rates and other developments, proportions of these margins accounted for by costs of labor increased markedly. Average value added by manufacture, per dollar of wages, decreased despite substantial improvements in plant and equipment. Margins of manufacturers of knit goods were down slightly, and value added per dollar of wages increased.

**Improvements in the manufacture of textile yarns and fabrics** may result from using the qualities of raw materials relatively best adapted, physically and economically, to the production of specified products, and from modernizing the equipment and manufacturing operations. Better adjustments in qualities of cotton and wool used, for example, could be based on detailed analysis of mill operations, under controlled conditions, to show differences in value for mill purposes of cotton and wool of different qualities but physically usable in the production of the specified products. Differences in value for mill purposes are made up of a combination of differences in processing costs and in quality or value of the products as a result of differences in quality of the cotton or wool used. Data showing such differences in value for mill purposes, along with data showing differences in cost of the cotton or wool as a result of differences in quality, would need to be combined to show the quality of cotton or wool relatively best adapted to the production of specified products.

**A basic requirement for determining the qualities of cotton and wool** relatively best adapted to the production of specified products is that differences in all important quality elements of cotton and wool be ascertained and evaluated. Techniques would need to be developed for accurately measuring differences in these quality elements, and in the quality or value of the products, and for relating differences in these quality elements of cotton and wool to differences in processing performance and in quality or value of the products. Considerable progress has been made in developing techniques for measuring differences in some properties of cotton and wool fibers, but apparently differences in other important quality elements need to be defined and evaluated.

**Adjustments in quality of cotton and wool to mill requirements** would need to be based on more complete information than is now available to show the influence of differences in the various quality elements of the fibers on their value for use in the manufacture of specified products, on costs to mills, on costs of producing the cotton and wool, and on prices to farm producers. When 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.

**Improvements in manufacturing operations** have been made in recent years, but further modernization is greatly needed. Reports of editors of *Textile World* indicate that during the 10 years 1948-57 the textile industry spent \$1.4 billion for new plants and equipment, and productivity per man-hour rose 67 percent. Yet it was estimated that fully 65 percent of the textile manufacturing equipment was obsolete in 1957. Textile manufacturers who were replacing old facilities with new plant and equipment in 1958 indicated that 37 percent of them expected these replacement expenditures to pay for themselves in 1 or 2 years, 47 percent in 3 to 5 years, and 16 percent in 6 or more years (46).<sup>1</sup> A report on operating costs in the textile industry indicated that labor costs to mills can be cut as much as 80 percent in opening and picking, 10 to 33 percent in carding, 75 to 80 percent in drawing, 60 to 70 percent in roving, 40 to 60 percent in spinning, 65 to 70 percent in slashing, 30 percent in weaving, and 50 to 75 percent in manufacturing knit goods (46).

**Research in the carded cotton yarn industry** in 1950 also indicated possibilities for substantial improvements, particularly in labor costs. Possible reductions in costs in individual establishments ranged up to 60 percent in labor costs and up to 40 percent in total manufacturing costs. The more promising improvements included 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 then in use; installation of evaporative cooling systems, including more modern humidifying systems and better lighting equipment; increased machine assignment per man and an equalization of reasonable workloads as determined by competent specialists; and adjustments in size of mills and in number of counts spun (94).

**Similar information is needed for other important segments of the textile manufacturing industry** as a basis for indicating the means by which and the extent to which it would be feasible to increase efficiency and reduce costs of manufacturing operations. Reports indicate that results of similar 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 (75). This situation apparently indicates that economic applications are lagging far behind technological developments in the textile manufacturing industry, with the result that manufacturing

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<sup>1</sup> Italic figures in parentheses refer to items in Literature Cited, p. 331.

costs are substantially higher than they would be if technological developments were fully utilized.

**Integration in industries manufacturing apparel and related products** in recent years has resulted in some changes in organization and management of operating units. Degree of vertical integration of these industries may be indicated by census data showing that substantial proportions of the products of these industries are sold through manufacturers' sales offices and branches direct to retailers. Changes in degree of horizontal concentration on a company basis, from 1947 to 1954, showed increases in nine industries, decreases in nine industries, and no changes in two industries. Average value added by manufacture per dollar of payroll in 1954 varied directly with degree of integration in both the men's and boys' and the women's and children's clothing industries (113).

**Gross margins for manufacturers of apparel and other fabricated textile products** increased from about 50 percent of the value of the products in 1939 to 55 percent in 1954. These proportions varied considerably from one kind of product to another. Proportions of gross margins accounted for by costs of labor decreased from 40 percent in 1939 to 35 percent in 1947, then increased to 39 percent in 1954. Average value added by manufacture per dollar of wages increased from \$2.07 in 1939 to \$2.17 in 1947, with marked advances in retail prices, then decreased to \$1.84 in 1954, despite substantial improvements in machinery used.

**Improvements in the manufacture of apparel and related products** might well include more attractive styling and good construction of products, installation and use of modern facilities and equipment, adjustments in sizes of plants to facilitate effective use of the more efficient equipment and methods, and development of labor-relations programs that would enlist the cooperation of both labor and management in formulating and carrying out plans to modernize establishments for efficient operation. 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 an effective means of reducing 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 favorable in some respects to the extension of unified control. Integration in the textile industry in the 1950's apparently indicates a continuing and perhaps growing interest in possibilities of further combinations. But additional information relating to economic possibilities of and limitations to both horizontal and vertical integration is needed as a basis for adequate appraisals.

**Gross margins for wholesale dry-goods houses** increased in recent years, and averaged about 17 percent of net sales in 1957, compared with 16 percent in 1939 and a high of almost 19 percent in the early 1940's. Operating expenses of merchant wholesalers of apparel and related products increased in recent years and averaged about 13 percent of net sales in 1954. Expenses of manufacturers' sales



branches and offices also increased, and averaged 9 percent of net sales in 1954. These expenses per dollar of sales usually average less for establishments with large volumes of sales than for those with small volumes. Selling and administrative expenses account for most of the wholesalers' gross margins. Profits usually amount to less than 3 percent of net sales.

**Retailers' gross margins**, as indicated by data for department stores, averaged 36.2 percent of net sales in 1958, about the same as in other recent years, but somewhat above the low point of 35.2 percent reached in 1949. Payroll expense, the largest item of cost, averaged 18.0 percent of net sales in 1958, about the same as in other recent years, but somewhat higher than the low point of 15.4 percent reached in 1945. Operating profits, amounting to 2.4 percent of net sales in 1958, were only slightly lower than those in the immediately preceding 5 years and were lower than in any other year since 1952.

**Means of reducing costs of distributing 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 operations, and purchase and sales policies, among others. Detailed information on 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 (94).

**Wholesalers' gross margins 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 1954, operating expenses per dollar of net sales of apparel by merchant wholesalers averaged about half as great for operators with annual sales of over \$2 million as for those with annual sales of less than \$50,000. Although factors other than size may also be involved, it appears likely that at least a part of these differences in operating expenses is attributable 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 payment at a convenient desk set up for that purpose. Such simplification makes possible reductions in retail margins mainly by reducing payroll 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 in these combined margins, during 1939, 1947, 1954, and 1957, would have amounted to about 8.7 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 about three times the total costs of marketing the raw fibers, including the ginning and baling of cotton but excluding the scouring of wool. A reduction of 10 percent in costs of manufacturing textiles, including the fabrication of apparel and household textiles, would have amounted to about 4.3 percent of the costs of the finished products to consumers, to about a third of the gross returns to farmers for the cotton and wool used, and substantially more than 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.**

*Changes in*  
**AMERICAN TEXTILE INDUSTRY:**

*Competition—Structure—Facilities—Costs*

BY L. D. HOWELL, *Agricultural Economist, Agricultural Marketing  
Service*

## COMPETITION AND MARKET OUTLETS

Market outlets for American cotton and wool are affected by greatly increased competition from cotton and wool produced in other countries and from manmade fibers produced in the United States and abroad. Increased supplies of foreign grown cotton and wool and of manmade fibers, improvements in the quality or suitability of these fibers, and the availability of these competing products at attractive prices are among the factors that adversely affect market outlets for our cotton and wool.

Trends in the nature and extent of this competition may be indicated by data showing recent changes in supplies, prices, and consumption of these competing products. Data are presented here on changes in supplies, prices, and consumption of American cotton in relation to those for foreign grown cotton and for manmade fibers, and on similar changes for American wool in relation to those for foreign wool and for manmade fibers.

### American and Foreign Grown Cottons

Proportions of world production of cotton accounted for by American production have decreased in recent years (table 1). During the 5 years ended with 1932, cotton produced in the United States accounted for about 57 percent of the world total. Following inauguration of the agricultural adjustment program in this country in the early 1930's, production of cotton in the United States was reduced, but that in other countries continued to increase and, during the 5 years ended with 1939, cotton produced in the United States accounted for only about 43 percent of the world total. Production of cotton in the United States and in other countries decreased during World War II and then increased in the early postwar period. During the 5 years ended with 1952, cotton produced in the United States accounted for about 45 percent of the world total. In more recent years, production of cotton in this country decreased and that in other countries continued to increase with the result that cotton produced in the United States accounted for only about 38 percent of the world total during the 5 years ended with 1956 and for only about 26 percent in 1958.

Prices of American cotton in most recent years have been maintained above their normal free-market relationship with those of other growths, as a result of price support loans and adjustment programs in the United States. These differences in relative prices, shortages of dollar exchange, and other developments have resulted in shifts in foreign consumption from American to cotton of other growths (32). During the 3 years ended July 1953, when loan rates averaged substantially below domestic prices and exports of American cotton under financial aid programs totaled about 4.7 million bales, American cotton accounted for about 30 percent of

TABLE 1.—World production of specified fibers, by specified years, 1925-58

Year	Cotton <sup>1</sup>			Wool <sup>2</sup>			Manmade fibers			Total
	Ameri- can	All other	Total	Domes- tic <sup>3</sup>	Foreign	Total	Rayon and acetate	Other <sup>4</sup>	Total	
	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>
1925-----	7, 730	5, 049	12, 779	146	1, 864	2, 010	187	-----	187	14, 976
1927-----	6, 285	4, 965	11, 250	165	2, 005	2, 170	296	-----	296	13, 716
1929-----	7, 178	5, 514	12, 692	185	2, 065	2, 250	444	-----	444	15, 386
1931-----	8, 308	4, 590	12, 898	215	2, 015	2, 230	503	-----	503	15, 631
1933-----	6, 273	6, 383	12, 656	213	1, 957	2, 170	690	-----	690	15, 516
1935-----	5, 129	7, 479	12, 608	209	1, 951	2, 160	1, 079	-----	1, 079	15, 847
1937-----	9, 153	8, 763	17, 916	206	2, 074	2, 280	1, 839	-----	1, 839	22, 035
1939-----	5, 631	7, 604	13, 235	208	2, 252	2, 460	2, 243	-----	2, 243	17, 938
1941-----	5, 222	7, 164	12, 386	220	2, 320	2, 540	2, 817	-----	2, 817	17, 755
1943-----	5, 462	6, 427	11, 889	216	2, 264	2, 480	2, 588	39	2, 627	16, 996
1945-----	4, 322	5, 210	9, 532	188	2, 092	2, 280	1, 325	50	1, 375	13, 187
1946-----	4, 186	5, 545	9, 731	170	1, 918	2, 088	1, 729	56	1, 785	13, 604
1947-----	5, 758	5, 736	11, 494	153	1, 947	2, 100	2, 090	56	2, 146	15, 740
1948-----	7, 139	6, 549	13, 688	137	2, 026	2, 163	2, 539	83	2, 622	18, 473
1949-----	7, 778	7, 505	15, 283	120	2, 103	2, 223	2, 743	112	2, 855	20, 361
1950-----	4, 795	9, 321	14, 116	120	2, 210	2, 330	3, 548	176	3, 714	20, 160
1951-----	7, 319	10, 516	17, 835	120	2, 236	2, 356	4, 002	262	4, 264	24, 455
1952-----	7, 375	11, 042	18, 417	128	2, 423	2, 551	3, 525	327	3, 852	24, 820
1953-----	7, 931	11, 281	19, 212	134	2, 446	2, 580	4, 127	400	4, 527	26, 319
1954-----	6, 555	12, 333	18, 888	136	2, 489	2, 625	4, 476	487	4, 965	26, 478
1955-----	7, 132	13, 002	20, 134	134	2, 646	2, 780	5, 020	660	5, 680	28, 594
1956-----	6, 306	13, 050	19, 356	135	2, 798	2, 933	5, 249	776	6, 025	28, 314
1957-----	5, 296	13, 575	18, 871	129	2, 747	2, 864	5, 450	1, 013	6, 514	28, 261
1958-----	5, 500	15, 300	20, 800	129	2, 863	2, 992	4, 994	1, 036	6, 030	29, 822

See footnotes at end of table.

TABLE 1.—World production of specified fibers, by specified years, 1925-58—Continued

Year	Cotton <sup>1</sup>			Wool <sup>2</sup>			Manmade fibers			Total
	Ameri- can	All other	Total	Domes- tic <sup>3</sup>	Foreign	Total	Rayon and acetate	Other <sup>4</sup>	Total	
	<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>
1925.....	51.6	33.7	85.3	1.0	12.4	13.4	1.3	-----	1.3	100.0
1927.....	45.8	36.2	82.0	1.2	14.6	15.8	2.2	-----	2.2	100.0
1929.....	46.7	35.8	82.5	1.2	13.4	14.6	2.9	-----	2.9	100.0
1931.....	53.1	29.4	82.5	1.4	12.9	14.3	3.2	-----	3.2	100.0
1933.....	40.4	41.2	81.6	1.4	12.6	14.0	4.4	-----	4.4	100.0
1935.....	32.4	47.2	79.6	1.3	12.3	13.6	6.8	-----	6.8	100.0
1937.....	41.5	39.8	81.3	.9	9.4	10.3	8.4	-----	8.4	100.0
1939.....	31.4	42.4	73.8	1.2	12.5	13.7	12.5	-----	12.5	100.0
1941.....	29.4	40.4	69.8	1.2	13.1	14.3	15.8	0.1	15.9	100.0
1943.....	32.1	37.8	69.9	1.3	13.3	14.6	15.2	.3	15.5	100.0
1945.....	32.8	39.5	72.3	1.4	15.9	17.3	10.0	.4	10.4	100.0
1946.....	30.8	40.7	71.5	1.3	14.1	15.4	12.7	.4	13.1	100.0
1947.....	36.6	36.4	73.0	1.0	12.4	13.4	13.3	.3	13.6	100.0
1948.....	38.7	35.4	74.1	.7	10.0	11.7	13.7	.5	14.2	100.0
1949.....	38.2	36.9	75.1	.6	10.3	10.9	13.5	.5	14.0	100.0
1950.....	23.8	46.2	70.0	.6	11.0	11.6	17.5	.9	18.4	100.0
1951.....	29.9	43.0	72.9	.5	9.1	9.6	16.4	1.1	17.5	100.0
1952.....	29.7	44.5	74.2	.5	9.8	10.3	14.2	1.3	15.5	100.0
1953.....	30.1	42.9	73.0	.5	9.3	9.8	15.7	1.5	17.2	100.0
1954.....	24.7	46.6	71.3	.5	9.4	9.9	16.9	1.9	18.8	100.0
1955.....	24.9	45.5	70.4	.5	9.2	9.7	17.6	2.3	19.9	100.0
1956.....	22.3	46.1	68.4	.5	9.9	10.4	18.5	2.7	21.2	100.0
1957.....	18.8	48.0	66.8	.5	9.7	10.2	19.3	3.7	23.0	100.0
1958.....	18.5	51.3	69.8	.4	9.6	10.0	16.7	3.5	20.2	100.0

<sup>1</sup> Commercial cotton, excludes the quantities produced for household use. Data up to 1944 from reports of New York Cotton Exchange. Data since 1944 are estimates of the International Cotton Advisory Committee.

<sup>2</sup> From reports and publications of Commonwealth Committee.

<sup>3</sup> Reported production converted to scoured equivalent at estimated yield of 44 percent for shorn and 75 percent for pulled wool.

<sup>4</sup> Noncellulosic fibers, includes fiber glass for United States only.

total world mill consumption of all growths, and for about 20 percent of mill consumption outside the United States. During the 3 years ended July 1956, when prices of American cotton were maintained above their normal free-market relationship to those of other growths as a result of loans made available to producers, and when exports of American cotton under financial aid programs totaled about 4.8 million bales, American cotton accounted for about 25 percent of total world mill consumption of all growths, and for 12.5 percent of mill consumption outside the United States. During the 2 years ended July 1958, when American cotton was made available for export at competitive prices, American cotton accounted for about 34.5 percent of world consumption of all growths, and 18 percent of mill consumption outside the United States. Less than half of the increase in consumption of American cotton in foreign countries for this 2-year period may be accounted for by increased exports of American cotton under financial aid programs.

Data for earlier years show that during the 5 years ended July 1932, American cotton accounted for 56 percent of total world mill consumption of all growths, and for about 42 percent of mill consumption outside the United States. During the 5 years ended July 1939, after initiation of agricultural adjustment programs in the United States in the early 1930's, American cotton accounted for about 42 percent of total world mill consumption of all growths, and for about 25 percent of mill consumption in foreign countries.

Effectiveness of competitive prices for American cotton in maintaining or expanding foreign outlets for this cotton is emphasized also by changes in exports associated with changes in relative prices. During the 3 years ended July 1956, for example, when prices of American cotton were maintained at relatively high levels by loan and adjustment programs, stocks of American cotton in foreign countries were reduced by about 500,000 bales and annual exports of American averaged about 3.1 million bales, about half of which was exported under financial aid programs. During the 2 years ended July 1958, when American cotton was made available for export at competitive prices, annual exports averaged about 6.6 million bales, less than half of which was exported under financial aid programs, and stocks of American cotton in foreign countries increased by about a million bales.

Although stocks of American cotton have been reduced since 1956, they continue higher than those for all other growths combined, despite restrictions on production in the United States and rapid expansions in production in other countries. Following substantial reduction in stocks in the early postwar period, world carryover of American cotton increased from 3.6 million bales, in 1951, or about 30 percent of the total for all growths, to 15.3 million in 1956, or about 65 percent of the total for all growths. Following the high point reached in 1956, stocks of American cotton were reduced, and on August 1, 1958, they amounted to about 10.5 million bales, or about 48 percent of the world total for all growths.

### American Cotton and Manmade Fibers

The competitive position of American cotton is adversely affected by marked increases in supplies and improvements in quality or suitability of manmade fibers available at attractive prices. World

production of manmade fibers increased from about 2,146 million pounds, or about 19 percent of total world production of cotton in 1947, to 6,514 million pounds, or about 35 percent of total world production of cotton, in 1957, and then decreased to 6,030 million pounds, or about 29 percent of total world production of cotton, in 1958 (table 1). In the United States, production of manmade fibers increased from about 1,026 million pounds, or about 18 percent of the amount of cotton produced, in 1947, to 1,764 million pounds, or about a third of the amount of cotton produced, in 1957, and then decreased to 1,607 million pounds, or 29 percent of the amount of cotton produced, in 1958. Although no satisfactory measures of changes in quality of manmade fibers are available, it appears to be generally recognized that improvements in the quality or suitability of at least some of these fibers have been made.

A pound of manmade fibers is equivalent to more than a pound of cotton for use in comparable fabrics. Adjusting these fibers to cotton equivalents shows that total world production of manmade fibers increased from the equivalent of about 27 percent of world production of cotton in 1947 to about 47 percent in 1957. In the United States, production of manmade fibers increased from the equivalent of about 27 percent of the amount of cotton produced in 1947 to about 52 percent in 1957.

World consumption of both cotton and manmade fibers has increased in recent years, but consumption of manmade fibers increased from about 14 percent of that for cotton in 1938 to about 30 percent in 1957. Per capita consumption of these fibers varies widely from one continent to another. In most instances, per capita consumption of both cotton and manmade fibers has increased in recent years, but usually the increases for manmade fibers were proportionally much greater than those for cotton. Per capita consumption of manmade fibers in western Europe increased from about 33 percent of that for cotton in 1938 to about 54 percent in 1957. Corresponding proportions for other areas show increases from about 19 to 33 percent in eastern Europe and Russia, from about 11 to 41 percent in North America, from 6 to 29 percent in Central and South America, from 10 to 14 percent in Asia, and from 8 to 51 percent in Africa. The proportions in Oceania (islands in the southern Pacific not in Asia or America, including Malaysia, Australia, and Polynesia, among others) varied irregularly from year to year (table 2).

Prices of many, if not most, manmade fibers have been reduced in recent years, whereas domestic prices of American cotton have been maintained at relatively high levels as a result of loans and adjustment programs. During the 5 years ended July 1939, equivalent prices of rayon staple fibers averaged 118 percent higher than those of Middling  $1\frac{5}{16}$ -inch cotton, but during the 5 years ended July 1952 they averaged 12 percent lower; during the 5 years ended July 1957, they averaged 16 percent lower, and during the year ended July 1958, they averaged about 20 percent lower. Similar changes occurred in the relationship between prices of rayon staple fibers and prices of Strict Middling  $1\frac{1}{16}$ -inch cotton. Declines in prices of acetate, nylon, Dacron, Orlon, and other manmade fibers in recent years have been about as great as, or greater than, those of rayon.



TABLE 2.—Per capita consumption (net available for home use) of cotton, wool, rayon and acetate, specified areas, 1938 and 1952-57

Items and years	West- ern Europe	Eastern Europe and USSR	North Amer- ica	Central and South Amer- ica	Asia	Africa	Oce- ania <sup>1</sup>	World
<b>Cotton:</b>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
1938.....	8.8	6.8	20.7	6.4	4.2	2.4	8.4	6.4
1952.....	8.8	6.4	25.8	6.4	3.7	2.9	11.0	6.4
1953.....	8.4	8.4	26.0	6.0	3.7	3.1	5.3	6.6
1954.....	9.7	9.0	23.1	6.4	3.7	3.3	10.4	6.6
1955.....	9.5	9.0	24.7	7.1	3.7	3.1	10.4	6.6
1956.....	9.9	9.9	23.8	7.3	4.8	2.9	9.7	7.3
1957.....	10.8	10.6	21.8	7.3	4.8	3.1	8.8	7.5
<b>Wool:</b>								
1938.....	3.3	1.3	2.4	.9	.2	.2	5.7	1.0
1952.....	3.1	.9	3.3	.9	.2	.3	6.4	1.0
1953.....	3.5	1.1	3.5	.9	.2	.4	4.0	1.1
1954.....	3.3	1.5	2.4	.9	.2	.4	6.6	.9
1955.....	3.3	1.8	2.6	.9	.2	.2	6.4	.9
1956.....	3.5	1.8	2.9	.9	.2	.2	6.2	1.1
1957.....	3.7	1.8	2.4	.9	.2	.2	6.0	1.1
<b>Rayon and acetate:<sup>2</sup></b>								
1938.....	2.9	.2	2.2	.4	.4	.2	2.9	.9
1952.....	3.1	2.0	7.1	1.1	.4	.4	4.0	1.5
1953.....	3.7	2.2	7.1	1.3	.4	.7	2.2	1.5
1954.....	4.2	2.4	6.4	1.5	.4	.9	4.0	1.8
1955.....	4.4	2.9	8.2	1.3	.4	.9	3.3	1.8
1956.....	4.6	3.1	6.6	1.5	.7	1.1	3.1	2.0
1957.....	5.1	3.3	6.4	1.4	.6	1.4	3.4	2.0
<b>Total:</b>								
1938.....	15.0	8.3	25.3	7.7	4.8	2.8	17.0	8.3
1952.....	15.0	9.3	36.2	8.4	4.3	3.6	21.4	8.9
1953.....	15.6	11.7	36.6	8.2	4.3	4.2	11.5	9.2
1954.....	17.2	12.9	31.9	8.8	4.3	4.6	21.0	9.3
1955.....	17.2	13.7	35.5	9.3	4.3	4.2	20.1	9.3
1956.....	18.0	14.8	33.3	9.7	5.7	4.2	19.0	10.4
1957.....	19.6	15.7	30.6	9.6	5.6	4.7	18.2	10.6

<sup>1</sup> Islands of southern Pacific not in Asia or America.

<sup>2</sup> Data for other manmade fibers not included.

Adapted from reports of Food and Agriculture Organization of the United Nations.

These declines in prices of manmade fibers in relation to domestic prices of American cotton have been associated with increases in mill consumption of manmade fibers in relation to consumption of cotton in the United States (table 3). Average annual per capita consumption of manmade fibers increased from about 2.6 pounds, or about 10 percent of the amount of cotton consumed, during the 5 years ended with 1939, to 8.9 pounds, or about 30 percent of cotton consumption, during the 5 years ended with 1952, and to 10 pounds, or about 39 percent of cotton consumption, during the 5 years ended with 1957. Per capita consumption of manmade fibers in 1958 totaled 9.7 pounds, or about 44 percent of the amount of cotton consumed.

TABLE 3.—Mill consumption of specified fibers, United States, specified years, 1925-58

Years	Cotton	Wool <sup>1</sup>	Manmade fibers			Total
			Rayon and acetate	Other	Total	
	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds
1925	3,075	350	58		58	3,483
1927	3,590	354	100		100	4,044
1929	3,425	368	133		133	3,926
1931	2,655	311	159		159	3,125
1933	3,051	317	217		217	3,585
1935	2,755	418	259		259	3,432
1937	3,647	381	305		305	4,333
1939	3,629	397	45		459	4,485
1941	5,192	648		12	664	6,444
1943	5,271	636		35	691	6,598
1945	4,516	645	770	50	820	5,981
1946	4,809	738	876	53	929	6,476
1947	4,666	698	988	51	1,039	6,403
1948	4,464	693	1,150	72	1,222	6,379
1949	3,839	500	994	93	1,087	5,426
1950	4,683	635	1,352	141	1,493	6,811
1951	4,869	484	1,277	196	1,473	6,826
1952	4,471	466	1,216	249	1,465	6,402
1953	4,456	494	1,223	280	1,503	6,453
1954	4,127	384	1,155	329	1,484	5,995
1955	4,382	414	1,419	432	1,851	6,647
1956	4,363	441	1,201	483	1,684	6,488
1957	4,060	370	1,177	562	1,739	6,169
1958	3,863	336	1,108	578	1,686	5,885
Proportion of total						
	Percent	Percent	Percent	Percent	Percent	Percent
1925	88.3	10.0	1.7		1.7	100.0
1927	88.8	8.7	2.5		2.5	100.0
1929	87.2	9.4	3.4		3.4	100.0
1931	85.0	9.9	5.1		5.1	100.0
1933	85.1	8.8	6.1		6.1	100.0
1935	80.3	12.2	7.5		7.5	100.0
1937	84.2	8.8	7.0		7.0	100.0
1939	80.9	8.9	10.2		10.2	100.0
1941	80.6	10.0	9.2	0.2	9.4	100.0
1943	79.9	9.6	10.0	.5	10.5	100.0
1945	75.5	10.8	12.9	.8	13.7	100.0
1946	74.3	11.4	13.5	.8	14.3	100.0
1947	72.9	10.9	15.4	.8	16.2	100.0
1948	70.0	10.9	18.0	1.1	19.1	100.0
1949	70.8	9.2	18.3	1.7	20.1	100.0
1950	68.8	9.3	19.8	2.1	21.9	100.0
1951	71.3	7.1	18.7	2.9	21.6	100.0
1952	69.8	7.3	19.0	3.9	22.9	100.0
1953	69.0	7.7	19.0	4.3	23.3	100.0
1954	68.8	6.4	19.3	5.5	24.8	100.0
1955	66.0	6.2	21.3	6.5	27.8	100.0
1956	67.3	6.8	18.5	7.4	25.9	100.0
1957	65.8	6.0	19.1	9.1	28.2	100.0
1958	65.7	5.7	18.8	9.8	28.6	100.0

<sup>1</sup> Apparel and carpet wool on a scoured basis. Since 1920, data were from Wool Consumption reports of the Bureau of the Census.

The relation of changes in domestic mill consumption of cotton to changes in consumption of manmade fibers also is indicated by statistical analysis of data for the years 1920-40 and 1947-52 (43). The analysis shows that, after adjustments for the influence of other factors, a change of 1 percent in consumption of manmade fibers was associated on the average with a change of about 0.1 percent in consumption of cotton in the opposite direction. During the two periods, per capita consumption averaged 26 pounds of cotton and 3 pounds of manmade fibers. Taking these differences in amounts consumed into account, it appears that a change of 1 pound in consumption of manmade fibers was associated, on the average, with a change in the opposite direction of about 0.86 pound of cotton consumed.

Changes in proportions of manmade fibers to cotton consumed in the United States in the manufacture of specified end-use products vary considerably from one product to another (table 4). Consumption of manmade fibers in all end-use products combined increased from about 9 percent of that for cotton in 1937 to 42 percent in 1957. Cotton's competitive position apparently was relatively strongest in children's and infants' wear, but the percentage of the market regained by cotton since 1951 was relatively greatest in women's and misses' apparel. Gains made by manmade fibers were relatively greatest in industrial products and in home furnishings. This strengthened competitive position of manmade fibers may be accounted for mainly by increased supplies of these fibers, along with improvements in their quality or suitability, and their being made readily available at attractive prices.

### American and Foreign Wool

During the 1950's, production of wool in foreign countries continued to increase in relation to that in the United States. Production of domestic wool decreased from an annual average of about 207 million pounds, clean basis, in the 5 years ended with 1938, to 120 million pounds in the early 1950's, averaged about 135 million pounds in the 4 years ended with 1956, and amounted to 129 million pounds in 1958. Wool production in foreign countries increased from an average of about 1,863 million pounds, clean basis, in the 5 years ended with 1938, to about 2,992 million in 1958. The proportion of the world total accounted for by wool produced in the United States decreased from about 10 percent for the 5 years ended with 1938 to about 5 percent for the 5 years ended with 1956, and to about 4 percent in 1958 (table 1 p. 4).

Consumption of wool produced in the United States has decreased markedly also in relation to consumption of that produced in other countries. This decrease may be accounted for in part by price supports, as well as by decreases in domestic production. Prices of our domestic wool have been strengthened by tariffs imposed on imported apparel wool. From 1930 to 1948, an import duty of 34 cents a pound, clean basis, was maintained, but in July 1948, the rate was reduced to 25.5 cents. In addition, prior to the National Wool Act of 1954, which became effective in 1955, prices of domestic wool were supported by loan and purchase programs.

TABLE 4.—Fiber consumption in the manufacture of specified end-use products, United States, specified years, 1937-57

End use and fiber	Amount					
	1937	1949	1951	1953	1955	1957
<b>Apparel:</b>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>
Men's and boys':						
Cotton.....	808.5	848.1	884.2	993.1	1,019.0	976.3
Wool.....	209.5	180.6	183.5	195.5	182.2	179.1
Manmade.....	34.0	112.3	164.5	173.3	162.4	174.2
<b>Total.....</b>	<b>1,052.0</b>	<b>1,141.0</b>	<b>1,232.0</b>	<b>1,361.9</b>	<b>1,363.6</b>	<b>1,329.6</b>
Women's and misses':						
Cotton.....	269.8	323.4	322.8	414.4	462.7	470.3
Wool.....	90.4	149.2	123.7	136.2	138.0	136.7
Manmade.....	171.7	324.1	388.5	336.9	312.8	324.0
<b>Total.....</b>	<b>531.9</b>	<b>796.7</b>	<b>835.0</b>	<b>887.5</b>	<b>913.5</b>	<b>931.0</b>
Children's and infants':						
Cotton.....	178.0	192.4	223.8	258.0	269.6	282.2
Wool.....	19.0	31.0	28.3	30.8	28.6	28.3
Manmade.....	11.2	26.5	31.0	36.1	42.0	40.7
<b>Total.....</b>	<b>208.2</b>	<b>249.9</b>	<b>283.1</b>	<b>324.9</b>	<b>340.2</b>	<b>351.2</b>
<b>All apparel:</b>						
Cotton.....	1,256.3	1,363.9	1,430.8	1,665.5	1,751.3	1,728.8
Wool.....	318.9	360.8	335.5	362.5	348.8	341.1
Manmade.....	216.9	462.9	584.0	546.3	517.2	538.9
<b>Total.....</b>	<b>1,792.1</b>	<b>2,187.6</b>	<b>2,350.3</b>	<b>2,574.3</b>	<b>2,617.3</b>	<b>2,611.8</b>
<b>Home furnishings:</b>						
Cotton.....	816.7	760.8	880.2	972.2	1,004.9	980.3
Wool.....	162.4	219.8	142.8	183.7	168.0	159.9
Manmade.....	28.7	85.5	161.7	194.3	309.0	375.3
<b>Total.....</b>	<b>1,007.8</b>	<b>1,066.1</b>	<b>1,184.7</b>	<b>1,350.2</b>	<b>1,481.9</b>	<b>1,515.5</b>
<b>Other consumer-type products:</b>						
Cotton.....	322.1	393.1	376.1	431.9	465.6	451.9
Wool.....	24.7	78.2	65.2	64.0	63.0	66.1
Manmade.....	77.5	129.7	137.7	130.0	141.3	139.2
<b>Total.....</b>	<b>424.3</b>	<b>601.0</b>	<b>579.0</b>	<b>625.9</b>	<b>669.9</b>	<b>657.2</b>
<b>Industrial uses:</b>						
Cotton.....	1,255.3	911.3	1,074.5	746.9	757.2	688.3
Wool.....	50.3	70.0	66.0	46.7	37.6	33.2
Manmade.....	13.8	343.0	438.8	577.7	612.8	556.8
<b>Total.....</b>	<b>1,319.4</b>	<b>1,324.3</b>	<b>1,579.3</b>	<b>1,371.3</b>	<b>1,407.6</b>	<b>1,278.3</b>
<b>All end uses:</b>						
Cotton.....	3,650.4	3,429.1	3,761.6	3,816.5	3,979.0	3,849.3
Wool.....	556.3	728.8	609.5	656.9	617.4	603.3
Manmade.....	336.9	1,021.1	1,322.2	1,448.3	1,530.3	1,610.2
<b>Total.....</b>	<b>4,543.6</b>	<b>5,179.0</b>	<b>5,693.3</b>	<b>5,921.7</b>	<b>6,176.7</b>	<b>6,062.8</b>

TABLE 4.—Fiber consumption in the manufacture of specified end-use products, United States, specified years, 1937-57—Continued

End use and fiber	Amount					
	1937	1949	1951	1953	1955	1957
Apparel:						
Men's and boys':	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Cotton.....	76.9	74.3	71.8	72.9	74.7	73.4
Wool.....	19.9	15.8	14.9	14.4	13.4	13.5
Manmade.....	3.2	9.9	13.3	12.7	11.9	13.1
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Women's and misses':						
Cotton.....	50.7	40.6	38.7	46.7	50.7	50.5
Wool.....	17.0	18.7	14.8	15.3	15.1	14.7
Manmade.....	32.3	40.7	46.5	38.0	34.2	34.8
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Children's and infants':						
Cotton.....	85.5	77.0	79.0	79.4	79.2	80.4
Wool.....	9.1	12.4	10.0	9.5	8.4	8.0
Manmade.....	5.4	10.6	11.0	11.1	12.4	11.6
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
All apparel:						
Cotton.....	70.1	62.3	60.9	64.7	66.9	66.2
Wool.....	17.8	16.5	14.3	14.1	13.3	13.2
Manmade.....	12.1	21.2	24.8	21.2	19.8	20.6
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Home furnishings:						
Cotton.....	81.0	71.4	74.3	72.0	67.8	64.7
Wool.....	16.1	20.6	12.1	13.6	11.3	10.5
Manmade.....	2.9	8.0	13.6	14.4	20.9	24.8
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Other consumer-type products:						
Cotton.....	75.9	65.4	64.9	69.0	69.5	68.8
Wool.....	5.8	13.0	11.3	10.2	9.4	10.0
Manmade.....	18.3	21.6	23.8	20.8	21.1	21.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Industrial uses:						
Cotton.....	95.2	68.8	68.0	54.5	53.8	53.8
Wool.....	3.8	5.3	4.2	3.4	2.7	2.6
Manmade.....	1.0	25.9	27.8	42.1	43.5	43.6
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
All end uses:						
Cotton.....	80.4	66.2	66.1	64.4	64.4	63.5
Wool.....	12.2	14.1	10.7	11.1	10.0	10.0
Manmade.....	7.4	19.7	23.2	24.5	25.6	26.5
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Adapted from Textile Organon (50).

Annual consumption of wool produced in the United States decreased from an average of about 211 million pounds, clean basis, or about 10 percent of world consumption of all wool, during the 5 years ended with 1938, to an average of about 151 million pounds, or about 6 percent of the world total, during the 5 years ended with 1954. The incentive program under the provisions of the National Wool Act of 1954 began in 1955, and price support loans and purchase programs were discontinued so that our wool could compete freely with imported wools in domestic markets. During the 4 years ended with 1958, annual consumption of domestic wool averaged about 170 million pounds, or about 6 percent of the world total. Proportions of apparel wool consumed in the United States that were accounted for by domestic wool decreased from an average of about 83 percent during the 5 years ended with 1938 to 44 percent during the 5 years ended with 1954, then increased to an average of 66 percent during the 3 years ended with 1958. Nearly all wool produced in the United States is consumed in this country. The United States characteristically consumes much more wool than it produces.

### American Wool and Manmade Fibers

Marked increases in supplies and improvements in quality or suitability of manmade fibers adversely affect market outlets for wool as well as for cotton. World production of manmade fibers was about 37 percent less than world production of wool, clean basis, in the 5 years ended with 1938, and it increased to 69 percent more than world production of wool during the 5 years ended with 1954, and to more than twice as much as wool production during the 4 years ended with 1958. In the United States, production of manmade fibers was about one-third more than the amount of wool produced, clean basis, during the 5 years ended with 1938, and it increased to more than 11 times as much as wool production during the 5 years ended with 1954, and to more than 13 times as much during the 4 years ended with 1958.

Prices of manmade fibers have declined during the 1950's in relation to domestic prices of wool. Prices of rayon staple fibers, for example, averaged about 36 percent of prices of fine good French combing and staple wool during the 5 years ended with 1938, declined to 21 percent during the 5 years ended with 1957, and then increased to 26 percent in 1958. Prices of other manmade fibers, especially the newer noncellulosic ones, have declined in recent years as much as, or more than, prices of rayon.

Mill consumption of manmade fibers in recent years has increased markedly in relation to mill consumption of wool. In the United States, for example, mill consumption of manmade fibers increased from about 81 percent of that for wool during the 5 years ended with 1938 to about 363 percent for the 5 years ended with 1956 and to 500 percent in 1958. The greatest increases since 1950 have been in the newer synthetic fibers, which apparently are more directly competitive with wool than are rayon and acetate.

World per capita consumption of wool has shown no definite trend in recent years, whereas that for manmade fibers has increased markedly. World consumption of manmade fibers increased from about the same amount as that for wool in 1938 to about twice as

much in 1957 (table 2, p. 8). Per capita consumption of both wool and manmade fibers varies considerably from one continent to another. In most instances, no definite trends in recent years are indicated for wool, but per capita consumption of manmade fibers on most of the continents increased markedly. Consumption of manmade fibers in western Europe increased from 88 percent of that for wool in 1938 to 157 percent in 1957. Corresponding proportions for other areas show increases from 15 to 194 percent in eastern Europe and Russia, from 92 to 375 percent in North America, from 44 to 233 percent in Central and South America, from 200 to 650 percent in Asia, and from 100 to 800 percent in Africa. In Oceania the proportions varied irregularly from year to year (table 2, p. 8).

Changes in proportions of manmade fibers to wool consumed in the United States in the manufacture of specified end-use products vary considerably from one product to another (table 4, p. 11). For all end-use products combined, consumption of manmade fibers increased from about 61 percent of wool consumed in 1937 to 265 percent in 1957. The competitive position of wool was relatively weakest in industrial products and was strongest in men's, boys', women's, and misses' apparel, and in home furnishings.

### Prospects and Problems

It is apparent from these developments that cotton and wool produced in the United States are faced with greatly increased competition as a result of expansion in supplies and improvements in quality or suitability of foreign cotton and wool and of manmade fibers, and the availability of these products at attractive prices. With further expansions in production of competing products in prospect, inadequate market outlets for our cotton and wool at remunerative prices may continue to limit the cotton and wool industries in this country, unless prompt and effective actions are taken to maintain or expand these outlets. Given a reasonably prosperous peacetime economy and further increases in population, prospective demands for textiles indicate the possibility of maintaining or expanding consumption of cotton and wool, 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) efficient manufacture of a variety of suitable and attractive wool and cotton fabrics, appropriately finished and made available at attractive prices 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 of cotton and wool fabrics; (4) 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 made of cotton and wool are readily available to consumers at competitive prices.

Cotton and wool compete with manmade fibers and other products as raw materials, as yarns and fabrics, and as fabricated products. Effectiveness of this competition may be largely influenced by differences between the quality, suitability, and prices of cotton and wool and their products and the quality, suitability, and prices of competing products. Among important factors that may affect the quality, suitability, and cost of textile products at each stage of the marketing, manufacturing, and distribution procedure are the size and organization of the operating units, techniques and equipment used, and operating methods and practices, along with the kinds and qualities of materials used.

The importance of costs of marketing services may be indicated by data showing that gross margins for assembling and merchandising raw cotton and wool, manufacturing 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 may have an important bearing on returns to farm producers, on costs of finished products to ultimate consumers, and on market outlets.

The size of these margins and the seriousness of the threat of increased competition from manmade fibers 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. Data are presented in this bulletin to show changes in size and organization of the operating units, in machinery and equipment used, in operating methods and practices, and in charges or costs for the services rendered at each important stage involved in taking raw cotton and wool from farms and delivering the finished textile products to ultimate consumers. These data are designed to show the relative importance of these margins from the viewpoint of costs, to indicate some of the factors responsible for or associated with differences in costs, and to serve as a basis for improvements.

Information on marketing channels and the division of the consumer's dollar paid for cotton and wool products is presented as a background for the more detailed data relating to specific stages of the marketing procedure.

## MARKETING CHANNELS AND DIVISION OF CONSUMER'S DOLLAR

Marketing channels and the division of the consumer's dollar for cotton and cotton products, for wool and wool products, and for rayon, acetate, silk, and related products are described in this bulletin. The data for cotton and wool begin with movements from the farm and with prices to farmers, and those for rayon, acetate, silk, and related products begin mainly with the delivered fibers and prices paid for them by 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



Consumed in U. S.

## APPROXIMATE DISTRIBUTION OF A TYPICAL BALE OF COTTON, 1954

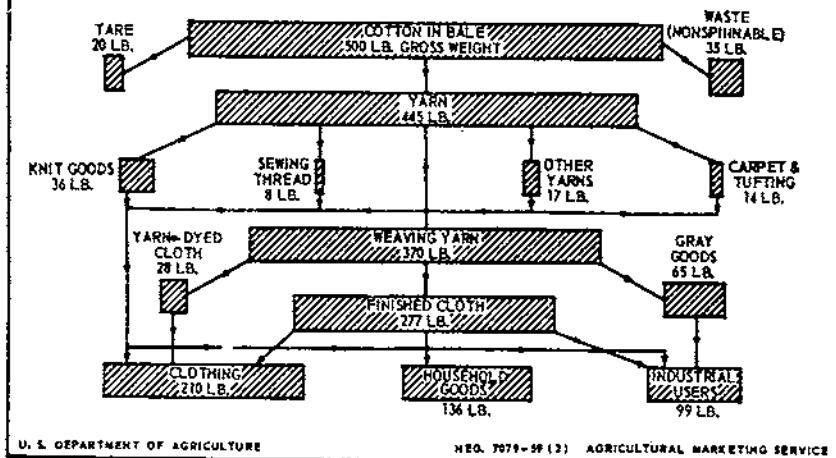


FIGURE 1

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 warehouses, which may be operated in connection with compresses, where it is assembled and stored. Much of the cotton, particularly in central and western areas of the Cotton Belt, is compressed to higher density to facilitate storage and transportation. 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 is 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 1954, for example, about 83 percent of the yarn was woven into cloth, 8 percent was used by the knit-goods industry, 3 percent was carpet and tufting yarns, 2 percent was used in thread, and 4 percent was used in making other yarns.

Census reports indicate that in 1954, about 17 percent of the woven cotton cloth was used in the gray or unfinished form, about 8 percent was colored yarn fabrics, and about 75 percent was finished from the gray (84). Finishing gray goods includes bleaching, dyeing, and printing. Of the total linear yardage finished in 1954, for example, about 43 percent was bleached and white-finished, 31 percent was plain dyed and finished, and 26 percent was printed and finished. In 1957 the corresponding proportions were 44, 32, and 24 percent, respectively (89). Styling and finishing of a large part of the cotton cloth is controlled by converters (persons who take gray goods and have them finished), but substantial proportions are controlled by mills, with or without the collaboration of the manufacturing user.

Much of the finished cloth usually goes to cutters, where it is made into wearing apparel and household goods. Estimates of cotton consumption by end uses show that the proportion that went into apparel increased from 36 percent in 1947 to about 50 percent in 1957. Proportions for industrial uses decreased from 36 percent in 1947 to 21 percent in 1957, and those for household uses increased from 28 percent in 1947 to 29 percent in 1957 (51). Clothing and household textiles usually go directly, or indirectly through wholesalers, jobbers, or other agencies, to retailers.

#### 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 account, in most instances, for a large share of the consumer's dollar paid for the finished cotton products. Data on retail values of a group of 25 cotton articles of clothing and household furnishings and on receipts by farmers for equivalent quantities of cotton indicate that from 1935 to 1958, returns to farm producers for the cotton used amounted on the average to about 15 percent, and marketing margins amounted to about 85 percent, of the consumer's dollar (fig. 2) (54). The proportion of the consumer's dollar represented by the farm value of the cotton usually varied irregularly with the price of cotton. It ranged from about 9 percent in 1938, when farm prices of cotton averaged about 8.60 cents a pound, to 18 percent in 1951, when farm prices of cotton averaged about 37.88 cents a pound, and amounted to 15 percent in 1958, when farm prices averaged 33.60 cents a pound.

Proportions of the consumer's dollar accounted for by the farm value of the cotton vary from one product to another. During the 6 years 1952-57, the proportions of the consumer's dollar accounted for by the farm value of the cotton averaged about 34 percent for sheets, 16 percent for work shirts, and 8 percent for business shirts.

The fact that, on the average, almost 85 percent of each dollar paid by consumers for finished cotton goods is accounted for by marketing margins emphasizes the importance of breakdowns 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, 1954, and 1957. Data available for this purpose are not complete, and in some instances they are not strictly comparable. Consequently, some liberties were taken in

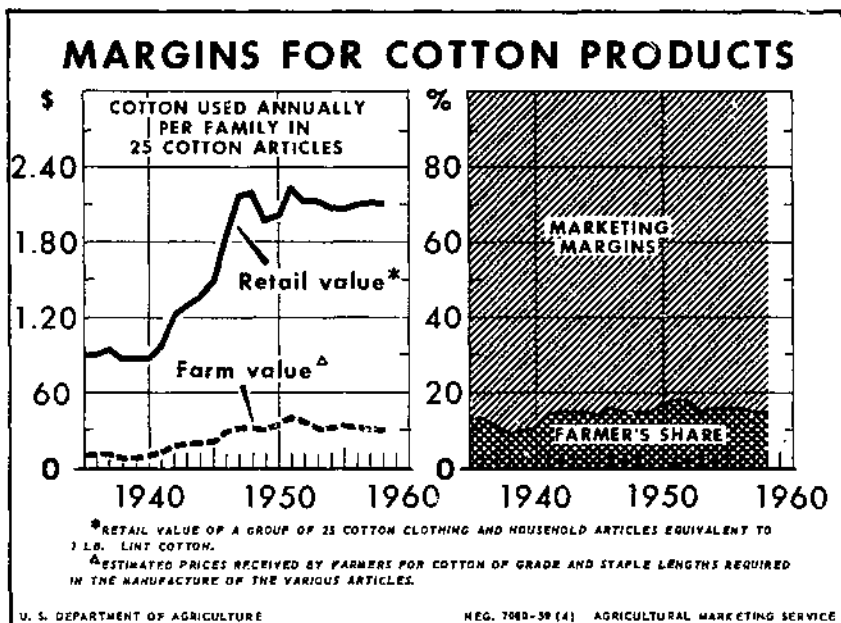


FIGURE 2

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 cotton clothing, household textiles, and yard goods as calculated by the Agricultural Marketing Service.

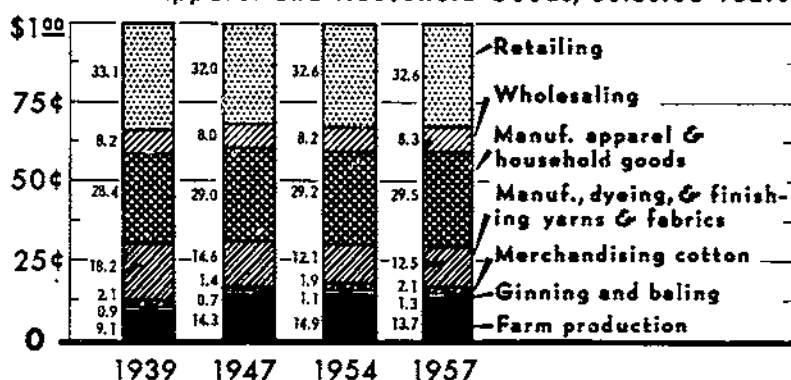
Approximations were made to show the average distribution of the consumer's dollar paid for these products on the basis of the specific conversions made or the services rendered. Results show that charges for marketing services in terms of dollars increased markedly during the 1940's, but the portion of the consumer's dollar that went to cotton growers for production (receipts by farmers less ginning charges) increased, on the average, from about 9 percent in 1939 to 15 percent in 1954 and then decreased to 14 percent in 1957. Proportions accounted for by margins for ginning, baling, and merchandising raw cotton, and for retail and wholesale distribution, decreased from 1939 to 1947, and then increased to 1957. Proportions accounted for by margins for spinning yarn, weaving cloth, and dyeing and finishing fabrics decreased from 1939 to 1954, and then increased to 1957; whereas those for manufacturing apparel and household textiles increased from 1939 to 1957 (fig. 3).

Information on 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, of the spread between the retail prices of apparel and household goods made of cotton and the returns to growers for the cotton used, the proportions that were accounted for by wages and salaries decreased from about 53 percent in 1939 to 51 percent in 1947, and then increased to about 58 percent in 1957. Proportions of these spreads that were accounted for by profits increased from about

Where It Goes

# THE CONSUMER'S COTTON DOLLAR, BY OPERATIONS OR SERVICES

*Paid for Apparel and Household Goods, Selected Years*



BASED ON OFFICIAL AND OTHER DATA, AND PARTLY ESTIMATED

U. S. DEPARTMENT OF AGRICULTURE

REG. 7081-59 (13) AGRICULTURAL MARKETING SERVICE

FIGURE 3

5 percent in 1939 to 16 percent in 1947, and then decreased to less than 7 percent in 1954 and in 1957. Proportions accounted for by all other items decreased from about 42 percent in 1939 to 32 percent in 1947, and then increased to 36 percent in 1957 (fig. 4). Wages and salaries of employees engaged in marketing, manufacturing, and distributing cotton and cotton products averaged, during 1939, 1947, 1954, and 1957, almost 4 times as much, and profits to marketing agencies averaged about half as much, as returns to growers for farm production of the cotton.

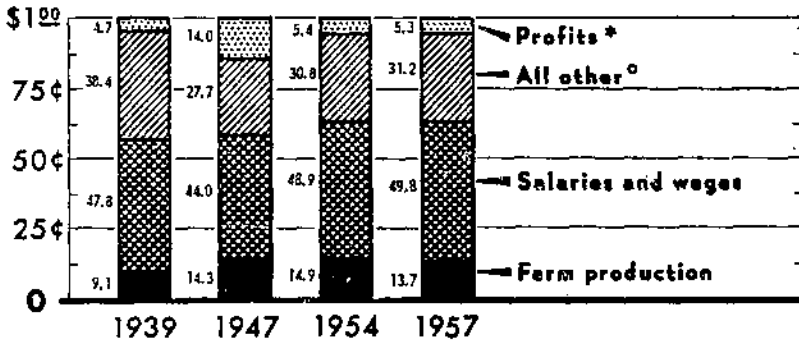
Data on the distribution of the consumer's dollar paid for apparel and household goods made of cotton may serve to indicate the relative importance, from the viewpoint of costs, of increasing efficiency and reducing costs for the different services. The margins for ginning and baling, combined with those for all the merchandising services involved in taking cotton from gins and delivering it to mills, amounted, on the average, during 1939, 1947, 1954, and 1957, to only about 7 percent of the combined margins for manufacturing and finishing the cloth and for fabricating it into wearing apparel and household goods, or for wholesaling and retailing these products. Thus a reduction of only 4 percent in the margins for wholesaling and retailing, or for manufacturing and finishing cloth and fabricating it into apparel and household goods, would have reduced the spread between retail prices to consumers and prices to growers for the cotton as much as 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 that can be passed back to cotton growers or on to consumers of the finished products. A determination of the extent

## Where It Goes

# THE CONSUMER'S COTTON DOLLAR, BY COST ITEMS

Paid for Apparel and Household Goods, Selected Years



BASED ON OFFICIAL AND OTHER DATA, AND PARTLY ESTIMATED.

\* NET PROFITS OF ALL AGENCIES, EXCEPT FARM PRODUCERS, AFTER DEDUCTION OF FEDERAL INCOME AND EXCESS-PROFIT TAXES.

° INCLUDES DEDUCTIONS FOR FEDERAL INCOME AND EXCESS-PROFIT TAXES.

U. S. DEPARTMENT OF AGRICULTURE

NEG. 7082-39 (3) AGRICULTURAL MARKETING SERVICE

FIGURE 4

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 on margins and costs and on means of reducing them is presented in this bulletin, in about the order in which the marketing services are rendered, beginning with movement of cotton from farms.

## Wool and Wool Products

Wool utilized in the United States is 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 and fabrics. Carpet wool consists of the coarser fibers used mainly in the manufacture of carpets and rugs. In 1958, apparel wool accounted for about 65 percent, and carpet wool for about 35 percent, of all wool consumed in the United States. All the carpet wool and substantial quantities of the apparel wool were imported. About seven-eighths of the wool produced in the United States in 1957 was shorn wool, obtained from shearing live sheep. The remainder is pulled wool, obtained by pulling the wool from the skins of slaughtered sheep. 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 175 to 350 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 (28).

Most of the imported apparel wool goes directly to central markets in which it is handled by the same large merchants and manufacturers 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 and manufacturers, most of whom are located in Philadelphia.

Domestic and imported wools are assembled in warehouses at concentration points or in central markets, where they are divided into relatively uniform lots and stored until needed by manufacturers. Most of the wool required by manufacturers, particularly the worsted mills, is 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 processors.

The apparel wool manufacturing industry consists of two major divisions, the worsted and the woolen. Of the virgin apparel wool consumed in the United States, the worsted division accounted for about 66 percent in 1948, and the proportion decreased to 50 percent in 1958. 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 some of them go into the knit-goods industry. Census data on manufacturers show that in 1954 about 84 percent of the yarns produced by woolen and worsted manufacturers was weaving yarn and about 16 percent was knitting yarn (fig. 5). About 88 percent of the weaving yarn was used in making apparel fabrics, about 7 percent was used in blankets, and 5 percent in other nonapparel fabrics.

Most of the worsted and woolen yarns and fabrics are 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 moistened fabric is subjected to heat, friction, and pressure, in order to shrink, thicken, and interlock the fibers. The fabrics are then napped and sheared (28).

Apparel fabrics are used chiefly for men's and women's outerwear. Census reports for 1954 show that about 46 percent of these fabrics were used in the manufacture of men's and boys' clothing and 54 percent in women's and children's clothing.

#### 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

Consumed in U. S.

## APPROXIMATE DISTRIBUTION OF WOOL, 1954

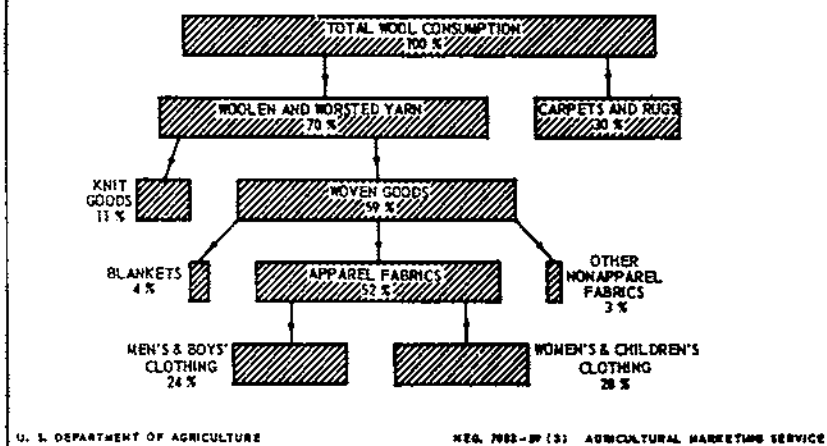


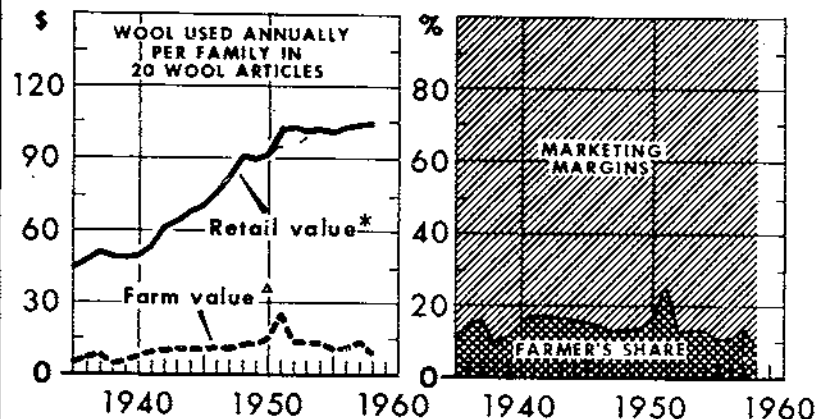
FIGURE 5

for the raw wool are only a small proportion of the prices paid by consumers for finished products. The retail values of 20 representative wool products and the farm value of the wool used in their manufacture show that, during the 24 years from 1935 to 1958, returns to growers for the raw wool averaged about 14 percent of the retail prices to consumers for the finished products (fig. 6).<sup>2</sup> The proportion of the retail value of the wool products accounted for by the farm value of the wool ranged from about 9 percent in 1958, when prices per pound received by farmers for shorn wool averaged 37 cents, to 25 percent in 1951, when farm prices averaged 97 cents.

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 24 years from 1935 to 1958. The proportions by years ranged from about 75 percent in 1951 to

<sup>2</sup> 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 Disbursements of Wage Earners and Clerical Workers, 1934-36." (121). 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.

## MARGINS FOR WOOL PRODUCTS



\*IN COMBINING THE VALUES FOR THE 20 ITEMS, PRICES WERE WEIGHTED BY THE NUMBER OF ARTICLES PURCHASED BY THE AVERAGE WAGE EARNER'S FAMILY AS REPORTED BY THE BUREAU OF LABOR STATISTICS. COMPLETED DATA FOR ALL ITEMS WERE NOT AVAILABLE EACH YEAR AND TOTALS WERE ESTIMATED FOR SOME YEARS ON THE BASIS OF RATIOS OF AVAILABLE ITEMS TO TOTALS.

▲ FARM VALUE OF 484 POUNDS OF TERRITORY WOOL AND 545 POUNDS OF WOOL FROM EASTERN STATES.

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NEG. 7084-59 (4) AGRICULTURAL MARKETING SERVICE

FIGURE 6

about 91 percent in 1958. The relative size of these margins emphasizes the importance of a breakdown 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 consumer's dollar paid for clothing and household goods made of wool in 1939, 1947, 1954, and 1957. Data available for this purpose are not complete, and in some instances they are not strictly comparable. Consequently, considerable 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 20 items of woolen and worsted clothing and household goods, as calculated by the Agricultural Marketing Service.

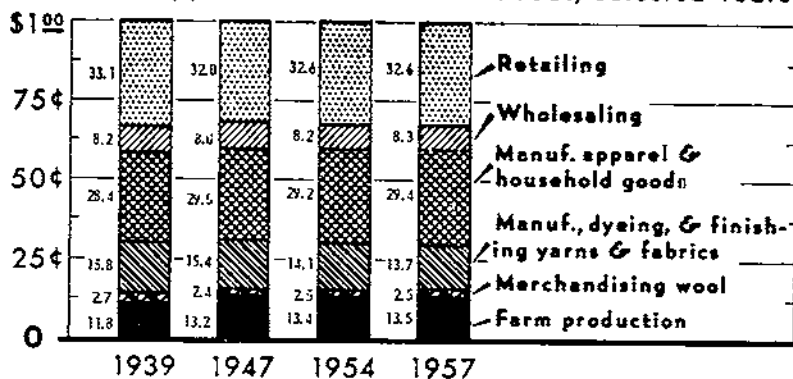
Approximations were made to show the average distribution of the consumer's dollar paid for clothing and household goods made of wool, on the basis of the services rendered. The results show that the portion of the consumer's dollar that went to growers for farm production of wool increased, on the average, from 11.8 percent in 1939 to 13.5 percent in 1957. Proportions accounted for by margins for merchandising raw wool decreased from 2.7 percent in 1939 to 2.5 percent in 1957. Margins for the manufacture of yarns and fabrics, including dyeing and finishing, decreased from about 16 percent of the consumer's dollar in 1939 to 14 percent in 1957; whereas those for fabricating apparel and household goods made of wool increased from about 28 percent in 1939 to 29 percent in 1957. Proportions for wholesale and retail distribution of these products averaged about 41 percent of the consumer's dollar in 1939 and in 1957 (fig. 7).



Where It Goes

# THE CONSUMER'S WOOL DOLLAR, BY OPERATIONS OR SERVICES

*Paid for Apparel and Household Goods, Selected Years*



BASED ON OFFICIAL AND OTHER DATA, AND PARTLY ESTIMATED.

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FIGURE 7

The distribution of the consumer's dollar for both apparel and household goods made of wool differs somewhat from that indicated for men's worsted suits. An analysis, made by the Wool Bureau, Inc., 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, shows that about 11 percent was accounted for by the cost of the cleaned wool required, 17 percent by costs of manufacturing the fabric, 32 percent by costs of making the garment, and 40 percent by retail distribution (39).

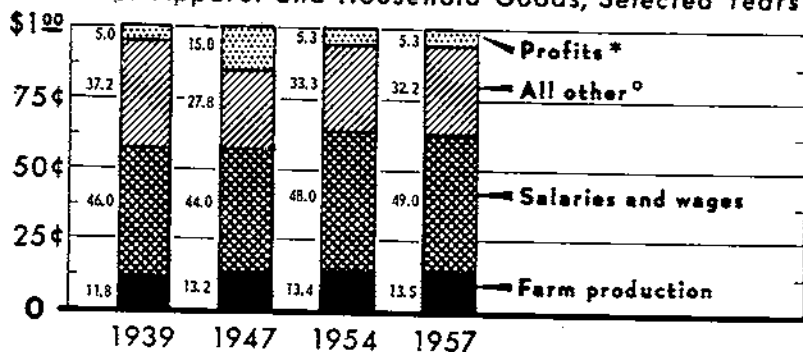
Information relating to specific items of cost is incomplete. Approximations, based on available data, indicate that salaries and wages account for more than half of the spread between retail prices of finished clothing and household goods made of wool, and returns to growers for the wool used; and that in recent years this proportion has increased (fig. 8). Combined profits of all agencies, except farm producers, increased from about 5 percent of the consumer's dollar paid for apparel and household goods made of wool in 1939 to about 15 percent in 1947, and then decreased to about 5 percent in 1957.

During 1939, 1947, 1954, and 1957, 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 6 percent of the combined cost of manufacturing wool products, or of the cost 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 producer-consumer price spread than would elimination of all margins for merchandising raw wool.

**Where It Goes**

**THE CONSUMER'S WOOL DOLLAR,  
BY COST ITEMS**

*Paid for Apparel and Household Goods, Selected Years*



BASED ON OFFICIAL AND OTHER DATA, AND PARTLY ESTIMATED.  
 \* NET PROFITS OF ALL AGENCIES, EXCEPT FARM PRODUCERS, AFTER DEDUCTION OF FEDERAL INCOME AND EXCESS-PROFIT TAXES.  
<sup>o</sup> INCLUDES DEDUCTIONS FOR FEDERAL INCOME AND EXCESS-PROFIT TAXES.  
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FIGURE 8

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 should 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 is presented in this bulletin.

**MARKETING MARGINS FOR COTTON**

Gross margins for marketing cotton include 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, and the lint has been separated from the seed by ginning, and packed and wrapped in bales weighing about 500 pounds. Costs of this handling, 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 are services performed in moving seed cotton from farms and delivering finished apparel and household textiles to ultimate consumers.

### Hauling from Farm to Gin

Cotton usually is hauled from farms to gins by producers, although some is hauled by ginners and commercial truckers. Proportions of the United States crop, taken as a whole, that were hauled to gins by farm producers decreased from 90 percent for the 1938 crop to 83 percent in the late 1940's, and ranged from about 87 to 90 percent in the early 1950's (127, 56, 25, 111, 125). Hauling by producers in wagons decreased from about 42 percent for the 1938 crop to about 3 percent for the 1956 crop, while hauling in motor vehicles increased from about 64 percent for the 1947 crop to about 87 percent in the middle 1950's. Cotton hauled from farms to gins by ginner trucks decreased from about 8 percent for the 1940 crop to about 2 percent in the early 1950's. Hauling by commercial truckers increased from less than 6 percent of the 1938 crop to 14 percent of the 1949 crop and amounted to less than 10 percent in the middle 1950's. 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 Missouri.

*Charges or Costs.*—Information on costs of hauling seed cotton from farms to gins is limited mainly to charges made by ginners and commercial truckers. In some instances, 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 as a whole, increased from 57 cents per bale for the 1940 crop to about \$1.78 for the 1956 crop. Charges made by commercial truckers increased from \$1.12 per bale for the 1939 crop to more than \$6.00 in the middle 1950's (127, 56, 25, 111, 125).

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 benefit by hauling seed cotton to their gins is indicated by the facts that their charges to their customers are substantially less than those made by commercial truckers, that some ginners pay a part of the charges made by commercial truckers for some seed cotton hauled to their gins, and that in some instances ginners reimburse farmers for hauling seed cotton to their gins.

*Means of Reducing Costs.*—Specific suggestions for reducing costs of hauling seed cotton from farms to gins would need to be based on detailed studies of factors affecting the efficiency and costs of such hauling under actual operating conditions. Apparently some possibilities would include adapting trucks, trailers, and other transportation facilities to the specific requirements for hauling seed cotton, loading them fully when feasible for each trip to the gin, and obtaining return loads whenever feasible.

### Ginning and Baling

Most of the cotton produced in the United States is taken to gins, where the seed cotton is conditioned, trash removed, and the lint separated from the seed and baled before it is sold by the farm producer. Only about 1 percent of the crop in the United States

usually is sold as seed cotton, and a substantial part of this is remnants harvested toward the end of the season.

*Charges or Costs.*—Charges for ginning cotton vary considerably from year to year with changes in general business conditions, in prices of cotton, and in 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 as a whole, average charges for ginning and wrapping a 500-pound bale of American Upland cotton, including charges for bagging and ties, increased from \$4.04 for the 1931 crop, when farm prices of cotton averaged 5.66 cents a pound, to \$14.75 for the 1958 crop, when farm prices averaged 33.6 cents (table 5). Proportions of the farm value of cotton that were 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. For the 1958 crop, when farm prices averaged 33.6 cents a pound, the proportions averaged about 9 percent.

During the 1958-59 season, average charges for ginning a 500-pound bale of American Upland cotton, including charges for bagging and ties, ranged from \$10.22 in Virginia to \$18.32 in Missouri. Proportions of the farm value of the cotton accounted for by these ginning charges ranged from about 6 percent in Alabama to 11 percent in Missouri (table 5).

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 for the 1942 crop to \$25.21 for the 1958 crop (56, 25, 111, 125).

*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 prices of cotton, farm wage rates, and general business conditions. From 1928 to 1931, ginning charges were reduced on the average about 32 percent. This reduction was associated with average reductions of 69 percent in farm prices of cotton, 28 percent in farm wage rates, and 14 percent in the index of industrial production. From 1931 to 1957, ginning charges increased 259 percent. During the same period, farm prices fluctuated considerably, but in 1957 they averaged more than four times as high as in 1931. Farm wages showed an increase of 321 percent, and industrial production an increase of 171 percent. These changes since the early 1930's reflect substantial reductions in the purchasing power of the dollar.

*Volume of ginning.*—Average cost per bale for ginning cotton usually is influenced by volume of ginning per gin plant. Differences in costs may result from differences in size of gin plants used to optimum capacity, in volume of ginning per unit of ginning equipment, or in some combination of the two factors. Data on the extent to which average ginning costs per bale are influenced by size of gin plant, when the volume of ginning per gin stand was about the same, appear inconclusive (8, 57, 58, 119). Average costs per bale for ginning cotton usually decrease considerably with in-

TABLE 5.—Average charges per 500-pound gross-weight bale and proportion of farm value, for ginning Upland cotton, by States, specified years, 1928-58

State	Year beginning August												
	1928	1931	1935	1939	1945	1947	1949	1951	1953	1955	1956	1957	1958
	<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>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Alabama.....	4.49	2.67	3.30	3.17	5.15	7.08	7.22	8.37	8.99	9.08	9.94	10.73	10.27
Arizona.....	7.83	5.87	5.72	5.12	6.80	8.90	9.10	11.41	13.75	13.68	14.81	14.60	14.84
Arkansas.....	5.69	3.98	5.39	5.21	7.35	9.50	10.48	13.42	13.39	14.08	15.16	15.85	16.14
California.....	6.83	5.05	6.00	4.61	6.91	8.40	9.54	11.20	13.65	13.84	14.29	15.36	15.92
Florida.....	4.64	3.37	5.06	4.63	5.68	7.13	7.59	10.00	11.18	11.32	11.66	12.35	11.66
Georgia.....	4.22	2.70	3.44	3.44	5.04	6.87	7.74	9.71	9.77	9.71	10.89	11.28	11.05
Louisiana.....	5.23	3.58	5.04	4.77	6.07	8.26	9.08	11.17	12.04	12.77	13.66	13.76	14.60
Mississippi.....	6.14	3.85	5.41	4.96	5.90	8.09	9.55	10.68	11.15	11.30	12.26	13.09	13.15
Missouri.....	7.51	5.85	8.10	5.97	9.73	12.11	13.79	17.75	16.56	17.05	17.65	18.55	18.32
New Mexico.....	8.34	5.39	7.64	5.24	7.43	9.21	11.70	14.42	13.68	12.71	12.54	13.99	13.80
North Carolina.....	4.29	2.60	3.43	3.16	5.00	7.39	8.31	10.07	10.31	10.48	11.48	11.65	12.19
Oklahoma.....	7.07	6.00	5.96	5.88	9.13	11.68	12.76	15.84	15.12	14.61	15.63	16.65	15.49
South Carolina.....	3.79	2.61	3.25	2.70	4.05	7.00	8.01	9.58	9.81	9.60	10.95	11.52	11.50
Tennessee.....	5.36	3.96	4.41	4.38	6.17	7.77	8.48	10.40	10.91	11.86	12.04	13.26	13.44
Texas.....	6.83	4.75	6.24	5.46	7.83	10.65	12.02	14.18	14.34	14.02	14.33	15.45	15.40
Virginia.....	4.91	3.41	4.51	4.05	5.08	6.72	7.57	8.68	9.13	9.22	9.21	8.96	10.22
United States....	5.96	4.04	5.03	4.67	6.40	9.00	10.47	12.04	12.69	12.75	13.56	14.51	14.75

Proportion of farm value

	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Alabama.....	5.0	9.5	6.2	6.9	4.6	4.4	4.8	4.4	5.3	5.3	6.1	7.2	5.8
Arizona.....	6.8	16.1	9.1	9.1	5.8	5.9	6.6	5.9	8.3	8.5	9.2	8.6	3.6
Arkansas.....	6.3	14.4	9.6	11.8	6.5	6.1	7.5	7.1	8.2	8.6	9.4	10.3	9.3
California.....	7.2	16.4	10.3	9.6	6.2	5.0	6.8	5.7	8.8	8.4	8.7	9.1	9.4
Florida.....	5.3	12.3	9.8	9.7	5.4	4.5	5.1	5.5	6.9	6.7	7.2	7.6	6.9
Georgia.....	4.6	9.3	6.2	7.3	4.4	4.2	5.2	5.0	5.9	5.7	6.7	7.3	6.1
Louisiana.....	5.9	12.9	9.2	10.6	5.4	5.1	6.2	6.0	7.3	7.8	8.5	9.0	9.1
Mississippi.....	6.7	12.5	9.6	10.7	4.9	4.9	6.4	5.4	6.6	6.7	7.5	9.3	7.7
Missouri.....	8.5	24.2	14.5	13.4	9.1	7.9	9.7	9.9	10.2	10.4	11.4	12.2	10.6
New Mexico.....	8.8	18.7	12.9	11.1	6.0	5.5	7.9	6.7	7.7	7.8	7.5	8.8	8.0
North Carolina.....	4.6	8.7	6.0	6.6	4.3	4.5	5.7	5.2	6.2	6.5	7.4	7.7	7.0
Oklahoma.....	8.8	23.7	11.3	14.1	9.1	7.7	9.2	8.9	10.2	10.0	11.0	14.8	9.9
South Carolina.....	4.1	8.6	5.7	5.7	3.7	4.3	5.4	5.1	5.9	5.8	6.8	7.4	6.5
Tennessee.....	6.0	14.9	8.1	9.7	5.6	4.8	5.8	5.4	6.5	7.1	7.3	8.4	7.6
Texas.....	7.7	17.1	11.4	12.5	7.3	6.9	8.6	7.8	9.4	9.3	9.5	11.7	9.9
Virginia.....	5.5	12.2	7.5	8.8	4.5	4.2	5.2	4.6	5.6	5.6	6.0	5.9	6.2
United States.....	6.6	14.3	9.1	10.3	5.7	5.6	7.3	6.4	7.9	7.9	8.6	9.8	8.9

<sup>1</sup> Includes separate charges for drying seed cotton or use of lint cleaners. Adapted from reports of Agricultural Marketing Service.

creases in proportion of capacity utilized over extended periods (55, 57, 58, 38, 41, 2, 71, 10, 13, 42).

*Weight of seed cotton per bale.*—The quantity of seed cotton required per 500-pound bale may be influenced considerably by the variety of cotton, by humidity and other conditions at the time of ginning, and by method of harvesting. The longer staple varieties usually give a smaller lint outturn and are somewhat more difficult to clean and to gin than the shorter staples. Charges for ginning vary considerably with the weight of seed cotton required to make a bale of standard weight. In the 1957-58 season, the quantity of seed cotton required to make a 500-pound bale averaged about 1,430 pounds of handpicked for American Upland cotton and about 1,533 pounds of handpicked for American Egyptian cotton (93). Ginning charges, including bagging and ties, averaged \$14.51 for American Upland and \$25.64 for American Egyptian cotton (93). But American Egyptian has an extra long staple 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.

Average quantity of seed cotton required per 500-pound bale of Upland cotton in the 1957-58 season ranged from 1,430 pounds for handpicked to 2,261 pounds for machine stripped cotton (93). Data for the 1950's indicate that ginning charges per 100 pounds of seed cotton averaged about the same for picked as for snapped and stripped cotton. Under these conditions, costs of ginning a 500-pound bale would average 58 percent more for snapped and stripped than for picked cotton.

In South Carolina, for example, about 99 percent of the 1957 crop was handpicked, whereas in Oklahoma about 99 percent of the crop was handsnapped or machine stripped. Charges for ginning a 500-pound bale, excluding charges for bagging and ties, averaged \$8.05 in South Carolina and \$12.63 in Oklahoma. Other factors also help to account for differences in ginning charges; for example, data for Missouri show that about 63 percent of the cotton was handpicked, 9 percent was machine picked, and 28 percent was handsnapped, but ginning charges, excluding bagging and ties, averaged \$13.70 per bale of 500 pounds, or about 70 percent more than in South Carolina and 11 percent more than in Oklahoma.

*Supplementary equipment.*—Increases in proportions of the crop harvested by handsnapping, machine picking, and machine stripping have necessitated the use of supplementary ginning equipment. During the 10 years from 1947 to 1957, proportions of the United States crop harvested by handsnapping increased from about 21 to 24 percent, machine-picked increased from less than 1 to 19 percent, and machine-snapped increased from about 2 to 13 percent. 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 burs and other coarse materials, used to an increasing extent in connection with ginning, may considerably influence the costs of ginning. The proportions of gins having this supplementary equipment increased considerably from 1945 to 1957, along with the increases in ginning charges (87, 95).

Such equipment is expensive to install and to operate and its use may affect considerably the quality and costs of the services performed. In southeastern States, 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 may help to account for differences in ginning charges. Data for gins in Georgia show that in 1951, for example, average replacement costs increased from about \$54,000 for simple gins with no overhead cleaning or extraction equipment, but having one drier which applied heat to the feeder, to \$72,500 for elaborate gins having one or two overhead cleaners, one or two driers, and one bur extractor, and to \$88,850 for elaborate gins equipped with lint cleaners, in addition to having one or two overhead cleaners, one or two driers, and one bur extractor. Costs per bale for these gins averaged \$9.28 for the simple gins with an average volume of 2,011 bales, \$10.01 for elaborate gins without lint cleaners with an average volume of 1,914 bales, and \$11.57 for elaborate gins equipped with lint cleaners and with an average volume of 1,940 bales (2).

In the Rio Grande and Pecos Valleys of Texas and New Mexico in the 1950-51 season, the value of gin plants averaged \$34,000 for standard plants with moderate overhead cleaning equipment but with no bur machines or lint cleaners, \$52,000 for specially equipped gins with elaborate cleaning machinery, including a bur machine and modern gin stands in addition to the drier, but with no lint cleaners, and \$85,000 for specially equipped gins with lint cleaners (26). Ginning costs per bale in the 1950-51 season averaged \$11.50 for standard gins without lint cleaners and an average volume of 3,345 bales, \$11.71 for specially equipped gins without lint cleaners and an average volume of 4,002 bales, and \$12.39 for specially equipped gins with lint cleaners and an average volume of 3,878 bales (26).

In Arizona, replacement costs per gin plant were about \$150,600 for the season 1951-52, and \$152,960 for 1952-53 (71), for specially equipped gins with huller fronts, extractor feeders, one or more driers, a large bur machine, 12 to 21 overhead cleaning cylinders, and some with lint cleaners. Costs were about \$100.110 in 1951 and \$100,580 in 1952 for standard gins with huller fronts, extractor feeders, usually either one dryer or heat on the feeders, and usually one small bur machine or its equivalent, all with less than 12 overhead cleaning cylinders, and some with lint cleaners. Ginning costs per bale in the 1951-52 season averaged \$9.22 for specially equipped gins with an average volume of 11,719 bales and \$8.08 for standard gins with an average volume of 13,176 bales. In the 1952-53 season, ginning costs averaged \$9.47 for specially equipped gins with an average volume of 11,781 bales and \$8.67 for standard gins with an average volume of 11,246 bales.

In addition to equipment for conditioning and cleaning seed cotton, many gins have installed equipment for cleaning the lint after it is removed from the seed. The proportions of the gins in the United States with lint cleaners increased from less than one-third in the 1954-55 season to about one-half in the 1956-57 season (24, 95). A report relating to lint cleaners in California shows that in 1956 total costs of controlled-bat saw-type lint cleaners for a plant with 5 gin stands of 90 saws each amounted to about \$17,000, or about 8.5 percent of the total costs of the fully equipped gin.



Charges for lint cleaning services at these gins averaged about \$1.60 per bale (70).

In Arkansas in 1954 and 1955, initial costs of lint cleaners ranged from about \$3,000 to \$18,500, depending on the type of machine and number of gin stands. Additional cost of lint cleaning was estimated at 94 cents per bale in 1954, with an average volume of 3,468 bales per gin, and 84 cents per bale in 1955, when the average volume was 4,129 bales per gin (70). Similar data for gins in Georgia in the 1951-52 season show that additional replacement costs attributable to lint cleaners averaged about \$16,000 (2). Additional costs per bale, attributable to the addition of lint cleaners, averaged about 72 cents for fixed costs and 84 cents for operating costs, a total of \$1.56 (2).

Other equipment at gins includes automatic lint cotton samplers and presses for compressing bales at the gin to densities equal to or higher than the regular standard density bale. Automatic samplers are of recent development and are designed to provide a sample representative of cotton throughout the bales, to reduce the amount of cotton removed by multiple sampling, and to lower damage to bale covers and to cotton from exposure. Commercially owned samplers in operation in the 1957-58 season totaled about 46, most of which were in California. Average costs of these samplers, including transportation and installation, apparently amounted to about \$5,000 or \$6,000. Data on costs per bale of using these samplers are not available, but research now under way is designed to appraise the economic advantages and costs of their use.

Gin presses for compressing cotton numbered 109 in the 1956-57 season, most of which were in Texas, Arizona, and California (95). Total costs of gin presses adequate for compressing bales to standard density apparently amounted to about \$45,000 or \$50,000 each in that season, and those adequate for compressing bales to high density apparently would cost, under 1958 conditions, about \$60,000 to \$65,000 each. Use of these presses is in the developmental stage, and data available are not adequate for an accurate appraisal of additional costs involved in their use. Research has been undertaken to show the relative efficiency and costs, under various conditions, of using these presses instead of the traditional low-density flat-bale presses at gins.

*Labor, power, and other items.*—Costs of ginning are influenced considerably by the costs of labor, power, and other expenses of operating and maintaining ginning and auxiliary equipment (55). As indicated in a preceding section (p. 27), increases in ginning charges from less than \$5.00 per bale in 1939 to \$14.51 per bale in 1957 were associated with greater proportional increases in farm wage rates (97). In 1957, farm wage rates per day without board or room averaged \$3.95 in South Carolina, \$5.10 in Arkansas, \$7.20 in Oklahoma, and \$6.40 in New Mexico. Average ginning charges in these States were \$11.52, \$15.85, \$16.65 and \$13.99 per bale, respectively.

Costs per bale of power and fuel in ginning operations vary with the kind of power used, from one locality to another, and usually inversely with the number of bales ginned per gin stand. In 1948, for example, average costs of power and fuel per 100 pounds of seed cotton ranged from 2.9 cents for gins powered by steam to

5.4 cents for gins powered by electricity (119). These data relate to gins in Texas and Oklahoma and apply to ginnings of 600 bales per gin stand. Average costs of power and fuel per bale for these gins in the 1948-49 season ranged from 57 cents in south Texas to \$1.08 in Arkansas. These costs varied inversely with number of bales per gin stand in Alabama, Mississippi, Oklahoma, and Texas, but they varied little, if any, with volume of ginnings in Arkansas and in the western irrigated areas.

Other items of cost, including maintenance, insurance and taxes, interest on investment, and miscellaneous expenses, account for a substantial part of total costs of ginning. Costs of these items vary considerably from one State or region to another. Costs per bale for most of these items decrease markedly with increases in number of bales ginned per gin stand (119).

*Quality of services performed.*—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. Quality of ginning services may be indicated by the proportion of the cotton that is rough ginned. Proportions of rough-ginned and gin-cut cotton usually are greatest in southeastern States where relatively large proportions of the cotton are handpicked, and where ginning charges are relatively low. Proportions of the 1956 crop, for example, that were rough ginned or gin cut ranged, in major cotton-producing States, from about one-tenth of one percent in Arkansas, California, and Missouri, where ginning charges averaged \$16.85, \$15.36, and \$18.55 per bale, respectively, to more than six-tenths of one percent in Alabama, Georgia, and South Carolina, where ginning charges averaged \$10.73, \$11.28, and \$11.52 per bale, respectively (96).

Proportions of rough-ginned and gin-cut cotton may be influenced considerably by weather during harvesting, staple length of the cotton, condition of the cotton at time of ginning, and the kinds and amounts of equipment used and method of its operation. Relatively small proportions of rough-ginned cotton, particularly in central and western portions of the Cotton Belt, reflect effective use of adequate auxiliary equipment for conditioning and cleaning the cotton prior to ginning. The volume of ginnings for many of the operating units, particularly in the Southeast, is so small that it would be difficult to use economically the equipment needed to improve the quality of the ginning services (96).

*Bagging and ties.*—Charges for bagging and ties, when assessed separately, averaged about 29 percent of total charges for ginning the 1957 crop (93). In the Southeastern States, charges for these materials usually average substantially less than in other areas. These relatively low charges are accounted for chiefly by the fact that ginners in those States cover a considerable proportion of the cotton with second-hand materials, whereas in other areas ginners customarily use new bagging and ties (68).

Types of bagging used include open-weave jute, sugar-bag cloth, cotton, and other bagging. Costs vary with the kind used. Proportions of the 1957 crop covered with new and second-hand open-weave jute bagging ranged from about 78 percent in the Western region to 29 percent in the Southwestern region and averaged about 54 percent for the United States. Proportions covered with sugar-

bag cloth ranged from 22 percent in the Western region to 71 percent in the Southwestern region, and averaged 46 percent for the United States. Bales covered with experimental and other bagging accounted for less than 1 percent of the total (69).

*Supplementary Services Rendered.*—Services rendered in connection with ginning, the charges for which are included with those for ginning, may materially affect the charges. Such services, in addition to those already indicated, may include hauling from gin to warehouse, cotton yard, or railroad platform; storing lint cotton on the gin yard and cottonseed at the gin; sampling the bales; and advances of credit for producing and harvesting the crop. In addition, ginners buy a substantial part of the cotton crop, and most of the cottonseed crushed is bought by or through ginners. Proportions of the crop purchased by ginners decreased from about one-third in the 1947-48 season to about one-fifth in the 1957-58 season (24, 93).

*Means of Reducing Costs.*—Because conditions vary from one area to another, specific information on the situation in each locality would be needed as a basis for indicating the means by which and the extent to which it might be feasible to reduce ginning costs and charges in specific localities.

*Increase in Volume of Ginnings.*—The fact that average costs per bale for ginning cotton usually are substantially less for gins with annual volumes of 600 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 many instances averages less than 300 bales, indicate that costs of ginning in many instances might be reduced considerably by increasing the volume ginned per gin stand. This would require further reductions in number of gin stands operated. Numbers of gin stands operated in the United States have been reduced from about 47,000 in 1935 to 38,000 in 1945 and to about 27,000 in 1956 (87,95). Further reductions 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 replacements, other than necessary repairs, in any locality to those required for efficient operations.

Substantial increases in volumes of ginnings per gin stand have been made in recent years, particularly since the end of World War II. Average number of bales ginned per gin stand of 80 saws increased from less than 250 in 1935 and 1945 to almost 500 in 1956. This increase is accounted for mainly by substantial reductions in number of gin stands and by a larger cotton crop in 1956 than in 1935 and 1945. Possibilities of further increases in volume of ginnings per unit of ginning equipment by reducing excess ginning capacity may be indicated by data on the extent to which gin capacity is utilized. Reports on the number and capacity of gins and on the number of bales ginned indicate that, if all gins had been operated at capacity on the basis of a 12-hour day, amounts equal to the United States crop could have been ginned in about 41 days in 1956, about 20 days in 1945, and 19 days in 1935 (table 6). The number of days by States in 1956 ranged from 19 for Virginia to 105 for Arizona.

The extent to which ginning capacity is utilized during the heaviest part of the ginning season perhaps supplies a good basis for estimating the extent to which the volume of ginning per unit of

TABLE 6.—Number of gins and gin saws, estimated capacity, and average number of days needed to gin crop, by States, 1935, 1945, and 1956

State	Gins			Gin saws		
	1935	1945	1956	1935	1945	1956
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Alabama.....	1, 339	1, 020	625	326, 720	270, 110	182, 110
Arizona.....	50	55	116	15, 970	20, 040	53, 080
Arkansas.....	1, 232	1, 066	653	311, 450	288, 120	197, 564
California.....	78	110	248	30, 970	48, 580	112, 870
Florida.....	61	26	7	9, 610	4, 160	2, 080
Georgia.....	1, 615	1, 078	467	380, 300	276, 440	139, 190
Louisiana.....	735	570	330	177, 700	153, 570	104, 810
Mississippi.....	1, 406	1, 263	883	349, 960	348, 050	278, 390
Missouri.....	158	184	163	41, 810	52, 060	49, 890
New Mexico.....	46	42	63	15, 730	14, 950	24, 670
North Carolina.....	1, 199	793	374	238, 545	178, 590	101, 430
Oklahoma.....	914	615	249	307, 490	204, 870	89, 980
South Carolina.....	1, 434	884	428	272, 110	198, 200	122, 890
Tennessee.....	459	400	323	111, 860	162, 680	91, 930
Texas.....	3, 564	2, 650	1, 684	1, 200, 980	899, 840	631, 520
Virginia.....	111	69	20	14, 190	10, 220	4, 030
All other.....	13	11	7	2, 770	2, 400	1, 630
United States....	14, 414	10, 836	6, 640	3, 808, 165	3, 073, 880	2, 188, 064

State	Capacity in bales per 12-hour shift			Average days needed to gin crop		
	1935	1945	1956	1935	1945	1956
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Alabama.....	50, 856	42, 279	26, 743	20. 3	21. 4	27. 9
Arizona.....	2, 246	2, 847	7, 802	58. 6	40. 8	105. 5
Arkansas.....	44, 741	43, 554	28, 999	18. 8	23. 0	48. 2
California.....	3, 856	6, 855	16, 591	60. 4	50. 7	88. 3
Florida.....	1, 518	658	329	17. 6	13. 0	27. 9
Georgia.....	57, 837	43, 431	20, 445	18. 2	15. 3	28. 3
Louisiana.....	29, 135	24, 261	15, 416	18. 6	15. 5	37. 0
Mississippi.....	50, 913	54, 646	40, 890	24. 1	27. 8	38. 6
Missouri.....	5, 932	7, 989	7, 332	30. 8	23. 2	60. 9
New Mexico.....	2, 091	1, 945	3, 619	33. 6	54. 9	78. 2
North Carolina.....	36, 156	26, 677	14, 899	16. 0	16. 0	24. 6
Oklahoma.....	40, 078	25, 790	13, 207	14. 0	11. 0	19. 6
South Carolina.....	40, 366	31, 091	18, 048	18. 3	21. 0	28. 9
Tennessee.....	16, 283	16, 419	13, 489	19. 4	27. 3	39. 1
Texas.....	163, 733	122, 182	92, 778	17. 4	14. 2	38. 3
Virginia.....	2, 166	1, 472	611	12. 8	10. 6	19. 0
All other.....	358	390	235	20. 7	25. 1	43. 8
United States....	548, 265	452, 486	321, 433	19. 0	19. 5	40. 9

Adapted from reports of Bureau of the Census and Agricultural Marketing Service (87, 55).

ginning equipment might be increased 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 3 months from about the middle of August to the middle of November (88). 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 and October.

In 1956, in about 27 percent of the cotton producing counties in the United States, less than 40 percent of the estimated total ginning capacity (on the basis of a 12-hour day) was used during the peak load of the ginning season (table 7). Proportions of the counties by States that utilized less than 40 percent of estimated capacity ranged from 7.6 percent in Mississippi to 70 percent in Oklahoma. The proportions of counties that utilized less than 60 percent of estimated capacity on the basis of a 12-hour day during the peak period amounted to 53 percent for the United States and ranged from about 23 percent in Mississippi to 96 percent in Oklahoma. The proportions of utilized capacity on a 12-hour-day basis in the irrigated counties in the West averaged 148 percent in New Mexico, 152 percent in Arizona, and 171 percent in California.

These data clearly indicate that substantial reductions in amounts of ginning equipment used and corresponding increases in volume of ginnings per unit of ginning equipment might be brought about in many parts of the Cotton Belt with little or no delay in harvesting and ginning, and with 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 all 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. Furthermore, the pressure on ginning facilities when the movement of cotton to gins is heaviest might 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 efficient operation, average costs per bale for ginning may be reduced by increasing the number of gin stands per plant, as well as by increasing the volume of ginning per gin stand. 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, savings in such costs that are attributable to the greater efficiency of the larger plants would need to equal or exceed expenses of making the combinations. In addition to such horizontal combinations, savings under some conditions might result from vertical integration through combining with regular ginning the functions of one or more of such services as financing production and marketing of cotton, taking automatic

TABLE 7.—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, season 1956

Percentage of ginning capacity utilized	Proportion of counties by States										
	Ala-bama	Arkansas	Georgia	Louisiana	Missis-sippi	North Carolina	Okla-homa	South Carolina	Texas	All other <sup>1</sup>	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.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.6	0.9
10 to 19.....	.0	.0	10.3	.0	1.5	21.1	22.2	9.7	8.1	.0	6.5
20 to 29.....	3.4	2.6	4.4	3.2	.0	21.1	26.0	4.9	8.1	4.8	6.7
30 to 39.....	13.6	12.8	14.7	12.9	6.1	10.5	22.2	22.0	14.8	3.3	12.7
40 to 49.....	20.3	17.9	27.9	9.7	6.1	23.7	18.5	12.2	14.1	4.8	15.2
50 to 59.....	23.7	2.6	14.7	12.9	9.1	18.4	7.4	22.0	6.6	1.6	11.1
60 to 69.....	22.0	2.6	8.8	6.5	21.2	2.6	.0	14.6	5.2	14.5	10.4
70 to 79.....	10.2	10.2	7.4	16.1	15.1	2.6	3.7	4.9	5.2	11.3	8.6
80 to 89.....	3.4	20.5	3.0	16.1	22.7	.0	.0	7.3	3.0	8.1	7.8
90 and over.....	3.4	30.8	8.8	22.6	18.2	.0	.0	2.4	31.9	50.0	20.1
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Includes Arizona, California, Florida, Illinois, Kentucky, Missouri, New Mexico, Virginia, and Tennessee.

Based on data from Bureau of the Census and Agricultural Marketing Service reports. 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 1956. Ginning periods used are those for which ginnings are reported to the Bureau of the Census and they range in length from 25 to 27 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 1956.

samples, compressing the bales to standard or high density, operating cottonseed oil mills, and buying and selling cotton and cottonseed.

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 harvest. But in many instances, increases in 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. The fact that in the 1947-48 season, for example, more than three-fourths of the seed cotton was hauled 6 miles or less to gins indicates that in most instances the volume per gin could be considerably increased without making the distance from the farm to the gin very great (88).

Any further concentration within a short period 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 has been considered as a means of reducing the peak-load demands for ginning services (119). But additional information is needed to show feasible means of more fully utilizing ginning facilities and labor and of reducing the costs of ginning.

Differences in costs that may be attributed to differences in volume of ginnings are not accurately reflected in differences in average charges from one State to another. In 1956, for example, the number of bales ginned per 320-saw gin averaged 1,311 in Alabama and 2,864 in Missouri. Charges for ginning services averaged \$9.94 per bale in Alabama and \$17.65 in Missouri. 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. Information is not available to indicate the extent to which ginning charges are influenced by factors other than volume of ginnings (95, 88).

Careful Selection and Efficient Use of Supplementary Equipment.—Costs of conditioning, cleaning, and other supplementary equipment, and the fact that some of it, if not properly used, may seriously damage cotton fibers, emphasize the importance of careful selection and use of this equipment. For best results, the equipment used would need to be limited to that relatively best adapted, mechanically and economically, for rendering the services that can be performed more effectively and economically at gin plants than at other locations and by other agencies. In addition, this equipment would need to be operated efficiently and in such a way as to minimize damages to the cotton fibers. Research now under way is designed to supply a basis for indicating the conditions under which and the extent to which it would be feasible to use the various kinds

of supplementary equipment at gins and how this equipment can be operated so as to maximize efficiency and minimize damage to fibers.

**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 so as to include small amounts of trash, instead of snapping, stripping, or machine picking and including large amounts of foreign matter with the seed cotton (30). But the feasibility of hand picking depends upon the extent to which the cost exceeds costs of other methods of harvesting, taking into account field waste, reductions in quality, and differences in costs of ginning and related services. In 1949, harvesting costs by hand picking in California averaged substantially more than costs of machine picking, including field waste, grade loss, and additional costs of ginning (4). Returns above harvesting and ginning costs for the 1948 crop on the High Plains of Texas averaged considerably more for cotton harvested by machine stripping than by snapping (122). 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). In North Carolina in 1947, costs of hand picking averaged somewhat less than costs of hand snapping and of mechanical stripping and picking, including loss in grade (67). 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 also may 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 reduction 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 to render needed services. With adequate volumes 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, as well as to reduce ginning costs per bale. Research has indicated possibilities for substantial savings in costs of ginning by more efficient organization and operation of gin machinery and equipment (118). Careful selection and efficient utilization of labor, power, and other items of expense may also reduce ginning costs (55, 119).

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 (119). Information available is inadequate to determine the conditions under which, and the extent to which, such integration would be feasible.

**Importance of Reductions in Costs.**—Costs of ginning might be reduced by one-fourth or more in many instances by increasing the volume of ginning per unit of equipment, by using suitable equipment and operating it more efficiently, and by other economies, available information indicates. The relative importance of such



savings is apparent when it is observed that, if such reductions had been reflected in prices to cotton growers in the 1956-57 season, the resulting increase in their incomes would have been about \$3.39 per bale, or about 2.3 percent of the farm value of the cotton.

### Cotton Merchandisers' Margins

Merchandisers' gross margins for raw cotton are the differences between the farm prices and the costs of the cotton to mills. These margins include 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. The 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 or Costs.*—In the 1958-59 season, charges for receiving cotton at public warehouses and compresses in the United States averaged \$1 cents per bale, compared with 23 cents in the 1939-40 season and 75 cents in the 1956-57 season (table 8). Although receiving charges have increased greatly since 1939, they did not advance proportionately as much as prices of cotton up to 1950. Since 1950, prices of cotton have declined, but receiving charges continued to increase. The proportions of the farm value of cotton represented by receiving charges decreased from about 0.5 percent in the 1939-40 season to 0.3 percent in the 1950-51 season, then increased to about 0.5 percent in the 1958-59 season.

Average receiving charges by States during the 1957-58 season ranged from 43 cents per bale in North Carolina to \$1.00 in Arizona. Variations in receiving charges may be accounted for largely by the fact that the services are not well standardized. The storage period included, for example, ranges 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 included also vary, and some compresses do not make a receiving charge if they compress the cotton.

*Means of Reducing Costs.*—Costs of the services rendered in connection with receiving cotton at warehouses and compresses may be reduced by minimizing unnecessary assembly 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 from contamination. Such duplication and waste could be reduced by use of suitable equipment for taking, automatically, adequate and authentic samples of cotton bales during the ginning operations.

TABLE 8.—Average receiving charges per bale at public cotton warehouses and compresses, by States, specified years, 1935-58<sup>1</sup>

State	Year beginning August—									
	1935	1939	1947	1949	1951	1953	1955	1956	1957	1958
	<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>	<i>Cents</i>
Alabama.....	30	30	47	57	56	59	66	61	74	72
Arizona.....	25	27	( <sup>2</sup> )	( <sup>2</sup> )	75	100	100	100	100	100
Arkansas.....	25	15	55	56	56	65	53	60	68	67
California.....	30	22	50	75	78	100	100	99	98	100
Georgia.....	25	37	35	50	53	56	60	77	78	68
Louisiana.....	30	28	51	54	57	63	60	71	73	75
Mississippi.....	31	28	55	56	57	65	58	60	66	65
Missouri.....	25	17	55	55	55	64	50	60	65	65
New Mexico.....	25	25	50	71	75	84	88	96	97	98
North Carolina.....	25	37	( <sup>2</sup> )	( <sup>2</sup> )	44	44	44	49	43	44
Oklahoma.....	15	15	50	75	75	75	75	75	75	74
South Carolina.....	25	35	32	41	46	39	38	37	50	45
Tennessee.....	25	15	55	55	50	64	56	66	68	68
Texas.....	21	23	52	64	76	77	82	87	83	86
United States....	25	23	52	63	65	72	70	75	80	81

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

<sup>2</sup> Data insufficient for reporting.

Adapted from reports of Agricultural Marketing Service.

Automatic lint cotton samplers, which have been developed and tested on a commercial scale, can be used with any standard gin equipment (29). Most effective use of these samplers would require some reliable means for correctly identifying the sample with the bale from which it was drawn, suitable methods of handling and storing the samples to preserve the quality of the lint included, and willingness of traders to sell and buy the cotton on the basis of these samples. Savings might also be made by reducing or eliminating unnecessary duplications of such services as weighing, marking, and tagging.

Research indicates that labor and other costs of handling and weighing cotton could be reduced substantially through improved methods of operation, including use of temporary blocks, and through use of improved handling and weighing equipment, including clamp trucks and mobile beam scales (124, 123).

#### Compression of Cotton

Cotton bales vary considerably in size, shape, and density. They include the flat or square gin bale and the standard- and high-density compressed bales. Flat gin bales average about 56 inches long, 28 inches wide, and 45 inches thick; and the density averages about 12 pounds per cubic foot. Standard-density bales average about 56 inches long, 31 inches wide, and 22 inches thick, the density averaging about 23 pounds per cubic foot. High-density bales average about 57 inches long, 22 inches wide, and 21 inches thick, and the density averages about 32 pounds per cubic foot. These dimensions and densities vary considerably with the weight of the bale (126).

Most of the cotton crop in this country is put up at first in flat gin bales, and the charges for this service are included with those for ginning. These 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, the most recent one for which the data are available, about 65 percent of the flat-gin bales were compressed to higher density, and the proportions varied from about 11 percent in the Southeast to about 85 percent in the Mississippi Valley and the Southwest (125).

*Charges or Costs.*—Charges for compressing cotton are made in most instances on a per-bale basis, but in some instances they are based on actual weight. Rates charged for compression to standard density usually are somewhat lower than those for high density. In the 1958-59 season, rates for standard density averaged \$1.43 for the United States, and averages by States ranged from \$1 per bale in Missouri and Tennessee to \$1.72 in New Mexico; for high density, the United States average rate was \$1.65 per bale, and averages by States ranged from \$1.40 in Arkansas, Louisiana, Mississippi, Missouri, and Tennessee to \$1.81 in California (table 9). United States average rates for standard-density compression increased from 62 cents per bale in 1939 to \$1.43 in 1958, and the rates for high-density compression increased from 72 cents in 1935 to \$1.65 in 1958.

If the proportions of the 1957 crop compressed to standard and high density were about the same as those for the 1937 crop, total charges for this compression amounted to the equivalent of about \$1 a bale for the entire 1957 crop. Several services, other than compressing, such as weighing, sampling, marking, insuring, reconditioning, and storing cotton, also are performed by the compress industry. Of the total revenue of compress companies in the 1932-38 season, for example, only about 30 percent was derived from the compression of cotton, whereas about 50 percent was obtained from storage and 20 percent from other services (125).

*Means of Reducing Costs.*—Since large proportions of the total revenues of compress companies are derived from services other than the compression of cotton, the extent to which compress charges could be reduced may be influenced considerably by efficiencies in the other services and the charges made for them. Compression of cotton to greater density at the gin has been proposed as a means of reducing costs of compression and related services. That would require more powerful equipment at gins and this in turn would probably require increased volumes of ginning at some individual gin plants to obtain the greatest net benefits from the use of this equipment. The technological and economic feasibility of using higher density compresses at gins apparently has been demonstrated, and in the 1956-57 season about 109 higher density presses were in operation (95). Reports during the early developmental stage indicated that substantial savings were likely to result from the use of these presses (126). Research has been undertaken to show the relative costs and efficiencies of pressing cotton at gins into denser and more compact bales than the traditional low-density bales.

TABLE 9.—Average charges per bale for compressing cotton, by type of compression and by States, specified years, 1935-58<sup>1</sup>

Standard density

State	Year beginning August—									
	1935	1939	1947	1949	1951	1953	1955	1956	1957	1958
	<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>	<i>Cents</i>
Alabama.....	70	61	98	99	116	121	120	128	129	129
Arkansas.....	62	60	95	100	100	115	82	100	101	102
California.....	108	100	130	140	140	108	107	168	168	168
Georgia.....	60	59	100	100	108	115	116	128	129	130
Louisiana.....	75	61	96	103	111	127	113	125	121	124
Mississippi.....	62	60	95	101	102	116	95	104	103	105
Missouri.....	57	60	95	100	100	115	88	100	100	100
New Mexico.....	67	76	125	150	160	163	163	169	175	172
Oklahoma.....	60	76	100	125	125	130	130	134	142	140
South Carolina.....	75	50	93	100	104	119	119	129	130	133
Tennessee.....	60	60	95	100	100	115	82	100	100	100
Texas.....	62	76	101	128	132	145	145	148	164	163
United States....	64	62	98	107	119	135	120	131	142	143
	High density									
Alabama.....	75	70	100	102	125	129	125	130	145	147
Arkansas.....	75	75	115	125	125	140	107	138	140	140
California.....	103	100	130	140	150	178	177	178	178	181
Georgia.....	75	65	100	100	119	125	125	137	146	143
Louisiana.....	75	68	108	118	124	138	128	139	140	140
Mississippi.....	75	75	115	126	128	140	119	140	140	140
Missouri.....	75	75	115	125	125	140	122	140	140	140
New Mexico.....	79	79	150	175	185	185	185	185	185	180
Oklahoma.....	60	76	100	125	125	135	135	138	150	150
South Carolina.....	75	65	102	102	112	125	125	129	143	138
Tennessee.....	75	75	115	125	125	140	106	140	140	140
Texas.....	68	76	103	128	134	146	146	150	165	163
United States....	72	77	110	129	134	153	146	155	164	165

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

Adapted from reports of Agricultural Marketing Service.

#### Storage and Insurance

Cotton in large quantities is held from the time it is ready for market until it is needed by mills. World stocks of American cotton on August 1 increased from a low point of 3,600,000 bales in 1951 to 15,300,000 bales in 1956, and then decreased to 10,500,000 bales in 1958. In addition, most of the American crop usually is ready for market during the first half of the crop year. Cotton in these stocks and that from the current crop needs protection to avoid or minimize deterioration, and to prevent destruction by fire and other hazards. These services are performed by warehouses with or without compressing facilities.

*Charges or Costs.*—Charges for storage and insurance vary from year to year, from one State or region to another, and with the size

of the bale (table 10). In the 1958-59 season, monthly charges for uncompressed cotton, or for compressed cotton for which no differential was provided, averaged 49 cents per bale per month for the United States. Averages by States ranged from 43 cents in California to 55 cents in Georgia. Average rates for the United States increased from 20 cents in 1939 to 49 cents in 1958, but this increase was proportionally less than the advance in cotton prices.

TABLE 10.—Average monthly charges per bale for storing cotton, by States, specified years, 1935-58<sup>1</sup>

State	Year beginning August—									
	1935	1939	1947	1949	1951	1953	1955	1956	1957	1958
	<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>	<i>Cents</i>
Alabama.....	20	23	31	37	41	47	47	48	50	54
Arizona.....	20	20	(?)	(?)	30	40	40	43	45	45
Arkansas.....	25	15	30	34	34	44	38	38	45	47
California.....	20	20	25	30	30	42	42	43	43	43
Georgia.....	20	22	30	35	46	50	51	50	51	55
Louisiana.....	18	20	30	32	35	43	42	46	45	48
Mississippi.....	25	19	30	33	35	43	39	37	45	46
Missouri.....	25	15	30	33	33	43	35	35	45	46
New Mexico.....	25	25	40	36	37	45	49	49	47	49
North Carolina.....	25	25	(?)	(?)	40	44	45	39	47	49
Oklahoma.....	15	15	30	40	45	50	50	50	50	50
South Carolina.....	25	25	32	38	41	45	47	47	47	51
Tennessee.....	25	15	30	33	36	44	37	39	46	47
Texas.....	23	23	32	36	40	46	47	47	51	52
United States.....	22	20	30	34	37	45	43	43	47	49

<sup>1</sup> Based on published tariffs of major units of the public cotton warehouse industry chiefly represented by those with compress facilities. Most of the storage companies included insurance in the storage charge.

<sup>2</sup> Data insufficient for reporting.

Adapted from reports of Agricultural Marketing Service.

Because of differences in space required, rates charged by many 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 flat gin bales, averaging 17 cents per bale per month for compressed and 24 cents for uncompressed bales. Compress establishments that do not provide differential rates usually compress all cotton upon arrival or reserve the right to compress the cotton in the event of a shortage of storage space (125).

Carryover of American cotton in the United States on August 1, 1957, totaled 11,284,000 bales. The 1957 crop of American cotton totaled 10,900,000 bales, most of which was made ready for market during the first half of the crop year. Domestic consumption of this cotton during the 1957-58 season totaled about 7,936,000 bales. Under these conditions, the quantity of American cotton ready for storage during the 1957-58 season averaged about 12,240,000 bales. If this cotton were all stored and insured until needed by mills or exported at the average monthly rate of 47 cents per bale, storage

and insurance charges that season would have amounted to about \$69,033,600, or about \$6.33 for each bale of the 1957 crop.

Storage and insurance charges for American cotton in the United States, exclusive of that exported, averaged about \$3.32 per bale in the 1957-58 season. Similar charges for other years amounted to about \$3.00 in the 1954-55 season, \$1.50 in the 1947-48 season, and \$1.58 in the 1939-40 season. All this cotton may not have been stored and insured all the time, but losses on the average 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. Compression of cotton to higher density before storage might reduce costs of storage as much as 25 percent, the 1938-39 data indicate (125). In some instances, rates may be reduced considerably by increasing the period of continuous storage. Substantial savings apparently would result from use of adequate machinery and equipment for handling, weighing, and stacking the cotton, and from a convenient system of arranging the bales so they could be shipped out with minimum handling (6, 72, 73, 123, 124).

As storage and insurance are, in many instances, provided in connection with related services, such as receiving, sampling, marking, and compressing, any economies in organization or operation of the combined business would make possible a reduction in charges for storage and insurance. Use of any excess storage space for other commodities also might be advantageous.

#### Transportation

Cotton shipped from interior compress points may go to interior concentration points, to ports, or to domestic mills. Data showing the proportions moving to these outlets in more recent years are not available, but during the 1938-39 season, about 6 percent of this cotton went to interior concentration points, 53 percent went to ports, and 41 percent went to domestic mills. These proportions vary considerably for compress points in different areas (125). Most of the shipments from compress points that season were made by rail.

*Charges or Costs.*—Charges for transporting cotton usually are based on fixed schedules of rates relating to size of load and distance shipped. Estimates based on freight revenues and values of cotton transported on Class 1 railroads, on indexes of freight rates, and on other information indicate that charges for rail transportation of cotton in the United States increased from an average of about \$2.80 per bale in 1939 to \$3.90 in 1947, and to \$5.45 in 1954, then decreased to \$4.85 in 1957 (92). Average distance hauled for cotton shipped by rail probably was considerably greater than that for cotton shipped by truck, but freight rates for rail transport may not include costs of trucking cotton to and from railroads.

During the 1956-57 season, standard transportation charges for cotton shipped from Bakersfield, Calif., averaged \$9.15 per bale to Carolina (Group B) mills, and \$10.45 to New England mills. Charges for cotton shipped from Dallas, Tex., averaged \$5.60 per bale to Carolina mills and \$7.05 to New England mills. From Greenwood, Miss., the charges averaged \$4.25 per bale to Carolina

mills and \$6.10 per bale to New England mills. Transportation charges for cotton shipped to Bremen, Germany, averaged \$12.55 per bale from Bakersfield, \$11 per bale from Dallas, and \$11.75 per bale from Greenwood. Similar charges for cotton shipped to Osaka, Japan, averaged \$11.80 per bale from Bakersfield, \$12.80 per bale from Dallas, and \$13.70 per bale from Greenwood (17a).

Indexes of rail freight rates for cotton increased from 78 percent of the 1947-49 average in 1945 to 128 percent in 1953 and 1954, then decreased to 119 percent in 1957. From 1945 to 1953, the indexes for cotton increased more than the corresponding indexes for fruits and vegetables, but less than for livestock, meats, and wheat. From 1953 to 1957, annual rail freight rate indexes for cotton decreased while those for livestock, meats, wheat, and fruits and vegetables continued to increase (92).

*Means of Reducing Costs.*—Means of reducing costs of transporting cotton may include lowering of freight rates, reduction or elimination when feasible of crosshauls and backhauls, loading cars to capacity to obtain minimum rates, use of through-rate privileges whenever possible, and substitution of other transportation for rail when savings in charges are available. The decrease in the index of freight rates for cotton since 1953 and the apparent increase in proportion transported by trucks indicate that some of these means are already being used. Data on carloads and less-than-carload rates on cotton from interior points to ports and to domestic mills indicate that less-than-carload rates may range up to 25 percent greater than carload rates.

#### Financing

Cotton merchants buy the large volumes of cotton sold by farm producers during or soon after harvest, and supply the demands of spinners for cotton throughout the year. This requires the financing of cotton from the time it is ready for marketing until it is needed for consumption by mills. Information as to the average length of time cotton is financed is not complete, but the world carryover of American cotton on August 1 has ranged from less than one-fourth of production in 1951 to 25 percent more than production in 1957. Most of the crop usually is harvested and sold by farm producers during the first half of the crop year, whereas mill consumption of cotton is distributed fairly uniformly throughout the year. The average quantity of American cotton carried in stocks during the year varied from about 52 percent of the crop in the 1951-52 season to about 113 percent more than the crop in the 1957-58 season.

*Charges or Costs.*—Interest charges for financing the holding of cotton range from as low as 2 percent or less for the larger merchants to as much as 5 percent or more for the smaller local merchants who obtain funds from local banks. In recent years, large quantities of cotton have been carried as collateral for Commodity Credit Corporation loans to farm producers at an interest rate of about 3.5 percent. On the basis of an average interest rate of 4 percent, interest charges amounted on the average to about 15 cents per bale per month in the 1939-40 season, when farm prices averaged 9.09 cents per pound; 53 cents in the 1947-48 season, when farm prices averaged 31.93 cents; 67 cents in the 1950-51 season, when farm prices averaged 40.07 cents; 56 cents in the 1954-55 season,

when farm prices averaged 33.61 cents; and 49 cents in the 1957-58 season, when farm prices averaged 29.23 cents.

The length of time individual bales were financed ranged from a few to many months. American cotton available in the United States for financing averaged about 12,240,000 bales during the 1957-58 season. If this cotton were all financed at a rate of 4 per cent per year, costs of this financing would have been about \$72 million, or about \$6.63 per bale for the 1957 crop.

Costs of financing American cotton in the United States, excluding that exported, averaged \$4.10 per bale in the 1957-58 season. Similar costs for other years averaged about \$4.15 in the 1954-55 season, \$2.65 in the 1947-48 season, and \$1.60 in the 1939-40 season.

*Means of Reducing Costs.*—As the costs of financing cotton are based on the interest rate charged, the value of the cotton, and the length of time it is financed, a decrease in interest rate, 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 would 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 carryover. The increase in world carryover of American cotton on August 1 from 3,600,000 bales in 1951 to 15,300,000 bales in 1956 was responsible for a substantial increase in cost of financing. A reduction in carryover to more nearly normal amounts would contribute in an important way toward reducing costs of financing cotton.

#### Other Services

Marketing services other than ginning and baling, receiving and related services, compression, storage and insurance, transportation, and financing, 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, to facilitate its sale from one to several times, and it may be assembled more than once during its passage through commercial channels to mills. Merchants, particularly the larger ones, usually hedge their market interests or position in spot cotton by offsetting transactions in futures markets, but not all the risks of loss from price changes may be offset by this means (36, 37). The general practice is for buyers to make deductions for any failure of the cotton delivered to meet specifications as to weight and quality, but usually no credit is allowed for over-weight 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, legal and other professional services, and profits.

*Charges or Costs.*—Data relating to charges or costs for these other services in marketing cotton are not complete. Data for representa-



tive cotton merchants in 12 selected spot markets in the southeastern, south central, and southwestern areas of the Cotton Belt show estimated costs, in the 1951-52 season, of assembling and merchandising cotton from these markets to the Carolina Group B mill area (15). Estimates by markets show that costs of concentration ranged from about 70 cents to \$1.15 a bale, and averaged 90 cents. Costs of interest and exchange (cost of handling drafts for payment of money) ranged from 45 cents to \$1.20, and averaged 75 cents a bale. Costs of hedging and insurance ranged from 30 to 55 cents, and average 40 cents. Estimated costs of mill brokerage and other selling expense ranged from 25 to 85 cents, and averaged 55 cents. Margins for overhead and profits ranged from \$2 to \$4.05, and averaged \$2.70 a bale.

Information on other charges for marketing cotton are not complete. In the 1956-57 season, standard charges for buying and local handling of cotton at points of origin were \$1.20 per bale in Bakersfield, Calif.; 90 cents in Dallas, Tex.; and 95 cents in Greenwood, Miss. Charges for taking cotton in mixed lots and concentrating it in even-running lots were \$1.40 per bale in Bakersfield, \$1.60 in Dallas, and 70 cents in Greenwood. Selling and other costs not previously reported averaged about 90 cents per bale in Bakersfield and Greenwood and 85 cents in Dallas. These charges are for cotton shipped to Carolina and New England mills. For cotton shipped to Germany or Japan, charges for buying and local handling, concentration, selling, and other costs than compression, transportation, interest, storage, and insurance averaged about \$8 per bale (17a).

*Means of Reducing Costs.* Merchandising raw cotton appears to be a highly competitive business, and possibilities of bringing about any substantial reductions in costs of the marketing services, without changing marketing methods and practices, therefore 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 gin, cotton yard, or warehouse. In recent years, increased quantities 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 damage to bale coverings, contamination and waste of cotton, and increased 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:

- (1) That the sample classified 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; (2) that the classifications be made in accordance with uniform standards upon the basis of which the quality of cotton can be described for commercial purposes with reasonable accuracy; (3) that the classifications be made by competent and reliable classifiers under conditions conducive to accurate classification; (4) that facilities be provided for assembling the samples, recording the classifications on convenient

forms and for making the information available in time for use in selling the cotton; and (5) that sellers and buyers have enough confidence in the classification service to be willing to sell and buy cotton on the basis of this information (35).

All these requirements are not likely to be fully met within the immediate future. But in recent years progress has been made toward the development and use at gins of automatic cotton samplers designed to provide a sample more representative of cotton throughout the bale, to reduce the amount of cotton removed by multiple sampling, and to minimize damage to bagging from cutting and to cotton from exposure (29). Official standards for grade and length of staple 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 usefulness of classifications based on official standards. Measures of differences in fineness, strength, and other fiber properties, in addition to grade and staple length, have been developed and are used to a considerable extent in marketing. 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 handled in many local markets. In many instances, the volume handled is so small that it is not feasible to provide facilities adequate for efficient services such 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 volume handled would support efficient modern facilities and 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 developments in the evaluation and standard measures of the quality elements in cotton, in classification services available to growers, and in market news so that prices to growers would reflect better 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 have increased considerably in recent years, but the proportions of such costs to total costs of cotton to mills continue substantially below what they were in 1939 (table 11). Although charges for ginning and baling increased from an average of about 0.8 cent a pound of lint in 1939 to 2.6 cents in 1957, the proportion of the average price of cotton to mills accounted for by these charges was greater in 1939 than in any other recent year. Estimated gross margins for merchandising cotton increased from about 1.80 cents a pound in 1939 to 3.81 cents in 1957, but the proportions of prices to mills accounted for by these margins decreased from 16.5 percent in 1939 to 7.8 percent in 1947, then increased to 11.4 percent in 1957.

TABLE 11.—Approximate average gross margin per pound and proportion of total cost of producing and marketing American cotton, by items, specified years, 1939-57

Item	Year beginning August—			
	1939	1947	1954	1957
Farm production <sup>1</sup> .....	<i>Cents</i> 8. 27	<i>Cents</i> 30. 36	<i>Cents</i> 31. 28	<i>Cents</i> 26. 88
Ginning and baling <sup>2</sup> .....	. 82	1. 57	2. 33	2. 64
Farm price.....	9. 09	31. 93	33. 61	29. 52
Receiving and related services <sup>3</sup> .....	. 05	. 10	. 14	. 16
Compressing <sup>3</sup> .....	. 09	. 14	. 19	. 20
Storage and insurance <sup>4</sup> .....	. 32	. 30	. 60	. 66
Transportation <sup>5</sup> .....	. 56	. 78	1. 09	. 97
Financing <sup>6</sup> .....	. 32	. 53	. 83	. 82
All other <sup>7</sup> .....	. 46	. 85	. 95	1. 00
Total merchandising margins.....	1. 80	2. 70	3. 80	3. 81
Average cost to mill.....	10. 89	34. 63	37. 41	33. 33
	Proportion of cost to mill			
Farm production <sup>1</sup> .....	<i>Percent</i> 76. 0	<i>Percent</i> 87. 7	<i>Percent</i> 83. 6	<i>Percent</i> 80. 7
Ginning and baling <sup>2</sup> .....	7. 5	4. 5	6. 2	7. 9
Farm price.....	83. 5	92. 2	89. 8	88. 6
Receiving and related services <sup>3</sup> .....	. 5	. 3	. 4	. 5
Compressing <sup>3</sup> .....	. 8	. 4	. 5	. 6
Storage and insurance <sup>4</sup> .....	2. 9	1. 0	1. 6	2. 0
Transportation <sup>5</sup> .....	5. 2	2. 2	2. 9	2. 9
Financing <sup>6</sup> .....	2. 9	1. 5	2. 2	2. 4
All other <sup>7</sup> .....	4. 2	2. 4	2. 6	3. 0
Total merchandising margins.....	16. 5	7. 8	10. 2	11. 4
Average cost to mill.....	100. 0	100. 0	100. 0	100. 0

<sup>1</sup> Includes hauling to gin. <sup>2</sup> 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. <sup>3</sup> Based on information reported by Agricultural Marketing Service. <sup>4</sup> Average number of bales of American cotton in United States, excluding that exported, multiplied by average rate for storage and insurance, and the result divided by the number of bales of American cotton consumed domestically. <sup>5</sup> Based on data reported by U.S. Department of Agriculture and Interstate Commerce Commission, and partly estimated. <sup>6</sup> Farm value of average number of bales of American cotton in United States, excluding that exported, stocks, multiplied by 4 percent and the result divided by the amount of American cotton consumed domestically. <sup>7</sup> Estimated and including an allowance for profits.

If costs of ginning, baling, and merchandising cotton had been reduced by 10 percent during the 1957-58 season, the reduction would have amounted to about 0.7 cent a pound, or about 2.5 percent of returns to growers for farm production and 0.03 percent of costs to consumers of the finished apparel and household goods made of cotton. A reduction of 10 percent in charges for ginning and baling would have amounted to about 0.26 cent a pound, or about 0.9 percent of returns to growers for farm production and 0.01 percent of

costs to consumers of the finished apparel and household goods. Reductions of 10 percent in merchandisers' gross margins would have amounted to about 0.42 cent a pound, or about 1.5 percent of returns to growers for farm production and 0.02 percent of costs to consumers of the finished apparel and household goods.

## MARKETING MARGINS FOR WOOL

All wool produced in the United States is apparel wool and large quantities of apparel wool are imported over a tariff duty of 25.5 cents a pound, clean basis. In 1958, about 129 million pounds, clean basis, were produced in the United States, and 67 million pounds of apparel wool and 121 million pounds of carpet wool were imported (92).

Production of wool in this country decreased from 221 million pounds, scoured basis, in 1942 to about 120 million pounds in 1950; increased to 136 million pounds in 1954, and then declined to 129 million pounds in 1958. During the 5 years 1946-50, imports for consumption of apparel wool averaged 277 million pounds a year and ranged from 155 million pounds in 1949 to 473 million in 1946. These imports decreased from 272 million pounds in 1951 to 67 million in 1958.

Carpet wools are admitted into this country free of duty. During the 5 years 1946-50, imports of carpet wool for consumption averaged about 175 million pounds a year, clean basis, and ranged from about 118 million pounds in 1949 to 233 million in 1948. After 1950, these imports ranged from 89 million pounds in 1951 to 136 million in 1955 and amounted to 128 million in 1958.

Most of the wool produced in the United States is "shorn wool," obtained by shearing live sheep. Considerable quantities of "pulled wool" are obtained by pulling the wool from skins of slaughtered sheep. The small quantities obtained by detaching the wool from carcasses of sheep which died on the range or farm are known as "dead" or "murrain" wool. During the 5 years 1946-50, shorn wool accounted for about 85 percent, and pulled wool about 15 percent, of total production in the United States. In 1957 the proportions were 80 percent and 20 percent, respectively.

Production of shorn and pulled wools is widely distributed over the United States. Every State produces some shorn wool. In 1958, for example, production of shorn wool ranged from about 14,000 pounds in Rhode Island to about 40 million in Texas. The 10 largest wool-producing States that year, listed in order, were Texas, Wyoming, California, Montana, Colorado, Utah, South Dakota, Iowa, Idaho, and New Mexico. Production by these 10 States made up about 66 percent of the total for the United States in 1958. Pulled wool is produced mainly in large slaughtering and meatpacking plants at such centers as Chicago, San Francisco, New York, Denver, and Philadelphia, but considerable quantities are produced in wool pulleries, independent of major meatpacking plants.

### Methods and Practices

Marketing wool in the United States involves the handling of domestic shorn and pulled wool, and also imported shorn and pulled wool. Stocks of wool near the first of April, plus production and

imports for consumption, decreased from about 1,304 million pounds, grease basis, in 1946 to 524 million pounds in 1954, and amounted to 483 million pounds in 1958 (92). During the 5 years 1953-57, domestic shorn and pulled wool accounted for about 44 percent, imported apparel wool for 28 percent, and carpet wool for 28 percent of the total handled by the wool industry in this country (92). These proportions vary considerably 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 most of the farm producers sell their wool at or soon after shearing time; hence, most of the shorn wool produced in the United States usually is sold by producers in the spring or summer. Data on farmer marketings indicate that in recent years as much as four-fifths of the total clip was sold by farm producers from April to July, inclusive. But practices with regard to time of selling vary considerably. In some years, considerable quantities of wool are sold by growers well in advance of shearing. Furthermore, in some years considerable proportions of the clips are consigned by producers to handlers, including farmers' cooperative associations, and may not be sold for several months or for 1 or more years.

Wool as it comes from sheep varies widely in fineness, length, strength, and other characteristics of the fibers, and in the kinds and amounts of foreign matter mixed with it. Producers and many buyers in producing areas are unable to evaluate these quality elements accurately as a basis for selling and buying wool. Consequently, much wool is sold, especially by producers, on a more or less flat price basis, with little variation in prices on the basis of quality of individual lots. Such pricing offers little inducement to farmers and ranchmen to improve the quality and preparation of the wool offered for sale.

Lack of availability and of use of uniform standards for all the chief elements of quality in wool, and of adequate classification and market information services, may help to account for the failure of prices to producers to reflect more of the differences in quality and preparation of the wool. Official United States standards for grades of wool, based on fineness or diameter of the fibers, were established in the 1920's, and amendments to these standards were proposed in 1955 but the amendments have not been accepted in the wool trade (98, 100). Facilities and methods have been developed for taking adequate samples and for measuring the shrinkage or yield of wool, but official standards for length, strength, color, and other quality elements of the fibers are not available. Technical and other problems involved in evaluating the quality elements and yield of wool are such that only small proportions are graded at shearing pens as a basis for sale by producers.

Marketing operations required in taking wool from farms and ranches and delivering it to manufacturers involve such marketing services as assembling, transporting, grading, storing, financing, and merchandising. Marketers engaged in these operations, classified on the basis of the nature and extent of the services and other functions performed, include brokers, commission agents, dealers, and topmakers. But a firm may engage in two or more types of operations during any marketing season.

Brokers arrange for the purchase or sale of wool and are paid a fee for their services, but usually they handle neither the physical wool nor the financial settlement for it. They take no part in the grading, sorting, or other preparation of the wool. Some brokers with purchase orders from eastern merchants or mills go west and buy specified quantities of selected types of wool to meet special requirements. They usually pay the grower by draft and attend to shipping the wool (117).

Commission agents, including farmers' cooperative marketing associations, receive wool on consignment, take responsibility for its care and preparation while it is held for sale, sell to and collect from buyers, deduct expenses and commissions, and remit the balance to the owner. The volume of wool consigned to agents usually is greatest in years when prices at shearing time are relatively low. Such prices may induce many growers to store substantial quantities of wool in anticipation of higher prices. Growers who belong to cooperative associations usually agree to consign their entire clip to the association (16).

Dealers buy and take outright possession of the wool, usually pay the full price at the time of purchase, and sell it as advantageously as possible for their own account. They commonly do a great deal of grading, sorting, and other preparation of wool, especially wool of the domestic clip. A variation from the ordinary dealer type of operation is the practice of contracting for the purchase of wool before it is shorn. The contracts specify the amounts to be delivered and the prices to be paid. Since it is impossible to estimate wool shrinkage accurately before the sheep are shorn, considerable risks of loss from underestimates of shrinkage, as well as from changes in prices, are involved. Because of these risks, buyers are necessarily conservative in the prices they offer.

Marketing practices involved in taking wool from growers and delivering it to manufacturers vary considerably from one area to another, with differences in size of individual clips, and with other factors. In territory States (the 11 western States), where many of the clips are large, much of the wool is sold at the ranch by the producer to agents of central market dealers, particularly those in Boston. When possible, buyers inspect the clips at the shearing shed during the shearing season as a basis for estimating shrinkage and quality. When such inspection is not feasible, the wool may be examined in the barn on the grower's ranch, or it may be bought, without inspection, on the basis of knowledge of previous clips of the same producer (12). Soon after the purchases are made, the wool usually is shipped to the central market for storage, preparation, processing, and manufacturing.

In Texas, usually a large part of the wool is delivered to local warehouses for storage and sale. Warehouse operators provide facilities for concentrating wool in volumes large enough for efficient handling, prepare it for storage and sale, display sample bags for inspection by buyers, and grade some of the wool as a basis for sale. Sales usually are made by private treaty, but some warehouses also make use of sealed bids. Many warehouse operators buy some wool from producers who have small clips, and a few operators buy large quantities of wool each year (11).

In "fleece-wool States," (all except Texas and the 11 western States) where clips usually are small, most of the wool is sold by

producers to country dealers, who assemble it in larger lots for sale to the larger merchants or for storage in their own warehouses. Many merchants in the larger cities buy wool from country buyers and resell it to merchants in central markets. In many instances the wool is ungraded, but in others it may be roughly graded into three classes as fine, medium, and rejects. Some dealers in central markets send their agents to the smaller towns or to farmer-owned warehouses to buy wool suited to their needs. This wool is shipped to the larger concentration points, where it is graded and otherwise prepared on the basis of mill requirements, and sold to manufacturers (117).

Substantial quantities of wool are marketed through cooperative marketing associations. The methods used in physical handling, showing, and selling wool through these associations are similar in most respects to those of other agencies. The proportion of 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 24 percent during the 6 years 1952-57.<sup>3</sup>

Topmakers usually buy some of their wool outright from dealers in eastern markets. But some buy much of the wool used directly from original sources in the West and Southwest through buyers in producing areas. Some topmakers sort this wool, but others have it sorted by commission combers, who sort and blend the wool according to instruction. Operations of topmakers usually are closely allied with those of the manufacturers to whom they sell their products.

Large proportions of the shorn wool produced in this country, as well as that imported, are handled by dealers in central markets. A large proportion of these firms are in Boston. More than 280 wool dealers in Boston were listed in Davidson's Textile Blue Book for 1957 and about 60 of them were members of the National Wool Trade Association that year. Dealer houses vary greatly in size of organization and in kind and volume of wool handled. A small house may have only one traveling buyer, five or six resident agents in producing areas, and one salesman. A large house may have 2 or 3 traveling buyers, 40 or 50 resident agents in producing areas, and 3 or 4 salesmen. Quantities of wool handled annually by individual dealers range from less than 1 million pounds to more than 20 million.

Most of the wool is bought by resident agents on commission under the supervision of traveling buyers. In addition to buying wool and soliciting consignments for dealers, resident agents see that wool bought is properly shipped. They also keep dealers posted on wool growing conditions, current prices in the country, and the activities of competitors (28).

Dealers grade or otherwise prepare wool and try to sell it to topmakers and manufacturers at prices that will net them a profit. Dealers' salesmen contact processors or manufacturers, describe their wool or show small samples, quote prices, and try to interest them in buying the dealers' holdings. If interested, the consumer examines the wool in the dealer's warehouse before definitely deciding to buy it. If the wool is graded, he looks at as many as 25 to 50

<sup>3</sup> Data supplied by Walter L. Hodde, Farmer Cooperative Service.

fleeces from each pile stacked on the warehouse floor. If the wool is not graded, he selects 5 to 10 percent of the bags and examines from one-third to one-half of the fleeces in each bag selected. Generally the fleeces are examined in the dealers' well-lighted sample and show rooms (28).

Substantial proportions of the wool are graded at warehouses at concentration points such as Boston, Philadelphia, Minneapolis, Denver, Salt Lake City, and other cities in the Midwest and South, and in the West Coast cities of Portland and Stockton. The amounts graded in central markets plus that graded in the country apparently total about half of the clip. The other half moves to consumers in original bags (117). 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 (117).

Domestic pulled wool usually is sold by meat packers, through their Boston offices, direct to consumers. Offers and sales of this wool are made on the basis of small samples. A 2-pound sample may represent 20,000 pounds. If the consumer finds that the wool received is not equal in quality to that in the sample, he may reject it. Some pulleries sell direct from their plant to consumers through traveling salesmen or by correspondence, and others sell through commission agents in Boston (28).

### Charges or Costs

Data relating to costs of marketing wool in recent years are incomplete. 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 supply a basis for indicating the margins or costs involved. Cost data for more recent years supply a basis for indicating changes since 1946.

Data on 106 million pounds of grease wool 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 41.34 cents, and merchandising margins averaged 5.69 cents a pound, or about 12 percent of the Boston price (table 12). 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.



TABLE 12.—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 <sup>1</sup>		
	1,000 pounds	Percent	Cents	Cents	Cents	Cents	Cents	Cents	Cents
United States.....	105,609	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	5.396	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	2.75	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.....	( <sup>2</sup> )	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.....	( <sup>2</sup> )	56.0	46.71	39.96	6.750	1.75	2.25	1.125	1.625
Maine, Massachusetts, New Hampshire, New Jersey, and Vermont.....	( <sup>2</sup> )	45.3	57.20	51.45	5.750	1.75	2.25	1.125	.625
Maryland and North Carolina.....	2	54.6	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

<sup>1</sup> Includes country service.

<sup>2</sup> Less than 500 pounds.

Adapted from data in a report, Domestic Wool Clip—Grades, Shrinkage, and Related Data Based on Purchases from the 1946 Clip by the Commodity Credit Corporation, and from data on merchandising margins, from the former Production and Marketing Administration (112).

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, and other items. Usually scouring and other processing are not included in these services. Data concerning costs of rendering these services are not complete, but information on 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, indicates 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 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 12). 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 charge 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 3 percent a year on the investment, averaged 1.125 cents a pound. 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 12).

Data on 169 million 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 13). 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 quality 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 13). 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 on more than 6 million 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 80.90 cents, and merchandising margins averaged 27.08 cents, or 25 percent of the Boston price (table 14).

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 4.8 cents a pound, or 4.4 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 3.4 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 4.7 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.

Volume of wool handled by the Commodity Credit Corporation decreased markedly after 1946, and since 1949 very little wool was purchased or acquired as collateral under the loan program. The National Wool Act of 1954 provided for incentive payments, instead of the price support loan program, for the 4 marketing seasons of 1955-58, and the Agricultural Act of 1958 extended the incentive program through 1961.

Maximum charges for handling wool permitted in the wool handler's agreement for the 1954 price support loan program supply a basis for indicating changes in costs since 1946. Maximum charges in 1954 for handling amounted to 4.75 cents a pound for lots of less than 2,000 pounds, 3.5 cents for lots of 2,000 to 5,000 pounds, and 2.25 cents for lots in excess of 5,000 pounds. Charges for country services of accumulating and assembling small lots of less than 2,000 pounds were listed at 1.5 cents a pound. Grading charges were 2.25 cents a pound for lots of less than 2,000 pounds and 1.5 cents for lots of 2,000 pounds or larger. Charges made by handlers in 1956 and 1957 apparently averaged about the same as those indicated for 1954. Charges for freight and trucking in 1956 averaged about two-thirds greater than 10 years earlier.

TABLE 13.—*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		Merchandising margins					
			At Boston	To growers	Total charges	Handling		Grading charges	Service and appraisal	Freight <sup>1</sup> and trucking
						Primary	Secondary <sup>1</sup>			
	<i>1,000 pounds</i>	<i>Percent</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>
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	54.25	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	59.62	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

<sup>1</sup> Includes country service.

Adapted from data in a report, Domestic Wool Clip—Grades, Shrinkage, and Related Data Based on Purchases from the 1946 Clip by the Commodity Credit Corporation, and from data on merchandising margins, from the former Production and Marketing Administration (112).

TABLE 14.—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 <sup>1</sup>			
	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

<sup>1</sup> Includes country service.

Adapted from data in a report, Domestic Wool Clip—by Grades, Shrinkage, and Related Data Based on Purchases from the 1946 Clip by the Commodity Credit Corporation, and from data on merchandising margins, from the former Production and Marketing Administration (112).



## Means and Importance of Improvement

Improvement of the marketing services for wool would need to be based on data showing the comparative advantages and disadvantages of performing such marketing services as skirting, grading, sorting, scouring, packaging, storing, and processing wool at different locations, by different agencies, and by use of different facilities and methods. Results of analysis should show the influence of the different factors 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 is limited. Specific suggestions regarding means of improvement must be limited accordingly.

Development and use of more adequate classification and market information services for selling and buying wool on description would be an important improvement. Maximum benefits from such developments would require: (1) Provisions for obtaining representative samples of the wool and correctly identifying them with the lots of wool from which they were drawn; (2) uniform standards upon the basis of which all important quality elements of wool can be described for commercial purposes with reasonable accuracy; (3) the services of competent and reliable classers or appraisers, facilities conducive to accurate classifications or evaluations, and means for adequate supervision of the classifications by a competent and reliable agency; (4) facilities for assembling the samples, recording the classifications or evaluations on convenient forms, and making the information available to producers and buyers in time for them to use it in selling and buying the product; (5) 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.

Problems in meeting these requirements and some means of dealing with them are:

1. *Availability of wool for sampling.*—Wool may be sampled at the ranch, at the warehouse, or at other concentration points. Where flocks are large, samples may be taken at the ranch, but for small farm flocks, samples may need to be taken at warehouses or at other concentration points. Data for 1950, for example, show that, for the United States as a whole, about 96 percent of the farms and ranches reporting sheep and lambs shorn had flocks of less than 300 sheep and lambs, and about 43 percent of the sheep and lambs shorn were accounted for by these small flocks. The large number of farms and ranches with small flocks of sheep and lambs shorn, along with variations in quality of the wool, complicate the problem of sampling wool at ranches and farms. It may be advisable to assemble the wool from these small flocks at warehouses or at other concentration points, grade or otherwise prepare it, and combine it into lots of adequate sizes, preferably of at least fairly uniform quality, before sampling it.

2. *Adequacy of the samples.*—The adequacy of the sample from a lot of wool is determined largely by the quality of the wool, the number of bags or bales sampled and the parts of them from which the sample is drawn, the method of obtaining the sample, and the care taken in handling and conditioning it. Lots that are uniform in quality throughout offer few difficulties in obtaining representative

samples, but those containing wool of different qualities in the same and different bags or bales offer real difficulties. Such variations complicate the problem of determining the bags or bales to be sampled, the parts of the bags or bales to be sampled, and the equipment to be used in drawing the sample.

Differences in results of analyses of samples from the same lot of wool may be great enough to result in substantial gains or losses in instances in which wool is bought on the basis of one sample and sold on the basis of another sample from the same lot. Laboratory results show that yields based on 3-inch side-core samples differed from top-noil-waste yields by more than 2 percent for 46 percent of the lots, and by more than 5 percent for about 7 percent of the lots. Yields based on 1¼-inch side-core samples deviated from top-noil-waste yields by more than 2 percent for about 15 percent of the lots (101). If these deviations may be taken as fairly typical of those normally to be expected, the differences appear to be great enough to result in substantial gains or losses in individual instances, if the wool had been bought on yields based on one sample and sold on yields based on another sample from the same lot. But such differences may be compensating in nature, so that for a large number of lots of wool the average yield as indicated by one set of samples may be about the same as that indicated by another set of samples taken in the same way from the same lots.

Important factors affecting the adequacy of a sample of a lot of wool include the competency of the sampler, adequacy of the equipment and method used, provisions for handling and conditioning the sample so that the quality elements can be correctly evaluated, and means for correctly identifying the sample with the wool from which it was drawn. To assure the representativeness of samples and to increase the acceptability of the quality evaluations based on them, provisions may need to be made for having official samples drawn, prepared, and identified by qualified samplers who may be licensed and supervised by a competent and unbiased agency.

3. *Uniform standards for quality.*—The usefulness of classification and market information services in marketing wool depends largely upon the adequacy of the standards for the various quality elements. These elements include all the physical properties of wool that affect its usefulness, such as yield of clean wool, fineness of the fibers, length of staple, uniformity and strength of staple, crimp of staple, and color. Means of determining yield on the basis of core samples have been developed, but apparently there remain some questions with regard to the accuracy or dependability of results obtained by the use of cores of different sizes. Official standards for grades of wool have been developed, but there is some opposition to their use as a basis for selling and buying wool on description. There are no official standards for length, strength, and uniformity of staple; crimp of staple; color; and other quality elements of wool fibers, except fineness.

Development of standards upon the basis of which all the important quality elements of wool can be evaluated and described with reasonable accuracy appears to be essential to the development of effective classification and market information services. As a prerequisite to the development of such standards, all important quality elements of wool would need to be defined and evaluated and adequate methods and techniques would need to be developed for

measuring significant differences in them. These statements are not intended to mean that standards for all quality elements must be satisfactory to all marketing agencies before such a classification and market information service can be initiated. It might be advisable to start with what we have and improve the evaluations, standards, and services as time and opportunity permit.

4. *Variations in classification or evaluation.*—The usefulness of wool classification service is influenced largely by the accuracy of the evaluations of quality elements in the sample, as well as by the representativeness of the sample and by the adequacy of the standards on the basis of which the quality elements are described. Accuracy in evaluating the quality elements in a sample of wool may be materially influenced by the competency of the analyst or appraiser, the method and equipment used, the conditions under which the sample is evaluated, and the physical condition of the sample evaluated. Evaluations of quality elements in individual samples are subject to some variations on the part of almost all analysts or appraisers, even under the most favorable conditions; but, for competent analysts or appraisers evaluating the same samples under similar conditions and on the basis of the same standards, such differences may reasonably be expected to be compensating.

Data available on variations in classification, although limited in volume and scope, show considerable differences, in some instances, between evaluations of the quality elements of wool by competent and unbiased appraisers under favorable conditions. Data for 39 lots of wool, for example, for which estimates of yield were made by industry appraisal committees in the routine manner followed in normal wool buying operations, show that these estimates differed from mill top-noil-waste yields by as much as 8 percent. A substantial proportion of the differences exceeded 4 percent. Evaluations of fineness and length of staple show more or less similar differences. Such differences may be great enough to affect materially the usefulness of a classification service as a basis for selling and buying wool on description. They emphasize the importance of having the quality elements of wool evaluated by competent and unbiased appraisers or analysts, under favorable conditions, and subject to the supervision of a competent and unbiased agency.

5. *Confidence in the adequacy of the classification service and willingness to use it.*—General acceptability and usefulness of a wool classification service to producers and to buyers also depend upon the availability of the service, confidence in the adequacy and dependability of the evaluations, and willingness of producers and buyers to sell and buy wool on the basis of such evaluations. The time intervening between the sampling and sale of wool may be an important consideration in providing producers with a classification service as the basis for selling, especially when producers desire to sell before or immediately after shearing. In addition, the facilities and personnel available, along with the costs involved, also may be important considerations in providing growers with dependable classification service.

Confidence in a classification service may be influenced largely by the dependability of the evaluations, which, in turn, are influenced to a considerable extent by the adequacy of the standards used, the representativeness of the samples, the conditions under which the

samples are evaluated, the competency of the analysts or appraisers, and the way in which the information on evaluations may be used.

Since the dependability of the classifications is influenced by the adequacy of the samples, provision would need to be made for securing samples truly representative of the quality or qualities of wool in the lot and for assuring that each sample is correctly identified with the lot from which it was drawn. Evaluations of the quality elements of wool are such that there may be considerable differences in evaluations of individual samples by competent appraisers, even under favorable conditions. Despite any such limitations, classification of wool on the basis of reasonably adequate standards may be accurate enough for wool to be bought on the basis of the classification of one competent and unbiased appraiser, and sold on the basis of the classification of another, both evaluating the wool under similar conditions, with little if any average gain or loss. Under such conditions, any differences in the classifications of individual lots would be counterbalancing, so that, for a substantial number of lots, little average gain or loss would result from differences in classification.

Confidence in the classifications of wool by competent and unbiased appraisers, evaluating the wool under favorable conditions and under careful supervision, may be materially reduced by permitting the selection of lots that appear to be undervalued, and the rejection of lots that appear to be overvalued, on the basis of other information. Biased or less competent classifiers evaluating wool under less favorable conditions may show greater differences in evaluations and offer greater inducements to select and reject lots on the basis of other information. In addition, differences in value of wool of the same description, when accurately described on the basis of reasonably adequate standards, might be used as a basis for selecting or rejecting individual lots and, if this were permitted, the procedure would tend to undermine confidence in a classification service.

Apparently, one means of building up and maintaining confidence in a classification service would be to provide for sale of all wool by producers on the basis of classification by a reliable agency, and to permit no selections or rejections of individual lots on the basis of other information on quality. Under such situations, differences in value of lots of the same description as a result of variations in classification, and differences in quality of wool of the same description where accurately classified, would be offsetting; therefore, on the average, no significant gain or loss would result from differences in value of wool of the same description.

Any change from the producers' practice of selling wool on the basis of a little information on quality, to the practice of selling it on the basis of a classification service, would require cooperation of wool producers and buyers in the use of this service. It is not known to what extent producers and buyers would cooperate. Producers of the higher qualities of wool would benefit by such a change, but these benefits would be partly at the expense of producers of the lower qualities of wool, who benefit from selling on a flat-price basis, with no premiums or discounts for quality.

In addition to an adequate classification service, wool producers need current information on prices of the various qualities of wool in local and central markets, on the demand and supply situation

for wool, and on market outlets, for use in determining when, where, and at what prices to sell their wool.

Storage and associated services for wool may be improved by use of more suitable buildings, better operating methods, and improved equipment for handling, grading, sorting, packaging, storing, and other services of warehouse operators. Storage space may be more efficiently utilized by compressing the wool to higher density before it is stored. Substantial savings apparently would result from the use of adequate machinery and equipment for handling, weighing, bagging, baling, and stacking the wool and from a convenient system of arranging the bags or bales so they could be shipped out with minimum handling (123, 124). Detailed engineering and cost studies are needed to show more specifically the means by which the adequacy and efficiency of storage and associated services for wool can be improved.

The charge for transportation is one of the largest items of cost involved in marketing raw wool. Efficiency of transportation services may be greatly influenced by the type of transportation agency used, by the condition of the wool and the way it is packaged, and by other factors. Developments in recent years indicate that transportation costs can be reduced substantially by scouring wool near points of origin and by compressing it to higher density in bales weighing from 500 to 1,000 pounds. Additional information is needed to show the conditions under which it would be profitable to sort, scour, and bale wool in producing areas; the kinds of equipment and methods of operation required; and other means that might be used to reduce transportation costs.

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 about 19 percent of the returns to growers of the wool, about 6 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 2.5 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 margins, or spread between the prices to farm producers and the retail prices paid for finished apparel and household goods made of wool.

## COTTON YARN AND THREAD MANUFACTURING

Cotton yarn mills comprise establishments primarily engaged in the spinning of yarn on the cotton system from cotton, wool, silk, or manmade fibers, or in the manufacture of tire cord and fabric. Establishments primarily engaged in twisting, winding, plying, or spooling of spun yarns also are included. Important products of this industry include yarns used in weaving, machine knitting, hand knitting, crocheting, darning, and embroidering, and also tire cord and fabric.

Census reports indicate that in 1954, shipments, including interplant transfers, of establishments in this industry accounted for about 92 percent of the cotton system yarns and about 94 percent

of the tire cord and fabric shipped by all industries. However, only about 23 percent of the total amount of yarns produced was shipped. The remainder was used by producing establishments in the manufacture of woven fabrics.

Thread mills are establishments primarily engaged in manufacturing thread of cotton, silk, or manmade fibers. In 1954, more than 95 percent of the thread produced was made of cotton, according to census reports. The remainder consisted of small quantities of silk, nylon, and other manmade fibers. Important products of this industry include thread used in sewing, crocheting, darning, embroidering, tatting, and hand knitting. Shipments by this industry in 1954 accounted for 94 percent of the thread shipped by all industries.

### Nature, Practices, and Equipment

Cotton bales at mills are opened and the lint is cleaned, carded, combed (for fine yarns), and spun into yarn. In 1954, according to census reports, yarns spun on the cotton system totaled 4,105 million pounds, of which about 91 percent was made of cotton and about 9 percent was made of manmade and other fibers. Production of yarn in the United States usually is integrated with weaving and other operations. In 1954, yarns produced by establishments for their own use accounted for about 76 percent of the total, that produced for sale accounted for about 17 percent, and that produced for end uses not specified accounted for 7 percent. Some integrated mills sell surplus yarns not needed in their weaving departments. Thread mills are highly specialized in the manufacture of thread as a finished product.

#### Size and Organization

Changes in size and organization of manufacturers of cotton yarn and thread may be indicated by information on number of spindles and quantities of fibers consumed, ownership and organization of establishments, and mergers and acquisitions of firms. Some of the information available, particularly that on number of spindles, on fibers consumed, and on mergers and acquisitions of firms, relates to larger segments of the textile industry than the cotton yarn and thread industries. This overall information is summarized in this section, and referred to in subsequent sections of this bulletin.

*Number of Spindles and Fibers Consumed.*—The number of spindles in place is customarily used to indicate the size of the plant or of the cotton textile industry. The world total of cotton spindles in place on July 31, 1956, was estimated at 131,340,000, of which about 17 percent were in the United States, 52 percent in Europe (including Russia), 24 percent in Asia and Oceania, and small proportions in South America, Africa, and countries other than the United States in North America (table 15). In Europe and in North America, the total number of spindles in place continued to decrease, despite substantial increases in Russia and in Mexico, after 1951. In South America and in Africa the number of spindles, although small, continued to increase. In Asia and Oceania, the number of spindles increased markedly, particularly after 1951. European countries have a large number of mule spindles, but it has been reduced markedly in recent years.

TABLE 15.—Number of cotton spinning spindles, by countries, 1939, 1951, and 1956<sup>1</sup>

Country	Year and type of spindles								
	Total			Mule			Ring		
	1939	1951	1956	1939	1951	1956	1939	1951	1956
	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>	<i>Thou-</i>
	<i>sands</i>	<i>sands</i>	<i>sands</i>	<i>sands</i>	<i>sands</i>	<i>sands</i>	<i>sands</i>	<i>sands</i>	<i>sands</i>
Europe:									
Czechoslovakia.....	3,330	2,355	2,480	1,205	400	300	2,125	1,955	2,180
France.....	9,794	8,035	5,547	2,303	1,245	233	7,491	6,790	5,314
Germany (Western).....	12,225	6,206	5,954	3,287	277	4	8,938	5,929	5,950
Italy.....	5,324	5,694	5,726	550	76	15	4,774	5,618	5,711
Spain.....	2,000	2,210	2,364	400	410	105	1,600	1,800	2,259
United Kingdom.....	36,322	28,252	23,972	25,847	17,905	13,227	10,475	10,347	10,745
U.S.S.R. (Estimated).....	10,350	9,850	12,250	1,000	1,250	500	9,350	8,600	11,750
Other.....	9,637	9,855	10,602	1,630	772	436	8,007	9,083	10,166
Total.....	88,982	72,457	68,895	36,222	22,335	14,820	52,760	50,122	54,075
North America:									
Canada.....	1,157	1,138	980	35	14	7	1,124	1,124	973
Mexico.....	884	1,114	1,145	5	3	—	879	1,111	1,145
United States.....	25,911	23,183	21,897	213	—	—	25,698	23,183	21,897
Other.....	95	151	281	4	4	—	91	147	281
Total.....	28,049	25,586	24,303	257	21	7	27,792	25,565	24,296

South America:									
Argentina.....	329	590	930				329	590	930
Brazil.....	2,765	3,281	3,391	17			2,748	3,281	3,391
Columbia.....	105	380	390				105	380	390
Peru.....	118	153	207				118	153	207
Other.....	124	368	518		1		124	367	518
Total.....	3,441	4,772	5,436	17	1		3,424	4,771	5,436
Africa:									
Egypt.....	251	518	652				251	518	652
Other.....	39	253	388				39	253	388
Total.....	290	771	1,040				290	771	1,040
Asia and Oceania:									
Australia.....	114	252	217		4	4	114	248	213
China.....	4,450	4,100	6,290				4,450	4,100	6,290
India.....	10,054	10,849	12,068	494	285	184	9,560	10,564	11,884
Japan.....	11,502	5,244	8,501	5	6		11,496	5,238	8,501
Korea.....	60	310	432				60	310	432
Manchuria.....	280	251	260				280	251	260
Turkey.....	104	383	956		57		104	326	956
Other.....	322	1,019	2,942		5		322	1,014	2,942
Total.....	26,886	22,408	31,666	500	357	188	26,386	22,051	31,478
World total.....	147,648	125,994	131,340	36,996	22,787	15,015	110,652	103,207	116,325

<sup>1</sup> Estimated number of spindles in 1939 as of January 31 and those for 1951 and 1956 as of July 31.

Adapted from International Cotton Statistics prepared by International Federation of Cotton and Allied Textile Industries.



Spinning activity is indicated by the number of active spindles and by the number of hours operated during a specified period. In the United States, the number of active spindles decreased from more than 35 million in 1925 to about 17.5 million in 1958 (table 16). 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 93 percent in 1958, whereas the proportion in New England decreased from about 46 percent in 1925 to 7 percent in 1958. The proportion of cotton consumed in cotton-growing States increased from 68 percent in 1925 to more than 95 percent in 1958, and the proportion consumed in New England decreased from 26 percent in 1925 to about 4 percent in 1958 (table 16).

TABLE 16.—Number of active spindles and proportion of cotton consumed, by areas, United States, specified years, 1925-58

Year <sup>1</sup>	United States	Cotton-growing States	New England States	All other
	Active spindles <sup>2</sup>			
	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
1940.....	23,586	17,641	5,279	666
1945.....	22,675	17,610	4,511	554
1950.....	20,518	16,574	3,603	341
1951.....	20,884	16,999	3,535	350
1952.....	19,923	16,902	2,809	212
1953.....	20,052	16,927	2,946	179
1954.....	19,299	16,767	2,409	123
1955.....	19,132	16,735	2,240	107
1956.....	19,019	16,874	2,034	111
1957.....	18,072	16,649	1,316	107
1958.....	17,513	16,246	1,158	109
	Proportion of cotton consumed			
	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
1940.....	100.0	85.4	11.8	2.8
1945.....	100.0	88.4	9.3	2.3
1950.....	100.0	90.7	7.5	1.8
1951.....	100.0	90.5	7.9	1.6
1952.....	100.0	92.6	6.1	1.3
1953.....	100.0	92.6	6.4	1.0
1954.....	100.0	93.4	5.8	.8
1955.....	100.0	94.5	4.8	.7
1956.....	100.0	94.5	4.9	.6
1957.....	100.0	95.3	4.1	.6
1958.....	100.0	95.7	3.7	.6

<sup>1</sup> Year ending July.

<sup>2</sup> Active any time during the year to 1945, and active at end of year for other years.

Adapted from Bureau of the Census reports on Cotton Production and Distribution (88).

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 146 percent in 1951, and mill consumption of cotton increased from 6 million bales in 1925 to 11 million bales in 1951, despite a substantial decrease in number of active spindles. From 1954 to 1956, the proportion of capacity utilized increased about 9 percent, the number of active spindles decreased about 1.5 percent, and mill consumption increased about 6.6 percent. From 1956 to 1958 the number of active spindles and proportion of capacity utilized decreased and cotton consumption decreased almost 13 percent. Cotton consumption per active spindle increased markedly from 1925 to 1951 and continued at a relatively high rate through 1958. Changes in cotton consumption per 100 spindle hours were relatively small (table 17).

TABLE 17.—Number of cotton spindles, spinning activity, and cotton consumption, United States, by specified years, 1925-58

Year <sup>1</sup>	Spindles		Total spindle hours	Proportion of capacity <sup>4</sup>	Cotton consumption		
	Total in place <sup>2</sup>	Total active <sup>3</sup>			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	6,193	84.5	3.25
1930.....	34,025	31,245	87,515	67.3	6,106	93.4	3.34
1935.....	30,092	26,701	72,526	65.3	5,361	96.0	3.53
1940.....	24,750	23,586	97,006	98.9	7,784	157.8	3.84
1945.....	23,128	22,675	111,898	118.6	9,568	201.7	4.09
1950.....	22,995	20,518	109,243	128.0	8,851	206.2	3.87
1951.....	23,195	20,884	126,852	146.0	10,654	243.8	4.01
1952.....	23,205	19,923	106,932	129.0	9,120	218.8	4.08
1953.....	22,903	20,052	118,206	141.7	9,424	224.6	3.81
1954.....	22,604	19,299	109,705	136.6	8,576	212.4	3.74
1955.....	22,273	19,132	113,447	142.5	8,841	220.9	3.72
1956.....	21,903	19,019	117,748	148.8	9,141	229.7	3.71
1957.....	21,195	18,072	112,108	149.1	8,728	230.8	3.72
1958.....	20,845	17,513	101,900	139.8	7,973	227.7	3.91

<sup>1</sup> Year ending July.

<sup>2</sup> In place near the end of the cotton year.

<sup>3</sup> For 1945 and earlier years, includes all spindles consuming cotton at any time during the year, and since 1945, includes spindles consuming 100 percent cotton.

<sup>4</sup> Proportion of capacity for 80-hour week for active spindles.

Adapted from or based on Bureau of the Census reports, Cotton Production and Distribution (88).

Spindle activity and rate of cotton consumption in cotton-growing States during the 1955-56 season were high in relation to the average for all other areas combined (table 18). Total spindle hours operated during this season averaged about 152 percent of capacity (for an 80-hour week, for spindles active at the end of the year) in cotton-growing States, compared with about 124 percent for those in New England States, and 149 percent for the United States as a whole. The quantity of cotton consumed per 100 spindle hours during the 1955-56 season averaged 3.86 pounds in cotton-growing

States, 2.04 pounds in New England, and 3.71 pounds for the United States as a whole.

*Ownership and Operation.*—The type of ownership or control of some cotton yarn and thread mills has been changing. Cotton yarn mills that were under corporate ownership or control in 1954 accounted for 94 percent of the number of establishments and about 99 percent of the total number of employees in this industry (table 19). These proportions increased from 1939 to 1954. Mills operated from central administrative offices as multiunits decreased from about 50 percent of the total in 1939 to 44 percent in 1954, but the proportion of total employees accounted for by multiunits increased from 61 percent in 1939 to 64 percent in 1954.

The proportion of thread mills under corporate ownership or control increased from about 71 percent in 1939 to 80 percent in 1954. Mills under individual ownership or control decreased from 21 percent of the total in 1939 to 11 percent in 1954. The proportion operated from central administrative offices as multiunits increased from 23 percent in 1939 to 26 percent in 1954. Average number of employees per mill decreased for both multiunit and single-unit establishments, but the proportion of total employees accounted for by multiunits increased from about 65 percent in 1939 to 76 percent in 1954, according to census reports.

TABLE 18.—*Number of active cotton spindles, hours operated, and cotton consumption, by areas, United States, 1956*<sup>1</sup>

Area	Active spindles <sup>2</sup>	Total spindle hours	Proportion of capacity <sup>3</sup>	Cotton consumed	
				Total	Per 100 spindle hours
	<i>Thousands</i>	<i>Millions</i>	<i>Percent</i>	<i>1,000 bales</i>	<i>Pounds</i>
Cotton-growing States:					
South Carolina.....	5, 828	39, 219	161. 8	2, 502	3. 05
North Carolina.....	5, 153	32, 161	150. 0	2, 637	3. 92
Georgia.....	2, 873	17, 131	143. 3	1, 781	4. 97
Alabama.....	1, 558	9, 568	147. 6	1, 040	5. 20
All others.....	1, 462	8, 884	146. 1	678	3. 65
Total or average.....	16, 874	106, 963	152. 4	8, 638	3. 86
New England States:					
Massachusetts.....	989	4, 919	119. 6	178	1. 73
Maine.....	445	2, 489	134. 5	164	3. 15
Rhode Island.....	309	1, 492	116. 1	41	1. 31
All others.....	291	1, 565	129. 2	63	1. 92
Total or average.....	2, 034	10, 465	123. 7	446	2. 04
Other States.....	111	320	69. 3	57	8. 52
United States.....	19, 019	117, 748	148. 8	9, 141	3. 71

<sup>1</sup> Year ending July.

<sup>2</sup> Spindles consuming 100 percent cotton.

<sup>3</sup> Proportion of capacity for 80-hour week for spindles active at end of year.

Adapted from or based on Bureau of the Census reports, Cotton Production and Distribution (88).

TABLE 19.—Number of establishments and average number of employees per establishment for manufacturers of cotton yarn, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	318	336	218	251
Partnership.....	13	11	34	49
Individual.....	15	9	33	(?)
Other.....	3	1	53	(?)
All.....	349	357	202	239
Operation:				
Single-unit:				
Corporate.....	148	180	179	(?)
Noncorporate.....	26	20	33	(?)
All.....	174	200	157	151
Multiunit:				
Corporate.....	170	156	252	(?)
Noncorporate.....	5	1	47	(?)
All.....	175	157	246	350
All.....	349	357	202	239

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures, 1939 and 1954.

*Mergers and Acquisitions.*—Mergers and acquisitions in the textile industry, including yarn and thread mills, apparently have resulted in significant changes in the organization and management of many operating units. According to the Cotton Textile Institute, the ownership of about 154 cotton textile companies engaged in spinning or weaving, or both, changed in the period 1940-46 (107). These firms owned more than 4,400,000 spindles and more than 88,000 looms, or approximately one-fifth of the industry's productive facilities.

Combinations in the textile industry include vertical, horizontal, or both kinds of integration.

Vertical integration in the textile industry involves the combination under one management of operating units in two or more stages in the manufacture and distribution of products, such as spinning, weaving, finishing, fabricating, wholesaling, and retailing. Acquisitions of textile firms in vertical integrations increased markedly in the period 1940-46. About half of the spindles that changed hands during this period did so as a result of vertical integration. Among the most active purchasers in this kind of acquisition were selling agents and converters, cotton mills, cutters, and other end-use firms.

Horizontal integration is the merging of two or more firms 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 firms or establishments in horizontal integrations also increased markedly in the period 1940-46. Approximately 18 percent of the mergers during this period were horizontal combinations.

Many acquisitions of textile firms or establishments represent both types of integration.

Several factors contributed to this wave of mergers. Profit margins, affected by price control during the war emergency, and expanded demand and other factors led some mills to integrate forward by buying or building finishing plants to take advantage of higher margins on converted goods. This development, in turn, made it necessary for some converters and custom finishing plants to integrate backward by buying mills to secure a supply of goods for their finishing operations. 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 owned 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 higher margins. Some industrial firms which use yarns and fabrics in the manufacture of other products found it advantageous to buy cotton mills to supply their requirements, either partially or fully (18, 44).

Reports of the Federal Trade Commission on corporate mergers and acquisitions in more recent years show 181 mergers in the textile industry during the years 1948-56, about 35 of which occurred in 1955 and 29 in 1956. Of the 117 mergers during the years 1948-54, more than 37 percent were acquisitions by firms with assets of \$50 million or more, and more than 70 percent were acquisitions by firms with assets of \$10 million or more (106). The number of acquisitions per acquiring firm ranged from 1 to 12 companies. About 74 percent of the firms acquired only 1 company each, about 14 percent acquired 2 companies each, and only 1 firm acquired as many as 12 companies (106).

Such integrations in the textile industry apparently multiply with prosperity and decline with depression. The first real wave of mergers during this century came with the boom following World War I. It was temporarily arrested during 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 letup during the depression of the early 1930's. Increased interest in mergers began again in the early 1940's and the rate of acquisitions reached a high level in 1947. Following a decline in rate of mergers during the late 1940's and early 1950's, another wave started in 1953 and continued through the middle 1950's.

Mergers and acquisitions, along with changes in type of ownership and operation of cotton yarn and thread mills, after 1947 apparently were associated with irregular changes in average size of individual mills as indicated by number of employees. Average number of employees per yarn mill decreased from 256 in 1947 to 239 in 1954. The proportion of yarn mills with 100 or more employees decreased

from 70 percent in 1947 to about 67 percent in 1954 (table 20). The proportion with less than 20 employees decreased from 14 percent in 1947 to 12 percent in 1954. Average number of employees per thread mill decreased from 165 in 1947 to 143 in 1954. The proportion with 100 or more employees increased from about 24 percent in 1947 to 27 percent in 1954 and the proportion with less than 20 employees decreased from 36 percent in 1947 to about 35 percent in 1954 (table 20).

The trend toward greater concentration in the textile industry is indicated by reports that the share of the total spindles accounted for by the largest 4 firms increased from 5 percent in 1937 to 17 percent in 1955 (120). Cotton yarn mills operated in 1954 by 4 of the largest of 278 companies accounted for 15 percent of the total number of employees and 26 percent of the total value of shipments of the industry (table 21). Mills operated by 20 of the largest companies, or less than 8 percent of the total number, accounted for 44 percent of the employees and 56 percent of the value of shipments of the industry. The degree of product specialization may be indicated by data showing that in 1954 about 95 percent of total shipments of cotton yarn mills were of products regarded as primary to the industry.

TABLE 20.—*Number of thread and yarn mills, cotton system, by number of employees, United States, 1947 and 1954*

Number of employees	Thread mills		Yarn mills	
	1947	1954	1947	1954
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
500 and over.....	9	9	42	44
250 to 499.....	2	9	91	62
100 to 249.....	10	8	150	134
50 to 99.....	14	10	40	44
20 to 49.....	13	17	24	29
10 to 19.....	10	11	28	14
5 to 9.....	16	15	18	9
1 to 4.....	15	18	11	21
Total.....	89	97	404	357
	Proportion of total			
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
500 and over.....	10.1	9.3	10.4	12.3
250 to 499.....	2.3	9.3	22.5	17.4
100 to 249.....	11.2	8.2	37.1	37.6
50 to 99.....	15.7	10.3	9.9	12.3
20 to 49.....	14.6	17.5	6.0	8.1
10 to 19.....	11.2	11.3	6.9	3.9
5 to 9.....	18.0	15.5	4.5	2.5
1 to 4.....	16.9	18.6	2.7	5.9
Total.....	100.0	100.0	100.0	100.0

Adapted from Census of Manufactures: 1947 and 1954.

TABLE 21.—Share of employment and shipments of the cotton yarn and thread manufacturing industry accounted for by largest companies, United States, 1947 and 1954

Industry, measure, and year	Companies <sup>1</sup>	Shipments <sup>2</sup> (1,000 dollars) or employment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup> —			Primary product specialization <sup>5</sup>
			4 largest companies	8 largest companies	20 largest companies	
Yarn mills, cotton system: <sup>6</sup>						
Number of employees (1954).....	Number 278	Number 85, 275	Percent 15	Percent 26	Percent 44	Percent 95
Value of shipments (1954).....	278	1, 030, 627	26	40	56	95
Thread mills: <sup>7</sup>						
Number of employees (1954).....	84	13, 908	67	79	92	88
Value of shipments:						
1954.....	84	183, 746	66	78	92	88
1947.....	83	154, 269	65	78	90	85

<sup>1</sup> The determination of company affiliation of establishments is based on census reports and other publicly available records. Value of shipment totals for establishments have been summarized into company totals in each manufacturing industry. "Largest" companies are determined by each company's value of shipments in the specified industry.

<sup>2</sup> Includes, for all manufacturing establishments classified in the industry, (a) value of products "primary" to the industry, (b) value of "secondary" products, which are primary to other industries, and (c) "miscellaneous receipts" such as receipts for contract and commission work on materials owned by others, scrap and salable refuse, repair, etc. Excludes products bought and sold in the same condition. The 1947 figures for some industries reflect minor revisions of previously published census data.

<sup>3</sup> Represents average total number of employees of all establishments classified in the specified industry. Except as noted, the averages are based on employment reported for the pay period ended nearest the 15th of March, May, August, and November.

<sup>4</sup> Largest companies are determined by summarizing each company's value of shipments (or average employment) by establishments classified in the specified industry. The percentages were calculated by dividing the value of shipments (or average total employment) of the 4, 8, and 20 largest companies by the totals for the industry.

<sup>5</sup> The "primary product specialization index" measures the extent to which plants classified in the industry "specialize" in making products regarded as primary to the industry. That is, value of shipments of primary products of plants in the industry is expressed as a ratio of the total shipments of all products made by these establishments, excluding "miscellaneous receipts," such as receipts for contract and commission work on materials owned by others, scrap and salable refuse, repair, etc.

<sup>6</sup> Includes yarn spun on silk system.

<sup>7</sup> Jobbers were included in 1947 but were excluded in 1954.

Adapted from United States Senate report on Concentration in American Industry (115).

Similar data for the thread industry show that in 1954, mills operated by 4 of the largest of 84 companies accounted for 67 percent of the total number of employees, and 66 percent of the value of shipments by the industry (table 21). Mills operated by 8 of the largest companies accounted for more than three-fourths of total employment and total shipments, and those operated by 20 of the largest companies accounted for 92 percent of employment and of shipments. These proportions changed very little from 1947 to 1954. The proportion of total shipments of thread mills that was accounted for by products regarded as primary to the industry increased from 85 percent in 1947 to 88 percent in 1954.

Census statistics by companies show that about 95 percent of the 2,376 establishments primarily engaged in the manufacture of yarn and thread, broadwoven cotton fabrics, and finished textiles (except

wool) were operated by companies primarily engaged in these segments of the textile industry, and about 5 percent by companies primarily engaged in the manufacture of other textile mill products (table 22). "Establishment" as used in the census and in this bulletin means a mill or similar plant. Single-unit companies accounted for about 65 percent of the number of establishments, 27 percent of the total number of employees, and 26 percent of the total value added by manufacture. As indicated by number of employees and by value added by manufacture, the multiunit establishments in this industry operated by multi-industry companies averaged about twice as large as those operated by single-industry companies.

More than a fifth of the establishments operated by companies primarily engaged in the manufacture of yarn and thread, broad-woven fabrics, and finished textiles (except wool) were primarily engaged in other industries. They included manufacturers of other textile mill products, manufacturers of clothing and other fabricated products, and wholesale and retail distributors of these products. About 12 percent of the establishments operated by these companies were central administrative offices, auxiliaries, sales branches, and sales offices.

In addition to concentration on a company basis, integration in the textile industry may involve various other combinations of manufacturing, financing, and selling agencies. In 1958, one com-

TABLE 22.—Number of establishments, average employment, and average value added per dollar of payroll by mills making yarn and thread and broad-woven fabric, and finishing textiles (except wool), by type of company, United States, 1954

Item	Com- panies	Estab- lish- ments	Average employ- ment	Value added per dollar of payroll
Establishments of companies primarily engaged in this industry: <sup>1</sup>				
Establishments in this industry-----	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Dollars</i>
Single-unit companies-----	1, 543	2, 263	238	1. 50
Multiunit companies-----	194		99	1. 43
Single-industry-----	85	1, 543	720	536
Multi-industry-----	109	207	323	1. 46
Establishments in other industries-----		513	022	1. 54
Total or average-----		652	106	
		2, 915	208	
Establishments in this industry operated by companies primarily engaged in other industries-----		113	335	1. 60
Total or average for all establish- ments classified in this industry-----		2, 376	243	1. 50

<sup>1</sup> In addition to the number of establishments shown, these companies had 268 central administrative offices, auxiliaries, sales branches, and sales offices.

Adapted from Bureau of Census report, *Company Statistics* (86).



pany, for example, formed as a mill sales agency, represented mills producing more than 500 million yards of cloth annually for converters, apparel manufacturers, and retail piece goods departments (1). This company was selling agent for 23 textile manufacturing companies in 10 States in the United States and in 3 other countries. Principals of this company had financial interests in some of the manufacturing companies, and the agent initiated or cooperated with all the manufacturers in planning operations, plant modernization, fabric development, styling, pricing, packaging, advertising, and market analysis. Sales offices are maintained in 11 cities in the United States and 2 in Canada. Furthermore, close working relationship between this selling company and its financing affiliate was guaranteed by interlocking directorates and by some duplication in executive officers. This financing company had a volume of business in 1958 of about \$101,000,000 (1).

A number of factors may motivate mergers, in addition to wartime advantages as a result of price controls and other regulations. Unprofitable companies may be acquired for the use of their losses as income tax credits. Closely held companies may be sold as a means of converting accumulated profits into capital gains. Mergers may be used to assure dependable supplies of raw materials and adequate market outlets for the products; to diversify among various textiles as a means of coping with fluctuations in popularity among fibers and of facilitating blending of fibers; to coordinate the various stages of production with consumer requirements; and to facilitate financing for operating the most economic-sized units, for acquiring improved facilities and equipment, and for providing modern management methods, including research and advertising.

Information available is not adequate for determining to what degree these motivating purposes are served by mergers and acquisitions in the textile industry, or the influence of such combinations on the adequacy and efficiency of the marketing services, on prices to producers and consumers, and on competition among fibers. It seems obvious that adequate information for such determinations would be extremely difficult to obtain. Some have concluded that integration has not essentially altered the overall competitive structure of the textile industry (120).

#### Manufacturing Methods <sup>4</sup>

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 ranges 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 cablestrands necessitates one or two additional processes known as twist-

<sup>4</sup> Based mainly on Cotton Goods Production and Distribution Techniques, Costs, and Margins (110).

ing. Auxiliary processing equipment needed by yarn mills for the preparation of yarns for twisting, for warps, or for sale, may be winders, spoolers, coners, and beamers. 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 both, to the first of a series of cleaning machines. Finally, after it is cleaned, mainly of the heavier impurities, 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 drawing or drafting the

fibers to increase parallelism and uniformity and to reduce the combined strands to approximately the size of a single strand being fed. The combined strands are coiled systematically into cans.

*The Roving Process.*—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. During the 1950's, these processes have been in a transition stage as a result of the development of so-called long-draft processes, which enable one process to do the work formerly performed by two or more.

*Spinning.*—The final process in the manufacture of yarn is spinning. Here the roving from the last roving process is fed, either as a single or double strand, drafted to the desired size, and twisted to produce the correct hardness or other condition. 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 in other processes, except that of filling (yarn 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, through use of knot-tying devices, either hand-operated or machine-operated, produces small nonslip knots that do not give trouble in 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 strands are wound uniformly as to spacing and tension, at a rate of from 400 to 900 yards a minute. This gives a full beam containing 20,000 to 36,000 yards or more. A full beam may contain yarn equal to the fiber 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

Changes in the number and kinds of machinery and equipment used in the manufacture of cotton yarn have resulted in considerable improvements. The number of improved long-draft spindles and the larger ring spindles increased markedly from 1942 to 1947 and also from 1947 to 1954 (table 23). Decreases in number of regular-draft spindles and the shorter ring spindles were greater than corresponding increases in improved long-draft and the larger ring

spindles, and the total number of spindles decreased. Marked increases in number of combs from 1942 to 1947 were followed by greater decreases from 1947 to 1954, so that the number of combs in 1954 was about 34 percent less than in 1947 and 17 percent less than in 1942.

TABLE 23.—*Number of cards, combs, and spindles in the cotton, rayon, and related manufacturing industries, by type of machine, United States, 1942, 1947, and 1954*

Type of machine	1942	1947	1954
Cards.....	<i>Number</i> 90, 582	<i>Number</i> 86, 442	<i>Number</i> 88, 670
Combs.....	7, 245	9, 138	5, 996
Spindles:			
Roving:			
Long draft:			
Slubbers.....	335, 138	523, 272	785, 000
Intermediate.....	188, 660	309, 636	294, 000
Fine frames.....	349, 188	295, 292	181, 000
Jack frames.....	10, 504	17, 024	17, 000
Total.....	883, 490	1, 145, 224	1, 277, 000
Regular draft:			
Slubbers.....	302, 391	184, 789	146, 000
Intermediate.....	511, 400	329, 786	308, 000
Fine frames.....	1, 613, 680	1, 006, 083	146, 000
Jack frames.....	514, 444	380, 670	157, 000
Total.....	2, 941, 915	1, 901, 328	757, 000
Total roving.....	3, 825, 405	3, 046, 552	2, 034, 000
Cotton-system spinning:			
Ring spinning: <sup>1</sup>			
By type:			
Draft:			
Long.....	12, 419, 642	14, 384, 442	18, 153, 000
Regular.....	11, 766, 305	8, 227, 451	3, 421, 000
Total.....	24, 185, 947	22, 611, 893	21, 574, 000
Drive:			
Tape.....	12, 199, 641	12, 676, 074	17, 191, 000
Band.....	11, 986, 306	9, 935, 819	4, 383, 000
Total.....	24, 185, 947	22, 611, 893	21, 574, 000
By ring diameter, inches:			
1½ and under.....	5, 136, 606	4, 440, 248	3, 776, 000
1⅞ to 1¾.....	9, 457, 361	7, 619, 891	5, 242, 000
1⅞ to 2¼.....	8, 690, 342	8, 714, 886	9, 856, 000
2½ and over.....	901, 638	1, 836, 958	2, 700, 000
Total ring spinning.....	24, 185, 947	22, 611, 893	21, 574, 000
Mule spinning.....	(?)	117, 956	33, 000
Total spinning.....	24, 185, 947	22, 729, 849	21, 607, 000

<sup>1</sup> Includes mule-spinning spindles in 1942.

<sup>2</sup> Included in ring spindles.

TABLE 23.—Number of cards, combs, and spindles in the cotton, rayon, and related manufacturing industries, by type of machine, United States, 1942, 1947, and 1954—Continued

Type of Machine	1942	1947	1964
Doubling and twisting, inches: <sup>3</sup>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1½ and under.....	507, 788	513, 068	190, 000
1½ <sup>5</sup> / <sub>16</sub> to 2½.....	1, 233, 423	1, 166, 054	795, 000
2½ <sup>5</sup> / <sub>16</sub> to 3½.....	1, 219, 017	1, 266, 481	1, 348, 000
3½ and over.....	412, 294	568, 171	659, 000
Brownell and not reported.....	54, 771	0	-----
<b>Total.....</b>	<b>3, 427, 293</b>	<b>3, 513, 774</b>	<b>2, 992, 000</b>
Throwing and twisting.....	( <sup>4</sup> )	1, 884, 000	2, 629, 000
Silk-system spinning.....	( <sup>4</sup> )	597, 000	203, 000
Warping equipment:			
High-speed warpers.....	( <sup>4</sup> )	2, 763	4, 245
Low-speed warpers.....	( <sup>4</sup> )	2, 644	1, 245
<b>Total.....</b>	<b>(<sup>4</sup>)</b>	<b>5, 407</b>	<b>5, 490</b>

<sup>3</sup> Cotton system.

<sup>4</sup> Not available.

Adapted from Bureau of Census reports.

Although information about the condition of machinery and equipment of cotton yarn manufacturers is limited, some indications of the condition may be derived from results of a survey made in 1950 of 15 representative carded cotton yarn mills. They show that the buildings of 3 of these mills were new and modern, those of 12 mills were not new but were fairly well laid out in most respects and were in good condition, and those of 3 mills were not modern and appeared to need considerable alterations and repairs (94).

Floor spacing and arrangements of machinery and equipment for efficient flow of materials between products were considered good for five of these mills, fair for seven, and poor for three. Twelve mills had their cotton warehouses and warehouses conveniently located in relation to the opening and packing rooms, the arrangements for two mills were only fair in this respect, and that for 1 was poor enough to materially reduce efficiency.

The type, amount, and condition of the opening and picking equipment used by eight of the mills were good; equipment used by four mills was not of the most improved type but was in good condition; and that used by three mills was neither modern nor in 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 type 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 one mill was fairly modern and that for nine was not modern. Spinning equipment

for 1 mill was good, 1 had a partial installation of modern spinning equipment, and that for 13 mills was not modern.

A new machine, developed in the early 1950's to improve the opening or fluffing of cotton, offers substantial benefits to mill operators. Cotton, in passing through the machine, is fluffed and blended, without damage to the fibers, it is claimed, and considerable amounts of trash are removed. This machine saves as much as a dollar a bale of cotton processed (59). In more recent years the lint cotton opener was integrated with a carding cleaner, with the result that cleaning efficiency was greatly increased (40).

Although some of the equipment used in spinning cotton yarn apparently is not modern and in good condition, improvements have been and are being made. Census reports indicate that expenditures for plant and equipment by manufacturers of cotton yarn and thread mills increased from \$7 million in 1939 to \$34 million in 1947, and amounted to \$30 million in 1954 (table 24). Of these amounts, \$20 million in 1947 and about the same amount in 1954 were spent for new machinery and equipment. Most of the remainder was spent for new plants. Expenditures for new machinery and equipment and for new plants increased from \$6 million in 1939 to \$32 million in 1947, and to \$38 million in 1956, according to census reports.

TABLE 24.—Total expenditures for plant and equipment by manufacturers of thread and cotton yarn, by industry groups, United States, 1939, 1947, and 1954

Year and industry	Expenditures for—			
	Total	New equipment	New plant	All other <sup>1</sup>
1939:	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Thread mills <sup>2</sup> .....	843	751	19	73
Yarn mills, cotton system.....	6,322	3,662	1,189	1,471
Total.....	7,165	4,413	1,208	1,544
1947:				
Thread mills <sup>2</sup> .....	4,375	1,879	2,329	167
Yarn mills, cotton system.....	29,550	18,059	9,721	1,770
Total.....	33,925	19,938	12,050	1,937
1954:				
Thread mills <sup>2</sup> .....	8,959	4,933	3,610	416
Yarn mills, cotton system.....	20,573	15,028	3,473	2,072
Total.....	29,532	19,961	7,083	2,488

<sup>1</sup> Expenditures for used plant and equipment.

<sup>2</sup> Cotton thread.

Adapted from Census of Manufactures: 1947 and 1954.

## Charges or Costs Involved

Cotton yarn and thread manufacturers' gross margins, or the spread between costs of materials, supplies, parts, and containers used and the value of the products manufactured, vary with the kind of yarn and thread produced, from one establishment to another, and from one time to another. Census reports relating to cotton yarn show that, in 1954, the manufacturers' gross margins averaged 30.8 percent of the value of the yarn produced, and were substantially less than the corresponding proportions in 1947 and in 1939 (table 25). Raw cotton accounted for most of the costs included under "materials, supplies, parts, and containers," but the spread between the cost of raw cotton and the value of the yarn was somewhat greater than the proportion derived from census data. Increases in costs of materials, supplies, parts, and containers since 1939 may be accounted for in part by marked advances in prices of cotton. Wages, the largest item of costs included in the margin, accounted for 55 percent of the manufacturers' gross margin in 1954, about 47 percent in 1947, and 49 percent in 1939.

The manufacturers' gross margins for thread averaged 36.9 percent of the value of the thread produced in 1954, and were about 27 percent less than the corresponding proportion in 1939 (table 25). Wages and salaries accounted for an average of 56 percent of the manufacturers' gross margins in 1954, about 48 percent in 1947, and 52 percent in 1939. Wages alone accounted for 44 percent of these margins in 1954, about 35 percent in 1947, and 40 percent in 1939.

Costs of manufacturing cotton yarn vary with the type of yarn and from one mill to another. In 1950, the proportion of total costs, excluding selling expenses, of carded cotton yarn to manufacturers that was accounted for by processing costs averaged about 28 percent for 10's hosiery yarn, 34 percent for 20's hosiery yarn, and 39 percent for 30's hosiery yarn (94). The proportions by mills ranged from about 25 to 32 percent for 10's yarn, 32 to 38 percent for 20's yarn, and 38 to 40 percent for 30's yarn. The proportion of processing costs accounted for by labor averaged 59 percent for 10's yarn and 58 percent for 20's yarn. The proportions by mills ranged from about 52 to 65 percent for 10's yarn and from 51 to 64 percent for 20's yarn (94).

In 1950, average production per man-hour by mills ranged from 9.55 pounds to 15.16 pounds for 10's hosiery yarn, and from 7.34 pounds to 9.60 pounds for 20's hosiery yarn. Average hourly wage rates ranged from about 93 cents to \$1.15 for manufacturers of 10's hosiery yarn, and from 93 cents to about \$1.17 for manufacturers of 20's hosiery yarn. Average labor costs per pound ranged from 7.50 cents to 11.37 cents for 10's hosiery yarn and from 10.22 cents to 12.97 cents for 20's hosiery yarn. Some of the influence of differences in wage rates on costs per pound were offset by differences in production per man-hour (94).

Differences in size of mills may affect unit costs of manufacturing cotton yarn. But the influence of such factors as differences in ability and efforts of managers, in variety and quality of yarns spun, in kinds and amount of machinery used, and in quality of the cotton consumed apparently are such that costs vary somewhat

irregularly with the size of the plant. Data for 15 yarn mills surveyed in 1950 show that manufacturing costs, for plants spinning 12 or fewer counts of yarn, averaged substantially less for mills with 7,000 to 14,000 spindles than for mills with less than 7,000 spindles. Costs for mills spinning more than 12 counts and with 14,000 to 25,000 spindles averaged substantially lower than those for mills with smaller numbers of spindles (94).

Variety of counts spun and frequency of changing products manufactured contribute to relatively high manufacturing costs. The 15 carded cotton yarn mills surveyed in 1950 showed a wide range in number of counts of yarn spun. Average manufacturing costs per pound of yarn, for small and medium-sized mills, varied directly and substantially with the number of counts spun. For the larger mills, average manufacturing costs varied somewhat irregularly with the number of counts spun (94). These relations of size and number of counts to costs indicate that carded cotton yarn mills with less than 7,000 spindles usually are too small for the most efficient operation, even for the manufacture of only a few counts of yarn; that mills with 7,000 to 14,000 spindles may be large enough for efficient operation if the number of counts spun is small; and that the size of mills usually would need to exceed 14,000 spindles if 12 or more counts are to be spun and if the most efficient operation is to be expected (94).

Developments in recent years emphasize the importance of changes in costs of labor in the manufacture of textile products. Average hourly earnings in the textile mill industry increased from \$1.04 in 1947 to \$1.36 in 1954 and to \$1.50 in 1957, according to Bureau of Labor Statistics reports. These data apply to the textile industry as a whole, but it is believed that essentially the same trend applies to the cotton yarn and thread parts of the industry. Average value added by manufacture per dollar of wages paid increased from \$1.86 in 1939 to \$2.04 in 1947, then decreased to \$1.80 in 1957 for cotton yarn mills. Similar data for thread mills show an increase from \$2.34 in 1939 to \$2.51 in 1947, then a decrease to \$2.39 in 1957.

Apparently the average value added by manufacture per dollar of wages and per hour of labor varied irregularly with the size of yarn and thread mills, as indicated by number of production workers (table 26). In 1954, average value added by yarn mills per dollar of wages ranged from \$1.61 for mills with 100 to 249 production workers to \$4.32 for mills with 5 to 9 production workers. Average value added per hour of labor ranged from \$1.82 for mills with 50 to 99 production workers to \$4.75 for mills with 5 to 9 production workers. Average wage rate per hour varied irregularly with the size of the mills and with the value added per dollar of wages and per hour of labor.

In thread mills, in 1954, average value added by manufacture per dollar of wages ranged from \$1.54 for mills with 500 or more production workers to \$3.43 for mills with less than 5 production workers (table 26). Average value added per hour of labor ranged from \$1.96 for mills with 500 or more production workers to \$4.40 for mills with 250 to 499 production workers. Average wage rate per hour ranged from \$1.18 for mills with 5 to 9 production workers to \$1.34 for mills with 20 to 49 production workers. Wage rates varied irregularly with value added per dollar of wages and per hour of labor.



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TABLE 25.—*Values, costs, and margins of manufacturers of yarn and thread, United States, 1939, 1947, and 1954*

Item	Yarn mills, cotton system			Thread mills		
	1939	1947	1954	1939	1947	1954
	<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.....	262, 799	781, 897	1, 030, 627	51, 376	154, 269	183, 746
Cost of materials, etc. <sup>1</sup> .....	<sup>2</sup> 141, 861	433, 730	713, 302	<sup>2</sup> 25, 407	77, 559	115, 877
Gross margin.....	120, 938	348, 167	317, 325	25, 969	76, 710	67, 869
Salaries and wages.....	68, 115	180, 076	197, 292	13, 497	33, 240	38, 281
Salaries.....	8, 686	16, 158	21, 734	2, 968	6, 310	9, 014
Wages.....	59, 429	163, 918	175, 558	10, 529	26, 930	29, 267
Fuel.....	1, 186	2, 036	1, 975	556	1, 240	984
Purchased electric energy.....	8, 532	10, 451	14, 039	732	756	1, 739
Contract and commission work.....	<sup>2</sup> 597	1, 912	2, 351	( <sup>2</sup> )	7, 842	2, 452
Other <sup>3</sup> .....	42, 508	153, 692	101, 668	11, 184	34, 132	24, 413

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, etc.....	<sup>2</sup> 54.0	55.5	69.2	<sup>2</sup> 49.5	50.3	63.1
Gross margin.....	46.0	44.5	30.8	50.5	49.7	36.9
Salaries and wages.....	25.9	23.0	19.1	26.3	21.5	20.8
Salaries.....	3.3	2.1	2.1	5.8	4.1	4.9
Wages.....	22.6	20.9	17.0	20.5	17.4	15.9
Fuel.....	.5	.3	.2	1.1	.8	.5
Purchased electric energy.....	3.2	1.3	1.4	1.4	.5	1.0
Contract and commission work.....	<sup>2</sup> .2	.2	.2	( <sup>2</sup> )	4.8	1.3
Other <sup>3</sup> .....	16.2	19.7	9.9	21.7	22.1	13.3

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Some "contract work" included with "material, supplies, parts, and containers," to avoid disclosing data reported by individual establishments.

<sup>3</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 26.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for manufacturers of cotton yarn and thread, by number of productive workers, United States, 1954

Industry and number of production workers	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Thread mills:				
500 and over.....	24,765	1.54	1.96	1.28
350 to 499.....	23,276	3.38	4.40	1.30
100 to 249.....	5,822	2.05	2.61	1.27
50 to 99.....	4,216	2.62	3.35	1.28
20 to 49.....	3,244	2.53	3.38	1.34
10 to 19.....	531	2.12	2.59	1.22
5 to 9.....	500	2.75	3.25	1.18
1 to 4.....	340	3.43	4.25	1.24
Total or average.....	62,694	2.14	2.75	1.28
Yarn mills, cotton system:				
1,000 and over.....	46,797	1.77	2.27	1.28
500 to 999.....	91,546	1.77	2.25	1.27
250 to 499.....	72,413	1.66	1.96	1.18
100 to 249.....	72,614	1.61	1.86	1.16
50 to 99.....	10,271	1.66	1.82	1.10
20 to 49.....	3,662	2.17	2.42	1.11
10 to 19.....	885	2.13	2.85	1.33
5 to 9.....	432	4.32	4.75	1.10
1 to 4.....	213	2.92	3.49	1.20
Total or average.....	298,833	1.70	2.06	1.21

Adapted from Census of Manufactures: 1954.

Average value added by manufacture by yarn and thread mills, and average wage rate per hour, vary considerably from one State or region to another (table 27). Relatively high average value added by yarn mills per dollar of wages in Southern States in 1954 may be accounted for in part by relatively low average wage rates per hour in this area. In New England, the relatively high average value added per hour of labor was associated with average wage rates substantially higher than those in Southern States. The relatively low average value added per dollar of wages in Middle Atlantic States was associated with relatively low average value added per hour of labor and with relatively high average wage rates.

Thread mills in the South had the lowest average value added by manufacture per dollar of wages and per hour of labor, and the lowest average wage rate per hour, of any region in the United States (table 27). In the Middle Atlantic States, the value added per dollar of wages and per hour of labor, and the average wage rate, were higher than for any other region. In New England, average value added per dollar of wages and per hour of labor, and average wage rates, were all above the average for all other regions combined.

TABLE 27.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate for manufacturers of yarn and thread, by region and State, 1954

Industry, region, and State	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
Yarn mills, cotton system:	1,000 dollars	Dollars	Dollars	Dollars
New England.....	15,750	1.64	2.31	1.41
Massachusetts.....	7,504	1.82	2.55	1.40
Rhode Island.....	5,369	1.43	2.04	1.43
Other.....	2,877	1.68	2.32	1.38
Middle Atlantic.....	4,242	1.28	1.93	1.51
New York.....	1,634	1.20	1.60	1.33
Other.....	2,608	1.33	2.21	1.66
All other divisions.....	278,841	1.71	2.05	1.20
North Carolina.....	151,736	1.64	1.91	1.16
South Carolina.....	17,624	1.78	2.07	1.16
Georgia.....	61,645	1.76	2.14	1.22
Alabama.....	23,733	1.62	2.08	1.28
Other.....	24,103	2.29	3.05	1.33
United States.....	298,833	1.70	2.06	1.21
Thread mills:				
New England.....	18,484	2.22	3.11	1.40
Connecticut.....	11,316	2.02	2.82	1.40
Other.....	7,168	2.64	3.68	1.39
Middle Atlantic.....	6,862	4.06	6.55	1.62
North Central.....	121	1.98	2.47	1.25
South.....	37,227	1.94	2.36	1.22
North Carolina.....	12,179	2.17	2.58	1.19
Other.....	25,048	1.84	2.27	1.23
United States.....	62,694	2.14	2.75	1.28

Adapted from Census of Manufactures: 1954.

Value added by manufacture of yarn and thread, broad-woven fabrics, and finished textiles (except wool) per dollar of payroll, in 1954, averaged \$1.43 for establishments operated by single-unit companies and \$1.53 for those operated by multiunit companies, according to census reports. Similarly, value added per dollar of payroll averaged \$1.46 for establishments operated by multiunit companies primarily engaged in a single industry, compared with an average of \$1.54 for establishments operated by multiunit companies engaged in more than one industry. Value added by establishments primarily engaged in the manufacture of these products, operated by companies primarily engaged in other industries, aver-

aged \$1.60 per dollar of payroll. These results appear to indicate that average value added by manufacture per dollar of payroll varied directly with degree of integration, but information available is not adequate to indicate whether or to what extent the differences in average value added per dollar of payroll may be attributed to differences in degree of integration.

### 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 (including evaluations of the influence of such factors as kinds of machinery, organizational setup, and operating schedules on efficient utilization of cotton of different qualities), under more or less controlled conditions, to show the differences in value for mill purposes of cotton that is of different qualities but is 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 or value of the products, as a result of differences in the quality of the cotton used. Data showing such differences in value for mill purposes and 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.

A basic requirement for determining the qualities of cotton relatively best adapted to the production of specified products is that all important quality elements of cotton be ascertained and evaluated. This would require accurate measuring of these quality elements and their relation to processing performance and to the quality or value of the products. Considerable progress has been made in developing techniques for measuring some properties of cotton fibers, but apparently other important quality elements need to be defined and evaluated. Apparently one of the quickest and most satisfactory ways of relating the various quality elements of cotton to processing performance and to the quality or value of the resultant products is by carefully controlled pilot-plant studies, using commercial equipment for processing the cotton and reliable measures for indicating differences in value of the products. Such a pilot-plant laboratory has been established by the Agricultural Marketing Service at Clemson College, South Carolina.

Some information has been assembled to show the grades, staple lengths, and some other characteristics of cotton used in the manufacture of specified kinds of fabrics (45). It shows averages for picker and card waste; neps per 100 square inches of card web; yarn number, strength, and appearance; fabric strength and number of threads per inch; and weight of fabric per square yard for yarns of different fineness and fabrics of different construction made of cotton of a wide range of grades, staple lengths, and other characteristics. But it does not indicate the influence of differences in grade, staple length, and other quality elements of the cotton on manufacturing performance and costs and on the quality or value

of the products. Consequently, this information does not supply an adequate basis for adjusting the quality of cotton used to mill requirements.

Adjustments in quality of cotton to mill requirements should be based on more nearly complete information showing more specifically the influence of differences in the various quality elements 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 (99).

Problems of increasing efficiency in manufacturing cotton yarn may involve consideration of such factors as the size, organization, and control of the operating units; kinds and arrangement of buildings, machinery, and equipment used; labor used, and operating methods and practices; and the quality of raw materials used. Integration in the textile industry has resulted in changes in organization and control of some operating units, but information available is not adequate to show whether or to what extent these changes affect the efficiency of the manufacturing operations or the competition among fibers. Use of improved machinery, suitably organized and operated, may result in substantial improvement.

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 cost engineering firm, with the assistance of the Carded Yarn Association, Inc. Detailed cost 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 the 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 cost-engineering knowledge of and experience with the industry.

Results show that total costs of manufacturing 10's yarn, for example, for 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. Differences in costs for mills spinning 20's and 30's yarns followed much the same pattern. Such differences in manufacturing costs apparently indicate that economic 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 (94).

These differences in manufacturing costs are largely accounted for by differences in costs of labor. Costs of labor for 10's 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 10's hosiery yarn per man-hour by the mills surveyed ranged from 41 to 66 percent of that for the model mill, and averaged 55 percent. 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 10's hosiery yarn; and from 14 percent for opening and picking to 147 percent for fly frames, for 20's yarn (94).

Such differences in unit labor costs emphasize the importance of adjustments to increase efficiency and to reduce costs. 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 10's 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 reductions ranging from 40 to 60 percent. 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 efficiency and reducing costs of manufacturing cotton yarns, as indicated by the



results of the study mentioned, 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 in operations, better lighting, evaporative cooling, and better humidification; increased machine assignment per worker and the equalization of reasonable work loads for machines and employees; and adjustments in size of mills and in number of counts spun.

Substantial improvements in the textile industry were reported in 1958 but further modernization was greatly needed (46). During the 10 years 1948-57, the textile industry spent \$4.4 billion for new plants and equipment, and about \$3.5 billion was for machinery. Productivity per man-hour, based on yards of broad-woven goods produced per man-hour, rose during this 10-year period from 7.7 yards to 11.6 yards, an increase of 67 percent, or 6.7 percent a year. Despite these improvements, it was estimated that fully 65 percent of the textile manufacturing equipment in place in 1957 was obsolete. Textile manufacturers who were replacing old facilities with new plant and equipment in 1958 indicated that 37 percent expected these replacement expenditures to pay for themselves in 1 or 2 years, 47 percent in 3 to 5 years, and 16 percent in 6 or more years (46).

An investigation of the textile industry, department by department, to ascertain what can be done by mills to strengthen their profit position indicated possibilities of substantial improvement. Mills find that the use of modern opening and picking machinery, arranged and operated to suit individual mill requirements, reduces labor costs up to 80 percent, produces better picker laps, improves subsequent operations, and makes possible the use of lower grade cotton (46). The use of new carding equipment speeds production per man-hour, and reduces labor costs 10 to 33 percent in carding, 75 to 80 percent in drawing, and 60 to 70 percent in roving (46). Modern spinning machinery doubles production per man-hour, reduces labor costs in spinning by 40 to 60 percent, improves yarn quality, reduces ends down, and increases machine efficiency (46).

New yarn-preparation machines can reduce payroll costs 35 to 80 percent, but a large proportion of the machines in use are 20 to 30 years old (46). New spoolers can reduce man-hours of labor up to 37 percent and produce cleaner and better running yarn. One of the late-model card winders runs 50 percent more yarn per minute and requires 63 percent fewer man-hours than 10-year-old machines. A new twister-winder machine requires 50 percent fewer man-hours than old machines formerly used for the same job (46).

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 greater 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 this bulletin relates mainly to manufacturers of cotton broad-woven and narrow fabric mills. The cotton broad-woven fabrics industry comprises establishments primarily engaged in weaving fabrics over 12 inches wide of cotton or mixtures in which cotton is the principal fiber by weight. Establishments weaving gray goods and further processing them into finished fabrics or fabricated textile products such as sheets, towels, and bedspreads also are included. Important products of this industry include apparel fabrics and mechanical and industrial fabrics, made of cotton, such as duck, osnaburgs, sheeting, print cloth, flannels, denims, shirtings, towelings, draperies, and upholstery fabrics. They also make such fabricated products as sheets, towels, and bedspreads.

The narrow-fabric industry comprises establishments primarily engaged in weaving or braiding fabrics 12 inches wide or narrower, of cotton, wool, silk, rayon, or other fibers. Also included are establishments weaving or braiding fabrics 12 inches wide or narrower of fabric-covered elastic yarn. Important products of this industry include fabric belting, ribbons, bindings and gimps, woven labels, hat bands, elastic and nonelastic webbing, covered rubber yarns and thread, and fabric lacings.

### Nature, Practices, and Equipment

Most of the mills in the cotton broad-woven fabric industry, particularly the larger and medium-sized mills, perform many or all the processing operations in converting raw fibers into woven fabrics. These processes include fiber preparation, spinning, spooling, warping, slashing, weaving, shearing, and inspecting. Finishing of yarn by bleaching, dyeing, or mercerizing before weaving is fairly common. Some fabrics are bleached or dyed and some are fabricated into such products as sheets, towels, and bedspreads before leaving the mill.

The principal materials consumed by this industry are cotton fibers and cotton yarn. In 1954, about 77 percent of the yarn spun on the cotton system was produced by establishments for their own use. Annual consumption of yarn by cotton broad-woven fabric mills since 1947, according to census reports, ranged from 2,899 million pounds in 1958 to 3,889 million in 1951 (table 28). Most of the yarns consumed were made of cotton, but yarns made of man-made fibers increased from about 7 percent of the total in 1947 to about 13 percent in 1953, then decreased to less than 4 percent in 1958.

The value of shipments of the cotton broad-woven fabric industry decreased from \$2,913 million in 1947 to \$2,790 million in 1954, then increased to \$3,054 million in 1956, according to census reports. Primary products, including cotton broad-woven gray and finished fabrics, sheets, pillowcases, and towels, valued at \$2,549 million in 1954, accounted for 94 percent of the value of total shipments of this industry and for 84 percent of total shipments of these products by all industries. Secondary products shipped included cotton system yarns, and rayon and related broad-woven fabrics.

TABLE 28.—Yarn consumed by manufacturers of broad-woven cotton goods, by type of yarn, United States, specified years, 1947-58

Type of yarn	1947	1949	1951	1952	1953	1954	1955	1956	1957	1958
Cotton:	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>
Carded.....	3,135	2,508	3,204	2,945	2,937	2,712	2,843	2,788	2,517	2,392
Combed.....	230	225	300	299	325	258	308	354	357	382
Total.....	3,365	2,733	3,504	3,244	3,262	2,970	3,151	3,142	2,875	2,774
Rayon:										
Spun.....	8	8	9	13	13	32	40	45	44	32
Filament.....	232	287	323	403	453	26	39	37	30	28
Total.....	240	295	332	416	466	58	79	82	73	60
Nylon.....				11	23	9	11	11	11	12
All other: <sup>1</sup>										
Cotton <sup>2</sup> .....	18	13	15	12	8	15	10	12	12	17
Rayon <sup>2</sup> .....	9	2	10	10	15	23	17	15	14	18
Wool, alpaca and mohair.....	12	11	17	10	8	5	4	5	3	2
Other <sup>3</sup> .....	5	10	11	3	4	8	13	17	18	16
Total.....	44	36	53	35	35	51	44	49	47	53
Total, all types.....	3,649	3,064	3,889	3,706	3,780	3,088	3,285	3,284	3,007	2,899

<sup>1</sup> Includes blends and mixtures.

<sup>2</sup> Used as part of blends or mixtures.

<sup>3</sup> Includes such fibers as acrylic, polyesters and protein fibers, flax, jute, linen, etc.

Adapted from Bureau of Census reports, Facts for Industry (Series: M15-A-05).

Operations performed in narrow-fabric mills include yarn preparation, weaving, braiding, and finishing. Some mills spin yarns from cotton or synthetic fibers for their own use, and practically all narrow fabrics are finished in this industry. The value of shipments of this industry increased from \$215 million in 1947 to \$284 million in 1956, according to census reports. In 1954, narrow fabrics valued at \$235 million accounted for 96 percent of total shipments of this industry, and for 94 percent of these products shipped by all industries.

#### Size and Organization

Changes in size and organization of the cotton broad-woven fabric industry may be indicated by information on number of looms and quantities of yarn consumed, on ownership and operation of manufacturing establishments, and on mergers and acquisitions.

*Number of Looms and Yarn Consumption.*—In 1958, according to census reports, the number of broad looms in place in cotton mills totaled 327,071, or less than half the number in 1927 and about four-fifths as many as 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 in 1958 total consumption of yarn was 18 percent greater and total production of fabrics was about 9 percent greater than in 1939 (table 29).

TABLE 29.—*Number of broad looms<sup>1</sup> in cotton mills, pounds<sup>2</sup> of cotton yarn consumed, and yards of broad-woven cotton goods produced, United States, specified years, 1927-58*

Year	Looms in place <sup>1</sup>	Yarn consumed		Broad-woven goods produced	
		Total	Per loom in place	Total	Per loom in place
	Number	Million pounds	Pounds	Million yards <sup>2</sup>	Yards <sup>2</sup>
1927	715, 046			8, 754	12, 242
1931	588, 128	2, 056	3, 496	6, 984	11, 875
1935	508, 496	2, 194	4, 315	6, 988	13, 742
1939	442, 698	2, 501	5, 649	8, 287	18, 719
1945	412, 243	3, 459	8, 391	8, 721	21, 355
1946	400, 849	3, 476	8, 672	9, 144	22, 812
1947	397, 101	3, 649	9, 189	9, 817	24, 722
1948	390, 112	3, 496	8, 962	9, 640	24, 711
1949	380, 862	3, 064	8, 045	8, 406	22, 071
1950	382, 209	3, 648	9, 542	10, 013	26, 192
1951	394, 288	3, 889	9, 863	10, 136	25, 707
1952	395, 149	3, 706	9, 379	9, 515	24, 080
1953	390, 556	3, 786	9, 694	10, 203	26, 124
1954	374, 817	3, 088	8, 239	9, 891	26, 389
1955	367, 215	3, 286	8, 948	10, 175	27, 708
1956	356, 254	3, 253	9, 215	10, 317	28, 960
1957	351, 657	3, 037	8, 636	9, 539	27, 126
1958	327, 071	2, 944	9, 003	8, 975	26, 535

<sup>1</sup> Average number at end of quarter or at end of year.

<sup>2</sup> Linear yards, 1939 through 1958, and square yards, 1927 through 1935.

Adapted from Bureau of Census reports, Facts for Industry (Series: M 15 A-05).

Increased proportions of the cotton and rayon broad looms are in cotton-growing States and decreased proportions are in New England and Middle Atlantic States (table 30). The proportion of the total number of the looms in the United States that was in cotton-growing States increased from less than 70 percent in 1942 to more than 76 percent in 1954. The proportion in New England States decreased from 22 percent in 1942 to 17 percent in 1954, and the proportion in Middle Atlantic States decreased from 8 percent in 1942 to 5 percent in 1954.

TABLE 30.—Number of cotton and rayon looms in place, by State and region, 1942, 1949, and 1954

State and region	Looms in place		
	1942	1949	1954
Cotton-growing States:	<i>Number</i>	<i>Number</i>	<i>Number</i>
Alabama.....	34, 870	30, 050	30, 915
Georgia.....	54, 404	54, 208	56, 011
North Carolina.....	85, 383	84, 635	88, 123
South Carolina.....	144, 770	135, 682	155, 950
Other States <sup>1</sup> .....	43, 949	44, 434	34, 091
Total.....	363, 376	349, 009	365, 090
New England States:			
Massachusetts.....	56, 790	53, 931	41, 547
Rhode Island and Connecticut.....	35, 029	25, 506	16, 877
Maine, New Hampshire, Vermont.....	25, 201	22, 707	22, 260
Total.....	117, 020	102, 144	80, 684
Middle Atlantic States <sup>2</sup> .....	39, 483	39, 573	26, 360
All other States.....	2, 248	2, 131	10, 745
United States.....	522, 127	492, 857	482, 879

<sup>1</sup> Includes Arkansas, California, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas, and Virginia.

<sup>2</sup> Includes Delaware, Maryland, New Jersey, New York, and Pennsylvania.

Adapted from Bureau of Census reports, Facts for Industry and Census of Manufactures: 1954.

Narrow fabric mills are located mainly in Middle Atlantic and New England States, but in recent years some shifts to South Atlantic States are indicated. The proportion of all narrow fabric plants that were in New England and Middle Atlantic States decreased from about 84 percent in 1947 to 80 percent in 1954, and the corresponding proportions of total employees decreased from about 81 percent in 1947 to 75 percent in 1954, according to census reports. The proportion of the number of plants in South Atlantic States increased from about 10 percent in 1947 to almost 13 percent in 1954, and the corresponding proportion of the number of employees increased from 11 percent in 1947 to 18 percent in 1954.

*Ownership and Operation.*—Ownership and operation of cotton broad-woven fabric mills have changed somewhat since 1939. Proportions of the mills that were under corporate ownership or control decreased from about 95 percent in 1939 to about 93 percent

in 1954, but the average number of employees per establishment increased, and the proportion of total employees accounted for by these mills continued at about 99 percent (table 31). Mills operated from central administrative offices as multiunits decreased from about 62 percent of the total in 1939 to 49 percent in 1954, but the proportion of total employees accounted for by multiunits increased from 77 percent in 1939 to 79 percent in 1954.

The proportion of narrow fabric mills under corporate ownership or control increased from 71 percent in 1939 to 75 percent in 1954, according to census reports. These mills accounted for about 91 percent of the employees in the industry in 1939 and in 1954. Mills operated from central administrative offices as multiunits accounted for 28 percent of the mills in the narrow fabric industry in 1939 and 14 percent in 1954. Employees in multiunit mills accounted for 47 percent of the total in 1939 and for 38 percent in 1954.

TABLE 31.—*Number of establishments and average number of employees per establishment for manufacturers of cotton broad-woven fabrics, by type of ownership and operation, United States, 1939 and 1954*

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	627	540	492	547
Partnership.....	13	19	( <sup>2</sup> )	42
Individual.....	19	23	31	9
Other.....	2	0	( <sup>2</sup> )	0
All.....	661	582	472	509
Operation:				
Single unit:				
Corporate.....	225	255	319	( <sup>2</sup> )
Noncorporate.....	26	41	27	( <sup>2</sup> )
All.....	251	296	289	208
Multiunit:				
Corporate.....	402	285	588	( <sup>2</sup> )
Noncorporate.....	8	1	419	( <sup>2</sup> )
All.....	410	286	585	821
All.....	661	582	472	509

<sup>1</sup> In 1939 only wage earners are included, and in 1954 all employees.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

*Mergers and Acquisitions.*—As indicated above (p. 75), mergers and acquisitions in the textile industry apparently have resulted in significant changes in the organization and management of many operating units. The extent of integration in cotton, rayon, and related broad-woven fabric mills in 1954 may be indicated by data showing, by size of mill, the number with weaving machinery only;

with spinning and weaving machinery; with weaving and finishing machinery; and with spinning, weaving, and finishing machinery (table 32). These data relate mainly to vertical integration and, as indicated earlier in this report (p. 75), about half of the spindles that changed hands in recent years did so in connection with vertical integration.

About 38 percent of the mills with less than 11 percent of the looms did weaving only. About half of the mills with about 74 percent of the looms and almost 84 percent of the spinning spindles had spinning and weaving machinery, or throwing and weaving, or spinning, throwing and weaving machinery. Almost 12 percent of the mills with 15 percent of the looms and 16 percent of the spinning spindles had weaving and finishing or spinning, weaving, and finishing machinery. About three-fourths of the throwing and twisting spindles were in establishments with throwing and weaving machinery; 22 percent in mills with spinning, throwing, and weaving machinery; and about 3 percent in mills with spinning, weaving, and finishing machinery.

In addition to other types of machinery reported, the integrated mills had, on the average in 1954, about 5 times as many looms per mill as those that reported weaving machinery only (table 32). The number of looms per mill for both integrated and nonintegrated mills ranged from less than 50 to 2,000 or more. Mills with 500 or more looms each accounted for about 36 percent of the number of mills, 81 percent of the number of looms operated, 84 percent of the spinning spindles, and 67 percent of the throwing and twisting spindles in the cotton rayon and related broad-woven fabric industry.

Mergers and acquisitions, along with changes in type of ownership and operation, of cotton broad-woven and narrow fabric mills in the period 1947-54 apparently were associated with decreases in average size of individual mills as indicated by number of employees. Average number of all employees per mill in the cotton broad-woven fabric industry decreased from 574 in 1947 to 509 in 1954, according to census reports. Average number of production workers decreased from 550 in 1947 to 482 in 1954. The proportion of the mills with 500 or more employees decreased from 42 percent in 1947 to 35 percent in 1954 (table 33). The proportion of establishments with less than 50 employees increased from 16 percent in 1947 to 26 percent in 1954.

The number of narrow fabric mills increased from 480 in 1947 to 513 in 1954, but the number of employees decreased, according to census reports. Average number of employees per mill decreased from 58 in 1947 to 50 in 1954, and the average number of production workers decreased from 53 in 1947 to 45 in 1954. The proportion of the mills with 10 or more employees decreased from 75 percent in 1947 to 66 percent in 1954 (table 33).

Degree of concentration in the cotton broad-woven and narrow fabric industries on a company basis may be indicated by the proportions of the total number of employees and total value of shipments accounted for by specified numbers of the largest companies in these industries. Data on the cotton broad-woven fabric industry show that, in 1954, mills operated by 20 of the largest companies, or less than 5 percent of the total number, accounted for 47 percent of the employees and 49 percent of the value of shipments of the

TABLE 32.—*Number of cotton, rayon, and related broad-woven fabric mills, looms, and spindles, by size of mill and degree of integration, United States, 1954*  
Fabric Mills

Degree of integration <sup>1</sup>	All	Looms per mill						
		1-49	50-99	100-499	500-999	1,000-1,499	1,500-1,999	2,000 or more
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Weaving only.....	346	127	87	112	12	4	<sup>2</sup> 4	( <sup>3</sup> )
Spinning and weaving.....	367	11	10	122	117	49	<sup>2</sup> 58	( <sup>3</sup> )
Throwing and weaving.....	66	6	8	26	17	<sup>2</sup> 9	( <sup>3</sup> )	-----
Spinning, throwing, weaving.....	16	3	-----	<sup>2</sup> 6	( <sup>3</sup> )	<sup>2</sup> 4	( <sup>3</sup> )	----- 3
Weaving and finishing.....	29	<sup>2</sup> 13	( <sup>3</sup> )	<sup>2</sup> 16	( <sup>3</sup> )	-----	-----	-----
Spinning, <sup>4</sup> weaving, finishing.....	75	<sup>2</sup> 4	( <sup>3</sup> )	30	18	14	3	----- 6
Total.....	899	157	112	308	168	78	37	39
		Looms operated						
Weaving only.....	52, 148	3, 695	6, 092	23, 085	7, 424	4, 860	<sup>2</sup> 6, 992	( <sup>3</sup> )
Spinning and weaving.....	308, 569	247	702	35, 945	80, 357	60, 580	<sup>2</sup> 30, 738	( <sup>3</sup> )
Throwing and weaving.....	32, 045	110	537	7, 706	12, 204	<sup>2</sup> 11, 488	( <sup>3</sup> )	-----
Spinning, throwing, weaving.....	17, 056	58	-----	<sup>2</sup> 2, 746	( <sup>3</sup> )	<sup>2</sup> 5, 632	( <sup>3</sup> )	----- 8, 620
Weaving and finishing.....	4, 517	<sup>2</sup> 677	( <sup>3</sup> )	<sup>2</sup> 3, 840	( <sup>3</sup> )	-----	-----	-----
Spinning, <sup>4</sup> weaving, finishing.....	68, 544	<sup>2</sup> 247	( <sup>3</sup> )	9, 426	13, 223	16, 509	5, 479	23, 660
Total.....	482, 879	4, 458	7, 907	80, 003	115, 953	95, 348	64, 489	114, 721



Cotton and silk system spinning spindles

	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands
Spinning and weaving-----	13,745	147	64	2,038	3,478	2,697	<sup>2</sup> 5,321	<sup>(3)</sup>
Spinning, throwing, weaving-----	400	<sup>(5)</sup>	-----	<sup>2</sup> 121	<sup>(3)</sup>	<sup>2</sup> 136	<sup>(3)</sup>	143
Spinning, <sup>4</sup> weaving, finishing-----	2,768	<sup>2</sup> 12	<sup>(3)</sup>	402	513	658	224	959
Total-----	16,913	150	73	2,516	4,036	3,457	2,328	4,353
Throwing and twisting spindles								
Throwing and weaving-----	981	72	52	261	442	<sup>2</sup> 154	<sup>(3)</sup>	-----
Spinning, throwing, weaving-----	290	<sup>(5)</sup>	-----	<sup>(3)</sup>	<sup>(3)</sup>	<sup>2</sup> 144	<sup>(3)</sup>	<sup>(3)</sup>
Spinning, <sup>4</sup> weaving, finishing-----	42	<sup>(5)</sup>	<sup>(3)</sup>	26	<sup>(3)</sup>	-----	-----	<sup>(3)</sup>
Total-----	1,313	72	52	304	456	182	162	131

- <sup>1</sup> Degree of integration determined by type of machinery reported.
- <sup>2</sup> Combined with data withheld to avoid disclosing information for individual companies.
- <sup>3</sup> Data withheld to avoid disclosing information for individual companies.
- <sup>4</sup> Includes spinning and throwing.
- <sup>5</sup> Less than 500 spindles.

Adapted from Census of Manufactures: 1954.

TABLE 33.—Number of broadwoven cotton and narrow-fabric mills, by number of employees, United States, 1947 and 1954

Number of employees	Broadwoven cotton fabric mills		Narrow-fabric mills	
	1947	1954	1947	1954
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1,000 and over.....	105	86	1	3
500 to 999.....	147	115	5	14
250 to 499.....	147	136	9	55
100 to 249.....	66	71	60	70
50 to 99.....	41	20	72	110
20 to 49.....	47	48	114	86
10 to 19.....	24	35	98	76
5 to 9.....	18	28	54	99
1 to 4.....	7	43	66	
Total.....	602	582	479	513
	Proportion of total			
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1,000 and over.....	17.4	14.8	0.2	0.6
500 to 999.....	24.4	19.8	1.0	2.7
250 to 499.....	24.4	23.4	1.9	10.7
100 to 249.....	11.0	12.2	12.5	13.7
50 to 99.....	6.8	3.4	15.0	21.4
20 to 49.....	7.8	8.2	23.8	16.8
10 to 19.....	4.0	6.0	20.5	14.8
5 to 9.....	3.0	4.8	11.3	19.3
1 to 4.....	1.2	7.4	13.8	
Total.....	100.0	100.0	100.0	100.0

Adapted from Census of Manufactures: 1947 and 1954.

industry. The degree of specialization may be indicated by data showing that, in 1954, about 94 percent of total shipments of cotton broad-woven fabric mills was accounted for by products regarded as primary to this industry (table 34).

Similar data for the narrow fabric industry show that, in 1954, mills operated by 20 of the largest companies, or about 4 percent of the total, accounted for about 35 percent of the employees and 37 percent of the value of the shipments of the industry. The proportion of the total value of shipments accounted for by the 4, 8, and 20 largest companies decreased from 1947 to 1954. The proportion of total shipments of narrow fabric mills that was accounted for by products regarded as primary to the industry increased from 95 percent in 1947 to 96 percent in 1954 (table 34).

#### Manufacturing Methods<sup>5</sup>

*Preparations of yarn.*—Weaving of gray goods in combined spinning and weaving mills necessitates the preparation of warp. Wind-

<sup>5</sup> Based mainly on Cotton Goods Production and Distribution Techniques, Costs, and Margins (110).

TABLE 34.—Share of employment and shipments of the cotton broad-woven and narrow-fabric manufacturing industry accounted for by largest companies, United States, 1947 and 1954

Industry, measure, and year	Com-panies <sup>1</sup>	Ship-ments <sup>2</sup> (1,000 dollars) or employ-ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup>			Prima-ry prod-uct special-iza-tion <sup>5</sup>
			4 larg-est com-panies	8 larg-est com-panies	20 larg-est com-panies	
Cotton broadwoven fabrics:						
Number of employees (1954)-----	Number 413	Number 296, 193	Percent 18	Percent 28	Percent 47	Percent 94
Value of shipments:						
1954-----	413	2, 789, 621	18	29	49	94
1947-----	( <sup>6</sup> )	2, 912, 651	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Narrow-fabric mills: <sup>7</sup>						
Number of employees (1954)-----	489	25, 676	14	21	35	96
Value of shipments:						
1954-----	489	250, 162	13	21	37	96
1947-----	445	215, 194	17	25	41	95

<sup>1</sup> See footnote 1, table 21, p. 78.

<sup>2</sup> See footnote 2, table 21, p. 78.

<sup>3</sup> See footnote 3, table 21, p. 78.

<sup>4</sup> See footnote 4, table 21, p. 78.

<sup>5</sup> See footnote 5, table 21, p. 78.

<sup>6</sup> Comparable data are not available, due to significant revisions in 1947 classification of plants or products in the industry.

<sup>7</sup> Jobbers were included in 1947 but excluded in 1954.

Adapted from United States Senate Report on Concentration in American Industry (115).

ing 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 yarn, into a single sheet for weaving, and coating the yarn with a sizing of starches, gums, softeners, penetrants, preservatives, and sometimes inert loading agents, constitutes 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 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 them

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.

*Weaving operations.*—Fabrics are woven with one of three foundation weaves—plain, satin, or twill—or with some combination of these weaves. Special types include leno weave for such fabrics as marquissette, curtain goods, men's summer shirtings, women's dress goods, special bags, such 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 harnesses 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 those making light-construction fabrics, faster than heavy-construction fabrics.

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 per minute. For a loom operating at 180 picks per minute, fabric production for print cloth would approximate 5 yards per hour.

*Preparation of Fabric.*—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 pieces of specific lengths, folded and baled for shipment.

#### Machinery and Equipment

The total number of looms in place in the cotton manufacturing industry decreased from 394,000 in 1947 to 326,000 in 1958, a decrease of about 21 percent within 12 years (table 35). The number of dobby, box, and jacquard looms each increased from 1947 to the early 1950's, then decreased by 1958 to below the 1947 level, whereas the number of plain looms decreased each year, except 1951, during this period. The number of looms of all types active at the end of the year, for the first and second shifts, decreased from 1947 to 1954. For the third shift, the number active increased markedly from 1947 to the middle 1950's, then decreased, but the number

active in 1958 was substantially greater than in 1947. Total loom hours operated for all types of looms combined varied irregularly from 1947 to 1958, despite a substantial reduction in the number of looms in place.

Many of the cotton looms in operation in the United States in earlier years apparently were not of the most improved types. Some apparently were not in the best of condition. But increased expenditures for new plants and equipment indicate that improvements were made in the 1940's and 1950's. Census reports show that total expenditures for plant and equipment by manufacturers of cotton broad-woven and narrow fabrics increased from \$24,651,000 in 1939 to \$90,345,000 in 1947, and amounted to \$70,358,000 in 1954 (table 36). Expenditures for new equipment and new plants in 1956 amounted to \$118,115,000 by manufacturers of broad-woven fabrics and to \$4,010,000 by manufacturers of narrow fabrics.

TABLE 35.—Number of looms in place, number active at end of year by shifts, and total loom hours operated by kind of loom, for cotton-manufacturing industry, United States, specified years, 1947-58

Year	Looms in place <sup>1</sup>				
	Kind of loom				
	All	Plain	Dobby	Box	Jacquard
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1958.....	326, 387	272, 477	25, 616	21, 174	7, 120
1957.....	350, 212	290, 781	30, 361	20, 809	8, 261
1956.....	353, 871	293, 022	29, 972	22, 407	8, 470
1955.....	364, 851	303, 210	29, 498	23, 306	8, 837
1953.....	391, 881	321, 194	34, 811	26, 316	9, 560
1951.....	395, 891	324, 719	34, 578	25, 594	11, 000
1949.....	378, 767	311, 600	31, 437	25, 251	10, 479
1947.....	393, 942	327, 333	32, 379	24, 101	10, 129
	Active at end of year, first shift				
1958.....	312, 866	263, 113	24, 548	19, 443	5, 762
1957.....	324, 755	271, 987	27, 536	19, 125	6, 107
1956.....	336, 372	281, 413	27, 061	21, 244	6, 654
1955.....	350, 914	293, 614	28, 471	22, 152	6, 677
1953.....	360, 442	300, 250	31, 213	22, 692	6, 287
1951.....	367, 334	307, 097	29, 991	22, 834	7, 412
1949.....	356, 454	295, 461	29, 935	23, 262	7, 796
1947.....	382, 246	318, 691	31, 431	23, 303	8, 821
	Active at end of year, second shift				
1958.....	309, 063	260, 673	24, 419	19, 187	4, 784
1957.....	321, 523	270, 586	27, 316	18, 312	5, 309
1956.....	332, 528	279, 554	26, 545	20, 822	5, 607
1955.....	346, 379	290, 926	28, 328	21, 612	5, 513
1953.....	353, 181	295, 136	31, 019	21, 663	5, 363
1951.....	357, 545	300, 104	29, 222	22, 168	6, 051
1949.....	345, 385	289, 228	28, 693	20, 984	6, 480
1947.....	364, 204	306, 030	28, 907	22, 400	6, 867

See footnote at end of table.

TABLE 35.—Number of looms in place and number active at end of year by shifts, and total loom hours operated, by kind of loom, for cotton-manufacturing industry, United States, specified years, 1947-58—Con.

Looms in place<sup>1</sup>

Year	Kind of loom				
	All	Plain	Dobby	Box	Jacquard
Active at end of year, third shift					
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1958.....	289, 234	246, 431	22, 270	17, 142	3, 391
1957.....	293, 567	249, 189	24, 716	16, 120	3, 542
1956.....	298, 293	256, 501	24, 553	14, 229	3, 010
1955.....	305, 560	258, 299	25, 099	18, 562	3, 600
1953.....	292, 055	247, 087	26, 346	15, 749	2, 873
1951.....	274, 354	237, 356	23, 004	12, 296	1, 698
1949.....	234, 964	203, 439	19, 498	9, 931	2, 096
1947.....	191, 922	166, 344	15, 596	8, 397	1, 585
Total loom hours operated (in thousands)					
1958.....	1, 860, 463	1, 568, 830	147, 789	115, 630	28, 214
1957.....	1, 917, 172	1, 618, 114	157, 121	113, 397	28, 540
1956.....	2, 103, 558	1, 795, 551	173, 524	120, 632	33, 831
1955.....	2, 090, 313	1, 758, 252	167, 452	130, 926	33, 683
1953.....	2, 179, 141	1, 822, 107	206, 369	120, 961	29, 704
1951.....	2, 080, 435	1, 760, 759	173, 288	115, 144	31, 244
1949.....	1, 785, 833	1, 511, 556	143, 397	104, 857	26, 023
1947.....	2, 002, 486	1, 708, 458	146, 224	113, 597	34, 207

<sup>1</sup> Looms in place and active in production of cotton broad-woven goods and tire cord and fabric.

Adapted from Bureau of Census reports, Facts for Industry (Series: M 15A-05).

### Charges or Costs Involved

Gross margins to manufacturers of cotton broad-woven and narrow fabrics, or the spread between costs of raw materials, supplies, parts, and containers, and the value of the products, vary with the kind of fabric produced, from one establishment to another, and from one time to another. Census reports relating to cotton broad-woven fabrics show that manufacturers' gross margins decreased on the average from 54 percent of the value of the fabrics in 1939 to 49.7 percent in 1947 and to 44 percent in 1954 (table 37). Available data indicate that these proportions in 1957 were about the same as in 1954. Similar data relating to narrow fabric manufacturers show decreases from 57 percent of net sales in 1939, to 55 percent in 1947, and to 52 percent in 1954. Raw fibers and yarns consumed accounted for most of the costs included under "materials, supplies, parts, and containers," but the spreads between the costs of these fibers and yarns consumed and the values of the fabrics produced were somewhat greater than the proportions derived from census data.

Increases in proportions of the value of the products that were accounted for by costs of materials, supplies, parts, and containers

TABLE 36.—*Total expenditures for plant and equipment by manufacturers of cotton broad-woven and narrow fabrics, United States, 1939, 1947, and 1954*

Year and industry	Expenditures for—			
	Total	New equipment	New plant	All other <sup>1</sup>
1939:				
Cotton broad-woven and narrow-fabric mills:				
Broad-woven.....	1,000 dollars 23,029	1,000 dollars 16,171	1,000 dollars 3,951	1,000 dollars 2,907
Narrow-fabric.....	1,622	1,046	204	372
Total.....	24,651	17,217	4,155	3,279
1947:				
Cotton broad-woven and narrow-fabric mills:				
Broad-woven.....	84,437	55,447	23,325	5,665
Narrow-fabric.....	5,908	3,869	1,801	238
Total.....	90,345	59,316	25,126	5,903
1954:				
Cotton broad-woven and narrow-fabric mills:				
Broad-woven.....	65,043	45,802	9,397	9,844
Narrow-fabric.....	5,315	3,626	1,176	513
Total.....	70,358	49,428	10,573	10,357

<sup>1</sup> Expenditures for used plant and equipment.

Adapted from Census of Manufactures: 1947 and 1954.

from 46 percent in 1939 to 56 percent in 1954 for broad-woven fabrics and from 43 percent in 1939 to 48 percent in 1954 for narrow fabrics are accounted for by greater advances in prices of materials consumed than in prices of the products. Prices of Middling  $1\frac{5}{16}$ -inch cotton in mill areas advanced from an average of 11 cents in 1939 to 36 cents in 1954. Wages, the largest item of cost, accounted for about 60 percent of the manufacturers' gross margin for broad-woven cotton fabrics in 1954, about 43 percent in 1947, and 48 percent in 1939. For narrow fabrics, the corresponding proportions are 48, 44, and 43 percent, respectively.

Gross margins for individual manufacturers vary with the kind of raw materials used, the processing or manufacturing operations involved, and the kinds of products manufactured. Some manufacturers buy cotton yarn, weave it into cloth, and sell the fabrics as gray goods. Others buy raw cotton, spin it into yarn, and weave the yarn into cloth. Still others buy raw cotton, spin it into yarn, weave the yarn into cloth, and finish or fabricate the cloth into forms ready for ultimate consumers. In addition, differences in quality of raw cotton, yarn, and fabrics also affect manufacturers' gross margins.

TABLE 37.—*Values, costs, and margins for manufacturers of cotton broad-woven and narrow fabrics, United States, 1939, 1947, and 1954*

Item	Broad-woven cotton fabrics			Narrow fabrics <sup>1</sup>		
	1939	1947	1954	1939	1947	1954
	<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.....	869,354	3,282,872	2,789,621	82,150	209,273	250,162
Cost of materials, etc. <sup>2</sup> .....	399,190	1,651,794	1,564,999	34,994	93,575	121,266
Gross margin.....	470,164	1,631,078	1,224,622	47,156	115,698	128,896
Salaries and wages.....	251,180	764,532	783,011	27,410	63,286	79,063
Salaries.....	26,005	64,661	80,362	7,027	12,241	17,607
Wages.....	255,175	699,871	702,649	20,383	51,045	61,456
Fuel.....	8,860	14,983	13,549	660	973	1,545
Purchased electric energy.....	22,706	32,683	39,200	895	1,265	1,702
Contract and commission work.....	267	32,827	42,940	221	5,303	4,096
Other <sup>3</sup> .....	187,151	786,053	345,922	17,970	44,871	42,490



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, etc. <sup>2</sup> .....	45.9	50.3	56.1	42.6	44.7	48.5
Gross margin.....	54.1	49.7	43.9	57.4	55.3	51.5
Salaries and wages.....	28.9	23.3	28.1	33.4	30.2	31.6
Salaries.....	3.0	2.0	2.9	8.6	5.8	7.0
Wages.....	25.9	21.3	25.2	24.8	24.4	24.6
Fuel.....	1.0	.5	.5	.8	.5	.6
Purchased electric energy.....	2.6	1.0	1.4	1.1	.6	.7
Contract and commission work.....	.1	1.0	1.5	.2	2.5	1.6
Other <sup>3</sup> .....	21.5	23.9	12.4	21.9	21.5	17.0

<sup>1</sup> Includes cotton, manmade fibers, and silk.

<sup>2</sup> Includes supplies, parts, and containers.

<sup>3</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

Federal Trade Commission data 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 (108). Differences in average margins may be accounted for by the fact that raw materials used by exclusively weaving companies were mainly yarns and that these companies limited their processing chiefly to weaving, whereas the raw materials for combined spinning and weaving companies were largely raw cotton and these companies both spun yarn and wove it into fabrics. Data for 33 cotton 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 finer products, finished goods, and fabricated products (34).

Mill margins for manufacturers of cotton cloth vary considerably with changes in prices of cotton and of the fabrics produced (table 38). 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. The 17 constructions do not include any fine goods, for which manufacturers' margins usually are wider than for the coarser fabrics. 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, expressed in cents per pound, usually vary directly with prices of the cloth and of the cotton used (table 38). These margins 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. Margins increased with advances in prices and averaged 56.80 cents in the 1947-48 season, when prices of cotton average 34.30 cents, and the margins averaged 45.98 cents in the 1950-51 season, when prices of cotton averaged 43.54 cents.

Expressed as proportions of the prices of the cloth, these margins vary irregularly with prices of cotton and of cloth. The proportions of the wholesale value of the unfinished cloth accounted for by these margins ranged from 40.4 percent in the 1951-52 season to 62.4 percent in the 1947-48 season and amounted to 42.4 percent in the 1957-58 season (table 38). During the 1930's, when prices of cotton were relatively low, the proportions of the value of the cloth accounted for by mill margins ranged from substantially below to considerably above some of those since the end of World War II, when cotton prices were relatively high.

Manufacturers' gross margins and items of cost for cotton print cloth differ considerably from those for cotton voile. Data on manufacture of textile products in 1950, prepared by Barnes Textile Associates, Inc., show that, for cotton print cloth, cost of material accounted for 50 percent and cost of labor for 28 percent of the total cost; whereas, for cotton voile, cost of material accounted for 34 percent and cost of labor 34 percent. These differences result mainly from the fact that finer counts of yarn and more labor are required for voile than for print cloth (5).

TABLE 38.—Prices of unfinished cloth and raw cotton, and mill margins per pound, United States, 1926-58

Year ending July 31	Cloth prices <sup>1</sup>	Cotton prices <sup>2</sup>	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	9.43	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	31.46	43.52	55.81
1948	91.10	34.30	56.80	62.86
1949	65.62	31.78	33.84	51.57
1950	67.13	31.82	35.31	52.15
1951	89.52	43.54	45.98	51.36
1952	68.57	40.87	27.70	40.40
1953	68.34	36.13	32.21	47.13
1954	63.82	35.12	28.71	44.99
1955	62.84	36.02	26.82	42.68
1956	65.68	36.07	29.61	45.08
1957	62.91	34.19	28.72	45.65
1958	59.79	34.45	25.35	42.40

<sup>1</sup> Seventeen constructions of unfinished cloth. Prices per yard converted to approximate quantity obtainable from a pound of cotton.

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

Compiled from Cotton Price Statistics, Agricultural Marketing Service.

The large proportions of gross margins for manufacturers of cotton broad-woven and narrow fabrics accounted for by wages, and increases in wage rates in recent years, emphasize the importance of labor in the manufacture of these products. Reports of the Bureau of Labor Statistics show that hourly earnings of labor in the textile industry increased from 46 cents in 1939, to \$1.45 in 1956. These data apply to the textile industry as a whole, but it appears reasonable to believe that essentially the same kind of trends apply to cotton broad-woven and narrow fabric industries. Census reports indicate that, for cotton broad-woven fabric mills, the average value added by manufacture per dollar of wages paid increased from \$1.95 in 1939 to \$2.22 in 1947, then decreased to \$1.68 in 1957.

Similar data for narrow fabric mills show decreases from \$2.23 in 1939 to \$2.12 in 1947 and to \$1.97 in 1954, then an increase to \$2.06 in 1957. Apparently these decreases in value added per dollar of wages occurred despite substantial improvements in machinery used as indicated by large expenditures for new equipment since the end of World War II.

Value added by manufacture of cotton fabrics per dollar of wages and per hour of labor, and average wage rate per hour, apparently vary irregularly with size of plant as indicated by number of production workers (table 39). For cotton broad-woven fabric mills, the value added per dollar of wages and per hour of labor in 1954 averaged less for mills with 250 to 499 production workers, and more for mills with fewer than 10 production workers, than for the industry as a whole. These differences were only partially accounted for by differences in wage rate per hour. Similar data for narrow fabric mills show similar irregular variations (table 39).

Value added by manufacture per dollar of wages and per hour of labor, and wage rate per hour, also vary irregularly from one State and region to another (table 40). For cotton broad-woven mills, in 1954, wage rates per hour and value added per hour of

TABLE 39.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for manufacturers of broad-woven and narrow fabrics, by number of production workers, United States, 1954

Industry and number of production workers	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
Cotton broad-woven fabrics:	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1,000 and over.....	578,380	1.60	2.12	1.32
500 to 999.....	309,596	1.62	2.13	1.32
250 to 499.....	171,345	1.52	1.88	1.24
100 to 249.....	49,608	1.77	2.28	1.29
50 to 99.....	7,192	2.00	2.95	1.47
20 to 49.....	7,159	1.85	2.58	1.39
10 to 19.....	2,426	1.81	2.79	1.54
5 to 9.....	1,231	2.39	3.49	1.46
1 to 4.....	570	2.46	2.88	1.17
Total or average.....	1,127,507	1.60	2.10	1.31
Narrow-fabric mills:				
500 and over.....	6,449	1.65	2.07	1.25
250 to 499.....	18,604	1.60	2.33	1.46
100 to 249.....	47,926	2.20	3.17	1.44
50 to 99.....	21,911	1.90	2.46	1.29
20 to 49.....	16,653	2.06	2.66	1.29
10 to 19.....	5,705	2.06	2.62	1.27
5 to 9.....	2,870	2.32	3.01	1.30
1 to 4.....	1,429	2.55	3.05	1.20
Total or average.....	121,547	1.98	2.70	1.37

Adapted from Census of Manufactures: 1954.

TABLE 40.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate for manufacturers of cotton broad-woven and narrow fabrics, by region and State, 1954

Industry, region, and State	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
	1,000 dollars	Dollars	Dollars	Dollars
Cotton broad-woven fabric:				
New England.....	119,914	1.57	2.27	1.44
Maine.....	40,343	1.71	2.47	1.44
Massachusetts.....	49,398	1.45	2.05	1.41
Connecticut.....	7,569	1.59	2.35	1.48
Other.....	22,604	1.62	2.43	1.50
Middle Atlantic.....	24,619	2.04	3.35	1.64
New York.....	2,570	3.18	4.74	1.49
New Jersey.....	12,839	2.12	3.49	1.64
Pennsylvania.....	9,210	1.77	2.95	1.67
All other divisions.....	982,974	1.60	2.06	1.29
North Carolina.....	266,671	1.65	2.18	1.32
South Carolina.....	331,161	1.61	2.09	1.30
Georgia.....	172,823	1.50	1.85	1.23
Other.....	212,318	1.61	2.05	1.27
United States.....	1,127,507	1.60	2.10	1.31
Narrow fabric mills:				
New England.....	47,346	1.86	2.56	1.38
Massachusetts.....	15,482	1.80	2.62	1.46
Connecticut.....	8,827	2.08	3.28	1.58
Other.....	23,037	1.82	2.33	1.28
Middle Atlantic.....	44,771	1.99	2.91	1.46
New York.....	14,058	2.08	3.20	1.54
New Jersey.....	10,681	2.01	3.35	1.67
Pennsylvania.....	20,032	1.91	2.56	1.34
North Central.....	5,358	3.40	4.31	1.27
South.....	23,818	2.03	2.44	1.20
North Carolina.....	8,002	1.93	2.46	1.27
South Carolina.....	2,961	1.93	2.40	1.24
Other.....	12,855	2.12	2.44	1.15
Pacific.....	254	2.35	2.99	1.27
United States.....	121,547	1.98	2.70	1.37

Adapted from Census of Manufactures: 1954.

labor averaged lower in Southern than in Middle Atlantic and New England States. The influence of differences in wage rates were offset, at least to some extent, by differences in value added per hour of labor, and value added per dollar of wages in Southern States averaged higher than in New England but lower than in Middle Atlantic States. For narrow fabric mills in 1954, wage rates per hour and value added per hour of labor averaged lower in the South than in any other region, but value added per dollar of wages averaged higher than in New England and the Middle Atlantic States.

As indicated in another section of this report (p. 78), census data for 1954 relating to 2,263 manufacturers of yarn and thread, broad-woven fabrics, and finished textiles (except wool) show that average value added by manufacture per dollar of payroll varied directly with degree of integration. Value added per dollar of payroll averaged \$1.43 for establishments operated by single-unit companies and \$1.53 for those operated by multiunit companies. Similarly, value added per dollar of payroll averaged \$1.46 for establishments operated by multiunit companies primarily engaged in a single industry, compared with an average of \$1.54 for establishments operated by multiunit companies engaged in more than one industry. Value added by establishments primarily engaged in the manufacture of these products, that were operated by companies primarily engaged in other industries, averaged \$1.60 per dollar of payroll (86).

Net sales and operating profits for manufacturers of cotton textiles increased markedly early in World War II, but during the postwar period some reductions were made. A substantial proportion of the increases in profits was absorbed by income taxes. Net profits of cotton cloth mills (after adjustments for depreciation reserves, for Federal income and excess profit taxes, bad debts, and 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 then declined to 1.4 percent in 1954, and amounted to 2.9 percent in 1956 (27, 23).

### Means and Importance of Improvement

Improvements in the quality, suitability, and attractiveness of cotton fabrics from the viewpoint of consumer preference are important means of expanding outlets for cotton products. Special chemical treatments and finishes, along with improved mechanical processing, offer great possibilities of improving the quality of cotton products so they will be in a better position to meet the ever increasing competition of manmade fibers. Additional information is needed to show the changes in construction, weight, finishes, and other characteristics required for fabrics made of cotton to meet this competition most effectively and to supply a basis for developing suitable equipment and techniques for manufacturing the improved products efficiently.

Problems of increasing the efficiency of manufacture of cotton fabrics, as well as of cotton yarn, may involve consideration of such factors as the size, organization, and control of the operating units; location, kind, and arrangement of buildings, machinery, and equipment used; labor used and operating methods and practices;

and the kinds and qualities of raw materials used. Integration in recent years has resulted in changes in the organization and control of some plants manufacturing cotton fabrics, but information available is not adequate to indicate whether or to what extent these changes affect the efficiency of the manufacturing operations or the competition among fibers. Reports indicate that effective use of improved machinery and equipment may result in substantial improvement.

Large proportions of the gross margins of manufacturers of cotton fabrics are accounted for by costs of labor; therefore, increases in wage rates in recent years emphasize the importance of utilizing labor efficiently so as to increase efficiency and reduce costs of manufacturing cotton fabrics. Hourly earnings of labor in textile mills in 1957 averaged more than 3 times as high as in 1939 and 44 percent higher than in 1947. Developments during the 1950's indicate that substantial improvements may be made through increased use of improved machinery and equipment and through more efficient organization and operation of the manufacturing establishments.

As indicated in another section of this bulletin (p. 95), during the 10 years ended with 1957, the textile industry spent \$3.5 billion for machinery and equipment, and productivity per man-hour, based on yards of broad-woven goods produced, increased 67 percent. Nevertheless, it was estimated that about two-thirds of the textile manufacturing equipment in place in 1957 was obsolete (46). There are several ways, in addition to those indicated for yarn manufacturers (p. 95), to bring about substantial improvements. The installation and use of modern high-speed warpers and drawing-in machines, for example, enable some mills to increase warping speeds greatly, to make drawing-in labor savings of more than 75 percent, and to bring about other improvements (46).

Modernization in slashing equipment is said to pay off more rapidly than in any other department of a textile mill (46). Slashers may be modernized by rebuilding old ones or by replacing the old with new ones. Rebuilt slashers in some instances deliver twice as much, and new slashers deliver up to 3 times as much, yarn per minute as old ones (46). Weaving mills are increasing productivity per man-hour up to 30 percent by replacing old looms with modern ones. A wide-sheeting loom introduced in 1956 is increasing production 20 percent at each of 4 mills. Other mills have rebuilt old looms for an average gain of 11 percent in productivity (46).

Results of these developments suggest the possibility of substantial improvements in the manufacture of cotton fabrics. The conditions under which and the extent to which these and other developments can be most feasibly utilized in increasing efficiency and reducing costs of manufacturing cotton fabrics may need to be based on information similar to that developed for manufacturers of carded cotton yarns, as indicated on pages 93 to 95 (94). 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 low-cost mills for manufacturing typical fabrics, no doubt would indicate feasible means for bringing about substantial improvements in the manufacture of cotton fabrics. Similar information for manufacturers of carded cotton yarn indicates possibilities of reducing manufacturing costs by amounts ranging up to 40 percent of the total for some mills. It is reported that, although cotton-spinning mills are among the industry's most progressive mills, the average spinning mill is operating 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 (75). This situation apparently indicates that economic applications are lagging far behind technological developments in the cotton textile manufacturing industry. Costs of manufacturing therefore are substantially higher than they would be if technological developments were fully utilized.

Some of the more promising means of increasing efficiency and reducing costs of manufacturing cotton fabrics include: (1) increased use of new and modern machinery, especially of the automatic types; (2) some modernization of buildings, and arrangement of machinery for more direct flow of work and more efficient operation; (3) full machine assignments and equalization of reasonable work loads for employees; and (4) adjustments in size of operating units and in variety of fabrics produced.

The relative importance of increasing the efficiency of manufacturing cotton fabrics, including dyeing and finishing, may be indicated by data which show that during the 1950's gross margins for rendering these services averaged over 50 percent more than gross returns to growers for 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 PRODUCTS MANUFACTURING

Establishments primarily engaged in manufacturing wool products include scouring and combing plants, yarn mills, manufacturers of woolen and worsted fabric, finishing plants, and manufacturers of wool carpets and rugs.

Scouring and combing plants 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 producing tops on worsted combs from wool, rayon, or other synthetic fibers. Establishments primarily engaged in the production of top from tow without combing, and in the production of nubs and slubs are also included in this industry. Byproducts of the industry include noils and recovered wool grease.



Wool yarn mills, except carpet, are primarily engaged in spinning, twisting, winding, or spooling yarn, except carpet and rug yarn, 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, also are included.

Manufacturers of woolen and worsted fabrics are primarily engaged in weaving woolen and worsted fabrics more than 12 inches wide. Important products of this industry include woolen and worsted apparel fabrics, industrial and mechanical fabrics, and woven felts and hair cloth.

Finishers of wool textiles are primarily engaged in dyeing and finishing woven woolen or worsted fabrics, or in dyeing wool, tops, or yarns. This industry includes establishments primarily engaged in dyeing and finishing, on a commission basis, materials owned by others; and those primarily engaged in dyeing and 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. Data relating to finishers of wool textiles are presented in another section of this bulletin (p. 159).

Manufacturers of wool carpets and rugs include establishments primarily engaged in weaving carpets and rugs wholly or in part of woolen or worsted yarn. Also included are establishments primarily engaged in spinning woolen or worsted yarn for use in carpets and rugs. Important products of this industry include woven wool carpets and rugs, wool automobile and aircraft floor coverings, and woolen and worsted system carpet yarns. Detailed data for carpets and rugs are not presented in this bulletin.

### Nature, Practices, and Equipment

A variety of products is shipped by establishments in the wool products manufacturing industry. In 1954, the value of shipments of 74 scouring and combing plants totaled \$94 million, of which about 58 percent was accounted for by primary products, consisting of scoured wool, tops, and related products; about 12 percent by secondary products, consisting principally of yarns spun on the woolen and worsted system, and woolen and worsted apparel fabrics; and about 30 percent by miscellaneous receipts, mainly from commission scouring or combing of wool owned by others.

Proportions of fibers consumed in woolen spinning that were accounted for by wool decreased from about 84 percent in 1947 to 74 percent in 1958, whereas the corresponding proportions for man-made fibers increased from about 5 percent in 1947 to 20 percent in 1958 (table 41). Proportions accounted for by cotton decreased markedly during this period. In worsted combing, proportions of fibers consumed that were wool and mohair decreased from about 96 percent in 1947 to 88 percent in 1958, whereas manmade fibers increased from about 2 percent in 1947 to 7 percent in 1958. Proportions of fibers consumed in the manufacture of carpet and rug yarns that were accounted for by manmade fibers increased from about 1 percent in 1947 to 20 percent in 1958.

TABLE 41.—Fibers consumed on woolen and worsted systems, United States, specified years, 1947-58

Item	1947	1949	1951	1953	1955	1956	1957	1958
	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>
Woolen spinning:								
Shorn and pulled wool.....	189,555	138,602	157,097	152,321	141,078	144,140	122,985	106,635
Other wool <sup>1</sup> .....	147,385	173,220	159,489	140,956	138,960	152,408	139,571	129,120
Cotton.....	38,952	19,143	19,040	17,044	10,941	12,289	10,170	7,456
Manmade fibers <sup>2</sup> .....	20,652	20,051	22,094	28,867	45,703	50,186	58,037	61,788
Other fibers <sup>2</sup> .....	2,738	12,349	11,580	1,869	2,887	4,674	5,707	4,285
Total.....	399,282	363,365	369,300	341,057	339,569	363,697	336,470	309,284
Worsted combing:								
Shorn and pulled wool.....	336,345	200,350	225,048	205,721	140,079	152,483	117,865	110,765
Mohair.....	13,880	12,106	8,785	5,544	4,443	2,743	2,114	6,147
Manmade fibers <sup>2</sup> .....	5,920	4,944	8,298	15,085	10,077	9,978	11,427	9,272
Other fibers <sup>2</sup> .....	8,539	13,801	20,036	5,859	5,229	6,147	5,138	6,148
Total.....	364,684	231,201	251,167	232,209	159,828	171,351	136,544	132,332
Carpet and rug yarns:								
Shorn and pulled wool.....	168,644	159,440	102,012	135,935	132,602	144,059	127,911	119,263
Other wool <sup>1</sup> .....	26,979	28,269	18,167	18,638	18,331	18,869	19,178	19,888
Manmade fibers <sup>2</sup> .....	2,384	2,874	32,795	25,693	36,650	34,228	31,363	37,727
Other fibers <sup>2</sup> .....	3,619	3,683	4,973	2,013	2,258	2,370	3,117	2,456
Total.....	201,626	194,266	157,947	182,279	189,841	199,526	181,569	179,334
Total all types.....	965,538	788,832	779,414	755,545	689,238	734,574	654,583	620,950

<sup>1</sup> As defined in Wool Products Labeling Act of 1939.<sup>2</sup> Prior to 1953, manmade fibers other than rayon and acetate were included in other fibers. Adapted from Bureau of Census reports.

In 1954, according to census reports, the value of shipments of 171 wool yarn mills, except carpet, totaled \$252 million, of which about 84 percent was accounted for by woolen and worsted system yarns; about 6 percent by secondary products, such as scoured wool, tops, and noils; and about 10 percent by miscellaneous receipts, mainly commissions from spinning yarns from materials owned by others. During this period, shipments of woolen and worsted system yarns, except carpet yarns, by mills in this industry accounted for about 85 percent of the total of these products shipped for sale or interplant transfer by all industries.

The value of shipments of the woolen and worsted fabrics industry in 1954 totaled \$890 million. About 88 percent of the total was accounted for by woolen and worsted fabrics; about 8 percent by secondary products, consisting mainly of scouring and combing mill products, rayon and related broad-woven fabrics, and yarns spun on woolen systems; and about 4 percent by miscellaneous receipts, mainly for commission work on materials owned by others. This industry includes a large number of integrated mills which perform all operations involved in converting raw fiber to finished fabric. Shipments, consisting mainly of finished fabrics, accounted for about 95 percent of the woolen and worsted fabrics shipped by all industries in 1954.

The value of shipments of the finishing wool textile industry totaled about \$33 million in 1954, according to census reports. A large proportion of the shipments of this industry are accounted for by materials finished on commission for others.

Shipments of the 98 plants in the wool carpets and rugs industry, valued at about \$339 million in 1954, represented 99 percent of the total value of these products shipped by all industries, according to census reports. The industry's shipments of woolen and worsted system carpet yarns, valued at about \$76 million in 1954, represented 98 percent of these products shipped by all industries. A large proportion of total yardage of carpets and rugs is produced by large integrated mills which engage in fiber preparation, spinning, dyeing, and weaving. Smaller mills in the industry engage either in weaving or in producing yarn for sale, according to census reports.

#### Size and Organization

Changes in size and organization of the wool products manufacturing industry are indicated by information on number of employees, number and kinds of machinery and equipment used, ownership and operation of establishments, and mergers and acquisitions.

*Number of Employees, Spindles, and Looms.*—The number of all employees in wool scouring and combing plants in 1954 was 17 percent less, and the number of production workers was 18 percent less, than in 1947. The quantity of tops and noils produced decreased from about 367 million pounds in 1947 to 160 million in 1954, and total shipments of scoured wool for sale decreased from about 23 million pounds in 1947 to 11 million in 1954, according to census reports.

The number of woolen and worsted spinning spindles in place decreased from about 4 million in 1939 to about 1.3 million in 1958,

according to census reports. Worsted combs decreased from 2,720 in 1949 to 1,473 in 1958 (table 42). Annual fiber consumption in woolen spinning and worsted combing decreased from about 764 million pounds in 1947 to 442 million in 1958. A substantial part of the decrease in consumption of wool since 1947 was offset by increases in consumption of other fibers. Yarns spun on woolen and worsted systems, except carpet yarns, in 1954 totaled about 404 million pounds and were about 32 percent less than in 1947. Production of carpet and rug weaving yarns, wool system, decreased from about 179 million pounds in 1947 to 137 million in 1954.

Looms in woolen and worsted mills decreased from 49,679 in 1939 to 18,606 in 1955. Decreases in number of looms were offset to some extent by increases in fabric production per loom hour operated, but loom hours operated per loom in place decreased from 3,294 in 1947 to 2,792 in 1954, then increased to 3,793 in 1957. Fabric production decreased from 516 million finished linear yards in 1947 to 284 million in 1954, and then increased to 291 million yards in 1957.

There have been considerable changes in the locations of machinery and equipment used in the manufacture of wool products since 1939 (table 42). The proportions of total woolen spinning spindles in the United States that were in the South increased from 8.5 percent in 1939 to about 23 percent in 1958. Similar proportions for worsted spinning spindles increased from about 2 percent in 1939 to 46 percent in 1958, and the proportions for woolen and worsted looms increased from about 6 percent in 1939 to about 22 percent in 1955. The proportion of worsted combs mainly in the South increased from about 4 percent in 1939 to 22 percent in 1958. The corresponding proportions in New England decreased markedly; those in Middle Atlantic States showed decreases for spindles and combs, and an increase for looms; and those in North Central States showed an increase for looms and a decrease for woolen spinning spindles.

Sizes of establishments in the wool manufacturing industry, as indicated by number of employees, vary widely, and the proportions in the larger size groups decreased and the proportions in the smaller size groups increased in recent years (table 43).

*Ownership and Operation.*—Type of ownership and operation of some establishments engaged in manufacturing wool products, and the average number of employees per establishment, have changed considerably since 1939. Establishments under corporate ownership or control accounted for about 90 percent of the number of establishments and 98 percent of the employees in 1954 (table 44). The proportions were only slightly greater than in 1939. The proportion of the establishments that were operated from central administrative offices as multiunits decreased from about 39 percent in 1939 to 29 percent in 1954. Average number of employees per establishment decreased markedly from 1939 to 1954 for both single units and multiunit plants, and the proportion of total employees accounted for by multiunits decreased from about 64 percent in 1939 to 55 percent in 1954.

TABLE 42.—Number of looms, spindles, and combs in place in wool manufacturing industry, by geographic division, specified years, 1939–58<sup>1</sup>

Items and years	New England	Middle Atlantic	North Central	South	All other	United States
Woolen and worsted looms:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1939.....	34, 146	9, 058	2, 870	3, 095	510	49, 679
1949.....	21, 695	8, 090	2, 532	4, 654	522	37, 493
1955.....	9, 225	3, 377	1, 523	4, 044	437	18, 606
Woolen spinning spindles:						
1939.....	986, 253	464, 451	175, 065	154, 024	31, 976	1, 811, 769
1949.....	749, 919	339, 539	138, 854	165, 756	29, 792	1, 423, 860
1955.....	409, 953	184, 815	76, 064	135, 094	10, 728	817, 254
1956.....	350, 325	172, 839	64, 049	149, 674	13, 550	750, 437
1957.....	344, 849	160, 801	60, 825	163, 724	14, 134	744, 383
1958.....	322, 349	141, 027	56, 461	168, 676	14, 520	703, 033
Worsted spinning spindles:						
1939.....	1, 564, 044	484, 930	40, 856	40, 448	10, 780	2, 141, 058
1949.....	1, 266, 740	414, 130	46, 100	95, 838	13, 936	1, 836, 744
1955.....	442, 906	152, 494	( <sup>2</sup> )	267, 448	62, 888	925, 736
1956.....	359, 372	119, 338	( <sup>2</sup> )	283, 196	47, 116	809, 022
1957.....	292, 246	104, 310	( <sup>2</sup> )	296, 444	16, 144	709, 144
1958.....	258, 578	69, 234	( <sup>2</sup> )	293, 028	15, 256	636, 096
Worsted combs:						
1939.....	1, 823	674	( <sup>2</sup> )	( <sup>2</sup> )	<sup>3</sup> 95	2, 592
1949.....	1, 915	671	( <sup>2</sup> )	( <sup>2</sup> )	<sup>3</sup> 80	<sup>3</sup> 2, 720
1955.....	1, 297	306	( <sup>2</sup> )	416	<sup>2</sup> 73	2, 092
1956.....	1, 131	308	( <sup>2</sup> )	283	<sup>2</sup> 29	1, 751
1957.....	917	286	( <sup>2</sup> )	333	<sup>2</sup> 28	1, 564
1958.....	930	180	( <sup>2</sup> )	330	<sup>2</sup> 33	1, 473

<sup>1</sup> Data for 1939 are for May, all other years are for December.

<sup>2</sup> Data included in "all other" to avoid disclosing information for individual companies.

<sup>3</sup> Totals are revised, but were not carried through to the detailed figures by types, hence they do not add to total.

Adapted from Bureau of Census Reports, Facts for Industry (Series M 22 E).

TABLE 43.—Number of wool scouring and combing plants, wool yarn mills, except carpet, and woolen and worsted fabric plants, by number of employees, United States, 1947 and 1954

Number of employees	Scouring and combing plants		Yarn mills, except carpet		Woolen and worsted fabric plants	
	1947	1954	1947	1954	1947	1954
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1,000 and more.....			2		24	7
500 to 999.....	5	3	14	4	27	10
250 to 499.....	5	6	29	14	82	62
100 to 249.....	14	11	45	39	137	99
50 to 99.....	11	10	32	36	66	31
20 to 49.....	12	18	30	41	60	56
10 to 19.....	10	8	11	17	42	24
5 to 9.....	6	8	24	5	22	16
1 to 4.....	11	10	13	15	35	38
Total.....	74	74	200	171	495	343
Proportion of total						
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1,000 and over.....			1.0		4.8	2.0
500 to 999.....	6.8	4.1	7.0	2.3	5.5	2.9
250 to 499.....	6.8	8.1	14.5	8.2	16.6	18.1
100 to 249.....	18.9	14.9	22.5	22.8	27.7	28.9
50 to 99.....	14.9	13.5	16.0	21.1	13.3	9.0
20 to 49.....	16.2	24.3	15.0	24.0	12.1	16.3
10 to 19.....	13.5	10.8	5.5	9.9	8.5	7.0
5 to 9.....	8.1	10.8	12.0	2.9	4.4	4.7
1 to 4.....	14.8	13.5	6.5	8.8	7.1	11.1
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Adapted from Census of Manufactures: 1947 and 1954.

*Mergers and Acquisitions.*—Mergers and acquisitions in the textile industry in recent years, as previously indicated (p. 75), apparently have resulted in changes in organization and management of operating units in the wool manufacturing industry. In 1954, about three-fourths of the mills with more than three-fourths of the looms had equipment for both spinning and weaving (table 45). About a fourth of the mills with less than a fourth of the looms had weaving equipment only. A larger proportion of the larger than of the smaller mills had both spinning and weaving equipment. Many of these mills perform all operations from the processing of raw fibers through the finishing of the fabrics.

Degree of concentration in wool product manufacturing industries, on a company basis, may be indicated by proportions of the total number of employees and of the total value of shipments that are accounted for by specified numbers of the largest companies in these industries. In the scouring and combing industry in 1954, plants operated by 20 of the largest companies, or less than 30 percent of the total, accounted for 80 percent of the employees and 87 percent

**TABLE 44.—Number of establishments and average number of employees per establishment for manufacturers of woolen and worsted yarns and fabrics, by type of ownership and operation, United States, 1939 and 1954**

Type of ownership and operation	Establishments <sup>1</sup>		Average employees per establishment <sup>2</sup>	
	1939	1954	1939	1954
<b>Ownership or control:</b>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	519	530	262	162
Partnership.....	31	27	( <sup>3</sup> )	40
Individual.....	32	31	33	14
Other.....	1	0	( <sup>3</sup> )	0
All.....	583	588	240	149
<b>Operation:</b>				
<b>Single unit:</b>				
Corporate.....	301	361	157	( <sup>3</sup> )
Noncorporate.....	57	56	49	( <sup>3</sup> )
All.....	358	417	140	95
<b>Multiunit:</b>				
Corporate.....	218	169	407	( <sup>3</sup> )
Noncorporate.....	7	2	150	( <sup>3</sup> )
All.....	225	171	399	280
All.....	583	588	240	149

<sup>1</sup> Data for 1939 relate only to regular factories or jobbers engaging contractors.

<sup>2</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>3</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

of the value of shipments of the industry. In 1954, about 83 percent of total shipments of scouring and combing plants was accounted for by products regarded as primary to this industry (table 46).

Similar data for wool yarn mills, except carpet, show that in 1954 mills operated by 20 of the largest companies, or about 13 percent of the total, accounted for 49 percent of the employees and 57 percent of the value of the shipments of the industry. The proportions of total value of shipments accounted for by the 4 and 8 largest companies decreased, and the proportions accounted for by the 20 largest companies increased, from 1947 to 1954. Products regarded as primary accounted for 90 percent of shipments in 1947 and 93 percent in 1954 (table 46).

Data for the woolen and worsted fabrics manufacturing industry show that in 1954, establishments operated by 20 of the largest companies, or about 7 percent of the total, accounted for 49 percent of the employees and 55 percent of the value of shipments of the industry. Proportions of the value of shipments accounted for by 4, 8, and 20 of the largest companies decreased from 1947 to 1954. Primary products specialization in this industry increased from 90 percent in 1947 to 92 percent in 1954 (table 46).

TABLE 45.—Number of woolen and worsted mills and looms, by size of mill and degree of integration, United States, 1954

Number of mills and looms by degree of integration <sup>1</sup>	Looms per mill				
	All	1-49	50-99	100-499	500 or more
Number of mills:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Weaving only.....	68	33	25	10	
Spinning and weaving.....	208	99	61	45	3
Total.....	276	132	86	55	3
Looms operated:					
Weaving only.....	4,818	795	1,867	2,156	
Spinning and weaving.....	17,581	2,997	4,353	8,466	1,765
Total.....	22,399	3,792	6,220	10,622	1,765
	Proportion of total				
Number of mills:	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Weaving only.....	24.6	25.0	29.1	18.2	
Spinning and weaving.....	75.4	75.0	70.9	81.8	100.0
Total.....	100.0	100.0	100.0	100.0	100.0
Looms operated:					
Weaving only.....	21.5	21.0	30.0	20.3	
Spinning and weaving.....	78.5	79.0	70.0	79.7	100.0
Total.....	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Degree of integration determined by type of machinery reported.

Adapted from Census of Manufactures: 1954.

Of the 644 establishments primarily engaged in the manufacture of woolen and worsted fabrics in 1954, about 92 percent were operated by companies primarily engaged in this segment of the textile industry and about 8 percent by companies primarily engaged in other segments of the textile industry or in other industries (table 47). Single-unit companies accounted for about 71 percent of these establishments, for 45 percent of the total number employed, and for 44 percent of the total value added by manufacture. About 7.5 percent of the establishments operated by companies primarily engaged in woolen and worsted manufacture were primarily engaged in other industries. They included manufacturers of other textile products and wholesale and retail distributors of these products.

Size of the establishments, as indicated by number of employees and by value added by manufacture, averaged more than twice as great for those operated by companies primarily engaged in other industries as for those operated by companies primarily engaged in the manufacture of woolen and worsted fabrics. Number of employees of multiunit establishments in this industry averaged slightly less, but value added by manufacture averaged about 37 percent more, for those operated by single-industry companies than for those operated by multi-industry companies.



TABLE 46.—Share of employment and shipments of the wool manufacturing industry accounted for by largest companies, United States, 1947 and 1954

Industry, measure, and year	Compan- nies <sup>1</sup>	Ship- ments <sup>2</sup> (1,000 dollars) or employ- ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup>			Pri- mary prod- uct special- ization <sup>5</sup>
			4 larg- est com- panies	8 larg- est com- panies	20 larg- est com- panies	
Scouring and combing plants:						
Number of employees (1954)-----	Num- ber 70	Number 7, 013	Percent 33	Percent 53	Percent 80	Percent 83
Value of shipments:						
1954-----	70	94, 168	53	68	87	83
1947-----	( <sup>6</sup> )	75, 557	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Yarn mills, wool, except carpet:						
Number of employees (1954)-----	157	17, 840	17	27	49	93
Value of shipments:						
1954-----	157	251, 614	20	32	57	93
1947-----	181	336, 956	21	34	55	90
Woolen and worsted fab- rics:						
Number of employees (1954)-----	285	62, 466	21	34	49	92
Value of shipments:						
1954-----	285	890, 281	27	38	55	92
1947-----	427	1, 355, 209	28	40	56	90

<sup>1</sup> See footnote 1, table 21, p. 78.

<sup>2</sup> See footnote 2, table 21, p. 78.

<sup>3</sup> See footnote 3, table 21, p. 78.

<sup>4</sup> See footnote 4, table 21, p. 78.

<sup>5</sup> See footnote 5, table 21, p. 78.

<sup>6</sup> Comparable data are not available, due to significant revisions in 1947 classification of plants or products in the industry.

Adapted from United States Senate report on Concentration in American Industry (113).

#### Manufacturing Methods <sup>6</sup>

After wool reaches the mill, it is sorted, scoured, and carbonized; that used in woolens 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 bags weighing, when filled, about 180 to 350 pounds each. As each fleece contains wool that differs 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

<sup>6</sup> Based mainly on American Wool Handbook (117).

TABLE 47.—Number of establishments, average employment, and average value added per dollar of payroll by woolen and worsted manufacturers, by type of company, United States, 1954

Item	Com- panies	Estab- lish- ments	Average employ- ment	Value added per dollar of payroll
Establishments of companies primarily engaged in this industry: <sup>1</sup>				
Establishments in this industry.....	Number	Number	Number	Dollars
.....	-----	588	128	1.43
Single-unit companies.....	460	460	90	1.46
Multiunit companies.....	45	128	264	1.39
Single-industry.....	25	51	262	1.65
Multi-industry.....	20	77	266	1.22
Establishments in other industries.....		48	44	
Total or average.....		636	121	
Establishments in this industry operated by companies in other industries.....		56	295	1.75
Total or average for all establish-ments classified in this industry.....		644	142	1.48

<sup>1</sup> In addition to the number of establishments shown, these companies had 40 central administration offices, auxiliaries, sales branches, and sales offices.

Adapted from Bureau of Census report, Company Statistics (86).

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 the dyeing, carding, combing, drawing, spinning, and finishing processes are attributable to improperly scoured or overscourd wool. Most of the wool processed in this country is scoured by the soap and soda ash or nonionic detergent processes.

*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, 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. It is highly desirable, therefore, 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 woolen 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 prepared, they are ready for the carding process. The principal functions of woolen 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. 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 done with 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 prepared, it is ready for the carding processes. Worsted carding is designed mainly: (1) To straighten and separate the fibers 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.

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 crossbred wools (French and Bradford systems); and (3) the double-cylinder worsted cards, with bur breast workers and strippers for fine burry wool (French system). Worsted mills in the United States prefer the double-cylinder card for fine and crossbred wools, irrespective of the system of drawing or spinning used.

*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 predetermined length, (2) to straighten the retained long wool fibers and make them 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.

*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 of 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 function 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 Worsted.*—Woolen and worsted yarns spun for weaving purposes may require certain preparatory processes which include 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 set running lengthwise in the loom and termed the "warp," and the other running crosswise in the loom and termed the "filling" 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.

*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, wool, jute, 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

Changes in machinery used in wool manufacturing industries may be indicated by the number of different kinds of machinery in place in recent years (table 48). Census data relating to worsted combs show that the number of the Bradford system decreased, but the number of the French system increased, and the total for both systems increased from 2,592 in 1939 to 2,738 in 1953. The number of worsted spinning spindles of both the Bradford and French systems decreased in recent years, but the decreases for Bradford were greater than those for the French system. Numbers of woolen spinning spindles in woolen, knitting, and carpet mills have decreased markedly in recent years. The proportion of broad woolen and worsted looms in place that were automatic increased from about 63 percent in 1939 to about 88 percent in 1953.

TABLE 48.—Number of machines in place, by kind of machine, in the woolen and worsted manufacturing industries, United States, specified years, 1939-53<sup>1</sup>

Kind of machine	December 31						
	1939	1947	1949	1950	1951	1952	1953 <sup>1</sup>
Woolen and worsted looms:							
Pile and jacquard-----	Number ( <sup>2</sup> )	Number 1,760	Number 1,546	Number 1,712	Number 1,730	Number 1,956	Number 1,883
Broad:							
Automatic-----	26,816	28,703	28,375	28,817	28,124	27,505	26,247
Nonautomatic-----	15,908	8,269	7,069	6,441	5,811	5,811	4,761
Total-----	42,724	36,972	35,444	35,258	33,935	33,187	31,008
Narrow-----	5,075	1,600	1,331	676	814	624	515
Total-----	47,799	38,572	36,775	35,934	34,749	33,811	32,089
Carpet and rug looms:							
Broad (8/4 and up)-----		2,329	2,307	2,332	2,243	2,226	2,209
Narrow (6/4 and under)-----		3,354	2,901	2,546	2,219	2,262	2,262
Total-----		5,683	5,208	4,878	4,462	4,488	4,471
Woolen spinning spindles:							
Woolen mills-----	1,464,000	1,281,314	1,183,101	1,076,776	990,715	} 967,415	910,092
Knitting mills-----	145,000	128,900	99,016	94,440	88,426		
Carpet mills-----	168,000	150,984	160,969	158,163	156,968		
Total-----	1,777,000	1,561,198	1,443,086	1,329,379	1,236,109	159,662	157,236
Total-----	1,777,000	1,561,198	1,443,086	1,329,379	1,236,109	1,127,077	1,067,328

Worsted spinning spindles:							
Bradford.....	1, 428, 000	1, 277, 554	1, 200, 735	1, 185, 024	1, 100, 106	1, 030, 836	950, 240
French.....	655, 000	642, 988	643, 434	628, 342	573, 680	508, 248	535, 236
Other.....					117, 848	152, 004	165, 880
Total.....	2, 083, 000	1, 920, 542	18, 441, 69	1, 813, 366	1, 791, 634	1, 691, 088	1, 651, 356
Worsted combs:							
Bradford.....	1, 777	1, 681	1, 662	1, 625	1, 643	1, 534	1, 423
French.....	815	975	1, 065	1, 125	1, 164	1, 160	1, 315
Total.....	2, 592	2, 656	2, 727	2, 750	2, 807	2, 694	2, 738

<sup>1</sup> In place December.

<sup>2</sup> Probably included in broad automatic looms.

Adapted from Bureau of Census reports.

Not all of the machinery and equipment in use in the woolen and worsted manufacturing industry apparently is of the most improved types and 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, improvements have been made. Census reports show that expenditures for plant and equipment by the industry increased from \$9,307,000 in 1939 to \$51,117,000 in 1947, and amounted to \$21,721,000 in 1954. New machinery and equipment accounted for about 67 percent of total expenditures in 1947 and 62 percent in 1954 (table 49).

Reports indicate that in the 1950's wool mills have set the textile pace in constructing modern mill buildings and installing new machinery (46). This modernization probably has changed worsted spinning more than any other segment of the textile manufacturing industry. Indications are that significant improvements are in prospect for woolen mills. Introduction and use of the American system of worsted spinning and the long-draft machines have been important developments in recent years. Total worsted spindles in place decreased from about 1,920,000 in 1947 to about 709,000 in 1957, but modern American-system spindles in place rose from less than 118,000 in 1951 to more than 450,000 by 1957 (46). Older Bradford and French systems are still used for some specialty yarns and fibers, but more and more worsted mills are swinging over to the American system (46).

TABLE 49.—*Total expenditures for plant and equipment by manufacturers of wool mill products, by industry groups, United States, 1947 and 1954*

Year and industry	Expenditures for—			
	Total	New equip- ment	New plant	All other <sup>1</sup>
1947:				
Woolen and worsted:				
Scouring and combing.....	3, 254	2, 032	1, 186	36
Yarn mills, wool, except carpet.....	6, 950	4, 922	1, 691	337
Woolen, worsted fabrics.....	40, 913	27, 418	11, 831	1, 664
Total.....	51, 117	34, 372	14, 708	2, 037
1948:				
Woolen and worsted:				
Scouring and combing.....	3, 129	1, 929	462	738
Yarn mills, wool, except carpet.....	4, 158	2, 959	343	856
Woolen, worsted fabrics.....	14, 434	8, 626	3, 087	2, 721
Total.....	21, 721	13, 514	3, 892	4, 315

<sup>1</sup> Expenditures for used plant and equipment.

Adapted from Census of Manufactures: 1947 and 1954.



## Charges or Costs Involved

Gross margins for manufacturers of wool products, or the spread between the value of the products and the costs of the materials, supplies, parts, and containers, increased from an average of 41 percent of the value of the products in 1939 to 47 percent in 1947, then decreased to 40 percent in 1954 (table 50). Cost of some contract work included with cost of materials, supplies, parts, and containers in 1939 tended to reduce gross margins shown for that year. The proportions of gross margins that were accounted for by wages and salaries decreased from 57 percent in 1939 to 50 percent in 1947, and then increased to about 60 percent in 1954. The proportions for wages alone decreased from 47 percent in 1939, to 43 percent in 1947, and then increased to 49 percent in 1954, according to census reports.

TABLE 50.—*Values, costs, and margins for woolen and worsted manufacturers, United States, 1939, 1947, and 1954*

Item	1939	1947	1954
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	735,905	1,941,846	1,268,851
Cost of materials, etc. <sup>1</sup> .....	<sup>2</sup> 432,882	1,030,645	756,704
Gross margin.....	303,023	911,201	512,147
Salaries and wages.....	172,605	456,731	305,765
Salaries.....	29,111	62,336	55,546
Wages.....	143,494	394,395	250,219
Fuel.....	9,597	19,382	11,135
Purchased electric energy.....	4,584	9,780	9,045
Contract and commission work.....	<sup>2</sup> 4,338	60,321	38,979
Other <sup>3</sup> .....	111,899	364,987	147,223
	Proportion of value of products		
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products.....	100.0	100.0	100.0
Cost of materials, etc. <sup>1</sup> .....	<sup>2</sup> 58.8	53.1	59.6
Gross margin.....	41.2	46.9	40.4
Salaries and wages.....	23.5	23.5	24.1
Salaries.....	4.0	3.2	4.4
Wages.....	19.5	20.3	19.7
Fuel.....	1.3	1.0	.9
Purchased electric energy.....	.6	.5	.7
Contract and commission work.....	<sup>2</sup> .6	3.1	3.1
Other <sup>3</sup> .....	15.2	18.8	11.6

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> A small amount of "contract work" was included with "materials, etc." to avoid disclosing data reported for individual establishments.

<sup>3</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

The decrease in proportion of the value of the products that was accounted for by costs of materials, supplies, parts, and containers from 59 percent in 1939 to 53 percent in 1947 occurred despite substantial increases in prices of wool, tops, and yarn. During this period, prices of graded territory shorn wool, fine staple, in Boston, advanced 50 percent; territory 64's wool tops advanced 82 percent; and prices of Bradford weaving yarn,  $\frac{2}{32}$ 's (64's) white, advanced 109 percent. The increase in proportion of the value of the products accounted for by materials, etc., from 53 percent in 1947 to 60 percent in 1954 was associated with further advances in prices of wool, tops, and yarn. These prices reached high levels in 1951 and then declined, but in 1954 prices of wool were 37 percent, and prices of tops and yarns each were 18 percent, higher than in 1947.

Gross margins for scouring and combing plants increased from 37 percent of the value of the products in 1947 to 40 percent in 1954 (table 51). The proportion of these margins that was accounted for by salaries and wages increased from 35 percent in 1947 to 64 percent in 1954. The proportion for wages alone increased from 28 percent in 1947 to 53 percent in 1954. These increases are accounted for in part by increases in wage rates and in part by decreases in contract and commission work.

Selling prices, costs, and margins for wool tops in 1942 show that manufacturers' gross margins averaged about 31 percent of the average selling price (33). Almost 70 percent of the topmakers' gross margins was accounted for by commission costs; more than 9 percent by overhead, general, and administrative expenses; and about 21 percent by other items. About 8 percent of these margins was accounted for by the cost of sorting, 32 percent by combing, 16 percent by losses on noils, 11 percent by losses on waste, and 3 percent by losses on off sorts.

Data for yarn mills, except carpet, show that manufacturers' gross margins decreased from 41 percent of the value of the products in 1947 to 35 percent in 1954 (table 51). The proportion of these margins that was accounted for by salaries and wages increased from 54 percent in 1947 to 59 percent in 1954. The proportions for wages alone increased from 48 percent in 1947 to 50 percent in 1954.

Similar data for woolen and worsted fabric mills show that gross margins decreased from 48 percent of the value of the products in 1947 to 41 percent in 1954 (table 51). Salaries and wages accounted for about 52 percent of these margins in 1947 and 59 percent in 1954. Wages alone accounted for 45 and 48 percent, respectively.

Costs of manufacturing wool products in 1950, as reported 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 (33). Labor costs accounted for about 30 percent of the total for wool covert and 29 percent for worsted twill. The corresponding proportions for selling expenses are 7 and 6 percent, respectively.

Large proportions of gross margins for manufacturers of wool products accounted for by wages and increases in wage rates since 1939 emphasize the importance of labor in the manufacture of these products. Hourly earnings of labor in the woolen and worsted industry increased from about 53 cents in 1939 to \$1.60 in 1957.

Average value added by all manufacturers of wool products per dollar of wages paid increased from \$1.98 in 1939 to \$2.08 in 1947, then decreased to \$2.02 in 1957. Value added per dollar of wages by scouring and combing plants decreased from \$2.56 in 1947 to \$1.74 in 1954; that for yarn mills, except carpet, decreased from \$1.93 in 1947 to \$1.79 in 1954; and that for woolen and worsted fabric mills decreased from \$2.04 in 1947 to \$1.95 in 1957, according to census reports.

Value added by manufacture of wool products per dollar of wages and per hour of labor, and average wage rate per hour, apparently vary irregularly with size of plant as indicated by number of production workers (table 52). The relatively high average value added per dollar of wages and per hour of labor by the smaller establishments may be accounted for, at least in part, by the larger proportion of active proprietors or partners of unincorporated firms among the smaller than among the larger establishments. Furthermore, wage rates per hour averaged higher for the larger than for the smaller establishments.

Value added by manufacture per dollar of wages and per hour of labor, and wage rate per hour, also vary irregularly from one State and region to another (table 53). Scouring and combing plants are located mainly in New England and Middle Atlantic States. Value added per hour of labor, and wage rate per hour, averaged less, and value added per dollar of wages averaged more, for plants in New England than for plants in Middle Atlantic States. Yarn mills and woolen and worsted fabrics manufacturing establishments are more widely distributed than scouring and combing plants (table 53). For yarn mills in the South, the value added per hour of labor and the wage rate per hour averaged lower, and value added per dollar of wages averaged higher, than for establishments in most other regions. For plants in Middle Atlantic States, the value added per dollar of wages and per hour of labor averaged lower than for those in any other region, and wage rate per hour averaged slightly higher than for the United States as a whole. For woolen and worsted fabric manufacturing establishments in the South, the value added per dollar of wages averaged higher and wage rate per hour averaged lower than for those in any other region.

Value added by woolen and worsted manufacturers per dollar of payroll in 1954 averaged \$1.46 for establishments operated by single-unit companies and \$1.39 for establishments operated by multiunit companies primarily engaged in this industry, according to census reports (86). For establishments in this industry operated by multi-unit companies primarily engaged in this industry, value added by manufacture per dollar of payroll averaged \$1.65 for those operated by single-industry companies and \$1.22 for those operated by multi-industry companies. Value added by manufacture per dollar of payroll averaged \$1.75 for establishments in this industry operated by companies primarily engaged in other industries, and \$1.43 for establishments in this industry operated by companies primarily engaged in this industry (table 47, page 128).

TABLE 51.—*Values, costs, and margins for manufacturers of wool products, by kind of product or plant, United States, 1947 and 1954*<sup>1</sup>

Item	Scouring and combing plants		Yarn mills, except carpet		Woolen and worsted fabric	
	1947	1954	1947	1954	1947	1954
	<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.....	203, 255	94, 168	336, 956	251, 614	1, 355, 209	890, 281
Cost of materials, etc. <sup>2</sup> .....	127, 789	56, 273	198, 324	163, 687	699, 547	528, 663
Gross margin.....	75, 466	37, 895	138, 632	87, 927	655, 662	361, 618
Salaries and wages.....	26, 475	24, 300	75, 056	51, 730	338, 928	214, 246
Salaries.....	5, 273	4, 166	8, 873	7, 645	44, 966	39, 550
Wages.....	21, 202	20, 134	66, 183	44, 085	293, 962	174, 696
Fuel.....	1, 193	1, 384	1, 685	1, 020	15, 098	7, 510
Purchased electric energy.....	1, 158	786	2, 825	2, 361	5, 500	5, 640
Contract and commission work.....	18, 949	629	5, 725	5, 574	35, 530	32, 700
Other <sup>3</sup> .....	27, 691	10, 796	53, 341	27, 242	260, 606	101, 522

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, etc. <sup>2</sup> .....	62.9	59.8	58.8	65.1	51.6	59.4
Gross margin.....	37.1	40.2	41.2	34.9	48.4	40.6
Salaries and wages.....	13.0	25.8	22.3	20.6	25.0	24.1
Salaries.....	2.6	4.4	2.6	3.1	3.3	4.5
Wages.....	10.4	21.4	19.7	17.5	21.7	19.6
Fuel.....	.6	1.5	.5	.4	1.1	.8
Purchased electric energy.....	.6	.8	.8	.9	.4	.6
Contract and commission work.....	9.3	.7	1.7	2.2	2.6	3.7
Other <sup>3</sup> .....	13.6	11.4	15.8	10.8	19.3	11.4

<sup>1</sup> Similar data for 1939 are not available.

<sup>2</sup> Includes supplies, parts, and containers.

<sup>3</sup> Includes depreciation, interest, insurance, rents, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1947 and 1954.

TABLE 52.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for manufacturers of wool products, by number of production workers, United States, 1954

Industry and number of production workers	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
Scouring and combing plants:	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
500 and over.....	8,302	1.49	2.33	1.57
250 to 499.....	11,063	1.93	3.10	1.60
100 to 249.....	7,690	1.60	2.69	1.68
50 to 99.....	3,085	1.58	2.40	1.52
20 to 49.....	3,657	2.30	3.62	1.58
10 to 19.....	663	1.96	3.13	1.59
5 to 9.....	463	4.41	6.01	1.36
1 to 4.....	161	3.83	5.03	1.31
Total or average.....	35,084	1.74	2.78	1.60
Yarn mills, wool, except carpet:				
500 and over.....	9,971	1.57	2.08	1.32
250 to 499.....	23,708	2.02	2.89	1.43
100 to 249.....	27,627	1.72	2.54	1.48
50 to 99.....	10,669	1.66	2.36	1.42
20 to 49.....	5,574	1.89	2.44	1.29
10 to 19.....	1,106	2.54	3.22	1.27
5 to 9.....	180	2.17	3.00	1.38
1 to 4.....	136	2.00	2.39	1.19
Total or average.....	78,971	1.79	2.54	1.42
Woolen and worsted fabrics:				
1,000 and over.....	62,284	1.79	2.89	1.61
500 to 999.....	30,835	1.88	2.70	1.43
250 to 499.....	120,645	1.82	2.90	1.59
100 to 249.....	81,772	1.78	2.81	1.58
50 to 99.....	9,064	1.60	2.38	1.49
20 to 49.....	8,355	1.78	2.56	1.44
10 to 19.....	1,847	2.50	3.53	1.41
5 to 9.....	475	1.83	2.64	1.44
1 to 4.....	426	2.27	2.00	1.32
Total or average.....	315,706	1.81	2.83	1.56

Adapted from Census of Manufactures: 1954.

Differences in value added by manufacture per dollar of wages from one establishment to another, from time to time, and from one State or region to another may be influenced by differences in such factors as kinds and amounts of machinery and equipment used, amounts of contract work, and salaries and bonuses to managers or operators. Information available is not adequate to indicate how and to what extent the differences shown in value added by manufacture in this industry were influenced by these factors.

TABLE 53.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate for manufacturers of wool products, by region and State, 1954

Industry, region, and State	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Scouring and combing plants:				
New England.....	29,060	1.75	2.77	1.58
Massachusetts.....	20,408	1.82	2.86	1.57
Other.....	8,652	1.59	2.59	1.63
Middle Atlantic.....	5,189	1.70	2.92	1.72
Pennsylvania.....	4,144	1.62	2.83	1.75
Other.....	1,045	2.14	3.37	1.57
All other divisions.....	835	1.82	2.32	1.27
United States.....	35,084	1.74	2.78	1.60
Yarn mills, wool except carpet:				
New England.....	46,437	1.83	2.70	1.48
Massachusetts.....	12,138	1.80	2.74	1.52
Rhode Island.....	22,441	1.68	2.51	1.49
Connecticut.....	5,158	3.11	4.11	1.32
Other.....	6,700	1.87	2.60	1.39
Middle Atlantic.....	11,116	1.45	2.08	1.43
New York.....	4,147	1.35	1.81	1.34
New Jersey.....	909	1.85	2.50	1.35
Pennsylvania.....	6,059	1.48	2.26	1.53
South.....	15,643	1.90	2.36	1.24
South Carolina.....	3,819	1.44	1.86	1.29
Tennessee.....	715	1.55	1.76	1.14
Other.....	11,109	2.16	2.65	1.23
All other divisions.....	5,775	2.01	2.92	1.45
United States.....	78,971	1.79	2.53	1.41
Woolen and worsted fabrics:				
New England.....	143,045	1.65	2.70	1.64
Maine.....	19,541	1.47	2.20	1.50
Massachusetts.....	66,861	1.74	2.94	1.69
Rhode Island.....	15,032	1.62	2.73	1.68
Connecticut.....	16,570	1.77	2.95	1.67
Other.....	25,041	1.52	2.43	1.60
Middle Atlantic.....	65,773	1.88	3.18	1.69
New York.....	25,906	2.45	4.16	1.70
New Jersey.....	22,762	1.46	2.60	1.78
Pennsylvania.....	17,104	1.92	3.00	1.56

TABLE 53.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate for manufacturers of wool products, by region and State, 1954—Continued

Industry, region, and State	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
	<i>1000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Woolen and worsted fabrics—Con.				
North Central.....	24, 066	1. 98	2. 98	1. 50
Ohio.....	15, 313	2. 01	3. 15	1. 57
Wisconsin.....	2, 714	2. 11	3. 06	1. 45
Other.....	6, 039	1. 87	2. 61	1. 40
South.....	76, 679	2. 08	2. 78	1. 34
North Carolina.....	21, 864	1. 64	2. 29	1. 40
South Carolina.....	10, 214	2. 39	3. 10	1. 30
Other.....	44, 601	2. 31	3. 03	1. 31
West.....	6, 143	1. 63	2. 69	1. 65
United States.....	315, 706	1. 81	2. 83	1. 56

Adapted from Census of Manufactures: 1954.

### Means and Importance of Improvement

Improvements in the manufacture of woolen and worsted yarns and fabrics may result from using qualities of wool that are relatively best adapted, physically and economically, to the manufacture of particular products, and from increasing the efficiency of manufacturing operations. Better adjustments in the qualities of wool used would need to be based on results of rather detailed analysis of mill operations, under more or less controlled conditions, to show differences in value for mill purposes of wool of different qualities but physically usable in the production of the specified products. Differences in value of wool for use in manufacturing specified products are made up of a combination of differences in processing costs and in quality of the product as a result of differences in the quality of the wool used.

As indicated earlier for cotton (p. 92), a basic requirement for determining the quality or qualities of wool relatively best adapted to the production of specified products is that all important quality elements of wool be ascertained and evaluated. This would require use of suitable methods and equipment for accurately measuring differences in these quality elements and for relating these differences to processing performance and to the quality or value of the products. Some progress has been made in developing techniques and equipment for measuring some quality elements of wool, but other important quality elements need to be more accurately defined and evaluated. Apparently one of the quickest and most satisfactory ways of relating the various quality elements of wool to processing



performance and to the quality or value of the resultant product is by carefully controlled pilot-plant studies using commercial equipment.

Processors and manufacturers of wool products presumably have considerable information on the influence of differences in some quality elements of wool on processing costs and on quality of the products. But better adjustments in the quality of wool to mill requirements would need to be based on more nearly complete information showing more specifically the influence of differences in the various quality elements of wool on its value for use in the manufacture of specified products, on costs to mills, on costs of producing the wool, and on prices to producers of wool. This information, if reasonably complete and integrated, would supply a basis for arriving at approximations to the best adjustments in quality of wool to mill requirements. But developments in technology, in animal breeding, and in other factors may result in considerable changes in the qualities of wool relatively best adapted to the production of particular products.

With differences in all important quality elements of wool accurately measured in terms of uniform standards and evaluated, differences in costs of wool to mills as a result of differences in quality, under perfect market conditions, would reflect differences in costs of producing wool of the different qualities. But only a few of the quality elements of wool have been so measured and evaluated. Furthermore, the market mechanism apparently is such that prices to wool producers reflect only a part of the differences in value for mill purposes attributable to differences in the quality elements that have been measured and evaluated. Under such conditions, price incentives to wool producers would be at variance with the best adjustments in quality of wool produced to mill requirements, in accordance with the principle of comparative advantage.

Improvements in the quality, suitability, and attractiveness of wool yarns and fabrics from the viewpoint of consumer requirements may be an important means of expanding outlets for wool products. Special chemical treatments and finishes offer great possibilities for improving the quality of wool products so that they may be in a better position to meet the ever increasing competition of manmade fibers. Improvements can be made also in mechanical processing of wool into yarns and fabrics. But additional information is needed to show the changes in construction, weight, finishes, and other characteristics required if yarns and fabrics made of wool are to meet this competition most effectively and to supply a basis for developing suitable equipment and techniques for manufacturing the improved products efficiently.

As indicated for manufacturers of cotton yarns and fabrics (pp. 94 and 116), problems of increasing the efficiency of manufacturers of wool yarns and fabrics involve consideration of such factors as the size, organization, and control of the operating units; location, kind, and arrangement of buildings, machinery, and equipment used; labor used, and operating methods and practices; and kinds and qualities of raw materials used. Integration in recent years has resulted in changes in the organization and control of some of the operating units, but information available is not adequate to indicate

whether or to what extent these changes affect the efficiency of wool manufacturers or the competition among fibers.

Reports indicate that the use of improved machinery and equipment, suitably organized and operated, results in substantial improvements. Further expansion of the American system of worsted spinning and long-draft machines would result in fewer machines, fewer workers, and lower costs (46). Pin drafters and high-speed gill reducers, autolevelers to correct variations in sliver thickness, new high-draft roving frames, and modern super-draft spinning frames reduce costs without impairing quality (46).

Adequate information is not available to indicate specifically the conditions under which these and other means might be used to increase the efficiency and reduce costs of manufacturing wool yarns and fabrics. 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. The data should show how such factors as size, organization, and control of the operating units; location, kind, and arrangement of buildings, machinery, and equipment used; labor used and operating methods and practices; kinds and qualities of raw materials; and number and kinds of products manufactured influence the efficiency and unit costs of labor and overhead under actual operating conditions. In addition, 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. These should show the more desirable buildings, machinery and equipment, floor plan, labor requirements, operating program, and production data. Detailed cost data for the various processes and operations also would be needed.

This information apparently would indicate the most feasible means of making improvements. As operators in the industry are in a particularly favorable position to suggest the kinds of information that would be of greatest use in reducing costs, their advice and assistance should be used in 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 segment of the industry under consideration (94).

The importance of using labor more efficiently is emphasized by the fact that the proportions of gross margins of woolen and worsted manufacturers that were accounted for by wages increased from an average of 44 percent in 1947 to about 49 percent in 1954, according to census reports. Hourly earnings of labor in this industry in 1957 averaged about 5 percent higher than in 1954, 38 percent higher than in 1947, and about 3 times as high as in 1939. Apparently labor might be used more efficiently, and unit costs of labor reduced, by use of improved automatic machinery and equipment and more effective adjustments in the organization and operation of the manufacturing establishments.

The relative importance of reducing costs of manufacturing woolen and worsted fabrics is indicated by the gross operating margins for manufacturers of these products, which average 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 gross returns to producers of the wool used and to more than five times as much as total costs of merchandising the raw wool, including transportation.

## MANMADE FIBER AND SILK PRODUCT MANUFACTURING

Yarn throwing mills and synthetic broad-woven fabric industries are considered in this part of the report. The yarn throwing mills industry comprises establishments primarily engaged in throwing or twisting filament yarn of silk, rayon, or other synthetic fibers, and those primarily engaged in winding and warping such yarn. Some establishments process, on a commission basis, yarns owned by others, and others process their own yarns. Shipments of thrown yarn by this industry in 1954 represented 79 percent of the thrown yarn shipped by all industries.

The synthetic broad-woven fabric industry comprises establishments primarily engaged in weaving fabrics over 12 inches wide of silk or manmade fibers, including mixtures in which those fibers are the principal ones by weight. Paper and glass broad-woven fabrics also are included in this industry. The principal materials used are filament yarns and manmade staple. Shipment of manmade fiber and silk broad-woven fabrics by this industry in 1954 represented 90 percent of the total of such fabrics, valued at \$1,062 million, shipped by all industries.

Materials for the manmade fiber and silk product manufacturing industries are supplied mainly by rayon, acetate, and other fiber industries, and they include imported silk. Consumption of cellulose by the United States rayon and acetate industries in the manufacture of rayon and acetate totaled 1,014 million pounds in 1958, of which 958 million pounds were obtained from woodpulp and 44 million from cotton linters (table 54). The amount of cellulose consumed in 1958 was about 20 percent less than in 1955 but was almost four times as great as in 1935 and more than 28 percent greater than in 1945. The proportion of total cellulose consumed that was obtained from woodpulp increased from less than 60 percent in the early 1930's to 96 percent in 1957.

Noncellulose materials used in the manufacture of nylon, Orlon, Dacron, and other manmade fibers have become of increasing importance in recent years. Raw silk imported for consumption in the United States since World War II, after reaching a peak of 13.5 million pounds in 1946, ranged from 3.2 million pounds in 1947 to 12.6 million in 1952 and amounted to about 8.5 million pounds in 1958.

Production of manmade filament yarns and staple used in the manufacture of textile mill products represents a rapidly growing industry. Output of this industry in the United States in 1957, amounting to the equivalent of 5.7 million bales of cotton, was about 5 times as great as in 1939 and about 64 percent greater than in 1949. Annual production of rayon and acetate in this country has decreased somewhat from the high levels reached in the early 1950's, but the influence of this decrease on total production of

TABLE 54.—Consumption of cellulose and production of rayon and acetate, United States, specified years, 1931-58

Year	Cellulose consumption			Rayon and acetate production		
	Wood-pulp	Linters pulp	Total	Filament yarn	Staple fiber	Total
	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>
1931	106	62	168	150.8	0.9	151.7
1933	130	100	230	213.5	2.1	215.6
1935	172	102	274	257.5	4.6	262.1
1937	264	88	352	320.6	20.2	340.8
1939	290	99	389	328.6	51.3	379.9
1941	429	146	575	451.2	122.0	573.2
1943	562	111	673	501.1	162.0	663.1
1945	594	206	800	623.7	168.4	792.1
1947	794	162	956	746.7	228.4	975.1
1949	697	256	953	800.6	195.1	995.7
1951	1,031	202	1,233	958.2	336.0	1,294.2
1953	1,044	134	1,178	886.9	310.0	1,196.9
1954	955	122	1,076	706.8	378.9	1,085.7
1955	1,094	176	1,270	865.1	395.6	1,260.7
1956	974	180	1,154	749.6	398.3	1,147.9
1957	1,034	98	1,132	714.3	425.1	1,139.4
1958	958	44	1,002	635.7	378.6	1,014.3

Adapted from *Textile Organon* (76, 78).

manmade fibers was more than offset by increases in production of noncellulose fibers. Similar increases in production of manmade fibers have occurred also in foreign countries (table 1, p. 4).

Consumption of manmade fibers has increased markedly in recent years. Total raw poundage of "apparel-type" textile fibers (cotton, wool, and manmade fibers) consumed by mills in the United States that was accounted for by manmade fibers increased from about 10 percent of all fibers in 1939 to 20 percent in 1949, and to 29 percent in 1958 (table 3, p. 9). Adjusting raw poundage for differences in waste involved indicates that the "utility poundage" of manmade fibers accounted for about 38 percent of the total in 1957. Manmade fibers apparently have been improved in quality or adaptability also, although no accurate measures of such improvements are available.

Increases in consumption of manmade fibers in the United States were accompanied by substantial reductions in prices of these fibers in relation to prices of cotton and wool. Prices of rayon staple fibers averaged 118 percent higher than prices of Middling  $1\frac{1}{16}$ -inch cotton during the 5 years ended July 1939; but during the 5 years ended July 1952, they averaged 12 percent lower; during the 5 years ended July 1957, they averaged 16 percent lower; and during the year ended July 1958, they averaged 20 percent lower than prices of the cotton. Prices of rayon staple averaged about 66 percent lower than prices of graded territory shorn wool, fine good French combing and staple, clean basis, in Boston, during the 5 years ended with 1939; during the 5 years ended with 1951, they averaged 80 percent lower; during the 5 years ended with 1956, they averaged

78 percent lower, and in 1958, they averaged 74 percent lower than prices of the wool. Prices of acetate, nylon, Dacron, Orlon, and other manmade fibers declined markedly to 1956, then advanced somewhat to 1958.

### Nature, Practices, and Equipment

Although yarn throwing mills in 1954 shipped 79 percent of the thrown yarn shipped by all industries, large quantities of thrown yarns are produced for their own use by establishments classified in other industries, principally the synthetic broad-woven fabric industry. Approximately half of all throwing and twisting spindles are in plants with weaving equipment, according to census reports.

Synthetic broad-woven fabric mills are mainly of three types with respect to the processing equipment employed: Mills with spinning or throwing, weaving, and finishing equipment; those with spinning or throwing and weaving but no finishing equipment; and those with weaving equipment only. Integration is important at the company level as well as at the mill level. The larger companies in the industry operate several fabric mills weaving manmade fibers, along with finishing plants. Some also operate cotton mills, woolen and worsted mills, or knitting mills. The extent of integration as indicated by the type of machinery reported for cotton, rayon, and related broad-woven fabric mills was indicated in an earlier section of this bulletin (table 32, p. 102).

Yarns consumed by manmade fiber and silk weaving mills include spun and filament yarns of manmade fibers, carded and combed cotton yarns, and other yarns made of various fibers, including blends (table 55). Rayon yarns consumed decreased from 730,803,000 pounds in 1950 to 415,303,000 pounds in 1957, and amounted to 442,000,000 pounds in 1958. Consumption of cotton yarns increased markedly from 1949 to 1956, then decreased in 1957. Nylon yarns consumed increased from 3,494,000 pounds in 1947 to 55,255,000 pounds in 1953, and amounted to 43,307,000 pounds in 1958. Consumption of other yarns, including blends, increased from 1947 to 1958.

### Size and Organization

Changes in size of the yarn throwing mill and synthetic broad-woven fabric plants may be indicated by the number of spindles, looms, and employees; ownership and operation of plants; and mergers and acquisitions.

*Number of Spindles, Looms, and Employees.*—The number of throwing and twisting spindles in the cotton, rayon, and related manufacturing industry increased from 1,884,000 in 1947 to 2,629,000 in 1954, about half of which were located in plants with weaving equipment. Thrown filament yarn produced increased from 144,111,000 pounds in 1947 to 166,160,000 in 1954, according to census reports.

Average number of employees per yarn throwing mill decreased from 122 in 1947 to 86 in 1954. The proportion of the mills that had 100 or more employees decreased from about 43 percent in 1947 to 26 percent in 1954 (table 56). The proportion with less than 20 employees increased from 14 percent in 1947 to 28 percent in 1954.

TABLE 55.—Yarn consumed by manmade fiber and silk weaving mills, by type of yarn, United States, specified years, 1947-58

Type of yarn	1947	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Rayon	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Spun.....	161, 988	185, 969	265, 259	279, 678	281, 963	281, 043	251, 973	297, 956	229, 184	179, 848	194, 424
Filament.....	337, 336	379, 308	465, 544	388, 908	313, 726	316, 115	239, 027	250, 053	243, 392	235, 455	247, 573
Total.....	499, 324	565, 277	730, 803	668, 586	595, 689	597, 158	491, 000	557, 009	472, 576	415, 303	441, 997
Cotton.....											
Carded.....	12, 330	4, 067	5, 466	7, 268	8, 637	9, 505	17, 227	20, 863	41, 059	32, 323	36, 088
Combed.....	11, 223	9, 784	13, 783	14, 590	14, 014	12, 460	32, 934	45, 574	48, 610	52, 472	50, 239
Total.....	23, 553	13, 851	19, 249	21, 858	22, 651	21, 965	50, 161	72, 437	89, 669	84, 795	86, 327
Nylon.....	3, 494	16, 673	20, 203	29, 248	44, 200	55, 255	45, 700	47, 151	39, 577	47, 797	43, 307
All other <sup>1</sup>											
Cotton <sup>2</sup> .....	2, 312	646	1, 990	1, 302	435	732	348	3, 605	4, 862	4, 767	2, 913
Rayon <sup>2</sup> .....	25, 612	23, 566	16, 670	13, 301	15, 453	16, 317	22, 341	32, 854	31, 945	44, 851	49, 064
Wool, alpaca, and mohair.....	13, 666	11, 870	7, 818	4, 308	3, 572	3, 400	3, 116	6, 005	3, 365	4, 311	6, 350
Silk.....	( <sup>3</sup> )	3, 065	6, 261	5, 813	8, 144	6, 099	5, 302	7, 149	7, 248	5, 681	4, 669
Glass.....	( <sup>3</sup> )	1, 874	5, 159	8, 581	12, 333	14, 326	14, 978	19, 687	29, 742	34, 531	39, 638
Plastics.....	( <sup>3</sup> )	5, 720	14, 981	15, 384	16, 843	19, 145	11, 993	13, 887	10, 731	12, 518	9, 864
Other <sup>4</sup> .....	7, 467	3, 133	3, 227	4, 903	9, 028	13, 402	42, 156	58, 145	60, 585	77, 007	72, 191
Total.....	49, 057	49, 439	55, 568	53, 025	65, 127	73, 421	100, 234	141, 332	148, 478	184, 266	184, 688
Total all types..	575, 428	645, 675	826, 361	773, 284	728, 348	747, 799	687, 095	817, 929	750, 300	732, 161	756, 319

<sup>1</sup> Includes blends and mixtures.<sup>2</sup> Used as part of blends or mixtures.<sup>3</sup> Not available.<sup>4</sup> Includes acrylic fibers, polyester fibers, paper, rubber, elastic, and others. Adapted from Bureau of Census reports, Facts for Industry (Series: M 22T).

TABLE 56.—Number of yarn throwing mills and synthetic broad-woven fabric mills, by number of employees, United States, 1947 and 1954

Number of employees	Yarn throwing mills		Broad-woven fabric plants	
	1947	1954	1947	1954
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1,000 and over.....			20	13
500 to 999.....	4	2	39	37
250 to 499.....	9	6	48	61
100 to 249.....	39	28	74	87
50 to 99.....	32	39	97	71
20 to 49.....	21	24	85	78
10 to 19.....	8	12	52	40
5 to 9.....	5	7	45	44
1 to 4.....	4	19	47	47
<b>Total.....</b>	<b>122</b>	<b>137</b>	<b>507</b>	<b>478</b>
	Proportion of total			
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1,000 and over.....			3.9	2.7
500 to 999.....	3.3	1.4	7.7	7.7
250 to 499.....	7.4	4.4	9.5	12.8
100 to 249.....	32.0	20.4	14.6	18.2
50 to 99.....	26.2	28.5	19.1	14.9
20 to 49.....	17.2	17.5	16.8	16.3
10 to 19.....	6.5	8.8	10.2	8.4
5 to 9.....	4.1	5.1	8.9	9.2
1 to 4.....	3.3	13.9	9.3	9.8
<b>Total.....</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Adapted from Census of Manufactures: 1947 and 1954.

In 1954, about 7 percent of the yarn throwing mills and 5 percent of the employees were in New England; 62 percent of the mills and 57 percent of the employees were in the Middle Atlantic States; and 31 percent of the mills and 38 percent of the employees were in other States, mainly Southeastern. The proportion of mills and of employees in Middle Atlantic States decreased, and the proportions in other States increased from 1947 to 1954. The proportion of the total value added by manufacture in this industry that was accounted for by mills in New England and Middle Atlantic States decreased from about 73 percent in 1947 to 57 percent in 1954; whereas the proportion accounted for by mills in other States, mainly in the Southeast, increased from about 27 percent in 1947 to 43 percent in 1954, according to census reports.

The number of looms in place in the synthetic broad-woven fabric industry increased from 106,695 in 1947 to 118,523 in 1951, then decreased to 90,875 in 1957, according to census reports. The quantity of rayon and related broad-woven fabrics (gray goods) produced increased from 2,038 million linear yards in 1947 to 2,397 million in 1954. Average number of employees per establishment

decreased from 193 in 1947 to 188 in 1954. The proportion of the establishments that had 1,000 or more employees, and the proportion that had 10 to 100 employees, decreased, whereas the proportion that had 100 to 500 employees, and the proportion that had less than 10 employees, increased from 1947 to 1954 (table 56).

In 1954, about 20 percent of the synthetic broad-woven fabric mills and 21 percent of the employees in this industry were in New England; 52 percent of the mills and 17 percent of the employees were in Middle Atlantic States; and 28 percent of the mills and 61 percent of the employees were in other States, mainly Southeastern. These proportions have changed considerably since 1947. The number of these mills in New England increased from 91 in 1947 to 97 in 1954, but the average number of employees per mill decreased from 295 in 1947 to 198 in 1954. In the Middle Atlantic States, the number of mills decreased from 325 in 1947 to 249 in 1954, and the average number of employees per mill decreased from 73 in 1947 to 63 in 1954. In all other States, mainly Southeastern, the number of mills increased from 91 in 1947 to 132 in 1954, but the average number of employees per mill decreased from 517 in 1947 to 417 in 1954. The proportion of the total value added by manufacture in this industry that was accounted for by mills in New England and Middle Atlantic States decreased from about 49 percent in 1947 to 40 percent in 1954, whereas the proportion accounted for by mills in other States, mainly Southeastern, increased from 51 percent in 1947 to 60 percent in 1954, according to census reports.

*Ownership and Operation.*—The types of ownership and operation of some mills that manufacture broad-woven fabrics made of man-made fibers and silk have changed in recent years. Proportions of these mills that were under corporate ownership and control increased from 78 percent in 1939 to 86 percent in 1954 (table 57). In 1954, mills under corporate ownership and control accounted for about 98 percent of all employees in the industry, according to census reports. Proportions of the mills that were operated from central administrative offices as multiunits decreased from 44 percent in 1939 to 38 percent in 1954, but the proportions of total employees accounted for by multiunits increased from 63 percent in 1939 to about 75 percent in 1954.

*Mergers and Acquisitions.*—Mergers and acquisitions in the textile industry in recent years, as indicated in a preceding section of this report (p. 75), apparently have resulted in changes in organization and management of operating units in the manmade fiber and silk products manufacturing industry. Data relating to the degree of integration in cotton, rayon, and related broad-woven fabric mills in 1954, as indicated by the type of machinery reported, show a substantial amount of vertical integration (table 32, p. 102). The integrated mills had about 5 times as many looms per mill as those that reported weaving machinery only.

In 1954, yarn throwing mills operated by 20 of the largest companies, about 17 percent of the total number, accounted for 63 percent of the total number of employees and 73 percent of the total value of shipments of the industry (table 58). The proportion of the total value of shipments accounted for by 4, 8, and 20 of the largest companies increased considerably from 1947 to 1954.



TABLE 57.—*Number of establishments and average number of employees per establishment of manufacturers of synthetic broad-woven fabrics, by type of ownership and operation, United States, 1939 and 1954*

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
<b>Ownership or control:</b>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	307	411	248	214
Partnership.....	34	30	(?)	59
Individual.....	50	35	23	(?)
Other.....	3	2	(?)	(?)
<b>All.....</b>	<b>394</b>	<b>478</b>	<b>202</b>	<b>188</b>
<b>Operation:</b>				
<b>Single unit:</b>				
Corporate.....	150	232	181	(?)
Noncorporate.....	71	65	29	(?)
<b>All.....</b>	<b>221</b>	<b>297</b>	<b>182</b>	<b>74</b>
<b>Multiunit:</b>				
Corporate.....	157	179	311	(?)
Noncorporate.....	16	2	95	(?)
<b>All.....</b>	<b>173</b>	<b>181</b>	<b>291</b>	<b>375</b>
<b>All.....</b>	<b>394</b>	<b>478</b>	<b>202</b>	<b>188</b>

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

In the synthetic broad-woven fabric industry, establishments operated by 20 of the largest companies, about 5 percent of the total, accounted for 54 percent of the total employees and 55 percent of the total value of shipments of the industry. The proportions of the total value of shipments that were accounted for by the 4, 8, and 20 largest companies in 1954 were about the same as, or slightly less than, in 1947 (table 58).

#### Manufacturing Methods

Information on methods of manufacture of rayon and acetate yarns and staples and on other developments in synthetic fibers is presented in a report on "The Rayon Industry" by the United States Tariff Commission (115). Rayon and acetate staples are processed on the cotton, worsted, and woolen systems, and the methods employed in these systems were outlined in earlier sections of this bulletin (pp. 80 and 127). 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

TABLE 58.—Share of employment and shipments of the yarn throwing and synthetic broad-woven fabric manufacturing industry accounted for by largest companies, United States, 1947 and 1954.

Industry, measure, and year	Com-panies <sup>1</sup>	Shipments <sup>2</sup> (1,000 dollars) or employ-ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by ←			Primary product speciali-zation <sup>5</sup>
			4 larg-est com-panies	8 larg-est com-panies	20 larg-est com-panies	
Yarn throwing mills: <sup>4</sup>	<i>Num-ber</i>	<i>Number</i>	<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>
Number of employees (1954).....	118	11, 840	29	44	63	93
Value of shipments:						
1954.....	118	99, 227	39	52	73	93
1947.....	96	64, 173	30	43	66	(7)
Synthetic broad-woven fabric mills: <sup>6</sup>						
Number of employees (1954).....	396	89, 994	28	37	54	87
Value of shipments:						
1954.....	396	1, 142, 629	30	39	55	87
1947.....	432	1, 002, 923	31	39	56	85

<sup>1</sup> See footnote 1, table 21, p. 78.

<sup>2</sup> See footnote 2, table 21, p. 78.

<sup>3</sup> See footnote 3, table 21, p. 78.

<sup>4</sup> See footnote 4, table 21, p. 78.

<sup>5</sup> See footnote 5, table 21, p. 78.

<sup>6</sup> Jobbers were included in 1947 but excluded in 1954.

<sup>7</sup> Not available.

Adapted from United States Senate report on Concentration in American Industry (115).

products. Detailed information on processes involved in the manufacture of rayon and acetate products are presented in "Rayon Technology—A Handbook for Textile Mills" (81).

#### Machinery and Equipment

As indicated earlier (pp. 83 and 84), the number of cards, combs, spindles, looms, and other machinery and equipment used in the cotton, rayon, and related manufacturing industries have changed considerably in recent years. From 1942 to 1954, the total of roving spindles decreased about 44 percent, but those of long draft increased 44 percent and those of regular draft decreased 74 percent. The number of throwing and twisting spindles increased from 1,884,000 in 1947 to 2,629,000 in 1954, an increase of about 39 percent in 7 years.

The average number of rayon and acetate spinning spindles increased from 1,083,000 in 1947 to 1,315,000 in 1953 (table 59). This was an increase of about 21 percent in 6 years. Consumption of fibers per spindle hour increased about 72 percent during this period. Average number of twisting spindles in place increased from 1,122,000 in 1947 to 1,563,000 in 1953, an increase of 39 percent (table 59).

Total number of looms in place in manmade fiber and silk fabric mills increased from 106,695 in 1947 to 118,523 in 1951 and then

TABLE 59.—Average number of rayon and acetate spindles in place, number active by shifts, hours operated, and fibers consumed, United States, specified years, 1947-53<sup>1</sup>

Spindles and activity	Unit	1947	1949	1951	1953
<b>Spindles:</b>					
<b>Spinning:</b>					
In place.....	Thousand.....	1, 083	1, 233	1, 218	1, 315
Active at end of—					
First shift.....	do.....	1, 041	1, 122	1, 138	1, 190
Second shift.....	do.....	993	1, 071	1, 104	1, 146
Third shift.....	do.....	749	819	994	1, 057
Hours operated:					
Aggregate.....	Million.....	6, 546	5, 871	6, 777	6, 789
Per week <sup>2</sup> .....	Number.....	116	92	95	99
Fibers consumed.....	Million.....	<sup>3</sup> 192	212	324	342
Per 1,000 spindle hours.....	Pound.....	<sup>3</sup> 29	36	48	50
<b>Twisting:</b>					
In place.....	Thousand.....	<sup>4</sup> 1, 122	1, 261	1, 612	1, 563
Active at end of—					
First shift.....	do.....	<sup>4</sup> 1, 066	1, 039	1, 247	1, 270
Second shift.....	do.....	<sup>4</sup> 1, 042	1, 018	1, 230	1, 252
Third shift.....	do.....	<sup>4</sup> 965	957	1, 174	1, 231
Hours operated.....	Million.....	<sup>3</sup> 6, 574	6, 393	7, 273	8, 256

<sup>1</sup> Spindles in place and active at end of specified shifts and averages of the numbers at the end of 3-month periods.

<sup>2</sup> Average number of hours per spindle in place.

<sup>3</sup> Based on rate for last half of year.

<sup>4</sup> Based on last quarter of year.

Adapted from Bureau of the Census reports, Facts for Industry (Series: M15C).

decreased to 93,905 in 1958 (table 60). Numbers of plain looms decreased, those of jacquard increased, and those of doobby and box varied irregularly from 1947 to 1958. During this period, substantial proportions of these looms were active at the end of the second and third shifts. Average number of hours per week the looms were operated increased from 98 in 1947 to 105 in 1958.

Substantial improvements in machinery and equipment used in the manufacture of manmade fiber and related products have been made in recent years. Total expenditures for plant and equipment for yarn throwing and manmade broad-woven fabric mills increased from \$9.5 million in 1939 to \$49.9 million in 1947, and amounted to \$21.2 million in 1954 (table 61). Expenditures for new machinery and equipment increased from \$6.5 million in 1939 to \$32.5 million in 1947, and amounted to \$13.1 million in 1954.

### Charges or Costs Involved

Gross margins for manufacturers of yarns, mainly thrown, and broad-woven fabrics composed mainly of manmade fibers show considerable variations among products and from one time to another. These margins for manufacturers of yarn, mainly thrown, increased on the average from 38 percent of the value of the products in 1939 to 76 percent in 1947, and then decreased to 61 percent in 1954 (table 62). For broad-woven fabrics, manufacturers' gross margins increased from 40 percent of the value of the products in 1939 to 52 percent in 1947, and then decreased to 40 percent in 1954. Salaries

TABLE 60.—Number of looms in place and number active at end of year by shifts, and total loom hours operated, by kind of loom, for manufacture of manmade fabrics, United States, specified years, 1947-58

Looms in place

Year	Kind of loom				
	All	Plain	Dobby	Box	Jacquard
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
1958.....	93, 905	19, 052	46, 290	21, 824	6, 739
1957.....	95, 783	19, 720	45, 973	23, 416	6, 674
1956.....	99, 581	19, 954	47, 911	27, 042	4, 674
1955.....	108, 195	21, 069	52, 398	30, 516	4, 212
1953.....	110, 953	25, 153	48, 541	33, 874	3, 385
1951.....	118, 523	25, 590	50, 291	38, 994	3, 648
1949.....	114, 090	28, 545	44, 104	37, 658	3, 783
1947.....	106, 695	32, 086	35, 892	34, 727	3, 990
	Active at end of year, first shift				
1958.....	86, 781	16, 998	45, 234	19, 294	5, 255
1957.....	83, 209	15, 318	42, 789	20, 145	4, 957
1956.....	89, 529	16, 808	45, 661	23, 255	3, 805
1955.....	94, 975	18, 568	47, 375	25, 359	3, 673
1953.....	93, 859	20, 467	43, 739	27, 057	2, 596
1951.....	99, 160	20, 857	43, 879	32, 378	2, 055
1949.....	107, 033	27, 179	42, 947	34, 307	2, 600
1947.....	101, 038	30, 575	34, 755	32, 470	3, 238
	Active at end of year, second shift				
1958.....	85, 079	16, 696	45, 149	18, 633	4, 601
1957.....	80, 889	15, 148	42, 678	18, 862	4, 201
1956.....	87, 143	16, 629	45, 454	22, 091	2, 969
1955.....	92, 098	18, 303	46, 852	23, 938	3, 005
1953.....	90, 234	19, 872	43, 124	25, 545	1, 693
1951.....	93, 101	19, 726	43, 222	28, 801	1, 352
1949.....	102, 712	25, 903	42, 780	32, 116	1, 913
1947.....	94, 346	29, 191	34, 145	28, 998	2, 012
	Active at end of year, third shift				
1958.....	78, 747	16, 289	44, 545	15, 164	2, 749
1957.....	74, 859	14, 170	42, 049	16, 030	2, 610
1956.....	79, 528	15, 511	44, 049	18, 488	1, 480
1955.....	81, 206	16, 380	43, 538	19, 806	1, 482
1953.....	79, 772	16, 465	41, 575	21, 080	652
1951.....	79, 341	14, 574	41, 225	22, 955	587
1949.....	84, 585	20, 623	40, 486	22, 588	888
1947.....	66, 648	19, 377	28, 862	17, 689	720
	Total loom hours operated				
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
1958.....	514, 547	103, 935	280, 544	104, 511	25, 467
1957.....	518, 086	99, 418	284, 631	108, 965	25, 072
1956.....	525, 979	98, 849	278, 292	125, 807	23, 041
1955.....	592, 320	115, 632	309, 552	153, 160	13, 976
1953.....	595, 774	123, 239	290, 272	172, 470	9, 773
1951.....	605, 647	125, 019	304, 260	168, 088	8, 280
1949.....	560, 711	141, 505	241, 324	166, 780	11, 092
1947.....	545, 464	155, 098	210, 334	164, 271	12, 761

Adapted from Bureau of Census reports, Facts for Industry.

TABLE 61.—*Total expenditures for plant and equipment by yarn throwing mills and manufacturers of synthetic broad-woven fabrics, United States, 1939, 1947, and 1954*

Industry	Expenditures for—			
	Total	New equip- ment	New plant	All other <sup>1</sup>
1939:	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Yarn throwing mills.....	1, 984	1, 192	270	522
Broad-woven fabric mills.....	7, 542	5, 270	1, 142	1, 130
Total.....	9, 526	6, 462	1, 412	1, 652
1947:				
Yarn throwing mills.....	5, 445	2, 840	1, 819	786
Broad-woven fabric mills.....	44, 500	29, 655	13, 226	1, 619
Total.....	49, 945	32, 495	15, 045	2, 405
1954:				
Yarn throwing mills.....	3, 798	2, 694	516	588
Broad-woven fabric mills.....	17, 391	10, 369	2, 626	4, 396
Total.....	21, 189	13, 063	3, 142	4, 984

<sup>1</sup> Expenditures for used plant and equipment.

Adapted from Census of Manufactures: 1947 and 1954.

and wages, the largest item of cost, decreased from 59 percent of the gross margins for yarn manufacturers in 1939 to 53 percent in 1954. The proportion of gross margins for manufacturers of broad-woven fabrics accounted for by salaries and wages decreased from 59 percent in 1939 to 44 percent in 1947, and then increased to 59 percent in 1954.

Manufacturers' gross margins for narrow fabrics, many of which are made of manmade fibers and silk, decreased from an average of 57 percent of the value of the products in 1939 to 51 percent in 1954 (table 37, p. 110). The proportion of these margins that was accounted for by salaries and wages increased from 43 percent in 1939 to 48 percent in 1954.

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 68 percent, labor 15 percent, selling 3 percent, defectives 1 percent, and all other expenses 12 percent of the total cost of 29 cents a yard (5).

Large proportions of gross margins for manufacturers of rayon and related products that are accounted for by labor costs, and increases in wage rates in recent years, emphasize the importance of labor in the manufacture of these products. Hourly earnings of labor in the textile industry in 1957 averaged about 10 percent more than in 1954, 44 percent more than in 1947, and 226 percent more than in 1939. Despite substantial increases in hourly earnings of labor, average value added by manufacture per dollar of wages paid by yarn throwing mills increased from \$1.99 in 1939 to \$2.01 in

TABLE 62.—Values, costs, and margins for manufacturers of yarn, mainly thrown, and manmade broad-woven fabrics  
United States, 1939, 1947, and 1954

Item	Yarn, mainly thrown			Broad-woven fabrics		
	1939	1947	1954	1939	1947	1954
Value of products.....	1,000 dollars 29,537	1,000 dollars 64,173	1,000 dollars 99,227	1,000 dollars 298,537	1,000 dollars 1,002,923	1,000 dollars 1,142,629
Cost of materials, etc. <sup>1</sup> .....	18,184	15,088	38,889	179,042	477,472	680,844
Gross margin.....	11,353	49,085	60,338	119,495	525,451	461,785
Salaries and wages.....	6,678	28,401	32,046	70,160	232,072	272,872
Salaries.....	1,201	4,078	5,256	8,851	27,081	38,396
Wages.....	5,477	24,323	26,790	61,309	204,991	234,476
Fuel.....	201	407	488	1,093	3,147	4,602
Purchased electric energy.....	729	1,934	2,339	4,054	8,178	12,702
Contract and commission work.....	106	774	3,547	2,894	26,078	21,576
Others <sup>2</sup> .....	3,639	17,569	21,918	41,294	255,976	150,033

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, etc. <sup>1</sup> .....	61.6	23.5	39.2	60.0	47.6	59.6
Gross margin.....	38.4	76.5	60.8	40.0	52.4	40.4
Salaries and wages.....	22.6	44.3	32.3	23.5	23.1	23.9
Salaries.....	4.1	6.4	5.3	3.0	2.7	3.4
Wages.....	18.5	37.9	27.0	20.5	20.4	20.5
Fuel.....	.7	.6	.5	.4	.3	.4
Purchased electric energy.....	2.5	3.0	2.3	1.3	.8	1.1
Contract and commission work.....	.3	1.2	3.6	1.0	2.6	1.9
Other <sup>2</sup> .....	12.3	27.4	22.1	13.8	25.6	13.1

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Some "contract work" included with "materials, supplies, and containers" to avoid disclosing the amounts reported by individual establishments.

<sup>3</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 63.— *Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for manufacturers of synthetic textile products, by number of production workers, United States, 1954*

Industry and number of production workers	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
<b>Yarn throwing mills:</b>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
250 and over.....	16,626	2.09	2.76	1.32
100 to 249.....	22,400	2.10	2.77	1.32
50 to 99.....	10,302	1.77	1.99	1.12
20 to 49.....	3,593	1.99	2.25	1.13
10 to 19.....	513	1.67	1.99	1.19
5 to 9.....	344	3.44	4.53	1.32
1 to 4.....	186	2.07	2.32	1.12
Total or average.....	53,964	2.01	2.53	1.26
<b>Synthetic broad-woven fabrics:</b>				
1,000 and over.....	91,228	1.87	2.65	1.42
500 to 999.....	114,196	1.69	2.32	1.37
250 to 499.....	106,699	1.85	2.56	1.39
100 to 249.....	70,185	1.85	2.66	1.44
50 to 99.....	23,169	1.73	2.53	1.46
20 to 49.....	11,989	1.86	2.64	1.42
10 to 19.....	3,041	2.25	3.49	1.55
5 to 9.....	1,635	2.06	3.21	1.56
1 to 4.....	623	2.84	4.21	1.48
Total or average.....	422,765	1.80	2.53	1.40

Adapted from Census of Manufactures: 1954.

1954, according to census reports. For broad-woven fabric mills, average value added per dollar of wages increased from \$1.82 in 1939 to \$2.38 in 1947, then decreased to \$1.87 in 1957. Some of these increases may be accounted for by the use of improved machinery.

Value added by manufacture of synthetic yarns and fabrics per dollar of wages and per hour of labor, and average wage rates per hour, apparently vary irregularly with size of the plant as indicated by number of production workers (table 63). In 1954, value added by manufacture per dollar of wages and per hour of labor, and average wage rates per hour, averaged higher for yarn throwing mills with 5 to 9 production workers and for those with 100 or more, than for mills of any other size. For synthetic broad-woven fabric mills, the value added per dollar wages and per hour of labor, and average wage rate per hour, averaged higher for plants with fewer than 20 production workers than for plants of any other size. The relatively high average value added per dollar of wages and per hour of labor shown for small plants may be accounted for in part by active proprietors of, and partners in, small unincorporated mills.

Average value added by manufacture per dollar of wages and per hour of labor, and average wage rates per hour, also varied



irregularly from one State and region to another in 1954 (table 64). For yarn throwing mills, value added per dollar of wages and per hour of labor averaged highest in New England and lowest in Middle Atlantic States. Average wage rate per hour ranged from \$1.21 in North Carolina to \$1.46 in New York. For broad-woven fabric mills, average value added per dollar of wages ranged from \$1.49 in Connecticut to \$2.92 in New York, average value added per hour of labor ranged from \$2.31 in North Carolina to \$4.64 in New York, and average hourly wage rates ranged from \$1.28 in Georgia to \$1.64 in New Jersey and Connecticut.

### Means and Importance of Improvement

As manmade fibers are processed on cotton, woolen, and worsted systems, many of the suggestions for improving the manufacture of cotton yarns (p. 92), cotton fabrics (p. 116), and wool products (p. 142) would apply also to the manufacture of products of manmade fibers and need not be repeated here. Possibilities for modernization were indicated by reports that, during the 10 years ended with 1957, the textile industry spent \$4.4 billion for new plant and equipment and increased productivity per manhour 67 percent (46). Yet it was estimated that fully 65 percent of the textile manufacturing equipment in place in 1957 was obsolete (46).

A study of the textile industry, department by department, was made to obtain information on possible further reductions in labor costs. The results show that, through the use of improved machinery and equipment and of improved methods of operation, labor costs can be reduced 10 to 33 percent in carding, 75 to 80 percent in drawing, 60 to 70 percent in roving, 40 to 60 percent in spinning, 65 to 70 percent in slashing, and up to 30 percent in weaving (46). New machines and methods for treating manmade fibers are said to be opening up vast possibilities for throwers who have felt the technological impact of newer fibers more than most processors of textile fibers. Modernization of throwing mills has been directed toward the installation of machinery to make stretch and bulk yarn. The new single-process stretch-yarn machines have eliminated four processes and reduced manhours 36 percent. Other improved machines are being developed (46).

The importance of further improvements in the manufacture of products of manmade fibers, particularly in productivity of labor, may be indicated by the value added by manufacture of broad-woven fabrics per dollar of wages. In 1954, the value added averaged about 24 percent less than in 1947 and slightly less than in 1939, according to census reports. Gross margins of these manufacturers averaged about 40 percent of the value of the products in 1954 and accounted for about 13 percent of the retail value of apparel and household goods made of manmade fibers.

### DYEING AND FINISHING

Information presented in this section relates mainly to industries primarily engaged in finishing textiles, except knit goods. Establishments in these industries are primarily engaged in bleaching, dyeing, printing, or otherwise finishing fabrics, yarn, thread, tops,

TABLE 64.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for manufacturers of synthetic yarns and fabrics, by region and State, 1954

Industry, region, and State	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
	1,000 dollars	Dollars	Dollars	Dollars
Yarn throwing mills:				
New England.....	2, 821	2. 36	2. 92	1. 24
Middle Atlantic.....	27, 916	1. 84	2. 32	1. 26
New York.....	4, 548	1. 96	2. 86	1. 46
Pennsylvania.....	21, 901	1. 82	2. 23	1. 22
Other.....	1, 467	1. 76	2. 32	1. 32
All other divisions.....	23, 227	2. 23	2. 79	1. 25
North Carolina.....	12, 222	2. 35	2. 85	1. 21
Other.....	11, 005	2. 12	2. 72	1. 28
United States.....	53, 964	2. 01	2. 53	1. 26
Synthetic broad-woven fabrics:				
New England.....	94, 232	1. 86	2. 85	1. 53
Maine.....	21, 714	2. 24	3. 54	1. 58
Massachusetts.....	31, 490	1. 62	2. 40	1. 48
Rhode Island.....	16, 897	2. 64	3. 92	1. 48
Connecticut.....	14, 363	1. 49	2. 44	1. 64
Other.....	9, 768	1. 78	2. 68	1. 51
Middle Atlantic.....	76, 239	1. 78	2. 66	1. 50
New York.....	9, 370	2. 92	4. 64	1. 59
New Jersey.....	14, 942	2. 03	3. 32	1. 64
Pennsylvania.....	51, 926	1. 61	2. 35	1. 46
North Central.....	3, 565	1. 81	2. 81	1. 55
South and West.....	248, 729	1. 79	2. 39	1. 34
North Carolina.....	97, 514	1. 73	2. 31	1. 34
South Carolina.....	98, 166	1. 85	2. 50	1. 35
Georgia.....	19, 632	1. 92	2. 46	1. 28
Other.....	33, 417	1. 72	2. 29	1. 33
United States.....	422, 765	1. 80	2. 53	1. 40

Adapted from Census of Manufactures: 1954.

or raw stocks of textiles, other than knit goods. Plants primarily engaged in flocking or sueding of fabrics or printing or embossing on plastics are also included. Establishments primarily engaged in dyeing or finishing knit goods are classified as knitting mills and are included in another section of this report (p. 174).

Establishments that manufacture basic textiles such as yarns and fabrics are classified as yarn mills or woven fabric mills, even

though a large part or all of their shipments consist of finished products. In 1954, according to census reports, about 59 percent of total shipments of finished textiles, except wool, were accounted for by these mills, and only 41 percent by shipments of the industry finishing textiles, except wool. Most of the shipments of finished woolen and worsted products are accounted for by yarn and fabric mills.

The total quantity of finished broad-woven goods made of cotton, silk, and manmade fibers ranged from 8,290 million linear yards in 1949 to 10,502 million in 1955, and amounted to 9,776 million in 1957 (table 65). Of the total finished in 1957, about 38 percent was bleached white and finished, 40 percent was plain dyed and finished, and 22 percent was printed and finished. These proportions varied considerably from one year to another. Shipments of woolen and worsted products in 1954 were valued at about \$1,159 million, but only a small quantity, if any, of these were shipped by finishers of wool textiles, according to census reports.

### Nature, Practices, and Equipment

Plants included in the industry finishing textiles, except wool, fall into three broad categories; Cotton bleaching and dyeing, synthetic and silk dyeing, and printing. These processes usually are performed in separate plants. Textiles may be dyed during the formation of fibers (manmade fibers only), as staple fibers before being spun into yarn, as yarn, and as fabrics. Dyeing is most commonly performed, and printing is almost invariably performed, in the fabric stage.

Wool fibers contain yellowish pigment which is removed by tinting or bleaching. Dyeing may be done at any stage of manufacture—to loose wool or stock, to slubbing or top, to yarn, or to fabrics or piece goods. Wool may be printed in the form of either yarn or piece goods, but printed wool materials comprise a minor portion of finished wool articles. In recent years, mothproofing of woolen and worsted goods has become widespread. After woolen and worsted goods leave the loom, they are subject to various types of finishes involving wet and dry finishing operations designed to improve the quality, appearance, and attractiveness of the fabrics (117).

Some establishments finish, on a commission basis, fabrics, yarns, or raw stocks owned by others, whereas others finish their own materials. A substantial amount of fabrics, particularly those made of cotton and manmade fibers, is finished on commission for converters who buy gray goods from weaving mills, arrange to have them finished, and sell the finished cloth. Sales of these converters in 1954 totaled \$1,012 million, including \$884 million of converted piece goods, according to census reports.

Styling and finishing of this cloth are controlled mainly by converters or mills, with or without collaboration of manufacturing users. Converters occupy a key position in this connection. They have gray goods finished to their order in many designs, styles, and finishes. A large percentage is bleached in various finishes from soft to hard; some goods 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

TABLE 65.—Cotton, silk, and manmade fiber broad-woven goods finished by type of fabric and finish, United States, 1947 and 1949-57

Type of fabric and finish	1947 <sup>1</sup>	1949	1950	1951	1952	1953	1954 <sup>1</sup>	1955	1956	1957
Bleached and white finished:	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>	<i>Million yards</i>
Cotton.....	3, 616	2, 813	3, 297	3, 379	3, 380	3, 354	3, 179	3, 346	3, 491	3, 424
Synthetics and silk.....	199	167	170	169	218	206	197	321	286	280
Total.....	3, 815	2, 980	3, 467	3, 548	3, 598	3, 560	3, 376	3, 667	3, 777	3, 704
Plain dyed and finished:										
Cotton.....	1, 757	1, 942	2, 166	2, 095	2, 413	2, 454	2, 308	2, 672	2, 594	2, 467
Synthetics and silk.....	1, 419	1, 563	1, 784	1, 605	1, 774	1, 591	1, 674	1, 648	1, 557	1, 491
Total.....	3, 176	3, 505	3, 950	3, 700	4, 187	4, 045	3, 982	4, 320	4, 151	3, 958
Printed and finished: <sup>2</sup>										
Cotton.....	1, 571	1, 485	1, 601	1, 401	1, 739	1, 820	1, 919	2, 126	1, 992	1, 815
Synthetics and silk.....	353	320	311	245	278	222	318	389	325	299
Total.....	1, 924	1, 805	1, 912	1, 646	2, 017	2, 042	2, 237	2, 515	2, 317	2, 114
All finishes:										
Cotton.....	6, 944	6, 240	7, 064	6, 875	7, 532	7, 628	7, 406	8, 144	8, 077	7, 706
Synthetics and silk.....	1, 971	2, 050	2, 265	2, 019	2, 270	2, 019	2, 189	2, 358	2, 168	2, 070
Total.....	8, 915	8, 290	9, 329	8, 894	9, 802	9, 647	9, 595	10, 502	10, 245	9, 776

<sup>1</sup> From Census of Manufactures.

<sup>2</sup> Includes roller, screen, flock, and block printed.

Adapted from Bureau of Census reports, Facts for Industry (Series: M 225-06).

with the fluctuating requirements of the market and, within the limits of changes in fashion, they influence the seasonal drift of style goods (114).

#### Size and Organization

Changes in size and organization of the finishing textile industries may be indicated by the number of employees and establishments, ownership and operation of plants, and mergers and acquisitions.

*Employees and Establishments.*—Establishments primarily engaged in finishing textiles, except wool, totaled 725 in 1954, compared with 641 in 1947 and 468 in 1939, according to census reports. The proportion of the establishments with 100 or more employees decreased from 29.7 percent in 1947 to 25.9 percent in 1954, and the proportion with less than 10 employees increased from 21.2 percent in 1947 to 30.1 percent in 1954 (table 66). The number of establishments with less than 5 employees increased markedly from 1947 to 1954.

The number of establishments primarily engaged in finishing wool textiles decreased from 59 in 1947 to 56 in 1954 (table 66). Average number of production workers per establishment decreased from 87 in 1947 to 63 in 1954. The proportion of the establish-

TABLE 66.—Number of establishments finishing textiles except knit goods, by number of employees, United States, 1947 and 1954

Number of employees	Textiles, except wool		Wool textiles	
	1947	1954	1947	1954
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
500 and over.....	37	37	2	1
250 to 499.....	44	48	2	3
100 to 249.....	109	103	12	5
50 to 99.....	87	99	13	11
20 to 49.....	131	125	16	21
10 to 19.....	97	104	6	5
5 to 9.....	84	84	3	5
1 to 4.....	52	134	5	5
Total.....	641	725	59	56
	Proportion of total			
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
500 and over.....	5.8	5.1	3.4	1.8
250 to 499.....	6.9	6.6	3.4	5.4
100 to 249.....	17.0	14.2	20.3	8.9
50 to 99.....	13.6	12.4	22.0	19.7
20 to 49.....	20.4	17.3	27.1	37.5
10 to 19.....	15.1	14.3	10.2	8.9
5 to 9.....	13.1	11.6	5.1	8.9
1 to 4.....	8.1	18.5	8.5	8.9
Total.....	100.0	100.0	100.0	100.0

Adapted from Census of Manufactures: 1947 and 1954.

ments with 100 or more employees decreased from about 27 percent in 1947 to 16 percent in 1954, and the proportion with less than 10 employees increased from 13.6 percent in 1947 to 17.8 in 1954.

In 1954, about 60 percent of plants finishing textiles, except wool, were in Middle Atlantic States, 19 percent in New England, 14 percent in the South, 4 percent in North Central States, and 3 percent in the West (table 67). Decreases from 1947 to 1954 in proportion of establishments in Middle Atlantic States were offset by marked increases in the South and smaller increases in other regions. Average size of the establishments, as indicated by number of production workers, was substantially greater for plants in the South and in New England than for those in other regions. In 1954, the South, with about 14 percent of the establishments, accounted for about 42 percent of the production workers in this industry. Average number of production workers per establishment decreased from 1947 to 1954 in all regions (table 67).

The proportion of all plants finishing wool textiles that were in New England decreased from about 37 percent in 1947 to 30 percent in 1954 (table 67). The proportion in Middle Atlantic States decreased from about 49 percent in 1947 to 47 percent in 1954, and the proportion in all other regions increased from about 14 percent in 1947 to 23 percent in 1954. Average number of production workers per plant decreased for plants in New England and Middle Atlantic States and increased for plants in other regions.

*Ownership and Operation.*—Type of ownership and operation, and average number of employees, for establishments finishing textiles, except wool, have changed somewhat in recent years. The proportion of all establishments that were under corporate ownership or control increased from about 85 percent in 1939 to 86 percent in 1954 (table 68). Average number of employees per establishment under corporate ownership or control decreased from 149 in 1939 to 123 in 1954, and the proportion of total employees in the industry that was accounted for by these establishments decreased from about 98 percent in 1939 to 97 percent in 1954.

Proportions of the establishments that were operated from central administrative offices as multiunits decreased from 26 percent in 1939 to 19 percent in 1954. Average number of employees per establishment increased for multiunits and decreased for single units from 1939 to 1954. The proportion of total employees accounted for by multiunits increased from about 54 percent in 1939 to 62 percent in 1954.

In 1954, about 86 percent of the establishments finishing wool textiles and about 94 percent of the employees were under corporate management or control (table 68). These proportions increased from 1939 to 1954. Proportions of the plants that were operated from central administrative offices as multiunits decreased from 27 percent in 1939 to 23 percent in 1954, but the proportion of total employees accounted for by multiunits increased from about 39 percent in 1939 to 61 percent in 1954.

*Mergers and Acquisitions.*—Mergers and acquisitions in the textile industry in recent years, as indicated previously (p. 75), apparently have resulted in some changes in organization and management of operating units in finishing textile industries. Degree of vertical integration in finishing textiles, except wool and knit

TABLE 67.—Number of establishments and average number of production workers per establishment for industry finishing textiles, except wool, by State and region, 1947 and 1954

Region and State	Establishments		Production workers per establishment	
	1947	1954	1947	1954
Finishing textiles, except wool and knit goods:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
New England.....	111	136	180	133
Massachusetts.....	50	57	167	121
Rhode Island.....	34	44	231	170
Other.....	27	35	138	108
Middle Atlantic.....	423	434	62	47
New York.....	205	212	35	25
New Jersey.....	159	171	86	68
Pennsylvania.....	59	51	86	65
North Central.....	22	32	52	34
Illinois.....	12	15	27	27
Other.....	10	17	84	40
South.....	68	103	315	277
Virginia.....	7	9	194	309
North Carolina.....	24	39	187	168
South Carolina.....	17	23	502	536
Georgia.....	6	10	278	219
Tennessee.....	6	6	333	271
Other.....	8	16	423	191
West.....	17	20	28	22
United States.....	641	725	103	94
Finishing wool textiles:				
New England.....	22	17	72	49
Middle Atlantic.....	29	26	107	62
All other.....	8	13	55	8
United States.....	59	56	87	63

Adapted from Census of Manufactures: 1947 and 1954.

goods, may be indicated by census data (the latest available) showing that, in 1954, about 59 percent of this finishing was done by establishments manufacturing basic textiles, such as yarns and fabrics, and classified as yarn mills or woven fabric mills. Data on cotton, rayon, and related broad-woven fabric mills show that, in 1954, about 12 percent of the mills, operating 15 percent of the looms, had machinery and equipment for finishing textile products (table 32, p. 102). A substantial proportion of these mills also had machinery and equipment for spinning and throwing, as well as for weaving and finishing.

TABLE 68.—Number of establishments and average number of employees per establishment for the finishing textile industries, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Finishing textiles, except wool and knit goods:				
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	399	623	149	123
Partnership.....	29	53	(?)	36
Individual.....	39	49	11	10
Other.....	1	0	(?)	0
All.....	468	725	129	109
Operation:				
Single unit:				
Corporate.....	281	489	(?)	(?)
Noncorporate.....	66	100	(?)	(?)
All.....	347	589	80	52
Multiunit:				
Corporate.....	118	134	(?)	(?)
Noncorporate.....	3	2	(?)	(?)
All.....	121	136	268	360
All.....	468	725	126	109
Finishing wool textiles:				
Ownership or control:				
Corporate.....	52	48	65	82
Partnership.....	4	2	40	(?)
Individual.....	7	6	43	(?)
Other.....	0	0	0	0
All.....	63	56	61	75
Operation:				
Single unit:				
Corporate.....	35	35	54	43
Noncorporate.....	11	8	42	32
All.....	46	43	51	41
Multiunits:				
Corporate.....	17	13	88	189
Noncorporate.....	0	0	0	0
All.....	17	13	88	189
All.....	63	56	61	75

<sup>1</sup> In 1933 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.



Degree of concentration in the industry finishing textiles, except wool, on a company basis may be indicated by data showing that in 1954 plants operated by 20 of the largest companies, or about 3 percent of the total, accounted for 40 percent of the employees and 48 percent of the shipments of the industry. Proportions of the value of shipments accounted for by plants operated by 4, 8, and 20 of the largest companies increased markedly from 1947 to 1956. The degree of primary product specialization is indicated by data showing that in 1954 about 86 percent of total shipments of this industry were accounted for by products regarded as primary to the industry (table 69).

TABLE 69.—Share of employment and shipments of finishing textile industries accounted for by largest companies, United States, 1947 and 1954

Industry, measure, and year	Compan-ies <sup>1</sup>	Ship-ments <sup>2</sup> (1,000 dollars) or employ-ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup> —			Pri-mary prod-uct special-ization <sup>5</sup>
			4 larg-est compan-ies	8 larg-est compan-ies	20 larg-est compan-ies	
Finishing textiles, except wool:						
Number of employees (1954)-----	Num-ber 680	Number 79, 308	Percent 14	Percent 23	Percent 40	Percent 86
Value of shipments:						
1954-----	680	998, 144	24	32	48	86
1947-----	599	531, 400	14	22	37	( <sup>6</sup> )
Finishing wool textiles:						
Number of employees (1954)-----	56	4, 215	42	58	81	( <sup>6</sup> )
Value of shipments:						
1954-----	56	32, 788	44	62	82	( <sup>6</sup> )
1947-----	59	28, 689	36	51	79	( <sup>6</sup> )

<sup>1</sup> See footnote 1, table 21, p. 78.

<sup>2</sup> See footnote 2, table 21, p. 78.

<sup>3</sup> See footnote 3, table 21, p. 78.

<sup>4</sup> See footnote 4, table 21, p. 78.

<sup>5</sup> See footnote 5, table 21, p. 78.

<sup>6</sup> Specialization index is not meaningful because of predominance of receipts for contract and commission work on materials owned by others.

Adapted from United States Senate report on Concentration in American Industry (113).

In finishing wool textiles, plants operated by 20 of the largest companies, or about 36 percent of the total, accounted for 81 percent of the employees and 82 percent of the value of shipments of the industry. Proportions of the value of shipments accounted for by plants operated by the 4, 8, and 20 largest companies increased considerably from 1947 to 1954 (table 69).

#### Methods and Practices<sup>7</sup>

All treatments or processing received by cotton textiles to fit them for consumer use, after their mechanical structure has been com-

<sup>7</sup> Based mainly on Cotton Goods Production and Distribution Techniques, Costs, and Margins (110).

pleted, 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 suitable for specific end uses. For 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, printing, starching, and others, which are designed to improve both the attractiveness and the usefulness of the final products.

Most cotton yarns and fabrics are given some degree of finishing before they are sold to consumers. For 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 for fabrics intended for wearing apparel. 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 here 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 to increase their 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. Then 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 wherever possible. Along with this development has gone a more complete mechanization of plants, substituting 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 widely varied demand apparently will not permit the adoption of straight production-line methods throughout the finishing industry.

Several special finishes or finishing processes developed since World War II 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 muzzing 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 (7). 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 appeared on the market. Additional useful products may be expected as the result of research by many organizations.

Application of color to cotton yarns and fabrics is a complex and highly developed business, which requires special equipment and techniques. Several 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.

In wool top finishing, the 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 affect 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.

In their natural state, wool fibers contain pigments which must be removed, either by bleaching or by tinting, 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 designed to enhance their quality and attractiveness to purchasers. Types of finishes include the clear and the 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 tentering, shearing, brushing, dry decating, damping, pressing, steaming, sponging, examining, stamping, measuring, weighing, folding, inspecting, and shipping.

#### Machinery and Equipment

Data are not available to show changes in the number and kinds of equipment used in finishing textile mill products. Total expenditures for plant and equipment by finishers of textile products, except wool, increased from \$7.1 million in 1939 to \$30.7 million in 1947, and amounted to \$23.8 million in 1954 (table 70). Expenditures for new plant and equipment by these manufacturers increased from \$6.4 million in 1939 to \$29.8 million in 1947, and amounted to \$30.8 million in 1956.

For finishers of wool textiles, total expenditures for plant and equipment increased from \$446,000 in 1939 to \$1.4 million in 1954 (table 70). Most of these expenditures were for new plant and equipment.

#### Charges or Costs Involved

Census reports on manufacturers in 1947 and in 1954, as they relate to finishing textiles, show neither the value of gray goods finished during the year nor the value of the products finished by establishments included in finishing industries. Consequently these data are not adequate for calculating the finisher's gross margins, or the spread between the value of materials used and the value of the finished products.

In 1946, gross margins of commission finishers of cotton fabrics ranged from 9 percent of the value of gray goods for plain white print cloth and sheeting to 49 percent for heavy twill (33). During the 3 years ended with 1944, converters' gross margins for cotton fabrics averaged 29 percent of the selling price for bleached fabrics, 35 percent for dyed, and 43 percent for printed (33). Costs of finishing operations averaged 35 percent of the gross margins for bleached fabrics, 49 percent for dyed, and 65 percent for printed. During the same 3-year period, converters' gross margins for rayon and acetate fabrics averaged 37 percent of the selling price for dyed fabrics and 51 percent for printed (33). Cost of finishing operations averaged 37 percent of the converters' gross margins for dyed fabrics and 50 percent for printed.

TABLE 70.—Total expenditures for plant and equipment by finishers of textile products, United States, 1939, 1947 and 1954

Year and industry	Expenditures for—			
	Total	New equipment	New plant	All other <sup>1</sup>
1939:	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Textile finishing plants:				
Finishing wool textiles.....	446	371	65	10
Finishing other textiles.....	7,059	4,922	1,431	706
Total.....	7,505	5,293	1,496	716
1947:				
Textile finishing plants:				
Finishing wool textiles.....	936	713	213	7
Finishing other textiles.....	30,715	22,068	7,600	1,047
Total.....	31,651	22,784	7,813	1,054
1954:				
Textile finishing plants:				
Finishing wool textiles.....	1,402	1,176	131	95
Finishing other textiles.....	23,797	17,405	4,495	1,897
Total.....	25,199	18,581	4,626	1,992

<sup>1</sup> Expenditures for used plant and equipment.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

As indicated in preceding sections of this bulletin, hourly earnings of labor in the textile industry have increased markedly since 1939 and wages account for large proportions of gross margins of manufacturers of textile products. Value added by finishers of textiles other than wool per dollar of wages decreased from \$2.12 in 1939 to \$1.96 in 1957. Value added by manufacture per dollar of wages and per hour of labor in 1954 averaged greater for finishers of textiles than for manufacturers of yarns and fabrics. Value added per dollar of wages per hour of labor by finishers varied irregularly with size of the establishment as indicated by number of production workers (table 71). These values also varied irregularly from State to State and from one region to another (table 72).

Median profits to converters of cotton goods and those to converters of manmade fiber and silk goods, after reserves for Federal income and excess-profits taxes and for renegotiation in the case of war contracts, increased early in the war period (27). These profits to converters of cotton goods reached a high point of 4 percent of sales in 1946, then declined to less than 1 percent of sales in 1953, and amounted to 1.6 percent of sales in 1956 (23). Profits to converters of manmade fiber and silk goods increased to about 7.4 percent of sales in 1947, then declined, but data for recent years are not available.

TABLE 71.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for finishers of textiles, by number of productive workers, United States, 1954

Industry and size	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
Finishing textiles, except wool:	1,000			
Number of production workers:	dollars	Dollars	Dollars	Dollars
1,000 and over.....	68,044	1.94	2.85	1.47
500 to 999.....	118,442	2.05	3.27	1.60
250 to 499.....	96,239	2.04	3.26	1.60
100 to 249.....	97,184	1.98	3.26	1.65
50 to 99.....	42,821	2.09	3.50	1.67
20 to 49.....	24,840	2.13	3.53	1.66
10 to 19.....	9,233	2.22	3.75	1.69
5 to 9.....	3,790	2.06	3.42	1.66
1 to 4.....	3,572	4.07	5.88	1.44
Total or average.....	464,165	2.03	3.25	1.60
Finishing wool textiles:				
Number of production workers:				
250 and over.....	7,670	1.59	2.55	1.61
100 to 249.....	6,815	3.33	4.98	1.50
50 to 99.....	3,750	1.70	2.78	1.64
20 to 49.....	4,117	2.17	3.56	1.64
10 to 19.....	334	2.23	3.27	1.47
5 to 9.....	333	2.90	5.29	1.83
1 to 4.....	124	2.07	4.00	1.94
Total or average.....	23,143	2.05	3.27	1.60

Adapted from Census of Manufactures: 1954.

### Means and Importance of Improvement

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 and probably lower costs.

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 being employed to improve luster and other qualities of fine-grade fabrics. Efforts to develop a practicable and effective crease-resistant finish for piece goods, if successful, would immensely improve the appearance and

usefulness of the fabrics, particularly in the garment field. Specific suggestions to increase the efficiency and to reduce the costs of these services probably would need to be based on detailed data relating to costs.

TABLE 72.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate for finishers of textiles, by region and State, 1954

Industry, region, and State	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
Finishing textiles, except wool:	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
New England.....	130,424	2.03	3.45	1.70
Massachusetts.....	51,278	2.08	3.53	1.70
Rhode Island.....	49,796	1.90	3.24	1.70
Connecticut.....	24,720	2.25	3.94	1.75
Other.....	4,630	2.04	2.84	1.39
Middle Atlantic.....	151,152	1.94	3.46	1.78
New York.....	41,464	2.14	3.73	1.74
New Jersey.....	89,112	1.91	3.48	1.82
Pennsylvania.....	20,576	1.74	3.00	1.72
North Central.....	6,975	1.94	3.29	1.70
Illinois.....	2,593	2.00	3.11	1.56
Missouri.....	874	1.83	2.70	1.48
Other.....	3,503	1.91	3.64	1.90
South.....	171,449	2.11	2.93	1.39
North Carolina.....	36,884	2.15	2.54	1.32
South Carolina.....	79,556	2.14	3.09	1.44
Georgia.....	9,503	1.77	2.15	1.21
Other.....	45,506	2.13	2.98	1.40
West.....	4,165	2.79	4.65	1.67
United States.....	464,165	1.81	2.90	1.60
Finishing wool textiles:				
New England.....	4,850	1.83	2.97	1.62
Massachusetts.....	1,554	2.18	3.49	1.60
Other.....	3,296	1.70	2.77	1.63
Middle Atlantic.....	10,943	1.90	3.40	1.79
Pennsylvania.....	4,045	1.94	3.33	1.72
Other.....	6,898	1.88	3.44	1.83
All other divisions.....	7,350	2.54	3.31	1.30
United States.....	23,143	2.05	3.27	1.60

Adapted from Census of Manufactures: 1954.

Results of modernization since World War II indicate that some mills have cut unit labor costs in drying operations by 50 percent. Others have sharply reduced warehousing and materials-handling costs. Improved continuous bleaching methods save up to 50 percent in costs of materials. Automation in color control, coupled with continuous dyeing, improves quality and reduces costs (46).

## KNIT GOODS MANUFACTURING

The knit-goods manufacturing industry is composed of establishments primarily engaged in knitting textile products or in dyeing and finishing hosiery or other knitted products. These establishments consume yarns made from basic materials such as cotton, wool, rayon, acetate, silk, nylon, Orlon, or other synthetics, or mixtures of these fibers. Census data show that in 1954, for example, machine-knitting yarns accounted for about 312 million pounds of yarn, or about 7.7 percent of the total produced on the cotton and silk systems, and about 56 million pounds of woolen and worsted yarns, or about 14 percent of the total produced. In addition, machine-knitting yarns that year included about 54 million pounds of filament rayon and acetate yarn and substantial quantities of filament yarns made of nylon and related products.

Principal products of the knit-goods industry are hosiery, knit outerwear, knit underwear, knit fabrics, and knit gloves. In 1954, total value of the products of this industry was about \$2,157 million, of which about 44 percent was accounted for by hosiery, 25 percent by knit outerwear, 12 percent by knit underwear, 17 percent by knit fabrics, and about 2 percent by other products. Some indication of manufacturer outlets for these products may be obtained from data relating to hosiery. In 1954, hosiery valued at 51 percent of the total was shipped on direct orders from retailers, 28 percent was shipped to or on orders from wholesalers and distributors, 7 percent to other manufacturing companies and converters, and 14 percent was accounted for by interplant transfers, direct exports, and shipments to other customers.

### Nature, Practices, and Equipment

Knit-goods industries comprise (1) establishments primarily engaged in knitting products from yarn purchased or spun in the same establishment, and in dyeing and finishing hosiery and other knit products for their own account, referred to as manufacturers; (2) establishments primarily engaged in knitting or finishing hosiery and other knit products for the account of others, referred to as contractors; and (3) establishments that act as converters of hosiery and other knit products in that they purchase yarns or gray goods and employ contractors to process the materials for their account. Some establishments operate both as manufacturer and converter, or as both manufacturer and contractor.

Hosiery mills engage in knitting, dyeing, and finishing hosiery. The value of shipments of full-fashioned hosiery is not available, but the value of shipments of seamless hosiery mills in 1954 totaled \$429 million and represented 93 percent of seamless hosiery shipped by all industries. Finished products accounted for about 70 percent



of the value of full-fashioned hosiery and 92 percent of seamless hosiery shipped, according to census reports.

Knit outerwear mills comprise establishments primarily engaged in knitting outerwear, or in manufacturing outerwear from knit fabric produced in the same establishment. Important products in this industry include sweaters, bathing suits, dresses, and headwear. The value of shipments of knit outerwear mills in 1954 totaled \$544 million, and represented 65 percent of these products produced by all industries.

Knit underwear mills are engaged in knitting underwear and nightwear, or in manufacturing underwear and nightwear from knit fabric produced in the same establishment. The value of shipments of this industry in 1954 totaled \$256 million and represented 39 percent of these products produced by all industries. The corresponding coverage ratio in 1947 was 70 percent. This decrease of 31 percentage points in coverage ratio reflects the sharp increase in output of these products on a cut-and-sew basis from fabrics knit in other establishments.

Knit fabric mills are engaged mainly in knitting tubular or flat fabric, including warp-knit mosquito netting, and in dyeing or finishing knit fabrics. This industry includes knit fabric mills operated by multiplant companies which transfer the knit cloth produced to other plants of the same company for further fabrication into such products as knit underwear and gloves. The value of shipments of this industry in 1954 totaled \$377 million and represented 91 percent of these products shipped by all industries.

#### Size and Organization

Changes in size and organization of knit goods manufacturing industries may be indicated by the number of employees, ownership and operation of plants, and mergers and acquisitions.

*Number of Employees.*—Average size of establishments in the knit-goods manufacturing industry, as indicated by number of employees, has changed considerably in recent years, according to census reports. For hosiery mills, including both full-fashioned and seamless, average number of production workers per establishment decreased from 171 in 1939 to 82 in 1954. Similar averages for knit outerwear mills show a decrease from 32 in 1939 to 29 in 1947, and then an increase to 43 in 1954. Production workers per knit underwear mill increased from an average of 204 in 1939 to 236 in 1947, then decreased to 210 in 1954. Similar averages for knit fabric mills decreased from 67 in 1939 to 46 in 1947, then increased to 49 in 1954.

Within each segment of the knit goods industry, size of individual mills, as indicated by total number of employees, varied widely and the proportion in the various size groups changed considerably from 1947 to 1954 (tables 73 and 74). Proportions of the establishments with 500 or more employees decreased from 1947 to 1954 for all industry groups except seamless hosiery and knit outerwear mills, and proportions with 100 or more employees decreased during this period for all industry groups except knit outerwear mills. Proportions of the establishment with fewer than 10 employees increased from 1947 to 1954 for all industry groups except knit outerwear and knit fabric mills. Some decreases in number of employees may be accounted for by the use of more automatic machinery which requires fewer attendants.

TABLE 73.—Number of manufacturers of specified kinds of knit goods, by number of employees, United States, 1947 and 1954

Number of employees	Hosiery				Knit outerwear	
	Full-fashioned		Seamless		1947	1954
	1947	1954	1947	1954		
	Number	Number	Number	Number	Number	Number
500 and over.....	24	24	16	18	2	6
250 to 499.....	39	36	57	47	8	19
100 to 249.....	103	85	111	105	60	78
50 to 99.....	115	109	108	133	106	141
20 to 49.....	138	166	141	141	240	285
10 to 19.....	126	109	85	67	293	207
5 to 9.....	91	106	55	34	228	163
1 to 4.....	102	154	44	64	264	184
Total.....	738	789	617	609	1, 201	1, 083
Proportion of total						
	Percent	Percent	Percent	Percent	Percent	Percent
500 and over.....	3. 2	3. 1	2. 6	3. 0	0. 2	0. 6
250 to 499.....	5. 3	4. 6	9. 2	7. 7	. 6	1. 8
100 to 249.....	14. 0	10. 8	18. 0	17. 2	5. 0	7. 2
50 to 99.....	15. 6	13. 8	17. 5	21. 8	8. 8	13. 0
20 to 49.....	18. 7	21. 0	22. 9	23. 2	20. 0	26. 3
10 to 19.....	17. 1	13. 8	13. 8	11. 0	24. 4	19. 1
5 to 9.....	12. 3	13. 4	8. 9	5. 6	19. 0	15. 0
1 to 4.....	13. 8	19. 5	7. 1	10. 5	22. 0	17. 0
Total.....	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0

Adapted from Census of Manufactures: 1947 and 1954.

Geographic distribution of knit-goods mills shows that, in 1954, more than half of the full-fashioned hosiery, knit underwear, knit outerwear, and knit fabric mills were in Middle Atlantic States (table 75). More than three-fourths of the seamless hosiery mills and about 40 percent of the full-fashioned hosiery mills were in Southern and Western States. Average number of production workers per mill varied widely from one region to another. Changes from 1947 to 1954 show a substantial increase in number of hosiery mills in the South and West and smaller changes in other regions (table 75).

*Ownership and Operation.*—The proportions of full-fashioned hosiery mills that were under corporate ownership or control decreased from 80 percent in 1939 to 67 percent in 1954 (table 76). Proportions operated by partnerships and individuals increased substantially during the same period. The average number of employees per mill and the proportion of total employees for the industry that were accounted for by mills operated by corporations decreased. The proportion of the mills that were operated from central administrative offices as multiunits decreased markedly, but

the proportion of total employees in this industry that was accounted for by multiunits increased.

Of seamless hosiery mills, the proportion operated by corporations decreased from 70 percent in 1939 to 67 percent in 1954 (table 77). Similar proportions of the mills that were operated by partnerships increased, and the proportion under individual ownership remained about unchanged. Average number of employees per mill was much greater for those operated by corporations than for those operated by partnerships and by individual owners. Proportions of the mills that were operated from central administrative offices as multiunits and proportions of total employees of the industry that were accounted for by multiunits decreased.

The proportion of knit underwear mills that were under corporate ownership or control increased from 83 percent in 1939 to 89 percent in 1954 (table 78). The number operated by partnerships and by individual owners decreased. The proportion of the mills operated from central administrative offices as multiunits decreased, but the proportion of total employees accounted for by these multiunits increased.

TABLE 74.—Number of manufacturers of specified kinds of knit goods, by number of employees, United States, 1947 and 1954

Number of employees	Knit underwear		Knit fabrics		Other knit goods <sup>1</sup>	
	1947	1954	1947	1954	1947	1954
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
500 and over.....	19	13	6	2	3	-----
250 to 499.....	27	16	7	12	3	2
100 to 249.....	56	46	28	31	6	6
50 to 99.....	38	35	13	28	21	10
20 to 49.....	29	23	46	80	19	16
10 to 19.....	2	5	61	69	10	17
5 to 9.....	1	5	61	58	9	10
1 to 4.....	-----	6	86	60	19	14
Total.....	172	149	308	340	90	75
	Proportion of total					
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
500 and over.....	11.0	8.7	2.0	0.6	3.3	-----
250 to 499.....	15.7	10.7	2.3	3.5	3.3	2.7
100 to 249.....	32.5	30.9	9.1	9.1	6.7	8.0
50 to 99.....	22.1	23.5	4.2	8.2	23.4	13.3
20 to 49.....	16.9	15.4	14.9	23.5	21.1	21.3
10 to 19.....	1.2	3.4	19.8	20.3	11.1	22.7
5 to 9.....	.6	3.4	19.8	17.1	10.0	13.3
1 to 4.....	-----	4.0	27.9	17.7	21.1	18.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Includes knit glove and mitten mills and knitting mills not elsewhere classified.

Adapted from Census of Manufactures: 1947 and 1954.

TABLE 75.—Number of establishments and average number of production workers, manufacturers of knit goods, by industry and geographic division, 1947 and 1954

Industry and geographic division	Establishments		Average production workers	
	1947	1954	1947	1954
<b>Full-fashioned hosiery:</b>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
New England.....	11	9	119	121
Middle Atlantic.....	437	438	62	38
North Central.....	35	27	212	105
South.....	249	300	116	113
Pacific.....	6	15	64	25
United States.....	738	789	88	70
<b>Seamless hosiery:</b>				
New England.....	21	22	71	46
Middle Atlantic.....	103	86	72	57
North Central.....	27	21	128	131
South and West.....	466	480	105	106
United States.....	617	609	99	98
<b>Knit outerwear:</b>				
New England.....	56	53	54	69
Middle Atlantic.....	982	875	21	32
North Central.....	71	56	51	59
South.....	21	35	47	123
West.....	71	64	31	26
United States.....	1,201	1,083	25	38
<b>Knit underwear:</b>				
New England.....	15	10	183	71
Middle Atlantic.....	99	92	163	115
North Central.....	24	12	242	255
South and West.....	34	35	378	398
United States.....	172	149	218	190
<b>Knit fabric:</b>				
New England.....	39	41	37	58
Middle Atlantic.....	210	233	28	31
North Central.....	10	10	42	23
South and West.....	49	56	96	86
United States.....	308	340	41	43

Adapted from Census of Manufactures: 1947 and 1954.

*Mergers and Acquisitions.*—Mergers and acquisitions in the textile industry, as indicated previously (p. 75), apparently have resulted in changes in organization and management of operating units in the knit goods manufacturing industry. The degree of vertical integration of knitting mills, on an establishment basis, may be indicated by these facts: Some knitting mills manufacture the yarns used in knitting; hosiery mills knit, dye, and finish hosiery and sell a substantial proportion of the finished products to wholesalers and

retailers; knit outerwear and underwear mills knit outerwear, underwear, and nightwear and manufacture these garments from knit fabrics produced in the same establishment; and knit fabric mills are primarily engaged in knitting tubular or flat fabric and in dyeing or finishing knit fabric.

In 1954, seamless hosiery mills operated by 20 of the largest companies, or less than 4 percent of the total, accounted for 33 percent of the number of employees and 35 percent of the value of shipments of the industry. Proportions of total value of shipments accounted for by mills operated by 4, 8, and 20 of the largest companies increased considerably from 1947 to 1954. Primary product specialization of seamless hosiery mills is indicated by data showing that products regarded as primary accounted for 96 percent of the value of shipments in 1947 and 1954 (table 79).

Knit outerwear mills operated in 1954 by 20 of the largest companies, or less than 2 percent of the total, accounted for 21 percent of the employees and 20 percent of the value of shipments of the industry. Proportions of total value of shipments of knit outerwear mills that were accounted for by mills operated by 4, 8, and 20 of the largest companies decreased from 1947 to 1954. Primary product specialization in this industry increased from 91 percent in 1947 to 93 percent in 1954 (table 79).

TABLE 76.—Number of establishments and average number of employees per establishment, manufacturers of full-fashioned hosiery, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	402	531	231	105
Partnership.....	45	117	(?)	25
Individual.....	50	139	34	(?)
Other.....	2	2	(?)	(?)
All.....	499	789	195	76
Operation:				
Single unit:				
Corporate.....	242	404	161	53
Noncorporate.....	83	255	44	16
All.....	325	659	131	39
Multiuunit:				
Corporate.....	160	127	337	270
Noncorporate.....	14	3	46	124
All.....	174	130	314	266
All.....	499	789	195	76

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

TABLE 77.—Number of establishments and average number of employees per establishment for manufacturers of seamless hosiery, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	305	412	182	138
Partnership.....	52	85	58	43
Individual.....	76	109	42	25
Other.....	0	3	0	44
All.....	433	609	143	104
Operation:				
Single unit:				
Corporate.....	219	332	157	(?)
Noncorporate.....	121	195	49	(?)
All.....	340	527	118	84
Multiunit:				
Corporate.....	86	80	248	(?)
Noncorporate.....	7	2	48	(?)
All.....	93	82	233	232
All.....	433	609	143	104

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

Knit underwear mills operated in 1954 by 20 of the largest companies, or 14 percent of the total, accounted for 61 percent of the employees and 64 percent of the value of shipments of the industry. The proportions of total value of shipments of knit underwear mills that were accounted for by establishments operated by 4, 8, and 20 of the largest companies increased considerably from 1947 to 1954. Primary product specialization increased from 87 percent in 1947 to 88 percent in 1954 (table 79).

Knit fabric mills operated in 1954 by 20 of the largest companies, or about 6 percent of the total, accounted for 48 percent of the employees and 51 percent of the value of shipments of the industry. Proportions of total value of shipments of knit fabric mills that were accounted for by establishments operated by 4, 8, and 20 of the largest companies decreased from 1947 to 1954. Primary product specialization in this industry increased from 93 percent in 1947 to 94 percent in 1954 (table 79).

Of the 3,045 establishments primarily engaged in the manufacture of knit goods in 1954, about 2,967 were operated by companies primarily engaged in this industry and 78 were operated by companies primarily engaged in other industries (table 80). Single-unit companies accounted for about 88 percent of the number of establishments, 61 percent of the total number of employees, and 60 percent of the total value added by manufacture. About 4 percent of the estab-

lishments, or mills, operated by companies primarily engaged in the manufacture of knit goods were primarily engaged in other industries.

Size of establishment, as indicated by number of employees and by value added by manufacture, averaged about 5 times as great for those operated by multiunit companies as for those operated by single-unit companies (table 80). For establishments operated by multiunit companies primarily engaged in manufacturing knit goods, those operated by multi-industry companies, on the average, had 49 percent more employees and 77 percent more value added than those operated by single-industry companies.

#### Manufacturing Methods <sup>a</sup>

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 "stitches" are drawn through those already formed on the needles until the desired length of knit material has been attained. In knit 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,

TABLE 78.—Number of establishments and average number of employees per establishment for manufacturers of knit underwear mills, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	165	132	223	225
Partnership.....	14	11	( <sup>2</sup> )	107
Individual.....	19	6	39	55
Other.....	1	0	( <sup>2</sup> )	0
All.....	199	149	194	210
Operation:				
Single unit:				
Corporate.....	113	97	197	147
Noncorporate.....	30	17	54	89
All.....	143	114	167	139
Multiunit:				
Corporate.....	52	35	279	442
Noncorporate.....	4	0	39	0
All.....	56	35	262	442
All.....	199	149	194	210

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

<sup>a</sup> Credit is due Evelina K. Southworth, U. S. Tariff Commission, for contributions to this section.

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.

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

TABLE 79.—Share of employment and shipments of knit goods manufacturing industry accounted for by largest companies, United States, 1947 and 1954

Industry, measure, and year	Compan- ies <sup>1</sup>	Ship- ments <sup>2</sup> (1,000 dollars) or employ- ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup> —			Pri- mary prod- uct special- iza- tion <sup>5</sup>
			4 larg- est com- panies	8 larg- est com- panies	20 larg- est com- panies	
Seamless hosiery mills:						
Number of employees (1954).....	Number 566	Number 63,350	Per- cent 12	Per- cent 20	Per- cent 33	Per- cent 96
Value of shipments:						
1954.....	566	429,251	17	25	35	96
1947.....	565	327,007	13	19	32	96
Knit outerwear mills:						
Number of employees (1954).....	1,081	46,403	7	12	21	93
Value of shipments:						
1954.....	1,081	544,129	6	10	20	93
1947.....	1,196	330,474	8	13	24	91
Knit underwear mills:						
Number of employees (1954).....	140	31,262	28	41	61	88
Value of shipments:						
1954.....	140	259,290	26	40	64	88
1947.....	140	295,411	21	34	57	87
Knit fabric mills:						
Number of employees (1954).....	324	16,812	16	27	48	94
Value of shipments:						
1954.....	324	377,383	17	29	51	94
1947.....	297	197,454	27	37	56	93

<sup>1</sup> See footnote 1, table 21, p. 78.

<sup>2</sup> See footnote 2, table 21, p. 78.

<sup>3</sup> See footnote 3, table 21, p. 78.

<sup>4</sup> See footnote 4, table 21, p. 78.

<sup>5</sup> See footnote 5, table 21, p. 78.

Adapted from United States Senate report on Concentration in American Industry (113).



TABLE 80.—*Number of establishments, average employment, and average value added per dollar of payroll by knitting mills, by type of company, United States, 1954*

Item	Com- panies	Estab- lish- ments	Average employ- ment	Value added per dollar of payroll
Establishments of companies primarily engaged in this industry: <sup>1</sup>				
Establishments in this industry-----	Number	Number 2, 967	Number 69	Dollars 1. 55
Single-unit companies-----	2, 693	2, 693	50	1. 56
Multiunit companies-----	119	274	256	1. 52
Single-industry-----	71	158	220	1. 48
Multi-industry-----	48	116	306	1. 57
Establishments in other industries-----		133	95	
Total or average-----		3, 100	70	
Establishments in this industry operated by companies primarily engaged in other industries-----		78	202	1. 85
Total or average for all establishments classified in this industry-----		3, 045	73	1. 57

<sup>1</sup> In addition to the establishments shown, these companies had 71 central administrative offices, auxiliaries, sales branches, and sales offices.

Adapted from Bureau of Census report (86).

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-stick tubular instead of ribbed fabric.

As knit fabrics are made of one yarn 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 knit fabrics. A common practice in production of quality knit 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 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 knit 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 size. 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 36's 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 knit 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 to learn 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 (48). 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 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 yarns, especially combed yarns, averaged longer in staple than that used in other yarns. None of the combed yarns was made of cotton shorter than 1 inch, and about two-thirds of this yarn was made of cotton longer than  $1\frac{1}{8}$  inches. About a fifth of the carded yarns were made of cotton shorter than 1 inch, and small proportions were made of cotton longer than  $1\frac{1}{8}$  inches. A study of market outlets for cotton in knit goods showed 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 71 percent of the cotton used in the manufacture of combed knitting yarn was of staples  $1\frac{1}{2}$  inches and longer (48).

#### 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 circumference 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, and 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.

Total expenditures for plant and equipment by knitting mills increased from \$25 million in 1939 to \$85 million in 1947, and amounted to \$47 million in 1954 (table 81). Expenditures for new machinery and equipment increased from \$19 million in 1939 to \$65 million in 1947, and amounted to \$34 million in 1954. Expenditures for new plants increased from \$4 million in 1939 to \$17 million in 1947, and amounted to \$6 million in 1954.

### Charges or Costs Involved

Gross margins for knitting mills, or the spread between the value of the products and the costs of the materials, supplies, parts, and containers, have changed considerably over the years, according to census reports. For seamless hosiery mills, gross margins increased from an average of 54 percent of the value of the products in 1939 to 55 percent in 1947 and then decreased to 51 percent in 1954 (table 82). The proportions of these margins that were accounted for by wages decreased from about 56 percent in 1939 to 50 percent in 1947, and then increased to 54 percent in 1954. These changes in proportions of wages may be largely accounted for by offsetting changes in proportions for contract and commission work and for other expenses and profits, particularly in 1947.

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USDA TECHNICAL BULLETINS

UPDATA

CHANGES IN AMERICAN TEXTILE INDUSTRY - COMPETITION - STRUCTURE - FACILITIES

HOWELL, L. D.

OF 4

TABLE 81.—Total expenditures for plant and equipment by manufacturers of knit goods, by industry groups, United States, 1939, 1947, and 1954

Industry	Expenditures for—			
	Total	New equipment	New plant	All other <sup>1</sup>
1939:	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
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
1947:				
Hosiery:				
Full-fashioned.....	40,441	31,315	7,273	1,853
Seamless.....	17,604	13,637	3,485	482
Knit outerwear.....	6,059	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
1954:				
Hosiery:				
Full-fashioned.....	10,308	6,761	937	2,610
Seamless.....	14,868	11,259	1,727	1,882
Knit outerwear.....	10,878	8,842	1,011	1,025
Knit underwear.....	3,536	1,969	1,011	556
Knit fabrics.....	7,124	5,347	867	910
Other.....	308	172	79	57
Total.....	47,022	34,350	5,632	7,040

<sup>1</sup>Expenditures for used plant and equipment.

<sup>2</sup>Adapted from Census of Manufactures: 1939, 1947, and 1954.

Gross margins for knit outerwear mills increased from 50 percent of the value of the products in 1939 to 54 percent in 1947, and to 56 percent in 1954 (table 82). Proportions of these margins accounted for by wages decreased from 36 percent in 1939 to 33 percent in 1947, then increased to 34 percent in 1954. The relatively low and decreased proportions of gross margins for knit outerwear mills that were accounted for by wages may be explained, in part at least, by the relatively high and increased proportions accounted for by contract and commission work and by the large proportions accounted for by other expenses and profits.

For knit underwear mills, manufacturer's gross margins increased from 48 percent of the value of the products in 1939 to 49 percent in 1947, then decreased to 46 percent in 1954 (table 83). Propor-

tions of these margins accounted for by wages decreased from 51 percent in 1939 to 46 percent in 1947, then increased to 53 percent in 1954. Proportions accounted for by contract and commission work increased from 1939 to 1954, but the decreased proportions of gross margins accounted for by wages and salaries in 1947 may be accounted for mainly by the large proportion accounted for by other expenses and profits.

For knit-fabric mills, manufacturers' gross margins decreased from 40 percent of the value of the products in 1939 to 36 percent in 1954 (table 83). Proportions of these margins accounted for by wages decreased from 37 percent in 1939 to 33 percent in 1954. Proportions of gross margins accounted for by contract and commission work increased from about 5 percent in 1939 to 12 percent in 1954 and the proportions accounted for by other expenses and profits increased from 38 percent in 1939 to 45 percent in 1947, then decreased to 41 percent in 1954.

Proportions of the value of the products in 1954 that were accounted for by manufacturers' gross margins averaged somewhat greater for knitting mills with 90 percent or more of primary product specialization than for other mills not so highly specialized (table 84). For manufacturers of knit underwear, the proportion of the value of the products accounted for by wages averaged 48 percent for specialized mills and 63 percent for other mills. The difference may be attributed mainly to relatively large proportions of gross margins for specialized mills accounted for by contract and commission work and by other expenses and profits.

For manufacturers of knit gloves, wages accounted for 61 percent of gross margins for specialized mills and 56 percent for other mills. A large proportion of the gross margin for nonspecialized mills was accounted for by other expenses and profits. For manufacturers of other knit products not classified, wages accounted for 32 percent of gross margins for specialized mills and 47 percent for other mills. This difference is attributed mainly to the relatively large proportion of the gross margins for specialized mills that was accounted for by other expenses and profits (table 84).

Relative importance of items of cost to manufacturers varies considerably with the kind of hosiery produced. Data 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 yarns averaged 48 percent of total operating expenses for various kinds of hosiery, and ranged from about 36 percent for children's and infants' hosiery to 59 percent for cotton work socks, and to 64 percent for those made on Government contract (33). 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 infants' hosiery. The proportion 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.

TABLE 82.—*Values, costs, and margins of manufacturers of seamless hosiery and knit outerwear, United States, 1939, 1947, and 1954*

Item	Seamless hosiery			Knit outerwear		
	1939	1947	1954	1939	1947	1954
	<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.....	138,665	329,739	429,251	104,191	319,761	544,129
Cost of materials, etc. <sup>1</sup> .....	63,342	147,268	210,960	51,797	146,338	239,010
Gross margin.....	75,323	182,471	218,291	52,394	173,423	305,119
Salaries and wages.....	48,873	104,818	135,481	26,489	78,586	139,182
Salaries.....	7,011	13,699	18,026	7,773	20,974	34,692
Wages.....	41,862	91,119	117,455	18,716	57,612	104,490
Fuel.....	858	1,660	2,182	241	631	1,165
Purchased electric energy.....	881	1,137	1,901	550	981	5,401
Contract and commission work.....	1,494	11,610	11,730	6,292	32,626	66,855
Other <sup>2</sup> .....	23,217	63,246	66,997	18,822	60,599	92,516

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
Cost of materials, etc. <sup>1</sup> .....	45.7	44.7	49.1	49.7	45.8	43.9
Gross margin.....	54.3	55.3	50.9	50.3	54.2	56.1
Salaries and wages.....	35.3	31.8	31.6	25.4	24.6	25.6
Salaries.....	5.1	4.2	4.2	7.5	6.6	6.4
Wages.....	30.2	27.6	27.4	17.9	18.0	19.2
Fuel.....	.6	.5	.5	.2	.2	.2
Purchased electric energy.....	.6	.3	.5	.5	.3	1.0
Contract and commission work.....	1.1	3.5	2.7	6.1	10.2	12.3
Other <sup>2</sup> .....	16.7	19.2	15.6	18.1	18.9	17.0

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.



TABLE 83.—*Values, costs, and margins of manufacturers of knit underwear and knit fabric, United States, 1939, 1947, and 1954*

Item	Knit underwear			Knit fabric		
	1939	1947	1954	1939	1947	1954
	<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.....	113, 353	301, 615	256, 290	68, 663	210, 388	377, 383
Cost of materials, etc. <sup>1</sup> .....	59, 217	154, 774	137, 422	41, 480	127, 358	243, 081
Gross margin.....	54, 136	146, 841	118, 868	27, 183	83, 030	134, 302
Salaries and wages.....	36, 163	80, 520	77, 501	14, 043	38, 300	57, 878
Salaries.....	8, 758	12, 530	14, 406	3, 877	8, 511	13, 257
Wages.....	27, 405	67, 990	63, 095	10, 166	29, 789	44, 621
Fuel.....	847	1, 349	1, 182	721	1, 278	3, 051
Purchased electric energy.....	564	908	910	556	911	2, 015
Contract and commission work.....	987	6, 390	6, 185	1, 448	5, 026	16, 115
Other <sup>2</sup> .....	15, 575	57, 674	33, 090	10, 415	37, 515	55, 243

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, etc. <sup>1</sup> .....	52.2	51.3	53.6	60.4	60.5	64.4
Gross margin.....	47.8	48.7	46.4	39.6	39.5	35.6
Salaries and wages.....	31.9	26.7	30.2	20.4	18.2	15.3
Salaries.....	7.7	4.2	5.6	5.6	4.0	3.5
Wages.....	24.2	22.5	24.6	14.8	14.2	11.8
Fuel.....	.7	.5	.5	1.1	.6	.8
Purchased electric energy.....	.5	.3	.4	.8	.4	.5
Contract and commission work.....	.9	2.1	2.4	2.1	2.4	4.3
Other <sup>2</sup> .....	13.8	19.1	12.9	15.2	17.9	14.7

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rents, taxes, profits, and other expenses.

Adapted from Census of Manufactures, 1939, 1947, and 1954.

TABLE 84.—Values, costs, and margins for manufacturers of knit underwear, gloves, and knit products not elsewhere classified, by degree of specialization, United States, 1954

Item	Knit underwear		Knit gloves		Knitting NEC <sup>1</sup>	
	Specialized <sup>2</sup>	All other <sup>3</sup>	Specialized <sup>2</sup>	All other <sup>3</sup>	Specialized <sup>2</sup>	All other <sup>3</sup>
	<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.....	165,540	90,750	6,040	5,747	7,581	8,224
Cost of materials, etc. <sup>4</sup>	87,290	50,132	2,482	2,502	3,922	4,578
Gross margin.....	78,250	40,618	3,558	3,245	3,659	3,646
Salaries and wages.....	46,105	31,396	2,630	2,241	1,687	2,263
Salaries.....	8,650	5,756	469	436	537	567
Wages.....	37,455	25,640	2,161	1,805	1,150	1,696
Fuel.....	582	600	32	27	13	34
Purchased electric energy.....	518	392	30	16	28	33
Contract and commission work.....	5,389	796	439	67	54	84
Other <sup>5</sup> .....	25,656	7,434	427	894	1,87	1,232
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, etc. <sup>4</sup>	52.7	55.2	41.1	43.5	51.7	55.7
Gross margin.....	47.3	44.8	58.9	56.5	48.3	44.3
Salaries and wages.....	27.8	34.6	43.5	39.0	22.3	27.5
Salaries.....	5.2	6.3	7.7	7.6	7.1	6.9
Wages.....	22.6	28.3	35.8	31.4	15.2	20.6
Fuel.....	.4	.7	.5	.5	.2	.4
Purchased electric energy.....	.3	.4	.5	.3	.4	.4
Contract and commission work.....	3.3	.9	7.3	1.2	.7	1.0
Other <sup>6</sup> .....	15.5	8.2	7.1	15.5	24.7	15.0

<sup>1</sup> NEC means not elsewhere classified.

<sup>2</sup> Manufacturing establishments with 90 percent or more primary product specialization.

<sup>3</sup> Manufacturing establishments with less than 90 percent primary product specialization.

<sup>4</sup> Includes supplies, parts, and containers.

<sup>5</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1954.

Large proportions of gross margins for manufacturers of knit goods accounted for by wages and increases in wage rates in recent years emphasize the importance of labor in the manufacture of these products. Hourly earnings of labor in the textile industry in 1957 averaged 226 percent higher than in 1939, about 126 percent higher than 1947, and 30 percent higher than in 1954. Average value added by manufacture of seamless hosiery per dollar of wages paid in-

TABLE 85.—Total value added by manufacture, average value added per dollar of wages and per hour of labor, and average wage rate, for fabricators of knit goods, by number of production workers, United States, 1954

Industry and number of production workers	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
<b>Full-fashioned hosiery:</b>	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
500 and over.....	87,350	1.74	2.63	1.51
250 to 499.....	56,619	1.78	2.70	1.52
100 to 249.....	55,695	1.77	2.64	1.49
50 to 99.....	30,131	1.65	2.35	1.42
20 to 49.....	22,924	1.74	2.53	1.45
10 to 19.....	8,392	1.96	2.84	1.45
5 to 9.....	3,446	1.84	2.74	1.49
1 to 4.....	2,436	3.48	4.14	1.19
Total or average.....	266,993	1.76	2.62	1.49
<b>Seamless hosiery:</b>				
1,000 and over.....	27,661	1.92	2.55	1.33
500 to 999.....	26,305	1.48	1.66	1.12
250 to 499.....	50,980	1.73	1.92	1.11
100 to 249.....	50,383	1.68	1.83	1.09
50 to 99.....	27,757	1.74	1.79	1.03
20 to 49.....	14,227	1.81	1.90	1.05
10 to 19.....	3,745	2.52	2.57	1.02
5 to 9.....	894	2.64	2.53	.96
1 to 4.....	525	2.18	1.95	.90
Total or average.....	202,477	1.72	1.91	1.11
<b>Knit outerwear:</b>				
500 or more.....	18,926	2.05	2.61	1.28
250 to 499.....	26,363	1.83	2.29	1.25
100 to 249.....	54,869	1.97	2.72	1.38
50 to 99.....	52,994	2.35	3.40	1.45
20 to 49.....	46,163	2.21	3.18	1.44
10 to 19.....	18,386	2.85	3.96	1.39
5 to 9.....	8,843	3.86	5.46	1.41
1 to 4.....	5,158	6.95	8.40	1.21
Total or average.....	231,702	2.22	3.05	1.38

Adapted from Census of Manufactures: 1954.

creased from \$1.59 in 1939 to \$1.86 in 1957. Value added per dollar of wages by manufacture of knit outerwear decreased from \$2.43 in 1939 to \$2.18 in 1957. For knit underwear, value added by manufacture per dollar of wages increased from \$1.89 in 1939 to \$2.11 in 1957. For knit fabric mills, value added by manufacture increased from \$2.41 in 1939 to \$2.75 in 1957.

Value added by manufacture of knit goods per dollar of wages and per hour of labor, and average wage rate per hour, apparently vary irregularly with size of plant as indicated by number of production workers (table 85). Relatively high average value added per dollar of wages and per hour of labor by some of the smaller

establishments may be accounted for, at least in part, by larger proportions of active proprietors or partners of unincorporated firms among the smaller than among the larger establishments. In addition, wage rates per hour averaged lower for some of the smaller than for the larger establishments.

Value added by manufacture of knit goods per dollar of wages and per hour of labor, and wage rate per hour, also varied irregularly from one geographic region to another (table S6). Full-fashioned hosiery mills are concentrated mainly in Southern and Middle Atlantic States, but value added by manufacture per dollar of wages and per hour of labor averaged higher in the Pacific region, and wage rate per hour averaged lower in New England, than in any other region. Seamless hosiery mills are concentrated mainly in the South and West, but the value added per dollar of wages and per hour of labor averaged highest in the North Central region and wage rate per hour averaged lowest in the Southern and Western States. Knit underwear mills are concentrated mainly in Middle Atlantic States, but value added per dollar of wages and per hour of labor averaged higher in the West than in any other region. A large proportion of knit underwear mills are located in Middle Atlantic States, where the value added by manufacture per hour of labor and per dollar of wages averaged higher than for any other region. Value added by knit fabric mills per dollar of wages and per hour of labor, and wage rate per hour, averaged highest in North Central States, where a relatively small proportion of knit fabrics is produced.

Median profits<sup>9</sup> of hosiery manufacturers increased from 2.5 percent of net sales in 1939 to 6.6 percent in 1948, then decreased to 1.3 percent in 1954, and amounted to 1.7 percent in 1957. Median profits of manufacturers of knit underwear increased from 1.3 percent of net sales in 1939 to 5.3 percent in 1948, then decreased irregularly to 1.2 percent in 1957, according to reports of Dun and Bradstreet, Inc. (27, 23).

### Means and Importance of Improvement

The large part of manufacturers' gross margins 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 in 1957 were about three times as great as in 1939. 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 (110). That considerable improvements have been made 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 \$47,022,000 in 1954. Manufacturing efficiency may be increased through improvements in plant layout,

<sup>9</sup> 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.

TABLE 86.—Average value added by manufacture per dollar of wages and per hour of labor, and wage rate, for fabricators of knit goods, by industry and by geographic division, 1954

Industry and geographic division	Value added by manufacture			Wage rate per hour
	Total	Per dollar of wages	Per hour of labor	
	<i>1,000 dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Full-fashioned hosiery:				
New England.....	5,044	1.79	2.39	1.33
Middle Atlantic.....	78,798	1.75	2.60	1.49
North Central.....	18,543	2.31	3.49	1.51
Southern.....	161,329	1.71	2.54	1.49
Pacific.....	3,279	2.74	4.32	1.57
Total or average.....	266,993	1.76	2.62	1.49
Seamless hosiery:				
New England.....	4,261	1.94	2.30	1.19
Middle Atlantic.....	19,947	1.91	2.25	1.18
North Central.....	11,815	2.00	2.38	1.19
South and West.....	166,454	1.68	1.84	1.10
Total or average.....	202,477	1.72	1.91	1.11
Knit outerwear:				
New England.....	16,727	1.90	2.41	1.27
Middle Atlantic.....	171,222	2.29	3.30	1.44
North Central.....	18,865	2.31	3.07	1.33
South.....	13,352	1.65	1.72	1.04
West.....	11,536	2.52	3.60	1.43
Total or average.....	231,702	2.22	3.05	1.35
Knit underwear:				
New England.....	2,581	1.58	1.94	1.22
Middle Atlantic.....	42,287	1.87	2.27	1.21
North Central.....	12,107	1.47	2.12	1.44
South and West.....	53,616	1.75	2.10	1.20
Total or average.....	110,591	1.75	2.16	1.23
Knit fabric:				
New England.....	22,007	2.87	4.09	1.43
Middle Atlantic.....	59,380	2.48	3.93	1.59
North Central.....	2,452	3.11	5.34	1.72
South and West.....	29,283	2.40	3.04	1.27
Total or average.....	113,122	2.54	3.70	1.46

Adapted from Census of Manufactures: 1954.

in organization, and in operation, as well as through improved machinery and equipment. Information available is inadequate to indicate the most effective means of increasing efficiency and reducing costs for manufacturers of knit goods. Detailed data on costs for these manufacturers are needed for this purpose (94).

Introduction of high-speed machines has focused attention upon the need for research designed to develop yarns of the improved

knitting qualities 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.

Reports indicate that modernization of knitting mills can reduce labor costs by more than 60 percent in full-fashioned knitting, 50 percent in warp knitting, and 75 percent in sweater knitting (46). Other advantages of using modern equipment are wider style ranges that put mills in stronger competitive positions. A full-fashioned-hosiery mill, for example, added two 30-section 60-gage automatic machines in 1956 and increased production per knitter by more than 100 percent (46). A knit outerwear manufacturer increased the scope of his patterned knit fabrics with 32-feed pattern-wheel machines equipped with 4-color strippers at each feed, with the result that production per machine was increased 75 percent compared with the mill's former 16-feed machines (46). There are other instances of possibilities of improvement in this industry through modernization.

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 to consume the entire output of a spinning mill. Economies in the purchase of yarns would be favorable to such federations, but perhaps more important would be the advantages of greater efficiency in sales organizations. Increased sales might be expected to result from increased promotional advertising by such a 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 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 efficiency and of reducing costs of manufacturing knit goods are indicated by the fact that in 1954 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 mill products, the output of industries considered in earlier sections of this bulletin, may be grouped, on the basis of the uses made of them, into three main classes: Consumers' goods, industrial goods, and cutters' goods. The distinctions among them 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 all three groups. 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).

Mill products classed as 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, wash cloths, and diapers. In addition, many knit goods, such as hosiery and knit 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 products 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, which are the principal materials used in the manufacture of apparel and related products, are mainly finished fabrics. Industries making apparel and related products include establishments that produce clothing and related fabricated textile products by cutting and sewing purchased woven or knit textile fabrics and related materials such as leather, rubberized fabrics, plastics, and furs. Excluded from these industries are knitting mills primarily engaged in manufacturing apparel from yarns knitted in the same establishment; custom tailors and dressmakers, who manufacture and sell apparel in the same retail establishments; and establishments which are primarily wholesalers or dealers.

### Nature, Practices, and Equipment

Types of establishments which operate in apparel industries include regular factories or manufacturers, apparel jobbers, and contract factories or contractors. Manufacturers purchase fabrics, employ production workers in their own plants to cut and sew the materials into apparel, and sell the finished product, thus performing all the usual manufacturing functions within their own establishment. Jobbers mainly perform entrepreneurial functions of a manufacturing company, such as buying raw materials, designing and preparing samples, arranging for the manufacture of garments from their materials, and selling the finished apparel. The actual processing, such as cutting and sewing, usually is performed on contract by apparel contractors, although many jobbers perform cutting operations in their own establishments.



### Size and Organization

Changes in size and organization of manufacturers of fabricated products may be indicated by number of employees, ownership and operation of plants, and mergers and acquisitions.

*Number of Employees.*—Fabricators of apparel and related products range from large companies operating several establishments, as is common in the manufacture of men's shirts, to small family shops. Census reports show that in 1954 about 26.5 percent of the 31,372 establishments in the apparel and related products industry had fewer than 5 employees, and about 41 percent had fewer than 10 employees. In 1947, about 24 percent of the establishments had fewer than 5 employees, and about 40 percent had fewer than 10. The proportion of the establishments in 1954 that had less than 20 employees ranged from 15.4 percent for manufacturers of work shirts to 82 percent for manufacturers of neckwear and scarfs (table 87). Proportions with 100 or more employees ranged from less than 1 percent for manufacturers of neckwear and scarfs to about 44 percent for manufacturers of work shirts.

A large proportion of establishments primarily engaged in the manufacture of apparel and related products are in Middle Atlantic States. Census reports for 1954 show that about 55 percent of the manufacturers of men's and boys' wear; more than three-fourths of the manufacturers of women's, misses', and children's wear; about 44 percent of the manufacturers of other fabricated textile products; and about two-thirds of all manufacturers of apparel and related products are in these States (table 88). Smaller proportions are located in New England, North Central, Southern, and other States. Changes from 1947 to 1954 varied considerably from one industry to another, but for all apparel industries combined, the proportions of the establishments in New England, Middle Atlantic, and North Central States decreased and the proportions in Southern and other States increased.

*Ownership and Operation.*—Data relating to type of ownership or control of companies making apparel and related products show that the proportion of the establishments that were operated by corporations increased from about 45 percent in 1939 and 1947 to almost 53 percent in 1954 (table 89). Proportions operated by partnerships increased from about 23 percent in 1939 to 29 percent in 1947, then decreased to 21 percent in 1954. Proportions operated by individuals decreased from about 31 percent in 1939 to 26 percent in 1947 and 1954. Average number of production workers per establishment, and average value added by manufacture per production worker, usually were greater for establishments operated by corporations than for those operated by others.

Proportions of the establishments that were operated from central administrative offices as multiunits decreased from about 9 percent in 1939 to 6 percent in 1954 (table 89). Multiunits had, on the average, about 5 times as many production workers per establishment in 1939, and 6 times as many in 1954, as single units. The proportions of total production workers in the industry that were accounted for by multiunits decreased from 32 percent in 1939 to 28 percent in 1954. Value added by manufacture per production worker averaged more for single units than for multiunits. This difference may be accounted for, at least in part, by relatively more active

TABLE 87.—*Proportion of apparel fabricating establishments employing specified numbers of wage earners, by industry, United States, 1954*

Industry	Establishments	Proportion of establishments with—		
		1-19 employees	20-99 employees	100 or more employees
<b>Men's and boy's wear:</b>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Suits and coats.....	1,310	47.6	30.7	21.7
Dress shirts and nightwear.....	971	30.4	34.5	35.1
Underwear.....	82	26.8	35.4	37.8
Neckwear.....	403	68.5	27.8	3.7
Cloth hats and caps.....	415	73.3	24.3	2.4
Separate trousers.....	798	48.6	32.0	19.4
Work shirts.....	52	15.4	40.4	44.2
Other clothing.....	1,117	35.4	39.5	25.1
<b>Total.....</b>	<b>5,148</b>	<b>44.9</b>	<b>32.9</b>	<b>22.2</b>
<b>Women's and misses' outerwear:</b>				
Blouses.....	1,245	43.9	50.4	5.8
Dresses, unit price.....	4,114	39.2	56.3	4.5
Dresses, dozen price.....	892	40.3	42.9	16.8
Suits, coats, skirts.....	3,204	53.9	41.6	4.5
Neckwear and scarfs.....	133	82.0	17.3	.7
Other outerwear.....	710	50.4	43.8	5.8
<b>Total.....</b>	<b>10,298</b>	<b>45.7</b>	<b>48.5</b>	<b>5.8</b>
<b>Women's and children's wear:</b>				
Underwear.....	1,352	43.3	43.4	13.3
Corsets and allied garments.....	491	34.8	39.7	25.5
Children's dresses.....	764	42.1	49.0	8.9
Children's coats.....	407	47.4	45.2	7.4
Other children's outerwear.....	812	51.5	40.1	8.4
<b>Total.....</b>	<b>3,826</b>	<b>44.1</b>	<b>43.6</b>	<b>12.3</b>
<b>Miscellaneous products:</b>				
Fabric and combination dress gloves.....	110	54.5	35.5	10.0
Fabric and combination work gloves.....	130	26.2	52.3	21.5
Robes and dressing gowns.....	328	52.1	40.6	7.3
Waterproof outer garments.....	294	47.6	43.2	9.2
Handkerchiefs.....	100	56.0	36.0	8.0
Curtains and draperies.....	716	74.6	21.9	3.5
Other house furnishings.....	1,213	70.2	23.6	6.2
Textile bags.....	268	54.8	30.5	14.6
<b>Total.....</b>	<b>3,159</b>	<b>63.1</b>	<b>29.4</b>	<b>7.5</b>
<b>Grand total.....</b>	<b>22,431</b>	<b>47.7</b>	<b>41.4</b>	<b>10.9</b>

Adapted from Census of Manufactures: 1954.

TABLE 88.—Proportion of apparel fabricating establishments, by geographic division and by industry, United States, 1954

Industry	Estab-lish-ments	New Eng-land	Middle Atlantic	North Central	South-ern	All other
Men's and boys' wear:	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Suits and coats.....	1,310	7.9	80.8	13.7	17.6	(4)
Dress shirts, night- wear.....	971	5.0	49.2	6.9	27.6	11.3
Underwear.....	403	8.4	64.5	10.9	6.0	10.2
Separate trousers.....	798	6.8	49.2	16.0	20.1	7.9
Total.....	3,482	6.9	55.4	12.0	19.6	6.1
Women's and misses' outerwear:						
Blouses.....	1,245	4.8	76.3	3.2	4.5	11.2
Dresses, unit price.....	4,114	5.7	78.5	5.4	3.2	7.2
Dresses, dozen price.....	892	7.4	47.4	22.9	14.1	8.2
Suits, coats, skirts.....	3,204	6.6	74.2	6.2	3.0	10.0
Total.....	9,455	6.1	73.8	7.0	4.3	8.8
Women's and children's wear:						
Underwear.....	1,352	5.8	74.8	6.0	9.9	3.5
Corsets and allied garments.....	491	8.6	62.9	9.7	8.6	10.2
Children's dresses.....	764	3.3	71.7	4.2	11.1	9.7
Children's coats.....	407	3.4	86.2	3.0	2.0	5.4
Other children's outerwear.....	812	5.2	70.2	7.1	10.5	7.0
Fur goods.....	1,972	.8	90.8	5.0	.3	3.1
Total.....	5,798	3.7	79.0	5.7	6.2	5.4
Other fabricated tex- tile products:						
Robes and dressing gowns.....	328	7.6	79.3	5.2	5.8	2.1
Waterproof outer garments.....	294	15.3	63.6	12.3	3.4	5.4
Leather and sheep- skin-lined clothing.....	153	15.0	38.6	17.6	3.3	25.5
Curtains and dra- peries.....	716	10.8	42.4	20.3	7.4	19.1
Other house fur- nishings.....	1,213	6.3	50.9	16.2	18.5	8.1
Textile bags.....	268	7.1	33.6	25.4	25.0	8.9
Canvas products.....	1,119	9.2	25.7	32.5	20.2	12.4
Total.....	4,091	9.0	44.1	20.9	14.8	11.2
Grand total.....	22,826	6.1	67.0	9.9	9.0	8.0

<sup>1</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1954.

TABLE 89.—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, 1947, and 1954

Type of ownership and operation	Establishments			Average production workers per establishment			Average value added per production worker		
	1939	1947	1954	1939	1947	1954	1939	1947	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Corporate.....	9, 065	14, 031	16, 559	56	48	48	1, 915	4, 779	5, 652
Partnership.....	4, 777	8, 941	6, 569	26	22	24	1, 839	4, 406	4, 639
Individual.....	6, 322	7, 913	8, 158	18	13	13	1, 500	3, 461	3, 609
Other.....	42	75	86	33	29	29	1, 681	4, 692	5, 826
All.....	20, 206	30, 960	31, 372	37	31	34	1, 838	4, 567	4, 811
Operation:									
Single unit:									
Corporate.....	7, 634	12, 362	14, 772	39	36	35	2, 119	5, 224	5, 144
Noncorporate.....	10, 762	16, 527	14, 662	20	17	18	1, 708	4, 139	4, 242
All.....	18, 396	28, 889	29, 434	28	25	26	1, 949	4, 805	4, 842
Multunit:									
Corporate.....	1, 431	1, 669	1, 787	148	139	162	1, 623	3, 932	4, 750
Noncorporate.....	379	402	151	74	49	77	1, 432	3, 349	4, 285
All.....	1, 810	2, 071	1, 938	132	122	155	1, 601	3, 887	4, 732
All.....	20, 206	30, 960	31, 372	37	31	34	1, 838	4, 567	4, 811

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 90.—Number of establishments and average number of employees per establishment of manufacturers of men's and boys' coats and suits, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	1, 029	826	96	124
Partnership.....	649	249	32	46
Individual.....	762	235	22	21
Other.....	9	0	50	0
All.....	2, 449	1, 310	56	91
Operation:				
Single unit:				
Corporate.....	888	695	68	79
Noncorporate.....	1, 389	478	26	34
All.....	2, 277	1, 173	42	61
Multiunit:				
Corporate.....	141	131	275	362
Noncorporate.....	31	6	71	90
All.....	172	137	238	350
All.....	2, 449	1, 310	56	91

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

Adapted from Census of Manufactures: 1939 and 1954.

proprietors of unincorporated businesses in establishments operated as single units than in those operated as multiunits.

Data for manufacturers of men's and boys' coats and suits show that the proportion of the establishments that were operated by corporations increased from about 42 percent in 1939 to 63 percent in 1954, along with substantial decreases in total number of establishments (table 90). The number of employees per establishment averaged substantially greater for establishments operated by corporations than for those operated by partnerships and by individuals. Proportions of the establishments that were operated from central administrative offices as multiunits increased from about 7 percent in 1939 to 10 percent in 1954. The proportion of total employees accounted for by multiunits increased from about 30 percent in 1939 to 40 percent in 1954.

For manufacturers of men's dress shirts and nightwear, the proportion of establishments that were operated by corporations increased from about 63 percent in 1939 to 77 percent in 1954 (table 91). An increase of about 65 percent in number of establishments from 1939 to 1954 was accompanied by a substantial decrease in average number of employees per establishment. Proportions of the establishments that were operated from central administrative offices as multiunits decreased from about 39 percent in 1939 to 24 percent

TABLE 91.—*Number of establishments and average number of employees per establishment of manufacturers of men's dress shirts and night-wear, by type of ownership and operation, United States, 1939 and 1954*

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	371	746	155	129
Partnership.....	93	124	(?)	70
Individual.....	125	100	48	(?)
Other.....	1	1	(?)	(?)
All.....	590	971	119	112
Operation:				
Single unit:				
Corporate.....	186	523	83	79
Noncorporate.....	175	217	46	49
All.....	361	740	65	71
Multunit:				
Corporate.....	185	223	227	245
Noncorporate.....	44	8	112	173
All.....	229	231	205	242
All.....	590	971	119	112

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

in 1954. The proportions of total number of employees in the industry that were accounted for by multiunits decreased from 67 percent in 1939 to 51 percent in 1954.

Data for manufacturers of dresses show that the proportions of the establishments that were operated by corporations increased from about 45 percent in 1939 to 54 percent in 1954, along with an increase of about 37 percent in total number of establishments in this industry (table 92). The proportion accounted for by establishments operated by partnerships remained about unchanged at 21 percent, and the proportion accounted for by establishments operated by private individuals decreased markedly. Proportions of the establishments in this industry that were operated from central administrative offices as multiunits decreased from about 7 percent in 1939 to 5 percent in 1954. The number of employees per establishment averaged much greater for multiunits than for single units, but the proportion of total employees in the industry accounted for by multiunits decreased from about 17 percent in 1939 to 15 percent in 1954.

In the manufacture of women's and children's underwear, the proportion of the establishments that were owned or controlled by corporations increased from about 47 percent in 1939 to 63 percent in 1954, and the total number of establishments in this industry more

TABLE 92.—Number of establishments and average number of employees per establishment of manufacturers of unit- and dozen-price dresses, by type of ownership and operation, United States, 1939 and 1954

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	1, 656	2, 701	50	48
Partnership.....	785	1, 040	( <sup>2</sup> )	35
Individual.....	1, 210	1, 252	26	24
Other.....	7	13	( <sup>2</sup> )	52
All.....	3, 658	5, 006	39	40
Operation:				
Single unit:				
Corporate.....	1, 470	2, 491	43	42
Noncorporate.....	1, 953	2, 276	29	29
All.....	3, 423	4, 767	35	35
Multiunit:				
Corporate.....	186	210	109	130
Noncorporate.....	49	29	71	65
All.....	235	239	101	122
All.....	3, 658	5, 006	39	40

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

than doubled during this period (table 93). The proportions operated by partnerships remained about unchanged at 20 percent, and the proportions operated by private individuals decreased markedly. Proportions of the establishments in this industry that were operated from central administrative offices as multiunits decreased from about 17 percent in 1939 to 11 percent in 1954. The number of employees per establishment averaged substantially greater for multiunits than for single units, and the proportion of total employees in the industry accounted for by multiunits decreased from about 41 percent in 1939 to 28 percent in 1954.

*Mergers and Acquisitions.*—Mergers and acquisitions in the textile industry, as indicated earlier in this report (p. 75), may have resulted in changes in organization and management of operating units in industries making apparel and related products. Degree of vertical integration of manufacturers of apparel and related products, on an establishment basis, is indicated by census data showing that in 1954 sales through sales branches and sales offices owned by manufacturers accounted for about one-fifth of the value of the apparel and related products manufactured. More than 70 percent of sales of these sales branches and offices were to retailers and more than one-fifth were to wholesale organizations. Merchandise agents and brokers, primarily engaged in marketing merchandise at whole-

TABLE 93.—*Number of establishments and average number of employees per establishment of manufacturers of women's and children's underwear, by type of ownership and operation, United States, 1939 and 1954*

Type of ownership and operation	Establishments		Average employees per establishment <sup>1</sup>	
	1939	1954	1939	1954
Ownership or control:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Corporate.....	325	854	83	69
Partnership.....	139	254	( <sup>2</sup> )	37
Independent.....	220	237	20	20
Other.....	1	7	( <sup>2</sup> )	58
All.....	685	352	56	54
Operation:				
Single unit:				
Corporate.....	238	713	60	52
Noncorporate.....	332	485	25	28
All.....	570	1,198	40	42
Multiunit:				
Corporate.....	87	141	146	155
Noncorporate.....	28	13	104	67
All.....	115	154	136	148
All.....	685	1,352	56	54

<sup>1</sup> In 1939 only wage earners and in 1954 all employees are included.

<sup>2</sup> Withheld to avoid disclosing figures for individual companies.

Adapted from Census of Manufactures: 1939 and 1954.

sale for others, accounted for the sale of more than two-fifths of the total, and more than three-fourths of their sales were made to retailers.

Census data relating to manufacturers' sales branches and offices for 1954 are not strictly comparable with those for 1948, but these data indicate that proportions of total sales of apparel and related products that were accounted for by manufacturers' sales branches and offices did not change much from 1948 to 1954. The proportions of these sales that were made to retailers decreased from about 86 percent in 1948 to 72 percent in 1954. Proportions of total sales of these products that were made through agents and brokers increased from about 45 percent in 1948 to 47 percent in 1954. Proportions of sales of these agents and brokers that were made to retailers decreased from about 84 percent in 1948 to 79 percent in 1954.

Degree of horizontal integration of manufacturers of apparel and related products, on a company basis, may be indicated by the proportion of total employees and of total value of shipments accounted for by specified numbers of the largest companies in these industries (table 94). These data show a wide range in number of companies per industry and in proportions of total employees and of total sales accounted for by 4, 8, and 20 of the largest companies. In



1954, establishments operated by 20 of the largest companies engaged in manufacturing unit-price dresses, or 0.5 percent of the total, accounted for 6 percent of the number of employees and 12 percent of the value of shipments of the industry. At the other extreme, establishments operated by 20 of the largest companies engaged in the manufacture of work shirts, or about 46 percent of the total, accounted for 85 percent of the number of employees and 88 percent of the value of shipments of the industry. Proportions for other industries engaged in the manufacture of apparel and related products fall within this range.

Changes from 1947 to 1954 in proportions of total value of shipments accounted for by establishments operated by 4, 8, and 20 of the largest companies vary considerably from one industry to another. Proportions of total shipments accounted for by 20 of the largest companies increased for 9 industries with total sales in 1954 of about \$4,968 million, decreased for 9 industries with total sales in 1954 of about \$2,500 million, and remained unchanged for 2 industries with total sales in 1954 of about \$168 million. Primary product specialization, as indicated by the proportion of the value of shipments accounted for by products regarded as primary to the industry, ranged from 82 percent for the women's outerwear industry to 98 percent for the handkerchief and men's and boys' neckwear industries. From 1947 to 1954, primary product specialization increased in 10 industries, decreased in 7 industries, and remained unchanged in 3 industries (table 94).

Census data for manufacturers of clothing, by companies, show that of the 5,320 establishments primarily engaged in the manufacture of men's and boys' clothing in 1954, about 5,242 were operated by companies primarily engaged in this industry and 85 were operated by companies primarily engaged in other industries (table 95). Single-unit companies accounted for about 86 percent of the number of establishments, 58 percent of the total number of employees, and 48 percent of the value added by manufacture. Of the 14,124 establishments primarily engaged in the manufacture of women's and children's clothing, except millinery and fur goods, 14,040 were operated by companies primarily engaged in this industry and 84 were operated by companies primarily engaged in other industries (table 95). Single-unit companies accounted for about 95 percent of the number of establishments, 81 percent of the total number of employees, and 80 percent of the total value added by manufacture. About 9 percent of the establishments operated by companies primarily engaged in the manufacture of men's and boys' clothing, and 2 percent of the establishments operated by companies primarily engaged in the manufacture of women's and children's clothing were primarily engaged in other industries.

#### Manufacturing Methods <sup>10</sup>

Methods employed in fabricating textile products vary with the nature of these products. Methods employed in the manufacture of men's dress (business) shirts are outlined here briefly, for illustrative purposes. The processes involved include: (1) Cutting the

<sup>10</sup> Based mainly on reports of Bureau of Labor Statistics relating to Man-Hours Expended per Dozen Men's Dress Shirts, 1939 to 1947 (91), and Productivity of Labor in Cotton-Garment Industry (72). See also Production Team Report on Men's Clothing by Anglo-American Council on Productivity (3).

TABLE 94.—Share of employment and shipments of the apparel and other fabricated products industry accounted for by largest companies, United States, 1947 and 1954

Industry, measure, and year	Com- pa- nies <sup>1</sup>	Ship- ments <sup>2</sup> (1,000 dollars) or employ- ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by—			Pri- mary prod- uct spe- cializa- tion <sup>5</sup>
			4 larg- est com- panies	8 larg- est com- panies	20 larg- est com- panies	
Men's, boys' suits, coats:						
Number of employees (1954).....	Number 1, 255	Number 119, 001	Per- cent 11	Per- cent 18	Per- cent 31	Per- cent 91
Value of shipments:						
1954.....	1, 255	1, 140, 731	11	18	31	91
1947.....	1, 761	1, 412, 782	9	15	26	92
Men's dress shirts, night- wear:						
Number of employees (1954).....	838	108, 304	14	22	34	90
Value of shipments:						
1954.....	838	893, 980	17	26	40	90
1947.....	922	731, 277	19	29	43	94
Men's, boys' underwear:						
Number of employees (1954).....	72	9, 385	33	45	72	88
Value of shipments:						
1954.....	72	74, 324	43	56	85	88
1947.....	94	49, 753	47	59	80	95
Men's, boys' neckwear:						
Number of employees (1954).....	403	94, 838	15	22	36	98
Value of shipments:						
1954.....	403	100, 036	16	24	41	98
1947.....	408	113, 688	20	29	46	97
Separate trousers:						
Number of employees (1954).....	768	51, 652	9	14	26	89
Value of shipments:						
1954.....	768	397, 685	12	19	33	89
1947.....	956	334, 039	12	18	29	86
Work shirts:						
Number of employees (1954).....	43	6, 992	46	59	85	97
Value of shipments:						
1954.....	43	38, 300	54	68	88	97
1947.....	60	95, 378	52	68	88	77
Women's suits, coats, skirts:						
Number of employees (1954).....	3, 178	96, 022	4	6	11	94
Value of shipments:						
1954.....	3, 178	1, 261, 320	3	6	11	94
1947.....	( <sup>e</sup> )	( <sup>e</sup> )	( <sup>e</sup> )	( <sup>e</sup> )	( <sup>e</sup> )	( <sup>e</sup> )
Blouses:						
Number of employees (1954).....	1, 233	42, 980	4	7	12	93
Value of shipments:						
1954.....	1, 233	375, 262	11	16	25	93
1947.....	1, 356	276, 575	7	11	20	93

See footnotes at end of table.

TABLE 94.—Share of employment and shipments of the apparel and other fabricated products industry accounted for by largest companies, United States, 1947 and 1954—Continued

Industry, measure, and year	Com- pan- ies <sup>1</sup>	Ship- ments <sup>2</sup> (1,000 dollars) or employ- ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup> —			Pri- mary prod- uct speci- aliza- tion <sup>5</sup>
			4 larg- est com- pan- ies	8 larg- est com- pan- ies	20 larg- est com- pan- ies	
Dresses, dozen price:						
Number of employees (1954)-----	808	54,507	10	16	29	94
Value of shipments:						
1954-----	808	435,216	12	19	34	94
1947-----	828	348,785	13	21	35	89
Dresses, unit price:						
Number of employees (1954)-----	4,072	143,278	2	3	6	96
Value of shipments:						
1954-----	4,072	1,455,080	4	7	12	96
1947-----	4,165	1,359,030	3	5	9	95
Women's neckwear, scarfs:						
Number of employees (1954)-----	133	1,745	21	33	53	95
Value of shipments:						
1954-----	133	26,297	48	58	73	95
1947-----	166	51,061	46	57	76	96
Women's outerwear NEC <sup>7</sup>						
Number of employees (1954)-----	699	25,361	11	18	29	82
Value of shipments:						
1954-----	699	252,074	16	25	38	82
1947-----	466	97,203	11	18	32	70
Women's, children's underwear:						
Number of employees (1954)-----	1,276	73,427	8	13	23	95
Value of shipments:						
1954-----	1,276	770,026	8	13	24	95
1947-----	1,467	575,679	6	11	19	95
Corsets, allied garments:						
Number of employees (1954)-----	424	38,807	20	31	47	96
Value of shipments:						
1954-----	424	394,808	26	38	75	96
1947-----	493	277,791	16	30	47	94
Children's dresses:						
Number of employees (1954)-----	736	32,525	12	17	26	95
Value of shipments:						
1954-----	736	291,499	13	20	32	95
1947-----	627	174,827	15	22	37	93
Robes, dressing gowns:						
Number of employees (1954)-----	322	10,957	12	20	37	93
Value of shipments:						
1954-----	322	107,964	15	25	45	93
1947-----	370	103,024	10	19	38	89

See footnotes at end of table.

TABLE 94.—Share of employment and shipments of the apparel and other fabricated products industry accounted for by largest companies, United States, 1947 and 1954—Continued

Industry, measure, and year	Com- pa- nies <sup>1</sup>	Ship- ments <sup>2</sup> (1,000 dollars) or employ- ment <sup>3</sup>	Concentration ratio: Proportion of total accounted for by <sup>4</sup> —			Pri- mary prod- uct spe- cializa- tion <sup>5</sup>
			4 larg- est com- pa- nies	8 larg- est com- pa- nies	20 larg- est com- pa- nies	
Waterproof outer gar- ments:						
Number of employees (1954)-----	Num- ber 291	Num- ber 12, 872	Per- cent 21	Per- cent 32	Per- cent 47	Per- cent 89
Value of shipments:						
1954-----	291	119, 660	20	30	50	89
1947-----	245	80, 751	23	37	55	85
Handkerchiefs:						
Number of employees (1954)-----	100	3, 513	22	37	61	98
Value of shipments:						
1954-----	100	40, 261	26	42	68	98
1947-----	158	53, 106	21	36	59	98
Curtains, draperies:						
Number of employees (1954)-----	697	13, 988	15	21	33	94
Value of shipments:						
1954-----	697	172, 668	20	28	42	94
1947-----	379	109, 640	18	29	49	97
Textile bags:						
Number of employees (1954)-----	235	12, 109	45	53	64	84
Value of shipments:						
1954-----	235	220, 978	45	56	70	84
1947-----	198	355, 981	53	63	77	93
Canvas products:						
Number of employees (1954)-----	1, 100	13, 540	13	19	29	89
Value of shipments:						
1954-----	1, 100	129, 611	14	19	31	89
1947-----	889	91, 108	10	17	31	91

<sup>1</sup> See footnote 1, table 21, p. 78.

<sup>2</sup> See footnote 2, table 21, p. 78.

<sup>3</sup> See footnote 3, table 21, p. 78.

<sup>4</sup> See footnote 4, table 21, p. 78.

<sup>5</sup> See footnote 5, table 21, p. 78.

<sup>6</sup> Comparable data not available, due to significant revisions in 1947 classification of plants or products in this industry.

<sup>7</sup> NEC means "not elsewhere classified."

Adapted from United States Senate report on Concentration in American Industry (115).

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 (91). Fully integrated shirt plants usually are organized into four departments on the basis of these processes 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 wide and range from 100 to 200 feet long. 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 or 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 highgrade 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 with hand knives, with die stamping machines which cut up to 60-ply lays, or with small rapid-action "clicker" presses which handle up to 25-ply lays.

The lot number, size, type, and other identifying marks are customarily stamped on the shirt parts, after they are cut, with either power-driven or hand-operated machines. In plants that use the bundle system for all or part 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, and then taken by hand cart 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, linings (when used) are sewed together, linings are sewed in, buttonholes are 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 those for 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 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 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 alined 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. 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 carefully 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 idleness enforced 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 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 such employees can be assigned to and can gain experience in the area of production that uses 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 per-



forming 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.

In the simplest and most 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, except 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 the 1950's, 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 has 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, 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 reached high levels. Many machines are designed especially for one type of operation. Typical examples are devices for sewing on buttons, making buttonholes, attaching labels, and for making center pleats. In addition, many special attachments are used on standard production machines, adapting 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 operations to make adjustments in the position of the cloth means 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 much less than changes in methods of handling and positioning the cloth and improvements in the moving of work from one operator to another.

No revolutionary changes in machinery and equipment in the sewing department occurred in the early 1950's, but a number of mechanical improvements have been widely adopted in the industry. Use of the 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 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 the arrangement of machines more flexible.

Relatively few changes in pressing and boxing equipment were made during the early 1950's. 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 layout 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 million in 1939 to almost \$90 million in 1947 and in 1954 (table 96). Most of the increases in expenditures were for new equipment, but substantial increases were made in expenditures for new plants. Expenditures by manufacturers of apparel and related products in 1956 for new plant and equipment totaled \$88 million, of which \$69 million were for new machinery and equipment and \$19 million were for new structures and additions to plants.

### Charges or Costs Involved

Gross margins for manufacturers of apparel and related products, or the spread between costs of materials, supplies, parts, and containers used and the value of the products manufactured, vary with the kinds of materials used and the products fabricated, from one establishment or industry to another, and from one time to another. Census reports show that, for apparel and related products as a whole, manufacturers' gross margins increased from about 50 percent of the value of the products in 1939 to 54 percent in 1947 and to 55 percent in 1954 (table 97). Proportions of gross margins that were accounted for by wages and salaries decreased from 52 percent in 1939 to 44 percent in 1947, then increased to 49 percent in 1954. Corresponding proportions for wages alone decreased from 40 percent in 1939 to 35 percent in 1947, then increased to about 39 percent in 1954.

Decreases in proportions of gross margins from 1939 to 1947 that were accounted for by wages were associated with an increase from 8 percent in 1939 to 11 percent in 1947 in proportions of these margins that were accounted for by contract and commission work. They were associated also with an increase from 15 percent in 1939 to 19 percent in 1947 in proportions accounted for by other items, including depreciation, interest, insurance, rent, taxes, and profits.

TABLE 96.—Total expenditures for plant and equipment by manufacturers of apparel and related products, by industry, United States, 1947 and 1954

Industry	Expenditures for—			
	Total	New equipment	New plant	All other <sup>1</sup>
1947:	1,000	1,000	1,000	1,000
Apparel and related products:	dollars	dollars	dollars	dollars
Men's, boys' suits, coats.....	12, 066	7, 898	3, 063	1, 105
Men's, boys' furnishings.....	19, 275	12, 913	4, 953	1, 409
Women's, misses' outerwear.....	20, 064	15, 466	3, 141	1, 457
Women's undergarments.....	10, 893	7, 853	2, 581	459
Children's outerwear.....	3, 678	2, 567	866	245
Miscellaneous apparel.....	4, 471	3, 060	1, 181	230
Other fabricated textiles.....	19, 054	10, 768	6, 057	2, 229
Total.....	89, 501	60, 525	21, 842	7, 134
1954:				
Apparel and related products:				
Men's, boys' suits, coats.....	3, 561	2, 697	864	(?)
Men's, boys' furnishings.....	17, 662	12, 279	4, 405	978
Women's, misses' outerwear.....	17, 524	12, 164	3, 335	2, 025
Women's undergarments.....	8, 965	6, 923	1, 509	533
Children's outerwear.....	3, 844	3, 038	806	(?)
Miscellaneous apparel.....	4, 091	2, 669	1, 422	(?)
Other fabricated textiles.....	33, 814	13, 560	10, 026	10, 228
Total.....	89, 461	53, 330	22, 367	13, 764

<sup>1</sup> Expenditures for used plant and equipment.

<sup>2</sup> Less than one-half million dollars, not reported separately.

Adapted from Census of Manufactures: 1947 and 1954.

The increase from 1947 to 1954 in proportions of gross margins that were accounted for by wages occurred despite a further increase, to 12 percent, of gross margins accounted for by contract and commission work, and was associated with a decrease to 16 percent in the proportion accounted for by "other" items.

Manufacturers' gross margins for men's and boys' clothing and furnishings increased from 52 percent of the value of the products in 1939 to 56.9 percent in 1954 (table 98). Proportions of these margins accounted for by wages and salaries decreased from about 53 percent in 1939 to 45 percent in 1947, then increased to 52 percent in 1954. Proportions accounted for by wages alone decreased from about 44 percent in 1939 to 37 percent in 1947, then increased to 43 percent in 1954. The decrease from 1939 to 1947 in proportion of gross margins accounted for by wages was associated with substantial increases in proportions accounted for by contract and commission work and by other items. The increase from 1947 to 1954 in proportions of gross margins accounted for by wages occurred despite further increases in proportions accounted for by contract and commission work.

Manufacturers of men's and boys' clothing and furnishings include manufacturers of men's and boys' suits, coats, and overcoats;

TABLE 97.—*Values, costs, and margins of manufacturers of apparel and other fabricated textile products, United States, 1939, 1947, and 1954*

Item	1939	1947	1954
	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Value of products.....	2, 734, 647	8, 708, 555	9, 763, 532
Cost of materials, etc. <sup>1</sup> .....	1, 381, 160	4, 032, 175	4, 390, 983
Gross margin.....	1, 353, 487	4, 676, 380	5, 372, 549
Salaries and wages.....	702, 840	2, 062, 247	2, 626, 690
Salaries.....	164, 087	426, 472	558, 930
Wages.....	538, 753	1, 635, 775	2, 067, 760
Fuel.....	2, 690	7, 438	2, 847
Purchased electric energy.....	9, 480	16, 823	18, 349
Contract and commission work.....	217, 744	944, 460	1, 129, 857
Other <sup>2</sup> .....	420, 733	1, 645, 412	1, 594, 806
Proportion of value of products			
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Value of products.....	100. 0	100. 0	100. 0
Cost of materials, etc. <sup>1</sup> .....	50. 5	46. 3	45. 0
Gross margin.....	49. 5	53. 7	55. 0
Salaries and wages.....	25. 7	23. 7	26. 9
Salaries.....	6. 0	4. 9	5. 7
Wages.....	19. 7	18. 8	21. 2
Fuel.....	. 1	. 1	. 1
Purchased electric energy.....	. 3	. 2	. 2
Contract and commission work.....	8. 0	10. 8	11. 5
Other <sup>2</sup> .....	15. 4	18. 9	16. 3

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

neckwear; dress shirts and nightwear; work shirts; and separate trousers. Manufacturers' gross margins by industry in 1954 ranged from 45.9 percent of the value of the products for work shirts to 59.7 percent for suits, coats, and overcoats (tables 99, 100, 101). Wages as proportions of the value of the products in 1954 ranged from 19.1 percent for neckwear to 27.8 for work shirts, and the proportions for contract or commission work ranged from 4.6 percent for neckwear to 13.7 percent for dress shirts and nightwear.

Gross margins of manufacturers of women's and children's clothing and furnishings increased from about 52 percent in 1939 to 58 percent in 1947 and 1954 (table 98, p. 218). Proportions of these margins accounted for by wages and salaries decreased from 50 percent in 1939 to 43 percent in 1947, then increased to 46 percent in 1954. Proportions for wages alone decreased from 38 percent in 1939 to

TABLE 98.—*Values, costs, and margins of manufacturers of men's and boys', and women's and children's clothing and furnishings, United States, 1939, 1947, and 1954*

Item	Men's and boys' wear <sup>1</sup>			Women's and children's wear <sup>2</sup>		
	1939	1947	1954	1939	1947	1954
Value of products.....	<i>1,000 dollars</i> 950,381	<i>1,000 dollars</i> 2,785,534	<i>1,000 dollars</i> 2,673,047	<i>1,000 dollars</i> 1,342,046	<i>1,000 dollars</i> 4,322,229	<i>1,000 dollars</i> 5,433,692
Cost of materials, etc. <sup>3</sup> .....	456,252	1,200,943	1,151,596	643,229	1,813,185	2,273,114
Gross margin.....	494,129	1,584,591	1,521,451	698,817	2,509,044	3,160,578
Salaries and wages.....	264,215	706,200	796,082	350,331	1,085,732	1,454,165
Salaries.....	48,361	119,471	146,701	87,608	242,136	313,102
Wages.....	215,854	586,729	649,381	262,723	843,596	1,141,063
Fuel.....	1,338	2,649	380	743	2,215	1,804
Purchased electric energy.....	2,999	5,042	5,526	4,924	8,489	9,316
Contract and commission work.....	75,713	326,812	318,280	134,196	273,659	749,954
Other <sup>4</sup> .....	149,864	543,888	401,183	208,623	838,949	945,339

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, etc. <sup>3</sup> .....	48.0	43.1	43.1	47.9	42.0	41.8
Gross margin.....	52.0	56.9	56.9	52.1	58.0	58.2
Salaries and wages.....	27.8	25.4	29.8	26.1	25.1	26.8
Salaries.....	5.1	4.3	5.5	6.5	5.6	5.8
Wages.....	22.7	21.1	24.3	19.6	19.5	21.0
Fuel.....	.1	.1	( <sup>6</sup> )	.1	.1	.1
Purchased electric energy.....	.3	.2	.2	.4	.2	.2
Contract and commission work.....	8.0	11.7	11.9	10.0	13.2	13.8
Other <sup>4</sup> .....	15.8	19.5	15.0	15.5	19.4	17.3

<sup>1</sup> Includes men's and boys' suits, coats, and overcoats; neckwear; dress shirts and nightwear; underwear; work shirts; and separate trousers.

<sup>2</sup> Includes women's suits, coats, and skirts; unit- and dozen-price dresses; blouses and waists; women's neckwear and scarfs; women's outerwear not elsewhere classified; corsets and allied garments; women's and children's underwear; children's dresses; and children's coats.

<sup>3</sup> Includes supplies, parts, and containers.

<sup>4</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>5</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 99.—*Values, costs, and margins of manufacturers of men's and boys' suits, coats, overcoats, and neckwear United States, 1939, 1947, and 1954*

Item	Suits, coats, and overcoats			Neckwear		
	1939	1947	1954	1939	1947	1954
	<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.....	598, 273	1, 448, 719	1, 168, 722	46, 392	113, 933	100, 036
Cost of materials, etc. <sup>1</sup> .....	270, 697	581, 411	470, 459	25, 546	58, 468	47, 063
Gross margin.....	327, 576	867, 308	698, 263	20, 846	55, 465	52, 973
Salaries and wages.....	170, 319	399, 971	382, 480	10, 955	25, 367	27, 797
Salaries.....	30, 591	66, 466	75, 321	3, 609	6, 882	8, 741
Wages.....	139, 728	333, 505	307, 159	7, 346	18, 485	19, 056
Fuel.....	795	1, 434	196	24	47	6
Purchased electric energy.....	1, 707	2, 512	2, 368	147	197	163
Contract and commission work.....	61, 357	183, 804	147, 530	881	4, 268	4, 566
Other <sup>2</sup> .....	93, 398	279, 587	165, 689	8, 839	25, 586	20, 441

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, etc. <sup>1</sup> .....	45.2	40.1	40.3	55.1	51.3	47.0
Gross margin.....	54.8	59.9	59.7	44.9	48.7	53.0
Salaries and wages.....	28.5	27.6	32.7	23.6	22.3	27.8
Salaries.....	5.1	4.6	6.4	7.8	6.1	8.7
Wages.....	23.4	23.0	26.3	15.8	16.2	19.1
Fuel.....	.1	.1	( <sup>3</sup> )	.1	( <sup>3</sup> )	( <sup>3</sup> )
Purchased electric energy.....	.3	.2	.2	.3	.2	.2
Contract and commission work.....	10.3	12.7	12.6	1.9	3.7	4.6
Other <sup>2</sup> .....	15.6	19.3	14.2	19.0	22.5	20.4

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.



TABLE 100.—Values, costs, and margins of manufacturers of men's and boys' dress shirts, nightwear, and underwear, United States, 1939, 1947, and 1954

Item	Dress shirts and nightwear			Underwear		
	1939	1947	1954	1939	1947	1954
Value of products.....	<i>1,000 dollars</i> 192, 366	<i>1,000 dollars</i> 741, 645	<i>1,000 dollars</i> 893, 980	<i>1,000 dollars</i> 16, 693	<i>1,000 dollars</i> 49, 938	<i>1,000 dollars</i> 74, 324
Cost of materials, etc. <sup>1</sup> .....	98, 365	338, 974	396, 857	9, 291	24, 689	39, 906
Gross margin.....	94, 001	402, 671	497, 123	7, 402	25, 249	34, 418
Salaries and wages.....	53, 666	161, 497	236, 726	4, 313	11, 330	18, 923
Salaries.....	8, 724	25, 896	40, 043	585	1, 483	2, 634
Wages.....	44, 942	135, 601	196, 683	3, 728	9, 847	16, 289
Fuel.....	337	645	91	24	38	4
Purchased electric energy.....	700	1, 298	1, 853	69	104	149
Contract and commission work.....	9, 237	95, 045	122, 235	893	4, 574	4, 312
Other <sup>2</sup> .....	30, 061	144, 186	136, 218	2, 103	9, 203	11, 030

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, etc. <sup>1</sup> .....	51.1	45.7	44.4	55.7	49.4	53.7
Gross margin.....	48.9	54.3	55.6	44.3	50.6	46.3
Salaries and wages.....	27.9	21.8	26.5	25.8	22.7	25.5
Salaries.....	4.5	3.5	4.5	3.5	3.0	3.6
Wages.....	23.4	18.3	22.0	22.3	19.7	21.9
Fuel.....	.2	.1	( <sup>3</sup> )	.1	.1	( <sup>3</sup> )
Purchased electric energy.....	.4	.2	.2	.4	.2	.2
Contract and commission work.....	4.8	12.8	13.7	5.4	9.2	5.8
Other <sup>2</sup> .....	15.6	19.4	15.2	12.6	18.4	14.8

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 101.—*Values, costs, and margins of manufacturers of men's and boys' work shirts and separate trousers, United States, 1939, 1947, and 1954*

Item	Work shirts			Separate trousers		
	1939	1947	1954 <sup>1</sup>	1939	1947	1954
	<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.....	35,672	95,919	38,300	60,985	335,380	397,685
Cost of materials, etc. <sup>2</sup> .....	20,636	52,287	20,736	31,717	145,114	176,575
Gross margin.....	15,036	43,632	17,564	29,268	190,266	221,110
Salaries and wages.....	8,475	16,609	11,468	16,487	91,426	118,688
Salaries.....	1,206	2,751	836	3,646	15,993	19,126
Wages.....	7,269	13,858	10,632	12,841	75,433	99,562
Fuel.....	50	78	3	108	407	80
Purchased electric energy.....	156	165	99	220	766	894
Contract and commission work.....	577	9,636	810	2,768	29,485	38,827
Other <sup>3</sup> .....	5,778	17,144	5,184	9,685	68,182	62,621

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, etc. <sup>2</sup> .....	57.8	54.5	54.1	52.0	43.3	44.4
Gross margin.....	42.2	45.5	45.9	48.0	56.7	55.6
Salaries and wages.....	23.8	17.3	30.0	27.0	27.3	29.8
Salaries.....	3.4	2.9	2.2	6.0	4.8	4.8
Wages.....	20.4	14.4	27.8	21.0	22.5	25.0
Fuel.....	.2	.1	( <sup>4</sup> )	.2	.1	( <sup>4</sup> )
Purchased electric energy.....	.4	.2	.3	.4	.2	.2
Contract and commission work.....	1.6	10.0	2.1	4.5	8.8	9.8
Other <sup>3</sup> .....	16.2	17.9	13.5	15.9	20.3	15.8

<sup>1</sup> Reduction in values and costs shown for work shirts in 1954, as compared with 1947, is accounted for mainly by shifts to other industries of a number of establishments which had produced a multiline of men's furnishings in 1947 but in 1954 their primary production was other than work shirts.

<sup>2</sup> Includes supplies, parts, and containers.

<sup>3</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>4</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

34 percent in 1947, then increased to 36 percent in 1954. A part of the decrease from 1939 to 1947 of gross margins accounted for by wages may be accounted for by an increase in the proportion accounted for by contract or commission work.

Industries manufacturing women's and children's clothing and furnishings include makers of women's suits, coats and skirts; unit- and dozen-price dresses; blouses and waists; women's neckwear and scarfs; women's outerwear not elsewhere classified; corsets and allied garments; women's and children's underwear; children's dresses; and children's coats. Manufacturers' gross margins by industry in 1954 ranged from about 47 percent of the value of the products for women's and children's underwear to 65 percent for corsets and allied garments (tables 102, 103, 104, 105, 106). Wages as proportions of the value of the products in 1954 ranged from 13.5 percent for women's neckwear and scarfs to 23 percent for dresses, and the proportions for contract or commission work ranged from 8.2 percent for women's and children's underwear to 18 percent for blouses and waists.

Gross margins of manufacturers of miscellaneous apparel, including fabric work and dress gloves, leather and sheepskin-lined clothing, handkerchiefs, robes and dressing gowns, and waterproof outer garments, increased from about 44 percent of the value of the products in 1939 to almost 52 percent in 1947, and to almost 54 percent in 1954 (table 107). Proportions of these margins accounted for by wages and salaries decreased from about 56 percent in 1939 to 45 percent in 1947, then increased to 50 percent in 1954. Proportions for wages alone decreased from 42 percent in 1939 to 35 percent in 1947, then increased to 39 percent in 1954. The decrease from 1939 to 1947 in proportion of gross margins accounted for by wages was associated with substantial increases in proportions accounted for by contract or commission work.

Gross margins varied considerably from one industry to another. In 1954, gross margins ranged from about 46 percent of the value of the product for fabric work gloves to 61.5 percent for waterproof outer garments. Wages as proportions of the value of the products ranged from less than 15 percent for handkerchiefs to 25 percent for fabric work gloves, and the proportions for contract and commission work ranged from less than 1 percent for fabric work gloves to 15.5 percent for fabric dress gloves (tables 108, 109, 110).

Similar data for housefurnishings, textile bags, canvas products, and miscellaneous textile products show that, for all these industries combined, manufacturers' gross margins decreased from about 33 percent of the value of the products in 1939 to 32 percent in 1947, then increased to 37 percent in 1954 (table 111, 112). Proportions of these margins that were accounted for by wages and salaries decreased from almost 55 percent in 1939 to 47 percent in 1947, then increased to 57 percent in 1954. Proportions for wages alone increased from 35 percent in 1939 and in 1947 to 41 percent in 1954.

Gross margins for these industries in 1954 ranged from about 24 percent of the value of the products for manufacturers of textile bags to almost 49 percent for manufacturers of canvas products, except bags (tables 111, 112). Wages as proportions of the value of the products ranged from 11 percent for textile bags to 20 percent for canvas products, except bags.

Gross margins in 1954 of manufacturers of men's and boys' suits and coats, for establishments with 90 percent or more of primary product specialization, averaged about 54 percent of the value of the products, and 54 percent of these margins was accounted for by costs of labor (table 113). Gross margins for establishments with less than 90 percent of primary product specialization averaged about 56 percent of the value of the products, and 47 percent of these margins was accounted for by wages.

Similar data for manufacturers of other apparel show that gross margins for men's and boys' underwear averaged about 42 percent of the value of the products for establishments with 90 percent or more of primary product specialization, and about 46 percent of these margins was accounted for by wages (table 114). Gross margins averaged about 38 percent of the value of the products for establishments with less than 90 percent of primary product specialization, and 53 percent of these margins was accounted for by costs of labor. For manufacturers of separate trousers, gross margins averaged about 46 percent of the value of the products for specialized establishments, and about 48 percent for nonspecialized (table 114). Proportions of these margins accounted for by wages averaged about 47 percent for specialized and 50 percent for nonspecialized establishments.

Gross margins of manufacturers of textile bags in 1954 averaged about 23 percent of the value of the products for establishments with 90 percent or more of primary product specialization, and wages accounted for about 44 percent of these margins (table 113). Gross margins for establishments with less than 90 percent of primary product specialization averaged about 25 percent of the value of the products, and about 48 percent of these margins was accounted for by wages. For manufacturers of canvas products other than bags, gross margins averaged 49 percent of the value of the products for specialized establishments, and 48 percent for nonspecialized (table 113). Proportions of these margins accounted for by wages averaged 41 percent for specialized and 40 percent for nonspecialized establishments.

An examination of these data shows no consistent relationship between degree of primary product specialization by manufacturers of apparel and related products and manufacturers' gross margins and the items of cost included.

Large proportions of gross margins of manufacturers of apparel and related products accounted for by wages, plus increases in wage rates, emphasize the importance of labor in the manufacture of these products. Hourly earnings of labor in the apparel and related products industries increased from an average of about 53 cents in 1939 to \$1.49 in 1957. Average value added by manufacture per dollar of wages paid increased from \$2.07 in 1939 to \$2.17 in 1947, then decreased to \$2.02 in 1954 (table 115). In 1957, the value added averaged \$2.08. Similar trends are indicated for most of the major groups of industries included. Apparently decreases in value added per dollar of wages occurred since 1947 despite substantial improvements in machinery used, as indicated by large expenditures for new equipment since the end of World War II.

TABLE 102.—*Values, costs, and margins of manufacturers of women's and misses' outerwear, United States, 1939, 1947, and 1954*

Item	Dresses, price per dozen			Women's suits, coats and skirts		
	1939	1947	1954	1939	1947	1954
Value of products.....	1,000 dollars 113, 698	1,000 dollars 350, 956	1,000 dollars 435, 216	1,000 dollars 313, 997	1,000 dollars 1, 067, 288	1,000 dollars 1, 261, 320
Cost of materials, etc. <sup>1</sup> .....	57, 981	169, 776	183, 556	160, 097	448, 202	558, 928
Gross margin.....	55, 717	181, 180	251, 660	153, 900	619, 086	702, 392
Salaries and wages.....	31, 289	89, 003	127, 276	72, 628	274, 165	326, 933
Salaries.....	7, 283	21, 714	27, 139	16, 211	54, 003	74, 621
Wages.....	24, 006	67, 289	100, 137	56, 417	220, 162	252, 312
Fuel.....	110	286	47	218	482	877
Purchased electric energy.....	520	717	866	1, 001	1, 923	2, 195
Contract and commission work.....	6, 563	25, 533	45, 677	35, 324	153, 624	169, 697
Other <sup>2</sup> .....	17, 235	65, 641	77, 794	44, 729	188, 892	202, 690

Proportion of value of products

	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
	100.0	100.0	100.0	100.0	100.0	100.0
Value of products.....	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. <sup>1</sup> .....	51.0	48.4	42.2	51.0	42.0	44.3
Gross margin.....	49.0	51.6	57.8	49.0	58.0	55.7
Salaries and wages.....	27.5	25.3	29.2	23.1	25.7	25.9
Salaries.....	6.4	6.2	6.2	5.2	5.1	5.9
Wages.....	21.1	19.1	23.0	17.9	20.6	20.0
Fuel.....	.1	.1	( <sup>3</sup> )	.1	( <sup>3</sup> )	.1
Purchased electric energy.....	.5	.2	.2	.3	.2	.2
Contract and commission work.....	5.8	7.3	10.5	11.3	14.4	13.4
Other <sup>2</sup> .....	15.1	18.7	17.9	14.2	17.7	16.1

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.



TABLE 103.—*Values, costs, and margins for manufacturers of women's and misses' outerwear, United States, 1939, 1947, and 1954*

Item	Blouses and waists			Dresses, unit-priced		
	1939	1947	1954	1939	1947	1954
	<i>1,000</i> <i>dollars</i>	<i>1,000</i> <i>dollars</i>	<i>1,000</i> <i>dollars</i>	<i>1,000</i> <i>dollars</i>	<i>1,000</i> <i>dollars</i>	<i>1,000</i> <i>dollars</i>
Value of products.....	41, 730	264, 411	375, 262	506, 261	1, 324, 083	1, 455, 080
Cost of materials, etc. <sup>1</sup> .....	18, 607	103, 017	141, 370	218, 079	501, 015	533, 809
Gross margin.....	23, 123	161, 394	233, 892	288, 182	823, 068	921, 271
Salaries and wages.....	10, 164	63, 425	99, 818	143, 810	360, 529	418, 577
Salaries.....	2, 771	13, 046	17, 617	35, 410	75, 272	83, 758
Wages.....	7, 393	50, 379	82, 201	108, 400	285, 257	334, 819
Fuel.....	10	98	261	153	358	199
Purchased electric energy.....	150	547	574	2, 019	2, 851	2, 289
Contract and commission work.....	6, 110	43, 385	67, 705	67, 677	226, 878	257, 491
Other <sup>2</sup> .....	6, 689	53, 939	65, 534	74, 523	232, 452	242, 715

Proportion of value of products

	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
	100.0	100.0	100.0	100.0	100.0	100.0
Value of products.....						
Cost of materials etc. <sup>1</sup> .....	44.6	39.0	37.7	43.1	37.8	36.7
Gross margin.....	55.4	61.0	62.3	56.9	62.2	63.3
Salaries and wages.....	24.4	24.0	26.6	28.4	27.2	28.8
Salaries.....	6.7	4.9	4.7	7.0	5.7	5.8
Wages.....	17.7	19.1	21.9	21.4	21.5	23.0
Fuel.....	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Purchased electric energy.....	.4	.2	.2	.4	.2	.1
Contract and commission work.....	14.6	16.4	18.0	13.4	17.2	17.7
Other <sup>2</sup> .....	16.0	20.4	17.5	14.7	17.6	16.7

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 104.—*Values, costs, and margins for manufacturers of women's and misses' outerwear, United States, 1939, 1947, and 1954*

Item	Women's neckwear and scarfs			Women's outerwear not elsewhere classified		
	1939	1947	1954	1939	1947	1954
Value of products.....	<i>1,000 dollars</i> 11, 948	<i>1,000 dollars</i> 51, 061	<i>1,000 dollars</i> 26, 297	<i>1,000 dollars</i> 40, 071	<i>1,000 dollars</i> 100, 204	<i>1,000 dollars</i> 252, 074
Cost of materials, etc. <sup>1</sup> .....	6, 267	26, 459	13, 786	19, 523	37, 451	106, 694
Gross margin.....	5, 681	24, 602	12, 511	20, 548	62, 753	145, 380
Salaries and wages.....	2, 681	6, 963	6, 199	10, 644	24, 802	67, 324
Salaries.....	1, 003	3, 134	2, 638	2, 729	5, 760	15, 821
Wages.....	1, 678	3, 829	3, 561	7, 915	19, 042	51, 503
Fuel.....	4	23	5	36	65	59
Purchased electric energy.....	38	58	21	170	206	455
Contract and commission work.....	891	7, 671	2, 808	3, 206	9, 927	29, 820
Other <sup>2</sup> .....	2, 067	9, 887	3, 478	6, 492	27, 753	47, 722

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, etc. <sup>1</sup> .....	52.5	51.8	52.4	48.7	37.4	42.3
Gross margin.....	47.5	48.2	47.6	51.3	62.6	47.7
Salaries and wages.....	22.4	13.7	23.5	26.6	24.8	26.7
Salaries.....	8.4	6.2	10.0	6.8	5.7	6.3
Wages.....	14.0	7.5	13.5	19.8	19.0	20.4
Fuel.....	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	.1	.1	( <sup>2</sup> )
Purchased electric energy.....	.3	.1	.1	.4	.2	.2
Contract and commission work.....	7.5	15.0	10.7	8.0	9.9	11.8
Other <sup>2</sup> .....	17.3	19.4	13.3	16.2	27.7	19.0

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 105.—*Values, costs, and margins for manufacturers of women's and children's underwear and of corsets and allied garments, United States, 1939, 1947, and 1954*

Item	Women's and children's underwear			Corsets and allied garments		
	1939	1947	1954	1939	1947	1954
Value of products.....	<i>1,000 dollars</i> 152,421	<i>1,000 dollars</i> 571,404	<i>1,000 dollars</i> 770,026	<i>1,000 dollars</i> 84,481	<i>1,000 dollars</i> 285,770	<i>1,000 dollars</i> 394,808
Cost of materials, etc. <sup>1</sup> .....	89,945	291,334	406,844	38,618	104,764	137,623
Gross margin.....	62,476	280,070	363,182	45,800	181,006	257,185
Salaries and wages.....	34,171	112,395	176,305	25,147	82,427	108,509
Salaries.....	7,987	28,301	36,242	9,413	24,169	29,532
Wages.....	26,184	84,094	140,063	15,734	58,258	78,977
Fuel.....	71	466	143	96	247	163
Purchased electric energy.....	492	980	1,336	232	555	680
Contract and commission work.....	5,313	48,978	63,318	1,160	16,745	41,471
Other <sup>2</sup> .....	22,429	117,251	122,080	19,165	81,032	106,362

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, etc. <sup>1</sup> .....	59.0	51.0	52.8	45.7	36.7	34.9
Gross margin.....	41.0	49.0	47.2	54.3	63.3	65.1
Salaries and wages.....	22.4	19.7	22.9	29.8	28.8	27.5
Salaries.....	5.2	5.0	4.7	11.1	8.4	7.5
Wages.....	17.2	14.7	18.2	18.7	20.4	20.0
Fuel.....	.1	.1	(*)	.1	.1	(*)
Purchased electric energy.....	.3	.1	.2	.3	.2	.2
Contract and commission work.....	3.5	8.6	8.2	1.4	5.9	10.5
Other <sup>2</sup> .....	14.7	20.5	15.9	22.7	28.3	26.9

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 106.—*Values, costs, and margins for manufacturers of children's dresses and coats, United States, 1939, 1947, and 1954*

Item	Children's dresses			Children's coats		
	1939	1947	1954	1939	1947	1954
	<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.....	50,584	171,842	291,499	26,918	135,210	172,110
Cost of materials, etc. <sup>1</sup> .....	20,048	72,597	117,274	14,064	58,570	73,230
Gross margin.....	30,536	99,245	174,225	12,854	76,640	98,880
Salaries and wages.....	13,952	38,794	78,244	5,845	33,229	44,980
Salaries.....	3,289	9,407	16,352	1,512	7,330	9,382
Wages.....	10,663	29,387	61,892	4,333	25,899	35,598
Fuel.....	32	117	25	13	73	25
Purchased electric energy.....	207	361	554	95	291	346
Contract and commission work.....	4,758	23,007	46,059	3,194	17,911	25,908
Other <sup>2</sup> .....	11,587	36,966	49,343	3,707	25,136	27,621

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, etc. <sup>1</sup> .....	39.6	42.2	40.2	52.2	43.3	42.5
Gross margin.....	60.4	57.8	59.8	47.8	56.7	57.5
Salaries and wages.....	27.6	22.6	26.9	21.7	24.6	26.1
Salaries.....	6.5	5.5	5.6	5.6	5.4	5.4
Wages.....	21.1	17.1	21.3	16.1	19.2	20.7
Fuel.....	.1	.1	( <sup>3</sup> )	( <sup>3</sup> )	.1	( <sup>3</sup> )
Purchased electric energy.....	.4	.2	.2	.4	.2	.2
Contract and commission work.....	9.4	13.4	15.8	11.9	13.2	15.1
Other <sup>2</sup> .....	22.9	21.5	16.9	13.8	18.6	16.1

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.



TABLE 107.—*Values, costs, and margins for manufacturers of miscellaneous apparel and household textiles, United States, 1939, 1947, and 1954*

Item	Miscellaneous apparel <sup>1</sup>			Household textiles <sup>2</sup>		
	1939	1947	1954	1939	1947	1954
	<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.....	125, 037	381, 357	429, 135	317, 183	1, 219, 435	1, 227, 658
Cost of materials, etc. <sup>3</sup> .....	69, 881	183, 667	198, 036	211, 798	834, 380	768, 237
Gross margin.....	55, 156	197, 690	231, 099	105, 385	385, 055	459, 421
Salaries and wages.....	30, 853	89, 003	114, 972	57, 441	181, 312	261, 471
Salaries.....	7, 419	19, 077	24, 206	20, 699	45, 788	74, 921
Wages.....	23, 434	69, 926	90, 766	36, 742	135, 524	186, 550
Fuel.....	126	396	-----	483	2, 178	663
Purchased electric energy.....	476	809	789	1, 081	2, 483	2, 718
Contract and commission work.....	5, 615	32, 740	41, 248	2, 220	11, 249	20, 375
Other <sup>4</sup> .....	18, 086	74, 742	74, 090	44, 160	187, 833	174, 194

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, etc. <sup>3</sup> .....	55.9	48.2	46.1	66.8	68.4	62.6
Gross margin.....	44.1	51.8	53.9	33.2	31.6	37.4
Salaries and wages.....	24.6	23.3	28.6	18.1	14.9	2.3
Salaries.....	5.9	5.0	5.6	6.5	3.8	6.1
Wages.....	18.7	18.3	21.2	11.6	11.1	15.2
Fuel.....	.1	.1	.....	.2	.2	.1
Purchased electric energy.....	.4	.2	.2	.3	.2	.2
Contract and commission work.....	4.5	8.6	9.6	.7	.9	1.6
Other <sup>4</sup> .....	14.5	19.6	17.3	13.9	15.4	14.2

<sup>1</sup> Includes fabric work and dress gloves, leather and sheepskin-lined clothing, handkerchiefs, robes and dressing gowns, and waterproof outer garments.

<sup>2</sup> Includes house furnishings, textile bags, canvas products, and miscellaneous products.

<sup>3</sup> Includes supplies, parts, and containers.

<sup>4</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 108.—*Values, costs, and margins for manufacturers of fabric work and dress gloves, United States, 1939, 1947, and 1954*

Item	Fabric work gloves			Fabric dress gloves		
	1939	1947	1954	1939	1947	1954
Value of products.....	<i>1,000 dollars</i> 22, 457	<i>1,000 dollars</i> 77, 588	<i>1,000 dollars</i> 65, 776	<i>1,000 dollars</i> 7, 703	<i>1,000 dollars</i> 29, 715	<i>1,000 dollars</i> 39, 091
Cost of materials, etc. <sup>1</sup> .....	11, 757	41, 467	35, 559	3, 434	11, 935	15, 626
Gross margin.....	10, 700	36, 121	30, 217	4, 269	17, 780	23, 465
Salaries and wages.....	6, 642	17, 979	19, 335	2, 806	8, 378	10, 374
Salaries.....	979	2, 016	2, 704	508	1, 380	2, 108
Wages.....	5, 663	15, 963	16, 631	2, 298	6, 998	8, 266
Fuel.....	36	105	-----	13	65	-----
Purchased electric energy.....	117	159	155	44	84	76
Contract and commission work.....	18	47	387	148	3, 721	6, 070
Other <sup>2</sup> .....	3, 887	17, 831	10, 340	1, 258	5, 532	6, 945

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, etc. <sup>1</sup> .....	52.4	53.4	54.1	44.6	40.2	40.0
Gross margin.....	47.6	46.6	45.9	55.4	59.8	60.0
Salaries and wages.....	29.6	23.2	29.4	36.4	28.2	26.5
Salaries.....	4.4	2.6	4.1	6.6	4.6	5.4
Wages.....	25.2	20.6	25.3	29.8	23.6	21.1
Fuel.....	.1	.1	-----	.2	.2	-----
Purchased electric energy.....	.5	.2	.2	.6	.3	.2
Contract and commission work.....	.1	.1	.6	1.9	12.5	15.5
Other <sup>2</sup> .....	17.3	23.0	15.7	16.3	18.6	17.8

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 109.—*Values, costs, and margins for manufacturers of robes and dressing gowns and waterproof outer garments, United States, 1939, 1947, and 1954*

Item	Robes and dressing gowns			Waterproof outer garments		
	1939	1947	1954	1939	1947	1954
	<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.....	39,830	103,024	107,964	11,304	77,020	119,660
Cost of materials, etc. <sup>1</sup> .....	22,772	47,735	50,972	6,288	34,983	46,056
Gross margin.....	17,058	55,289	56,992	5,016	42,037	73,604
Salaries and wages.....	8,280	23,353	27,039	2,673	19,561	34,702
Salaries.....	2,579	5,723	5,946	799	4,570	7,585
Wages.....	5,701	17,630	21,093	1,874	14,991	27,117
Fuel.....	18	63	-----	6	87	-----
Purchased electric energy.....	142	228	163	40	179	226
Contract and commission work.....	2,751	12,435	12,780	749	9,796	13,997
Other <sup>2</sup> .....	5,867	19,210	17,010	1,548	12,414	24,679

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, etc. <sup>1</sup> .....	57.2	46.3	47.2	55.6	45.4	38.5
Gross margin.....	42.8	53.7	52.8	44.4	54.6	61.5
Salaries and wages.....	20.8	22.7	25.0	23.7	25.4	29.0
Salaries.....	6.5	5.6	5.5	7.1	5.9	6.3
Wages.....	14.3	17.1	19.5	16.6	19.5	22.7
Fuel.....	( <sup>3</sup> )	.1	-----	.1	.1	-----
Purchased electric energy.....	.4	.2	.2	.3	.3	.2
Contract and commission work.....	6.9	12.1	11.8	6.6	12.7	11.7
Other <sup>2</sup> .....	14.7	18.6	15.8	13.7	16.1	20.6

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 110.—*Values, costs, and margins for manufacturers of leather and sheepskin-lined clothing and handkerchiefs, United States, 1939, 1947, and 1954*

Item	Leather and sheepskin-lined clothing			Handkerchiefs		
	1939	1947	1954	1939	1947	1954
	<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.....	22,142	40,904	56,383	21,601	53,106	40,261
Cost of materials, etc. <sup>1</sup> .....	13,466	21,482	30,066	12,164	26,065	19,757
Gross margin.....	8,676	19,422	26,317	9,437	27,041	20,504
Salaries and wages.....	5,878	10,678	15,730	4,574	9,054	7,792
Salaries.....	1,300	2,637	3,868	1,254	2,751	1,995
Wages.....	4,578	8,041	11,862	3,320	6,303	5,797
Fuel.....	23	28	—	30	48	—
Purchased electric energy.....	76	78	90	57	81	79
Contract and commission work.....	201	518	1,968	1,748	6,223	6,046
Other <sup>2</sup> .....	2,498	8,120	8,529	3,028	11,635	6,587

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 etc. <sup>1</sup> .....	60.8	52.5	53.3	56.3	49.1	49.1
Gross margin.....	39.2	47.5	46.7	43.7	50.9	50.9
Salaries and wages.....	26.5	26.1	27.9	21.2	17.0	19.4
Salaries.....	5.8	6.4	6.9	5.8	5.2	5.0
Wages.....	20.7	19.7	21.0	15.4	11.8	14.4
Fuel.....	.1	.1	.....	.1	.1	.....
Purchased electric energy.....	.4	.2	.2	.3	.2	.2
Contract and commission work.....	.9	1.3	3.5	8.1	11.7	15.0
Other <sup>2</sup> .....	11.3	19.8	15.1	14.0	21.9	16.3

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1939, 1947, and 1954.



TABLE 111.—*Values, costs, and margins for manufacturers of housefurnishings and textile bags, United States, 1939, 1947, and 1954*

Item	Housefurnishings			Textile bags		
	1939	1947	1954	1939	1947	1954
	<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.....	139,433	589,570	675,871	121,702	360,904	220,978
Cost of materials, etc. <sup>1</sup> .....	89,182	396,489	422,288	93,335	288,830	168,218
Gross margin.....	50,251	193,081	253,583	28,367	72,074	52,760
Salaries and wages.....	27,516	90,439	134,004	14,531	28,363	35,120
Salaries.....	9,187	19,952	35,014	4,528	7,317	10,791
Wages.....	18,329	70,487	98,990	10,003	21,046	24,329
Fuel.....	176	1,462	395	148	280	53
Purchased electric energy.....	554	1,474	1,591	282	312	419
Contract and commission work.....	1,797	7,899	16,294	42	503	647
Other <sup>2</sup> .....	20,208	91,807	101,299	13,364	42,616	16,521

Proportion of value of products

	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
	100.0	100.0	100.0	100.0	100.0	100.0
Value of products.....	100.0	100.0	100.0	100.0	100.0	100.0
Cost of materials, etc. <sup>1</sup> .....	64.0	67.3	62.5	76.7	80.0	76.1
Gross margin.....	36.0	32.7	37.5	23.3	20.0	23.9
Salaries and wages.....	19.7	15.3	19.8	11.9	7.8	15.9
Salaries.....	6.6	3.4	5.2	3.7	2.0	4.9
Wages.....	13.1	11.9	14.6	8.2	5.8	11.0
Fuel.....	.1	.2	.1	.1	.1	( <sup>3</sup> )
Purchased electric energy.....	.4	.3	.2	.3	.1	.2
Contract and commission work.....	1.3	1.3	2.4	( <sup>3</sup> )	.2	.3
Other <sup>2</sup> .....	14.5	15.6	15.0	11.0	11.8	7.5

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 112.—*Values, costs, and margins for manufacturers of canvas products (except bags) and miscellaneous textile products, United States, 1939, 1947, and 1954*

Item	Canvas products (except bags)			Miscellaneous textile products (not elsewhere classified)		
	1939	1947	1954	1939	1947	1954
	<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.....	24,408	79,568	129,611	31,640	189,393	201,198
Cost of materials, etc. <sup>1</sup> .....	12,845	42,542	66,339	16,436	106,519	111,392
Gross margin.....	11,563	37,026	63,272	15,204	82,874	89,806
Salaries and wages.....	7,429	21,159	40,180	7,965	41,351	52,167
Salaries.....	3,808	7,145	14,263	3,176	11,374	14,853
Wages.....	3,621	14,014	25,917	4,789	29,977	37,314
Fuel.....	73	188	132	86	248	83
Purchased electric energy.....	102	230	314	143	467	394
Contract and commission work.....	9	772	1,385	372	2,075	2,049
Other <sup>2</sup> .....	3,950	14,677	21,261	6,638	38,733	35,113

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, etc. <sup>1</sup> .....	52.6	53.5	51.2	51.9	56.2	55.4
Gross margin.....	47.4	46.5	48.8	48.1	43.8	44.6
Salaries and wages.....	30.4	26.6	31.0	25.2	21.8	25.9
Salaries.....	15.6	9.0	11.0	10.1	6.0	7.4
Wages.....	14.8	17.6	20.0	15.1	15.8	18.5
Fuel.....	.3	.2	.1	.3	.1	( <sup>2</sup> )
Purchased electric energy.....	.4	.3	.2	.4	.3	.2
Contract and commission work.....	.1	1.0	1.1	1.2	1.1	1.0
Other <sup>2</sup> .....	16.2	18.4	16.4	21.0	20.5	17.5

<sup>1</sup> Includes supplies, parts, and containers.

<sup>2</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

<sup>3</sup> Less than 0.05 percent.

Adapted from Census of Manufactures: 1939, 1947, and 1954.

TABLE 113.—*Values, costs, and margins for manufacturers of men's and boys' suits and coats, textile bags, and canvas products, by degree of specialization, United States, 1954*

Item	Men's and boys' suits and coats		Textile bags		Canvas products	
	Specialized <sup>1</sup>	All other <sup>2</sup>	Specialized <sup>1</sup>	All other <sup>2</sup>	Specialized <sup>1</sup>	All other <sup>2</sup>
	<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.....	443, 684	166, 256	107, 063	113, 915	90, 197	39, 414
Cost of materials, etc. <sup>3</sup> .....	202, 325	72, 325	82, 286	85, 932	45, 975	20, 364
Gross margin.....	241, 359	93, 931	24, 777	27, 983	44, 222	19, 050
Salaries and wages.....	164, 552	55, 004	15, 538	19, 932	27, 771	12, 409
Salaries.....	34, 547	10, 580	4, 561	6, 580	9, 422	4, 841
Wages.....	130, 005	44, 424	10, 977	13, 352	18, 349	7, 568
Purchased electric energy.....	854	321	189	230	216	98
Contract and commission work.....	15, 090	8, 121	256	388	1, 091	294
Other <sup>4</sup> .....	60, 863	30, 485	8, 794	7, 433	15, 144	6, 249

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, etc. <sup>1</sup> .....	45.6	43.5	76.9	75.4	51.0	51.7
Gross margin.....	54.4	56.5	23.1	24.6	49.0	48.3
Salaries and wages.....	37.1	33.1	14.5	17.5	30.8	31.5
Salaries.....	7.8	6.4	4.3	5.8	10.5	12.3
Wages.....	29.3	26.7	10.2	11.7	20.3	19.2
Purchased electric energy.....	.2	.2	.2	.2	.2	.2
Contract and commission work.....	3.4	4.9	.2	.4	1.2	.7
Other <sup>4</sup> .....	13.7	18.3	8.2	6.5	16.8	15.9

- <sup>1</sup> Manufacturing establishments with 90 percent or more of primary product specialization.
- <sup>2</sup> Manufacturing establishments with less than 90 percent of primary product specialization.
- <sup>3</sup> Includes supplies, parts, and containers.
- <sup>4</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1954.

TABLE 114.—*Values, costs, and margins for manufacturers of men's and boys' underwear, separate trousers, and men's and boys' clothing not elsewhere classified, United States, 1954*

Item	Men's and boys' underwear		Separate trousers		Men's and boys' clothing not elsewhere classified	
	Specialized <sup>1</sup>	All other <sup>2</sup>	Specialized <sup>1</sup>	All other <sup>2</sup>	Specialized <sup>1</sup>	All other <sup>2</sup>
	<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.....	42, 428	16, 992	130, 950	53, 998	243, 261	303, 441
Cost of materials, etc. <sup>3</sup> .....	24, 531	10, 600	71, 320	27, 844	138, 946	177, 021
Gross margin.....	17, 897	6, 392	59, 630	26, 154	104, 315	126, 420
Salaries and wages.....	9, 538	3, 868	34, 810	16, 939	61, 095	79, 245
Salaries.....	1, 229	467	6, 544	3, 872	11, 619	18, 584
Wages.....	8, 309	3, 401	28, 266	13, 067	49, 476	60, 661
Purchased electric energy.....	74	27	216	98	453	614
Contract and commission work.....	461	397	1, 995	1, 040	4, 353	7, 894
Other <sup>4</sup> .....	7, 824	2, 100	22, 609	8, 077	38, 414	38, 667

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, etc. <sup>3</sup> .....	57.8	62.4	54.5	51.6	57.1	58.3
Gross margin.....	42.2	37.6	45.5	48.4	42.9	41.7
Salaries and wages.....	22.5	22.8	26.6	31.4	25.1	26.1
Salaries.....	2.9	2.8	5.0	7.2	4.8	6.1
Wages.....	19.6	20.0	21.6	24.2	20.3	20.0
Purchased electric energy.....	.2	.2	.1	.2	.2	.2
Contract and commission work.....	1.1	2.3	1.5	1.8	1.8	2.6
Other <sup>4</sup> .....	18.4	12.3	17.3	15.0	15.8	12.8

<sup>1</sup> Manufacturing establishments with 90 percent or more of primary product specialization.

<sup>2</sup> Manufacturing establishments with less than 90 percent of primary product specialization.

<sup>3</sup> Includes supplies, parts, and containers.

<sup>4</sup> Includes depreciation, interest, insurance, rent, taxes, profits, and other expenses.

Adapted from Census of Manufactures: 1954.



TABLE 115.—Average value added by manufacture per dollar of wages by fabricators of apparel and other textile products, by industry, United States, 1939, 1947, and 1954

Industry	1939	1947	1954
<b>Men's and boys' wear:</b>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Suits and coats.....	1.92	1.99	1.78
Dress shirts and nightwear.....	1.86	2.13	1.90
Underwear.....	1.72	2.07	1.84
Neckwear.....	2.69	2.74	2.53
Cloth hats and caps.....	2.05	1.98	1.84
Separate trousers.....	1.78	2.11	1.82
Work shirts.....	1.96	2.40	1.57
Other clothing.....	1.95	2.07	2.00
All.....	1.92	2.07	1.87
<b>Women's and misses' outerwear:</b>			
Blouses.....	2.30	2.28	2.01
Dresses, unit-price.....	2.01	2.07	1.98
Dresses, dozen-price.....	2.02	2.22	2.05
Suits, coats, and skirts.....	2.08	2.09	2.10
Neckwear and scarfs.....	2.83	4.40	2.72
Other outerwear.....	2.15	2.23	2.23
All.....	2.06	2.13	2.04
<b>Women's and children's wear:</b>			
Underwear.....	2.14	2.62	2.13
Corsets and allied garments.....	2.82	2.70	2.72
Children's dresses.....	2.40	2.25	2.06
Fur goods.....	2.58	2.13	2.20
All.....	2.44	2.47	2.27
<b>Miscellaneous products:</b>			
Fabric dress and work gloves.....	1.83	2.09	1.88
Robes and dressing gowns.....	2.73	2.41	2.09
Waterproof outer garments.....	2.24	2.16	2.19
Handkerchiefs.....	2.29	3.28	2.48
Curtains and draperies.....	2.57	2.98	2.25
Textile bags.....	2.79	3.16	2.12
All.....	2.42	2.59	2.13
All.....	2.07	2.17	2.02

Adapted from Census of Manufactures: 1939, 1947, and 1954.

Value added by manufacture of men's and boys' clothing per dollar of payroll in 1954 averaged \$1.48 for single-unit companies and \$1.58 for multiunit companies. For multiunit companies, the value added per dollar of payroll averaged \$1.55 for establishments operated by single-industry companies and \$1.61 for establishments operated by multi-industry companies (table 9, p. 210.)

The value added per dollar of payroll by manufacture of women's and children's clothing, except millinery and fur goods, in 1954 averaged \$1.60 for single-unit and \$1.91 for multiunit companies. For establishments operated by multiunit companies, the value added per dollar of payroll averaged \$1.78 for those operated by single-industry companies, and \$2.23 for those operated by multi-industry companies (table 95, p. 210).

Value added by manufacture per dollar of wages by fabricators of apparel and related products varies from one geographic region to another and from one industry to another (table 116). In 1954, value added per dollar of wages, for all apparel manufacturing industries combined, averaged highest in the North Central States and lowest in the Southern States. Value added per dollar of wages by industries ranged from \$1.57 for manufacturers of children's dresses in Southern States to \$3.30 for manufacturers of men's and boys' neckwear in Southern States.

TABLE 116.—Average value added by manufacture per dollar of wages by fabricators of apparel and other textile products, by industry and by geographic division, United States, 1954

Industry	Geographic division					
	New England	Middle Atlantic	North Central	Southern	Other	All
Men's and boys' wear:	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Men's and boys' suit coats.....	1.67	1.76	1.82	1.87	(1)	1.78
Men's dress shirts, nightwear.....	1.57	2.05	1.94	1.79	1.93	1.90
Men's and boys' neckwear.....	2.45	2.42	2.58	3.30	2.38	2.53
Separate trousers.....	1.84	1.77	2.01	1.75	2.09	1.82
All.....	1.69	1.86	1.89	1.82	2.00	1.85
Women's and misses' outerwear:						
Blouses.....	1.74	2.04	2.05	2.07	1.87	2.01
Dresses, unit-price.....	1.83	1.96	2.10	2.26	2.05	1.97
Dresses, dozen-price.....	1.80	2.17	2.23	1.71	2.32	2.05
Women's suits, coats, skirts.....	2.03	2.09	2.14	2.09	2.22	2.10
All.....	1.89	2.02	2.16	1.95	2.13	2.03
Women's and children's wear:						
Underwear.....	1.73	2.22	2.11	2.15	1.70	2.13
Corsets, allied garments.....	3.18	2.43	3.63	2.64	2.94	2.72
Children's dresses.....	1.84	2.16	2.17	1.57	1.83	2.06
Children's coats.....	1.63	2.07	2.15	1.62	2.08	2.04
Other children's outerwear.....	2.40	2.09	2.06	1.99	1.94	2.09
Fur goods.....	2.09	2.18	2.79	2.06	2.80	2.20
All.....	2.24	2.20	2.59	2.14	2.17	2.23
Other fabricated products:						
Robes and dressing gowns.....	1.94	2.17	2.32	1.62	2.03	2.09
Waterproof outer garments.....	1.97	2.34	2.19	1.83	2.45	2.19
Leather, sheepskin-lined clothing.....	2.20	2.02	1.87	1.74	2.15	2.04
Curtains and draperies.....	2.19	2.35	2.43	2.04	1.98	2.25
Other house furnishings.....	2.55	2.59	2.89	2.14	2.60	2.43
Textile bags.....	2.38	1.99	2.18	2.08	2.20	2.12
Canvas products.....	2.20	2.36	2.43	2.17	2.72	2.37
All.....	2.18	2.35	2.40	2.09	2.29	2.27
All.....	1.97	2.05	2.15	1.94	2.14	2.04

<sup>1</sup> Amounts for "Southern" and "All other" combined.

Adapted from Census of Manufactures: 1054.

Differences in value added per dollar of wages, as shown in table 116, may be accounted for in part by differences in wage rates per hour and in part by differences in value added per hour of labor. Census data for 1954 show that the average wage rates per hour ranged from 91 cents for manufacturers of children's coats in Southern States to \$2.47 for manufacturers of fur goods in Middle Atlantic States, and averaged \$1.36 for all geographic divisions and industries combined (table 117). Average wage rates per hour by geographic divisions, and for all industries combined, ranged from \$1.06 in Southern States to \$1.48 in Middle Atlantic States.

TABLE 117.—Average wage rate per hour for fabricators of apparel and other textile products, by industry and by geographic division, United States, 1954

Industry	New England	Middle Atlantic	North Central	Southern	Other	All
Men's and boy's wear:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Men's and boys' suit coats	1. 61	1. 69	1. 60	1. 39	(1)	1. 61
Men's dress shirts, nightwear	1. 22	1. 24	1. 18	. 93	1. 32	1. 09
Men's and boys' neckwear	1. 33	1. 48	1. 24	1. 12	1. 36	1. 38
Separate trousers	1. 26	1. 58	1. 13	. 99	1. 35	1. 19
All	1. 41	1. 52	1. 41	1. 05	1. 33	1. 32
Women's and misses' outerwear:						
Blouses	1. 24	1. 22	1. 36	. 99	1. 30	1. 21
Dresses, unit-price	1. 34	1. 59	1. 40	1. 15	1. 50	1. 53
Dresses, dozen-price	1. 17	1. 17	1. 16	. 97	1. 24	1. 11
Women's suits, coats, skirts	1. 56	1. 80	1. 64	1. 15	1. 77	1. 71
All	1. 37	1. 56	1. 35	1. 05	1. 56	1. 47
Women's and children's wear:						
Underwear	1. 12	1. 24	1. 22	1. 04	1. 24	1. 18
Corsets, allied garments	1. 47	1. 33	1. 20	1. 14	1. 28	1. 31
Children's dresses	1. 10	1. 22	1. 06	. 95	1. 35	1. 18
Children's coats	1. 41	1. 63	1. 24	. 91	1. 79	1. 57
Other children's outerwear	1. 27	1. 24	1. 10	. 96	1. 26	1. 17
Fur goods	1. 65	2. 47	1. 92	1. 24	1. 96	2. 43
All	1. 24	1. 37	1. 22	1. 03	1. 31	1. 29
Other fabricated products:						
Robes and dressing gowns	1. 29	1. 31	1. 16	. 92	1. 22	1. 25
Waterproof outer garments	1. 29	1. 39	1. 54	1. 01	1. 19	1. 34
Leather, sheepskin-lined clothing	1. 49	1. 50	1. 42	1. 04	1. 50	1. 46
Curtains and draperies	1. 12	1. 24	1. 15	. 93	1. 30	1. 19
Other house furnishings	1. 37	1. 24	1. 25	1. 15	1. 23	1. 21
Textile bags	1. 25	1. 33	1. 37	1. 11	1. 56	1. 30
Canvas products	1. 23	1. 31	1. 29	1. 14	1. 43	1. 26
All	1. 26	1. 30	1. 32	1. 12	1. 39	1. 26
All	1. 33	1. 48	1. 35	1. 06	1. 44	1. 36

1 Amounts for "Southern" and "Other" combined.

Adapted from Census of Manufactures: 1954.

Value added by manufacture per hour of labor in 1954 ranged from an average of \$1.48 for fabricators of children's coats in Southern States to \$5.49 for manufacturers of fur goods in Western States, and averaged \$2.77 for all geographic divisions and industries combined (table 118). Value added per hour of labor by geographic divisions, and for all industries combined, ranged from an average of \$2.05 in Southern States to \$3.08 in other, mostly Western, States. The influence of the relatively high average value added per hour of labor in Middle Atlantic States on value added per dollar of wages was offset to some extent by the relatively high average wage

TABLE 118.—Average value added by manufacture per hour of labor by fabricators of apparel and other textile products, by industry and by geographic division, United States, 1954

Industry	New England	Middle Atlantic	North Central	Southern	Other	All
Men's and boys' wear:	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
Men's and boys' suit coats.....	2.68	2.96	2.92	2.60	( <sup>1</sup> )	2.86
Men's dress shirts, night-wear.....	1.92	2.54	2.29	1.67	2.55	2.06
Men's and boys' neckwear.....	3.25	3.57	3.20	3.69	3.24	3.50
Separate trousers.....	2.32	2.79	2.27	1.73	2.81	2.17
All.....	2.37	2.83	2.67	1.92	2.66	2.45
Women's and misses' outerwear:						
Blouses.....	2.16	2.48	2.77	2.04	2.44	2.44
Dresses, unit-price.....	2.46	3.12	2.95	2.61	3.07	3.02
Dresses, dozen-price.....	2.11	2.54	2.58	1.66	2.86	2.28
Women's suits, coats, skirts.....	3.16	3.76	3.50	2.45	3.94	3.59
All.....	2.60	3.15	2.91	2.05	3.32	2.98
Women's and children's wear:						
Underwear.....	1.94	2.75	2.58	2.24	2.11	2.51
Corsets, allied garments.....	4.67	3.25	4.68	3.00	3.75	3.56
Children's dresses.....	2.02	2.63	2.30	1.49	2.47	2.43
Children's coats.....	2.30	3.39	2.67	1.48	3.72	3.20
Other children's outerwear.....	3.05	2.58	2.27	1.92	2.44	2.44
Fur goods.....	3.46	5.38	5.37	2.55	5.49	5.36
All.....	2.79	3.02	3.17	2.20	2.85	2.86
Other fabricated products:						
Robes and dressing gowns.....	2.51	2.85	2.70	1.49	2.48	2.61
Waterproof outer garments.....	2.54	3.27	3.36	1.84	2.92	2.94
Leather, sheepskin-lined clothing.....	3.27	3.04	2.65	1.80	3.23	2.99
Curtains and draperies.....	2.44	2.91	2.80	2.01	2.58	2.67
Other house furnishings.....	3.49	3.21	3.60	2.47	3.20	2.93
Textile bags.....	2.97	2.65	2.99	2.30	3.43	2.75
Canvas products.....	2.71	3.09	3.15	2.46	3.89	3.00
All.....	2.75	3.06	3.17	2.34	3.18	2.86
All.....	2.62	3.03	2.90	2.05	3.08	2.77

<sup>1</sup> Amounts for "Southern" and "Other" combined.

Adapted from Census of Manufactures: 1954.

rate per hour, so that the value added per dollar of wages averaged less in Middle Atlantic than in North Central States. Similarly the influence of the relatively low average wage rate per hour in Southern States on average value added per dollar of wages was partly offset by the relatively low average value added per hour of labor, so that value added per dollar of wages averaged less in the Southern than in any other division.

Median profits to manufacturers of apparel and household textiles (after full depreciation on buildings, machinery, equipment, furniture, and other assets; after reserves for Federal income and excess profit taxes; after charge-offs for bad debts; after all miscellaneous reserves and adjustments; but before dividends and 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, and averaged 1 percent in 1957 (table 119). As proportions of tangible net worth, these profits were considerably greater, but the trends from 1939 through 1957 were similar to those in proportion to net sales.

### Means and Importance of Improvement

Gross margins of manufacturers of apparel and other finished textile products have increased considerably, and the proportions of these margins accounted for by salaries and wages increased from 44 percent in 1947 to almost 50 percent in 1954. According to reports of the Bureau of Labor Statistics, average hourly earnings of wage workers in this industry in 1957 were about 10 percent higher than in 1954 and about 32 percent higher than in 1947. These data emphasize the importance of making full use of technological developments and of improvements in organization and operation in increasing the efficiency and reducing the costs of manufacturing apparel and household textiles.

Time studies may be useful in developing 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 improved 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 locating and removing causes of labor turnover and costly slowups in production. Modernization of plants and utilization of workers to their full potentialities, to the mutual benefit of workers and management, apparently offer 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

TABLE 119.—Median net profits of manufacturers of apparel and household textiles as proportions of net sales and of tangible net worth, by kind of products, specified years, 1935-57<sup>1</sup>

Item	Net profits <sup>2</sup> as proportion of net sales <sup>3</sup>									
	1935-39	1941	1945	1947	1949	1951	1953	1955	1956	1957
Women's coats and suits.....	Percent 0.14	Percent 1.42	Percent 4.00	Percent 3.95	Percent 3.50	Percent 0.92	Percent 0.36	Percent 1.12	Percent 0.90	Percent 0.54
Dresses, rayon and silk.....	.37	.74	3.27	2.77	1.03	.86	1.04	.43	.61	.63
Men's and boys' clothing.....	.61	2.04	4.05	3.19	1.38	.76	1.03	1.14	1.28	.59
Men's shirts, underwear, and pajamas.....	.70	1.79	2.26	4.38	1.51	.75	1.62	1.29	.80	.77
Overalls and work clothing <sup>4</sup> .....	1.04	3.84	3.56	2.62	1.82	1.79	1.94	1.56	1.47	1.49
Knit outerwear.....	.79	2.18	3.96	4.22	1.66	2.16	2.14	1.58	1.25	1.15
Hosiery.....	1.65	3.35	3.42	5.69	2.14	2.26	1.87	1.68	1.41	1.67
	Net profits as proportion of tangible net worth <sup>5</sup>									
Women's coats and suits.....	1.15	9.56	21.96	19.37	13.52	4.43	3.52	7.55	4.89	4.70
Dresses, rayon and silk.....	2.75	8.57	17.85	16.38	6.41	5.77	9.04	4.22	6.66	7.17
Men's and boys' clothing.....	2.93	10.79	16.04	12.30	5.15	2.76	4.81	4.50	6.77	2.64
Men's shirts, underwear, and pajamas.....	3.35	9.68	10.73	16.25	5.92	3.16	7.29	4.47	3.93	3.18
Overalls and work clothing <sup>4</sup> .....	3.14	14.49	11.80	11.45	9.49	6.78	7.16	5.59	4.78	4.67
Knit outerwear.....	2.99	10.70	17.41	13.20	5.09	6.25	8.62	6.46	6.65	4.82
Hosiery.....	4.04	11.90	10.75	15.63	5.74	6.32	3.63	3.97	3.07	3.89

<sup>1</sup> The number of concerns reported for 1957 ranged from 50 for overalls and work clothing to 194 for men's and boys' clothing.

<sup>2</sup> 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 chargeoffs for bad debts; after all miscellaneous reserves and adjustments; but before dividends or withdrawals.

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

<sup>4</sup> Aprons and dresses, cotton, after 1948.

<sup>5</sup> 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 goodwill, trademarks, patents, copyrights, leaseholds, mailing lists, treasury stock, organization expenses, and underwriting discounts and expenses.

Adapted from reports of Dun and Bradstreet, Inc. (#7, #5).

garment industry is not highly mechanized (110). 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 turnover 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 1954 about 26 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 58 percent had fewer than 20 employees, and about 81 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 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 indication of the effects of styling on costs of women's dresses, for example, may be obtained from this situation: From 1940 to 1942, average gross margins of 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 (93). Style is an important consideration also 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 (14). 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.

Information available indicates possibilities of reducing some costs through integration. Census data for 1954 show that the value added by manufacture of women's and children's clothing, except millinery and fur goods, per dollar of payroll, averaged about 19 percent greater for multiunit than for single-unit companies. For multiunit companies, value added per dollar of payroll averaged about 25 percent greater for multi-industry companies than for single-industry companies (table 95, p. 210). Similar data for manufacturers of men's and boys' clothing show smaller proportions in favor of multi-unit and multi-industry companies (table 95, p. 210).

Apparently opportunities for integration 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 making 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 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 sideline. The most difficult problems reported thus far have been in distribution rather than in manufacture.

In the overalls manufacturing industry, integration has seldom been successful (19). Widely different scales 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, since, 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 of 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 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. Detailed specifications also are needed, 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 also are needed.



As this information is mainly for the use of operators in the particular segment of the industry involved, their advice and assistance in planning and developing the research may be used to advantage. The nature of the industry manufacturing apparel and household textiles is such that the research would require the services of 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 (94). 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 on manufacturers' gross margins. These margins in the 1930's averaged about 29 percent of the consumer's dollar paid for the finished products, more than two and one-half times the returns to growers for 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 exceed an increase of 25 percent in returns to growers for farm production of the cotton and wool used, and would also exceed the 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 related products through several combinations of agencies to consumers. An important channel of distribution, particularly in earlier years, was from manufacturers to wholesalers to retailers to consumers. 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 (47), and mergers in the textile industry reached a high rate in 1947. Following a decline in rate of acquisitions during the late 1940's and early 1950's, another wave of mergers started in 1953 and continued through the middle 1950's.

Wholesale distribution of textile products relates to intermediate or partially manufactured products, as well as to those that are in form for distribution to ultimate consumers. Information on wholesaling methods, practices, charges, and costs is presented separately for partially manufactured products and for products ready 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 yarns and fabrics, but some yarns and fabrics are ready for dis-

tribution to ultimate consumers when they leave the mill. Information on partially manufactured textile products, presented here, is limited mainly to the wholesale distribution services of manufacturers, finishers or converters, and wholesalers. Some of these agencies also handle products ready 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 yarns and fabrics as intermediate products is presented here.

*Yarn.*—Census data for 1954 indicate that shipments, including interplant transfers, of yarn spun on the cotton system totaled 956 million pounds, or about 23 percent of the total produced. About 60 percent of these shipments were carded cotton yarns, 28 percent combed cotton yarns, and 12 percent other yarns made of manmade fibers and blends. Shipments of thrown filament yarns amounted to 24 million pounds, or about 14 percent of the total produced. About 54 percent of the filament yarns shipped were weaving yarns, and 46 percent were knitting yarns. Shipments of yarns spun on woolen and worsted systems amounted to 105 million pounds, or about 26 percent of the total produced. About 53 percent of these shipments were knitting yarns, 46 percent weaving yarns, and 1 percent other yarns. Similar data are not available for 1948, but available information indicates that the total volume of shipments, including interplant transfers, decreased from 1948 to 1954.

Integrated weaving mills try to 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 apparently 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 yarn require specialized skills (16).

Yarns usually are manufactured in larger quantities of uniform quality than are required by individual customers. A basic problem in marketing this yarn 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 sellers, in that it reduces the costs of selling by enabling one seller to handle yarns from many spinners.

Producers of yarn for sale usually do not limit themselves to any one basis of operation in selling their products. They use different agencies and processes in dealing with different purchasers (16). Procedures and agencies involved in distributing sales yarn include: (1) Direct sales of yarn by spinners to those who use it, through the spinners' own sales staffs and offices, with or without the services of brokers; (2) sales to merchants or dealers, who in turn resell to consumers; (3) sales by spinners exclusively through agents who

maintain offices and sales staffs in central marketing centers; and (4) distribution through a combination of sales through agents and direct sales to users.

Census data show that industrial yarns valued at \$191 million were sold in 1954 through merchant wholesalers. Of this, about 81 percent was distributed to industrial users, almost 10 percent to wholesalers, 4 percent to retailers, and 5 percent to export. In 1948, yarns valued at \$155 million were sold through merchant wholesalers, of which about 55 percent were distributed to industrial users, 27 percent to wholesalers, 8 percent to retailers, 9 percent to export, and small proportions to other customers.

Manufacturers' sales branches and offices in 1954 sold \$822 million of textile mill products, other than cotton and rayon fabrics, knitting mill products, and carpets and rugs, some of which apparently was yarns. About 68 percent of these products were distributed to industrial users, 13 percent to wholesalers, 14 percent to retailers, 3 percent to export, and small proportions to other customers. The value of industrial yarns sold through manufacturers' sales offices in 1948 totaled \$386 million, of which about 68 percent were distributed to industrial users, 27 percent to wholesalers, 3 percent to export, and small proportions to retailers and other customers.

Yarns valued at \$263 million were sold in 1954 through merchandise agents and brokers. Of these, about 93 percent went to industrial users, 4.5 percent to wholesalers, 2 percent to retailers, and small proportions to other customers. Similar data for 1948 are not available.

About 97 percent of the merchant wholesalers reported credit sales of industrial yarns in 1954, and the value of credit sales amounted to 97 percent of the total. About the same proportion of sales were made on credit in 1948. End-of-year receivables and bad debt losses, as proportions of sales, were slightly greater in 1954 than in 1948. Cash-credit 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 cash. Of cotton yarns sold through the manufacturers' sales branches, about 12 percent were sold on credit for more than 30 days, 78 percent on credit for 11 to 30 days, and about 10 percent on credit for 10 days or less.

*Fabrics.*—A large proportion of fabrics as they leave the mill represent intermediate products ready for converters, fabricators, or industrial users. Some, however, are fabricated by mills into such items as sheets, pillowcases, towels, and bedspreads, and some are sold as finished piece goods ready for the ultimate consumer. Manufacturer outlets for textile fabrics are accounted for largely 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.

Substantial proportions of broad-woven fabrics made of cotton and manmade fibers 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 concentrated mostly 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 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 the finishing is done by or for the manufacturer before the fabrics are sold. But considerable quantities of gray goods made of cotton and manmade fibers, and some woolen and worsted fabrics, are finished by establishments primarily engaged in finishing operations. Manufacturers' sales of woven fabrics usually are made directly by the sales staff of manufacturers, or through agents, brokers, and commission merchants, or by some combination of these means.

Census data show that in 1954 the value of textile fabrics sold through manufacturers' sales branches and offices totaled \$475 million, of which about 46 percent went to industrial users, 45 percent to wholesalers, 5.5 percent to retailers, and small proportions to export and other outlets. In 1948, the value of piece goods sold through manufacturers' sales branches totaled \$1,003 million, of which 72 percent went to industrial users, 18 percent to wholesalers, about 8 percent to retailers, and small proportions to other customers. Piece goods valued at \$603 million were sold through manufacturers' sales offices, and 59 percent of them went to industrial users, 26 percent to wholesalers, 12 percent to retailers, and small proportions to other customers.

The value of piece goods sold through merchandise agents and brokers in 1954 totaled about \$2,521 million, according to census reports. About 53 percent went to industrial users, 35 percent to wholesalers, 7 percent to retailers, 4 percent to export, and small proportions to other customers. In 1948, the value of piece goods sold through merchandise agents and brokers totaled almost \$3,000 million, of which 61 percent went to industrial users, 22 percent to wholesalers, 13 percent to retailers, and 4 percent to exports.

Sales of piece goods converters totaled \$1,504 million in 1954, according to census reports, of which about 42 percent went to industrial users, 40 percent to wholesalers, 14 percent to retailers, and 4 percent to export. In 1948, sales of piece goods converters totaled \$1,764 million, of which 49 percent went to industrial users, 28 percent to wholesalers, and 17 percent to retailers.

Sales of piece goods by merchant wholesalers totaled \$975 million in 1954, according to census reports, of which 31 percent went to industrial users, 28 percent to wholesalers, 28 percent to retailers, and 13 percent to export. In 1948, sales totaled \$1,133 million, of which 30 percent went to industrial users, 22 percent to wholesalers, 26 percent to retailers, 21 percent to export, and small proportions to other customers.

Gray-goods markets for knit goods are relatively unimportant, as most of the knit goods are finished by 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 more 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 finish-

ing 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).

About 97 percent of sales of piece goods in 1954 by wholesalers, and in 1948 about 93 percent, were made on credit, according to census reports. Piece goods converters in 1954 sold about 98 percent on credit, and in 1948, about 99 percent. End-of-year receivables as proportions of sales in 1954 amounted to about 12 percent for piece goods wholesalers and 9 percent for piece goods converters. The corresponding proportions in 1948 were about 8 and 9 percent, respectively.

#### Charges or Costs Involved

Information relating to charges and costs involved in the wholesale distribution of yarns and fabrics as intermediate textile products is presented here.

*Yarn.*—Charges or costs involved in wholesale distribution of yarns usually cover 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.

Commissions received in 1954 for the sale of yarns valued at \$263 million sold through merchandise agents and brokers, averaged 2.5 percent of the selling price. As indicated above (p. 264), most of this yarn was sold to industrial users and to retailers, but 4.5 percent was sold to wholesale organizations for further distribution. Similar data for textile mill products other than fabrics, knitting mill products, and carpets and rugs, some of which apparently were yarns, show that operating expenses in selling products valued at \$822 million through manufacturers' sales branches and offices averaged 5.7 percent of sales. Most of these sales were made to industrial users, retailers, and to export, but about 13 percent were made to wholesalers. Operating expenses of wholesale merchants for selling industrial yarns, valued at \$192 million in 1954, averaged 6.9 percent of sales, according to census reports. Almost 10 percent of these sales were made to wholesalers.

Census data show that average operating expenses of merchant wholesalers decreased from 8.3 percent of sales in 1939 to 6.9 percent in 1948 and 1954 (table 120). These expenses varied inversely with the size of the establishment as indicated by annual volume of sales. In 1954, they ranged from an average of 3.5 percent of sales for establishments with annual sales of \$5 million or over to 30.4 percent for establishments with annual sales of less than \$50,000. These operating expenses include no compensation for active proprietors of unincorporated businesses, or for profits.

Payrolls accounted for about 48 percent of total operating expenses in 1954, about the same as in 1939 and slightly less than in 1948 (table 120). Payrolls as proportions of sales also varied inversely with the size of the establishment as indicated by annual

volume of sales. In 1948, the ratio of number of active proprietors to paid employees decreased, and proportions of total operating expenses that were accounted for by payrolls increased, with increases in size of the establishments.

TABLE 120.—Number of establishments operating entire year, volume of sales, operating expenses and payroll of merchant wholesalers of yarn, by size group, United States, 1939, 1948, and 1954

Size group by value of sales	1939			
	Estab-lish-ments	Total sales	Operating expenses as propor-tion of sales <sup>1</sup>	Payroll as propor-tion of sales
<i>Dollars</i>	<i>Number</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>Percent</i>
All.....	157	65, 134	8. 3	4. 0
2,000,000 and over.....	6	27, 370	5. 5	2. 6
1,000,000 to 1,999,999.....	7	10, 329	6. 9	3. 3
500,000 to 999,999.....	19	12, 749	8. 7	4. 8
300,000 to 499,999.....	16	6, 470	11. 1	5. 5
200,000 to 299,999.....	13	3, 331	17. 0	8. 1
100,000 to 199,999.....	13	1, 661	13. 7	5. 1
50,000 to 99,999.....	24	1, 982	17. 1	7. 2
10,000 to 49,999.....	43	1, 138	19. 8	9. 0
Less than 10,000.....	16	104	21. 2	14. 4
	1948			
All.....	210	144, 652	6. 9	3. 4
5,000,000 and over.....	4	32, 935	4. 1	2. 1
2,000,000 to 4,999,999.....	16	49, 926	5. 0	2. 6
1,000,000 to 1,999,999.....	12	14, 962	6. 9	3. 5
500,000 to 999,999.....	30	20, 960	9. 9	5. 2
300,000 to 499,999.....	31	12, 213	10. 0	4. 5
200,000 to 299,999.....	19	4, 739	13. 5	6. 0
100,000 to 199,999.....	38	5, 556	12. 4	5. 2
50,000 to 99,999.....	35	2, 687	14. 6	6. 0
Less than 50,000.....	25	674	23. 3	8. 6
	1954			
All.....	218	191, 000	6. 9	3. 3
5,000,000 and over.....	6	47, 347	3. 5	1. 5
2,000,000 to 4,999,999.....	16	51, 590	4. 4	2. 5
1,000,000 to 1,999,999.....	31	45, 619	6. 0	3. 2
500,000 to 999,999.....	31	22, 345	12. 0	5. 0
300,000 to 499,999.....	23	10, 841	14. 2	7. 1
200,000 to 299,999.....	23	5, 607	15. 2	6. 9
100,000 to 199,999.....	34	5, 022	17. 0	7. 4
50,000 to 99,999.....	25	1, 875	21. 2	10. 0
Less than 50,000.....	29	757	30. 4	16. 0

<sup>1</sup> Operating expenses include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Wholesale Trade: 1939, 1948, and 1954.

*Fabrics.*—Any evaluation of the charges or costs of distributing textile products 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.

Census data show that in 1954 operating expenses of manufacturers' sales branches and offices for selling textile mill products valued at \$1,810 million, averaged 5.8 percent of total sales. Operating expenses for broad-woven fabrics, valued at \$475 million, averaged 5 percent of sales. About 45 percent of the sales of fabrics, and 27 percent of the sales of all textile mill products combined, were made to wholesalers. Brokerage or commissions received by merchandise agents and brokers for the sale of piece goods, valued at \$2,521 million, averaged 3.1 percent of sales. About 35 percent of these sales were made to wholesalers.

Operating expenses in 1954 of converter wholesalers of piece goods averaged 9.8 percent of total sales, and those for merchant wholesalers averaged 12.8 percent (tables 121 and 122). About 48 percent of the operating expenses of converter wholesalers and 46 percent of the operating expenses of merchant wholesalers were accounted for by payrolls. Proportions of sales accounted for by selling expenses increased from 1948 to 1954, and varied inversely with size of the operating unit as indicated by annual volume of sales. In 1954, about 40 percent of the sales of piece goods by converter wholesalers and 27 percent of those by merchant wholesalers were made to wholesalers.

Census reports show that administrative and selling expenses are the principal items in total operating expenses of service wholesalers of piece goods. 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 of 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.

Ratios of operating expenses to sales of piece goods by converter wholesalers varied widely, according to census reports. In 1954, operating expenses of about 21 percent of these wholesalers amounted to less than 7 percent of total sales, whereas operating expenses for more than 10 percent of the wholesalers amounted to 25 percent or more. Of the establishments with annual volume of sales of \$1 million or more, about 70 percent had operating expenses of less than 11 percent of sales and about 3 percent had operating expenses of 25 percent or more of total sales; whereas, for establishments with annual volume of sales of less than \$200,000, about 30 percent had operating expenses of less than 11 percent, and 26 percent had operating expenses of 25 percent or more (table 132, p. 288).

TABLE 121.—Number of establishments operating entire year, value of sales, operating expenses, and payroll for converter wholesalers of piece goods, by size group, United States, 1948 and 1954<sup>1</sup>

Size group by value of sales	1948			
	Establishments	Total sales	Operating expenses as proportion of sales <sup>2</sup>	Payroll as proportion of sales
<i>Dollars</i>	<i>Number</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>Percent</i>
All.....	1, 134	1, 764, 143	8. 9	4. 6
5,000,000 and over.....	70	822, 549	7. 6	4. 1
2,000,000 to 4,999,999.....	140	423, 711	9. 3	4. 6
1,000,000 to 1,999,999.....	171	240, 898	10. 2	5. 2
500,000 to 999,999.....	219	157, 538	10. 4	5. 2
300,000 to 499,999.....	166	65, 720	11. 6	6. 1
200,000 to 299,999.....	104	25, 677	12. 9	4. 0
100,000 to 199,999.....	138	20, 576	12. 3	5. 9
50,000 to 99,999.....	82	6, 241	18. 6	9. 6
Less than 50,000.....	44	1, 233	30. 1	18. 0
	1954			
All.....	791	1, 487, 111	9. 8	4. 7
5,000,000 and over.....	54	815, 586	8. 5	4. 2
2,000,000 to 4,999,999.....	96	294, 969	9. 5	4. 4
1,000,000 to 1,999,999.....	137	187, 525	11. 3	5. 1
500,000 to 999,999.....	151	106, 751	13. 1	6. 0
300,000 to 499,999.....	126	49, 455	12. 8	5. 9
200,000 to 299,999.....	63	15, 264	17. 1	7. 1
100,000 to 199,999.....	89	13, 049	18. 1	7. 9
50,000 to 99,999.....	41	3, 421	19. 9	8. 6
Less than 50,000.....	37	1, 091	27. 9	11. 1

<sup>1</sup> Data for 1954 do not include establishments with no paid employees during census year. Comparable data for 1948 show 1,000 establishments.

<sup>2</sup> Operating expenses include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Wholesale Trade: 1948 and 1954.

Of the merchant wholesalers of piece goods, about 16 percent had operating expenses of less than 7 percent of total sales in 1954, and about 21 percent had operating expenses of 25 percent or more. Of the establishments with annual volume of sales of \$1 million or more, about two-thirds had operating expenses of less than 11 percent, and almost 7 percent had operating expenses of 25 percent or more of total sales (table 132, p. 288).

Most of the establishments operated by converter wholesalers and merchant wholesalers of piece goods are operated as single units, according to census reports. In 1954, the average value of annual sales per establishment and operating expenses as proportions of total sales, for both converter and merchant wholesalers, were less for establishments operated as single units than for those operated as multiunits (table 128, p. 283).





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 1954, for example, total operating expenses of wholesale yarn merchants ranged from an average of 3.5 percent of total sales for concerns with annual sales of \$5 million or more to 30 percent for concerns with annual sales of less than \$50,000. Similar data for piece goods show that operating expenses of converter wholesalers ranged from 8.5 percent of total sales for concerns with annual sales of \$5 million and over to 29 percent for those with annual sales of less than \$50,000. For merchant wholesalers, these proportions ranged from about 11 percent of sales for concerns with annual sales of \$1 million or more to 27 percent for those with annual sales of less than \$50,000. 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 expenses of wholesaling yarn and piece goods through different agencies indicates the possibility of some reductions in costs of wholesale distribution through integration of the manufacturing and distributing functions. According to census reports, operating expenses for wholesaling 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. In 1954, operating expenses for wholesaling piece goods averaged 12.7 percent of sales for merchant wholesalers, and 3.1 percent for merchandise agents and brokers. But information available is not adequate to show the extent to which these differences may be accounted for by differences in services performed.

Possibilities of improvements through reductions in unnecessary handling of products, the use of quality standards as a basis for sales on description, vertical and horizontal integration, and the modernization of equipment and methods need to be explored and evaluated as means of increasing efficiency and reducing costs of distributing intermediate textile products. Additional information is needed to show the influence of the various factors on the adequacy and costs of each important process of service involved. Some suggested means that might be used in obtaining such information are presented in another section of this bulletin (p. 296).

The relative importance of increasing efficiency and reducing costs of wholesale distribution of intermediate textile products may be indicated by the fact that gross margins of these wholesalers average substantially less than those for manufacturing and retailing the finished products. But costs of wholesale distribution of piece goods average 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 products of hosiery and underwear factories leave the mills as completed goods for consumers.

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 (51). 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 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 for 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 merchant wholesalers, manufacturers' sales branches and offices, and merchandise agents and brokers. Merchant wholesalers buy and sell merchandise on their own account. They sell principally to retailers or to industrial, commercial, or professional users. Usually they carry stocks assembled in large lots and generally redistribute them through salesmen. They extend credit to customers, make deliveries, service merchandise sold, and render advice to the trade. Manufacturers' sales branches and offices are establishments owned by manufacturers and maintained apart from manufacturing plants primarily for selling their products at wholesale. Merchandise agents and brokers are operators in business for themselves and primarily engaged in selling or buying goods for others.

Census data show that, in 1954, textile products valued at \$5,445 million were distributed by \$,675 merchant wholesalers to retailers, industrial users, wholesalers, and others (table 123). Proportions of total sales that went to retailers averaged 43 percent and ranged from less than 1 percent for general-line dry goods to about 78 percent

TABLE 123.—Number of merchant wholesalers of textile products, total sales, and proportion of sales to specified customers, by kind of products, United States, 1948 and 1954

Kind of product	1948					
	Establishments	Total sales	Proportion of sales to—			
			Industrial users	Wholesalers	Retailers	Other
	Number	1,000 dollars	Percent	Percent	Percent	Percent
Dry goods, piece goods, notions.....	5,466	2,405,040	21.7	15.4	50.5	12.4
General line.....	182	457,242	3.3	2.4	90.6	3.7
Hosiery, underwear.....	702	208,443	1.7	10.0	80.4	7.9
Piece goods (jobbers).....	2,441	1,133,056	29.9	22.1	26.3	21.7
Other.....	2,141	606,299	27.3	14.5	55.0	3.2
Clothing, furnishings.....	4,013	1,153,190	4.7	7.5	82.3	5.5
General line.....	379	179,233	3.4	4.8	78.8	13.0
Men's and boys'.....	1,454	402,531	3.1	6.2	85.9	4.8
Women's, children's.....	1,435	424,697	3.4	3.7	90.0	2.9
Furs, fur clothing.....	544	102,796	12.2	33.1	48.1	6.6
Work clothing.....	201	43,933	20.3	5.9	71.2	2.6
Piece goods converters.....	1,134	1,764,143	49.4	27.9	17.0	5.7
Yarn, industrial.....	236	154,823	55.3	27.3	7.5	9.9
Total or average.....	10,849	5,477,196	28.0	18.1	45.2	8.7
	1954					
Dry goods, piece goods, notions.....	4,320	2,359,079	23.3	20.1	48.6	8.0
General line.....	132	393,580	1.6	.6	95.2	2.6
Hosiery.....	471	260,192	1.6	10.4	83.3	4.7
Underwear.....	164	71,420	7.7	3.7	85.1	3.5
Notions.....	770	198,449	40.4	23.3	33.9	2.4
Piece goods.....	1,663	975,319	30.9	27.7	27.5	13.9
Other dry goods.....	1,120	460,119	33.3	27.4	34.4	4.9
Clothing, furnishings.....	3,316	1,390,679	10.0	13.9	70.2	5.9
General line.....	797	296,157	8.9	12.4	68.4	10.3
Men's and boys'.....	761	384,769	6.9	9.8	77.9	5.4
Women's, children's.....	1,299	566,298	11.1	15.9	68.9	4.1
Furs, fur clothing.....	324	94,317	7.3	27.4	58.7	6.6
Work clothing.....	135	49,138	32.6	5.7	58.2	3.5
Piece goods converters.....	817	1,503,962	41.7	39.8	14.0	4.5
Yarn, industrial.....	222	191,250	80.7	9.6	4.0	5.7
Total or average.....	8,675	5,444,970	27.0	23.6	43.0	6.4

Adapted from Census of Business, Wholesale Trade: 1948 and 1954.

for men's and boys' clothing and furnishings. Proportions that went to industrial users averaged 27 percent and ranged from less than 2 percent for hosiery and general-line dry goods to about 81 percent for industrial yarn. Almost 24 percent of these products went to other wholesalers for further distribution, and the proportions ranged from less than 1 percent for general-line dry goods to about 40 percent for piece goods converters. Changes from 1948 to 1954 in proportions of sales that went to specified outlets varied irregularly from one kind of product to another, but, on the average, the proportion that went to other wholesalers for further distribution increased and the proportions to other outlets decreased (table 123).

Similar data for other wholesale distributors show that in 1954 textile products valued at \$2,546 million were distributed by manufacturers' sales branches and offices to retailers, industrial users, wholesalers, and others (table 124). Sales to retailers averaged 36.5 percent of the total and the proportions by kind of product ranged from less than 6 percent for cotton and rayon fabrics to about 92 percent for women's and children's apparel. Sales to industrial users accounted for about 35 percent of the total and the proportions ranged from less than 2 percent for men's and boys' apparel to 68 percent for other textile mill products not specified. Almost 26 percent of the total was sold to wholesalers for further distribution, and the proportions ranged from less than 1 percent for women's and children's apparel to 58 percent for other apparel not specified. Changes from 1948 to 1954 show decreased proportions sold to industrial users and increased proportions to other outlets.

Census data show that in 1954 textile products with a total value of \$5,136 million were sold by merchandise agents and brokers to retailers, industrial users, wholesalers, and others (table 125). Sales to retailers accounted for about 38 percent of the total and ranged from about 7 percent for piece goods to 82 percent for general-line apparel and furnishings. Sales to industrial users averaged about 32 percent of the total and ranged from less than 4 percent for general-line apparel to about 53 percent for piece goods. Proportions sold to wholesalers averaged 27 percent of the total and ranged from about 13 percent for general-line and women's and children's apparel to about 53 percent for hosiery. Changes from 1948 to 1954 in proportion of sales to specified outlets varied irregularly from one kind of product to another, but on the average the proportions that went to industrial users decreased and the proportions to other outlets increased (table 125).

Degree of specialization of merchant wholesalers of textile products may be indicated by census data showing proportions of total sales of these wholesalers that were accounted for by specified commodity lines. In 1954, the proportions of total sales of all commodity lines that were accounted for by sales of the specified commodity lines ranged from about 6 percent for women's and children's suits and coats, except fur, to 90 percent for yard goods (table 126). In more than half of the instances, sales of the specified commodity line averaged less than one-fourth of total sales of all commodity lines. Similar data for 1948 show that the proportion of total sales of all commodity lines that were accounted for by sales of the specified commodity lines ranged from about 3 percent for women's and children's suits and coats, except fur, to 88 percent for yard goods. In less than half of the instances, sales of the specified commodity

line averaged less than one-fourth of total sales of all commodity lines in 1948.

Size of establishment as indicated by the value of annual sales varies considerably from one type of wholesaler to another and also from one establishment to another among wholesalers of the same type. Annual volume of sales of men's and boys' clothing and furnishings, for example, in 1954 averaged \$505,600 for merchant wholesalers, \$2,990,100 for manufacturers' sales branches and offices, and \$1,582,200 for merchandise agents and brokers, according to census reports. More or less similar differences are shown for other lines of products. Annual volume of sales of men's and boys' clothing and furnishings by merchant wholesalers, for example, in 1954, ranged from less than \$50,000 to more than \$5 million.

TABLE 124.—Number of wholesalers (manufacturers' sales branches and offices) of textile products, total sales, and proportion of sales to specified customers, by kind of product, United States, 1948 and 1954

Kind of product	1948					
	Estab- lish- ments	Total sales	Proportion of sales to—			
			Indus- trial users	Whole- salers	Retail- ers	Other
	Num- ber	1,000 dollars	Per- cent	Per- cent	Per- cent	Per- cent
Dry goods, piece goods.....	514	2, 130, 728	58. 6	18. 9	20. 7	1. 8
Hosiery.....	108	197, 386	. 6	6. 0	91. 1	2. 3
Piece goods.....	158	1, 608, 622	67. 3	21. 3	9. 5	1. 9
Other dry goods.....	248	324, 720	51. 0	15. 3	32. 7	1. 0
Clothing, furnishing.....	420	667, 111	1. 7	10. 7	86. 2	1. 4
Men's and boys'.....	203	379, 529	. 9	6. 7	90. 0	2. 4
Women's, children's.....	193	187, 681	. 4	10. 8	88. 5	. 3
Other.....	33	99, 901	6. 5	26. 2	67. 2	. 1
Total or average.....	943	2, 797, 839	45. 0	17. 0	36. 3	1. 7
	1954					
Textile mill products.....	431	1, 809, 931	48. 0	26. 8	22. 3	2. 9
Cotton, rayon fabrics.....	86	475, 325	46. 3	44. 8	5. 5	3. 4
Knitting mill products.....	31	88, 419	5. 1	31. 6	61. 7	1. 6
Carpets and rugs.....	131	424, 336	20. 9	37. 6	41. 5	0
Other products.....	183	821, 851	68. 1	13. 3	14. 2	4. 4
Apparel and related prod- ucts.....	283	735, 931	3. 5	23. 4	71. 3	1. 8
Men's and boys'.....	103	307, 979	1. 2	26. 0	72. 1	. 7
Women's, children's.....	107	279, 228	4. 5	. 5	92. 3	2. 7
Other.....	73	148, 724	6. 4	58. 1	33. 6	1. 9
Total or average.....	714	2, 545, 862	35. 1	25. 8	36. 5	2. 6

Adapted from Census of Business, Wholesale Trade: 1948 and 1954.

TABLE 125.—Number of wholesalers (merchandise agents and brokers) of textile products, total sales, and proportion of sales to specified customers, by kind of product, United States, 1948 and 1954

Kind of product	1948					
	Estab- lish- ments	Total sales	Proportion of sales to—			
			Indus- trial users	Whole- salers	Retail- ers	Other
	Num- ber	1,000 dollars	Per- cent	Per- cent	Per- cent	Per- cent
Dry goods, piece goods.....	1,063	3,223,128	56.8	23.5	15.7	4.0
Hosiery, underwear.....	225	223,685	.8	39.0	58.2	2.0
Piece goods.....	838	2,999,443	61.0	22.3	12.5	4.2
Apparel, furnishings.....	1,521	4,513,396	2.6	11.8	83.9	1.7
General line.....	245	519,560	.7	12.6	84.5	2.2
Men's and boys'.....	358	215,723	2.5	17.3	78.1	2.1
Women's, children's.....	824	721,486	3.1	8.6	87.1	1.2
Furs, fur clothing.....	94	56,627	13.2	25.6	60.3	.9
Total or average.....	2,584	4,736,524	39.4	19.8	37.5	3.3
	1954					
Dry goods, piece goods.....	818	3,233,165	47.1	34.7	13.9	4.3
Hosiery.....	111	224,021	6.9	52.8	39.3	1.0
Dry goods.....	159	488,027	43.3	24.9	29.6	2.2
Piece goods.....	548	2,521,117	52.8	34.7	7.3	5.2
Apparel, furnishings.....	1,023	1,902,837	5.5	13.9	78.7	1.9
General line.....	226	658,415	3.6	12.6	82.4	1.4
Men's and boys'.....	162	248,213	7.5	14.9	75.7	1.9
Women's, children's.....	573	921,217	5.2	12.8	80.0	2.0
Furs, fur clothing.....	48	59,941	16.3	39.1	39.7	4.9
Work clothing.....	14	15,051	28.6	26.1	43.9	1.4
Total or average.....	1,814	5,136,002	31.7	27.0	37.9	3.4

Adapted from Census of Business, Wholesale Trade: 1948 and 1954.

Most of the sales of textile products by merchant wholesalers are made on credit. Census reports show that in 1954 about 97 percent of sales of dry goods and apparel by merchant wholesalers reporting credit sales was made on credit. End-of-year receivables varied from an average of about 9 percent of sales for piece goods to 13 percent for general-line dry goods. Bad-debt losses averaged less than 0.2 percent of sales.

As indicated in greater detail later in this bulletin (p. 282), most of the merchant wholesalers and merchandise agents and brokers for textile products operate single-unit establishments, but the average annual volume of sales in 1954 was less for single-unit than for multiunit establishments, according to census reports. Most of the establishments operated by manufacturers' sales branches and offices were multiunits, and the annual volume of sales in 1954 averaged much greater for multiunits than for single units.

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 retailers. 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 turnover. Total costs of storage are reduced because largescale 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.

It has been suggested that wholesalers could relieve manufacturers of much of their storage burdens and their price risks by ordering greater quantities in advance. They might reduce transportation and selling costs if they bought in larger lots at less frequent intervals. They might help in the work of assembling by carrying larger lines of merchandise, and they might give more aid in the introduction of new products by manufacturers. Extra care in granting credit might avoid keeping many incompetent retailers in business who give no real indication of developing into competent storekeepers (16).

#### Charges or Costs Involved

Gross margins involved in taking finished textile products from manufacturers and delivering them to ultimate consumers include charges or costs for distribution services of manufacturers, wholesalers, and retailers. But information on the kind and extent of distribution services performed by the different agencies and to the charges made for these services is incomplete. Data on costs of distribution services 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.

Charges or costs involved in the wholesale distribution of finished textile products vary with the type of wholesaler, size of the operating unit, kind of product, and from one period to another. Census data show that in 1954 operating expenses of wholesalers averaged 13.1 percent of net sales for merchant wholesalers, 9 percent for manufacturers' sales branches and offices, and 3.3 percent for merchandise agents and brokers (table 127). These proportions varied considerably from one kind of product to another as well as among types of wholesalers. Operating expenses as proportions of sales in 1954 averaged greater than in 1948 and 1939 for merchant wholesalers and for merchandise agents and brokers, and averaged greater than in 1948 and less than in 1939 for manufacturers' sales branches and offices.



TABLE 126.—Number of merchant wholesale establishments reporting, total sales, and proportion of total sales accounted for by sales of specified textile commodity lines, United States, 1948 and 1954

Commodity line	Establishments reporting commodity lines		Total sales of all commodity lines		Proportion accounted for by specified commodity line	
	1948	1954	1948	1954	1948	1954
Clothing and furnishings:	<i>Number</i>	<i>Number</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>Percent</i>
Men's and boys'-----	1, 872	1, 368	628, 527	622, 706	72. 6	70. 6
Hosiery, underwear, etc.-----	779	768	289, 278	383, 648	36. 6	15. 8
Suits, coats, overcoats-----	412	189	163, 680	72, 768	56. 1	43. 7
Work clothing-----	593	399	186, 787	140, 633	31. 6	31. 7
Other-----	880	841	300, 281	489, 542	47. 7	37. 7
Women's and children's-----	2, 747	2, 348	879, 457	926, 389	82. 7	79. 5
Dresses, skirts, blouses-----	617	607	227, 063	305, 490	48. 6	60. 4
Suits, coats (except furs)-----	303	246	128, 152	112, 823	51. 2	38. 8
Hosiery, underwear, etc-----	448	633	176, 461	274, 002	22. 9	12. 6
Children's, infants' wear-----	531	453	203, 180	219, 010	39. 1	35. 7
Piece goods and domestics-----	392	293	182, 875	174, 512	12. 9	16. 2
Specialty-line dry goods:						
Men's and boys'-----	288	442	120, 548	247, 618	17. 5	41. 6
Hosiery, underwear, etc-----	206	494	76, 395	254, 079	16. 8	32. 1
Suits, coats, overcoats-----	24	22	8, 911	7, 616	13. 0	19. 4
Work clothing-----	81	90	24, 458	32, 406	8. 9	10. 5
All other-----	78	139	31, 604	99, 960	6. 2	5. 9
Women's and children's-----	847	681	332, 526	349, 668	62. 2	66. 1
Dresses, skirts, blouses-----	70	85	24, 921	37, 738	12. 4	12. 1

Suits, coats (except fur)-----	15	12	4, 347	7, 883	2. 8	6. 5
Hosiery, underwear, etc-----	671	674	263, 588	308, 397	65. 2	50. 9
Children's, infants' wear-----	94	117	27, 687	63, 914	8. 3	12. 7
Piece goods and domestics-----	3, 124	1, 900	1, 505, 090	1, 025, 636	85. 4	92. 1
Yard goods-----	2, 368	1, 103	1, 212, 095	600, 657	88. 3	90. 0
Curtains and draperies-----	306	141	135, 582	65, 604	45. 6	15. 8
Sheets and pillow cases-----	350	197	136, 486	94, 064	25. 9	12. 1
Bedspreads, comforters, blankets-----	313	169	121, 949	85, 453	20. 0	12. 4

Adapted from Census of Business, Wholesale Trade: 1948 and 1954.

TABLE 127.—Average sales per establishment and operating expenses as proportion of sales, by type of wholesaler and by kind of textile products sold, United States, 1939, 1948, and 1954

Kind of product	Merchant wholesalers					
	Average sales per establishment			Operating expense as proportion of sales		
	1939	1948	1954	1939	1948	1954
Dry goods, piece goods, notions.....	<i>Dollars</i> 209, 100	<i>Dollars</i> 440, 000	<i>Dollars</i> 546, 100	<i>Percent</i> 12. 3	<i>Percent</i> 12. 3	<i>Percent</i> 13. 9
General line.....	932, 400	2, 512, 300	2, 981, 700	11. 8	13. 0	14. 4
Hosiery, underwear.....	203, 800	296, 900	522, 200	11. 0	10. 8	13. 7
Piece goods.....	346, 400	464, 200	586, 500	10. 5	10. 2	12. 7
Other dry goods, notions.....	115, 900	283, 200	348, 300	18. 5	16. 3	15. 6
Clothing and furnishings.....	161, 600	302, 800	433, 300	15. 0	14. 5	15. 7
General line.....	143, 800	472, 900	371, 600	14. 9	13. 8	14. 8
Men's and boys'.....	129, 600	276, 800	505, 600	14. 2	14. 2	15. 4
Women's and children's.....	202, 700	296, 000	435, 900	15. 6	15. 3	16. 6
Work clothing.....		218, 600	364, 000		11. 4	13. 8
Piece goods converters.....		1, 555, 700	1, 840, 800		8. 9	9. 7
Total or average.....	238, 600	518, 400	634, 700	13. 0	11. 6	13. 1

Manufacturers' sales branches and offices						
Apparel and related products.....	622, 900	1, 551, 700	2, 600, 500	12. 4	8. 8	9. 0
Men's and boys'.....	807, 700	1, 869, 600	2, 990, 100	12. 0	8. 8	7. 3
Women's and children's.....	437, 700	972, 400	2, 609, 600	13. 2	10. 0	11. 4
Other.....	374, 300	2, 426, 700	2, 037, 300	12. 5	7. 0	7. 9
Merchandise agents and brokers						
Dry goods.....	1, 104, 100	2, 645, 200	3, 952, 500	2. 4	3. 2	3. 3
General line.....	816, 300	1, 595, 900	3, 069, 400	1. 8	2. 3	3. 9
Hosiery, underwear.....	540, 600	994, 200	2, 018, 200	4. 0	4. 6	4. 2
Piece goods.....	1, 326, 800	3, 579, 300	4, 600, 600	2. 4	3. 2	3. 1
Clothing and furnishing.....	361, 900	1, 020, 900	1, 902, 000	3. 1	3. 0	3. 2
General line.....	353, 700	2, 120, 600	2, 913, 300	2. 9	2. 2	2. 5
Men's and boys'.....	254, 000	560, 300	1, 532, 200	4. 6	4. 3	4. 1
Women's and children's.....	403, 700	875, 600	1, 607, 700	2. 8	3. 3	3. 5
Total or average.....	805, 300	1, 840, 900	2, 844, 900	2. 5	3. 1	3. 3

Adapted from Census of Business, Wholesale Trade: 1939, 1948, and 1954.

Data on wholesalers of textile products by single-unit and multi-unit firms show that in 1954 operating expenses as proportions of sales, and proportions of operating expenses that were accounted for by payrolls, varied irregularly with number of establishments operated per firm (table 128). Annual volume of sales per establishment averaged substantially less for single units than for multi-unit firms.

TABLE 128.—*Number of establishments, volume of sales, operating expenses, and payroll as proportion of sales of wholesalers of textile products, United States, 1954*

Kind of product and unit of operation	Merchant wholesalers			
	Estab-lish-ments	Average sales per establish-ment	Operating expenses as pro-portion of sales	Payroll as pro-portion of sales
Clothing, furnishings:	<i>Number</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>
General line.....	797	371, 590	14. 8	7. 7
Single unit.....	775	362, 125	15. 0	7. 8
2 to 9 units.....	22	705, 000	12. 5	5. 8
Men's and boys'.....	761	505, 610	15. 4	6. 7
Single unit.....	721	355, 365	15. 9	7. 2
2 or 3 units.....	26	1, 459, 577	13. 1	6. 5
4 to 9 units.....	14	6, 471, 571	14. 9	5. 3
Women's, children's.....	1, 299	435, 940	16. 6	7. 8
Single unit.....	1, 248	425, 076	16. 4	7. 9
2 or 3 units.....	35	935, 000	18. 2	6. 6
4 to 9 units.....	16	192, 375	18. 5	7. 0
Dry goods:				
General line.....	132	2, 981, 667	14. 4	8. 4
Single unit.....	101	2, 657, 574	13. 7	8. 3
2 to 9 units.....	31	4, 037, 581	15. 9	8. 6
Hosiery.....	471	552, 425	13. 4	6. 3
Single unit.....	449	502, 036	13. 3	6. 1
2 or 3 units.....	22	1, 580, 818	14. 2	7. 4
Notions.....	770	257, 726	18. 7	9. 5
Single unit.....	749	243, 533	19. 5	9. 9
2 to 9 units.....	21	763, 952	9. 8	4. 6
Piece goods.....	1, 663	586, 482	12. 7	5. 9
Single unit.....	1, 560	567, 651	12. 4	5. 7
2 or 3 units.....	73	987, 507	14. 4	7. 4
4 to 25 units.....	30	589, 833	20. 2	10. 2

TABLE 128.—Number of establishments, volume of sales, operating expenses, and payroll as proportion of sales of wholesalers of textile products, United States, 1954—Continued

Kind of product and unit of operation	Merchant wholesalers			
	Estab-lish-ments	Average sales per establish-ment	Operating expenses as pro-portion of sales	Payroll as pro-portion of sales
Dry goods—Continued	<i>Number</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>
Piece goods, converters.....	817	1, 840, 835	9. 7	4. 6
Single unit.....	780	1, 537, 731	9. 6	4. 4
2 or 3 units.....	22	4, 051, 727	10. 9	6. 0
4 to 9 units.....	15	14, 359, 600	10. 1	5. 3
	Manufacturers' sales branches and offices			
Textile mill products:				
Single unit.....	60	7, 519, 850	( <sup>1</sup> )	3. 4
2 or 3 units.....	74	8, 894, 892	( <sup>1</sup> )	3. 3
4 to 9 units.....	100	13, 565, 980	( <sup>1</sup> )	5. 1
10 to 24 units.....	145	10, 320, 414	( <sup>1</sup> )	4. 3
25 or more units.....	52	149, 700, 827	( <sup>1</sup> )	4. 1
Total or average.....	431	27, 255, 021	( <sup>1</sup> )	4. 1
Apparel and related products:				
Single unit.....	107	2, 994, 701	( <sup>1</sup> )	5. 8
2 or 3 units.....	73	1, 847, 068	( <sup>1</sup> )	4. 8
4 to 25 or more units.....	103	2, 724, 874	( <sup>1</sup> )	3. 5
Total or average.....	283	2, 600, 463	( <sup>1</sup> )	4. 7
	Agents and brokers			
Apparel (including footwear):				
Single unit.....	1, 178	1, 543, 215	3. 6	1. 5
2 or 3 units.....	15	8, 234, 000	2. 9	1. 7
4 to 24 units.....	12	11, 225, 917	1. 7	1. 1
Total or average.....	1, 205	1, 722, 928	3. 4	1. 5
Dry goods, piece goods:				
Single unit.....	664	2, 698, 456	3. 0	1. 5
2 or 3 units.....	31	5, 585, 290	4. 2	1. 9
4 to 9 units.....	32	6, 642, 719	4. 1	2. 2
10 to 24 units.....	91	11, 600, 868	3. 6	1. 4
Total or average.....	818	3, 952, 524	3. 3	1. 5

<sup>1</sup> Not available.

Adapted from Census of Business, Wholesale Trade: 1954.

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Operating expenses as proportions of sales for merchant wholesalers of men's and boys' clothing and furnishings (table 129), of women's and children's clothing and furnishings (table 130), and of hosiery and underwear (table 131) vary inversely with the size of establishment as measured by annual volume of sales. In 1954, these proportions for wholesalers of men's and boys' clothing and furnishings ranged from an average of about 12 percent for establishments with annual volumes of sales of \$2 to \$5 million to 26 percent for establishments with annual sales of less than \$50,000. Similar proportions for wholesalers of women's and children's clothing and furnishings ranged from about 14 percent for establishments with annual sales of \$2 to \$5 million to 31 percent for those with annual sales of less than \$50,000. Those for wholesalers of hosiery and underwear ranged from less than 12 percent for establishments with annual sales of \$1 to \$2 million to 26 percent for those with annual sales of less than \$50,000. Similar relationships are indicated for 1939 and for 1948 (tables 129, 130, 131).

Payrolls accounted on the average for somewhat less than half of total operating expenses of these wholesalers (tables 129, 130, 131). The proportions of total operating expenses that were accounted for by payrolls usually were greater for the larger than for the smaller establishments. This difference may be accounted for, at least in part, by larger ratios of active proprietors of unincorporated businesses to total employees for the smaller than for the larger establishments and also by the fact that operating expenses include no compensation for these active proprietors.

Frequency distributions of operating expenses of merchant wholesalers of dry goods and apparel by size groups show that, in 1954, operating expenses as proportions of net sales varied widely within size groups as well as from one group to another (table 132). Operating expenses ranged from less than 7 percent of sales to 35 percent or more for firms in each size group, but the proportions of establishments with operating expenses of less than 11 percent of sales usually were greater for the medium and larger than for the smaller size groups. Proportions of the establishments with operating expenses of 25 percent or more of sales usually were greater for the smaller than for the medium and larger size groups.

Operating expenses of wholesalers of textile products as proportions of sales varied somewhat from one geographic division to another. In 1954, operating expenses of merchant wholesalers of dry goods and apparel ranged from 12.5 percent of sales in Middle Atlantic States to 16.1 percent in East North Central States and averaged 13.3 percent for the United States (table 133). Similar data for manufacturers' sales branches and offices show that, for textile mill products, operating expenses ranged from 4.5 percent of sales in South Atlantic States to 7.3 percent in East South Central States and averaged 5.8 percent for all States. For apparel and related products, these expenses ranged from 4.9 percent of sales in South Atlantic States to 14 percent in West North Central States and averaged 9 percent for the United States (table 133). Operating expenses of merchandise agents and brokers ranged from 2.9 percent of sales in East South Central States to 4.5 percent in South Atlantic and Mountain States, and averaged 3.3 percent for the United States (table 133).



TABLE 129.—Number of establishments operating entire season, volume of sales, operating expenses, and payroll for merchant wholesalers of men's and boys' clothing and furnishings, by size group, United States, 1939, 1948, and 1954<sup>1</sup>

Size group by value of sales	1939			
	Establishments	Total sales	Operating expenses as proportion of sales <sup>2</sup>	Payroll as proportion of sales
<i>Dollars</i>	<i>Number</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>Percent</i>
All.....	1, 155	150, 644	14. 1	6. 9
1,000,000 and over.....	23	34, 023	11. 5	6. 1
500,000 to 999,999.....	31	22, 249	13. 2	6. 7
300,000 to 499,999.....	68	25, 691	15. 1	7. 6
200,000 to 299,999.....	73	17, 407	15. 0	7. 7
100,000 to 199,999.....	158	22, 717	15. 1	7. 2
50,000 to 99,999.....	222	15, 732	14. 8	6. 3
10,000 to 49,999.....	437	11, 982	16. 6	6. 6
Less than 10,000.....	143	843	20. 6	7. 4
1948				
All.....	1, 410	391, 835	14. 3	7. 4
2,000,000 and over.....	21	96, 163	12. 9	7. 5
1,000,000 to 1,999,999.....	44	60, 620	13. 0	7. 5
500,000 to 999,999.....	102	70, 570	15. 0	7. 9
300,000 to 499,999.....	150	57, 813	15. 7	8. 4
200,000 to 299,999.....	141	34, 727	14. 7	7. 0
100,000 to 199,999.....	292	42, 057	14. 3	6. 5
50,000 to 99,999.....	275	20, 199	15. 3	6. 0
Less than 50,000.....	385	9, 686	17. 6	5. 1
1954				
All.....	740	382, 462	15. 3	6. 7
5,000,000 and over.....	10	109, 196	14. 5	5. 1
2,000,000 to 4,999,999.....	19	64, 333	12. 1	5. 3
1,000,000 to 1,999,999.....	39	51, 655	14. 8	7. 8
500,000 to 999,999.....	86	59, 072	16. 9	7. 8
300,000 to 499,999.....	88	34, 493	17. 4	7. 8
200,000 to 299,999.....	102	25, 406	16. 2	7. 7
100,000 to 199,999.....	186	27, 168	18. 5	8. 3
50,000 to 99,999.....	113	8, 421	19. 3	8. 8
Less than 50,000.....	97	2, 718	26. 0	12. 5

<sup>1</sup> Data for 1954 do not include establishments with no paid employees during census years. Comparable data for 1948 show 1,123 establishments.

<sup>2</sup> Operating expenses include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Wholesale Trade: 1939, 1948, and 1954.

TABLE 130.—Number of establishments operating entire year, volume of sales, operating expenses, and payroll of merchant wholesalers of women's and children's clothing, furnishings, by size group, United States, 1939, 1948, and 1954<sup>1</sup>

Size group by value of sales	1939			
	Establishments	Total sales	Operating expenses as proportion of sales <sup>2</sup>	Payroll as proportion of sales
Dollars	Number	1,000 dollars	Percent	Percent
All.....	1, 056	216, 766	15. 5	7. 6
1,000,000 and over.....	38	47, 087	15. 3	8. 1
500,000 to 999,999.....	85	59, 990	14. 7	7. 5
300,000 to 499,999.....	89	33, 936	16. 1	7. 9
200,000 to 299,999.....	106	25, 384	14. 3	6. 7
100,000 to 199,999.....	199	28, 876	16. 6	7. 9
50,000 to 99,999.....	171	12, 639	16. 5	7. 4
10,000 to 49,999.....	297	8, 362	18. 4	7. 6
Less than 10,000.....	77	492	22. 0	7. 5
1948				
All.....	1, 386	417, 181	15. 4	7. 7
2,000,000 and over.....	22	79, 818	13. 5	7. 3
1,000,000 to 1,999,999.....	54	76, 657	15. 3	7. 7
500,000 to 999,999.....	121	83, 393	15. 3	8. 2
300,000 to 499,999.....	188	72, 407	15. 6	8. 2
200,000 to 299,999.....	146	30, 396	15. 0	6. 6
100,000 to 199,999.....	295	42, 780	16. 7	7. 6
50,000 to 99,999.....	246	17, 591	18. 1	7. 0
Less than 50,000.....	314	8, 139	20. 1	6. 8
1954				
All.....	1, 255	553, 577	16. 7	7. 8
5,000,000 and over.....	5	38, 913	15. 2	9. 2
2,000,000 to 4,999,999.....	38	110, 655	14. 1	6. 6
1,000,000 to 1,999,999.....	84	116, 741	17. 1	8. 0
500,000 to 999,999.....	159	113, 844	16. 1	7. 4
300,000 to 499,999.....	183	71, 679	17. 7	8. 4
200,000 to 299,999.....	176	44, 337	16. 3	7. 4
100,000 to 199,999.....	270	39, 686	20. 0	8. 7
50,000 to 99,999.....	168	12, 775	23. 7	10. 6
Less than 50,000.....	172	4, 947	31. 4	14. 8

<sup>1</sup> Data for 1954 do not include establishments with no paid employees during census year. Comparable data for 1948 show 1,178 establishments.

<sup>2</sup> Operating expenses include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Wholesale Trade: 1939, 1948, and 1954.

TABLE 131.—Number of establishments operating entire year, volume of sales, operating expenses, and payroll for merchant wholesalers of hosiery and underwear, by size group, United States, 1939, 1948, and 1954<sup>1</sup>

Size group by value of sales	1939			
	Establishments	Total sales	Operating expenses as proportion of sales <sup>2</sup>	Payroll as proportion of sales
Dollars	Number	1,000 dollars	Percent	Percent
All.....	404	84,461	19.9	5.3
2,000,000 and over.....	16	24,034	9.9	5.2
1,000,000 to 999,999.....	28	19,070	9.3	4.3
500,000 to 499,999.....	39	15,107	12.3	6.5
300,000 to 299,999.....	39	9,625	10.6	5.4
100,000 to 199,999.....	55	7,847	11.6	5.4
50,000 to 99,999.....	76	5,473	13.7	5.5
10,000 to 49,999.....	122	3,139	14.1	5.2
Less than 10,000.....	29	166	19.3	5.4
	1948			
All.....	659	193,021	10.9	5.5
2,000,000 and over.....	11	33,595	8.1	5.2
1,000,000 to 1,999,999.....	32	42,636	10.7	5.6
500,000 to 499,999.....	55	35,597	11.5	6.1
300,000 to 299,999.....	84	33,015	10.9	5.4
200,000 to 199,999.....	63	15,264	11.0	4.5
100,000 to 99,999.....	143	20,843	11.9	5.0
50,000 to 49,999.....	112	7,849	13.8	5.5
Less than 50,000.....	159	4,222	17.8	6.6
	1954 <sup>3</sup>			
All.....	460	256,241	13.4	6.3
2,000,000 and over.....	26	106,506	12.9	6.3
1,000,000 to 1,999,999.....	30	41,374	11.6	5.6
500,000 to 499,999.....	67	46,760	13.7	6.1
300,000 to 299,999.....	72	28,733	12.5	6.2
200,000 to 199,999.....	55	13,591	15.7	7.7
100,000 to 99,999.....	81	11,918	17.2	7.0
50,000 to 49,999.....	68	5,276	18.7	8.5
Less than 50,000.....	61	1,983	26.5	11.1

<sup>1</sup> Data for 1954 do not include establishments with no paid employees during census year. Comparable data for 1948 show 535 establishments.

<sup>2</sup> Operating expenses include: no compensation for active proprietors of unincorporated businesses.

<sup>3</sup> Hosiery only.

Adapted from Census of Business, Wholesale Trade: 1939, 1948, and 1954.

TABLE 132.—Frequency distribution by size of establishment measured by annual sales, and operating expense ratios of merchant wholesalers of dry goods and apparel, United States, 1954

Kind of product and size group by value of sales	Estab-lish-ments	Proportion of establishments having ratio of operating expense to sales of—					
		Less than 7.0	7.0 to 10.9	11.0 to 16.9	17.0 to 24.9	25.0 to 34.9	35.0 or more
<i>Dollars</i>	<i>Num-ber</i>	<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>
Clothing, furnishings: General line.....	785	11.2	18.1	29.4	23.1	10.4	7.8
1,000,000 and over.....	52	19.2	19.2	26.9	19.2	11.6	3.9
200,000 to 999,999.....	344	13.4	20.0	31.1	24.1	5.3	4.1
Less than 200,000.....	389	8.2	16.2	28.3	22.6	13.1	11.6
Men's and boys'.....	740	11.1	16.1	26.5	22.8	13.4	10.1
1,000,000 and over.....	68	22.0	16.2	26.5	26.5	5.9	2.9
200,000 to 999,999.....	276	12.7	17.0	33.3	21.4	10.9	4.7
Less than 200,000.....	396	8.1	15.4	21.7	23.2	16.4	15.2
Women's and children's.....	1,255	10.0	14.0	27.1	23.8	11.1	14.0
1,000,000 and over.....	127	18.1	18.9	29.9	20.5	7.9	4.7
200,000 to 999,999.....	518	11.8	16.0	33.8	25.1	7.7	5.6
Less than 200,000.....	610	6.7	11.3	20.8	23.5	14.6	23.1
Total or average.....	2,780	10.6	15.7	27.6	23.4	11.5	11.2
Dry goods:							
Hosiery.....	460	16.5	22.6	26.3	15.5	10.2	8.9
1,000,000 and over.....	56	14.3	30.4	37.5	14.2	1.8	1.8
200,000 to 999,999.....	194	21.6	24.7	28.9	15.5	5.7	3.6
Less than 200,000.....	210	12.4	18.6	20.9	15.7	16.7	15.7
Notions.....	749	7.2	14.4	23.5	22.0	14.7	13.2
1,000,000 and over.....	35	25.7	5.7	31.4	14.3	14.3	8.6
200,000 to 999,999.....	237	4.7	18.1	27.9	23.6	16.0	9.7
Less than 200,000.....	477	7.1	13.2	20.8	21.8	14.0	23.1
Piece goods.....	1,617	16.4	20.8	25.2	16.9	10.3	10.4
1,000,000 and over.....	243	35.8	30.5	18.5	8.6	4.9	1.7
200,000 to 999,999.....	707	18.4	25.2	28.4	15.3	7.1	5.6
Less than 200,000.....	667	7.2	12.6	24.1	21.7	15.6	18.8
Piece goods converters.....	794	21.2	23.0	25.4	13.6	4.3	6.5
1,000,000 and over.....	287	28.2	38.7	20.6	9.4	2.1	1.0
200,000 to 999,999.....	340	20.6	25.3	30.6	13.8	4.1	5.6
Less than 200,000.....	167	10.2	19.8	23.3	20.4	8.4	17.9
Total or average.....	7,240	15.5	21.5	25.0	17.1	9.9	11.0

Adapted from Census of Business, Wholesale Trade: 1954.

TABLE 133.—Number of wholesale establishments, average volume of sales, operating expenses, and payroll as proportion of sales, for wholesalers of textile products, by type of wholesaler, kind of product, and region, United States, 1954

Product and region	Merchant wholesalers			
	Estab-lish-ments	Average sales per establish-ment	Operating expenses as propor-tion of sales <sup>1</sup>	Payroll as proportion of sales <sup>1</sup>
Dry goods, apparel:	<i>Number</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>
New England.....	583	508, 825	13. 6	6. 7
Middle Atlantic.....	6, 009	659, 864	12. 5	6. 0
East North Central.....	803	459, 300	16. 1	8. 0
West North Central.....	326	788, 767	15. 1	8. 3
South Atlantic.....	522	463, 649	14. 4	7. 1
East South Central.....	224	449, 433	13. 8	7. 4
West South Central.....	230	507, 552	15. 3	8. 1
Mountain.....	62	455, 258	15. 1	8. 9
Pacific.....	630	498, 838	16. 0	7. 3
United States.....	9, 389	605, 991	13. 3	6. 5
	Manufacturers' sales branches and offices			
Textile mill products:				
New England.....	30	1, 732, 967	6. 5	4. 1
Middle Atlantic.....	160	7, 251, 862	6. 0	3. 4
East North Central.....	90	2, 693, 889	5. 3	3. 3
West North Central.....	30	1, 663, 000	5. 1	3. 8
South Atlantic.....	26	5, 453, 538	4. 5	2. 3
East South Central.....	7	1, 018, 857	7. 3	3. 8
West South Central.....	23	2, 071, 826	7. 0	4. 3
Mountain.....	6	984, 500	5. 0	2. 9
Pacific.....	59	1, 742, 729	6. 2	3. 5
United States.....	431	4, 199, 376	5. 8	3. 3
Apparel and related products:				
New England.....	12	2, 359, 083	12. 2	4. 5
Middle Atlantic.....	137	3, 376, 540	9. 0	2. 3
East North Central.....	45	1, 992, 844	8. 7	4. 6
West North Central.....	12	2, 106, 500	11. 2	5. 9
South Atlantic.....	13	2, 398, 385	4. 9	2. 5
East South Central.....	2	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
West South Central.....	16	1, 313, 938	14. 0	6. 0
Mountain.....	5	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Pacific.....	41	1, 684, 195	7. 5	3. 8
United States.....	283	2, 600, 463	9. 0	4. 7
	Merchandise agents and brokers			
Dry goods, piece goods:				
New England.....	40	2, 057, 700	3. 7	1. 5
Middle Atlantic.....	499	5, 224, 269	3. 2	1. 6
East North Central.....	87	2, 305, 793	3. 5	1. 2
West North Central.....	30	1, 976, 833	3. 7	1. 2

See footnotes at end of table.

TABLE 133.—Number of wholesale establishments, average volume of sales, operating expenses, and payroll as proportion of sales, for wholesalers of textile products, by type of wholesaler, kind of product, and region, United States, 1954—Continued

Product and region	Merchant wholesalers			
	Estab- lish- ments	Average sales per establish- ment	Operating expenses as propor- tion of sales <sup>1</sup>	Payroll as proportion of sales <sup>1</sup>
	Manufacturers' sales branches and offices—Con.			
	<i>Number</i>	<i>Dollars</i>	<i>Percent</i>	<i>Percent</i>
South Atlantic.....	48	2, 593, 208	4. 5	1. 6
East South Central.....	12	1, 905, 583	2. 9	. 9
West South Central.....	26	1, 743, 423	3. 8	1. 0
Mountain.....	7	469, 714	4. 5	1. 9
Pacific.....	69	1, 276, 522	4. 1	1. 4
United States.....	818	3, 952, 524	3. 3	1. 5

<sup>1</sup> Operating expenses and payrolls include no compensation for active proprietors of unincorporated businesses.

<sup>2</sup> Withheld to avoid disclosure.

Adapted from Census of Business, Wholesale Trade: 1954

Operating gross margins for wholesale dry goods houses, obtained from reports of the Wholesale Dry Goods Institute, Inc., increased from about 16 percent of net sales in 1939 to 18 percent in 1941, decreased to about 15 percent in 1949, and averaged about 17.0 percent in 1957 (table 134). Total operating expenses decreased from 15 percent in 1939 to 12 percent in 1943 and 1947, and increased to 15 percent in 1954 and 1957.

Gross margins and operating expenses usually average less for establishments with large volumes of sales than for those with small volumes. From 1939 to 1957, gross margins for wholesale dry goods houses averaged about 18 percent of net sales for houses with annual sales of less than \$500,000 and about 16 percent for houses with annual sales of \$1 to \$2 million (table 134). Operating expenses averaged almost 16 percent of net sales for houses with net sales of less than \$500,000 annually compared with an average of about 13 percent for houses with annual sales of over \$2 million. Profits as proportion of sales averaged larger for houses with annual sales of over \$2 million than for the smaller houses.

Census reports for 1948 show that operating expenses of wholesalers of textile products accounted, on the average, for larger proportions of total sales for establishments operated as corporations, particularly those in the medium and smaller size groups, than for those not incorporated (39). These differences may be accounted for, at least in part, by the fact that operating expenses include no compensation for active proprietors of unincorporated businesses. These reports also show that operating expenses of wholesalers of textile products averaged smaller proportions of net sales for the larger than for the smaller establishments.

TABLE 134.—Medians of gross margins, operating expenses, and profits for wholesale dry goods houses expressed as proportions of net sales, United States, specified years, 1939-57

Item	Sales under \$500,000											
	1939	1941	1943	1945	1947	1949	1951	1953	1954	1955	1956	1957
Gross margin <sup>1</sup> -----	<i>Pct.</i> 16. 87	<i>Pct.</i> 22. 27	<i>Pct.</i> 18. 15	<i>Pct.</i> 16. 28	<i>Pct.</i> 12. 85	<i>Pct.</i> 18. 32	<i>Pct.</i> 19. 21	<i>Pct.</i> 17. 24	<i>Pct.</i> 19. 02	<i>Pct.</i> 17. 45	<i>Pct.</i> 18. 29	<i>Pct.</i> 20. 1
Total operating expense-----	15. 70	16. 13	14. 34	13. 06	11. 09	17. 33	17. 77	17. 05	19. 01	17. 40	16. 86	17. 3
Administrative-----	4. 69	3. 68	5. 88	7. 38	6. 69	6. 03	6. 61	7. 74	7. 54	6. 04	-----	-----
Buying-----	1. 50	1. 21	. 76	. 02	. 18	. 41	. 27	. 51	. 85	. 62	-----	-----
Selling-----	7. 70	7. 78	7. 02	3. 78	3. 08	7. 21	8. 45	5. 82	7. 11	7. 50	-----	8. 0
Receiving and shipping-----	1. 10	1. 07	1. 24	. 83	. 82	1. 42	1. 62	1. 58	. 86	1. 05	-----	-----
Occupancy-----	1. 27	1. 20	. 72	1. 15	. 75	1. 05	. 90	1. 56	1. 60	1. 03	-----	1. 4
Profit <sup>2</sup> -----	1. 17	6. 14	3. 81	3. 22	1. 76	. 99	1. 44	. 19	. 01	. 05	1. 43	2. 8
	Sales \$500,000 to \$1,000,000											
Gross margin <sup>1</sup> -----	17. 10	18. 62	18. 88	16. 67	15. 58	17. 84	16. 12	16. 49	16. 60	16. 60	16. 62	17. 2
Total operating expense-----	15. 52	13. 92	10. 78	13. 03	11. 99	13. 26	13. 22	14. 25	15. 08	15. 20	14. 30	14. 6
Administrative-----	4. 34	4. 17	3. 43	4. 40	4. 73	5. 25	4. 09	4. 75	5. 35	5. 38	4. 82	-----
Buying-----	1. 35	1. 24	. 82	. 68	. 36	1. 23	1. 55	1. 08	1. 08	. 92	. 57	-----
Selling-----	6. 62	7. 21	5. 56	5. 14	5. 80	6. 04	6. 22	7. 60	6. 96	6. 99	6. 76	7. 0
Receiving and shipping-----	1. 06	1. 08	1. 06	. 86	1. 18	1. 02	. 96	1. 04	1. 34	1. 03	1. 19	-----
Occupancy-----	1. 39	1. 12	. 48	1. 00	. 95	. 69	1. 12	. 60	. 83	. 89	. 83	1. 1
Profit <sup>2</sup> -----	1. 58	4. 70	8. 10	3. 64	3. 59	4. 58	2. 90	2. 24	1. 52	1. 40	2. 32	2. 6

TABLE 134.—Medians of gross margins, operating expenses, and profits for wholesale dry goods houses expressed as proportions of net sales, United States, specified years, 1939-57—Continued

Item	Sales \$1,000,000 to \$2,000,000											
	1939	1941	1943	1945	1947	1949	1951	1953	1954	1955	1956	1957
Gross margin <sup>1</sup> .....	<i>Pct.</i> 15. 13	<i>Pct.</i> 17. 99	<i>Pct.</i> 17. 14	<i>Pct.</i> 15. 90	<i>Pct.</i> 14. 53	<i>Pct.</i> 14. 85	<i>Pct.</i> 16. 03	<i>Pct.</i> 15. 05	<i>Pct.</i> 15. 28	<i>Pct.</i> 15. 95	<i>Pct.</i> 16. 37	<i>Pct.</i> 16. 3
Total operating expense.....	13. 44	13. 29	11. 89	13. 24	11. 77	14. 24	13. 39	13. 77	14. 17	14. 46	14. 25	14. 9
Administrative.....	4. 29	4. 15	3. 42	4. 64	3. 72	4. 12	4. 09	3. 87	4. 08	4. 29	4. 76	-----
Buying.....	. 92	1. 23	. 80	1. 16	. 88	. 84	1. 12	. 95	1. 29	1. 23	. 31	-----
Selling.....	7. 05	6. 38	5. 29	5. 65	5. 43	6. 13	6. 25	6. 74	6. 21	6. 12	6. 30	6. 5
Receiving and shipping.....	. 94	. 98	. 97	. 92	1. 02	1. 20	1. 29	1. 19	1. 00	1. 00	1. 33	-----
Occupancy.....	. 90	. 86	. 93	. 58	. 74	1. 03	1. 09	1. 00	1. 02	1. 07	1. 02	1. 5
Profit <sup>2</sup> .....	1. 69	4. 70	5. 25	2. 66	2. 76	. 61	2. 64	1. 28	1. 11	1. 49	2. 12	1. 4
	Sales over \$2,000,000											
Gross margin <sup>1</sup> .....	15. 79	17. 11	18. 58	19. 31	15. 59	14. 87	16. 28	15. 32	16. 46	15. 82	16. 90	16. 9
Total operating expense.....	14. 29	12. 59	10. 76	12. 72	11. 52	13. 35	13. 25	13. 91	14. 67	14. 10	14. 26	14. 7
Administrative.....	3. 27	2. 99	2. 88	3. 33	3. 16	3. 59	3. 49	3. 66	3. 92	3. 84	3. 73	-----
Buying.....	1. 05	1. 11	. 90	. 86	. 77	1. 06	1. 10	1. 08	1. 08	1. 11	1. 18	-----
Selling.....	7. 41	6. 60	5. 52	6. 12	6. 14	6. 44	6. 82	7. 15	7. 06	7. 07	6. 94	7. 2
Receiving and shipping.....	1. 17	1. 03	. 86	. 89	1. 03	1. 26	1. 14	1. 22	1. 25	1. 30	1. 24	-----
Occupancy.....	. 99	. 71	. 80	. 76	. 67	. 90	. 79	. 89	. 88	. 86	. 91	1. 0
Profit <sup>2</sup> .....	1. 50	4. 52	7. 82	6. 59	4. 07	1. 52	3. 03	1. 41	1. 79	1. 72	2. 24	2. 2



All stores <sup>3</sup>

Gross margin <sup>1</sup> -----	16.17	18.50	17.58	16.55	15.37	14.71	16.00	15.39	16.43	16.11	16.47	17.0
Total operating expense-----	14.61	13.65	11.75	12.96	11.75	13.43	13.36	14.03	15.02	14.58	14.35	14.8
Administrative-----	4.18	3.76	3.19	4.21	3.68	4.12	4.05	4.24	4.23	4.29	4.31	-----
Buying-----	1.23	1.22	.85	.94	.77	.98	1.10	1.03	1.25	1.09	1.88	-----
Selling-----	6.89	6.93	6.05	5.72	5.80	6.41	6.54	6.90	7.01	6.84	6.54	7.1
Receiving and shipping-----	1.10	1.02	.92	.89	.99	1.22	1.21	1.19	1.23	1.13	1.24	-----
Occupancy-----	1.14	.89	.82	.78	.77	.94	.90	.89	.93	.94	.94	1.1
Profit <sup>2</sup> -----	1.56	4.85	5.83	3.59	3.62	1.28	2.64	1.36	1.41	1.53	2.12	2.2

<sup>1</sup> Gross margins are the sum of median total operating expense and median profits.

<sup>2</sup> As reported for wholesale dry goods houses, some before and some after Federal income taxes. After 1959, profits are before Federal income taxes.

<sup>3</sup> Median for all years except 1956. For 1956 the medians for stores of the various size groups were weighted by number of houses and by volume of sales reported in arriving at a weighted mean of the medians.

Derived from unpublished reports of National Wholesale Dry Goods Association.

Principal items of cost included in gross margins for wholesalers of textile products are selling and administrative expenses. Reports on operating results of wholesale dry goods houses show that, from 1939 to 1956, selling expenses averaged about 6.5 percent of net sales, 48 percent of total operating expenses, and 40 percent of gross operating margins (table 134). Administrative expenses averaged about 4 percent of net sales, 30 percent of total expenses, and 25 percent of gross margins. Proportions of net sales accounted for by administrative expenses averaged less for the larger than for the smaller establishments.

Census reports show that in 1948 selling and administrative expenses of wholesalers of textile products amounted to about 10 percent of total sales and accounted for about three-fourths of total operating expenses (23). Administrative expenses per dollar of sales averaged less for wholesalers of the larger than for those of the medium and smaller size groups. Administrative expenses per dollar of sales usually averaged 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 varied irregularly with size groups, and usually they averaged more for corporate than for noncorporate wholesalers. Shipping and delivery, warehouse, occupancy, and other expenses usually were relatively small items.

Median profits reported for wholesale dry goods houses increased from an average of less than 2 percent of net sales in 1939 to 5.8 percent in 1943, then decreased to about 1.3 percent in 1949 (table 134). In 1957 profits before Federal income taxes averaged about 2.2 percent of net sales. From 1939 to 1957, profits averaged 2.7 percent of net sales, 20 percent of total operating expenses, and 17 percent of gross operating margins.

Median profits for wholesalers of apparel and household textiles, after Federal income taxes and excess profits taxes, as proportions of net sales and of tangible net worth, decreased markedly in the postwar period (table 135). In 1957 these profits ranged from 0.4 percent of sales for women's wear to 2.2 percent for men's furnishings.

#### Means and Importance of Improvement

Most of the considerations involved in increasing efficiency and reducing costs of distributing intermediate textile products (p. 270) are also important in connection with improvements in the wholesale distribution of finished textile products. Information on operating expenses of existing agencies indicates that costs of wholesale distribution of finished textile products might be reduced by concentrating larger proportions of the services in the hands of the larger and more efficient concerns.

Possibilities of reducing operating expenses of wholesalers of finished textile products by increasing the volume of business appear to be supported by census data. In 1954, for example, operating expenses of merchant wholesalers of men's and boys' clothing and furnishings ranged from an average of about 12 percent of sales for concerns with annual sales of \$2 million to \$5 million to 26 percent for those with annual sales of less than \$50,000. Similar

TABLE 135.—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, specified years, 1935-57<sup>1</sup>

Line of business	Net profits <sup>2</sup> as proportion of net sales <sup>3</sup>									
	1935-39	1941	1945	1947	1949	1951	1953	1955	1956	1957
Dry goods.....	1.03	2.95	3.18	2.95	0.77	1.50	0.69	1.00	0.93	1.07
Men's furnishings.....	2.68	7.33	2.28	2.00	1.79	2.03	2.70	1.38	2.18	
Hosiery and underwear.....	.74	3.97	6.85	4.13	2.43	1.76	2.02	1.59	1.09	.64
Women's wear, coats, suits, and dresses.....	.56	2.50	5.85	1.42	.44	-----	1.24	1.03	.50	.35
	Net profits as proportion of tangible net worth <sup>4</sup>									
Dry goods.....	4.24	13.08	10.17	11.75	4.02	5.91	2.58	3.78	4.04	3.96
Men's furnishings.....	-----	11.77	22.20	11.35	5.79	6.05	4.82	5.54	3.96	6.70
Hosiery and underwear.....	3.02	14.67	18.40	15.55	5.84	6.72	9.11	5.00	2.88	2.64
Women's wear, coats, suits, and dresses.....	3.57	13.59	31.80	5.13	2.32	-----	6.87	4.20	1.97	1.44

<sup>1</sup> The number of concerns reported for 1957 ranged from 31 for men's furnishings to 156 for dry goods.

<sup>2</sup> 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.

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

<sup>4</sup> 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 of Dun and Bradstreet, Inc. (27, 21).

proportions for women's and children's clothing and furnishings ranged from about 14 percent for wholesalers with annual sales of \$2 million to \$5 million to 31 percent for those with annual sales of less than \$50,000. For merchant wholesalers of hosiery and underwear, operating expenses ranged from an average of less than 12 percent of sales for concerns with annual sales of \$1 million to \$2 million to more than 26 percent for those with annual sales of less than \$50,000.

Total operating expenses per dollar of sales of wholesale dry goods houses, from 1939 to 1957, averaged about 21 percent more for houses with annual sales of less than \$500,000 than for houses with annual sales of more than \$2 million. Although factors other than differences in size may also be involved, it appears 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 valid, 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 wholesalers of different kinds indicate that some reductions in costs might be made, in some instances at least, by the integration of manufacturing and distributing functions. In 1954, according to census reports, operating expenses of wholesaling men's and boys' clothing and furnishings, for example, averaged 15.4 percent of sales for merchant wholesalers, 7.3 percent for manufacturers' sales branches and offices, and 4.1 percent for merchandise agents and brokers. For women's and children's clothing and furnishings, these expenses averaged 16.6 percent of sales for merchant wholesalers, 11.4 percent for manufacturers' sales branches and offices, and 3.5 percent for merchandise agents and brokers. Similar results are shown for other finished textile products. But information available is not adequate to show the extent to which these differences are accounted for by differences in services rendered.

An adequate appraisal of the most effective means of increasing efficiency and reducing costs of wholesale distribution of 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 (94).

Such data should supply a basis for indicating the more feasible means of improvements. But such analyses may require specialized training and experience relating to the particular kinds of operations involved. Well-informed operators in the business could suggest the kinds of information that would be of greatest usefulness to

them in reducing their costs, and their advice and assistance might be used to advantage in planning and developing the required research.

The relative importance of increasing the efficiency and of reducing the costs of wholesaling textile products may be indicated by data showing that, in recent years, 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 of textile products bring together, at places convenient to consumers, varied stocks of goods which satisfy the needs and tastes of the community. They also pass back to wholesalers and to manufacturers information as to the demands of consumers, for use as a guide 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. In addition, they render delivery and other services to consumers.

### Methods and Practices

The number of general merchandise retailers<sup>11</sup> in the United States increased from 67,398 in 1948 to 73,770 in 1954, according to census reports (table 136). Total value of sales increased about 4 percent, but average volume of sales per establishment decreased from about \$251,000 in 1948 to \$238,000 in 1954. Stores with annual volume of sales of \$1 million or more accounted for 3 percent of the total number of stores and 62 percent of the total value of sales in 1954, compared with 3 and 64 percent, respectively, in 1948. In 1954, about 25 percent of the stores had annual sales of less than \$20,000 each and accounted for 1 percent of total sales, compared with almost 29 percent and 1 percent, respectively, in 1948. Payrolls as proportions of sales increased from 14 percent in 1948 to 15 percent in 1954 and varied directly with the size of the store as indicated by annual value of sales.

The number of retail apparel and accessory stores decreased, but the average volume of sales per store increased from about \$85,000 in 1948 to \$94,000 in 1954 (table 137). Apparel and accessory stores with annual volumes of sales of \$1 million or more accounted for less than 1 percent of the number of stores in 1948 and in 1954, and

<sup>11</sup> Includes stores usually selling two or more merchandise lines, as dry goods, apparel and accessories, and furniture and home furnishings, among others. Businesses commonly known as department stores, variety stores, and general stores are included. General stores are usually located in rural communities and sell a general line of merchandise of which food is usually the most important line.

TABLE 136.—Number of general merchandise retailers, volume of sales, and payroll as proportion of sales, by size of sales, United States, 1948 and 1954<sup>1</sup>

Annual volume of sales	1948				
	Stores		Sales		Payroll as proportion of sales <sup>2</sup>
	Total	Proportion	Total	Proportion	
Dollars	Number	Percent	1,000 dollars	Percent	Percent
All.....	67,398	100.0	16,897,090	100.0	13.9
1,000,000 or more.....	2,056	3.0	10,920,659	64.7	15.6
500,000 to 999,999.....	2,129	3.2	1,482,353	8.8	13.1
300,000 to 499,999.....	2,733	4.1	1,049,399	6.2	12.9
100,000 to 299,999.....	10,397	15.4	1,794,207	10.6	11.5
50,000 to 99,999.....	11,986	17.8	842,246	5.0	7.9
30,000 to 49,999.....	11,043	16.4	428,104	2.5	5.7
20,000 to 29,999.....	7,694	11.4	188,460	1.1	4.2
10,000 to 19,999.....	9,625	14.3	141,373	.8	3.0
5,000 to 9,999.....	5,133	7.6	37,892	.2	1.9
Less than 5,000.....	4,600	6.8	12,397	.1	1.9
	1954				
All.....	73,770	100.0	17,554,998	100.0	14.9
5,000,000 or more.....	505	.7	7,328,569	41.7	17.3
2,000,000 to 4,999,999.....	658	.9	2,017,585	11.5	15.9
1,000,000 to 1,999,999.....	1,164	1.6	1,597,800	9.1	15.2
500,000 to 999,999.....	2,428	3.3	1,695,070	9.7	14.6
300,000 to 499,999.....	2,869	3.9	1,108,128	6.3	14.3
100,000 to 299,999.....	11,295	15.3	1,901,926	10.8	12.6
50,000 to 99,999.....	13,985	18.9	979,089	5.6	8.4
30,000 to 49,999.....	12,867	17.4	496,517	2.8	6.0
20,000 to 29,999.....	9,342	12.7	225,414	1.3	4.2
10,000 to 19,999.....	11,059	15.0	159,133	.9	3.0
5,000 to 9,999.....	6,487	7.4	38,551	.2	2.2
Less than 5,000.....	2,111	2.9	7,216	.1	1.6

<sup>1</sup> Establishments operating entire year. The 1948 data excluded establishments which operated the entire year but which had sales volumes of under \$500. The 1954 data exclude establishments with no paid employment in 1954 which had sales volumes of less than \$2,500 in that year.

<sup>2</sup> Payrolls include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Retail Trade: 1948 and 1954.

the proportion of total sales accounted for by these stores decreased from about 20 percent in 1948 to 17 percent in 1954. Stores with annual sales of less than \$20,000 decreased from about 30 percent of the total in 1948 to 21 percent in 1954, and the proportion of total sales accounted for by them decreased from 3.3 percent in 1948 to 2.5 percent in 1954. Payrolls as proportions of sales increased from 12 percent in 1948 to 13.5 percent in 1954 and varied directly with the size of store as indicated by volume of sales.

The proportion of general merchandise and apparel retail stores operated as corporations increased from 25 percent of the total in 1939 to 26 percent in 1954 (table 138). Annual sales per store

averaged greater for corporations than for other stores, but the proportion of total sales accounted for by corporate stores decreased from about 77 percent in 1939 and 1948 to 73 percent in 1954. The proportion of general merchandise and apparel stores operated as individual proprietorships decreased from about 62 percent in 1939 to 55 percent in 1954, and the proportion of total sales accounted for by individual-proprietorship stores decreased from 16 percent in 1939 to 13 percent in 1948, then increased to 16 percent in 1954. The proportion of stores accounted for by partnerships increased from about 12 percent in 1939 to 18 percent in 1954, and the proportion of total sales accounted for by these stores increased from about 7 percent in 1939 to 11 percent in 1954.

TABLE 137.—Number of apparel and accessory retail stores, volume of sales, and payroll as proportion of sales, by size of sales, United States, 1948 and 1954<sup>1</sup>

Annual volume of sales	1948				
	Stores		Sales		Payroll as proportion of sales <sup>2</sup>
	Total	Proportion	Total	Proportion	
Dollars	Number	Percent	1,000 dollars	Percent	Percent
All.....	115,246	100.0	9,803,218	100.0	12.0
1,000,000 or more.....	801	.7	1,943,501	19.8	15.6
500,000 to 999,999.....	1,418	1.2	961,330	9.8	13.7
300,000 to 499,999.....	2,411	2.1	916,134	9.4	13.3
100,000 to 299,999.....	17,721	15.4	2,823,335	28.8	11.5
50,000 to 99,999.....	24,734	21.5	1,751,234	17.9	9.5
30,000 to 49,999.....	19,321	16.8	755,270	7.7	7.7
20,000 to 29,999.....	12,977	11.2	318,199	3.3	6.4
10,000 to 19,999.....	16,262	14.1	237,626	2.4	5.4
5,000 to 9,999.....	9,592	8.3	70,594	.7	4.1
Less than 5,000.....	10,009	8.7	25,995	.2	2.8
	1954				
All.....	114,485	100.0	10,773,530	100.0	13.5
5,000,000 or more.....	54	-----	526,243	4.9	17.3
2,000,000 to 4,999,999.....	197	.2	577,119	5.3	18.4
1,000,000 to 1,999,999.....	531	.5	719,043	6.7	16.6
500,000 to 999,999.....	1,533	1.3	1,038,691	9.6	15.7
300,000 to 499,999.....	2,953	2.6	1,120,258	10.4	15.1
100,000 to 299,999.....	20,905	18.2	3,301,295	30.6	13.4
50,000 to 99,999.....	29,299	25.6	2,071,054	19.2	11.4
30,000 to 49,999.....	21,511	18.8	837,953	7.8	9.6
20,000 to 29,999.....	13,146	11.5	318,739	3.0	8.1
10,000 to 19,999.....	13,978	12.2	202,165	1.9	7.2
5,000 to 9,999.....	7,188	6.3	50,213	.5	5.5
Less than 5,000.....	3,190	2.8	10,757	.1	3.4

<sup>1</sup> Establishments operating entire year. The 1948 data exclude establishments which operated the entire year but which had sales volumes of under \$500. The 1954 data excluded establishments with no paid employment in 1954 which had sales volumes of less than \$2,500 that year.

<sup>2</sup> Payrolls include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Retail Trade: 1948 and 1954.

TABLE 138.—*Number of retail stores and average annual sales, by kind of business and legal form of organization, United States, 1939, 1948, and 1954*

Kind of business and legal form of organization	Stores			Average annual sales per store		
	1939	1948	1954	1939	1948	1954
<b>General merchandise:</b>						
Individual proprietorship.....	<i>Number</i> 30,360	<i>Number</i> 27,801	<i>Number</i> 46,404	<i>Dollars</i> 13,600	<i>Dollars</i> 34,000	<i>Dollars</i> 41,264
Partnerships.....	5,754	9,120	12,291	40,700	80,700	88,285
Corporations.....	13,923	15,536	17,193	359,800	919,400	858,425
Other legal forms.....	230	87	310	33,100	115,600	366,339
<b>Total.....</b>	<b>50,267</b>	<b>52,544</b>	<b>76,198</b>	<b>112,700</b>	<b>304,000</b>	<b>234,552</b>
<b>Apparel:</b>						
Individual proprietorships.....	67,281	65,303	61,420	14,600	37,500	43,725
Partnerships.....	12,839	23,365	23,343	29,700	76,300	85,172
Corporations.....	25,937	26,423	34,677	72,600	210,300	183,788
Other legal forms.....	902	155	303	12,000	104,400	103,066
<b>Total.....</b>	<b>106,959</b>	<b>115,246</b>	<b>119,743</b>	<b>30,500</b>	<b>85,100</b>	<b>92,517</b>
<b>Both:</b>						
Individual proprietorships.....	97,641	93,104	107,824	14,300	36,400	42,666
Partnerships.....	18,593	32,485	35,634	33,100	77,600	86,246
Corporations.....	39,860	41,959	51,870	172,900	472,800	407,406
Other legal forms.....	1,132	242	613	16,300	108,400	236,206
<b>Total.....</b>	<b>157,226</b>	<b>167,790</b>	<b>195,941</b>	<b>56,800</b>	<b>153,600</b>	<b>147,752</b>

Adapted from Census of Business: 1939, 1948, and 1954.

Considerable proportions of the sales of general merchandise and apparel by retailers are made on credit. Census reports for 1954 do not show credit sales of retailers, but census data for 1948 show that 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 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 were on open account, and about 28 percent on installment.

Earlier reports suggested that retailers were too numerous and that many of them were inefficient (16). Whatever the merits of these criticisms, the first half of this century has witnessed a continued development of types of mercantile organizations which combine functions of wholesalers and retailers under one management, 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 by 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, chainstores, mail-order houses, and co-operative buying and selling systems.

Department stores 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 manufacturers from department stores usually average substantially less than those from wholesalers and cutters. In 1954, according to census reports, 2,761 stores in the United States were classed as department stores, compared with 2,558 in 1948. The volume of sales totaled \$10,558 million, or an average per store of \$3,824,000, in 1954; and \$9,432 million, or an average of \$3,687,000, in 1948. Although the 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 the volume of sales of specific items may be no larger than those of other independent retailers with whom they compete.

Chainstores consist of four or more units of the same general kinds of business, owned and operated jointly, with central buying, usually supplied from one or more central warehouses. Usually the operation of each store is in the hands of a manager who is not an owner. In 1954, according to census reports, the number of general-merchandise stores that were operated as 1 of 4 or more store units totaled 13,199, or about 17 percent of the total number (table 139). Similar data for 1948 show that stores operated as 1 of 4 or more units totaled 13,409, or about 18 percent of all general-merchandise stores. Volume of sales per store averaged greater for chains than for other stores, and the proportion of total sales accounted for by chains increased from about 52 percent in 1948 to about 60 percent in 1954. Payrolls as proportions of sales averaged higher in 1954 than in 1948, and those for single-unit stores averaged less than those for multiunit stores.

Similar data for apparel and accessory stores show that, in 1954, about 19,881 of these stores, or 16.6 percent of the total, were operated as 1 of 4 or more units (table 140). In 1948, about 14,515 of these stores, or 12.6 percent of the total, were operated as 1 of 4 or more units. Volume of sales per store averaged greater for multiunit than for single-unit stores and the proportion of total sales of apparel and accessories that was accounted for by chainstores increased from 28 percent in 1948 to 29 percent in 1954. Payrolls as proportions of sales averaged higher in 1954 than in 1948, and usually the proportions for single units averaged less than those for multiunits.

Chainstores, with their centralized buying, take over some but not all of the wholesalers' functions. Some chains operate several hundred stores, but many of them have only a few stores. The larger chains, in procuring essentially similar merchandise for a

TABLE 189.—Number of general-merchandise retail stores, volume of sales, and payroll as proportion of sales, by number of store units, United States, 1948 and 1954

Store units	1948				
	Stores		Sales		Payroll as proportion of sales <sup>1</sup>
	Total	Proportion	Total	Average per store	
	Number	Percent	1,000 dollars	Dollars	Percent
All.....	74, 101	100. 0	17, 134, 718	231, 235	13. 8
Single units.....	57, 122	77. 1	6, 650, 571	116, 427	12. 9
Multiuunits:					
2 or 3.....	3, 570	4. 8	1, 554, 330	435, 387	16. 1
4 or 5.....	1, 093	1. 5	777, 929	711, 737	18. 5
6 to 10.....	1, 239	1. 7	534, 055	431, 037	13. 5
11 to 25.....	1, 332	1. 8	1, 063, 283	798, 223	15. 0
26 to 50.....	1, 109	1. 5	281, 747	254, 055	13. 9
51 to 100.....	852	1. 1	6, 272, 853	726, 361	13. 6
101 or more.....	7, 784	10. 5			
Total.....	16, 979	22. 9	10, 484, 147	617, 477	14. 5
	1954				
All.....	76, 198	100. 0	17, 872, 386	234, 552	14. 8
Single units.....	59, 150	77. 6	5, 723, 469	96, 762	12. 3
Multiuunits:					
2 or 3.....	3, 849	5. 1	1, 511, 798	392, 777	17. 7
4 or 5.....	852	1. 1	595, 451	698, 886	18. 5
6 to 10.....	853	1. 1	880, 106	1, 031, 777	17. 5
11 to 25.....	1, 321	1. 7	2, 052, 752	1, 553, 938	16. 6
26 to 50.....	965	1. 3	329, 159	341, 097	13. 9
51 to 100.....	1, 148	1. 5	713, 391	621, 421	16. 5
101 or more.....	8, 060	10. 6	6, 066, 260	752, 638	15. 0
Total.....	17, 048	22. 4	12, 148, 917	712, 630	16. 0

<sup>1</sup> Payrolls include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Retail Trade: 1948 and 1954.

large number of stores, buy from manufacturers on a large scale comparable with that of wholesalers, but many of the smaller chains are supplied mainly through wholesalers (16).

Mail-order houses engaged in selling general merchandise increased from 60 in 1948 to 92 in 1954, according to census reports, and these houses accounted for about 7 percent of total sales of general merchandise each year. Mail-order houses for handling apparel and accessories increased from 92 in 1948 to 104 in 1954, and the proportion of total sales of these products accounted for by these houses increased from about 5 percent in 1948 to 8 percent in 1954.

TABLE 140.—Number of retailers of apparel, volume of sales, and payroll as proportion of sales, by number of store units, United States, 1948 and 1954.<sup>1</sup>

Store units	1948				
	Stores		Sales		Payroll as proportion of sales <sup>2</sup>
	Total	Proportion	Total	Average per store	
	Number	Percent	1,000 dollars	Dollars	Percent
All.....	115, 246	100. 0	9, 803, 218	85, 063	12. 0
Single units.....	91, 596	79. 5	5, 954, 132	65, 004	11. 4
Multiuunits:					
2 or 3.....	9, 135	7. 9	1, 143, 431	122, 659	14. 3
4 or 5.....	2, 303	2. 0	41, 111	174, 746	15. 7
6 to 10.....	2, 455	2. 1	442, 519	180, 252	14. 7
11 to 25.....	2, 703	2. 4	586, 713	217, 060	13. 3
26 to 50.....	1, 576	1. 4	321, 367	203, 913	11. 0
51 to 100.....	2, 570	2. 2	445, 745	173, 442	9. 9
101 or more.....	2, 908	2. 5	529, 815	182, 192	10. 3
Total.....	23, 650	20. 5	3, 849, 086	162, 752	13. 0
	1954				
All.....	119, 743	100. 0	11, 078, 209	92, 517	13. 4
Single units.....	89, 784	75. 0	6, 497, 180	72, 365	12. 9
Multiuunits:					
2 or 3.....	10, 078	8. 4	1, 384, 315	137, 360	15. 1
4 or 5.....	2, 475	2. 0	365, 575	147, 707	16. 0
6 to 10.....	2, 232	1. 9	449, 582	201, 426	15. 9
11 to 25.....	3, 303	2. 8	568, 845	172, 221	14. 7
26 to 50.....	2, 418	2. 0	290, 182	120, 009	12. 8
51 to 100.....	2, 839	2. 4	585, 496	202, 664	13. 3
101 or more.....	6, 564	5. 5	937, 034	142, 754	11. 7
Total.....	29, 959	25. 0	4, 581, 029	152, 910	14. 1

<sup>1</sup> Retail stores with payrolls.

<sup>2</sup> Payrolls include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Retail Trade: 1948 and 1954.

Much of the aggregate business done by mail-order houses is accounted for by a few large companies that do a nationwide business of selling to consumers by mail (16). These are large-scale buyers and apparently 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 retail margins, or the spread between merchandise costs and net sales, for department stores ranged from 35.2 percent of

sales in 1949 to 36.5 percent in 1950 and amounted to 36.2 percent in 1958 (table 141). These margins represent typical performance of department stores, as reported by the National Retail Dry Goods Association. In arriving at these margins, adjustments were made in the cumulative markon to allow for markdowns for stock shortages, workroom costs, and cash discounts. In 1957, typical gross margins ranged from less than 30 percent of sales for bedding and domestics, junior suits, and men's work clothes to more than 40 percent for handkerchiefs, neckwear, corsets and brassieres, and curtains and draperies (table 142).

Data on operating results of department stores, as reported by the Harvard Bureau of Business Research, show that gross margins increased from 33.1 percent of sales in 1932 to more than 38 percent during World War II, decreased to 35.2 in 1949, then increased to 36.4 percent in 1956, and amounted to 36.3 percent in 1957 (table 143). Total operating expenses decreased from 39.5 percent of sales, which was 6.4 percentage points above gross margins, in 1932 to 27.8 percent in 1945, then increased to 34.3 percent in 1957.

Payroll expenses, which include salaries, wages, and bonuses for all employees, including executives, but exclude pensions and payroll taxes, were by far the largest single item of expense for department stores. Proportions of net sales accounted for by payroll expenses decreased from 18.7 percent in 1932 to 15.4 percent in 1945, then increased to 18.4 percent in 1953, and were again 18.4 percent in 1957. Real estate costs, advertising and other expenses, as proportions of net sales, have increased since World War II. Net operating results show improvement from losses of more than 6 percent of net sales in 1932 to profits before taxes of almost 10 percent of net sales in 1945. In the postwar period, operating profits before taxes decreased, and in 1957 they averaged 2.0 percent of net sales (table 143).

Gross margins for retailers vary with the kind of store operated. Data on 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 apparel 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 (50).

Salaries and wages were the largest items of cost included in these retail margins. Salaries of owners and officers averaged about 9 percent of total sales and 30 percent of retailers' gross margins. Salaries and wages combined averaged about 16 percent of net sales and 52 percent of retailers' gross margins. The proportions varied noticeably from one kind of store to another. Salaries ranged from about 8 percent of net sales for dry goods and general-merchandise stores to 17 percent for custom tailors. Wages ranged from 6.4 percent of net sales for men's furnishing stores to about 27 percent for custom tailors (51).

TABLE 141.—*Merchandising expense, profits and sales data, expressed as percentages of sales, showing typical performance of department stores, United States, by years, 1947-58*

Item	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Merchandising data:	<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>	<i>Percent</i>
Cumulative markon.....	38.2	38.2	38.2	38.8	38.4	38.4	38.8	38.8	38.6	38.75	38.9	38.9
Markdown at retail.....	6.6	6.5	6.95	6.05	6.85	6.2	6.2	6.25	6.05	6.25	6.5	6.45
Stock shortage.....	1.3	1.25	1.25	1.05	1.35	1.3	1.3	1.25	1.15	1.15	1.25	1.3
Workroom net cost.....	.6	.65	.7	.7	.75	.7	.65	.6	.55	.55	.56	.55
Cash discount.....	2.7	2.85	2.8	2.7	2.65	2.75	2.7	2.7	2.7	2.75	2.75	2.75
Gross margin.....	35.4	35.6	35.2	36.5	35.3	35.8	36.3	36.35	36.3	36.4	36.3	36.25
Expense data:												
Total payroll.....	16.85	17.3	17.9	17.6	17.95	18.15	18.4	18.2	18.15	18.75	18.25	18.0
Total real estate costs.....	2.2	2.35	2.65	2.55	2.65	2.65	2.7	2.8	2.8	2.8	2.8	2.95
Total advertising.....	2.45	2.6	2.65	2.65	2.85	2.8	2.8	2.85	2.85	2.75	2.65	2.65
All other expense.....	8.6	8.85	9.3	9.3	9.75	9.9	9.9	9.9	9.75	9.95	10.05	10.25
Total expense.....	30.1	31.1	32.5	32.1	33.2	33.5	33.8	33.75	33.55	33.75	33.75	33.85
Profit data:												
Net profit from merchandising.....	5.3	4.5	2.7	4.4	2.1	2.3	2.5	2.6	2.75	2.65	2.55	2.4
Net other income.....	2.0	2.2	2.3	2.55	2.6	2.7	2.7	2.7	3.05	3.4	3.05	3.25
Net gain before taxes.....	7.3	6.7	5.0	6.95	4.7	5.0	5.2	5.3	5.8	6.05	5.6	5.65
Federal taxes.....	2.75	2.5	1.85	3.1	2.4	2.6	2.6	2.65	2.95	2.95	2.8	2.9
Net gain after taxes.....	4.55	4.2	3.15	3.85	2.3	2.4	2.6	2.65	2.85	3.1	2.8	2.75
Sales by terms of sale:												
Cash.....	42.0	40.5	39.5	37.5	37.5	38.0	37.5	38.0	37.5	36.5	37.5	38.0
C.O.D. and layaway.....	8.0	6.5	6.5	6.0	6.0	5.5	4.5	4.5	4.0	4.0	3.5	3.5
Regular charge.....	43.5	45.0	46.0	46.5	47.0	47.5	48.0	47.0	46.0	46.5	44.0	42.0
Installment and other term accounts.....	6.5	8.0	8.0	10.0	9.5	9.0	10.0	10.5	12.5	13.0	15.0	16.5

Adapted from reports of National Dry Goods Association: Departmental Merchandising and Operating Results of Department Stores and Specialty Stores. Report for 1957 (63).

TABLE 142.—Merchandising data for typical performance of department stores with annual sales of \$2 to \$5 million, by departments, United States, 1957<sup>1</sup>

Department	Cumulative mark-on	Mark-down at retail	Stock shortage at retail	Work-room net cost	Cash discount	Gross margin	News-paper space cost	Sales people's salary	De-livery expense	Other expense and profit
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Piece goods and household textiles:										
Piece goods.....	40.6	8.0	1.3	0.1	1.2	35.6	2.1	8.8	0.4	24.3
Cottons.....	41.0	8.2	1.8		1.3	35.9	2.1	8.7		25.1
Silks, velvets, rayons, and new synthetics.....	42.0	8.0	2.4		1.4	36.6	2.2	8.8		25.6
Woolens.....	41.3	8.3	2.7		.3	34.9	2.2	7.7		25.0
Patterns.....	35.6	.6	.1		.1	36.2	1.3	13.3	1.0	20.6
Household textiles.....	35.9	5.3	1.4	.3	1.8	33.6	3.5	5.8	1.3	23.0
Domestics, linens, towels.....	32.9	4.2	.2	.6	1.9	32.0	2.5	6.6	1.2	21.7
Blankets, comforters, spreads.....	37.1	4.5	.6	.2	1.5	35.1	2.8	6.1	1.9	24.3
Linens, towels.....	39.2	4.1	.1	.7	1.6	38.1	2.5	6.3	1.2	28.1
Bedding, domestics.....	31.5	5.2	1.6	.1	1.8	29.1	2.4	5.9	1.4	19.4
Blankets, comforters.....	36.9	3.7	.5		1.5	34.6	2.9	5.9		25.8
Towels.....	39.2	4.6	.1		1.8	37.4		7.3		30.1
Linens.....	40.3	4.9	1.3		1.6	38.3	2.4	6.9		29.0
Ready-to-wear accessories:										
Handkerchiefs.....	40.8	3.1	1.8		1.9	40.3	2.0	10.0	.3	28.0
Neckwear.....	39.2	4.5	1.0		5.2	41.1	2.1	8.0		31.0
Handbags.....	40.2	5.3	.4		2.0	39.4	2.0	8.1		29.3
Women's and children's gloves.....	40.2	4.6	.9		3.2	40.1	1.8	8.2	.2	29.9
Corsets, brassieres.....	42.3	3.0	.3	.4	4.3	44.4	1.6	6.9	.4	35.5
Hosiery.....	40.2	3.1	.6		.3	38.1	2.1	7.8	.5	27.7
Underwear.....	39.0	4.5	.7		2.7	38.7	2.1	6.9	.4	29.3
N negligees and robes.....	38.8	7.0	1.2	.1	5.2	39.2	2.3	6.1	.6	30.2
Women's and children's outer apparel:										
Coats and suits.....	39.6	11.7	.9	1.0	5.5	35.5	4.0	5.3	.2	26.0
Women's and misses' coats and suits.....	39.9	13.8	.8	.9	5.5	36.2	3.0	5.8	.2	27.4
Junior coats and suits.....	40.3	13.9	1.3	.8	5.4	36.2	2.4	5.3	.1	28.4
Women's and misses' coats.....	40.5	13.1	.2	.9	5.3	37.7	3.6	5.6	.2	28.3
Women's and misses' suits.....	40.8	19.5	.8	1.0	5.5	32.6	3.7	5.6	.2	23.1

Junior coats.....	41.4	14.5	.3	.8	5.1	36.5	2.3	6.5	27.7
Junior suits.....	40.1	23.6	1.7	1.3	5.6	27.6	4.8	7.4	15.4
Misses' coats.....	40.2	12.7		.8	5.5	36.7			36.7
Women's coats.....	41.0	7.7			5.2	39.4			39.4
Dresses.....	39.5	12.2	.7	1.6	5.5	35.2	3.5	6.4	25.1
Women's and misses' dresses.....	40.5	12.6	.7	1.4	5.5	35.7	3.0	6.4	26.1
Junior dresses.....	40.3	12.9	1.4	.8	5.4	36.3	2.4	6.2	27.5
Women's and misses' better dresses (\$20 up).....	41.2	18.5	1.2	1.2	5.6	33.2	2.9	6.5	23.8
Women's and misses' inexpensive dresses (\$20 down).....	38.3	8.2	.7	.9	5.4	36.9	2.9	6.5	27.5
Maternity dresses.....	39.7	8.4	1.0	.3	5.4	38.9	3.3	6.1	29.5
Blouses and sportswear.....	39.0	8.0	1.6	.2	5.2	37.7	2.7	6.3	28.4
Blouses, \$5.50 down.....	36.9	8.6	.5	.1	5.5	36.5	2.1	8.0	26.4
Better blouses, \$5.51 up.....	39.8	10.1	.1		5.1	39.7		6.3	33.4
Girls' and infants' apparel.....	38.1	6.7	.8	.2	3.5	36.9	2.2	7.0	27.3
Girls' and teenage apparel.....	38.2	9.5	1.3	.3	4.8	35.8	2.7	7.9	24.8
Girls' wear.....	38.0	8.7	1.0	.2	4.7	36.8	2.8	6.7	26.8
Infants' and juvenile apparel.....	37.9	5.4	.9		3.4	37.8	2.0	6.8	29.0
Aprons, housedresses, uniforms.....	36.5	6.9	.5	.3	5.4	36.3	3.3	6.7	25.7
Housedresses.....	36.9	8.8	.7	.2	5.4	36.1	2.6	6.3	27.2
Aprons and uniforms.....	38.0	4.6	1.5	.3	4.9	39.7	1.7	6.2	31.8
Men's and boys' wear:									
Men's wear.....	40.2	6.0	1.0	1.4	1.4	36.2	2.3	6.5	26.9
Men's clothing.....	40.9	8.0	.9	3.7	.6	33.2	2.1	6.4	26.7
Men's furnishings.....	40.0	5.0	1.0	.3	1.5	37.7	2.3	6.3	28.8
Men's sport, casual wear.....	40.2	7.8	1.4	1.0	1.3	35.9	2.2	6.1	27.0
Men's work clothing.....	33.3	3.8	.8		.8	29.7	1.0	5.8	22.9
Men's sport clothing.....	41.3	7.0	2.3	1.4	1.3	34.4	3.2	6.5	24.7
Boys' wear.....	38.6	5.6	1.1	1.0	1.4	35.4	2.4	6.7	25.7
Boys' clothing.....	38.7	7.3	2.1	1.1	1.6	34.2	2.5	6.3	25.4
Boys' furnishings.....	38.1	6.4	1.0		1.3	34.7	2.5	7.4	24.8
Home furnishings:									
Carpets and rugs.....	37.2	3.7	1.1	1.3	2.6	33.4	2.3	6.9	24.2
Curtains and draperies.....	41.5	5.8	.2	1.2	1.7	40.1	3.0	7.6	29.5
Curtains.....	41.9	5.7	.4		1.8	40.9	1.9	7.6	31.4
Draperies.....	42.2	6.4	.4		1.6	40.8	1.9	6.9	32.0

<sup>1</sup> 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 percentages of sales.

Adapted from reports of National Dry Goods Association: Departmental Merchandising and Operating Results of Department Stores and Specialty Stores. Report of 1957 (53).

TABLE 143.—Average costs, margins, and profits for department stores expressed as proportions of net sales, United States, for specified years, 1932-57

Item	1932	1939	1941	1945	1947	1949	1951	1953	1954	1955	1956	1957
	<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>	<i>Percent</i>
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Merchandise costs.....	66.9	63.1	61.8	62.4	63.6	64.8	64.7	63.7	63.7	63.7	63.6	63.7
Gross margin.....	33.1	36.9	38.2	37.6	35.4	35.2	35.3	36.3	36.3	36.3	36.4	36.3
Total expense <sup>1</sup> .....	39.5	35.4	33.4	27.8	30.1	32.6	33.2	33.8	33.7	33.6	33.8	34.3
Total payroll <sup>1</sup> .....	18.7	17.8	17.3	15.4	16.9	18.0	18.0	18.4	18.2	18.2	18.2	18.4
Real estate costs.....	6.5	4.4	3.6	2.5	2.2	2.6	2.6	2.7	2.8	2.8	2.8	2.9
Advertising.....	4.0	3.6	3.2	2.2	2.4	2.6	2.8	2.8	2.8	2.8	2.8	2.7
All other expense <sup>1</sup> .....	10.3	9.6	9.3	7.7	8.6	9.4	9.8	9.9	9.9	9.8	10.0	10.3
Operating profit <sup>1</sup> .....	<sup>2</sup> 6.4	1.5	4.8	9.8	5.3	2.6	2.1	2.5	2.6	2.7	2.6	2.0
Other income <sup>1</sup> .....	4.0	2.5	2.5	1.7	2.0	2.3	2.6	2.7	2.7	3.0	3.4	3.6
Gain before taxes <sup>3</sup> .....	<sup>2</sup> 2.4	4.0	7.3	11.5	7.3	4.9	4.7	5.2	5.3	5.7	6.0	5.6
Federal income taxes.....		.6	3.2	<sup>4</sup> 7.9	2.8	1.8	2.4	2.6	2.6	3.0	3.0	2.8
Gain after taxes <sup>3</sup> .....		3.4	4.1	<sup>4</sup> 3.6	4.5	3.1	2.3	2.6	2.7	2.7	3.0	2.8
Reports.....	<i>Number</i> 428	<i>Number</i> 428	<i>Number</i> 407	<i>Number</i> 398	<i>Number</i> 383	<i>Number</i> 354	<i>Number</i> 349	<i>Number</i> 364	<i>Number</i> 368	<i>Number</i> 342	<i>Number</i> 325	<i>Number</i> 345

<sup>1</sup> 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.

<sup>2</sup> Loss.

<sup>3</sup> Federal income taxes.

<sup>4</sup> Federal income taxes for 1945 include taxes on excess profits net of the 10 percent postwar refund and debt-retirement credit.

Abstracted from Operating Results of Department and Specialty Stores in 1944 and 1957 (49).



Retailers' gross operating margins vary considerably with the kind of product, with price lines, and from one establishment to another. Typical costs to retailers and retail prices to consumers were obtained by the Bureau of Labor Statistics from about 2,600 retail stores in about 150 cities of different sizes distributed throughout the United States, for September 1942. They show that retailers' average gross margin for yard goods and domestics, for example, ranged from an average of about 28 percent of the retail price for bed sheets to about 39 percent for rayon yard goods. Similar margins for women's and children's clothing ranged from less than 33 percent for low-priced cotton dresses to more than 40 percent for expensive suits and coats. For men's and young men's clothing and furnishings, these margins ranged from about 28 percent for cotton gloves to about 42 percent for the more expensive suits and coats (110).

Data for the different price lines for several of the commodities included in the Bureau of Labor Statistics survey 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, 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 (110). These margins varied considerably among different retailers of the same commodity and price line, as well as from one price line to another. Most of the margins shown by the data for 1942 came within the range of 30 to 45 percent of the retail price. Many retailers of yard goods, bath towels, cotton knit undershirts and union suits, and men's work socks, among others, had gross margins of less than 30 percent. Many retailers of men's and women's more expensive suits and coats, women's expensive dresses, cotton knit undershirts, and men's work socks, among others, had gross margins of more than 45 percent of the retail price (110).

Gross operating margins for department and specialty stores usually are relatively greater for stores with the larger than for those with the smaller volumes of annual sales. In 1957, for example, average gross margins for department stores ranged from 31.7 percent of net sales for stores with annual sales of less than \$250,000 to 36.4 percent for those with annual sales of \$20 million and over (table 144). Average operating expenses ranged from about 30 percent of net sales for stores with annual sales of less than \$250,000 to 35.1 percent for those with annual sales of \$10 million to \$20 million. Merchandise costs accounted for larger proportions of net sales for stores with annual sales of \$20 million and more than for stores with smaller volumes of annual sales. These differences in costs may be accounted for, at least in part, by more wholesaling and other services performed by the larger than by the smaller operators. Proportions of net sales accounted for by payroll and most other items of expense, and by net profits, varied irregularly with annual volume of sales.

TABLE 144.—Costs, expenses, and profits of department stores expressed as proportions of net sales, by volume of sales United States, 1957

Item	Total net sales per store, 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 and over
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Merchandise costs.....	63.3	66.2	64.5	64.5	63.7	64.0	63.8	63.6	63.6
Gross margin.....	31.7	33.8	35.5	35.5	36.3	36.0	36.2	36.4	36.4
Total expense.....	30.0	31.3	34.8	33.7	34.5	33.9	35.1	34.0	33.3
Total payroll.....	16.7	18.2	20.1	18.8	18.9	17.95	18.9	18.3	18.0
Real estate.....	2.9	2.5	3.1	3.2	3.0	3.35	3.1	2.95	2.6
Advertising.....	2.4	2.25	2.6	3.0	3.0	3.15	3.25	2.7	2.45
Taxes.....	.95	.95	1.15	.95	1.05	1.05	1.05	1.1	1.1
Imputed interest.....	1.5	1.45	1.4	1.35	1.45	1.45	1.5	1.5	1.4
Supplies.....	1.6	2.1	2.3	2.1	2.2	2.25	2.2	2.15	1.9
Services purchased.....	.8	.8	1.0	1.0	1.3	1.5	1.65	1.8	2.15
Unclassified.....	.5	.45	.45	.5	.55	.45	.5	.65	.8
Traveling.....	.45	.45	.45	.5	.45	.4	.35	.25	.2
Communication.....	.35	.45	.5	.45	.45	.5	.5	.5	.5
Pensions.....	.0	.0	.0	.1	.25	.3	.35	.35	.35
Insurance <sup>1</sup> .....	.65	.6	.55	.45	.55	.4	.5	.3	.45
Depreciation <sup>1</sup> .....	.8	.65	.65	.7	.8	.7	.7	.85	.75
Professional services.....	.25	.15	.3	.3	.2	.15	.2	.25	.3
Donations.....	.05	.1	.1	.1	.15	.15	.15	.1	.1
Losses from bad debts.....	.1	.2	.15	.2	.2	.15	.2	.25	.25
Equipment rentals.....	.0	.0	.0	.0	.0	.0	.05	.0	.0

Net operating profit.....	1.7	2.5	.7	1.8	1.8	2.1	1.1	2.4	3.1
Net other income.....	1.6	1.7	1.7	1.7	2.2	2.4	3.0	3.2	3.2
Net gain before taxes.....	3.3	4.1	2.4	3.5	4.0	4.5	4.1	5.6	6.3
Federal income taxes.....	( <sup>1</sup> )	( <sup>2</sup> )	.7	1.5	1.9	2.2	2.05	2.8	3.15
Net gain after taxes.....	( <sup>2</sup> )	( <sup>2</sup> )	1.7	2.0	2.1	2.3	2.05	2.8	3.15
Reporting firms.....	<i>Number</i> 43	<i>Number</i> 37	<i>Number</i> 33	<i>Number</i> 36	<i>Number</i> 55	<i>Number</i> 37	<i>Number</i> 42	<i>Number</i> 36	<i>Number</i> 26

<sup>1</sup> Except on real estate.

<sup>2</sup> Usable data not available.

Adapted from Operating Results of Department and Specialty Stores in 1987 (40).

Operating results for specialty stores in 1957 show that gross margins and total operating expenses as proportions of sales varied directly, for the most part, with annual volume of sales (table 145). Furthermore, payrolls, real estate costs, and advertising expenses, the principal items of expense, when expressed as proportions of sales, each usually varied directly with annual volume of sales. Other items of cost and net operating profits varied irregularly with volume of sales.

Data on typical operating ratios of 240 dry goods and general-merchandise stores, as reported by Dun and Bradstreet, Inc., show

TABLE 145.—Costs, expenses, and profits of specialty stores expressed as proportions of net sales, by volume of sales, United States, 1957

Item	Volume of net sales, in thousands of dollars			
	Less than 250	250 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
Merchandise costs.....	66.1	63.4	61.6	61.3
Gross margin.....	33.9	36.6	38.4	38.7
Total expense.....	33.3	36.0	37.45	37.5
Payroll.....	18.15	19.0	20.0	20.0
Real estate.....	3.55	3.75	3.95	3.85
Advertising.....	2.45	3.15	3.3	3.45
Taxes.....	.85	.95	1.0	1.05
Imputed interest.....	1.3	1.35	1.15	1.3
Supplies.....	1.85	2.05	2.4	2.4
Service purchased.....	1.05	1.25	1.5	1.75
Unclassified.....	.7	.7	.75	.7
Traveling.....	.9	1.05	.7	.43
Communication.....	.45	.6	.6	.65
Pensions.....	0	0	.2	.2
Insurance <sup>1</sup> .....	.5	.6	.5	.45
Depreciation <sup>1</sup> .....	.85	.9	.65	.75
Professional services.....	.35	.3	.35	.2
Donations.....	.1	.1	.15	.1
Losses on bad debts.....	.25	.25	.2	.15
Equipment rentals.....	0	0	.05	.05
Net operating profit.....	.6	.6	.95	1.2
Net other income.....	1.6	1.3	1.25	1.7
Net gain before taxes.....	2.2	1.9	2.2	2.9
Federal income taxes.....	(2)	(2)	1.0	1.45
Net gain after taxes.....	(2)	(2)	1.2	1.45
Reporting firms.....	Number 28	Number 29	Number 20	Number 12

<sup>1</sup> Except on real estate.

<sup>2</sup> Usable data not available.

Abstracted from Operating Results of Department and Specialty stores in 1957 (85).

that, in 1957, retailers' gross operating margins averaged 29.5 percent of net sales, compared with 27.5 percent in 1949, and ranged from about 28 percent for unprofitable stores to almost 32 percent for stores with profits of 6 percent or more of net sales (table 146). These margins varied irregularly with annual volume of sales and with proportions of sales on credit, and directly with profitability of the business. Owners' compensation, wages, and occupancy were the main items of expense. Net profits before income taxes averaged less than 2 percent of net sales.

Typical operating results for 302 children's and infants' wear stores show that, in 1957, gross margins averaged 32.5 percent of net sales, the same as in 1950, and ranged from 30.3 percent for unprofitable and neighborhood stores to 35.7 percent for stores with net profits of 7 percent or more of net sales (table 147). These margins varied directly with proportions of sales made on credit and with annual volume of sales. Owners' compensation, wages, and occupancy accounted for a large proportion of total expenses. Expressed as proportions of sales, owners' compensation and occupancy varied directly, and wages varied inversely, with volume of annual sales and with proportion of sales made on credit. Net profits before income taxes averaged 1.7 percent of net sales and varied directly with volume of annual sales.

Reports for 181 family clothing stores show that, in 1951, gross operating margins averaged 30.1 percent of sales and ranged from about 28 percent for stores that sold for cash to 34 percent for stores in downtown shopping areas (table 148). These margins varied directly with the price range of the products and with the proportion sold on credit. Salaries averaged 8.5 percent of net sales and varied considerably with volume of annual sales, price range of the products, and type of shopping area. Wages averaged 7.7 percent of net sales and varied directly with volume of annual sales, prices of the products, and proportion of sales made on credit. Wages were relatively high for stores operated by corporations and those in downtown shopping areas. Net profits before taxes averaged 3.4 percent of net sales and were highest for stores with annual volumes of sales of \$50,000 to \$100,000.

Data for 265 men's furnishing stores show that, in 1952, retailers' gross margins averaged 32.8 percent of net sales and ranged within relatively narrow limits (table 149). Salaries averaged 9.8 percent of net sales and varied inversely with volume of annual sales, with proportions of credit sales, and with price range of the commodities. Wages averaged 6.5 percent of net sales and varied directly with volume of annual sales, with proportion of sales on credit, and with price range of the commodities, and inversely with profits as proportions of sales. Occupancy expenses averaged 6.4 percent of net sales, and varied directly with volume of annual sales, and irregularly with most other factors. Profits before taxes averaged 3.5 percent of net sales and ranged from an average loss for some groups to an average gain of 11 percent for others.

TABLE 146.—*Typical operating ratios of dry goods and general-merchandise stores, by kind and location, United States, 1957*

Item	Stores re-ported	Net sales per store	Proportion of net sales								Net profit <sup>1</sup>
			Cost of goods sold	Gross margin	Expenses					Net profit <sup>1</sup>	
					Total	Owner's compensation	Wages	Occupancy	Advertising		
	Number	Dollars	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent
All stores.....	240	90,220	70.5	29.5	27.6	8.6	8.6	4.5	1.3	4.6	1.9
By sales volume—dollars:											
Under 50,000.....	65	32,940	70.8	29.2	28.1	12.1	5.2	6.4	.9	3.5	1.1
50,000 to 99,000.....	64	72,330	70.0	30.0	27.4	8.9	7.4	4.7	1.3	5.1	2.6
100,000 to 199,000.....	75	129,050	71.0	29.0	26.9	6.7	9.6	3.9	1.5	5.2	2.1
200,000 and over.....	36	283,730	68.6	31.4	29.6	7.2	12.8	3.5	1.3	4.8	1.8
By form of ownership:											
Proprietorship.....	112	72,020	70.5	29.5	27.1	8.3	8.2	4.9	1.3	4.4	2.4
Partnership.....	79	89,380	71.2	28.8	26.5	9.7	7.2	4.5	1.1	4.0	2.3
Corporation.....	49	163,530	68.7	31.3	30.1	7.4	11.6	3.9	1.6	5.6	1.2
By type of shopping area:											
Downtown.....	148	102,585	70.5	29.5	27.3	8.0	8.9	4.2	1.4	4.8	2.2
Suburban.....	31	86,960	69.8	30.2	29.3	10.7	7.6	5.0	1.0	5.0	.9
Neighborhood.....	61	65,080	70.6	29.4	27.6	9.6	7.8	5.0	.9	4.3	1.8
By percent, sales on credit:											
None.....	92	77,000	70.6	29.4	27.1	9.0	7.4	4.9	1.3	4.5	2.3
1 to 25.....	88	89,645	70.0	30.0	28.3	8.6	8.7	4.9	1.2	4.9	1.7
Over 25.....	60	111,480	70.8	29.2	27.1	7.9	9.6	3.7	1.3	4.6	2.1
By principal lines:											
A—dry goods, etc. <sup>2</sup> .....	53	76,390	68.6	31.4	27.5	8.9	8.2	5.6	1.2	3.6	3.9
B—apparel <sup>3</sup> .....	105	108,640	70.8	29.2	27.5	8.2	8.7	4.0	1.4	5.2	1.7
C—mixed items <sup>4</sup> .....	82	85,460	70.9	29.1	27.5	8.8	8.5	4.3	1.1	4.8	1.6

By net profits on sales:

Unprofitable.....	79	68,990	71.6	28.4	30.9	10.9	8.5	5.1	1.5	4.9	* 2.5
0.1 to 2.9 percent.....	59	111,540	70.4	29.6	28.2	8.3	9.0	4.7	1.4	4.8	1.4
3.0 to 5.9 percent.....	56	92,055	70.5	29.5	25.3	7.3	8.3	3.7	1.2	4.8	4.2
6.0 percent and over.....	46	88,435	68.3	31.7	22.7	7.8	6.6	4.2	.8	3.3	9.0

<sup>1</sup> Before Federal income taxes.

<sup>2</sup> Obtained 60 percent or more of sales from dry goods, bedding, and notions.

<sup>3</sup> Obtained 60 percent or more of sales from men's, women's, and children's apparel and footwear.

<sup>4</sup> Sold approximately equal amounts of the aforementioned items and housewares, house furnishings, and hardware.

<sup>5</sup> Loss.

Adapted from Dry Goods and General Merchandise Stores (61).

TABLE 147.—*Typical operating results for children's and infants' wear stores, by kind and location, United States, 1957*

Item	Stores reported	Net sales per store	Proportion of net sales								Net profit <sup>1</sup>
			Cost of goods sold	Gross margin	Expenses					Net profit <sup>1</sup>	
					Total	Owner's compensation	Wages	Occupancy	Advertising		
	Number	Dollars	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
All stores.....	302	65,500	67.5	32.5	30.8	9.4	7.2	6.9	1.3	6.0	1.7
By sales volume—dollars:											
Under 50,000.....	116	32,430	68.0	32.0	31.5	12.6	4.1	7.8	1.2	5.8	.5
50,000 to 99,000.....	115	71,900	67.4	32.6	30.8	9.1	7.2	6.8	1.3	6.4	1.8
100,000 and over.....	71	165,220	66.6	33.4	30.4	6.5	9.4	6.1	1.9	6.5	3.0
By form of organization:											
Proprietorship.....	153	58,370	68.4	31.6	30.1	9.5	6.6	6.8	1.2	6.0	1.5
Partnership.....	95	64,920	67.2	32.8	30.4	9.7	6.9	6.7	1.6	5.5	2.4
Corporation.....	54	82,660	65.6	34.4	33.0	9.1	8.5	7.3	1.2	6.9	1.4
By type of shopping area:											
Downtown.....	116	67,050	66.7	33.3	31.6	9.4	7.3	6.9	1.5	6.5	1.7
Suburban.....	97	72,630	67.3	32.7	31.5	9.0	7.5	7.5	1.4	6.1	1.2
Neighborhood.....	89	46,700	69.7	30.3	28.4	10.3	5.4	6.4	.9	5.4	1.9
By merchandise line: <sup>2</sup>											
Group A.....	173	65,760	67.7	32.3	31.0	9.6	7.1	7.0	1.2	6.1	1.3
Group B.....	129	64,500	67.3	32.7	30.5	9.3	7.2	6.8	1.4	5.8	2.2
By proportion of credit sales:											
None.....	103	51,840	68.3	31.7	30.2	10.2	6.6	7.1	.8	5.5	1.5
1 to 25 percent.....	104	58,420	67.9	32.1	30.8	9.4	7.2	7.0	1.3	5.9	1.3
25 percent and over.....	95	89,250	66.8	33.2	31.3	8.9	7.7	6.4	1.7	6.6	1.9
By profit on net sales:											
Unprofitable.....	105	49,680	69.7	30.3	34.4	10.9	7.9	7.7	1.2	6.7	4.1
0.1 to 2.9 percent.....	84	68,415	67.5	32.5	31.2	9.0	7.6	7.3	1.4	5.9	1.3
3.0 to 6.9 percent.....	65	72,630	67.4	32.6	28.2	8.0	6.4	6.3	1.6	5.9	4.4
7.0 percent and over.....	48	63,795	64.3	35.7	25.3	9.1	5.7	5.4	.9	4.2	10.4

<sup>1</sup> Before Federal income taxes.<sup>2</sup> Group A sold only children's and infants' clothing, furnishings, and accessories. Group B sold, in addition to items listed for Group A, toys, juvenile furniture, and other merchandise in moderate amounts.<sup>3</sup> Loss.

Adapted from Children's and Infants' Wear Stores, Operating Results in 1957 (80).



TABLE 148.—Typical operating ratios for family clothing stores, by kind, size, and location, United States, 1951

Item	Stores re-ported	Net sales per store	Proportion of net sales										Net prof- it <sup>1</sup>
			Cost of goods sold	Gross margin	Expenses								
					Total	Sal-aries	Wages	Occu-paney	Adver-tising	Buy-ing	Depre-ciation	Other	
Number	Dols.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	
All stores.....	181	76, 800	69. 0	30. 1	26. 7	8. 5	7. 7	4. 7	1. 2	0. 4	0. 6	3. 6	3. 4
By sales volume—dollars:													
Under 50,000.....	54	35, 600	69. 6	30. 4	27. 8	11. 5	6. 2	5. 3	. 6	. 4	. 5	3. 3	2. 6
50,000 to 99,000.....	59	69, 800	70. 7	29. 3	24. 7	7. 3	7. 5	4. 4	1. 1	. 3	. 6	3. 5	4. 6
100,000 and over.....	68	169, 650	68. 9	31. 1	27. 3	6. 0	9. 6	4. 4	2. 1	. 5	. 7	4. 0	3. 8
By form of ownership:													
Proprietorship.....	88	55, 800	71. 0	29. 0	24. 9	8. 3	7. 2	4. 4	. 9	. 4	. 5	3. 2	4. 1
Partnership.....	55	95, 900	69. 3	30. 7	26. 3	8. 7	7. 3	4. 5	1. 2	. 2	. 7	3. 7	4. 4
Corporation.....	38	105, 450	67. 4	32. 6	30. 3	6. 8	10. 7	5. 0	2. 0	. 5	. 7	4. 6	2. 3
By principal line of merchan- disc:													
Men's wear.....	50	70, 000	70. 1	29. 9	26. 8	8. 3	7. 7	4. 3	1. 2	. 6	. 7	4. 0	3. 1
Women's wear.....	55	91, 500	70. 1	29. 9	26. 6	8. 4	7. 6	4. 8	1. 2	. 5	. 7	3. 4	3. 3
Mixed line.....	69	73, 200	69. 7	30. 3	25. 8	8. 3	7. 6	4. 4	1. 0	. 2	. 6	3. 7	4. 5
By price range:													
Low.....	68	52, 550	72. 0	28. 0	24. 5	9. 0	6. 6	4. 6	. 7	. 3	. 5	2. 8	3. 5
Middle.....	60	108, 850	69. 2	30. 8	26. 7	7. 9	8. 1	4. 5	1. 6	. 4	. 7	3. 5	4. 1
High.....	34	135, 850	67. 1	32. 9	29. 1	5. 7	10. 8	3. 9	2. 5	. 6	. 9	4. 7	3. 8
By type of shopping area:													
Downtown.....	43	112, 900	65. 9	34. 1	31. 2	7. 0	11. 3	5. 1	2. 1	. 5	. 7	4. 5	2. 9
Secondary.....	31	59, 600	70. 6	29. 4	26. 6	9. 9	6. 6	5. 0	1. 0	. 2	. 4	3. 5	2. 8
Neighborhood.....	33	48, 700	70. 5	29. 5	26. 6	10. 1	6. 4	5. 0	. 7	. 1	. 6	3. 7	2. 9
By proportion of sales on credit:													
None.....	75	66, 700	72. 1	27. 9	23. 4	8. 4	6. 2	4. 5	. 6	. 2	. 4	3. 1	4. 5
1 to 25 percent.....	53	76, 100	69. 2	30. 8	26. 3	8. 7	7. 0	4. 4	1. 5	. 3	. 7	3. 7	4. 5
Over 25 percent.....	53	107, 200	66. 2	33. 8	31. 1	7. 0	10. 6	4. 7	2. 7	. 6	. 9	4. 6	2. 7

<sup>1</sup> Before Federal income taxes.

Adapted from Family Clothing Stores, Operating Results in 1951 (62).

TABLE 149.—*Typical operating ratios for men's furnishing stores, by kind, size, and location, United States, 1952*

Item	Stores reported	Net sales per store	Proportion of net sales									
			Cost of goods sold	Gross margin	Expenses						Net profit <sup>1</sup>	
					Total	Salaries	Wages	Occupancy	Advertising	Buying		Other
	Number	Dols.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
All stores-----	265	64, 680	67. 2	32. 8	29. 3	9. 8	6. 5	6. 4	1. 3	0. 3	5. 0	3. 5
By sales volume—dollars:												
Under 50,000-----	100	36, 110	67. 4	32. 6	28. 5	12. 7	1. 2	8. 0	1. 0	. 1	5. 1	3. 9
50,000 to 100,000-----	85	69, 800	67. 6	32. 4	29. 1	9. 5	6. 3	6. 3	1. 4	. 2	5. 0	3. 2
100,000 and over-----	80	138, 870	66. 8	33. 2	31. 4	7. 7	9. 5	5. 5	2. 1	. 5	5. 4	3. 4
By population of city:												
Under 20,000-----	67	60, 720	68. 1	31. 9	27. 7	9. 6	5. 9	5. 0	1. 5	. 5	5. 2	4. 2
20,000 to 100,000-----	60	84, 060	67. 4	32. 6	30. 1	9. 3	7. 2	6. 6	1. 8	. 4	4. 8	2. 5
101,000 to 500,000-----	57	68, 730	66. 4	33. 6	29. 1	9. 2	6. 1	6. 8	1. 4	. 2	5. 3	4. 5
500,000 and over-----	81	52, 590	67. 0	33. 0	29. 5	10. 4	5. 9	7. 6	. 8	0	4. 8	3. 5
By form of ownership:												
Proprietorship-----	139	48, 700	67. 5	32. 5	28. 1	9. 4	5. 8	6. 7	1. 1	. 2	4. 9	4. 4
Partnership-----	65	72, 160	67. 8	32. 2	29. 4	10. 9	5. 1	6. 1	1. 6	. 3	5. 3	2. 8
Corporation-----	61	105, 300	65. 5	34. 5	31. 8	9. 7	9. 0	6. 3	1. 6	. 4	4. 8	2. 7
By shopping location:												
Neighborhood-----	48	44, 570	65. 5	33. 5	28. 2	10. 7	4. 8	6. 5	. 8	. 1	5. 3	5. 3
Secondary-----	59	48, 920	68. 1	31. 9	28. 6	11. 0	4. 5	6. 3	1. 3	. 1	5. 4	3. 3
Downtown-----	150	74, 400	67. 2	32. 8	29. 7	9. 2	7. 2	6. 4	1. 6	. 4	4. 9	3. 1
By proportion of credit sales:												
None-----	124	48, 830	67. 6	32. 4	28. 5	10. 6	4. 9	6. 9	. 9	. 1	5. 1	3. 9
1 to 20 percent-----	78	73, 070	67. 7	32. 3	29. 1	9. 7	6. 6	5. 7	1. 9	. 2	5. 0	3. 2
Over 20 percent-----	63	96, 320	65. 2	34. 8	31. 4	8. 6	9. 1	5. 8	2. 0	. 5	5. 4	3. 4

By net profit on sales:													
Unprofitable.....	50	57,470	67.5	32.5	35.8	12.5	7.6	8.8	1.5	.1	5.3	-3.3	
0.1 to 2.9 percent.....	75	77,330	68.3	31.7	29.9	9.6	7.0	6.1	1.4	.3	5.5	1.8	
3.0 to 6.9 percent.....	69	68,570	67.2	32.8	28.4	10.2	5.9	5.9	1.4	.2	4.8	4.4	
7.0 percent and over.....	71	60,720	64.7	35.3	24.3	8.4	5.4	5.9	.9	.2	3.5	11.0	
By price range:													
Low to medium.....	210	60,150	67.5	32.5	29.0	10.1	6.2	6.4	1.2	.3	4.8	3.5	
High.....	42	105,440	66.2	33.8	30.3	8.0	8.2	6.4	2.1	.3	5.3	3.5	

<sup>1</sup> Before Federal income taxes.

Adapted from Men's Furnishings Stores, Operating Results in 1952 (64).

Typical operating ratios for 269 women's ready-to-wear retail stores show that, in 1953, gross margins averaged 32.3 percent of net sales and ranged from 30.1 percent for a group of 65 unprofitable ones to 36 percent for the 43 stores in the Far West group (table 150). Salaries averaged 8.2 percent of net sales, varied inversely with volume of annual sales and with proportion of credit sales, varied irregularly with most other factors, and averaged highest for 46 stores which were open 60 or more hours per week. Wages averaged 8.8 percent of net sales, varied directly with volume of annual sales and with proportion of credit sales, and varied irregularly with most other factors. Profits before income taxes averaged 2.9 percent of net sales, averaged higher in the Far West than in any other geographic division, and ranged from an average loss of 2 percent of net sales for 65 unprofitable stores to almost 10 percent for stores with profits of 7 percent or more of net sales.

Reports for 213 women's accessory and specialty stores show that, in 1954, gross margins averaged 33.7 percent of net sales and ranged from 31.5 percent for 65 stores with annual volumes of sales of \$25,000 to \$50,000 to 36.7 percent for 73 stores that sold mostly underwear and nightwear, including foundation garments (table 151). Similar data for 168 women's accessory and specialty stores in 1949 show that gross margins averaged 32.4 percent of net sales (33). Salaries in 1954 averaged 11.2 percent of net sales and varied inversely with annual volume of sales, with hours per week the stores were open, and with percentage of sales on credit. Wages averaged 5.8 percent of sales and varied directly with annual volume of sales and with percent of sales on credit. Occupancy expense averaged 7.5 percent of net sales and was highest for stores with volumes of sales of less than \$25,000. Net profits before income taxes averaged 2.2 percent of net sales and ranged from an average loss of 3.9 percent of net sales for 64 unprofitable stores to 8.6 percent for 47 stores with profits of 6 percent or more of net sales.

Data for 192 family clothing stores show that, in 1956, retailers' gross margins averaged 30.6 percent of net sales, and ranged from 24.8 percent for 50 stores with gross margins of less than 28 percent of net sales to 37.7 percent for a group of 60 stores with gross margins of 33 percent or more of net sales (table 152). These margins varied directly with percentage of credit sales. Salaries averaged 9.4 percent of net sales, varied inversely with annual volume of sales and with profits, and varied directly with gross margins earned. Wages averaged 7.7 percent of net sales and varied directly with annual volume of sales, with percent of credit sales, and with gross margins earned. Occupancy expense averaged 4.2 percent of net sales, varied directly with gross margins, and varied inversely with net profits. Net profits before taxes averaged 2.7 percent of net sales and ranged from an average loss of 1.5 percent of net sales to an average profit of 8.7 percent for 40 stores with profits of 6 percent or more of net sales.

Comparisons of the operating results for women's accessory and specialty stores reported for 1954 (table 151) and for 1949 (33) show that the proportions of net sales accounted for by gross margins, total operating expense, salaries, occupancy, and some other

expenses increased, but the proportions accounted for by wages and profits decreased. Similar comparisons of operating results for family clothing stores for 1956 (table 152) and those for 1951 (table 148) show similar results except that, for family clothing stores, the proportions of net sales accounted for by wages were unchanged and the proportions accounted for by occupancy expense decreased. Advertising expenses as proportions of net sales were unchanged for women's accessory and specialty stores, but they increased for family clothing stores.

As indicated above for department stores (p. 304) and for other kinds of stores in 1939 (50), salaries and wages are two of the chief items included in gross retail margins for textile products. Salaries and wages for 192 family clothing stores in 1956 averaged about 17 percent of net sales, 56 percent of retailers' gross margins, and 61 percent of total operating expenses. For 213 stores selling women's accessories and specialties, wages and salaries in 1954 averaged 17 percent of net sales, 50 percent of the retailers' gross margins, and 54 percent of total operating expenses. Similar data for 265 men's furnishing stores show that, in 1952, salaries and wages averaged 16.3 percent of net sales, about 50 percent of the retailers' gross margins, and 56 percent of total operating expenses. These results are fairly typical of those for other kinds of retail stores, including women's ready-to-wear, children's and infants' wear, and dry goods and general-merchandise stores (tables 152, 151, 149).

Payrolls as proportions of sales vary from one geographic division to another. In 1954, payrolls for operators of general-merchandise stores ranged from 13.1 percent of sales in East South Central States to 16.5 percent in New England, and averaged 15.3 percent for the United States (table 153). For apparel and accessory stores, these proportions ranged from 12.6 percent in East South Central States to 14.7 percent in New England, and averaged 13.9 percent for the United States. Substantial proportions, but not all, of these differences in payrolls are accounted for by differences in wage rates. Census reports show that, for the week ended nearest November 15, 1954, the average weekly wage rate for the general-merchandise group of retail stores ranged from \$43.92 in East South Central States to \$54.98 in Pacific States, and averaged \$49.92 for the United States. For apparel and accessory stores, these rates ranged from \$43.23 in East South Central States to \$60.54 in Pacific States, and averaged \$54.65 for the United States.

Various types of cooperative plans have been worked out by retailers and wholesalers in an effort to improve efficiency in buying and selling (51). 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 buys for them directly from manufacturers, rather than through wholesalers. Some wholesalers also have formed such buying syndicates. But available information is not adequate to show to what extent the "traditional" channel, from producers to wholesalers to retailers, has been affected by these developments.

TABLE 150.—*Typical operating ratios for women's ready-to-wear stores, by kind, size, and location, United States, 1953*

Item	Stores re-ported	Net sales per store	Proportion of net sales									
			Cost of goods sold	Gross margin	Expenses							Net profit <sup>1</sup>
					Total	Salaries	Wages	Occupancy	Advertising	Buying	Other	
	Number	Dollars	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
All stores.....	269	72, 560	67. 7	32. 3	29. 4	8. 2	8. 8	5. 4	1. 3	0. 9	4. 8	2. 9
By shopping location:												
Central.....	181	86, 890	67. 1	32. 9	30. 0	7. 6	9. 1	5. 8	1. 6	1. 0	4. 9	2. 9
Neighborhood.....	88	45, 005	69. 2	30. 8	28. 1	10. 1	7. 1	4. 8	1. 0	. 7	4. 4	2. 7
By sales volume—dollars:												
Under 50,000.....	99	32, 460	69. 2	30. 8	28. 3	11. 1	5. 5	6. 0	. 8	. 7	4. 2	2. 5
50,000 to 100,000.....	77	73, 370	68. 2	31. 8	28. 2	7. 6	7. 9	5. 0	1. 5	1. 0	5. 2	3. 6
100,000 and over.....	93	153, 580	66. 0	34. 0	31. 3	6. 4	11. 1	5. 1	2. 3	1. 2	5. 2	2. 7
By form of ownership:												
Proprietorship.....	140	58, 900	67. 6	32. 4	29. 4	8. 5	8. 6	5. 4	1. 2	1. 0	4. 7	3. 0
Partnership.....	83	76, 810	68. 8	31. 2	28. 1	8. 8	7. 7	5. 1	1. 4	. 7	4. 4	3. 1
Corporation.....	46	96, 995	65. 3	34. 7	33. 1	7. 0	10. 9	6. 0	2. 2	1. 1	5. 9	1. 6
By geographic location:												
Northeast.....	91	51, 485	69. 3	30. 7	28. 6	9. 1	7. 3	5. 9	1. 0	. 9	4. 4	2. 1
Middle West.....	66	94, 860	68. 1	31. 9	29. 6	7. 9	9. 8	4. 7	1. 6	. 9	4. 7	2. 3
South.....	68	84, 490	67. 4	32. 6	29. 4	7. 7	9. 1	4. 9	1. 4	1. 2	5. 1	3. 2
Far West.....	43	69, 380	64. 0	36. 0	31. 6	8. 1	8. 3	6. 4	1. 8	1. 9	5. 1	4. 4
By number of hours open:												
40 to 48.....	106	79, 725	67. 0	33. 0	30. 3	8. 0	8. 9	5. 8	1. 7	1. 1	4. 8	2. 7
49 to 59.....	112	70, 685	68. 5	31. 5	28. 3	7. 6	8. 8	5. 3	1. 2	. 9	4. 5	3. 2
60 and over.....	46	52, 305	67. 4	32. 6	30. 9	11. 4	7. 6	4. 9	1. 1	. 6	5. 3	1. 7

By proportion of credit sales:

None.....	68	40,675	68.3	31.7	30.4	9.7	7.2	7.3	.9	.6	4.7	1.3
1 to 25 percent.....	66	74,460	68.3	31.7	28.8	8.6	8.4	4.9	1.4	.7	4.8	2.9
25 to 50 percent.....	57	81,610	68.1	31.9	28.6	8.1	8.0	5.3	1.5	1.0	4.7	3.3
50 percent and over.....	78	116,380	66.2	33.8	30.9	7.2	10.3	5.0	1.7	1.3	5.4	2.9
By net profits on sales:												
Unprofitable.....	65	66,100	69.9	30.1	32.2	8.4	9.4	5.9	1.5	1.0	5.9	<sup>1</sup> 2.0
1 to 3 percent.....	74	79,035	68.3	31.7	30.4	7.9	9.3	5.7	1.6	1.0	4.9	1.3
3 to 7 percent.....	78	68,920	66.9	33.1	28.2	8.8	7.8	5.0	1.2	.9	4.5	4.9
7 percent and over.....	52	78,275	65.1	34.9	25.0	7.6	7.9	4.6	1.1	.5	3.3	9.9

<sup>1</sup> Before Federal Income taxes.

<sup>2</sup> Loss.

Adapted from Women's Ready-to-Wear Stores, Operating Results in 1953 (66).

TABLE 151.—*Typical operating ratios for women's accessory and specialty stores, by kind of store, size, and location United States, 1954*

Item	Stores re-ported	Net sales per store	Proportion of net sales								Net profit <sup>1</sup>
			Cost of goods sold	Gross margin	Expenses						
					Total	Salaries	Wages	Occu-pancy	Adver-tising	Other	
Number	Dols.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	
All stores.....	213	44, 980	66. 3	33. 7	31. 5	11. 2	5. 8	7. 5	1. 0	6. 0	2. 2
By sales volume—dollars:											
Under 25,000.....	52	15, 820	65. 9	34. 1	32. 7	15. 8	. 2	11. 3	. 9	4. 5	1. 4
25,000 to 49,000.....	65	35, 790	68. 5	31. 5	29. 8	13. 4	3. 8	6. 8	1. 0	4. 8	1. 7
50,000 to 99,000.....	54	69, 850	65. 6	34. 4	31. 2	8. 2	8. 9	6. 8	1. 1	6. 2	3. 2
100,000 and over.....	42	126, 480	65. 5	34. 5	33. 2	7. 8	10. 9	6. 1	1. 5	6. 9	1. 3
By type of shopping area:											
Central.....	112	51, 120	64. 5	35. 5	33. 4	10. 5	7. 6	7. 8	1. 3	6. 2	2. 1
Neighborhood.....	90	39, 530	68. 1	31. 9	29. 5	12. 1	4. 0	7. 0	. 9	5. 5	2. 4
By principal line of merchandise:											
Underwear and nightwear <sup>2</sup> .....	73	35, 790	63. 3	36. 7	33. 5	13. 2	5. 6	7. 9	1. 1	5. 7	3. 2
Sportswear <sup>3</sup> .....	75	55, 820	67. 7	32. 3	30. 4	11. 1	5. 6	6. 5	1. 0	6. 2	1. 9
General-line items <sup>4</sup> .....	63	51, 130	67. 3	32. 7	31. 5	10. 2	6. 0	7. 7	1. 3	6. 3	1. 2
By hours open per week:											
40-51.....	72	42, 180	65. 5	34. 5	31. 8	12. 0	5. 6	7. 2	1. 2	5. 8	2. 7
52-57.....	75	43, 650	65. 9	34. 1	31. 9	11. 9	5. 5	7. 0	1. 2	6. 3	2. 2
58-72.....	56	46, 525	67. 9	32. 1	29. 7	10. 6	5. 4	7. 6	. 6	5. 5	2. 4
By proportion of sales on credit:											
None.....	135	43, 370	67. 0	33. 0	31. 6	11. 9	5. 5	7. 6	. 8	5. 8	1. 4
1 to 20 percent.....	45	40, 360	66. 2	33. 8	30. 9	10. 9	4. 8	7. 8	1. 4	6. 0	2. 9
Over 20 percent.....	33	85, 920	63. 3	36. 4	33. 9	8. 6	10. 9	6. 1	1. 8	6. 5	2. 5
By profit on net sales:											
Unprofitable.....	64	34, 745	67. 9	32. 1	36. 0	13. 5	5. 3	9. 2	1. 4	6. 6	<sup>5</sup> 3. 9
0.1 to 2.99 percent.....	57	51, 130	66. 8	33. 2	32. 1	12. 1	6. 0	6. 8	1. 0	6. 2	1. 1
3.0 to 5.99 percent.....	45	55, 940	65. 4	34. 6	30. 5	9. 8	6. 9	7. 1	1. 1	5. 6	4. 1
6.0 percent and over.....	47	41, 370	64. 7	35. 3	26. 7	10. 1	4. 6	6. 3	1. 0	4. 7	8. 6

<sup>1</sup> Before Federal income taxes. <sup>2</sup> Foundation garments included. <sup>3</sup> Includes blouses, sweaters, skirts, beachwear, etc. <sup>4</sup> Includes foundation garments, underwear, nightwear, sportswear, hosiery, and accessories. <sup>5</sup> Loss.

Adapted from Women's Accessory and Specialty Stores, Operating Results in 1954 (65).



TABLE 152.—Operating results of family clothing stores, by kind, size, and location, United States, 1956

Item	Stores reported	Net sales per store	Proportion of net sales										Net profit <sup>1</sup>
			Cost of goods sold	Gross margin	Expenses								
					Total	Salaries	Wages	Occupancy	Advertising	Buying	Depreciation	Other	
Number	Dollars	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
All stores.....	192	87, 580	69. 4	30. 6	27. 9	9. 4	7. 7	4. 2	1. 5	0. 4	0. 7	4. 0	2. 7
By volume of sales—dollars:													
Under 60,000.....	62	42, 335	69. 6	30. 4	27. 0	12. 4	4. 3	4. 5	. 8	. 5	. 5	4. 0	3. 4
60,000 to 120,000.....	67	87, 090	70. 4	29. 6	27. 5	9. 4	6. 8	4. 8	1. 4	. 4	. 9	3. 8	2. 1
120,000 and over.....	63	192, 690	68. 7	31. 3	28. 8	7. 1	10. 5	3. 6	2. 0	. 3	. 8	4. 5	2. 5
By form of ownership:													
Proprietorship.....	91	61, 830	70. 4	29. 6	27. 2	9. 0	7. 4	4. 1	1. 4	. 5	. 9	3. 9	2. 4
Partnership.....	62	99, 790	69. 2	30. 8	27. 5	10. 3	7. 1	4. 0	1. 2	. 3	. 6	4. 0	3. 3
Corporation.....	39	137, 910	68. 4	31. 6	29. 7	8. 2	9. 5	4. 7	1. 7	. 4	. 6	4. 6	1. 9
By proportion of sales on credit:													
None.....	59	71, 280	70. 8	29. 2	26. 5	9. 6	6. 3	4. 8	1. 1	. 3	. 8	3. 6	2. 7
1 to 20 percent.....	61	73, 180	70. 3	29. 7	26. 2	8. 2	7. 5	4. 0	1. 5	. 4	. 8	3. 8	3. 5
Over 20 percent.....	72	106, 910	66. 6	33. 4	31. 4	9. 7	9. 2	4. 0	1. 7	. 5	. 6	5. 7	2. 0
By gross margin earned:													
Under 28 percent.....	50	68, 745	75. 2	24. 8	23. 2	8. 4	5. 6	3. 9	1. 1	. 3	. 6	3. 3	1. 6
28 to 33 percent.....	82	95, 700	69. 6	30. 4	27. 9	9. 0	8. 0	4. 4	1. 6	. 3	. 8	3. 8	2. 5
33 percent and over.....	60	91, 320	62. 3	37. 7	34. 1	10. 9	9. 8	4. 5	1. 6	. 6	. 7	6. 0	3. 6
By shopping area:													
Central.....	118	104, 560	69. 6	30. 4	27. 7	8. 5	8. 4	3. 9	1. 8	. 4	. 7	4. 0	2. 7
Neighborhood.....	74	64, 005	69. 2	30. 8	28. 7	11. 0	6. 5	4. 8	1. 0	. 3	. 8	4. 3	2. 1
By percent of net profit:													
Unprofitable.....	44	64, 095	70. 3	29. 7	31. 2	11. 2	8. 3	4. 6	1. 5	. 4	. 9	4. 3	<sup>2</sup> 1. 5
0.1 to 3.0 percent.....	62	104, 645	70. 2	29. 8	28. 4	8. 4	8. 3	4. 6	1. 7	. 3	. 7	4. 4	1. 4
3.0 to 6.0 percent.....	46	97, 580	68. 1	31. 9	27. 4	9. 0	8. 2	3. 8	1. 5	. 4	. 7	3. 8	4. 5
6.0 percent and over.....	40	57, 670	68. 3	31. 7	23. 0	8. 6	6. 0	3. 5	. 7	. 4	. 6	3. 2	8. 7

<sup>1</sup> Before income taxes.   <sup>2</sup> Loss.

Adapted from Family Clothing Stores, Operating Results in 1956 (63).

TABLE 153.—Number of retail stores, average volume of sales, and payroll as proportion of sales, by kind of store and region, United States, 1954<sup>1</sup>

Kind of store and region	Establishments	Average sales per establishment	Payroll as proportion of sales <sup>2</sup>
<b>General-merchandise group:</b>	<i>Number</i>	<i>Dollars</i>	<i>Percent</i>
New England.....	3, 053	331, 510	16. 5
Middle Atlantic.....	6, 933	469, 547	16. 4
East North Central.....	8, 427	472, 556	16. 0
West North Central.....	5, 735	276, 229	14. 7
South Atlantic.....	3, 407	270, 109	14. 5
East South Central.....	4, 982	184, 424	13. 1
West South Central.....	6, 353	248, 140	13. 9
Mountain.....	2, 224	294, 136	13. 8
Pacific.....	4, 440	466, 951	15. 3
United States.....	50, 554	342, 749	15. 3
<b>Apparel, accessory stores:</b>			
New England.....	7, 348	101, 995	14. 7
Middle Atlantic.....	25, 091	118, 913	14. 1
East North Central.....	19, 377	110, 623	14. 4
West North Central.....	7, 855	99, 283	13. 8
South Atlantic.....	12, 235	102, 382	13. 2
East South Central.....	5, 037	99, 308	12. 6
West South Central.....	7, 763	108, 765	13. 1
Mountain.....	2, 971	99, 559	12. 8
Pacific.....	10, 152	113, 448	14. 1
United States.....	97, 829	109, 387	13. 9

<sup>1</sup> Retail stores with payrolls.

<sup>2</sup> Payrolls include no compensation for active proprietors of unincorporated businesses.

Adapted from Census of Business, Retail Trade: 1954.

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, and decreased in the late 1940's and early 1950's (table 154). Simple averages of the proportions shown in table 154 show that average profits increased from 2.5 percent of net sales in 1939 to 6.9 percent in 1946, decreased to 3.7 percent in 1948, then increased to 4.7 percent in 1950, and averaged 2.6 percent in 1957. Similar data for median profits as proportions of net worth show increases from 5.5 percent in 1939 to 19 percent in 1946, a decrease to 8.2 percent in 1949, then an increase to 10.3 percent in 1950, and an average of 5.7 percent in 1957.

### 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 existing agencies would involve consideration of the facilities and equipment used, organization and operation of the business units,

TABLE 154.—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, for specified years, 1939-57<sup>1</sup>

Line of business	Net profits <sup>2</sup> as proportion of net sales <sup>3</sup>									
	1939	1941	1945	1947	1949	1951	1953	1955	1956	1957
	<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>
Department stores.....	2.03	3.49	3.36	4.22	2.55	2.40	2.27	2.06	2.15	1.83
Men's and boys' clothing.....	2.39	4.02	6.47	5.76	4.72	2.91	2.71	3.91	2.51	2.07
Clothing, installment <sup>4</sup> .....	3.89	4.81	5.40	6.56	5.39	3.87	2.26	3.18	2.92	4.06
Men's furnishings.....	2.70	3.88	5.68	3.82	4.91	3.53	3.40	5.35	4.72	3.03
Women's specialty shops.....	1.31	2.82	3.42	4.73	2.80	2.46	2.06	2.34	1.49	1.90
	Net profits as proportions of tangible net worth <sup>5</sup>									
Department stores.....	5.57	10.45	11.48	16.10	6.77	6.64	5.99	5.80	5.67	5.05
Men's and boys' clothing.....	5.67	11.64	18.75	16.53	7.55	6.52	6.27	8.13	5.75	3.78
Clothing, installment <sup>4</sup> .....	5.77	10.79	10.25	17.10	10.11	7.61	6.99	8.45	7.26	8.96
Men's furnishings.....	6.00	10.10	18.52	17.20	8.47	8.79	6.99	8.92	8.04	4.64
Women's specialty stores.....	4.64	11.80	15.02	15.80	8.16	6.38	6.67	7.17	4.94	6.12

<sup>1</sup> The number of concerns reported for 1957 ranged from 43 for men's furnishings to 447 for department stores.

<sup>2</sup> 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.

<sup>3</sup> Dollar volume of business transacted for 365 days net after deductions for returns, allowances, and discounts from gross sales.

<sup>4</sup> Clothing, men's and women's, after 1946.

<sup>5</sup> 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 of Dun and Bradstreet, Inc. (27, 28).

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 complete enough to indicate all the more effective means 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 (47). Some economies may result from buying large volumes directly from manufacturers. In 1954, according to census reports, textile mill products valued at more than \$350 million, and apparel and related products valued at more than \$460 million, were sold through manufacturers' sales branches and offices to retailers. Economies of large retailers may be attributed in part to savings from handling large volumes and in part to advantages of direct purchases from manufacturers.

Efficiency of the smaller retailers might be increased through expansion of the activities of large organizations which provide purchasing and merchandising services to the smaller independently owned and operated stores (47). These services, by helping smaller operators to obtain better selections of merchandise, better control of stocks, and increased rate of turnover, may enable the small stores 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 manufacture and distribution of textile products may be an effective means of achieving economies in production and distribution, and also a closer linkage between production planning and ultimate consumer demands (47). 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 (19). Price and production regulations during the war apparently were favorable at certain points to the extension of unified control (47), and developments after the war indicate continuing and perhaps growing interest in the possibilities of further combinations (44).

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 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 costs by setting up minimum sizes of packages that will be delivered, and by limiting the return for credit of products purchased. 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. Any increases in volume as a result of advertising may make possible some reductions in average per unit costs of distribution. If advertising were made more informative and were placed on a more efficient basis, it probably would be more effective in expanding market outlets and in reducing costs of distribution (102).

Style and changes in fashion are important elements in the 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 sales 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 unimportant (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 (31). 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 (110).

Self-service makes possible a reduction in retail margins mainly by reducing payroll 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 to indicate more specifically the most effective means to increase efficiency and reduce costs of retailing textile products. Meeting this need would involve 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. Detailed specifications for model low-cost units for retailers of specified types, based on cost-engineering data and other information, would be helpful. Such models would show the more desirable buildings and equipment, floor plans and arrangements for display, purchase and sales policies, operating methods and labor requirements, kinds of products handled, and detailed costs for each major process or service.

Such information should supply at least a fairly adequate basis for improvements. But the nature of the business of retailing is such that such a study would require the services of personnel having specialized training and experience in this kind of business. Well informed operators could suggest the kinds of information that would be of greatest usefulness to them in reducing their costs, and their advice and assistance could be used.

Some indications of the importance of reducing the costs of retail distribution of textile products may be obtained from data showing that, during recent years, 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 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 of wool. Such savings would amount to more than a fourth of the total returns to growers for production of the cotton and wool used.

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