March 1957

The Feasibility of Processing Wool and Mohair in Texas

TEXAS AGRICULTURAL EXPERIMENT STATION

R. D. LEWIS, DIRECTOR, COLLEGE STATION, TEXAS

CONTENTS

SUMMARY

The possibility of processing wool in the western wool-growing area has been a controversial subject between western producers and New England wool manufacturers for many years. Surveys have been made in several states, and a number of reports and articles have been written on the subject. None of these studies discloses an economic condition or combination of conditions that would prohibit some wool processing in the West.

Since about 1883, Texas wool growers organizations, leading wool producers, chambers of commerce and other enterprising Texans have made efforts to establish wool-processing plants in Texas. Several small mills have been located in the State for short periods. At present, the industry in Texas is small, although notable progress was made in scouring facilities in 1954 and 1955. Scouring capacity has been doubled, and there are now six scouring trains capable of scouring about 30 million pounds of grease wool annually.

World fiber consumption is increasing, and per capita consumption of fibers is increasing in the United States. Despite comparatively bad years, the volume of business for the domestic wool textile industry during 1950-55 is far above the average during the period between the two world wars.

The domestic wool textile industry reached its present capacity about 1900 and is heavily concentrated in the New England States. Although simple in the beginning, it has become a highly complex industry that requires considerable management and manufacturing skills and huge investments in machinery, buildings, equipment, inventories and operating expenses.

The U. S. wool industry probably has the greatest productive capacity in the world, even though the United Kingdom has more of some machines. Other leading wool-manufacturing countries include France, Italy, Germany and Japan. The U. S. industry produces almost exclusively for domestic consumption, while the other countries are leading exporters of processed wool goods. While most of these countries had losses in capacity during World War II, their industries have largely been restored and are now more modern. Some probably have greater capacity than before 1939.

The domestic industry went into World War II in poor condition. Much of the machinery used wore out or became obsolete. The industry's profits during the war and postwar years were good, and some modernization was done.

The industry has made little money since 1950, and the number of plants has been reduced sharply. The loss of capacity, however, has been largely offset by multiple shift operation, by improvement of machinery and methods and through construction of some completely new, highly efficient plants. The reduction in the number of plants has been accompanied by an even greater reduction in the number of companies in the business through mergers of two or more companies.

Lowering the U. S. tariffs of 1930 on wool processed goods, especially the reductions in 1948, greatly increased the problems of the domestic industry. Although total imports still are relatively small, imports of higher quality wool fabrics increased tremendously during the period of bad business for the domestic industry. Exporting countries need U. S. dollars, our prices are much higher than in other countries and our tariffs are the lowest they have been in 100 years. U. S. leaders are sparing no efforts to increase world trade.

Since the close of World War II, the size of the wool-processing industry has decreased in the New England States and increased in the Southeast. The industry has overcome the inertia toward changing its historic location.

Labor is the chief cause of the southern movement. Labor accounts for about 50 to 60 percent of the value added in manufacture. Hourly wage rates plus fringe benefits are 30 to 40 percent lower in the Southeast and southern workers operate more machines. The supply, trainability, attitude and efficiency of southern labor are highly satisfactory.

Labor cost in Texas cotton textile plants was about 15 percent lower than the average in the Southeast in November 1954. Labor for wool textiles could be 5 to 10 percent lower in Texas than in the Southeast, despite the present $1 minimum hourly wage. Texas has a greater supply of labor than any southern textile state, and other labor factors appear to be as good or better.

Texas is expected to produce about 70 million pounds of grease wool annually. The bulk of the clip is fine grade and combing length. Most of it is best suited for worsted goods, but large volumes of woolen wools also are produced. The characteristics and high price of these woolen wools make them best suited for high-quality fabrics. Texas also produced 97 percent of the nation's mohair in 1955. Other domestic wools suitable for blending can be shipped to Texas at less cost than to the Southeast. Foreign wools can be shipped to Texas plants for the same price as to other states. Shipping costs for pulled wool, byproducts, raw materials and synthetic fibers would be slightly higher for Texas plants than for those

in the Southeast. On Texas wool and mohair, Texas plants could save 2 to 6 cents per clean pound transportation costs over the rates to Southeastern mills.

A Texas mill probably could market large volumes of its products in the West at a saving in transportati costs, but would have a higher transportation cost to the main market at New York. Other marketing co would be the same, regardless of location.

Some locations in Texas have adequate water supplies; others do not. The water in many areas wo have to be softened.

Texas has the cheapest fuel of all the states. Some locations in Texas have cheaper power than locatio in Southeastern States, but power cost may be higher at other locations.

Texas has lower per capita taxes and a smaller per capita state debt than any southeastern textile st except Virginia. The State tax climate is favorable for industry and local taxes are reasonable.

Cost of capital should be no higher than in the Southeast. The bulk would have to come from oth areas, but an established, reputable firm might expect some investments from local interests.

The top-level management might have to come from other areas. Some technical and manageme personnel could be obtained from graduates of the State's textile engineering school.

Despite strong and rigidly enforced waste disposal laws in Texas, plant wastes can be handled many locations with no greater cost or problems than in other areas. Other locations might requ sump disposal, an almost negligible burden in comparison with total processing expenses.

The cost of expendable supplies, such as soaps and chemicals, in Texas is comparable with other are

Texas climate is excellent for industry. There would be little or no absenteeism or plant tieups becau of bad weather. Air-conditioning costs might be a little higher generally than in the Southeast, but th could be offset partially by cheaper fuel and in some areas by the use of evaporative-type coolin which is cheaper to operate.

The cost of living for plant workers and management should be comparable with such costs in t Southeast.

Sites should be as cheap or cheaper in Texas in or near similar towns.

Plants in Texas probably would need to stock larger supplies of spare parts, but parts not on ha could be flown in with little delay. Texas has adequate machinery repair facilities.

State and community attitudes toward industry in Texas are excellent. Although the State has special inducements, tax waivers, state planning board or advertising program, legislation and its enforc ment and the favorable tax structure speak for themselves. Cities are prohibited by law from voting bon to construct buildings for industry, but industrial foundations to help industry are growing rapidly. Th can offer assistance comparable with that of cities in the Southeast.

The State has adequate facilities for repairing electronic devices and automation equipment.

Texas' recreation facilities probably are better balanced and superior to any southern textile state.

The marked progress in industrialization enjoyed by Texas since the end of World War II indicat that other industries have found advantages in this State.

Wool-processing plants in Texas could expect to make large savings compared with New England mil and they probably could produce and market woolen and worsted fabrics cheaper than Southeaste mills. Trends toward decentralization of the garment-making industry and style centers, which are accom panied by improving markets in the Western States, should enhance the advantages of Texas as a locati for integrated mills. The only disadvantage for a plant producing intermediate stages appears to be t distance to other mills.

ACKNOWLEDGMENTS

Sincere thanks are extended to the numerous individuals who helped with this study and to the firm and associations they represent. Their advice, information and encouragement were most valuable.

Appreciation also is expressed to the members of the special advisory committee in the Texas Agricu tural Experiment Station who guided the study and to the others who reviewed the report.

The Feasibility of Processing Wool and Mohair in Texas

JACK B. TAYLOR*

THIS STUDY WAS CONDUCTED to determine the economic conditions which favor locating wool and mohair textile-processing plants in Texas and which conditions are unfavorable.

About 70 percent of the domestic wool clip is produced in the Western States, but the manufacture of wool textiles has been confined largely to the New England States. Since raw wool contains 50 to 70 percent extraneous matter that is lost in scouring and the finished goods must be back-hauled to consumers in the West, processing wool near production centers would save transportation costs. The possibility of processing wool in the West has been a subject of controversy for many years.

Many authorities, wool producers, public officials and other people interested in the industrial development of the Western States contend that domestic wools can be processed more economically in the West. Eastern wool interests maintain that western facilities are inadequate in comparison with the economic advantages of New England. Some people believe that decentralization of the textile industry to the West would help improve the growers' production and marketing efficiency. They also believe that since the textile industry ranks high in the number of people employed, its location in underdeveloped areas would contribute to the social and economic progress of these areas.

Some enterprising Texans have long considered that this State offers excellent possibilities for processing plants because Texas produces such large volumes of wool and mohair. This State produced 19.4 percent of the nation's average wool clip and 87 percent of its mohair from 1929 through 1953. The wool producers' association of Texas at its annual meeting in 1883 passed a resolution advocating the establishment of scouring and woolen mills in the State. Interest in the subject has continued since that time.

A number of trends indicate that circumstances favoring dominance of the New England area in wool textiles may have changed while opportunities in Texas may have improved. Some of these trends are:

1. Plant closures in the New England area and growth of the wool textile industry in the Southeast.

2. Decentralization of industry since World War II and the rapid growth of manufacturing in underdeveloped areas.

3. The rapid growth of manufacturing in Texas, especially of the apparel industry.

4. Improved markets in the Western States as a result of rapid population growth and increased per capita income.

5. Increasing labor force in Texas as a result of rapid population growth and increasing urban population with corresponding decreases in rural population.

6. Growth of important style centers in the West.

Texas is a large state with widely varying conditions. Some locations may offer excellent opportunities while others probably would have severe handicaps. The State as a whole was considered in the present study, and no attempt was made to point out particular locations that seem to offer the best combination of favorable conditions.

Any interests which consider locating a plant in Texas probably will want representatives of the firm or industrial consultants to make detailed surveys of prospective locations. Such surveys would furnish more exacting cost data and determine the technical problems involved for a particular plant.

Data for the present study were collected from a number of sources. The earlier outlines and files on the study were examined, and reports on other surveys and magazine and newspaper articles on the subject were reviewed. Relevant literature was collected and reviewed throughout the study. All plants in the State known to be processing any wool or mohair were visited and their management personnel interviewed. The problem also was discussed with selected cotton textile manufacturers, garment makers, hat makers, industrial consultants, garment and fabric retailers, wool warehousemen, wool and mohair growers and specialists with knowledge of some phase of the subject. A rough draft

*Formerly, research assistant, Department of Animal Husbandry, Texas Agricultural Experiment Station, now in private business at San Angelo, Texas.

of the report was prepared, and the findings were discussed with selected authorities representing various segments of the wool textile industry in the New England and Southeastern States. The report then was reviewed by a special advisory committee in the Texas Agricultural Experiment Station, and its suggestions were incorporated in this report.

EARLY STUDIES AND REPORTS

A number of studies and reports have been published on the possibilities of processing wool in states outside the traditional wool-manufacturing center.[1] Many of these reports deal with scouring wool near the source of supply to save transportation costs on the extraneous matter removed from grease wool during manufacture.

The writers generally agreed that it might be feasible for small plants to scour some short clothing wools, tags, clippings, off-sorts and very heavy shrinking, combing wools near wool concentration points in the West. These wools would have to be marketed to the woolen trade. A certain amount of business might be obtained in commission scouring, but the plants would have to purchase some wools to stay busy. Small savings could be made on freight and processing costs in some locations. The big problems are the ability to market the plants' own scoured wool to advantage and the ability to get business in commission scouring. The volume of wools suitable for scouring and resale is small in any given area.

The studies showed generally that it is not feasible for a privately owned scouring plant without mill or dealer connections to purchase and scour combing or worsted wools in the West. There is little possibility for such a plant to get business in commission scouring of these wools. The main limiting factors are: worsted manufacturers want to do their own sorting and blending in the grease since blends are mill secrets; they prefer to do their own scouring; and when worsted wools are scoured, they become so thoroughly mixed it is difficult to determine what percentage of short fibers will be taken out in the combining process. It is argued that if very much could be saved, the mills would have been scouring wool in the West long ago. Most of the foreign wools are shipped in the grease to U. S. mills, but a branch plant of an established firm or a plant with established business still might scour worsted wools profitably in producing areas. The wools can be blended later in the gilling process.

Some studies indicate that the manufacture of wool tops offers good possibilities in the West. Such a plant would have to plan on purchasing the raw wool needed; however, it might be able to obtain some commission combing business from top makers who do not own combing machinery. Costs of manufacture and the ability to market the to profitably are the major problems involved.

Other studies show that integrated mills produce woolen fabrics are economically feasi in the West. Although such plants would ha access to good supplies of domestic raw wools many areas of the West, they generally would at a disadvantage in obtaining pulled wool, no rags, wastes and other byproduct raw materi produced in the East. Production costs and pr itable marketing would determine success.

Only one report[2] mentions worsted fabr as a likely product for a plant in the West. T conclusion was based on favorable product costs and marketing the fabrics to sportswe clothing manufacturers located in the West.

The manufacture of yarns in the West sale or on commission either was not consider or not recommended by the researchers.

None of the reports reviewed discloses a factors that would prohibit some wool processi in the West.

HISTORY AND PRESENT STATUS OF MILLS IN TEXAS

Many attempts have been made by wool gro ers, chambers of commerce and promoters to tablish wool-processing plants in Texas. Most them hardly went past the recommendation sta Some ended with surveys, and a few went as as selection of company officials, charters fr the State or attempts to sell stock to investors.

One of the earliest known efforts was t resolution passed by the State wool growers ganization in 1883 advocating the establishme of woolen and scouring mills in Texas.[3]

Probably the first processing plant of a kind to operate in Texas was the San Ang Scouring Mill Company.[4] On June 21, 1891, t company leased a multi-story building that h been planned for a flour mill. It started wi $5,000 cash capital and purchased secondha machinery for $20,000 worth of stock in the co pany. After trying unsuccessfully to grade, s and scour wool on a commission basis, the co pany attempted to purchase wool for scouri and resale; this ended when the stockholders jected. Some wool buyers for a large easte wool merchant leased the plant and operated at a profit until the machinery wore out.

Interest in establishing processing plants the West was keen during the early 1920's a

[1]See Bibliography for a complete listing of reports reviewed.

[2]Texas Technological College Research Committ "Wool Textile Industry Survey for West Texas," B letin of the Texas Technological College, Lubbock, Te 1949.

[3]Editorial, "Still Talking About It," The Cooperator, V 3, No. 20, July 15, 1933, San Angelo, Tex. (now T Sheep and Goat Raiser).

[4]San Angelo Standard Times, June 10, 1934.

middle 1930's. State newspapers and the wool growers' official publication carried numerous articles and editorials pointing out the need for and advantages of local wool and mohair processing.

During 1919-21, the Texas Agricultural Experiment Station, with strong grower support, established its wool and mohair research laboratory and scouring plant at College Station. Growers credit its work with assisting materially in some 5 to 7 percent reduction in the State's average estimated wool shrinkage.

The Texas Sheep and Goat Raisers' Association passed a resolution and appointed a committee in 1921 to investigate the possibilities of wool scouring and manufacture in Texas.[5] As a result of this action, Gregg and Company, engineers of San Antonio, made a study[6] in Texas and at eastern mills and concluded "beyond a doubt" that certain kinds of wool and mohair goods could be manufactured profitably in Texas.

Another study[7] was made by C. A. Broome, chairman of a wool growers' committee, and a practical woolen goods manufacturer. Important conditions favoring Texas as a location were:

1. Textile mills in the South were pursuing a great building program.

2. Manufacture at the source of raw materials was economical.

3. Texas labor costs were lower; the quality of labor was better and more reliable.

4. Plants in the North were being outdated because of antiquated machinery and equipment.

5. The national center of population was moving South and West.

The mill representative concluded that a plant could be built for $200,000, exclusive of site, and $100,000 would be required for operating capital. This plant could produce 111,627 yards of military cloth a year from 450,000 pounds of grease wool. The cloth could be made for $3.12 per yard. At that time, the American Woolen Company quoted indigo dyed wool keersee, trainsmen's uniform, 14 to 15-ounce cloth, at $4.05 per yard, discount 2 percent, delivered in 8 weeks. The profits would yield 8 to 10 percent on the investment and take care of repairs and depreciation.

A small processing plant or two may have operated for a short time earlier, but by 1924 there were no mills of any kind in the State.[8]

In 1935, a Dallas promoter and a mill manager obtained a permit to sell stock for a woolen mill in a West Texas town.[9] Their second step was to be a mill at Del Rio to make tropical and semitropical suitings. Third was to be a knitting mill at Fort Worth. Fourth was a San Angelo mill to make uniform cloth.

In 1935 and 1936, two groups attempted to sell stock to build scouring plants in San Angelo, one a $75,000 corporation[10] and the other a $250,000.[11]

The Texas Planning Board hired an engineering firm in 1937 to survey the possibilities of scouring the State's wool at home. Their report[12] indicated that a small plant at Houston to scour some 6 million pounds of short wools, tags, clippings and heavy shrinking wools might be successful, but that large-scale scouring in Texas was not feasible.

So far as is known, no efforts were made to attract branch plants from established firms or to interest out-of-state capital.

Capital seems to have been the major obstacle because producers and businessmen were uncertain about the promoters and some of their propositions. About 1920 and 1921, promoters of the United States Wool Company attempted to raise 10 million dollars in the West to build a number of western plants.[13] They planned to revolutionize the wool industry by dry-cleaning wool with gypsum in western plants. However, J. A. Hill, wool specialist of the University of Wyoming, in investigating the process, demonstrated that it was unsatisfactory. He pointed out that a small pilot plant to check the method adequately could be built for a fraction of the amount the promoters were trying to raise. "Scouring staple wool in the West would have the same effect as cutting the fibers in two," he reported.

In general, mill interests mentioned the following objections to scouring plants in Texas:

1. Only a small percentage of Texas wools goes to commercial scouring plants. Most of the 8 and 12-month wools are used by the worsted industry, which prefers to do its own scouring.

2. There would be no material saving on freight because the rates are higher on scoured wool.

3. Texas is too far away for mills to sample clips, and few goods are made 100 percent from Texas wools.

[5]San Antonio Express, Mar. 9, 1940.
[6]Gregg and Company, "The Manufacture of Wool and Mohair in Texas," Sheep and Goat Raiser's Magazine, Vol. 2, Nos. 8 and 9, Mar. and Apr. 1922.
[7]Broome, Claude A., "Woolen Mill Plan Goes to Sheepmen," Sheep and Goat Raiser's Magazine, Vol. 5, No. 1, Aug. 1924.
[8]Southwestern Sheep and Goat Raiser, Vol. 5, No. 10, Feb. 1935.
[9]Southwestern Sheep and Goat Raiser, Vol. 5, No. 23, Sept. 1935.
[10]Dallas Morning News, Nov. 24, 1936.
[11]The Sheep and Goat Raiser, Vol. 4, No. 6, Jan. 1924.
[12]Hawley, Freese and Nichols, "The Feasibility of Establishing a Wool Scouring Plant in Texas." Report to the Texas Planning Board, 1937.
[13]Correspondence file of J. M. Jones, Texas Agri. Expt. Sta., College Station, Tex.

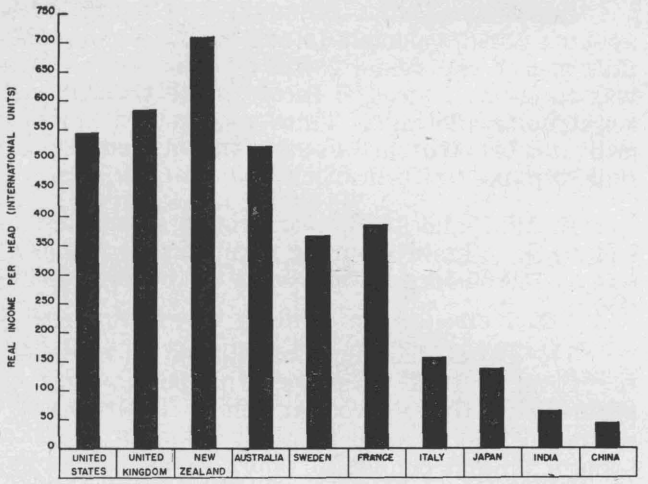

Figure 1-A. Real income per capita in selected countries, 1934-38 average. An international unit is the amount of goods and services which could be purchased for $1.00 in the United States over the average of 1925-34. Source: World Fiber Survey, FAO, page 174.

4. A good-size scouring plant in the State would not have enough business to operate throughout the year.

Local interests felt that the State's attributes outweighed its handicaps. Their strong feelings in the controversy are reflected in a quotation from L. J. Wardlaw, Fort Worth, then chairman of the Livestock Sanitary Commission and prominent Val Verde and Edwards counties ranchman.[14] In a letter to H. A. Wagenfuer, who planned to build a scouring plant at New Braunfels in 1937, Judge Wardlaw offered to buy some stock in the project and said he believed it would benefit the growers. He then stated:

> "It will be an utter impossibility to procure wool or mohair for scouring purposes on a cost basis per pound. There are allegiances and business relationships between the purchasers of wool and the scouring and manufacturing interests which have existed for many years. The major portion of wool and mohair of this country is fabricated in the North and East. Your venture will meet with stiff opposition. The power of money used by purchasers, the money invested in scouring mills, the influence of railroads and steamship lines and the strangle hold of Boston wool buyers and warehouses, the ingenuity of their agencies will be used to wreck your enterprise."

From the best information available, it seems the first commercial wool-scouring plant in Texas was established at Marble Falls about 1938. It operated until 1940. A second plant was built at San Marcos in late 1939 or 1940, and a little later, one was set up in New Braunfels.

[14]San Angelo Standard Times, May 21, 1937.

A woolen mill operated from about 1950 1952 at Marble Falls in the building formerly cupied by the scouring plant, and a blanket followed the scouring plant at San Marcos.

A wool-top manufacturing plant was built New Braunfels during 1940-41, and the first pr ucts were shipped on October 8, 1941. Spinn equipment to process the wool top into yarn added about 1948. Weaving equipment was be added about 1951, but the plant ceased ope tions and was sold in 1954.

It is difficult to determine why the pla closed or to get factual information about th operations. Personal interviews with citizens the towns, former employees and others, indic that the reasons include poor management, in ior products, the use of wornout or obsolete chinery and lack of capital. Overexpansion the start of the 1951-53 depression in the textile industry may have contributed to plant's failure. So far as can be determined, n of the failures can be attributed directly to th locations in Texas.

Texas had a very small wool textile indus in 1955. Houston has a plant equipped w hand-operated looms to make specialty produ A one-card blanket mill has been operating at dorado since 1940. The commercial scour plant with three scouring trains at San Mar is a branch plant of an eastern firm. Anot scouring plant with two scouring trains is Brady. A small top-making plant is in N Braunfels. The State's only wool-knitting fi a branch plant of an eastern concern, is in S Antonio. There is a small woolen piece-goo plant at Brownwood.

A number of warehouses in the State do so wool and mohair grading and sorting, the fi step in wool manufacturing. Only mohair is tually detail sorted. The wool preparation u ally consists of removing tags, off-sorts and fects, then putting the wool into lots of sta combing and clothing wool according to grade

Texas has a great volume of cotton-text manufacturing. With the modern equipment th mills already have and will install in modern tion programs, they may be able to process so wool and mohair and blends of other fibers.

FIBER CONSUMPTION

World Trends

The world trend in fiber consumption is u ward although there are areas of chronic deficie cies. Consumption varies between high and lo income countries, much the same as it varies b tween high and low-income groups within a cou try.

The people of countries with high levels living consume 9 to 10 times as much fiber p

capita as people in poor countries. A 1939 study[15] of a number of countries shows that amounts spent on clothing ranged from 6.6 to 17.3 percent of total expenditures in the budgets of manual wage earners, and 9.9 to 16.7 percent of expenditures in budgets of nonmanual workers.

Most people subsist on low levels of apparel fiber use. Only about 18.5 percent of the world's population has a per capita fiber-consumption level of as much as half the U. S. average. A billion people in the world use only 6 to 12 yards of cloth per year, but people in the United States use over 75 yards per person.[16]

Fiber consumption is related closely to real income, Figures 1-A and 1-B. Total fibers consumed and the wool portion consumed vary with climates and customs in the different countries.

The United States leads all countries of the world in per capita fiber consumption and uses almost twice as much cotton per capita as the next leading country. The United States led the nations of the world in total volume of wool consumed during 1946-53, although it ranks low in per capita wool consumption.[17]

World wool production has set record highs for the past several years, but domestic wool production has declined. Although about two-thirds of the wool used in the United States is imported, a wool shortage for mills is unlikely unless a world crisis cuts off foreign supplies. The high real income of this country should enable it to compete successfully in the world markets for the available wool supply.

Trends in the United States

Since practically all the products of the domestic wool textile industry are consumed within the United States, domestic consumption is important to U. S. mills. It also is important in determing the possibility of some expansion or relocation of this industry to Texas.

Per capita total fiber consumption is increasing in the United States, Figure 2. The simple average of total fibers consumed per capita during 1921-39 was 29.39 pounds; the average during 1950-53 was 42.99 pounds, an increase of more than 45 percent. Flax and silk consumption declined, cotton increased 18 percent and total clean wool consumption increased only about 17 percent. Synthetic fibers contributed the bulk of the increase. Per capita consumption of rayon and acetate grew from 1.2 pounds during 1921-39 to 8.03 pounds during 1950-53. Other man-made

[15]"World Fiber Survey," Food and Agriculture Organization of the United Nations, Washington, D. C., Aug. 1947.

[16]Textile World, Vol. 105, No. 4, Apr. 1955.

[17]"Wool Statistics and Related Data." Statistical Bulletin No. 142, Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C., Sept. 1954, page 69.

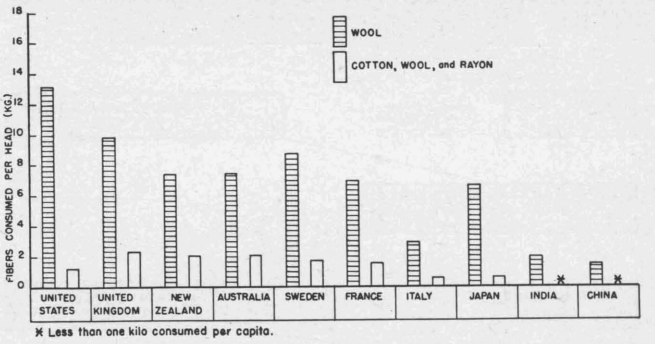

Figure 1-B. Net fiber consumption per capita in selected countries, 1934-38 average. Source: World Fiber Survey, FAO, page 174.

fibers, not even reported before 1940, averaged 1.42 pounds per capita during 1950-53.

Apparel wool consumption is more significant for wool textile mills than total fibers consumed. During 1921-39, apparel wool averaged 2.11 pounds per capita. Consumption was heavy during World War II, the postwar years and during 1950. Although 1951-53 are considered bad financial years for the wool textile industry, per capita apparel wool consumption averaged 2.26 pounds, clean basis. Total per capita wool consumption, including carpet wools, has averaged nearly 4 pounds annually since World War II. However, wool consumption is not increasing as much as is the use of some other fibers; therefore, it is not maintaining its earlier proportion of fibers consumed.

The volume of products that the wool textile industry can produce and market profitably each year depends on per capita wool consumption, population, population increases and the volume of competing imports. During 1920-39, the United States consumed 340.66 million clean pounds of wool (apparel and carpet) per year, but during the wool textile depression of 1951-53, annual consumption averaged 478.7 million pounds, a 40 percent increase.[18]

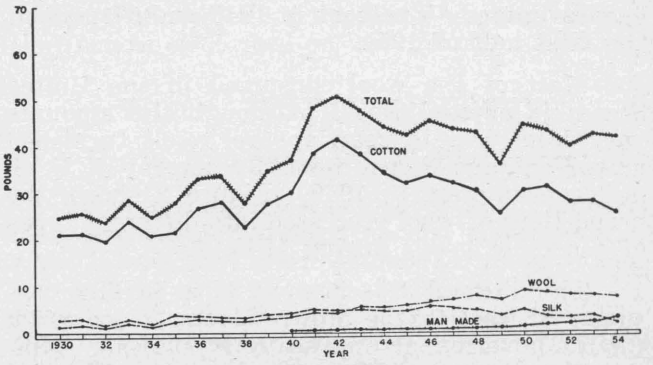

Figure 2. Estimated United States consumption of fibers, 1930-54. Source: "Wool Statistics and Related Data," AMS, USDA Statistical Bulletin No. 142.

[18]"Wool Statistics and Related Data," Statistical Bulletin No. 142, Agricultural Marketing Service, U. S. Department of Agriculture, Sept. 1954, page 68.

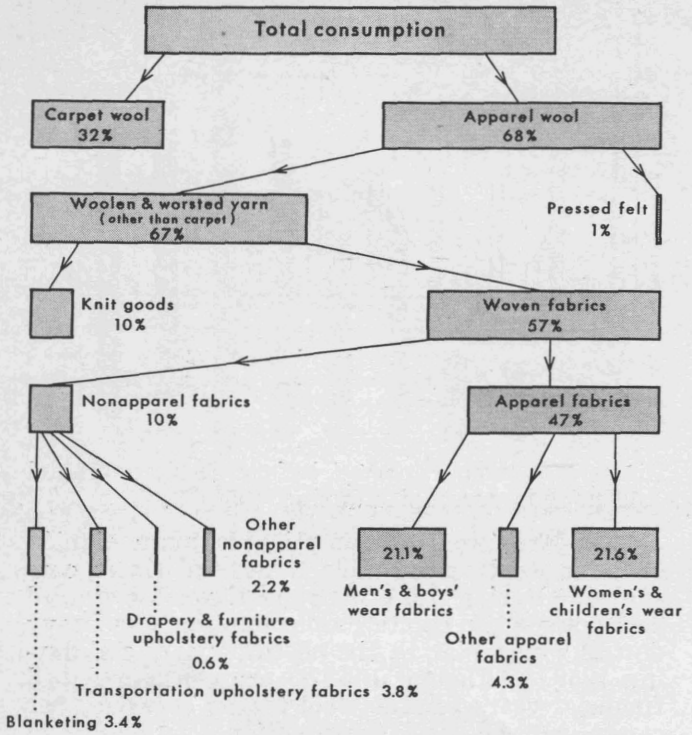

Figure 3. Distribution of wool consumption in the United States, 1949. Source: Bureau of the Census data.

Although total fibers consumed per capita and total mill consumption are increasing, consumer expenditures for clothing and accessories have not maintained their proportion of total personal expenditures. Competition is intense from other consumer goods such as new homes, television sets, cars, labor-saving devices and many others. Also, trends toward casual living and dress lower the amounts spent on clothing.

Another trend that has reduced wool consumption is the use of lighter weight clothing. Woolen goods weighing less than 13 ounces per yard averaged 38 percent of production in 1948 and 52 percent of it in the first half of 1954. Worsted goods weighing less than 13 ounces per yard averaged 45 percent in 1948 and 67 percent the first half of 1954.[19]

Most of the wool consumed in the United States is apparel wool. Although the amounts vary from year to year, apparel wools furnished 68 percent and carpet wools 32 percent of U. S. mill consumption in 1949. Figure 3 shows the proportions of wool processed into different types of consumer goods during 1949.

The Federal Government is a leading consumer of wool textile mill products. Production for the government was heavy in 1941-45. Military purchases in 1951 were about two-fifths of total mill production. Purchases then declined rapidly, amounting to less than 1 percent of production in 1954.[20] The reductions in military buying during 1946-50 and after 1951 have affec wool-textile mills. However, government busin should average much better than during 1953- although large increases cannot be expected less the Armed Forces are expanded greatly.

Inter-fiber Competition

Wool growers, the wool trade and wool t tile mills have been concerned over reduced w consumption during the 1950's, the rapid incre

TABLE 1. SELECTED COMPETITIVE USES OF WO COTTON AND SYNTHETICS, 1953[1]

Item	Wool[2]	Cotton	Synthe
	— —	Million pounds	—
Men & boys apparel	201.8	975.6	162.
Outerwear	172.9	366.2	92.
Suits	60.7		11.
Winter weight	56.2		3.
Summer weight	4.5		7.
Separate coats	6.0		6.
Separate trousers	28.4	7.9	38.
Overcoats & topcoats	22.6		1.
Outdoor jackets	30.6	29.1	21.
Sweaters	12.9		2.
Robes & smoking jackets	3.7		1.
Work clothing	5.4	300.2	4.
Shirts	12.0	264.2	41.
Underwear & nightwear	1.1	187.2	5.
Hosiery	7.6	83.1	13.
Furnishings	8.2	74.9	8.
Women & misses apparel	143.8	389.5	329.
Outerwear	128.3	209.9	177.
Suits	14.5		16.
Jackets, skirts	19.2	23.7	24.
Street, formal dresses	8.2	44.3	92.
Housedresses	1.2	78.9	13.
Coats	62.8	1.3	5.
Sweaters	18.0	1.3	7.
Bathrobes, housecoats	3.5	19.2	2.
Blouses, shirts	6.8	46.0	17.
Intimate wear	0.5	102.8	97.
Hosiery	0.3	18.4	26.
Accessories	7.9	12.4	10.
Children & infants apparel	37.1	256.4	32.
Outerwear	35.0	110.5	22.
Blouses, shirts	1.2	25.8	0.
Underwear, other	0.9	130.1	9.
Household uses	191.3	1,247.4	187.
Bedding, blankets	31.6	204.3	41.
Linens		507.5	3.
Other items	159.7	535.6	142.
Carpets, rugs	150.5	117.6	26.
Upholstery, drapery	9.2	296.0	86.
Other consumer-type products	65.4	361.6	152.
Linings, piece goods	56.7	205.1	115.
Apparel linings	27.8	76.6	49.
Apparel piece goods	28.9	89.5	47.
Other products	1.8	107.9	17.
Industrial uses	38.8	779.5	595.
Automotive	23.3	59.3	64.
Carpets	4.1	2.8	12.
Upholstery	19.2	42.3	17.
Rubber industry		175.2	469.
Tire cord & fabric		15.5	437.
Hose, etc.		92.5	32.
Other industrial products	15.5	547.0	61.
Felts	10.6	9.5	0.
Filters	4.0	12.3	6.

[1]Source: "Textile Organon," Volume XXVI, No. 6, Supplem June 1955.
[2]Wool includes all processed wool and mohair.

[19]Textile Organon, Nov. 1954.
[20]The Commercial Bulletin, Apr. 2, 1954.

in consumption of synthetic fibers and the inroads some synthetic fibers have made into many of wool's traditional markets. These conditions have led to much speculation on the future of wool in competition with synthetic fibers.

Competition among fibers is not new. Wool has been competing with cotton, silk and flax since they were developed. Synthetic fibers are not new either. A synthetic fiber was produced successfully by a Frenchman in 1891,[21] a long time ago in terms of technological progress.

Wool interests were not unduly concerned about the earlier synthetic fibers, such as rayon, because they competed more with cotton and silk than with wool. However, many of the synthetic fibers developed since World War II have been designed more specifically for the same end uses as wool.

Per capita consumption of rayon acetate and other man-made fibers has increased rapidly. Most of these fibers have made marked gains in the percentage of all fibers consumed for most end uses. Table 1 shows a comparison of the volumes consumed in 1953 for selected end uses.

Industrial uses consume the largest portion of man-made fibers. Much of this consumption is at the expense of cotton. Rayon accounted for 47 percent of tire-cord production in 1946, but rayon and nylon accounted for 97 percent in 1953.[22]

The next largest user is the women and misses apparel group. Consumption of man-made fibers far exceeds wool and even surpassed cotton in 1949-51. Man-made fibers also have made important inroads into men and boys apparel and household uses. Rayon made up only 1.1 percent

TABLE 2. CONSUMPTION OF COTTON, WOOL AND MAN-MADE FIBERS BY END USE, 1953[1]

End use	Cotton	Wool	Man-made fibers
	— — Million pounds — —		
Men & boys apparel	975.6	201.8	162.3
Women & misses apparel	389.5	143.8	329.6
Children & infants apparel	256.4	37.1	32.7
Household uses	1274.4	191.3	187.4
Other consumer-type products	361.6	65.4	152.1
Industrial uses	779.5	38.8[2]	595.5

[1]From "Textile Organon," Volume XXVI, No. 6, Supplement, June 1955.

[2]Wool used mainly in automotive uses, carpets, upholstery and felts (10.6 million pounds in 1953) and filters (4.0 million pounds in 1953.)

[21]Fletcher, Hazel M., "Synthetic Fibers and Textiles," Bulletin 300, Agricultural Experiment Station, Kansas State College, Manhattan, Kans., Apr. 1952.

[22]"Natural and Man-made Fibers—A Review," FAO Commodity Series Bulletin No. 26, Food and Agriculture Organization of the United Nations, Rome, Italy, Nov. 1954.

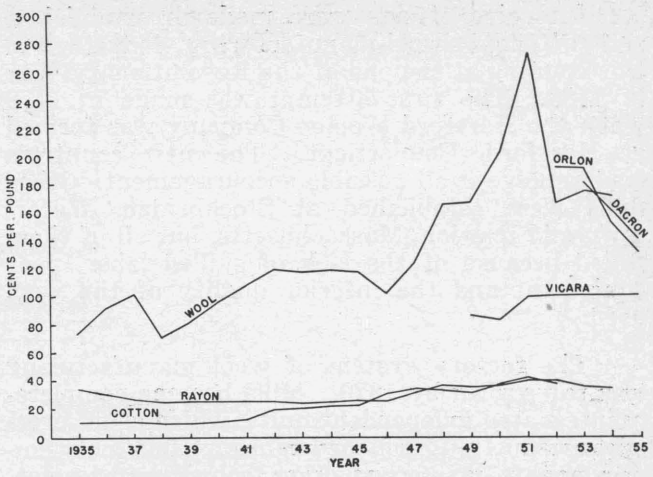

Figure 4. Prices of textile fibers in the United States, 1935-55. Source: USDA, "Achieving a Sound Domestic Wool Industry" and "Wool Statistics and Related Data."

of the fibers used in carpets in 1949, but the proportion was 20.9 percent in 1951.[23]

The volumes of cotton, wool and synthetic fibers used in different garments and other items during 1953 are shown in Table 2.

The price of wool is its worst enemy in competing with synthetic fibers. It is higher than all the man-made fibers, except the new ones being brought into commercial production, and the lack of price stability is a serious handicap, Figure 4. Wool is likely to remain a high-price fiber because sheep growing is not well adapted to increased efficiency through technological progress. The man-made fibers probably will become cheaper with improved manufacturing methods and quantity production.

Estimates are varied of the effect synthetic fibers ultimately will have on wool. Some predict they will make wool growing extinct; others predict a greater percentage for wool use.[24] Some doubt that a synthetic fiber can be developed to duplicate all of wool's good qualities. Although synthetic fibers may affect some old-line wool firms adversely, these fibers should extend the business of wool textile mills in general because they can be processed on wool textile machinery.

WOOL TEXTILE INDUSTRY

Early History and Development

Wool processing was one of the first arts man discovered, although no one knows exactly when it was first used. Wool fabrics have been found in the ruins of stone age inhabitants, which indicates that the use of wool was developed along with or soon after the art of making stone weapons. By 4,000 B.C., the Babylonians were wearing beautiful wool fabrics.

[23]Ibid.

[24]A New York advertising agency study indicated that wool will account for 10 percent of all fibers in 1975, The Commercial Bulletin, May 15, 1954.

Intensive efforts were made to establish a self-sufficient wool-manufacturing industry in this country at the end of the Revolutionary War in 1783. The first attempt was made in 1778 when the Hartford Woolen Company was formed at Hartford, Connecticut. The new country's leaders gave it all possible encouragement. Other mills were established at Stockbridge, Watertown and Ipswich, Massachusetts, but all of them failed because of the lack of skilled labor, poor equipment and the inferior quality of the wool used.

The factory system of wool manufacturing was full grown by 1870. Mills became completely integrated independent units, which could process raw wool into finished fabric. Machinery improvements, mass production techniques and electric power greatly increased flexibility and output. By about 1900, the industry generally had reached its present status and was supplying all domestic wool textile requirements.[25]

Among the most important conditions responsible for the location of the wool textile industry in the Northeast were:

1. The people, and therefore the markets, were concentrated mainly in this area.

2. It was the center of sheep and wool production during the early period of development of the textile industry; and the raw material was available locally.

3. The area had excellent harbors where imported wools could be landed close to the mills.

4. The skilled labor was here.

5. The area's large supplies of soft water were ideally suited for wool manufacturing.

6. Good locations were available for water-driven power machinery, and later for hydroelectric power.

7. Good inland waterways provided transportation.

8. The climate, especially the humidity, was favorable.

9. The raw wool market and marketing facilities developed here.

10. Other manufacturing industries, which supplied the needs of the mills, also were developed here.

11. The capital was raised here, and the area's lending agencies developed a knowledge and understanding of the industry's problems.

[25]The foregoing historical data is from: McMullen, Thomas R., and Edla B. Carter, "Wool and Wool Manufactures," Business Information Service, Office of Domestic Commerce, U. S. Department of Commerce, Release of May 1950.

Steps in Manufacture

Processing raw wool into finished fabric an old art. Although simple in the beginning has developed into a complex industry with large number of operations, all vitally affect the final product. Many expensive, complica machines are required for the complete proc and a large mill has millions of dollars inves in buildings, machinery and equipment. Huge ditional sums must be invested in raw wool sto stocks in processing stages and storage, and ished goods on hand or on account to buyers. marketing, manufacturing and distribution pha of wool processing in a large, integrated mill the consumer about six times as much as farm production phase. The processing steps a age about 86 percent of the total cost; the maining 14 percent represents the cost of raw wool.[26]

All mills do not process raw wool through the finished fabric ready for the garment m ers. Some complete certain phases, then sell product to other mills, which may finish the or complete another stage and resell to ot mills. The industry has developed distinct sta at which the partially processed fiber become standard marketable product that the indus trades freely. Since these products, as well finished fabrics, should be considered as po bilities for manufacture in Texas, the stages manufacturing wool and mohair products are sented. The flow of raw wool through the dif ent processes is shown in Figure 5.

Marketing

Moving raw wool from the farms and ranc to the manufacturer involves such marketi services as assembling, transporting, gradi storing and merchandizing. Brokers may range for the purchase or sale and take no p in preparing, handling or financing. Commiss agents, warehouses or cooperatives may rece the wool on consignment, assume responsibil for its care, sell it, collect from the buyers, duct expenses and make settlement with the gr ers. Dealers may take possession of the w ship it to consuming centers, prepare it for p cessing, store it and sell it for their own accou Or the mill may purchase it from the grower his marketing agency. The combined costs raw wool marketing services average about percent of the cost of goods to the consumers.[27]

Sorting and Blending

Raw wool is sorted after it reaches the m that is, fibers with similar characteristics placed in one group. No matter how carefu the grower prepares the wool, there will be var

[26]"Achieving a Sound Domestic Wool Industry," A re to the President of the United States from the Se tary of Agriculture, U. S. Department of Agricult Dec. 1953, page 18.

[27]Ibid.

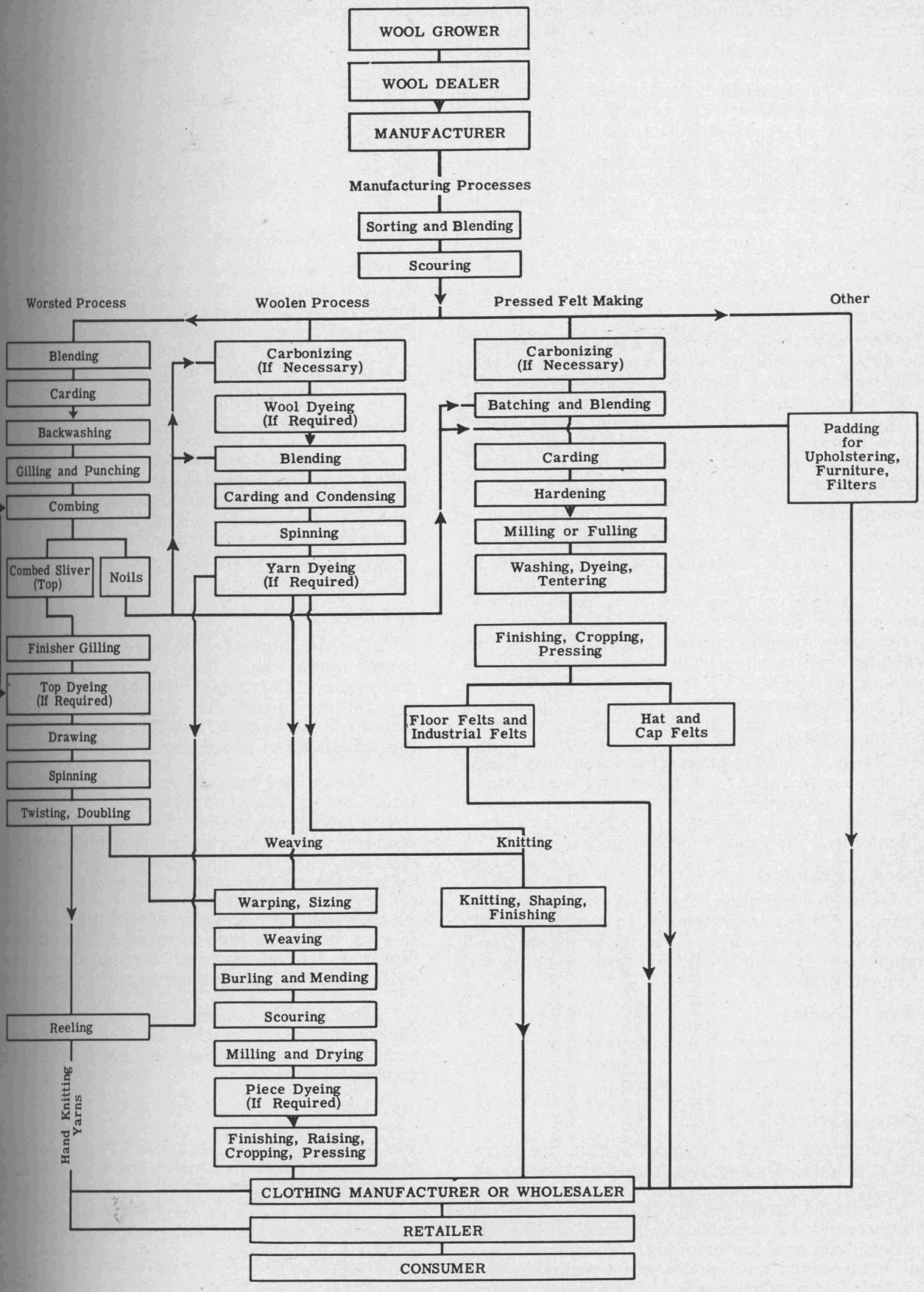

Figure 5. Flow of raw wool through the different marketing stages. Source: USDA.

tions in fineness, length, soundness, color and other characteristics which may influence the quality of the finished product. The highest quality goods require the most careful sorting, which is done by skilled workers. Since labor is expensive, there is a trend toward trap or bench sorting instead of detailed sorting.

Blending is mixing various lots of wool, or mixing wool with other fibers, to obtain the best possible stock for the price. It usually precedes scouring in the manufacture of worsted goods, but may be done after scouring, especially in making woolens. Worsted goods also can be blended in the gilling process after carding.

Scouring

Washing the dirt, grease and other impurities out of the wool is called scouring. The raw wool is raked gently through a series of vats called a scouring train. These vats usually contain warm water, soap and soda ash and rinse water. Water requirements average 1 to 3 gallons per pound of grease wool, depending on the method of operation.

Carbonizing

Wool that contains vegetable matter is carbonized if enough vegetable matter is present to damage the value of the goods. The scoured wool stock is treated with an acid to reduce the vegetable matter to carbon, which can be removed mechanically by rolling and shaking. Unless the wool has been blended with fibers that would be damaged by the acid, it can be carbonized in the later stages of processing.

Woolen Carding

The next stage in processing is carding. Carding breaks up locks, untangles and straightens the fibers, mixes the stocks, removes some vegetable matter and delivers the stocks in a convenient form for further processing.

Woolen Spinning

In woolen spinning, the card roving (ribbon of carded fibers) is drawn out to the desired diameter or weight, and the strand is twisted and wound onto packages suitable for weaving or shipment.

Worsted Carding

Worsted carding is similar to woolen carding except that greater efforts are made to arrange the fibers parallel to each other.

Worsted Combing

The functions of worsted combing are to remove the short fibers intermingled in the stock, to straighten and make the longer fibers retained lie parallel, and to remove more impurities. Combing may be preceded by several gilling operations, backwashing or oiling. The short fibers that are combed out (noils) are a valuable raw material for woolen goods. The longer fibers, with further processing, become worsted top.

Top Finishing

The sliver delivered from the combing m chines is uneven in diameter, and must be pr essed further to yield a commercial top of sta ard weight, length and condition. Several stra of the slivers are run through gilling machi which further straighten, parallel and blend t fibers, giving the top the uniformity requir Moisture or conditioning materials may be ad in this process.

Worsted Drawing and Spinning

More processes are required to convert w sted top into yarn than to spin woolen yarn. T top must be drawn out, redoubled to reduce v ation and drawn out again until the desired di eter is obtained. Then it is twisted and wou into packages. Some 7 to 11 steps usually are quired to complete the process.

Weaving Woolens and Worsteds

Weaving is the production of cloth by int lacing at right angles the yarns running leng wise (warp yarns) with those running crossw (the filling or weft). A number of preparat processes, such as rewinding, beam warping, wa sizing, reeding, twisting in and drawing, prec the actual weaving or operation of the loom.

Finishing

The finishing of wool fabrics involves a nu ber of operations. They vary according to t material and finish desired but may include was ing, fulling, carbonizing, dyeing, perching, sin ing, shearing, burling, mending, pressing, inspe ing, labeling and packaging for shipment.

Woolen and worsted yarns also are proces into knit goods, but processing is the sa through the yarn stage. The bulk of the fabr produced goes to fabricators, who fashion the fa rics into clothing and household goods, but t bulk of the knitted goods goes to retailers.

Woven felts are processed much like wool fabrics, but the fibers in pressed felts are bou together by interlocking the individual fibe with heat, friction, pressure and bonding agen

The distinct stages in processing at whi the products are marketable are scoured wo wool tops, woolen and worsted yarn, fabrics, k goods and felts.[28]

---

[28]Von Bergen, Werner, and Herbert R. Mauersberg "American Wool Handbook," Second Edition, Tex Book Publishers, Inc., New York, 1948.
Howell, L. D., "Marketing and Manufacturing Servi and Margins for Textiles," Technical Bulletin No. 1 Bureau of Agricultural Economics, U. S. Dept. of Ag culture, Sept. 1952.
Carr, D. W., and L. D. Howell, "Economics of Prepar Wool for Market and Manufacture," Technical Bull No. 1078, Bureau of Agricultural Economics, U. S. D partment of Agriculture, Nov. 1953.

Leading Wool-manufacturing Countries

The leading wool textile-manufacturing countries of the world include the United Kingdom, United States, France, Germany, Italy and Japan. With the exception of the United States, which imports more than it exports, these countries also are the leading exporters of wool textile goods. Many other countries manufacture some wool, but mainly for their own consumption.

The export trade of all the leading countries except the United Kingdom was cut off during World War II, and Great Britain's exports were greatly reduced. Europe and Asia were cut off from Southern Hemisphere supplies of raw wool. Bombing destroyed many of the wool textile plants in Germany, and Japan diverted many of her own plants to produce more essential war goods.

During the postwar years, the industry has been largely restored in these war-torn countries, some now exceeding prewar capacity, Figures 6-A, 6-B and 6-C. They have a larger number of various kinds of machinery, which is more modern and has a higher production capacity than before the war.

Reduction in numbers of some machinery may reflect a change to automatic types rather than a reduced capacity. Longer hours of operation per week also can influence production greatly.

Although production records may not be a reliable measure of capacity, Japan's production of tops, yarns and fabrics during 1948-53 ranged from 400 to 800 percent above prewar production.[29]

Many smaller countries recently have made great strides in enlarging their wool textile industries. The most notable examples are the five major wool surplus-producing countries, whose combined mill consumption has increased over 230 percent above prewar levels.[30] Some of these countries may be eying foreign markets as well as producing their own needs.

Trends and Problems of the Domestic Industry

Machinery in Place, Location and Hours Operated

The U. S. textile industry is important in this country's economy by any standard of measurement. Income tax returns in 1952 show that the textile mill products industry ranked seventh among the nation's manufacturing industries. In

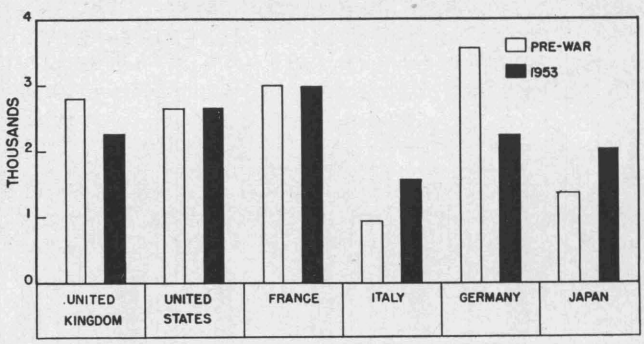

Figure 6-A. Worsted combs installed and capable of operation, selected years, selected countries.

1952, it employed 1,134,680 people, compared with 15,944,379 employed in all manufacturing industries.[31] In addition to the industry's contribution to our peacetime economy and comfort, military leaders rank its contribution to victory during World War II third behind only munitions and food.

Wool textile manufacture is an important part of the textile industry. Woolen and worsted fabric production, which is only one segment of the wool textile industry, ranked 19th in number of people employed and 25th in value added by manufacture among the 458 industries surveyed in the 1947 Census of Manufacturers.

Although it is a large industry, basically it is made up of a number of small businesses. There were 808 plants in 1947. Of this number, 90 percent employed less than 500 people each, and about 75 percent employed fewer than 250 each. The industry paid about 469 million dollars for wages and salaries in manufacture in 1950.

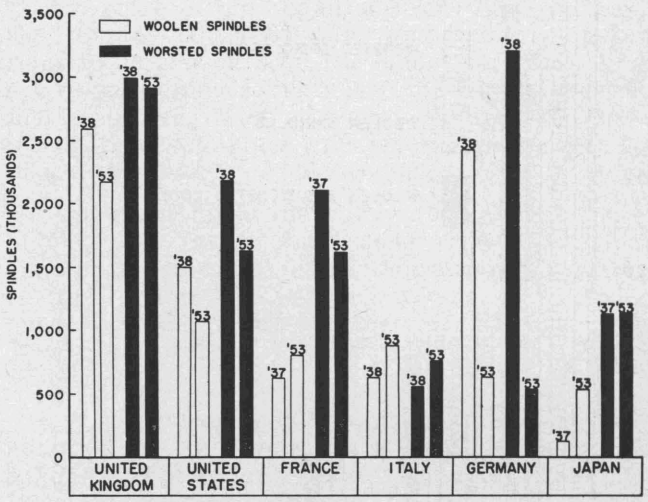

Figure 6-B. Woolen and worsted spindles in selected countries, 1938 and 1953.

[29] Bulletin of the Wool Manufacturers, 1954, pages 2-108, 2-127, and 2-152.

[30] "Achieving a Sound Domestic Wool Industry," a report to the President of the United States by the Secretary of Agriculture, U. S. Department of Agriculture, Dec. 1953, page 32.

[31] "The Merger Movement in the Textile Industry," a staff report to Subcommittee No. 5 of the Committee on the Judiciary, House of Representatives, Washington, D. C., 1955, page 2.

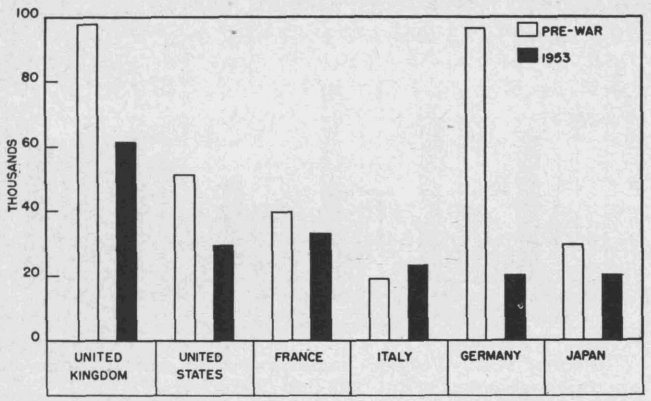

Figure 6-C. Woolen and worsted looms (except carpet) installed and capable of operation, selected years, selected countries. Source, 6-A, 6-B and 6-C: Bulletins of the National Association of Wool Manufacturers, 1939 and 1954.

Machinery in place is one of the most accurate measures of the industry's size. Table 3 shows the trends in number of wool textile machines. Woolen and worsted spindles show sharp downward trends. The total number of broad looms is sharply downward also, but the reductions have been in nonautomatic types. Although the number of Bradford combs has decreased, French combs have increased correspondingly to maintain the total number of combs. The combing capacity, however, has been reduced because of the lower combing rate of the French comb process.

The reduction in number of spinning chines does not necessarily mean that there been a simliar reduction in spinning capac The newer, continuous system has a high rat production so that fewer machines of this t produce as much spun yarn as did more machi of the older, or intermittent type.

Replacement of old looms with autom types has reduced the number of looms. H again, total production capacity of looms has been reduced because of the higher rate of p duction of the newer, automatic types as com ed with the older, nonautomatic looms.

Besides the changed types of machin multiple-shift operations also have helped to set any loss of capacity caused by reduced n bers of machines. There is a marked trend ward in multiple-shift operation, both on two three shifts. A plant operating on two shifts about twice the production of single-shift ope tion.

The bulk of the wool textile-processing eq ment is located in the New England States. ure 7 shows the percentage distribution by reg as of December 1949. No doubt, the propor has been reduced in New England and increa in the Southeast since that time. New Engla portion of automatic looms was reduced 11 p cent during 1939-49, but a greater change m have taken place in the past 6 or 7 years with regional shift southeastward.

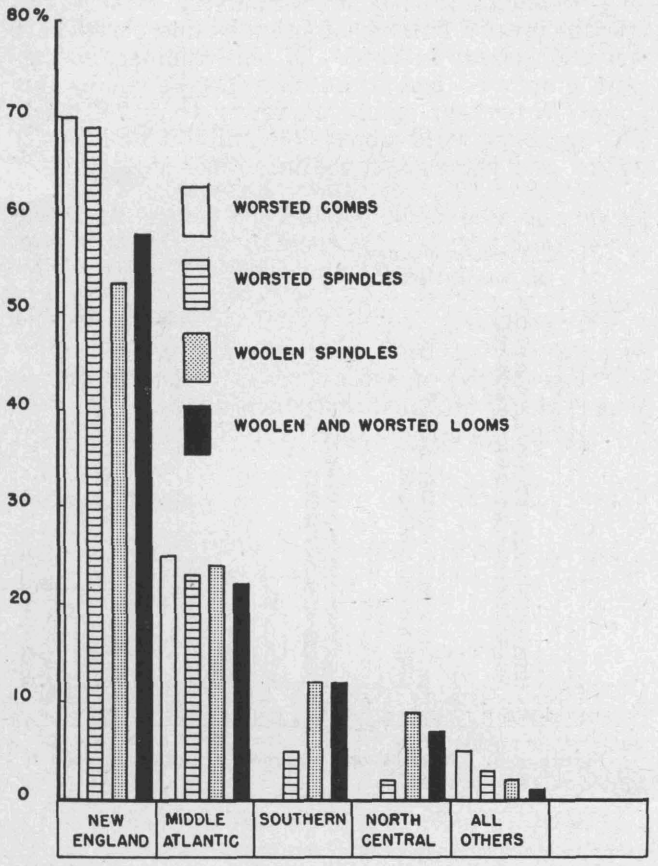

Figure 7. Proportion of key wool-textile machinery, by geographical regions in the United States, December 1949.

TABLE 3. WOOL TEXTILE MACHINERY IN PLACE IN UNITED STATES BY YEARS[1]

As of December	Total worsted combs	Total worsted spinning spindles, thousands	Total woolen spinning spindles, thousands	Total wool and worst loom
1919	2,382[2]	2,356[2]	2,401[2]	62.
1925	2,787[2]	2,757[2]	2,460[2]	64.
1930	2,712[2]	2,510[2]	2,265[2]	54.
1935	2,631	2,265	1,916	44.
1940	2,490	2,036	1,684	41.
1945	2,598	1,930	1,605	37.
1946	2,601	1,917	1,600	37.
1947	2,656	1,921	1,561	36.
1948	2,679	1,863	1,535	36.
1949	2,727	1,844	1,443	35.
1950	2,750	1,813	1,329	35.
1951	2,807	1,792	1,236	33.
1952	2,721	1,692	1,124	33.
1955	2,060[3]	950	818	20.

[1]Source: National Association of Wool Manufacturers Bull 1955.
[2]Not specified whether in place or otherwise.
[3]Included 141,000 combs for recombing but not classifie to type of comb.

New Machinery, Techniques, Buildings and Equipment

The wool textile industry went through some trying times between the two world wars.[32] Much of the machinery was idle. In 1939, one of the better years, the woolen and worsted manufacturers spent only $9,307,000 for new plants and equipment.[33] As a result, the industry went into World War II with machinery and equipment in relatively poor condition. Almost no new additions to plants and equipment were made during the war. Heavy war and postwar demands were met by putting the idle machinery back to work and by increasing the hours of operation through multiple shifts.

Stepped-up activity wore out much of the machinery; and since machinery manufacturing was limited to the most essential production, shortages in machinery developed. Newly designed, more productive machines made obsolete much of the machinery that had not been worn out. The industry has been and still is faced with a big machinery replacement problem.

The industry has been able to modernize somewhat because of good profits during the war and postwar years. In 1947, the total value added by manufacture was under 800 million dollars, and the industry invested over 52 million back into the business. New machinery took most of the expenditures.

Textile machinery has been improved greatly during recent years. The president of the American Textile Machinery Association said[34] that the advance in textile machinery during the past 25 years was the greatest in American history. The number of mills and spindles has declined, but production has gone up. Since World War II, the textile industry has spent over 3 billion dollars on new plants and equipment, yet the industry is still about 70 percent nonmodernized. Machinery is costly. One die for a certain shuttle, only one part of a loom, costs over $12,000, and there are more than 3,000 varieties of shuttles.

The editor of *Textile World* reported[35] on a study comparing 1954 spinning frames with 1940 frames. It showed that the 1940 frames were, in comparison, a waste of workers' time. Many mills still are running band-driven spinning frames, yet none of these has been manufactured since 1915. It has been estimated that a fourth to a third of all U. S. spindles are of this type (December 1954). The same situation probably exists with other machinery in use by the industry.

A loom census in 1942 by the Crompton and Knowles Machine Company showed that only 38 percent of their looms in use were less than 20 years old.[36]

A brief review of a few improvements in machinery and operations may illustrate why a mill with outdated equipment has difficulty competing with a modern mill.

Scouring equipment has changed little in recent years, so this machinery has not been outdated. Scouring, however, is one of the less costly operations and is seldom a bottleneck to most mills. Even with scouring, automatic controls have improved the operation and reduced labor requirements.

The modern cards are metallic and self-stripping, which has reduced labor cost; they also are wider and offer greater carding surface. An 84-inch card costs only 11 percent more than a 72-inch card, 23 percent more than a 60-inch card and 35 percent more than a 48-inch card; yet, the 84-inch card offers 16 percent more carding surface than a 72-inch card, 40 percent more than a 60-inch card and 75 percent more carding surface than a 48-inch card. A mill needs fewer cards, fewer man-hours, less space and less upkeep to reach the same production.[37]

Spinning probably has advanced further than any other phase of the woolen and worsted industry. Only a few years ago worsted yarn manufacturers used 9 and sometimes as many as 12 steps to convert wool tops into worsted yarns. Today, some of the manufacturers have reduced the drawing out, redoubling and twisting operations to as few as 5 on the same machinery and are even running some of the machines twice as fast as before. This was made possible by quality control techniques and laboratory testing to insure the quality of the product.

In general, the new spinning machines are bigger, run faster, have larger packages, are simpler to operate and maintain and require fewer steps to convert the top into yarn. One of the most outstanding new machines is the pindrafter developed by the Uxbridge and Warner-Swazey Companies.

A far-reaching development has been the adaption of the Long Draft System, commonly called the American System, to worsted spinning. It was developed primarily by the Whitin Machine Works for processing long staple rayon. Although the principles may be similar, it is improper to term it the cotton system since it can-

[32] "Woolens and Worsteds," War Changes in Industry, Series, Report No. 29, U. S. Tariff Commission, 1949, page 59.

[33] Carr, D. W., and L. D. Howell, "Economics of Preparing Wool for Market and Manufacture," Technical Bulletin No. 1078, Bureau of Agricultural Economics, U. S. Department of Agriculture, Nov. 1953, page 50.

[34] Howe, Frederick W., Jr., "Textile Equipment Advance Greatest in Past 25 years," The Commercial Bulletin, Feb. 12, 1955.

[35] Thomas, P. M., "Obsolescence Is The Industry's Biggest Waste," Textile World, Vol. 104, No. 12, Dec. 1954, page 4.

[36] Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont," 1952, page 58.

[37] Textile Industries, Vol. 118, No. 1, Jan. 1954, page 150.

not process fibers shorter than 1½ inches. The Long Draft System was designed to process fibers up to 4 inches long, in 56's to 64's quality top containing 2 to 3 percent of oil.[38] Von Bergen lists the advantages of this system as: a labor saving of up to $10 per spindle for a 4,000 spindle mill on two shifts, better fiber control and a smaller investment outlay. The disadvantages include: the requirement of highly uniform tops, difficulty of blending because of the smaller number of doublings and a lack of flexibility because of the narrow range of tops (fiber lengths and grades) it can handle.[39] Some mills claim savings of up to 30 cents per pound of yarn over the older system.[40] Although only 24 companies had 151,848 of these spindles in 1952,[41] their number has increased rapidly.

In the weaving phase, probably the most important advance has been the development of shuttle magazines which replace an empty shuttle automatically without stopping the loom. This has increased production greatly and reduced labor requirements. Other improvements have made the loom more efficient and more automatic, and increased its operation speeds.

Many improvements also have been made in winding devices, yarn-conditioning equipment, material-handling devices, washing equipment, dyeing, laboratory equipment and techniques, quality control devices and others. For example, one recent development in dyeing makes it possible to do a job in a few minutes that formerly required 4 to 5 hours. Such a development makes the earlier system obsolete immediately.

Machinery is not the only production factor that has been improved. The buildings which house the machinery are a radical departure from the old-style mills. New buildings have been designed around well-engineered machinery layouts for more efficient flow of materials. Rarely are they more than one story high. The efficient flow of processes reduces labor; and better lighting, better temperature and humidity control and other improvements have increased overall efficiency. Many of the changes are not well adapted to old-style, multiple-story establishments, but their advantages have prompted the building of new plants equipped with the latest machinery.

These improvements also have resulted in greater labor efficiency as measured by the value added per production worker. The value of pr duction per worker was $1,898 in 1939, but it h increased to $4,813 by 1947. This is a 47 perce increase in efficiency[42] based on the same dol value. The increase would have been somewh greater if management had been free to set s entifically designed workloads on the new m chinery.

Production, Exports and Potential Capacity

Production records and the productive c pacity of the industry should be considered studying the size of the domestic industry. Pr duction is not a reliable guide to capacity becau it is influenced to such a high degree by dema A possible exception occurred in the early po war years when demand was high and producti was not controlled. Even then, production mig have been increased through longer hours of o eration.

The longtime production trend in tops, yar and fabrics is up, but sharp declines in the 195 resulted from decreased consumption and subs tution of other fabrics for woolens and worste in consumer goods.

Practically all the production of the U. S. i dustry is for consumption in the United Stat Exports normally account for less than ¼ of percent of domestic production.[43] An exceptio was the lend-lease and United Nations relief du ing 1944-46 when the United States supplied considerable volume of woven goods for expo Large amounts of rags and clips are exported, b these are considered raw material for cheap wo en fabrics and are not finished products. Italy our major customer for rags and clips.

Top, yarn and fabric exports have been sma with no increase expected in the foreseeable f ture.

The National Association of Wool Manufa turers is concerned about the potential capaci of the industry. The association recently reque ed that the Federal Government make a surv to determine whether the industry's capacity great enough to meet any emergency. Repr sentatives of the association report that some 1 out of 800 wool textile mills have closed do since 1947.[44] Some of these plants probably ha reopened; machinery has been moved to oth plants and put into operation, and a number new plants and additions to existing plants ha been built. The net loss, therefore, is not near as large as mill closure figures indicate. Ma of the closed mills probably would be put ba into operation if demands and profits were fav able.

[38]Von Bergen, Werner, and Herbert R. Mauersberger, "American Wool Handbook," Second Edition, Textile Book Publishers, Inc., New York 16, N. Y., 1948, page 610.

[39]Ibid., page 613.

[40]Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont," 1952, page 21.

[41]Bulletin of the Wool Manufacturers, National Association of Wool Manufacturers, 1954, pages 2-77. A representative of Whitin Machine Works estimated there were a quarter of a million of these spindles in operation at the end of 1951—Brandt, Carl D., "The American System," Textile World, Vol. 101, No. 12, Dec. 1951, page 113.

[42]Morris, James A., "Woolen and Worsted Manufacturi in the Southern Piedmont," 1952, page 37.

[43]"Woolens and Worsteds," War Changes in Indust Series, Report No. 29, U. S. Tariff Commission, 19 page 80.

[44]The Wall Street Journal, Oct. 3, 1955.

Machinery in place is decreasing in the United States, but this trend has been accompanied by an increase in hours operated—multiple-shift operation. Machinery has been improved, and new plants are much more efficient; still the industry is largely nonmodernized by today's standards. Production of goods also is increasing, although it has been curtailed sharply in the past 3 or 4 years.

Most authorities have blamed overcapacity as a major cause of the industry's ills in the past. Production levels were high during heavy postwar demands; a study of the conditions tending to reduce and increase capacity indicates that the industry could produce considerably more than its present volume.

Future productive capacity is more difficult to predict. Probably no shortages will occur unless a critical world situation should develop which would greatly increase the need for apparel fabrics.

Edwin Wilkinson in testimony before the Tariff Commission, December 22, 1954, said, "Wool textile production potential far exceeds present and prospective demands."[45]

Profits and Mergers

Most industries have experienced good and bad business cycles and this is certainly true with the domestic wool-textile industry. The bulk of the wool-textile market is for apparel products. When people feel an economic pinch, it is easier to cut down on clothing expenditures than on expenditures for most other consumer goods.

The wool industry went through one serious business depression before World War II. In the 11 years, 1928-38, the industry showed profits after taxes only in 1933, 1935 and 1936. The total net combined losses after taxes during this period amounted to almost 100 million dollars.[46]

A small number of large woolen and worsted manufacturers showed the following percentage returns on stockholders' investments after taxes during 1940-48:[47]

1940 - 5.8	1945 - 10.3
1941 - 11.8	1946 - 24.8
1942 - 9.5	1947 - 20.2
1943 - 9.1	1948 - 20.9
1944 - 7.8	

Comparable data for suceeding years are not available; however, figures for woolen and worsted and broad woven fabric mills show that profits declined sharply. Profits were given a boost in 1950-51, with the outbreak of the Korean War, after they had declined from the high 1946-48 period.

[45]Bulletin of the Wool Manufacturers, National Association of Wool Manufacturers, 1954, pages 1-42.
[46]"Woolens and Worsteds," War Changes in Industry, Series, Report No. 29, U. S. Tariff Commission, 1949, page 59.
[47]Ibid.

The textile business has been declining since 1951. It may not have reached the prewar depression stage, but it is serious. The textile mill products industry showed a profit of 6.5 cents per dollar of sales in the first quarter of 1941 and 9.5 cents the first quarter of 1947. Profits were 5.1 cents per dollar of sales the first quarter of 1951 but dropped to 1.6 cents during the third quarter.[48] Since the third quarter of 1951, no quarter has been higher than 2.7 cents per dollar of sales to May 1954.[49] The wool industry has been the hardest hit of any of the textile mill products group. During 1947-55, the wool industry suffered a 29.9 percent decline in business.[50]

Production and profits have decreased yearly since 1951, although 1955 appears to have reversed the downward trend. However, plants continue to close and business failures are high. Dunn and Bradstreet reported 250 business failures among manufacturers of textile mill products and apparel for the first half of 1955, compared with 297 failures the first half of 1954.[51] *Wall Street Journal* reporters say these figures show textile mill products and apparel accounted for 22 percent of all 1955 industrial failures to October 24.[52]

The current situation in the wool-textile industry may not be a depression by the prewar standard, but it is a depression compared with other U. S. economy. Many circumstances have been responsible. Reduced buying of the industry's products is a most obvious factor. Products from other textile industries have replaced some of wool's markets. Excess capacity in the industry, aggravated by reduced consumption, has increased competition to almost a "cutthroat" business. Mills have sold at a loss to keep their workers and stay in business. Marginal mills that were able to stay in business during the war and postwar booms were slow in going out of business.

This depression can be attributed partially to the high cost of labor and the demands of labor unions. In some cases, union regulations would not permit a mill to increase the number of machines per worker so as to take advantage of the improvements in new machinery.

A number of new, well-laid-out plants, equipped with the most modern machinery, scientifically determined workloads and lower per-hour wages, established price levels impossible for many mills to meet. A wide disparity of production efficiency was established in the industry.

Woven fabric imports have increased severalfold, although imports still constitute only a small fraction of U. S. production. The bulk is now high-quality goods, and imports have hurt

[48]Textile Industries, Vol. 118, No. 3, Mar. 1954, page 97.
[49]Textile Industries, Vol. 118, No. 5, May 1954, page 81.
[50]U. S. News and World Report, July 8, 1955.
[51]Daily News Record, July 18, 1955.
[52]"How to Fail," The Wall Street Journal, Oct. 24, 1955.

the U. S. mills producing these goods. Other imports have been small except for the volume of wool tops in 1952. Possibly the threat of reduced tariffs and increased imports has influenced business more than the actual imports.

Other conditions include high taxes in some areas, outdated depreciation schedules and poor management. Management may be criticized for paying high dividends during lush years and saving inadequate reserves for modernization.[53] Union policy in regulating labor made it difficult for management to utilize its labor efficiently.[54]

The rapid tax amortization granted to synthetic fiber manufacturers has helped the competitors of the wool textile industry. As of September 30, 1954, the Office of Defense Mobilization had issued 32 certificates of necessity for the manufacture of synthetic fibers. The cost of these 32 projects was $257,854,000. Only one project had not been started by the date on the certificates of necessity, while 22, or 68.8 percent, had been completed.[55]

Some other financial conditions have helped the wool-textile industry. Substantial depreciation allowances help the industry to purchase capital equipment.[56] Also, new machinery purchase plans help plants with low reserves to modernize. The Commercial Investment Trust, the world's largest industrial financing firm, has a "pay-as-you-depreciate" 10-year installment plan.[57] New financial arrangements also have been offered by machinery makers.

Although the wool-textile industry is basically one of small businesses, there is a recent trend toward increased size of firms. There have been a few large concerns, such as the American Woolen Company, but no one firm controlled a very large share of the market. Recent mergers have tended to increase the size pattern in the industry.

The Federal Trade Commission reported[58] that during 1948-54, 74 textile and apparel concerns acquired 117 other concerns. Of these, 55 acquired only 1 company, 10 acquired 2, 5 acquired 3, 2 acquired 4, 1 acquired 6 to 10 and 1 acquired 11 to 20 companies. These figures show that the majority bought only one company, but a small number expanded greatly. The textile and apparel group ranked third among all industry groups in number of firms taking part in mergers and sixth in number of firms acquired.

[53]Time Magazine, Sept. 1954.
[54]"A Lesson for All of Us," Textile Industries, Vol. 119, No. 7, July 1955, page 61.
[55]"Expansion Progress-Projects Under Certificates of Necessity," Office of Defense Mobilization, Washington, Apr. 1955.
[56]Howe, Frederick W., Jr., "Textile Machinery Advance Greatest In Past 25 Years," The Commercial Bulletin, Feb. 12, 1955.
[57]"CIT Plan for Financing Textile Machinery," The Commercial Bulletin, Dec. 25, 1954.
[58]"Report on Corporate Mergers and Acquisitions," Federal Trade Commission, May 1955, page 28.

The extent of present concentration is a ma ter of sharp dispute.[59] A labor union claims th mergers have resulted in substantially reduc competition. On the contrary, a representati of the largest textile organization claims that single company controls more than 3 to 4 perce of the total textile volume.[60] Two unbiased a thorities see the merger movement as natur inevitable and no cause for alarm.

Some advantages of increasing the size the textile-industry enterprises through merge are:

1. Diversification of products so that business is bad in one field and good in anoth the business still can show a profit.

2. More efficient use of research, purcha ing, selling and top-management skills.

3. Improvement of facilities.

4. Decentralization of production to avo complete shutdowns from strikes or mill dama

5. More effective use of name brands.

6. Obtaining tax savings through loss cre its carried over.

7. Achieving a stronger financial structur

The increased number of textile compani with plants in several locations probably h strengthened the possibility of branch plants Texas.

Tariffs and Imports

Like the producers of raw wool, the man facturers of wool-textile goods have had tari protection since 1816. Today this country h the world's highest level of living and offers a attractive market to other countries. Howeve the U. S. textile industries are handicapped competing with other countries because of muc higher production costs. Tariffs, therefore, a a vital subject in any analysis of the domest textile industry or discussion of its future. Th especially is true in light of this country's lea ership in attempts to promote free world trad The "trade-not-aid" philosophy has taken muc of the political spotlight during the past 3 or years.

In tariff acts passed by the U. S. Congres the longtime trend in duties on wool manufa tures is upward. Recent rates negotiated throug treaties and agreements by the executive branc of the federal government are sharply downwar

The Trade Agreement Act of 1934 and i numerous extensions have given the Preside

[59]"The Merger Movement in the Textile Industry," staff report to Subcommittee No. 5 of the Committ on the Judiciary, House of Representatives, 1955, pa 14.
[60]Ibid., page 14.

authority to reduce tariffs, and it is through trade agreements that our duties have been lowered materially. The first important reductions under this act were in an agreement with the United Kingdom which became effective January 1, 1939. A slight reduction had been given to Belgium on billiard cloth in 1935. In the British agreement, ad valorem rates on wool fabrics were reduced to 45, 40 and 35 percent. An unusual twist to the agreement was that the lowest rate would apply to highest priced goods, which reversed all previous tariff act policies. The rate on the highest priced imports was thus reduced from 60 to 35 percent.

The next duty-lowering trade agreement was negotiated at Geneva, and the concessions granted became effective January 1, 1948. In this agreement, raw wool duties were lowered 35 percent, from 34 to 25½ cents. Specific duties on woolen and worsted fabrics were lowered from 50 cents per pound to 37½ cents, or 25 percent. The ad valorem rate was lowered to 25 percent, which applies to all goods regardless of value.

After tariffs were lowered in 1948, imports of practically all manufactured goods increased. Imported woolen worsted fabrics cause a greater loss to the domestic industry than the other imports. Duties on fabrics valued at over $2 per pound were 50 cents per pound and 60 percent ad valorem in 1930, but are now 37½ cents plus 25 percent of the value. Thus, an imported, 8-ounce worsted fabric valued at $5 per yard paid a duty of 25 cents (½ pound) plus $3 per yard in 1930. Today the duty is 18.75 cents plus $1.25 per yard —a difference in duty of $1.81 per yard. Mills in this country gain or lose contracts over a few cents per yard difference in bids. About 80 per-

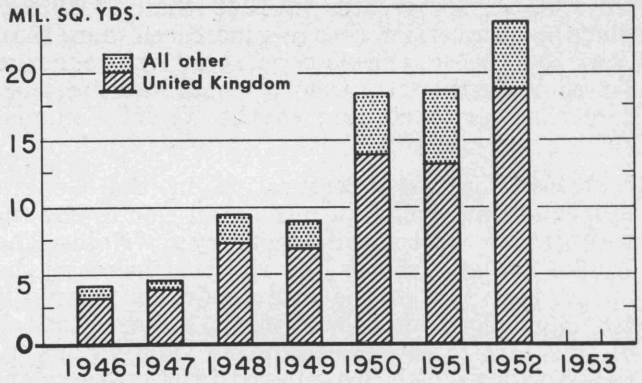

Figure 8. Total annual imports of woven wool apparel fabrics, 1946-53. Source: USDA.

cent of our imported woolen and worsted fabrics comes from the United Kingdom, Figure 8.

Lower raw wool tariffs after 1948 have helped lower the income of domestic wool growers and reduce sheep numbers in the United States.

The bulk of our dutiable wools is imported from the five major wool surplus producing countries in the Southern Hemisphere, Table 4. Argentina is our leading supplier of the duty-free wools. Other major suppliers are New Zealand, China, United Kingdom, Syria, Iraq, India and Pakistan; but a number of other countries supply small amounts.

The ratio of imports of high-priced goods to cheap goods has increased tremendously. In 1939, fabrics weighing over 4 ounces per yard and valued at over $2 per pound accounted for only 14 percent of imports. In 1947, they were 74 percent and in 1948, 90 percent. The volume was more

TABLE 4. IMPORTS OF DUTIABLE WOOL, CLEAN CONTENT, INTO THE UNITED STATES, FROM LEADING COUNTRIES, 1935-54[1]

Year	Argentina	Australia	New Zealand	Union of South Africa	Uruguay	Total[2]
			1000 pounds			
1935	7,441	5,524	2,376	230	3,218	29,746
1936	16,654	18,296	6,088	1,846	14,067	75,559
1937	17,638	40,305	11,024	2,257	13,554	94,263
1938	6,779	3,934	4,002	293	1,867	20,993
1939	14,022	16,871	7,287	3,817	10,093	59,567
1940	44,062	20,988	2,965	14,621	25,543	118,302
1941	105,832	125,394	3,365	19,638	61,812	329,064
1942	89,014	284,908	15,992	35,934	20,758	457,116
1943	104,276	168,275	16,749	22,386	63,872	397,427
1944	108,815	122,714	14,226	12,171	64,733	344,906
1945	82,191	167,582	33,959	19,402	93,115	417,970
1946	109,410	196,034	38,014	56,629	57,990	473,040
1947	49,503	124,125	21,701	20,307	36,691	259,266
1948	59,847	84,515	13,211	16,646	59,506	246,228
1949	24,045	56,747	9,874	13,960	41,193	154,931
1950	44,248	86,199	20,929	12,326	73,848	250,112
1951	27,934	121,262	25,049	23,563	57,825	272,017
1952	29,787	93,522	54,892	24,286	32,069	248,450
1953	49,173	46,301	22,788	11,130	28,736	158,128
1954	14,521	42,613	16,199	14,123	11,805	99,261

[1]Source: "Wool Statistics and Related Data" Statistical Bulletin No. 142, USDA, Sept. 1954, page 33.
[2]Includes the other countries.

than 4½ times greater in 1948 than in 1939.[61] Since the conversion cost has increased more than raw wool prices, the 25 percent ad valorem rate is less protective now than it would have been before the war, according to the Tariff Commission.[62]

One important reservation in the Geneva agreement may play an influential role in the future of the wool textile industry: "Note—The United States reserves the right to increase the ad valorem part of the rate applicable to any of the fabrics provided for in item 1108 or 1109 (a) of this part to 45 per centum ad valorem on any such fabrics which are entered in any one calendar year in excess of an aggregate quantity by weight of 5 per centum of the average annual production of similar fabrics in the United States during the three immediately preceding calendar years." This note refers to woolen and worsted fabrics.

There are three main problems connected with applying this clause. First, many production records are listed in yards instead of pounds. Second, there are differences of opinion as to what characterizes similar fabrics. Third, it is up to the President, with his advisors, to increase the rate; and the industry's leaders have had difficulties in obtaining relief in the past. The escape clause in the 1934 Trade Agreement Act also allows protection for domestic industries, but it was applied only four times before May 1955.[63] The ratio of wool-textile imports to domestic production has been increasing since 1947.

There are many indications that wool-textile imports will continue to increase.[64] Tariffs are lower than at any time in almost a century, and they have been changed so that expensive goods pay the same rate as cheap goods. The world's production potential is probably greater than it was before the war, and it is definitely greater in some countries that need to trade with the United States to get dollars. World production is increasing. World top production in 1953 was 30 percent above 1952 and exceeded the previous record of 1950 by 4 percent. Greater quantities of raw wool are being produced than ever before. Some of the prewar markets are closed, or partially closed, because of the "cold war"; and a number of smaller countries that previously imported many of their needs are trying to produce for themselves.

The domestic textile industry is concerned that imports will be greater. Japan's production, largely consumed by China prior to World War II, exceeds prewar levels. To help Japan find ne markets, the United States has lowered tari to encourage other countries to make such co cessions. In 1948, the Japanese showed so samples of worsteds that undercut comparab British goods by as much as $1.50 per yard.[65] 1954, Japan landed wool cloth in the United Stat at $1.50 to $2 per yard less than American-ma goods after the duty was paid.[66]

The wide difference in labor costs is the m jor condition that enables foreign countries pay our tariffs and still undersell us. Labor cos in the U. S. wool-textile industry averaged $1. per hour in 1954. Numerous sources estima labor costs in Japan at 14 cents per hour. Wa rates in other countries may be estimated fro hourly wages paid in cotton textiles. These ar United States $1.30, United Kingdom 40 cen France 38 cents, Germany 31.7 cents, Italy (es mated) 30 cents, Japan 13.6 cents and India 9 cents.[67] Although production per worker in t United States is higher than in other countri it does not compensate for wage differences. addition to higher hourly rates, we have high fringe benefits for workers, which are charg able to labor. Other costs of production also a higher in this country, but labor cost is the maj difference. Wages and salaries account for 50 60 percent of the value added in manufacture the United States.

The problem of tariffs and world trade pr sents a real dilemma. The tariff itself is simp compared with manipulations such as manag currencies, currency devaluation, compensato spending, unbalanced budgets, discriminatory cu rency exchanges, discriminatory import and e port taxes, import and export quotas, governme fixation of minimum prices, state financing, e port subsidies and a host of others. Accordi to the American consulate in Bradford, Englan "The export price advantage as a result of dev uation (British) presented a special opportuni for the sale of wool textiles to the United States.

All the requests for lower U. S. tariffs do n come from foreign countries. Many come fro within this country. Cotton, wheat and other i terests are strong proponents of lower tariffs that other countries can get U. S. dollars to b their products. Cotton, wheat and wheat flo are protected by a duty as well as by an infle ible import quota imposed under section 22 of t Agricultural Adjustment Act. Only 800,000 bus els of wheat (less than 1/10 of 1 percent of o production) can come into this country per yea Wheat flour is limited to not over 4 million poun (about 1/50 of 1 percent of our production) an the cotton quota is less than 1 percent of our pr

[61]"Woolens and Worsteds," War Changes in Industry, Series, Report No. 29, U. S. Tariff Commission, 1949, page 17.
[62]Ibid., page 17.
[63]Clark, Albert, "Surrender of Power," The Wall Street Journal, May 13, 1955.
[64]"Woolens and Worsteds," War Changes in Industry, Series, Report No. 29, U. S. Tariff Commission, 1949, page 18.
[65]Ibid., page 112.
[66]Textile World, Vol. 118, No. 7, July 1954, page 59.
[67]Ashmore, William G., "We Are Not Expendable," Te tile World, Vol. 105, No. 4, Apr. 1955.
[68]Foreign Agricultural Circular, U. S. Department Agriculture, Oct. 21, 1949.

duction. In addition, wheat is heavily subsidized under the international wheat agreement.[69]

Contrary to claims by some foreign and domestic interests, the United States no longer can be considered a high tariff country. The President's Commission on Foreign Economic Policy (the Randall Commission) said, "It seems clear by any test that can be devised that the United States is no longer among the high tariff countries of the World."[70] The American Tariff League, in a 1951 world trade study, found that 35 to 43 leading trading countries had higher tariffs than the United States. Of five leading countries (United Kingdom, France, Canada, Germany and the United States), the U. S. had the lowest average tariffs. The league found that the average U. S. tariff was only 5.1 percent of the value of imported goods. The Randall Commission found that duties dropped from 24.4 percent when the United States started cutting duties to 12.2 percent in 1953. About 58 percent of U. S. imports are duty free.

Political developments or economic conditions may change the outlook, but it appears that imports are likely to continue the higher trends. The extra 20 percent of ad valorem duty, if the Geneva reservation is applied, may not limit imports. It is possible to obtain increased protection, however, if the situation becomes critical, as shown by the success of watchmakers and bicycle manufacturers in 1955. The bicycle increase is especially significant in that the manufacturers' arguments hinged solely on damage to a domestic industry.

Labor and the North-to-South Migration

Labor is the big problem of the domestic industry. It is the largest single cost item in converting raw wool into finished fabrics, and wage rates in this country exceed those of the next highest major country three to one. Average hourly earnings of wool-textile workers increased every year during 1939-52. Other problems are fringe benefits, work loads, efficiency and productivity of workers, attitudes of the workers and their unions and wage differentials between rural and urban centers, regions and industries. Labor is one of the main reasons that mills are closing in the North and the industry is growing in the South.

The wage rate differences between regions in the United States are much smaller than between this country and wool-textile exporting countries; however, they are important in this highly competitive industry. Figure 9 shows some differences in the 1952 wage rate between New England and the Southeast.

The industry is highly concentrated in the New England States, where wool-textile wages

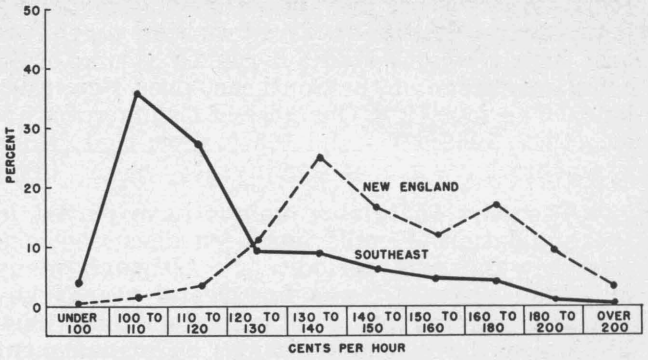

Figure 9. Pay ranges of production workers in woolen and worsted mills, New England and Southeast, April-May 1952. Source: "Wage Structure—Woolen and Worsted Textiles," USDA.

are higher than the U. S. average. Only about 1 percent of the textile workers, those located in the Pacific Northwest, have higher wage rates than New England, which is followed by the Middle Atlantic, Great Lakes and Southeastern areas in that order. Only about 13.5 percent of the production workers were in the Southeast in 1952. These workers, on the average, received 26 cents per hour less than the U. S. average and 31 cents per hour less than those in the New England States. Thus, the average wage costs in the Southeast were more than 20 percent lower than in New England, according to the Bureau of Labor Statistics. In 1953, the woolen and worsted industry paid its production and related workers $284,124,000.[71] If 20 percent could have been saved on this labor bill, it would amount to $56,824,800, or more than the whole industry's profits for many years.

Fringe benefits are labor costs that are not included in weekly wages and hourly rates. They include pensions, social security, paid rests and vacations, hospitalization and other benefits. According to a U. S. Chamber of Commerce study in 1953,[72] the textile mill products and apparel industry has the lowest fringe benefits of all major industry groups except the pulp, paper, lumber and furniture groups. Fringe payments in 1953 for textile mill products and apparel accounted for 14.5 percent of the payroll. The total fringe payments amounted to 22 cents per hour, or $451 per year for each employee.[73]

There are regional differences in benefits the same as in hourly wage rates. Although the U. S. average in this industry is 14.5 percent of the payroll, the Northeast paid 16.5 percent, the Eastern North-Central paid 13.5 percent and the Southeast 10.5 percent. Applying these percentages to New England's $1.50 per hour production worker rate and the Southeast's $1.19, gives a

[69]Strackbien, O. P., "Address on Import, Export Trade and Tariff," The Wyoming Wool Grower, June 3, 1954.
[70]"Tariff Tactics," The Wall Street Journal, Feb. 2, 1955.
[71]Bulletin of the Wool Manufacturers, National Association of Wool Manufacturers, 1954, pages 2-80.
[72]"Fringe Benefits 1953," U. S. Chamber of Commerce, Washington, D. C., 1954.
[73]Ibid., page 11.

fringe-benefit cost advantage of 12 cents per hour to the Southeast. Adding this to the 31 cent hourly wage advantage makes a total of 43 cents advantage of the Southeast over New England. The four U. S. Chamber of Commerce studies (1947, 1949, 1951 and 1953) show that fringe payments have grown steadily.

The part that labor unions have played in the liquidation of mills has been discussed considerably in trade periodicals. Although many mills had suffered losses for several years, they were not granted any wage reductions until 1954. The unions have made decisions on management problems such as workloads, wage rates, operating schedules and fringe benefits.[74] A letter written by a Massachusetts firm to its 1,000 employees illustrates the wage problem. It said, "The mill's average straight time hourly wage rate of $1.605, plus vacation, holiday and insurance benefits, created a gap of 56 cents per hour in favor of competing southern mills. Simple computation proves an annual competitive disadvantage to this Massachusetts mill of $1,065,000 in wage costs alone."[75]

Faced with competition from a growing and more efficient industry in the Southeast, the older mills in the Northeast had to decide whether to modernize or close up. The advantages of new modern machines are not completely utilized unless more of these machines are assigned to a worker; because of union policy, in some instances workload assignments could not be increased even though the workers would be doing no more actual work. About 90 percent of the woolen industry operated 4 looms per weaver; yet, in some mills a weaver operated as many as 16. If one mill increased workload assignments for weavers, then the 250 other mills would request the same.[76]

In late 1954, the CIO agreed to allow a mill in New Hampshire to assign 12 looms to a weaver. instead of the customary 4, for a 6-weeks' trial period.[77] New contracts in 1955 allowed companies to change workload assignments without referring the matter to arbitration if the union objected.[78] This workload assignment flexibility is one of the strong labor advantages in the South.

The labor unions are strongly opposed to states' right-to-work laws. These laws, allowing the states to ban union security agreements, are authorized by Section 14 (B) of the Taft-Hartley Act. They outlaw the closed shop in that a worker cannot be forced against his will to join a union as a condition of employment.

[74]"A Lesson for all of Us," Textile Industries, Vol. 119, No. 7, July 1955, page 61.
[75]The Commercial Bulletin, Feb. 6, 1954.
[76]Hogan, John A., "Employment and Collective Bargaining Problems in the American Woolen and Worsted Industry," Unpublished Ph.D. Thesis, Harvard Univ., Cambridge, Mass., June 1952.
[77]The Commercial Bulletin, Aug. 4, 1954.
[78]The Wall Street Journal, July 18, 1955.

Eighteen states now have such laws. Th include Arizona, Arkansas, Alabama, Flori Georgia, Iowa, Louisiana, Mississippi, Neva Nebraska, Tennessee, Texas, Virginia, Nor Carolina, South Carolina, North Dakota, Sou Dakota and Utah. Eleven of these states are the South.

The closing of mills in the North and t growth of the industry in the South have caus a great deal of concern in the New Engla States. A number of towns which depended pr marily on textile employment faced a serio problem when the mills closed. Although mu progress has been made in attracting new indu tries, the problem was so acute that the gove nors of the New England States appointed a co mittee in 1952 to study the problem thoroughl a number of other studies also have been ma One, the Blanchard study,[79] lists the followi causes of New England's textile troubles: hi labor costs, attitude of state authorities, unsat factory labor relations, trends to higher tax no decisions on third-shift women, labor sho ages in some areas, high power and fuel costs a cost of unemployment insurance, workmen's co pensation and fringe benefits.

The textile industry has been moving Sou since the 1920's, and it has been shrinking in si at the same time both in number of people e ployed and number of plants. The northern are are losing textile workers and plants faster th the South. During 1946-54, total liquidatio were 640 plants with 167,945 employees. Ne England lost 236 plants with 91,835 employe the Middle Atlantic States 287 with 51,245 pe ple and the South 117 plants with only 24,8 employees.[80] The South had 17.6 million spindl in 1925 and 18.4 million in 1950. New Engla declined from 18.3 to 4.3 million during the sa period. By 1950, 80 percent of cotton textile c pacity was in the South.[81]

In April and May 1952, about 70 percent the employees in worsted mills were in New En land, and this area had over half of the wool mill employees. In woolen and worsted man facture, New England had 63,000 employees, t Middle Atlantic States 18,000, the Southeast 1 000 and the Great Lakes and Pacific Coast re ions 54,000 employees.

FACTORS INVOLVING THE THREE REGIONS

Labor

Labor Factors in the North and South

The wool textile industry is a labor-orient industry. Labor constitutes the largest sing

[79]Thomas, P. M., "Unions at the Crossroads," (Editori Textile World, Vol. 102, No. 5, May 1952.
[80]"The Merger Movement in the Textile Industry," a st report to Subcommittee No. 5 of the Committee on t Judiciary, House of Representatives, Washington, D. 1955, page 8.
[81]Ibid., page 9.

TABLE 5. COSTS AND MARGINS AS A PROPORTION OF VALUE OF WOOLEN AND WORSTED PRODUCTS, UNITED STATES, 1939 AND 1947[1]

Item	1939	1947				
	All plants	All plants	Scouring & combing	Yarn mills	Woolen & worsted fabric	Finishing
	Percent					
Value of products	100.0	100.0	100.0	100.0	100.0	100.0
Costs of materials & supplies[2]	58.8	53.1	61.6	59.0	51.1	17.3
Gross margin	41.2	46.9	38.4	41.0	48.9	82.7
Salaries & wages	23.5	23.5	12.8	22.3	24.8	56.3
Salaries	4.0	3.2	2.6	2.6	3.3	11.2
Wages	19.5	20.3	10.2	19.7	21.5	45.1
Fuel	1.3	1.0	0.6	0.5	1.1	4.9
Purchased electric energy	0.6	0.5	0.6	0.8	0.4	1.0
Contract & commission work	0.6	3.1	9.1	1.7	2.6	0.4
All others[3]	15.2	18.8	15.3	15.7	20.0	20.1

[1]Source: Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, USDA, September 1952, page 130.
[2]Includes parts and containers.
[3]Includes depreciation, interest, insurance, rent, taxes, profits and other expenses.

cost item in processing, while transporting raw materials to mills and finished goods to market are comparatively minor costs.

Tables 5 and 6 show the proportion of costs and margins making up the value of woolen and worsted products for 1939 and 1947 and the cost of manufacturing wool covert and worsted twill in 1950.

Salaries and wages cost the woolen and worsted industry 23.5 percent of the value of its products in 1939 and the same percentage in 1947. These costs varied in 1947 from 12.8 percent for scouring and combing plants to 56.3 percent for finishing plants. In 1939, total woolen and worsted broad woven fabric production was 567,560,000 square yards valued at $476,787,000 f.o.b. the plant, which was less than 85 cents per yard. In 1947, production was 814,753,000 square yards valued at $1,238,609,000 or over $1.52 per square yard at the plant.[82]

TABLE 6. COST TO MANUFACTURE WOOL COVERT AND WORSTED TWILL, UNITED STATES, 1950[1]

Item	Wool covert	Worsted twill
	Dollars per yard	
Material	0.9521	2.5915
Labor	0.6112	1.4185
Administration	——	0.1553
Expense	0.2971	0.2748
Social Security, etc.	0.0189	0.0742
Selling	0.1440	0.2832
Defectives	0.0280	0.0677
Total	2.0513	4.8652

[1]Source: Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, USDA, September 1952, page 136.

[82]Bulletin of The Wool Manufacturers, National Association of Wool Manufacturers, 1954, pages 2-138.

A general trend in rapidly increasing labor cost has occurred since 1939. Labor cost increased about 30 percent during 1947-54. The National Association of Wool Manufacturers estimated labor accounted for 60 percent of the value added in manufacturing in 1954. Value added is the value of the products less cost of materials, supplies, fuel, electricity and contract work.

The cost of labor to make and sell woolen covert and worsted twill in 1950 accounted for 55 and 62 percent, respectively, of all costs less materials.

Lower hourly wage rates and fringe benefits gave the Southeast 43 cents per hour labor advantage over the New England States in 1952. One survey showed that in 1951 a differential of 30 cents per hour accounted for 8.1 to 12.1 percent of the price of eight different fabrics.[83]

Another item in the cost of labor is productivity. It may be influenced by workload assignments, skill and attitudes of workers and the efficiency of the machinery and equipment.

Labor productivity is greatest in the Southeast. Most of the plants in the Southeast are newer and are equipped with more modern machinery than those in the New England States. The buildings are constructed for the new equipment and are planned carefully to allow the most efficient flow of material through the processing stages. Management in the Southeast has had more freedom to use scientifically determined workloads to fit the new machinery so that workers in this area operate more machines. New job arrangements with special workers to do such jobs as oiling and maintenance have increased overall mill efficiency.

[83]"Report on the New England Textile Industry," Committee Appointed by the Conference of New England Governors, 1952, page 29.

The editor of *Textile World* said that the present advantage of the South over Massachusetts is largely a matter of people and attitudes.[84] A plant manager with mills in both the Southeast and the North said that the people in the Southeast liked their jobs and worked industriously, which was not always true of workers in the North.[85]

Worker efficiency is difficult to compare in the Southeast and the North because standard conditions do not exist. Investigations on relative worker efficiency by 12 consulting firms are conflicting.[86] A broad study, based on company data and interviews with top executives of more than 50 firms in all major types of industry, leads "to the almost unanimous conclusion that the South has extremely favorable and highly unexpected labor values for industry."[87]

The average skill of woolen and worsted textile workers is probably higher in the Northeast than in the Southeast because the industry is so much older in the North. This advantage very likely is offset by the wider choice of workers because of the plentiful supply in the Southeast. The 1951 average annual wage for factory workers in the Southeast was 60 percent higher than the average farm income per worker.[88] This may explain the smaller turnover of workers, the lower absenteeism and the lack of interest in unions attributed to southern workers.

Most of the new wool plants going into the Southeast have preferred to train their own workers from the rural labor force rather than bring them from the North or attract them from other industries, such as cotton textiles. Locations in cotton textile areas where labor rates are low have seemed to attract some mills. Some have used trained northern workers who migrated from the South earlier and were anxious to return home.

The trainability of southern workers is excellent.[89] Training new labor for new machines seemed preferable to converting workers experienced on older types. The new workers have no preconceived ideas as to what constitutes a reasonable workload and none of the unfavorable habits often attributed to workers in older areas.

The labor advantage of the Southeast over the New England area likely will continue; however, it probably will be narrowed. Northern workers are being assigned more machines, or higher workloads, which will reduce labor cost in the North. The $1 minimum wage in effect March 1, 1956, will increase hourly rates in the Southeast. Although only 4.9 percent of all woolen and worsted production workers in the Southeast received less than $1 per hour in April and May 1952, increasing their wages to $1 probably will cause adjustments upward in other wage brackets. Only ½ to 1 percent of the woolen and worsted production workers in New England received less than $1.

Despite the resistance to the union movement in Southern States, unionization probably will make headway in the South and tend to narrow area differences.

One very important question will be answered when the Supreme Court rules on states' right-to-work laws. Forcing repeal of these laws may hasten unionization in southern "right-to-work" states.

Texas Labor

Essential labor requirements for processing wool and mohair would be the same whether the plants were located in Texas or any other area. Primary labor considerations are cost, supply, availability and quality.

Average earnings of factory workers in the West-South-Central area of the United States (Texas, Arkansas, Oklahoma and Louisiana) have been among the lowest in the Nation. During 1950, hourly earnings averaged $1.29, compared with $1.47 in the Nation. Hourly earnings rose 28 percent during 1950-54, or more than double the national increase; but the $1.65 average for this area in 1954 was still below the National $1.81 average per hour.[90]

Texas workers in all manufacturing averaged more per hour than the West-South-Central area as a whole. Although Texas wage rates were less than the national average, they were higher than in the New England States, except Connecticut, and considerably above the important southern textile states. This higher wage rate for all manufacturing in Texas results from the big volume of high-paying industries, such as petroleum refining, chemicals, rubber, transportation equipment and aircraft. Despite these high-wage industries, there are many food, apparel, lumber and other low-paying industries. The State is comparatively unindustrialized; large numbers of unskilled workers are available for the comparatively small number of factory jobs since they represent a considerable improvement in income as compared with farm wages.[91]

Because the Texas wool-textile industry is so small at present, current wages probably would not be representative; however, the State's much

[84] Thomas, P. M., "Massachusetts Can Save its Mills," (Editorial) Textile World, Vol. 102, No. 9, Sept. 1955, page 329.
[85] Arden, Ringold, "The Guaranteed Annual Raise," Textile Industries, Vol. 119, No. 7, July 1955, page 117.
[86] "Report on the New England Textile Industry," Committee appointed by the Conference of New England Governors, 1952, page 192.
[87] Robock, Stefan H., and John M. Peterson, "Facts and Fiction about Southern Labor," Reprint from Harvard Business Review, Mar. - Apr. 1954, page 80.
[88] Ibid., page 81.
[89] Ibid., page 83.
[90] "Employment and Earnings," Vol. 2, No. 6, Bureau of Labor Statistics, U. S. Department of Labor, Dec. 1955, pages 13-16.
[91] Ibid., page 15.

larger cotton textile industry should give comparable wage rates for textiles. In November 1954, the cotton textile industry had 8,293 production workers in the Southwest receiving an average of $1.05 per hour. The U. S. average was $1.19 for 329,814 production workers, with 287,526 receiving $1.17 in the Southeast, 30,467 receiving $1.32 in the New England States and 2,253 receiving $1.52 per hour in the Middle Atlantic States. Most of the Southwest's cotton textile industry is in Texas. The plants are widely scattered and are located in some of the larger as well as in the smaller towns. In November 1954, Texas cotton textile workers averaged $1.02 per hour. There was no material difference in fringe benefit costs in the Southwest and Southeast.

The financial importance of the wage differential is best shown by the yearly savings for a typical cotton mill. In 1952, the differential was 14 cents per hour in the Southwest compared with the Southeast. For a mill producing print cloth that used 10,000,000 pounds of cotton and required 179.86 man-hours per 1,000 pounds of cotton, the savings would be $251.800 compared with the Southeast. Compared with New England with $1.36 average hourly wage, the labor savings would be $593,500.[92]

Texas has an abundant supply of labor. Total population was 8,240,000 in July 1954, nearly double the second-ranking Southern State (North Carolina). The 16 Southern States gained 16.5 percent in white population during 1940-50, but Texas gained 22.6 percent white and 5.7 percent colored. About 40 percent of the Texas citizens lived on farms and ranches in 1930. but only 13.7 percent of the population lived on farms in 1954. The number of farms in Texas decreased 11.6 percent from 331,567 in 1950 to 292,946 in 1954. The State's farm population in April 1954, was 1,126,000, but one-third of the State's total population lived in rural areas.[93]

Population and population centers are more heavily concentrated in the eastern half of the State. Fifteen major cities account for about 35 percent of the total, and the population of these centers is increasing faster than the State average.[94]

About 29 percent of the population in 1950 was in the 14 or younger age group, 32 percent from 15 to 34, 29 percent from 35 to 59 and 10 percent was 60 and older.

During 1950, 53 percent of the 5,583,178 people in Texas who were 14 years old or older were in the total labor force, Table 7. Of the 2,870,605 in the force, 74 percent were males. The women's labor force was 748,106, which was only 27 percent of the group 14 years and older. The other 73 percent were not gainfully employed. Women make up about two-fifths of the work force in woolen and worsted-textile manufacture.[95]

Latin Americans contribute a large portion of Texas' population. In 1955, the number was estimated at 1,500,000 during the height of the migration of legal transient agricultural workers.[96] These workers have a large range of educational and cultural standards and excellent manual dexterity.

Texas has more commercial-type farms and more part-time and residential-type farms than any leading southeastern textile state. Also, according to the 1954 Census of Agriculture (preliminary), Texas had nearly as many farm operators working off their farms in 1954 as two of the largest southern textile states combined. About 143,000 Texas farm operators worked off their farms in 1954.

Texas' farm population is declining more rapidly and its population growth rate increasing faster than the U. S. average. It has a larger total population and a greater number of farm operators working off the farm than other Southern States, while a smaller percentage of Texas' population is employed in manufacturing than in the leading southern textile states. These conditions should put Texas in an advantageous position from the standpoint of labor supply. Not only is there an excellent supply, but wages are low compared with other textile states. The rapid increase in apparel industries, which also pay low wages, points out the availability of labor in the State.

TABLE 7. TEXAS LABOR FORCE, 1950[1]

Item	Total	Male	Female
Total population	7,711,194	3,863,142	3,848,052
14 years & older	5,583,178	2,781,613	2,801,565
Labor force	2,972,434	2,222,050	750,384
Civilian	2,870,605	2,122,499	748,106
Employed	2,758,433	2,037,758	720,685
Unemployed	112,162	84,741	27,421
Experienced	110,934	84,077	26,875
New workers	1,228	664	564
Not in labor force	2,610,744	559,563	2,051,181
Keeping house	1,653,702	13,866	1,639,836
Unable to work	221,299	135,014	86,285
Inmates of institutions	49,045	32,313	16,732
Others & not reported	686,698	378,370	308,328
14-19 years old	405,450	200,075	205,375
20-64 years old	210,743	128,073	82,670
65 years & older	70,505	50,222	20,283

[1]Source: Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas," Cotton Economic Research, Univ. of Texas, 1954, page 60.

[92]Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas," Cotton Economic Research, University of Texas, Austin, Tex., 1954, page 73.

[93]Adkins, W. G., and R. L. Skrabanek, "The Texas Farm Population, 1954," Texas Agricultural Experiment Station, Progress Report 1738, Dec. 23, 1954.

[94]Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas," Cotton Economic Research, University of Texas, Austin, Tex., 1954, page 54.

[95]"Wage Structure—Woolen and Worsted Textiles," Series 2, No. 90, Bureau of Labor Statistics, U. S. Department of Labor, Apr.-May 1952.

[96]Texas Almanac, 1956-57, Dallas Morning News, Dallas, Tex., page 140.

Education level is a factor that indicates labor trainability. The average educational level in Texas was about equal the U. S. average in 1950, which was 9.3 school years completed by persons 25 years and over. Of this group, 31 percent completed at least high school, while 16 percent completed less than the fifth grade. In 1950, 94.5 percent of the 7 to 13 age group was enrolled in school, as was 89.1 percent of the 14 and 15, 66.4 percent of the 16 and 17, 27.5 percent of the 18 and 19 and 11.0 percent of the 20 to 24-year-old group. More stringent state laws and rigid enforcement probably have increased attendance in the younger groups since 1950.[97] Rapid consolidation of school districts and the increase in school bus transportation have improved educational opportunities for Texas rural youth.

According to a survey by a leading authority,[98] Texas ranks above all the Southern States and above Maine, Vermont and Pennsylvania in education as measured by financial support, teacher status and results obtained.

Opportunities for higher education are excellent in the State. During the 1954-55 school year, 153,118 students were enrolled in accredited senior and junior colleges. There are 51 tax-supported and 83 private institutions in Texas, and 33 of the institutions are widely scattered junior colleges.[99] The rapid increase in junior colleges in recent years and their location in all areas have helped bring advanced training within reach of more students in the State.

Texas has the only textile engineering school west of the Mississippi River—Texas Technological College at Lubbock. This school has been turning out graduates since 1929. Some are employed in the State, but many are in other textile states. These men would be qualified for a number of engineering and management jobs and no doubt would be favorable to employment in their home state.

No survey data are available on the productivity, efficiency and attitude of Texas labor; however, interviews with cotton textile mill executives, hatmakers, garment makers and the State's wool mill managers indicate that the quality of labor is excellent. They mentioned good attitude, low rate of absenteeism, initiative and lack of interest in unions as special qualities of their workers. Most of those interviewed said that the quality of Texas labor was as good or better than labor in other areas. The favorable attitude of Texas labor is indicated further by the fact that only two textile mills in the State were labor organized in 1954.

[97]Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas," Cotton Economic Research, University of Texas, Austin, Texas., 1954, page 57.
[98]Rummell, Frances, "How Your State Ranks in Education," Look, Sept. 1955.
[99]Texas Almanac, 1956-57, Dallas Morning News, Dallas, Tex., page 487.

It seems certain that Texas has an advanta in labor over other textile areas at the prese time. The advantage in labor supply probabl will continue for some time. Some of the diffe ential in labor cost will likely be removed by th new $1 minimum wage. In November 1954, 41 percent of the cotton textile workers in the Soutl west received less than $1 per hour compare with 14.9 percent in the Southeast. The Texa Employment Commission reported that cott textile mill wages were raised 6 cents per hou after March 1956. Although Texas labor may re ceive greater increases, the total labor bill of th mills probably will continue to be lower in Texa than in the Southeast.

Labor cost patterns are higher in wool tex tiles than in cotton textiles, and the minimu wage should have a smaller effect on wool mi wage levels. Since Texas labor has no precon ceived ideas as to job pay differentials, it seem that labor for wool textiles in the State would b 5 to 10 percent lower than in the Southeast. Th number of high-wage industries in the Stat causes a wide range in wages. These industrie tend to raise the overall wage level and in tim could remove any wage advantage Texas ma have now for wool textiles.

The status of unionization and the attitud of the State Government and the general publi toward unions and toward laws governing organ ized labor are very important to most industrie considering locating in Texas. The Texas att tude toward labor may be stated generally a equal rights for all, although the laws regulatin labor are more restrictive than in many othe states.

Important labor laws are summarized as fo lows:[100]

"The use of violence or coercion, or the threa of violence or coercion, in a labor dispute is a fe ony.

"The closed shop, the union shop and main tenance of membership provisions in labor con tracts are illegal.

"Labor organizations are responsible for dam ages resulting from strike or picketing in breac of contract.

"Strikes, picketing, obstructing service i public utilities providing electrical energy, gas, o water are illegal; sabotage or conspiracy to sabo tage such services are felonies.

"Mass picketing is illegal.

"The check-off is illegal; the employer ca make no deduction for labor union dues or assess ments without the written authorization of th employee.

[100]"The Texas Charter of Equal Rights," (Leaflet), Da las Chamber of Commerce, Dallas, Tex., Oct. 1952.

"Labor unions are made liable to Texas' anti-trust laws, both civil and criminal.

"No public official and no unit of Texas Government—municipal, county, or state—can recognize a labor organization as the bargaining agent for any group of public employees; nor can any public official or unit of government enter into a collective bargaining contract with a union for any group of public employees.

"Secondary boycotts, secondary strikes and secondary picketing are illegal.

"Every man has a right to earn an honest living at work of his own choice; no man has the right to coerce or intimidate his neighbor to keep him from working at the job of his choice.

"Labor organizations must hold annual elections, file reports with the secretary of state and are subject to other regulatory provisions."

Additional laws regulating labor were passed in 1955. One, the Parkhouse Bill, prohibits strikes for union recognition unless the union represents a majority of employees. Another denies unemployment compensation to workers idled at a subsidiary plant by labor disputes at a parent plant.

Estimates indicate that total Texas union membership is around 420,000 of a total 2,754,400 nonagricultural labor force. The nonagricultural labor force rose by 474,800 during 1948-55, with the unions organizing about 10 percent of this increase.[101] Texas unions have about 20 percent of the industrial labor force. Their gains have been the result of new industries such as chemicals, aviation and automobile plants coming into the State. Also, many high-wage industries, where labor forms a minor part of total costs, have not resisted unionization.

AFL and CIO representatives say that it is difficult to organize in Texas and believe that the new antipicketing law will make it impossible to organize firms with less than 250 employees. They agree that the laws could either ruin the unions or unions can live under them, depending on how the courts rule.[102]

Unions lost 42.4 percent of the elections held in Texas by the National Labor Relations Board from January 1, 1954 to March 1, 1955; and they lost 44.4 percent of the next 25 elections held.[103]

Unions do operate and have some strength, but union members in Texas represent less than 2.5 percent of total U. S. union membership. Pickets are extremely rare in some areas of the State.

[101]Kinch, Sam, "Labor Plans Mourning Over Picketing Law," Houston Chronicle, Sept. 3, 1955.
[102]Ibid.
[103]Texas Industry, July 1955, page 13.

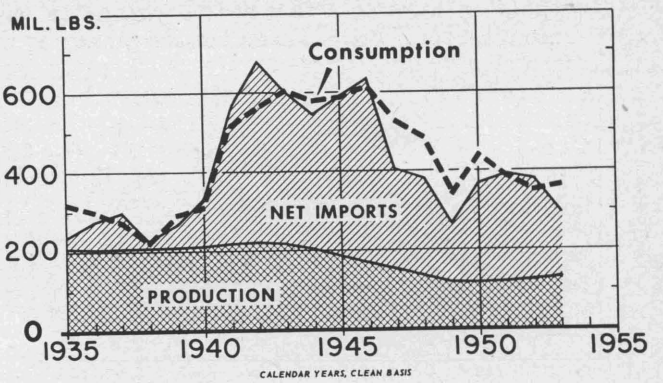

Figure 10. Supply and mill consumption of apparel wool, 1935-55. Source: AMS, USDA.

Raw Materials

Volumes and Cost

The volume of apparel wool consumed in the United States is well below the peak war and postwar years, but consumption is still above prewar years. A smaller portion of domestic requirements is supplied now by domestic production than before the war, Figure 10. The increase in man-made fiber use is shown in Figure 2.

The domestic industry uses virtually all of the domestic wool clip and most of the domestic mohair. In addition to big volumes of apparel and carpet wools, this country imports small volumes of mohair, camel's hair, cashmere, alpaca, vicuna and other wool-like fibers. The bulk of the apparel wools used are the finer grades, 60's and up; but good volumes of 50's to 60's also are used. As compared with the average volume of fibers used during 1950-55, an increase in volume during the succeeding period may be expected.

Raw materials and supplies, which include parts and containers, cost woolen and worsted manufacturers in all plants 58.8 percent of the value of their products in 1939. The proportion was reduced to 53.1 in 1947, and varied from 17.3 percent for finishing mills to 61.6 percent for scouring and combing plants. Yarn mills paid 59.0 percent, and woolen and worsted fabric mills 51.1 percent.[104] During 1939-47, the proportion of material cost to value of products was reduced by 5.7 percent, showing that other costs increased more rapidly than raw materials. Probably the proportionate cost in 1955 was lower than in 1947 because the price of domestic raw wool was roughly the same, but other costs were higher.

Cost of material to make wool covert and worsted twill in 1950 was $0.9521 for covert selling at $2.0513 per yard, and $2.5915 for twill selling at $4.8652 per yard. The proportionate costs for the material were 46 and 53 percent, respec-

[104]Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, U. S. Department of Agriculture, Sept. 1952, page 130.

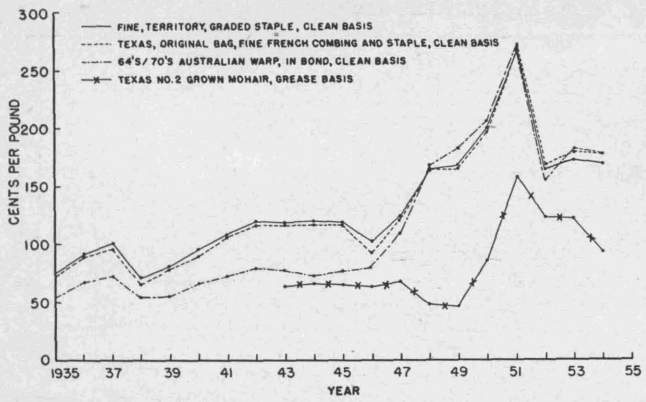

Figure 11. Average price per pound for selected wools, 1935-55. Source: "Wool Statistics and Related Data," AMS, USDA Statistical Bulletin No. 142.

tively. These figures show the importance to the industry of raw material price. Since costs are pyramided through all manufacturing stages, raw material price is an even greater consideration than these figures indicate.

Although there are high and low cycles, the longtime trend of raw wool price is upward, Figure 11. This trend is likely to continue; but in comparing locations of wool-textile plants at the present time, the price makes little difference since all wools are priced delivered at Boston. Southeastern plants may be able to save 1 or 2 cents on some domestic wools shipped direct, but they must pay about 2 cents per clean pound more freight than northern mills on wools shipped from Boston. Foreign wools are landed at Charleston, South Carolina, at the same price as at Boston. As scouring and combing plants increase, the Southeast will have no raw material handicap on the bulk of the wool it uses. As long as Boston continues to be the main raw wool market, the Southeast probably will continue to pay a little added freight cost on small volumes of some wools and specialty fibers landed at Boston.

Texas Raw Materials

Wool. One of the main advantages for Texas as a location for wool and mohair-textile plants

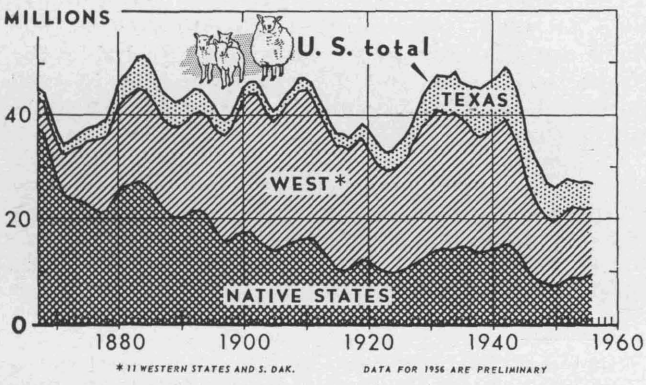

Figure 12. Stock sheep and lambs on farms, January 1, selected years. Source: AMS, USDA.

is nearness to raw material supplies. The Texas wool clip has amounted to 19.4 percent of the average domestic clip for 25 years, 1929-53. Actually the only savings in raw materials are in transporting wool to the mills. There may be additional advantages or disadvantages in transporting the fabric to market. A mill located in Texas could save on transportation of raw materials produced in the State.

The number of sheep in Texas has declined sharply since the high of 1943 and is now only about half that year's record number, Figure 12. Most of the conditions that caused a decline in the nation's sheep population[105] also contributed to the decline in Texas, but the biggest factor in this State has been the long period of below-average rainfall.

Although production of shorn wool since 1946 averages less than 50 million pounds per year, U. S. Department of Agriculture committees estimate that Texas sheep numbers could be increased to about 9 million head.[106] The goal set by Congress under the 1954 wool act (300 million pounds of shorn grease wool) also indicates about 9 million head for Texas, or about 70 million pounds of wool per year. This is approximately the same as in 1946 when the Commodity Credit Corporation purchased virtually the entire domestic clip and made it possible for the U. S. Department of Agriculture to provide the only complete analysis of the domestic wool clip. Grades of the Texas clip should not change markedly, but improvement can be expected in pounds of clean wool produced per ewe, staple length, quality and packaging for market.

Most Texas wools are marketed in original bags (not graded). In 1946, 60,523,215 pounds were sold as original bag; 7,394,379 pounds were graded; and 809,800 pounds (clean) were sold as scoured wool. The clip graded 93.1 percent fine, 4.2 percent half blood, 1.2 percent three-eighths blood and 1.5 percent off-wools. The average estimated shrink for all wools was 57.3 percent. The relatively high shrink may be explained partially by the large portion of fine wool, which normally shrinks more than the coarser grades. Variations in rainfall and range conditions have a marked effect on the shrinkage of Texas wools.

Even though the appraisers classified only 3,513,240 pounds of the Texas clip as woolen length, the woolen trade undoubtedly uses a much greater volume since about 7½ million pounds were fall shorn. Some of the 8 months' and even some of the 12 months' wools are too short to comb efficiently. It is significant, however, that

---

[105] _____, "Achieving a Sound Domestic Wool Industry," a report to the President of the United States by the Secretary of Agriculture, U. S. Department of Agriculture, Dec. 1953, page 7.

[106] "Domestic Wool Requirements and Sources of Supply," Production and Marketing Administration and Bureau of Agricultural Economics, U. S. Department of Agriculture, June 1950, page 62.

TABLE 8. BASIC QUALITIES OF THE TEXAS WOOL CLIP, 1946[1]

Description	Fine	½ blood	⅜ blood	¼ blood	Low ¼ blood	Common & braid	Off-wools[2]	Total
Strictly staple, pound	136,169	193,565	86,613	12,700	2,085	1,286		432,418
Staple & good French, pound	19,190,306	572,302	263,413					20,026,021
French combing, pound	42,343,846	411,960	117,635	17,750				42,891,191
Woolen, pound	3,097,476	89,226	325,337	1,201				3,513,240
Shrinkage, %[3]	57.5	53.5	48.1	45.1	51.2	51.2		57.3[4]
Grease equivalent	87,562	1,657,604	1,139	1,847	400			1,748,552
Scoured wool								[5]
Total grease basis	64,855,359	2,924,657	794,498	33,498	2,485	1,286	1,054,724	69,666,146
Percent of total	93.1	4.2	1.2	[6]	[6]	[6]	1.5	100

[1]Source: "The Domestic Wool Clip." Livestock Branch, Production and Marketing Administration, USDA, June 1951.
[2]Off-wools do not necessarily represent inferior wools. They were very small lots made up of mixtures, and it was not practical for the CCC to grade them.
[3]All shorn wool (original bag and graded.)
[4]Average percent shrinkage.
[5]809,800 pounds were purchased as scoured wool.
[6]Less than .05 percent.

the bulk of Texas wool is worsted (combing) type, Tables 8 and 9.

About 17 million pounds of the 1946 Texas wool clip was discounted an average of .8 cent per grease pound for defects such as burr, with nearly 14 million pounds of this amount drawing only a .7 cent discount. Over 50 million pounds of the Texas wool received no discount.

Mohair. Texas produces about 90 to 95 percent of the domestic mohair clip, which is almost half the world clip. The State produced 97 percent of the U. S. clip in 1955. Since very little mohair is imported, the domestic textile industry virtually depends on Texas production. There are no U. S. Department of Agriculture benchmarks for mohair, but the longtime yearly average in Texas is about 3 million head of Angora goats which produce about 16 million grease pounds of mohair per year.

TABLE 9. VOLUME AND SHRINK OF TEXAS ORIGINAL BAG WOOLS

Type of wool	Volume, 1,000 pounds	Estimated shrink, percent
Fine 12 months'—64's & finer		
Staple & good French	4,036.2	55.9
Good French, some staple	12,093.4	57.1
Average to good French combing	18,327.7	59.0
Average French combing	4,495.5	59.8
Short French combing	720.6	62.0
Clothing & inferior	151.4	68.1
Crossbred type, 12 months'—64/60's to 60/64's		
Staple & good French, 64's edge 60's	929.4	52.5
Good French and staple 60/64's	542.2	54.0
Average to good French 60/64's	226.0	44.2
8 months'		
Best length	9,680.3	56.4
Average length	1,515.2	56.9
Short length	162.4	59.1
Fall		
Best length	6,799.3	56.6
Average length	733.3	59.3
Short length	110.0	61.1

The fiber diameter of mohair, the most important element affecting its price, is much more variable than wool. Wethers produce coarser hair than does; barren does produce coarser hair than does raising kids; older goats produce coarser hair than young goats and goats grazing on good pasture produce coarser hair than goats on poor forage. A complete analysis of the domestic mohair clip, such as the one on wool, is not available.

The finer grades of mohair are the most valuable because of their use in expensive fabrics and their limited volume. Mohair shrinkage from the records of a leading Boston firm, averages about 22 percent for 36's and 32's and about 22 percent for 22's and 18's.[107] This explains why mohair in the grease usually outsells wool in the grease, but $1 per grease pound for mohair, shrinking 20 percent is the same price as 50 cents for grease wool shrinking 60 percent.

The average price of No. 2 grown mohair was shown in Figure 11. Kid mohair prices are considerably higher.

Mohair is a specialty fiber with a widely fluctuating demand. Fashion requirements change, and mohair cannot be substituted for other fibers to the same extent that other fibers can be substituted for all or part of the mohair content of fabrics. Mohair, especially the coarser grades, must compete with duty-free imported wools for some end uses. Since these circumstances cause prices to fluctuate more freely than the prices for wool, mohair production is thought of as a "boom and bust" industry.

Another aspect of price should be pointed out. Pounds of mohair clipped per goat in Texas

[107]"Potential Market Outlets for Mohair," a report to the U. S. Department of Agriculture Industrial Consultants of the Commodity Marketing Corporation, June 1952, page 9.

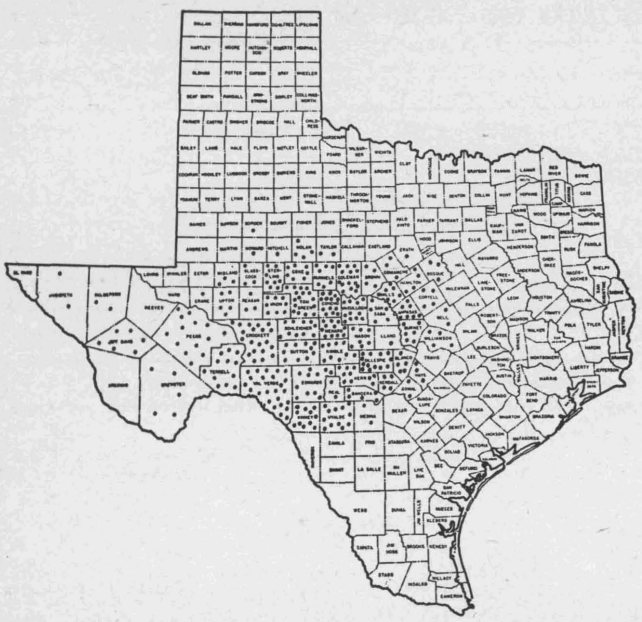

Figure 13. Wool production by counties in Texas 1954 Census of Agriculture. One dot equals 100,000 pounds. Up to 149,000 pounds shown by one dot; 151,000 pounds and over shown by two dots.

has increased consistently since 1930. Some of this increase is the result of improved breeding, but some is the result of selecting for heavier shearing goats. There is a strong tendency for buyers to pay the same price per pound for kid mohair and adult hair in a season regardless of quality. Producers with the heaviest shearing goats receive the most money. These heavier shearing goats usually produce coarser hair.[108]

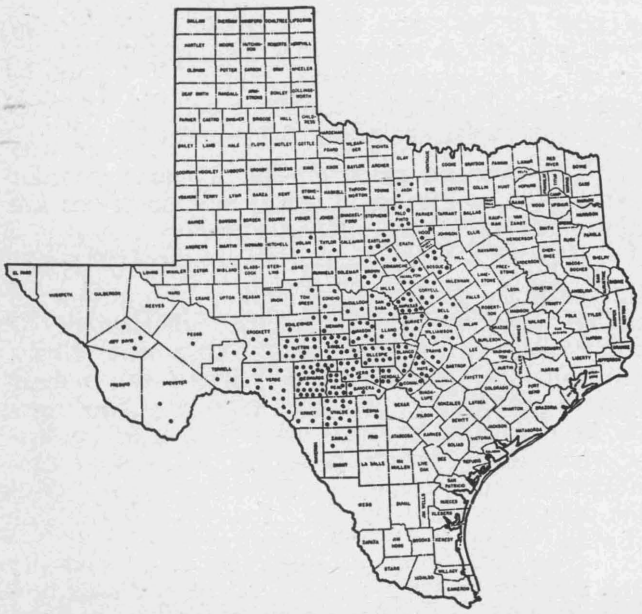

Figure 14. Shorn mohair production by counties in Texas, 1954 Census of Agriculture. One dot equals 50,000 pounds.

[108]Ibid., page 2.

The good prices for mohair during the past years may be partially the effect of mohair exports. Exports of mohair averaged less than 100,000 pounds per year until 1953. Over 2½ million pounds were exported in 1954, and during the first 7 months of 1955, exports were 3.3 million pounds, clean basis.[109]

Texas started the warehouse system of marketing wool and still leads the Nation in this method. About 95 percent of the State's clip is sold through some 90 to 100 warehouses located in the producing areas, Figure 13.[110] The warehouses, which are located mainly in the mohair producing area, Figure 14, also handle the State's mohair. A small amount is sold direct by the ranchmen, either through cooperatives or individually; however, considerable volumes are contracted prior to shearing in some years. This is especially true with mohair.

Warehouses offer a number of services to the growers. They receive, handle, store, insure, sell and ship the wool. They act as the producer's agent in bargaining with buyers, but generally have the owner's prior approval before a sale is made. Although charges vary, the average fee for these services is about 2 cents per pound. In addition to these usual services, some warehouses offer advances or credit on wool, help grade and cull sheep, sell ranch supplies, help sell surplus livestock and may even buy wool.

The main advantage of the warehouse system is that it concentrates the wool for the buyers. It would require time and expense to buy small lots direct from the producers on the many ranches. Warehouse officials also are better informed on wool qualities, values and markets than the average grower.

Domestic producers often have been criticized for doing poor packaging of their wool for market. Much research and teaching have been done on the subject. Many leading growers have gone to extra trouble and expense to do a better job. When their wools did not bring sufficient premium to make it pay, some continued to work at packaging and others stopped. In the past few years, a great deal more interest has been shown in packaging, and progress is being made. The wool marketing study[111] by Davis and Gabbard in cooperation with the Sonora Wool and Mohair Company showed that fleece-grading wool at the shearing pen and marketing these wools on a quality basis give good returns to producers. Texas producers are probably more interested in

[109]Textile Organon, Vol. XXVI, No. 12, Dec. 1955, page 220.

[110]Campbell, Fred R., L. P. Gabbard, and Stanley P. Davis, "Marketing Wool Through Texas Warehouses," Bulletin 740, Texas Agricultural Experiment Station, Oct. 1951, page 5.

[111]Davis, Stanley P. and L. P. Gabbard, "Quality Price Relationships of Graded and Ungraded Wool," Progress Report 1572, Texas Agricultural Experiment Station, 1952.

packaging now than ever before, and their efforts will be greater if properly prepared clips are given higher prices.

It may be that grading makes less difference than some believe. The 24-year (1930-53) average prices per clean pound of graded fine, territory staple and French combing wool at Boston were $1.1671 and $1.1137, respectively. The average price for original bag, Texas fine staple and French combing wools for the same period was $1.1476 per clean pound at Boston. This also may indicate that graded Texas fine wools are more valuable than graded fine wools of the same length produced in other states.

A trend that seems to be spreading rapidly among Texas growers is marketing wool on a clean basis. This practice helps insure growers a higher price for the better, properly prepared clips. Combined with the incentive for better quality offered through the National Wool Act of 1954, marketing on a clean basis should help improve the preparation of Texas wools.

Uses of Texas Wool and Mohair. Theoretically, Texas wool could be used in almost any wool product from high-quality woolen, worsted and knit goods to felts. Practically speaking, however, their use generally is limited to better quality men's and women's suitings, women's dress goods, coatings and other high-quality woolen and worsted fabrics and knit goods. The high price of Texas wool excludes it for many goods. To justify the cost of the fiber, the products must be of good quality and sell at high prices. Because of their high felting qualities, the shorter 4 months' wools, noils and tender Texas wools are in demand for woven and pressed felts, hat bodies, papermakers' felts and other felts.

Mohair, the specialty fiber, has a wide variety of uses. It is a snow-white, lustrous, smooth, wrinkle-resistant, resilient fiber that has remarkable clarity of color when dyed, packs tightly in weaving, wears extremely well and is easily cleaned; but it is scratchy (especially coarser grades) unless blended with softer fibers. These qualities make it a superior fiber for upholstery of all kinds, drapery materials, clothing and carpets. Its use in upholstery has been threatened seriously by new synthetic fibers, partially because of style changes that could revert and partially because of its high cost. Its use in clothing has been confined mainly to men's summer suitings, uniforms, overcoats and fleece fabrics for outer wear. Its use in carpets depends on the costs of the coarser grades of mohair compared with the imported carpet wools with which it must compete.

Other Domestic Wools

The Texas wool clip is over 93 percent fine grade. The greater portion of the clip is long enough to comb and goes to the worsted trade, but there are good volumes of shorter wools that are best suited for woolen goods.

The general practice in the worsted industry is to blend wools from different sources. The woolen industry also blends shorn wools, pulled wools, noils and other raw materials. For these reasons, it is necessary to consider bringing other raw materials to Texas mills.

Many of the Western States produce good volumes of half-blood, three-eighths blood and one-quarter blood apparel wools that are suitable for blending with Texas wools. Even in the other Western States, the bulk of the clip (about 60 percent or 67 million pounds) grades fine; but some 46 million pounds of the coarser grades are produced. These coarser wools shrink less on the average than Texas wool. The states producing the greatest quantities of half and three-eighths blood wools, which would be most needed by Texas mills, include Montana, California, Colorado, Wyoming, Idaho and Utah. Idaho also is the largest producer of quarter-blood wool.

Some plants in Texas might want to use fleece-type wools. They are produced mainly in the farm-flock states.

Other Domestic Raw Materials

Other raw materials that may be needed by mills in this State include noils, pulled wool, synthetic fibers and cotton.

Noils are the short fibers combed out of worsted wools. They are necessary raw material for woolen manufacture. Since noils are produced in the Northeast and Southeast, they would have to be shipped to Texas mills from those areas unless a Texas worsted industry produced them in sufficient quantities.

Pulled wool is the wool obtained from the pelts of slaughtered sheep. It accounts for approximately one-fifth of the total volume of domestic wool. Like noils, pulled wool is a required raw material for woolen manufacture. In addition, a number of the best lengths are used to lower fiber costs in some worsteds. A small wool pullery (the Melton Provision Company) is located at San Antonio, Texas; and some wool is pulled at Denver, Colorado; however, most of it is pulled at Chicago and other eastern cities and would have to be shipped into Texas. If lamb markets developed in Texas, wool pulling in this State might increase.

Cotton might be required as a raw material, but it would be no problem since this State produces about one-third of the Nation's supply and a great variety of types and strains. Also, cotton is produced over virtually all the State.

Synthetic fibers may play an increasing roll in woolen and worsted goods, and the availability of these fibers should be considered. Texas produces considerable volumes of the basic salts from which some of the synthetic fibers are manufactured. Since the State has no synthetic fiber plants, however, these fibers would have to be shipped from the Southeast and Northeast.

Foreign Wools

Availability of foreign wools is another important consideration for Texas as a location for wool textile plants.

Australia is the leading wool-producing and exporting nation in the world and the leading supplier of U. S. imports. About 70 to 75 percent of the Australian clip is Merino type, and the bulk of U. S. imports are of the 60's and 64/70's grades. These grades accounted for 77.9 percent of U. S. imports in 1953-54.[112]

Argentina is our second major supplier of raw wool. Only about 20 percent of her clip is fine grade. The bulk of U. S. imports from this country are coarser, crossbred wools for use in carpets.

Uruguay is the country of next importance in volume of wool sold to the United States. The bulk of the clip is crossbred; only about 15 percent is Merino. Super-fine crossbreds, 58/60's, make up about 45 percent of her clip.

New Zealand generally ranks fourth in supplying imports to the United States. About 97 to 98 percent of her clip is the crossbred type.

South Africa is another country which has supplied us with good volumes of wool. The bulk of her clip is Merino, and 64's and 64/70's are the predominant grades.

The shrinkage of wool sold by the major exporting countries is much less than domestic wools with the exception of Argentina. These countries do a better job of packaging their wool and their Merinos are selected almost entirely for wool production.

Special trade and barter agreements greatly affect the volumes of wool going to the different countries each year. British Dominion wools are sold at auction, but credit deals or trades influence purchases. The governments of Argentina and Uruguay exercise considerable control over sales of their wool.

Although some 13 deepwater ports on the Gulf Coast could be used as ports of entry for foreign wools, the bulk probably would be handled through the ports of Houston or Galveston. Houston is the second-ranking port in the Nation in tons of cargo handled. According to the Bureau of Customs office,[113] foreign wools have entered these ports and can enter without special considerations. The customs service there is sufficiently staffed and equipped to handle wool imports; although samples must be sent to Boston for determination of clean content, no costs above those at any other port would accrue to importers. The customs service also reported there were bonded warehouses in the area suitable f wool storage.

Marketing Wool-textile Products

Volumes

Products marketed by the woolen and wo sted textile industry include scoured wool, wo tops, yarns and fabrics.

Wool that is scoured and sold represents very small fraction of the total business. N shipments and interplant transfers during 19 amounted to only 35,708,000 pounds.[114]

Domestic top production in 1947 was 31 868,000 pounds, of which 159,970,000 pounds we for the plants' own use. The rest was manufa tured for sale. In recent years, top produced f sale averaged about 50 percent of the total.[115]

A much smaller percentage of the total yar manufactured is sold as yarn. In 1947, total vo ume of yarn produced was 591,937,000 pound and 447,062,000 pounds were for the makers' ow use. Of the 166,466,000 pounds sold, 20,724,0 pounds were yarns spun on the woolen syste 115,014,000 pounds were worsted yarns spun o the Bradford system and the other 30,728,0 pounds were worsted yarns spun on the Fren system.[116]

Most yarns are produced for weaving in fabrics, but about 15 percent is for knitti yarns. The total volume of knitting yarns pr duced in 1947 was 87,340,000 pounds. A lit over 11 million pounds of the total knitting yar sold went to the hand-knitting trade.[117] T knitting industry generally prefers to buy yar rather than make its own.

Some woolen and worsted fabrics are sold t mills that do only finishing, but this is a ver small portion of the total business. In 1947, th finishing plants paid less than 5 million dollar for materials, containers and supplies, compare with almost 700 million dollars paid by woole and worsted fabric manufacturers.[118]

The big business for woolen and worste manufacture is the production and sale of finis ed fabrics. In 1947, the industry produced 464 503,000 pounds of broadwoven fabrics. This wa 814,753,000 square yards and 515,843,000 linea yards. Apparel fabrics made up 372,263,0 pounds, nonapparel fabrics 92.240,000 pounds an woven (papermakers) felts 7.061,000 pounds.[1 The proportion of woolen and worsted appare fabrics varies with style trends.

---

[112] _____, "Dalgety's Annual Wool Review for Australia and New Zealand, 1954-55," Dalgety and Co. Limited, 65/68 Leadenhall Street, London, page 54.

[113] Personal correspondence with the Galveston Office.

[114] Bulletin of the Wool Manufacturers, National Associa tion of Wool Manufacturers, 1954, pages 2-98.

[115] Ibid.

[116] Ibid., pages 2-114.

[117] Ibid.

[118] "Census of Manufacturers 1947," M C 22B, Woolen an Worsted Manufacturers, Bureau of Census, U. S. D partment of Commerce, 1949, page 4.

[119] Bulletin of the Wool Manufacturers, National Associa tion of Wool Manufacturers, 1954, pages 2-138.

Scoured wools are sold to other plants through wool dealers or direct. Wool tops may be sold direct to other mills or through dealers, but the bulk of the tops offered for sale are handled by topmakers. Most of these companies have no combing machinery; instead they buy raw wool, hire it combed, then market tops to worsted mills and dealers. There are no data on marketing costs for these concerns.

Yarns also may be sold direct to knit or fabric plants through trade journal advertisements. Sales may be made indirectly through agents. Although there are no marketing cost data on yarns, the cost of marketing through selling agents compared with value is probably similar to fabrics.

As a general rule, woolen and worsted fabrics are sold and then made since styling begins with the selection of fibers and continues through the yarn, weaving and finishing stages. Cotton, on the other hand, is styled mainly in the finishing stage, which means that cotton fabrics generally are made and then sold.

As a result of selling woolen and worsted fabrics before making them, cancellation of orders has long been a severe marketing problem in the industry. Hand-to-mouth buying and deferred ordering place additional burdens on the manufacturers. The 1954 weekly average by 75 firms of sales, cancellations, production and billings for woven cloths containing 25 percent or more wool follows: orders for 2,820,000 linear yards were accepted; 196,000 yards were canceled; 2,353,000 were finished; and 2,375,000 linear yards were invoiced. This means that of the volume ordered an average of 7 percent was canceled each week in 1954.[120]

Some woolen and worsted fabrics are sold by wholesalers or jobbers, but the bulk is handled by selling agents for a commission. The selling agents may operate independently, or the mill may own them, or they may own the mill. They occasionally sell goods produced by several different firms, but do not handle similar fabrics from more than one firm.

Marketing Costs

Selling expense varies according to type and value of the fabric. The average expense for certain fabrics in 1946 was: $0.024 for mens wear worsted shirting and suiting costing $2.514 per yard; $0.084 for mens wear woolen coating costing $1.98; $0.117 for womens worsted dress goods and suiting costing $1.914; and $0.070 for womens woolen dress goods and suiting costing $1.405 per yard.[121] The average selling expense, then, varied from about 1 to 6 percent for these goods in 1946. Selling expense in 1950 was about 7 percent for woolen covert and 6 percent for worsted twill.

The actual cost of selling fabrics from a mill in the Southeast and a mill in the New England States should be the same because selling agents handle goods produced in both areas, but the cost of transporting the goods to market at New York may differ.

The main market for fabrics is not the individual but the fabricator. In the case of apparel goods, it is the garment maker. This market is highly concentrated in the Middle Atlantic States since garment makers in other areas use mostly cotton fabrics.

New York is the garment-making center, and the bulk of the goods must be delivered there. Thus, southeastern mills have a competitive disadvantage in transportation charges. Shipping by truck costs 90 cents per 100 pounds less from Boston to New York than from Charlotte, North Carolina, to New York.[122] This is not a very big handicap. It amounts to only 1/10 of 1 percent of the product's value for fabrics weighing ½ pound per yard and valued at $4.51 per yard. The handicap becomes greater as a fabric decreases in value or increases in weight.

The market for knitting yarns also is highly concentrated. In 1947, there were 1,201 knit outerwear establishments in the Nation. Of these, 982 were in the Middle Atlantic States with 786 in New York alone.

Marketing from Texas Plants

Transportation to the main markets in the East would be costlier for woolen and worsted mills in Texas than for mills in Southeastern or Middle Atlantic States, but other marketing costs would be the same. Established selling agents could handle Texas mill products and serve as all-important stylists in advising on fabrics to make. A Texas mill producing competitively styled and priced goods could sell at any market. Styling in fabrics is important. The fabric manufacturers and garment designers are working constantly to create new styles, but volume sales are reported in only 15 to 25 percent of new designs in women's goods.[123]

Knitting firms and fabric-using firms, like many other U. S. industries, are undergoing some decentralization. The movement has been more rapid in recent years and probably results from a number of conditions. The rising cost of labor in the traditional garment-making areas and the increase in style centers, marketing shows, pop-

[120] Ibid., pages 2-144.

[121] Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, U. S. Department of Agriculture, Sept. 1952, pages 133 and 134.

[122] Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont," University of South Carolina Press, Columbia, S. C., 1952, page 145.

[123] Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, U. S. Department of Agriculture, Sept. 1952, page 222.

ulation and incomes in other areas are among the conditions causing decentralization.

The garment-making industry is growing rapidly in Texas. Apparel products employed 22,008 workers in 1947, but the number in 1953 was 29,439. Beginning as a work-clothing industry, it has expanded into a large style-goods industry that produces women's dresses, suits and coats, sportswear and other styled goods.[124]

Texas garment makers produced 10 percent of the Nation's dress and sports trousers in 1953. The Haggar Slack Company, with plants in Dallas and in four towns in other areas, is considered the largest mens dress-slack firm in the business. Large volumes of mens goods are cut in Mississippi, Tennessee, Missouri and on the Pacific Coast.

The womens goods fabricators are decentralizing too. The president of the Wool Bureau said in 1951 that the Pacific Coast was the second largest producer of womens suits and coats.[125] The Los Angeles, San Francisco and Hollywood areas are becoming important style centers, and Texas' famous Neiman-Marcus takes a back seat for none. Decentralization is likely to continue.

Another trend that deserves consideration is the increased home-sewing market. Prior to World War II, most piece goods were sold through department stores, but business is sufficient now to support fabric shops even in small towns. A number of conditions that probably have influenced this trend include scarcity of clothing during the war; improved sewing machines, equipment, techniques and patterns; school and club training for women and girls; new consumer goods, such as new homes, cars and television sets, which reduce the clothing budget; and labor-saving devices that give the housewife more time to sew.

Some 38 million women who sew spent 468 million dollars for 704 million yards of piece goods in 1953. The number of sewing machines sold in 1953 was estimated at 1.5 to 1.8 million.[126] The home-sewing business is likely to grow.

Transportation

Facilities

Other conditions probably equalize any difference in transportation facilities between the New England States and the Southeast. New England may have more facilities, but the Southeast has fewer interruptions by bad weather. Services are adequate in both areas.

Texas is the highest ranking state in tot miles of railroad; but because of the State's siz this mileage does not give rail coverage as com plete as that in other regions. A number of sma Texas towns have no rail facilities. The mo important railroad centers include Houston, S Antonio, Waco, Fort Worth, Dallas, Paris, Swee water, Lubbock, Amarillo and El Paso.

Highway systems and trucking facilities a probably of greater importance to mills in Texa than railroads. This State has one of the fine highway systems in the Nation, and since 19 has led the Nation in new construction each yea Practically every town is served with excelle paved roads. Some 2,761 motor trucking com panies operate in the State.

Texas has 13 deepwater ports. Houston, th leading port city, is served by 6 railway syste and some 17 or 18 divergent lines owned by the 6 companies. About 50 freight trains operate i and out of this city daily. Also, about 34 com mon carrier truck lines serve Houston. Deliver of imported wools to any part of the State woul not be a problem.

If mills in Texas were branch concerns o firms in the Northeast or Southeast, airline ser ice might be a consideration. In air transport tion, too, the State excels. Eleven major ai lines operate in Texas with service to most of th larger towns. There are very few days durin the year when weather prevents airline oper tion.[127]

Cost on Raw Materials

The amount that a plant in Texas could sav on transportation costs for Texas wools woul depend on its location. San Angelo is the larges concentration point for Texas wools and is nea the center of production. The all-rail, carlo rates from San Angelo to Boston for wool, in th grease, in bags are $2.74 per 100 pounds (24,00 pounds), $2.52 (30,000 pounds) and $2.39 (40,00 pounds). The rate to Charleston, South Carolin is $2.31 per hundredweight for 24,000-poun minimum carloads.[128]

Scoured wool in bales from San Angelo t Boston is $3.92 per hundredweight (24,00 pounds) and to Charleston, South Carolina, $2.9 (24,000 pounds).

Based on these costs, a plant located in Texa could save 2 to 3 cents per grease pound on Texa wool and mohair compared with a mill in th Northeast or Southeast that transports these ra materials by rail. This would amount to 4 to cents per clean pound. Some Texas wools ar scoured in Texas and shipped by truck to Boston

[124]Texas Almanac, 1956-57, Dallas Morning News, Dallas, Tex., page 365.

[125]Ackerman, F. E., "The West as a Wool Textile Center," The National Wool Grower, Feb. 1951.

[126]"The Development of the Home Sewing Market and a Look at Its Future," Simplicity Pattern Co., Inc., 200 Madison Ave., N. Y., Jan. 11, 1955.

[127]Hembree, Joel F., "Cotton Textiles: An Opportunity i Texas," Cotton Economic Research, University of Te as, Austin, Tex., 1954, page 30.

[128]Letter from Traffic Department, Panhandle and San Fe Railway Co., Amarillo, Tex., July 18, 1955.

TABLE 10. SELECTED RAIL CARLOAD FREIGHT COSTS ON GREASE WOOL IN BAGS

From	To		To		To	
	Dollars per 100 pounds					
San Angelo, Tex.	Boston, Mass.	$2.52 (30,000)	Charleston, S.C.	$2.31 (24,000)	San Angelo, Tex.	.....
Billings, Mont.	Boston, Mass.	2.41 (40,000)	Charleston, S.C.	2.38 (40,000)	San Angelo, Tex.	$4.49 (24,000)
Boise, Idaho	Boston, Mass.	2.71 (30,000)	Charleston, S.C.	2.71 (30,000)	San Angelo, Tex.	2.87 (24,000)
Casper, Wyo.	Boston, Mass.	2.33 (30,000)	Charleston, S.C.	2.89 (24,000)	San Angelo, Tex.	2.01 (24,000)
Denver, Colo.	Boston, Mass.	2.14 (40,000)	Charleston, S.C.	2.47 (40,000)	San Angelo, Tex.	1.62 (24,000)
Rapid City, S. Dak.	Boston, Mass.	2.01 (40,000)	Charleston, S.C.	2.81 (24,000)	San Angelo, Tex.	2.09 (24,000)
Salt Lake City, Utah	Boston, Mass.	2.67 (30,000)	Charleston, S.C.	2.17 (30,000)	San Angelo, Tex.	2.87 (24,000)
Los Angeles, Calif.	Boston, Mass.	6.21 (24,000)	Charleston, S.C.	6.08 (30,000)	San Angelo, Tex.	4.20 (24,000)
Roswell, N. Mex.	Boston, Mass.	2.56 (30,000)	Charleston, S.C.	2.50 (24,000)	San Angelo, Tex.	0.98 (24,000)
	Rail: Scoured wool in bales, tops and noils, carload					
San Angelo, Tex.	Boston, Mass.	3.92 (34,000)	Charleston, S.C.	2.94 (24,000)	San Angelo, Tex.	.....
San Angelo, Tex.	Boston, Mass.	4.76 (10,000)	Charleston, S.C.	3.57 (10,000)	San Angelo, Tex.	.....
Boston, Mass.	Boston, Mass.	.....	Charleston, S.C.	2.38 (24,000)	San Angelo, Tex.	3.92 (24,000)
Boston, Mass.	Boston, Mass.	.....	Charleston, S.C.	2.89 (10,000)	San Angelo, Tex.	4.76 (10,000)

for 3 cents and to Charleston for 2 cents per pound. Compared with a southeastern mill that transports scoured Texas wool by truck, a Texas mill would save about 2 cents per clean pound.

A Texas mill also could save on transportation for domestic raw wools from some other states. The normally economical routes to Boston for wools in the Western States, according to the breaking points on freight rates, are: Texas, New Mexico and most Arizona wool through the Gulf ports of Houston and Galveston, Texas; Utah, Colorado and Wyoming wool through Chicago, Illinois, and Milwaukee, Wisconsin; the bulk of Montana wool through Duluth, Minnesota; Washington, Oregon and some Montana and Idaho wool through Portland, Oregon; Nevada and some Idaho and California wool through San Francisco, California; and some California and Arizona wool through Los Angeles, California.[129] Some selected freight costs are shown in Table 10. These figures indicate that plants in Texas could save in transporting wool from some of the other states, but they would have a slight disadvantage in obtaining wool from the northeastern part of the wool-producing area.

The State would be at a disadvantage in obtaining fleece-type wools from some areas, but would have a slight advantage in obtaining these wools from other areas, especially if they were hauled by truck.

Freight costs on domestic noils would be higher for Texas plants. The all-rail carload rate to San Angelo from Boston for wool noils and scoured wool in bales is $3.92 (24,000 pounds) per 100 pounds. From Boston to Charleston, the rate is $2.38 (24,000 pounds).[130] Thus, a plant at San Angelo would have to pay $1.54 more per 100 pounds to get noils from Boston than would a plant at Charleston.

Plants in the State would have a small freight advantage on Denver pulled wools, but would have slightly higher costs on pulled wools from Chicago.

Transportation costs on cotton would be about equal for woolen mills in Texas and the Southeast since both areas produce good quantities.

Most of the synthetic fibers are manufactured in the Southeast. Some of these fibers are priced delivered anywhere east of the Mississippi River. Texas plants would have a competitive disadvantage equal to the freight charge from the Mississippi River crossing to the mill.[131] Other fibers are priced at the plant, and the customer pays the freight. For example, the truckload rate for nylon from Du Pont's Seaford, Delaware, plant (equalized at Enka, North Carolina) is $1.71 to Houston, $1.02 to Boston and 80 cents to Charleston. For orlon from Lugoff, South Carolina, the costs are $1.78 to Houston, $1.57 to Boston and 60 cents to Charleston. For dacron from Graingers, North Carolina, the costs are $1.93 to Houston, $1.33 to Boston and 86 cents to Charleston.

Cost of landing imported wools at Texas ports is important. About 93 separate steamship lines operate in and out of Houston.[132] Imported wools can be landed at Houston at exactly the same cost as at Boston and Charleston, although there may be a few minor exceptions. Freight costs from major foreign ports are:

1. From Buenos Aires, Argentina, and Montevideo, Uruguay, to Atlantic and Gulf ports: (a) wool in the grease, in bales (measuring not more than 50 cubic feet per ton) contract rate—2½ cents per pound; (b) scoured wool in bales (measuring not more than 120 cubic feet per 2,240 pounds) contract rate — 3 cents per pound; (c) wool noils—$66 per 2,240 pounds; (d) wool tops —$81.51 per 2,240 pounds.

2. From Cape Town, South Africa, to Gulf ports the raw wool rate is $73.25 per 2,240 pounds.

[129] Hodde, Walter L., "Sales Method Problems of Wool Cooperatives," Service Report No. 6, Farmers Cooperative Service, USDA, June 1954.

[130] Letter from Traffic Department, Panhandle and Santa Fe Railway Co., Amarillo, Tex., July 18, 1955.

[131] Letters from leading synthetic fiber manufacturers.

[132] "Houston," Industry Data Booklet for 1954, Houston Chamber of Commerce, Houston, Tex.

This rate was quoted by a firm that does not serve Boston and Charleston. A firm that serves Atlantic ports, but has no service to Houston, quotes shipping rates to Boston and Charleston of $66.50 per 2,240 pounds on grease wools; $89.00 per 2,240 pounds on noils and scoured wools; and $111.50 per 2,240 pounds on tops.

3. The rate from Australia to Boston, Charleston or Houston is $4.651 per 100 pounds on baled grease wool. A firm that serves only the West Coast quoted $4.651 per 100 pounds on grease wool in bales in any quantity from Australia to San Angelo, Texas; and $4.89 per 100 pounds on New Zealand wools in less than carload lots, or $3.79 per 100 pounds in carload lots (minimum weight 40,000 pounds). The minimum bill of lading charge is $11.50. The costs include trans-shipment by rail to San Angelo and probably would be the same for any point in Texas.

Some of these rates on imported wools include free transportation on the lowest carload basis from the port of discharge to inland points. The free transportation probably extends only to the Mississippi River; so costs on free inland shipments in Texas could not exceed the cost of shipping wool from other ports of discharge to the Missssippi. This would appear to offer no competitive disadvantage to Texas.

In general, obtaining foreign wools involves neither an advantage nor disadvantage for Texas as a location for wool-processing plants. Transporting foreign wools to domestic mills is cheaper than transporting domestic wool from many of the Western States.

Mills in Texas might want to obtain imported wool or specialty fiber from Boston whenever they need small, unforeseen quantities quickly. The rate on grease wool in bales from Boston to San Angelo is $3.08 per 100 pounds (24,000 minimum carload pounds) and to Charleston the rate is $1.87 (24,000 pounds). The rate on scoured wool in bales is $3.92 per 100 pounds (24,000 pounds) from Boston to San Angelo and $2.38 (24,000 pounds) to Charleston. Texas would have 1 to 1½ cents per pound disadvantage on wool shipped in the grease from Boston and about 1½ cents per clean pound disadvantage on scoured wool.

Since U. S. mills use chiefly domestic wools, transportation costs on U. S. wools are the most significant. These costs indicate that mills in Texas can save on transportation for most domestic wools. The savings would be 4 to 6 cents per clean pound on Texas wool shipped in the grease and about 2 cents per grease pound on mohair. Other domestic wools needed for blending can be shipped from most states either at a small saving or at costs equal to those for mills in the Northeast and Southeast. To take advantage of the savings, however, Texas mills would have to buy the wool in the West. Since the bulk of the clip is sold by growers and mov to Boston during some years, a Texas mill wou have to purchase virtually its whole year's su ply during the few months that wool is availab in the producing area. This would require large operating capital. If the wool moved Boston and had to be shipped back, it would a about 3 cents per grease pound to the cost these wools for a Texas plant, compared wi New England, or about 1½ cents compared wi the Southeast.

Costs to Market

Transportation costs are a small part of t total cost of wool textiles. Past differentials freight rates have largely been equalized. T New England area, because of its location, has slight advantage in freight costs to market the present time.

The cost of shipping finished fabrics from mill in New England, the Southeast and Tex to selected markets is shown in Table 11. Ne York is the largest market for finished wool and worsted fabrics. To New York, Texas plan would have 2 to 3 cents per pound of product ad ed freight on fabric compared with New Englan mills and 1 to 2 cents compared with the Sout east. This is not a significant differential b cause of the high value of the product.

The fabricators of textile mill products a decentralizing and the industry is growing in t South and West. Mills in Texas have a freig advantage to most areas west of the Mississip River compared with the Southeast. To Los An geles, the advantage is roughly 2 cents per pou Almost a third of the U. S. population lives Texas' primary market area, and population an incomes in the area are increasing faster tha the U. S. average. Texas' geographical locati should become increasingly advantageous as the trends continue.

TABLE 11. SELECTED FREIGHT RATES ON FINISHED CLO IN ROLLS IN LESS THAN CARLOAD LOTS, DOLLARS P 100 POUNDS[1]

To	From Dallas, Tex.		From Chicopee Falls, Mass.	From Spartan burg, S.C.
	Rail	Truck	Rail	Rail
Chicago, Ill.	$2.05	$1.78	$1.81	$1.84
Minneapolis, Minn.	2.44	2.61	2.92	2.65
Cincinnati, Ohio	2.05	1.87	1.75	1.44
Louisville, Ky.	2.05	1.89	1.86	1.44
Memphis, Tenn.	1.55	1.54	2.76	1.62
New Orleans, La.	1.61	1.58	2.98	1.73
Des Moines, Iowa	2.13	2.28	2.83	2.52
St. Louis, Mo.	1.73	1.52	2.06	1.84
New York, N. Y.	3.46	3.21	0.98	1.82
Philadelphia, Pa.	3.38	3.12	1.14	1.73
Los Angeles, Calif.	2.96	2.96	5.72	4.89
Seattle, Wash.	4.46	4.29	5.72	5.61

[1]Source: Hembree, Joel F., "Cotton Textiles: An Opportun in Texas," Cotton Economic Research, Univ. of Texas, 19 pages 31-36. Correspondence with a number of curriers.

Texas mills producing woolen and worsted fabrics should be able to market half their products in the Texas primary market area. This would largely offset the disadvantage in marketing the other half in the New York area.

Water

The wool textile industry needs huge quantities of water. It is used in scouring the grease wool, backwashing during processing and in dyeing and finishing. The volume of water required varies with the mill and its products, but average figures are 1 to 3 gallons of water per grease pound of wool for scouring and 50 to 70 gallons of water per pound of clean wool in the other operations.[133]

The quality of the water must be good. Excess foreign matter, silt and minerals must be removed before the water is suitable for any stage of processing. Foreign matter and silt may discolor the fibers; and minerals, such as calcium and magnesium carbonates and bicarbonates, form insoluble compounds with soap that cause difficulties all through processing, but are most objectional in dyeing. Water that contains more than 75 parts per million total hardness must be softened before it is used.[134] Zero hardness is best and is preferred for use with chrome dyes.

Iron in the water is especially harmful to many wool colors. The iron must be removed from water containing more than 1 part per million of iron.[135] Once the foreign matter is removed, water can be treated satisfactorily with soda lime and ion exchangers, such as zeolites.[136]

Water is not a major cost item. Even if it cost 30 cents per 1,000 gallons, the cost would be only $18 to $20 per 1,000 pounds of product manufactured, which is about 2 cents per pound, or less than 1 cent per yard for fabrics weighing 8 ounces to the yard.

Adequate supplies of water of comparable quality seem to be available both in the New England and Southeastern States, but local shortages have existed in both areas. The advantage, if any, probably rests with New England.

Water is fast becoming the number one problem of the Nation.[137] With rising populations, rising living levels, increased industrialization and more irrigation, water usage also is rising rapidly. A closely related problem is water for waste disposal. The supply for this purpose is seriously low in some of the highly populated and industrialized areas.

Water may be a possible limitation to large-scale wool and mohair processing in Texas. The water supplies of some towns and areas are inadequate for current needs, but Texas is a big state with widely varying rainfall, water supplies and potentials. State and community governments and people over the State recognize the problem. The 1955 Texas Legislature passed 69 bills relating to water.

In the early part of 1955, about 511 lakes and reservoirs in Texas had a capacity of over 100 acre-feet. Total capacity of these lakes was 35,841,065 acre-feet. The State Board of Water Engineers estimates that the State receives 362 million acre-feet per year in rainfall of which about 53 million acre-feet run off into other states or into the Gulf of Mexico.

Although Texas has huge underground supplies, they are being depleted by greatly increased use, especially irrigation, during the current long period of less-than-average rainfall in much of the State. The total consumption of water in the State in 1953 for other than irrigation was 4,322,896 acre-feet; another 4½ to 6 million acre-feet were used for irrigation.[138] About 85 percent of Texas runoff water reaches the Gulf.

Space is reserved in certain Texas lakes for flood control, fish and recreation, while other space is prorated for municipal and domestic, industrial and irrigation uses.

By Legislative enactment, the order of water priority in Texas is: domestic and municipal use, industrial uses, irrigation, mining, hydroelectric power, navigation and recreation and pleasure. Legislative rulings may not control the water supply fully, however, because of riparian rights, prior appropriation rights and the ability to pay.[139]

New dams are being built and planned each year. Many are federally financed in part, and towns and cities are interested in doing a greater part themselves.

Some cities and towns have plant capacities and water far exceeding their needs; industries are coming into the State with higher water requirements than wool textiles. Projects already approved by Congress will add 12 million more feet of storage. One lake slated to begin in 1957 (McGee Bend) will hold over 4 million acre-feet of water — something like 1¼ trillion gallons. No data are available on water costs in other areas of the United States, but even a wide dif-

[133]Calise, V. J., "Water Quality Essential to Textile Processes," Textile World, Vol. 98, No. 7, July 1948, page 101, and personal interviews with mill managers.

[134]Von Bergen, Werner, and Herbert R. Mauersberger, "American Wool Handbook," Second Edition, Textile Book Publishers, Inc., New York, 1948, pages 406, 728.

[135]Matthews, J. Merritt, "Bleaching and Related Processes," The Chemical Catalog Co., Inc., One Madison Ave., New York, 1921, page 49.

[136]Von Bergen, Werner, and Herbert R. Mauersberger, "American Wool Handbook," Textile Book Publishers, Inc., New York, 1948, page 407.

[137]"U. S. Running Short of Water," U. S. News and World Report, July 8, 1954.

[138]Texas Almanac, 1956-57, Dallas Morning News, Dallas, Tex., page 201.

[139]Caldwell, Phillip E., "River Development in Texas," Monthly Business Review, Federal Reserve Bank of Dallas, Dallas, Tex., June 1, 1954.

ferential would have little overall effect on comparative manufacturing costs.

To produce 5 million pounds of wool textiles a plant would require approximately 350 million gallons of water, or about 25 to 30 million gallons per month. In one of Texas' largest industrial cities, this amount of water would cost 9 cents per 1,000 gallons inside the city and 14 cents outside the city limits. In another of the State's industrial cities, the cost would be 12 cents per 1,000 gallons inside the city and 1½ times this amount outside the city.

The quality of Texas water ranges from good to very poor. Some water would be satisfactory without softening. Although softening would be necessary in other areas, it would add little to total processing cost. With zeolite, 1,000 gallons of water containing 10 grains per gallon would require about 5 pounds of rock salt for regeneration.[140] The cost of salt varies with the location; but even at $1 per 100 pounds, softening would cost only 5 cents per 1,000 gallons, plus a little extra labor. The initial cost of the water-softening plant would not be a large investment. A plant that can handle 100,000 gallons per day costs about $5,000.[141]

A new water purification process developed by the Texas A&M College System may help reduce Texas water cost. This plant for settling out foreign matter uses exhaust gases, and one untrained operator can run it. It can save cities 70 to 80 thousand dollars on labor costs alone.

Power and Fuel

Costs in the North and South

Power and fuel are two of the more expensive requirements of the industry. In 1939, fuel cost all plants 1.3 percent of the value of the products, and purchased electric energy cost .6 percent. In 1947, the ratios were 1.0 and .5 percent.[142] The combined cost of fuel and power in 1947 was 1.25 percent of the value of products shipped by scouring and combing plants, 1.34 for yarn mills, 1.52 for woolen and worsted fabric mills and 6.48 percent for finishing plants.[143] The cost of power and fuel for all plants in 1947 was 3.2 percent of the gross margins. In other words, about 3.2 percent of all costs plus profit was paid for purchased electricity and fuel.

The major fuels consumed in woolen and worsted textiles are bituminous coal, fuel oil and natural gas; but small volumes of anthracite coal and manufactured gas are used. Plants in t Piedmont area of the Southeast use coal almo exclusively, while more fuel oil than coal is us in the New England States.[144] Each plant us the cheapest fuel possible, and the price is dete mined largely by transportation. Natural ga which is cheaper, will be used more extensive when new trunk lines make it available.[145]

Fuel costs are lower in the Southeast th in the New England States mainly because t price is lower and partially because less fuel required.

One wool-plant official whose firm has plan in both regions believed that a 100-loom plant the Piedmont area would save $50,000 per ye by using coal.[146] The new, one-story buildings a easier to heat than older, multi-story building and less heat is required in the South because a milder climate.

A Boston Federal Reserve Bank survey sho that fuel disadvantage alone explained about tw thirds of the difference in power costs betwe New England and the South.[147] The purchas power cost to textiles in New England in 19 was 48 percent above the U. S. average, but many individual cases the difference was as hig as 100 percent.[148] Labor caused part of the di ference in costs. According to the Federal Pow Commission, 31 employees are required to ge erate 100 million kilowatt-hours in New Englan while the national average is only 22 employee Part is explained by the cost difference in stea generated power and water power. In Sou Carolina, 80 percent of the power is hydroele tric, which costs about 13 cents per kilowat hour to generate. Only 25 percent is hydroele tric in New England, where it costs 68 cents p kilowatt-hour to generate power with steam.[14

In 1947, woolen and worsted plants in Ma sachusetts paid $1.41 per kilowatt-hour, Rhode I land $1.66, North Carolina 93 cents, South Car lina 82 cents and Georgia 77 cents. Where pow costs are high and a plant uses considerab amounts of steam in processing, the plant ma generate its own electricity. In 1947, Massach setts mills generated 50.4 percent of their pow needs, Virginia 20.5 percent and North Caroli 37.6 percent, but South Carolina and Georg mills generated none.

Costs in Texas

Although costs of power and fuel vary amo states, comparisons can be misleading since the

[140]Personal letter from Elgin Refinite, Elgin, Ill., June 21, 1955.
[141]Personal interview.
[142]Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, U. S. Department of Agriculture, Sept. 1952, page 130.
[143]Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont," University of South Carolina Press, Columbia, S. C., 1952, page 135.
[144]Ibid., page 136.
[145]Ibid., pages 136 and 138.
[146]Von Bergen, Werner and Herbert R. Mauersberg "American Wool Handbook," Second Edition, Text Book Publishers, Inc., New York, 1948, pages 406 a 728.
[147]"Report on the New England Textile Industry," Co mittee appointed by the Conference of New Engla Governors, 1952, page 259.
[148]Ibid., page 258.
[149]Ibid., page 260.

are likely to be high and low-cost cities in every state. Even so, Texas seems to have an advantage in power and fuel costs over New England; and some cities in Texas may have an advantage over some cities in the Southeast.

An adequate and dependable supply of electricity serves all counties in Texas. Most of this power is generated by steam, but several hydroelectric plants also operate in the State.

Electricity is more expensive in some Texas cities than in some southeastern cities, but it is cheaper in others. Houston, Galveston, San Antonio and Dallas, for example, have lower industrial rates than any of the southeastern cities listed in the Federal Power Commission Report except for those in Tennessee, and most of the new wool plants have gone into states other than Tennessee, Table 12.

Texas is the source of much of the natural gas shipped to other states. On December 31, 1953, Texas had over half of the recoverable known reserves of the Nation's natural gas and over half of the estimated recoverable reserves of crude oil.[150] The average wellhead price of natural gas in Texas in 1953 was 6.2 cents per million cubic feet.[151] Crude oil and natural gas give Texas a cheaper fuel than any other state.

TABLE 12. TYPICAL NET MONTHLY ELECTRIC BILLS FOR INDUSTRIAL SERVICE IN CITIES OF 50,000 OR MORE POPULATION, JANUARY 1, 1955[1]

Selected states and cities	500 kw.-hr. demand		1,000 kw.-hr. demand	
	100,000 kw.-hr.	200,000 kw.-hr.	200,000 kw.-hr.	400,000 kw.-hr.
Massachusetts				
Boston				
Highest rates	$2,103	$3,066	$3,841	$5,769
Lowest rates	1,765	3,597	3,453	4,981
Lawerence	1,942	3,023	3,816	5,977
Rhode Island				
Pawtucket	2,011	3,112	3,523	3,600
North Carolina				
Charlotte	1,340	2,060	2,480	3,600
Raleigh	1,434	2,282	2,864	4,414
South Carolina				
Greenville	1,340	2,060	2,480	3,600
Charleston	1,584	2,241	2,824	4,139
Virginia				
Norfolk	1,693	2,388	3,203	4,592
Georgia				
Atlanta	1,524	2,294	2,823	4,023
Texas				
Amarillo	1,679	2,519	3,358	5,038
Austin	1,558	2,338	3,055	4,615
Dallas	1,524	1,975	2,678	3,581
Houston	1,251	1,939	2,502	3,462
San Antonio	1,200	1,783	2,283	3,449
Galveston	1,359	1,939	2,502	3,462

[1]Source: Typical Electric Bills 1955, Cities of 50,000 population and more 1-pc R-50, Federal Power Commission.

[150]"Gas Facts—A Statistical Record of the Gas Utility Industry in 1953," American Gas Association, 420 Lexington Ave., New York 17, N. Y., pages 3 and 20.
[151]Ibid., page 31.

A plant in Texas might save 50 percent of fuel costs over the Nation's average. Texas natural gas varies from 1,000 to 1,100 British thermal units average heat value per cubic foot. Coal ranges from 12,000 to 15,000 B.T.U.'s per pound. Therefore, about 13 cubic feet of natural gas would be required to supply the same heat as a pound of coal. According to the rates of a leading gas company, a plant using 10 million cubic feet per month for 10 months and 15 million for 2 months would have a $23,190 fuel bill, Table 13. The plant using coal would have a $50,000 heating bill if its coal cost $10 per ton. Little or no labor is involved in burning natural gas; coal burning requires some labor.

If a plant found all the requirements it needed at a Texas location except cheap power, it might be feasible for the plant to generate its own power. For fuel, gas could be purchased at 15 to 16 cents per thousand cubic foot (1 million B.T.U.'s). This would be especially true if the plant had heavy requirements for both fuel and power.

A greater part of the textile and apparel industry is using gas as it becomes available or as the plants can be changed to gas. In 1950, these industries used 31.2 million therms of gas, 54.9 million therms in 1951, 106.4 million therms in 1952 and 129.8 million therms in 1953.[152]

Normally there should be no shortages of natural gas or petroleum. According to the Bureau of Mines, petroleum reserves and productive capacity are adequate to meet demands for many years to come.[153]

Texas also has coal. On January 1, 1953, the State had 30.9 billion short tons of estimated reserves of coal and lignite.[154]

Taxes

In New England and the South

Taxes are an important cost to the woolen and worsted industry, although they probably re-

TABLE 13. SCHEDULE OF INDUSTRIAL RATES—4-C FOR LONE STAR GAS COMPANY[1]

Item	Rate per 1,000 cubic feet per month	
First	1,000 MCF or less per mo.—	$225.00
Next	4,000 MCF per mo.—20.00¢ gross,	18¢ net per MCF
Next	5,000 MCF per mo.—18.89¢ gross,	17¢ net per MCF
Next	10,000 MCF per mo.—18.33¢ gross,	16½¢ net per MCF
Next	15,000 MCF per mo.—17.78¢ gross,	16¢ net per MCF
Next	15,000 MCF per mo.—17.22¢ gross,	15½¢ net per MCF
All over	50,000 MCF per mo.—16.67¢ gross,	15¢ net per MCF

[1]Based on delivery of 1,000 B.t.u.'s. per cubic foot. Cost adjusted up or down by percent. The average heating value varies from 1,000 B.t.u.'s. per cubic foot.

[152]Ibid., page 166.
[153]The Wall Street Journal, Aug. 29, 1955.
[154]"Gas Facts—A Statistical Record of the Gas Utility Industry in 1953," American Gas Association, 420 Lexington Ave., New York 17, N. Y., page 23.

ceive greater emphasis than their portion of total costs justifies. Taxes, profits, rent, insurance, interest and depreciation in 1947 accounted for 18.8 percent of the total value of products shipped by all plants.[155]

One survey indicates that taxes accounted for 3.2 percent of production costs.[156] A Federal Trade Commission study of 22 woolen and worsted companies in 1939 shows that all taxes, except income and social security payments, were .97 percent of all costs and about 2 percent of manufacturing costs.[157] Another Federal Trade Commission study of 44 woolen and worsted plants indicates that all taxes and social security costs represented 2 percent of sales in 1939 and 1.6 percent in 1940.

In 1948, an average of 75 percent of the taxes collected were federal, 13 percent state and 12 percent local.[158] The proportions would differ from these averages in some states and localities, but federal taxes form the bulk of tax costs and are the same in all locations. State and local taxes account for the tax differential among states, areas and cities. A number of the local taxes are property taxes. They are assessed regardless of whether the firm shows a profit; and in case of loss, they increase in relative importance.

The proportion of state and local taxes to per capita income 1 year was 7.3 percent in Massachusetts, 6.8 percent for four New England industrial states and 6.1 percent for 10 leading industrial states. The ratio for three major southern textile states was 6.7 percent.[159] About 33 states have corporate income taxes, and only Oregon has higher rates than Massachusetts.[160] The rates for some selected states in 1949 were: Massachusetts 6.215 percent, Rhode Island 4.0 percent, Virginia 5.0 percent, North Carolina 6.0 percent, South Carolina 4.5 percent and Georgia 5.5 percent.[161] Different tax practices may result in widely different actual tax costs.

Local taxes are even more difficult to compare on a state or regional basis because rates and assessment values vary so greatly. A city with a high rate may have low valuation schedules, while in another the reverse would be true. The size of cities also affects tax costs. Sm cities generally provide fewer services, and many cases the services supplied are cheap Most of the plants built in the Southeast ha been located in or near the smaller towns. So areas depend heavily on general property tax Property taxes in 1939 accounted for 59.1 to 6 percent of all state and local revenues in N England, but only 52.5 percent average for t Nation.[162]

All states in the Piedmont area except Nor Carolina provide temporary tax exemption f new manufacturing plants and equipment. Many New England States now have similar pra tices to attract new industries.[164]

Taxes on woolen and worsted manufacturi plants in the Southeast are lower than in the N England States. The savings, however, are n a large item and alone would not cause regio shifts. They may be large enough to influen location in a particular state or town when se eral are otherwise equal. If taxes represent 3 percent of total production costs and there is tax differential of 30 percent,[165] then a pla could save almost 1 cent for every dollar of pr duction cost in the Southeast as compared wi New England.

As the Southeast develops its economy a as tax-exempt plants start paying their sha tax rates seem certain to increase faster th those in the older areas. This will narrow t tax differential.

In Texas

Taxes in Texas are comparatively low co sidering the State's progress and development.

Probably the three most important questio concerning the State's taxes are the amount taxes collected per capita, the amount of per ca ita net long-term debt and how these figures co pare with leading southern textile states. Fi ure 15 shows that Texans pay less taxes and o less per capita than people in any other state e cept Virginia. The average state tax collected p capita was $70.42 compared with $56.68 in Te as, and the average net long-term debt was $50. compared with $12.94 in Texas.

Texas has no state individual income tax, n general sales or gross receipts tax and no corp ration net income taxes. Most of the Souther States where wool textiles are locating have the taxes.[166] Texas has no manufacturers' use ta or payroll taxes, but it does have an ad valore tax on real and personal property. During th

[155]Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 1062, Bureau of Agricultural Economics, U. S. Department of Agriculture, Sept. 1952, page 130.
[156]"Report on the New England Textile Industry," Committee Appointed by the Conference of New England Governors, 1952, page 237.
[157]Ibid., page 239.
[158]Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont," University of South Carolina Press, Columbia, S. C., 1952, page 123.
[159]"Report on the New England Textile Industry," Committee appointed by the Conference of New England Governors, 1952, page 237.
[160]Ibid., page 241.
[161]Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont," University of South Carolina Press, Columbia, S. C., 1952, page 124.
[162]Ibid., page 125.
[163]Ibid., page 125.
[164]"Report on the New England Textile Industry," Committee appointed by the Conference of New Engla Governors, 1952, pages 312-315.
[165]Ibid., page 57.
[166]"Summary of State Government Finances in 195 April 19, 1955, U. S. Bureau of the Census.

fiscal year 1952, the ad valorem tax collected on this property was only 5.5 percent of total revenue of the State Government. A homestead law exempts homes up to $3,000 valuation.[167]

Corporations chartered or doing business in the State pay a franchise tax. The State has a gasoline tax and motor vehicle license tax.

When Texas joined the Union, it reserved its public lands and revenue from these lands to reduce the State's taxes. Some of the lands are rich in oil, and the State income from these sources is large.

The State Constitution as amended prohibits issuing bonds unless the people approve in a statewide vote.[168]

The low per capita tax rate and small indebtedness are favorable to industries located in Texas. A new industry is not faced with paying off heavy State debts created by others. The laws regulating union activity in the State may indicate a favorable attitude toward industry on the state level.

The only way local taxes in Texas cities and towns can be compared accurately with those in another state is on a town-by-town basis. Since many states and towns in the Southeast have granted tax exemptions to industry and Texas has not, local tax costs are favorable to new industries in the Southeast. However, some companies have not sought or accepted tax considerations in that area because they did not think it fair to tax older industries more heavily to make concessions possible. They also feared that local industries might feel it their right to help manage the new industry and that their tax load might be heavy when the exemption ran out.

There is no program in Texas for waiving taxes or other inducements. No community is permitted, by law, to use either tax or revenue bonds for constructing buildings to rent to industry.[169]

Texans, generally, realize the value of new industry to their cities and local communities. They are anxious to help any prospective new industry. Many towns have industrial foundations, commissions and chamber of commerce committees to help. In some cases, they are prepared to assist in all phases of location problems. These citizens will be fair about local tax rates and valuations. There are no reasons to believe that local taxes in Texas would not be comparable with local taxes in similar-size towns in the other Southern States.

[167] Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas," Cotton Economic Research, University of Texas, Austin, Tex., 1954, page 132.

[168] Ibid., page 132.

[169] "Subsidies for New Industries Described by Leaders from North and South," Industrial Development, Vol. II, No. 1, Jan. - Feb. 1955.

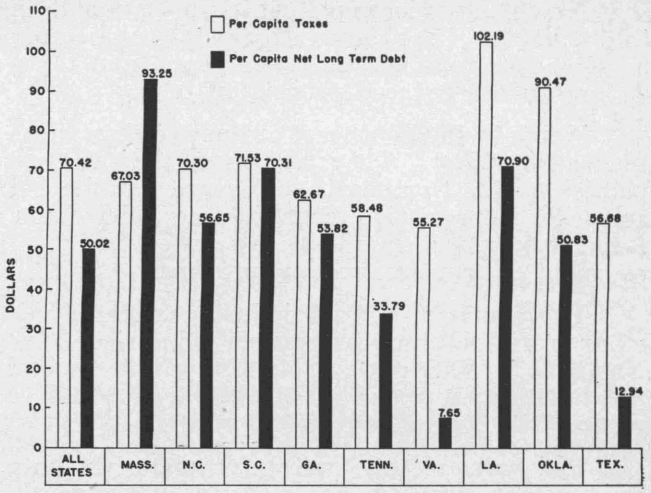

Figure 15. Per capita taxes and net long-term debt, selected states, 1954. Source: "Summary of State Government Finances in 1954," Bureau of the Census, 1955.

Capital

Capital requirements of the wool textile industry are high because the buildings and modern machinery run into millions of dollars for a good-size plant. Large amounts of money also are required for operating capital to buy raw wool stocks and goods in the processing stages, storage or transit.

It is important that the owners of capital be familiar with the problems of the wool-textile industry, such as the long delays between purchase of foreign raw wool and its delivery, the time required from start of processing to sale of finished fabrics, the risks involved and the possibilities for profit.

Capital was developed along with industry in the Northeastern States. Capital management there is thoroughly familiar with the problems of the wool-textile industry.

Before the war, depreciation and obsolescence accounted for 2.29 percent of total costs for 22 woolen and worsted firms. In 1940, 44 woolen and worsted firms allotted 1.55 percent of production costs and expenses to depreciation and obsolescence and 2.16 percent for maintenance and repairs. A textile workers' union survey shows that in 1949 depreciation was 1.5 percent of sales and 23.1 percent of profits, but in 1950 it was 1.4 percent of sales and 13.9 percent of profits for 121 companies studied.[170]

Depreciation allowance averages about 2 percent of all costs. This amount is set aside before figuring profits, taxes and dividends, but is not necessarily spent. In the past, depreciation allowances in a woolen industry were based on a long, useful life. The recent, faster depreciation

[170] "Report on the New England Textile Industry," Committee appointed by the Conference of New England Governors, 1952, page 265.

schedules have encouraged capital investments in the industry. Cash outlays for plants and equipment can be regained in fewer years, and taxes on profits are reduced proportionately.

Plants in the Southeast are newer than those in the Northeast. They cost more than the old plants in the Northeast, and more can be set aside for depreciation than on the older mills. Because southeastern plants are newer, less must be spent on repairs and maintenance.

The southern textile industry generally is more profitable than comparable industries in the Northeast. Therefore, it is likely that capital for building southern mills should be obtained more easily than for northern plants.

The bulk of the capital for plants in both areas comes from the North. Most of the southern plants are either branch plants of companies in the North, or were established by northern companies; therefore, the northern capital followed the southern movement. The greater profit opportunities in the Southeast also encouraged northern textile capital to move south.

Some of the wool textile plants were financed with southern capital, and southern cities furnished some of the new plants moving into the Southeast with a site and building.

Capital for Texas plants is a much more difficult problem. Lack of capital is probably the main reason that plants have not yet been established in the State. Many individuals and towns have shown a great deal of interest in having plants in the State; but, with a few exceptions, none has been interested enough to invest money in such a venture. This may be explained partially by the fact that some plants appeared to be only money-making schemes, economically unsound or to lack skilled management. However, the main reason that local capital is difficult to obtain is that people do not know enough about the wool-textile industry. Some owners of capital may fear investing money in a firm that could be crippled, almost overnight, by labor troubles. They prefer to invest their money in real estate, land, livestock or other businesses with which they are more familiar.

For these reasons, it appears that major development of a wool-textile industry, or even one good-size mill, must depend on outside capital. It will be necessary for a big company with adequate financing to establish a branch plant in the State, or for a well-financed firm to move into the State.

Local interests might invest money in stock if a well-known firm sought to establish a modern branch plant in the State. Some of the industrial foundations or chamber of commerce committees might help finance a building for an established company.

Although there are adequate lending agencies in the State, their management is not familiar with the wool-textile industry; and might be more difficult to obtain high-risk operating capital in this State than in the Northeast. At the same time, some of the lending agencies undoubtedly have had experience with cotton textile plants and apparel manufacturers in the State. Banks along the Gulf Coast are experienced in foreign trade.

Management

Progressive management is probably the key to a company's success in the woolen and worsted textile industry. It is partially responsible for some mills making money during periods when most are operating at a loss. There are no data to show how much management costs a plant or what salary a good mill manager receives, but some idea of the cost of management is contained in Bureau of the Census data.

In 1947, salaries, as distinguished from wages, cost the U. S. woolen and worsted fabric plants $44,966,000 to produce $1,369,239,000 worth of products. Management, then, cost 3.3 percent of the value of the products. Gross margins, which include all costs plus profits less the costs of materials and supplies, amounted to $669,692,000.[171] The average cost, then, for salaried employees of woolen and worsted fabric plants was a little over 6.7 percent of manufacturers' gross margins. Salaried employees include company officials, plant managers, production managers, engineers, research workers, bookkeepers, typists and others.

Management has been charged with doing a poor job in both the North and South. Some say that tariffs have protected inefficient management in the whole industry. Others think that northern management should have modernized more and have avoided the influence of labor on management. Some say that southern management has not had to be very progressive because of the area's economic advantages, especially the cost, supply and lack of unionization of southern labor.

A study on mergers in the textile industry points out that details of management, such as more efficient production and marketing research, better selling and better financing, were some of the reasons for mergers.

Although much of the management personnel in southeastern plants came originally from the Northeast, southern management seems to be doing a good job in worker relations, morale and recreation and in community development and leadership.[172]

---

[171] Howell, L. D., "Marketing and Manufacturing Services and Margins for Textiles," Technical Bulletin No. 106, Bureau of Agricultural Economics. U. S. Department of Agriculture, Sept. 1952, page 130.

[172] "A Lesson For All of Us," Textile Industries, Vol. 119, No. 7, July 1955, page 67.

The cost of management in the Northeast and Southeast seems to be about equal. Since the southeastern mills are branch plants of northern firms, a number of the higher paid company officials serve as executives for both locations. Plant managers and other key production personnel in the branch plants may receive higher salaries than their counterparts in the Northeast as an incentive for moving. Some salaried employees, such as bookkeepers, typists and key employees, who already lived in the Southeast probably are working for lower salaries than those in the Northeast.

Texas mills would be in a similar position to those in the Southeast in respect to management. If the mills were branch plants, their higher paid company officials also would be officers of the parent company. Some key personnel would require higher salaries to encourage them to move, but the mills might be able to employ at no extra cost former Texans now working in mills in other states. Some other key salaried employees also would cost no more than in other states.

Waste Disposal

Waste disposal and stream pollution have become serious problems in recent years, especially in heavily populated and industrialized areas. It will become an even bigger problem with increased industrialization and the growing population in this country.

By January 1954, 41 states had some kind of stream pollution laws in effect. They differ a great deal, not only in the laws themselves, but also in the way they are enforced.[173] During the 1955 session of Congress, the House Ways and Means Committee approved a bill (H.R. 3547) that permits rapid tax writeoffs (in 5 years) on waste treatment plants built by textile mills and chemical producers to reduce stream pollution.[174]

Waste from wool-textile plants is one of the most harmful effluents released into a stream and one of the most difficult to treat. In the Yorkshire area of England, dumping tremendous volumes of wool scouring wastes into the river created so much hydrogen sulfide gas that it was possible for the air above the water to burn.[175] The waste is toxic to stream life, depletes the oxygen supply and impairs the stream's physical characteristics and properties.

Wastes from wool scouring plants are especially offensive. Some plants in the East make no attempt to recover any byproducts, and others recover only a small percentage of the wool grease in the effluent.[176] Some of them have no waste treatment plants of their own, but discharge the waste into streams or run it through the local city sewage system. Only three plants in this country used the acid-cracking process to recover wool grease and make a more acceptable effluent.[177]

The percentage of grease taken out of the scouring wastes affects the cost of waste treatment, and the volume of grease recovered depends heavily on the price it will bring. The office of Price Stabilization ceiling price from June 1952 to March 1953 was 20 cents per pound for crude centrifugal, not refined, moisture maximum 2½ percent and 18 cents for wet (over 5 percent moisture). Special anhydrous cosmetic grade was 40.5 cents per pound. About 80 percent of the wool grease recovered in the United States is done by the centrifugal method, which has a recovery rate of only 30 to 40 percent of the grease present. The acid-cracking process recovers 60 to 70 percent, but the grease is of low quality and unsuitable for some high-quality uses.[178]

The rate of grease recovery in the industry averages about 2.2 percent of the grease weight of the wool.[179] A mill that scours 8 to 10 million pounds of average grease wool annually can expect to get about 200,000 pounds of wool grease which, at 18 cents per pound, would be worth around $35,000. Fine wool produces more grease than average wool, and the recovery rate is near 5 percent of the grease weight of wool. The normal output of two scouring trains scouring fine wool is about 100 pounds of grease per hour. Centrifugal equipment to handle this volume requires an investment of about $45,000.[180] Using this equipment and scouring 10 million pounds of fine wool, a mill could gross around $90,000, with one man operating the equipment.

Wool scourers can abate stream pollution by cracking the emulsion, settling it and filtering the sludge. This decreases the solid material and biological oxygen demand to acceptable limits for disposal in streams.[181] One mill in New England that scours 100,000 pounds of fine wool a week has a waste treatment plant costing $35,500 to treat the plant's 100,000 gallons of waste water weekly. All cost of treatment plus depreciation is $195 a week. The grease recovered by centrifugal equipment pays this cost and a substantial part of the scouring cost.[182]

Some Boston engineering firms estimate that an acid-cracking, grease recovery plant which

[173]Industrial Development, Vol. 1., No. 2, Mar. and Apr. 1955.
[174]Daily News Record, Fairchild Publishers, Inc., New York, July 18, 1955.
[175]"An Industrial Waste Guide to the Wool Processing Industry," Public Health Service, Publication No. 438, U. S. Department of Health, Education, and Welfare, 1955, page 5.
[176]"Wool Grease—The Economics of Recovery and Utilization in the United States," Marketing Research Report No. 89, Agricultural Marketing Service, U. S. Department of Agriculture, June 1955, page 53.
[177]Ibid., page 63.
[178]Ibid., page 142.
[179]Ibid., page 58.
[180]Ibid., page 60.
[181]Ibid., page 52.
[182]Ibid., pages 54 and 55.

could treat 100,000 gallons of effluent daily and produce an acceptable effluent would cost $250,000 to $300,000. It would require four or five men per shift to operate. Such a plant is beyond the resources of most mills.[183]

Some mills have found an adequate answer to the problem by extracting some of the grease, then acid-cracking the effluent in a plant costing $30,000 to $35,000 and operated by one man. The effluent can be discharged into streams satisfactorily under the present state public health laws. Changes in the laws or their administration might change the picture.

There appear to be no significant differences in the cost of grease recovery and waste treatment in the Northeast as compared with the Southeast. The Southeast probably has a slight advantage as a result of lower labor costs and cheaper land for sumps and lagoons. On the other hand, some of the mills in the Northeast have no particular problem because the city sewage system is adequate to handle their waste. If more rigid administration of the stream pollution laws forces mills to treat effluent more thoroughly, it may affect the Northeast first because of the higher concentration of industry in that area.

Texas has strong anti-stream pollution statutes, and Texas courts have interpreted them to mean, "that any waste discharged into a watercourse shall be of such nature as to not materially affect the quality of the receiving water."[184] Waste disposal is a serious problem in Texas because much of the State's water supply is impounded in lakes on streams that do not flow all the time, and the number of rivers that flow year-round is small.

The wool scouring plants located in Texas do not treat their effluent, but they have centrifugal grease recovery units. The mills own land where sumps have been constructed, and the waste effluent is hauled to these sumps in tank trucks.

Some areas in the State have porous soils that absorb much of the liquids, and the evaporation rate in much of the State is high. At Austin and Big Spring, 51 and 59 inches of water, respectively, normally evaporate from April through September. These rates are considerably above those of the Southeast and New England.[185] Texas has plenty of land, and land suitable for waste disposal is comparatively cheap around the smaller towns and cities.

Some firms in the State are considering seriously the possibility of waste water disposal through wells drilled to underground strata. This may result in cheaper waste disposal in so areas of Texas.

Mills in some sections of Texas probably ha an advantage in the cost of waste disposal co pared with some locations in the New Engla States, but New England mill locations that u city sewage systems and those that do not u any treatment have an advantage over prese mills in Texas. Some locations in the Southea have advantages over Texas. If more rigid e forcement of stream pollution legislation forc mills in other areas to use expensive treatme and mills in Texas can continue to use evapor tion and seepage, then the advantage may be r versed in favor of this State.

The disadvantage Texas now suffers in t current method of disposing of scouring wast would not be an important cost item. Deprec tion on a tank truck, interest on land investme and labor and truck expense would likely be le than $10,000 per year for a plant scouring 10 m lion pounds of wool per year.

Some city sewage systems in Texas can ha dle waste from wool plants satisfactorily. Ev some of the smaller towns might handle lar volumes of wool mill wastes if the effluent made constant in character and the feeding ra into the sewer system is controlled to a fair constant ratio of waste to sewage. This wou require building a waste storage tank. One lar plant scouring and dyeing 300,000 pounds of wo per week used this system in a city of 80,0 people.[186] The scouring and dyeing waste in t storage tank partially neutralize each other.

Chemicals and Supplies

No industry-wide data are available on t cost of chemicals, dyes and other expendable su plies for wool-textile mills. Since volumes a types vary according to the mill, method of pr cessing, raw material and finished product, su a figure, even if available, would be of little va in estimating the costs of expendable supplies f a mill. In scouring, for example, the materi used range from synthetic detergents or through various proportions of synthetic dete gents, soap and soda ash to soda a only. Even in the soap and soda ash combinati the proportion of soap varied from 1 pound soap for each 1.33 pounds of soda ash to 1 pou of soap for each 13.5 pounds of soda ash amo 23 mills studied.[187]

The method of plant operation can result considerable savings in soap and soda ash. Co

[183]Ibid., page 68.

[184]Personal letter from the Office of the State Department of Public Health.

[185]Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas," Cotton Economic Research, University of Texas, Austin, Tex., 1954, page 130.

[186]"An Industrial Waste Guide to the Wool Processi Industry," Public Health Service, Publication, No. 4 U. S. Department of Health, Education, and Welfa 1955, page 9.

[187]"Wool Grease—The Economics of Recovery and Ut zation in the United States," Marketing Research R port No. 89, Agricultural Marketing Service, U. S. D partment of Agriculture, June 1955, page 38.

tinuous operation with the use of grease-recovery units and recirculation of scouring liquors saves water and chemicals. The cost of the scouring materials for the industry averaged $0.134 for 100 pounds of grease wool scoured.[188] The total cost of scouring per 100 pounds of grease wool for integrated mills handling 1, 5, 10 and 20 million pounds was $2.564, $1.541, $1.441 and $1.309, respectively.[189] Thus, the cost of chemicals was 8.7 percent of total cost in scouring 5 million pounds of wool, but the chemicals cost less than 1½ mills per pound of wool scoured.

Although the acids, dyes, sizing, oils, soaps and such used in further processing cost more per pound of wool processed than the chemicals used in wool scouring, they probably account for a smaller percentage of the total processing cost.

Regardless of the actual or percentage costs of these expended supplies, the cost seems to be equal for the New England and Southeastern States. Most chemicals are priced delivered anywhere in the United States. There are a few exceptions, but even wide price differences would show small cost differentials between the two areas.

The same would be true with costs of chemicals in Texas. The State's dynamic chemical industry produces most of the chemicals needed by wool textile plants. Since the other chemicals can be shipped at no higher cost than to other areas, there would be no advantage or disadvantage from this standpoint to locating plants in Texas.

Climate

Climate in itself is not a cost item to the wool textile industry, but it affects other costs.

The Southeast seems to have a slight advantage over the New England States because of its milder climate.[190] The new, one-story buildings in the Southeast are easier and cheaper to construct. Roofs may be built flatter and do not require the strength of those in the North where snow loads are heavy. Sites and labor are cheaper and construction time is not prolonged in winter by bad weather. Less heat is required to warm the buildings.

Most of the new textile mills in the Southeast have installed air conditioning. The initial cost of this equipment is an added burden to the Southeast compared with the Northeast, although some northern mills also have installed this equipment. The cost of operation for air conditioning is higher in the Southeast during the warmer months, but the controlled temperature and humidity have greatly increased worker efficiency and improved fiber behavior. In some southeastern mills, big supplies of cold water have reduced air-conditioning costs.

Other advantages in the South as a result of the milder climate are less likelihood of plant shutdowns and absenteeism and less chance of transportation tieups because of bad winter storms.

Although Texas has an excellent climate for industry, there apparently would not be much advantage or disadvantage for wool processing in the State as a result of climatic factors compared with the Southeastern States. Some areas in the State have milder weather than some states in the Southeast. Fuel demands are lower and the fuel is cheaper. The longer, hotter summers probably would require higher expenditure for air conditioning if refrigeration types were used. It might be possible to save on air conditioning in Texas, depending on the plant location. The average rainfall in the State varies from around 50 inches in East Texas to about 10 inches in far West Texas, and the humidity varies generally along the same lines. It might be possible to lower temperatures to satisfactory levels in some parts of the State with evaporative-type coolers, which are much cheaper to install and operate than refrigeration units.

Excellent roads and mild weather would be favorable to uninterrupted transportation and steady work attendance. Most locations in Texas have more open flying days than the other areas.

Cost of Living

The lower cost of living is both a cause and an effect of the lower labor cost in the Southeast.

Cost of living is difficult to distinguish from level of living. Better food, clothing, housing, conveniences, luxuries and more time for recreation and entertainment are associated with higher levels of living. The Southeast generally has been considered an area where the level of living is comparatively lower than in other areas. It is assumed generally that rural areas have lower levels than cities. However, much wider differences exist within all areas than between them.

Cost of living depends somewhat on consumption patterns. Consumption patterns probably account for more of the lower cost of living in the Southeast than do variations in the cost of individual items.[191]

Other more positive factors help account for the lower cost of living in the South. Lower labor costs are reflected in the price of many items. Taxes are lower. Heating costs are lower and fuel is cheaper. Heavy, warm clothing is not required in the Southeast, and school children can wear cotton clothing almost the year round.

[188] Ibid., page 43.
[189] Ibid., page 47.
[190] "Report on the New England Textile Industry," Committee appointed by the Conference of New England Governors, 1952, page 267.
[191] Ibid., page 154.

Power is cheaper in the Southeast. It costs less to build a house in the Southeast than in the North.[192] Prices of food items are not directly comparable because of different consumption patterns, influences of favorite brands and popularity of different foods; but they are probably lower in the Southeast. Cost of living for mill workers also is probably lower in the Southeast as a direct influence of location in smaller towns and because many of the workers live on farms.

A cost of living survey by the Works Progress Administration in 59 U. S. cities during 1936 showed a range of 20 percent difference from the high to the low. By regions, there was only 6.3 percent difference, with New England the highest. By size of city, the low was 8 percent less than the high, but smaller cities in the Southeast probably were more than 8 percent lower. The highest southern city was lower than the cheapest New England or Middle Atlantic city.[193]

A study of the Bureau of Labor Statistics showed that it cost $3,111 per year to provide a reasonable level of living for a family of four in Washington, D. C., the highest U. S. city, and $2,734 in New Orleans, the lowest.[194]

The cost-of-living spread seems to be wider than this between the cities in the North and South where wool plants have located. A mill manager in the South who formerly lived in New England said in an interview that, considering the cost of living, southern workers in wool-textile mills were better paid than northern workers.

Very few data are available to compare cost of living in Texas with the wool textile states, but it is believed that the costs would be similar. Fuel in Texas is cheaper, but this advantage is probably offset by the greater use of air conditioning in this State. Cost of constructing the standard house in Texas is about the same as in other Southern States. The fact that cotton-textile workers in Texas work for lower wages than the average in other Southern States may indicate slightly lower living costs, but there is surely no large cost-of-living advantage or disadvantage in Texas compared with the other Southeastern States.

Sites

The cost of sites has little influence on the selection of a location or on processing cost of the wool-textile industry. Even if a site cost $100,000, at 4 percent interest on the investment, it would amount to only $4,000 per year. Location of the site with regard to accessibility of water, fuel, power, transportation facilities a waste disposal may be far more important.

A report on the New England textile indu try[195] states that sites are much cheaper in t Southeast than in the Northeast. It furth states that sites are available in the Southea indicating that they might not be so readily ava able in some areas in the New England Stat Cost of sites would not be an important influen on migration of industry to the Southeast, ev if sites are donated to the firm. Providing go sites at reasonable cost or free of cost does in cate a favorable attitude of towns and peop which is important to a firm. Any reduction cost of sites also may be important for capi financing.

The price of sites in Texas probably is co parable with the price around similar size tow in the Southeast. There would be no advanta or disadvantage to mills locating in Texas fr the standpoint of sites.

Machinery Repair, Parts and Maintenanc

The cost of depreciation, repair and mainte ance was discussed in considering cost of capi to the industry. Another aspect of machine maintenance deserves mention—the accessibili of machinery replacements, spare parts and fac ities for major repairs.

Most of the wool machinery and spare par manufacturing concerns are located in the Nort east. Although the price of these goods wou be the same regardless of who purchased the the Southeast probably has to pay a small amou extra for transportation. In the past few yea machinery companies have established spare par supply houses in the Southeast, but many wo mills had already been established in the Sout This indicates that lack of a quickly availab supply of parts was not an important conditio Most mills keep an adequate supply of extra par on hand. They also have on their payrolls go mechanics who can make most repairs necessar In addition, good machine shops in most of t large towns over the Nation can do any maj repair that is needed.

Texas has no supply parts houses for wo textile machinery. There are fine machine sho in Texas' cities and big towns, and many smal towns have capable welding shops. The State h a good-size machine-tool industry, and Westin house Electric Corporation has a heavy electri equipment manufacture, maintenance and repa plant in Texas.

Cost of transporting new machines to Tex would be a little higher than for other areas, bu a modern mill with its own mechanics and ad quate supply of spare parts would suffer litt handicap. Parts not stocked could be flown in

[192] "Comparative Estimates—Standard House," Construction Cost Section, Federal Housing Administration, Nov. 17, 1955.

[193] "Report on the New England Textile Industry," Committee appointed by the Conference of New England Governors, 1952, pages 154 and 155.

[194] Ibid., page 155.

[195] Ibid., page 267.

the State with only a day's delay. Texas has a supply house which stocks parts for cotton-textile machinery.

Attitudes and Special Inducements

State and community attitudes toward new industries are important to mill ownership, management and workers. The attitude toward wool textiles is far better in the Southeast than in the Northeast.[196] With higher birth rates and higher percentages of people leaving the farms, the Southeast needs more jobs for its people.

Southern States seem to be fully aware of what new industrial jobs mean to a community. A United States Chamber of Commerce survey,[197] with most of the data collected in the Southern States, shows that 100 new factory jobs mean $360,000 more retail sales to a community and many other benefits.

State attitude toward industry in the Southern States is indicated by right-to-work and other labor laws and how these laws are enforced, by laws that permit cities to vote bonds to build buildings, by state tax policies and in many other ways. Interest by state officials in plants that locate in their state also indicates a favorable state attitude.

Southern community attitudes are exemplified by courtesy of the community leaders, help in planning, furnishing information, tax policies, building and site arrangements, personal letters and advertisements.

Many southern communities have offered special inducements to industry. These generally take the form of special tax exemptions that extend for some period of time. A number of communities have erected buildings to the mills' specifications by voting bonds and have rented the buildings to the firms with an option to buy later. Some objections to these procedures are that older firms carry the new firm's part of the tax load and that the new building, as municipal property, is tax free. The rent may be set so as to retire the bonds in a specified time. Other cities may only donate a site. During one 4-month's period, southern communities voted 63 million dollars in bonds to build textile plants.[198]

Although no special inducements were received by most of the industries locating in the Southeast,[199] they do show a favorable attitude that may have decided the exact mill location where several areas had equal facilities. The inducements may have been more important to concerns with limited capital.

Some companies have not requested or accepted financial favors. They fear that special favors from a community might bring about interference in mill management and greater tax burdens later. Also, they may not think it just for older concerns to carry the tax load alone.

Although special inducements are more prevalent in the Southeast, some Northern States and communities have similar practices.[200] Maine and New Hampshire are the only New England States with statutes that prohibit tax exemptions.[201]

Special inducements may give some advantage in the Southeast over the New England States in capital outlay for sites and buildings, but all the southern communities do not offer them and most new industries have not accepted them. This indicates that they are not a major reason for plants to move to the Southeast. The Southeast has enough sound economic advantages to attract industry, but the special inducements indicate an all-important favorable attitude toward industry.

Texas also has a favorable attitude toward industry, as shown on the state level by the right-to-work law and other labor legislation insuring equal rights for both labor and industry. Texans believe it is far better to keep taxes as low as possible and have everyone pay his fair share. The State has no program for waiving taxes.[202]

Almost every city and town in the State has an active chamber of commerce willing and anxious to provide information to industry. Many of the larger cities publish literature on their advantages for industry, but a law passed during Civil War reconstruction days prohibits the State from advertising its attributes.

In April 1953, Texas had 14 industrial foundations, but by December 1955 there were at least three times that many and the number is increasing rapidly.[203] These organizations are scattered over most of the State, but are concentrated more heavily in the eastern half. Most of the foundations are incorporated. They may sell stock or borrow from members or financial institutions. They may purchase and develop sites, build buildings for lease or conduct similar activities to attract industry. Possibly the most valuable service of chamber of commerce groups, industrial committees and industrial foundations in Texas is encouraging their own local businesses to expand.

In 1942, 42 states had state planning boards, but Texas is one of the states without such serv-

[196]Ibid., page 75.
[197]"What New Industrial Jobs Mean to a Community," Chamber of Commerce of the United States, Washington, 1954.
[198]"Report on the New England Textile Industry," Committee Appointed by the Conference of New England Governors, 1952, page 269.
[199]Ibid., page 268.
[200]Ibid., page 269.
[201]"Subsidies for New Industries Described by Leaders from North and South," Industrial Development, Vol. II, No. 1, Jan. - Feb. 1955, page 18.
[202]Ibid., page 18.
[203]Tippit, John W., "Recent Developments in Industrial Foundation Activity in Texas," Supplement No. 1 (Dec. 1955) to Research Report No. 43, Texas Engineering Experiment Station, College Station, Tex.

ice. However, the industrial departments of numerous commercial concerns are trained and equipped to provide valuable services for an industry that seeks a location in the State.

Technical Services

Availability of technical services is important to the wool-textile industry. Research findings of public institutions are available to mill management. Independent fiber laboratories equipped to handle wool are located mainly in the Northeast and are more accessible to eastern mills, which may give them a slight advantage. The larger firms have their own research facilities, and findings in northern laboratories would be available to their southern branch plants.

A Texas branch plant of a good company would be at no disadvantage compared with the Southeast. Both the U. S. Testing Company and American Conditioning House offer core testing services at San Angelo. Extensive research facilities are available at the major colleges in the State. The Southwest Research Institute, a private research organization at San Antonio, has facilities for research on problems of the textile industry. The U. S. Testing Company has a complete cotton fiber laboratory in Dallas.

The increasing interest in automation brings up instrument service facilities, another technical service worthy of consideration. A number of the firms that repair and maintain highly complicated electronic and automatic continuous-flow equipment have branch plants in Texas. These companies include Foxboro, Brown, Taylor, Leeds and Northrup and the Instrument Society of America. Texas cities where these facilities are located include Dallas, Fort Worth, Houston, Corpus Christi, El Paso, Odessa, Lubbock and Amarillo.[204]

Recreation

Many articles in trade journals indicate that southern mill management is doing a good job in worker relations and that recreation for workers contributes to their happiness and efficiency. The geographical location of the Southeast probably gives it slightly better access to the Nation's recreation facilities, but a bigger advantage is in the South's milder climate.

Texas seems well located for recreation since it is near the geographical center of the country. The State has 4 National forests, 5 State forests, 47 State parks and 1 National park. The Gulf Coast offers boating and deep sea fishing; there are numerous lakes and streams for fresh water fishing. Dude ranches are plentiful. Almost every town has one or more golf courses and swimming pools. Golfing is a year-round sport in this mild climate. The many high schools, colleges and universities have athletic teams. Ma areas have deer and wild turkey for hunting. T excellent highways make weekend travel to poi of interest much faster than the distance wou indicate.

Texas Business

Anyone considering Texas as a location f wool-processing plants would be vitally interest in the economics of the State, the primary ma ket area and what other industries think of Te as as a location for manufacturing plants.

Texas leads the Nation in the production petroleum, natural gas, sulphur, helium and number of agricultural products. It is seco in aluminum production and one of the large in chemical production. It has a dynamic petr chemical and plastics industry, important produ tion of transportation equipment, aircraft, m chine tools, building materials and other indu tries. The State has the Nation's largest ligni deposits and in 1953 had a steel-producing capa ity of 1,269,720 tons annually.

During 1939-53, the value added in man facture in Texas increased 700 percent, from 448 million dollars to over 4 billion. During 1947-5 manufacturing grew 84 percent. During 193 52, per capita income rose from $401 to $1,45 The national total of employees in nonagricu tural establishments rose 75 percent during 193 54, but in Texas the number more than double One out of 3 Texans lived on a farm in 1940, b in 1950 only 1 out of 6.[205] Texas led the Nati in the trend toward urbanization. According t a report in *Business Week*, based on a McGra Hill survey, the Southwest is the second faste growing region in terms of factory jobs. It surpassed only by the Pacific Coast; but th Great Lakes, Middle Atlantic, South Atlantic an New England States lead, in that order, in tot factory jobs.[206] This report also said, "One thi is clear: industrial migration is going to co tinue relentlessly to change the industrial map the United States."

For the first 10 months of 1954, Texas spe 1,997 million dollars on construction. Expend tures of leading southern textile states wer North Carolina 560 million dollars, South Car lina 477, Tennessee 631, Georgia 551 and Al bama 376.[207] A private development agency re port[208] shows that Texas got about 40 percent the 1.9 billion dollars spent in the 13 Souther States on manufacturing buildings between Ju 1945 and June 1948. The 13 Southern States' to

[204] "New Study Reveals Influence of Automation in Location of Industry," Industrial Development, Vol. 1, No. 3, May 1954, page 16.

[205] Wickens, Aryness, Joy, "Trends in Employment a Income in Texas and the United States," Acting Co missioner of Labor Statistics, U. S. Department of La or, (Address) Jan. 11, 1955.

[206] "Industrial Map Changing as Southwest Growing U San Angelo Standard Times, Aug. 15, 1955.

[207] Manufacturers Record, Vol. 124, No. 1, May 1955, page 10.

[208] "Survey of Industrial Expansion," Territorial Inform tion Department, Chicago, Illinois, Sept. 1948.

tal was 35 percent of the amount spent in the whole Nation.[209]

Also during the first 10 months of 1954, Texas spent 7.801 million dollars on retail trade. The area west of the Mississippi River, where Texas mills would have a marketing transportation advantage, spent 45,481 million dollars on retail trade, almost a third of the U. S. total.[210]

A survey of Texas manufacturers conducted by the Bureau of Business Research to determine why industry comes to Texas[211] gives the following main reasons: the State's industrial potentials, natural resources, raw materials, rapidly increasing population with resultant larger labor force, rising per capita income, central location in a large geographical market, oil and gas supplies in virtually all sections of the State, mild climate, above-average highway system and favorable labor atmosphere. Most of the firms surveyed either had offices in other states or had moved from another state.

The primary market area for Texas textiles, population, growth, total and per capita income, number of production workers per 1,000 population and value of private construction are developing faster than the U. S. average.[212]

Texas wholesalers and retailers purchased some $551,324,000 worth of apparel and related products in 1952.[213] The main items which might include wool goods are:

Women and misses coats	$14,808,000
Women and misses jackets	2,042,000
Women and misses sport and casual dresses	62,967,000
Women and misses suits	12,352,000
Women and misses skirts	4,471,000
Women and misses sweaters	2,279,000
Men and boys separate trousers	4,685,000
Men and boys dress suits	34,390,000
Men and boys sport trousers	1,626,000
Men and boys dress trousers	9,955,000
Men and boys sweaters	1,688,000
Drapery and upholstery	7,146,000
Blankets	4,507,000
Wool carpets	2,680,000

[209]McLaughlin, Glenn E., and Stefan Robock, "Why Industry Moves South," National Planning Association Committee of the South, Report No. 3, June 1949.

[210]Manufacturers Record, Vol. 124, No. 1, Jan. 1955, page 9.

[211]Escot, Florence, "Why Industry Comes to Texas," Texas Business Review, Vol. XXVIII, No. 12, Dec. 1954, Bureau of Business Research, University of Texas, Austin, Tex.

[212]Wood, Noel H., "Cotton Textiles: An Opportunity in Texas," Texas Business Review, Vol. XXVII, No. 6, July 1954, Bureau of Business Research, University of Texas, Austin, Tex., page 16.

[213]Bradley, James R., "Out of State Purchases of Textile Mill, Apparel, and Related Products by Texas Organizations, 1952," Research Report 44, Texas Engineering Experiment Station, College Station, Tex., Sept. 1953.

Since World War II, Texas has experienced relatively more growth in apparel manufacturing and has made relatively more progress in apparel marketing than any other state.[214] The Texas apparel industry has been confined largely to work clothing, childrens wear and womens cotton goods; but recently sportswear and high-styled womens cotton goods have increased in importance. It appears that the Texas industry, which grew from 10,000 employees in 1939 to about 35,000 in 1954, will continue to grow into fields embracing wool goods.

Decentralization is taking place in the garment industry. Especially notable is the exit from New York City to surrounding areas. Garment making is an easy-entry industry with low capital requirements in which labor accounts for about 50 percent of operating costs. Women contribute the bulk of the work force. Labor costs are lower in the West, and transportation savings are possible if fabrics are purchased in the West for garments to be made and sold there. With these savings, and the increasing style centers west of the Mississippi, both textile and garment industries probably will increase in that area.

Past experience shows that a heavy concentration of textiles in a town, a state or an area is unhealthy for the people as well as the industry. Cotton textiles migrated from New England to the Southeast, and wool-textiles are in the process of doing so. In 1939, 50 percent of the factory jobs in seven Southeastern States were in textiles.[215] The Southwest and Pacific Coast are the next logical stops for textile industry; and Texas, with its big and growing labor force and much lower labor costs, is the better area.

RECOMMENDED PRODUCTS AND DECREASED OVERHEAD

It was found in this study that it is feasible for an established wool-textile firm to process wool in Texas through any of the standard processing stages. A locally owned company without the connections needed to obtain commission business would have some serious problems and probably would have difficulty marketing products that the mill owns in some of the processing stages.

Scouring worsted wools on commission is practicable only for a well-known firm with business already established. Purchase of grease wool for scouring and resale to the worsted industry is not feasible.

It is feasible to scour woolen wools, tags, clippings, off-sorts and some very heavy-shrinking combing wools on commission and to pur-

[214]Dale, Alfred G., "Texas Expansive Clothing Industry," (Reprint) Texas Business Review, Vol. XXVIII, No. 11, Nov. 1954.

[215]McLaughlin, Glenn E., and Stefan Robock, "Why Industry Moves South," National Planning Association Committee of the South, Report No. 3, June 1949.

chase these wools for scouring and resale to the woolen industry. Marketing the wools to advantage is the main problem. The volume of these wools produced in Texas is not large, and the State already has six scouring trains capable of scouring some 30 million grease pounds per year.

Top-making in Texas also is economically sound, but a locally owned firm might find it difficult to get commission combing business or to market any tops owned by the mill.

Production of both woolen and worsted yarn for the fabric and knitting trades also is practicable. Commission business would hinge on favorable relations with users in the industry. Yarns made for sale probably would have fewer marketing difficulties than scoured wool or wool tops made for sale.

The wool-textile industry's recent growth in the South began mainly with spinning and weaving plants. Partially processed goods were shipped to the Southeast for spinning and weaving, and the finished goods were shipped back for marketing. Because of the greater distances from other mills to Texas, the availability of raw material in the State and the lower labor costs, earlier processing stages also would probably be done in Texas.

Completely integrated mills that process raw wool into finished woolen and worsted fabrics would produce the greatest savings for plants in Texas. More labor is required than in the earlier stages, and savings on labor would be greater. There is a large market for these goods in Texas and other states where Texas has a transportation advantage. Also, the full benefit of transportation savings on the raw wool could be realized. The goods should sell in the higher price brackets because of the high-price wools, and these goods are suffering the greatest competition from imported fabrics.

In addition to fabrics, the mills might be able to obtain commission yarn-making or combing business, or to make some of these products for sale.

Knitting is another operation that is economically practicable. Since the market for knit goods is mainly wholesalers and retailers, the bulk of the plant's produce possibly could be marketed in Texas' primary market area. Some Texas wools are well suited for certain knit goods; however, the greater portion is better suited for woven fabrics.

Pressed felts probably would be a sound venture in Texas for an established firm, but because of the small size of this industry, it was not given as much consideration as other processes.

Texas has a greater volume of worsted wools than woolen wools. The worsted industry requires much greater capital and more skilled labor than the woolen industry. The State produces very little pulled wool, noils or other by-product raw materials often used for woolen goods. The demand for woolen or worsted goods varies in short cycles according to styles. For these reasons, a completely integrated, combination woolen and worsted plant of medium size probably would have the best chance for success in Texas.

The savings for such a plant located in Texas, compared with the Southeast, can be estimated. Assume that the plant would produce about 5 million pounds of products, consisting of 5 million yards of woolen fabric and 5 million yards of worsted fabric that average 8 ounces per yard. About 7.5 million pounds of worsted grease wool averaging 55 percent shrink would be required to produce the worsted fabric, and about 5 million pounds of woolen grease wools shrinking 55 percent, plus the noils from the worsted wools by truck to the Southeast, would be about $150,000 and the cost of shipping the woolen wools after scouring in Texas would be about $45,000. *Minimum transportation savings=$195,000.*

The labor to produce this volume of woolen and worsted goods in the Southeast cost about 10 million dollars. Texas labor for the woolen and worsted industry should be 5 to 10 percent lower. *Minimum labor savings=$500,000.*

The fuel bill for a southeastern plant would be about $42,200 to produce these goods. It would require about 5,000 tons of 13,000 B.T.U. coal at $8.44 per ton, plus some labor costs. The Texas mill would use about 130 million cubic feet of natural gas costing about $23,200. *Minimum fuel savings=$19,000.*

Water and waste disposal might cost more for the Texas plant, although in some locations Texas might have an advantage. Actual water cost probably would be comparable, but it might have to be softened in some locations. Softening cost would not be greater than 5 cents per 1,000 gallons, or $15,000 to soften 300 million gallons. Labor and depreciation on equipment would not exceed $4,000 per year. *Net water disadvantage=$19,000.*

The Texas mill in some locations would have no higher waste disposal costs than the Southeast, but in others the mill might have to buy land for seepage and evaporation disposal. Interest on the land investment, tank truck depreciation, labor for a driver and truck expense probably would not exceed $8,000 per year. *Net waste disposal disadvantage=$8,000.*

Possibly half of the mill's products could be marketed west of the Mississippi River at a saving of about 1 cent per pound, or $25,000. The other half probably would have to be sold in New York, with about 2 cents per pound more transportation costs than southeastern mills, or $50,000. *Net marketing disadvantage=$25,000.*

The many other cost elements account for only a small percent of total costs. Some locations in the Southeast may have slight advantages over Texas locations, but Texas would be favored over others. Accurate figures on the other cost elements would require a city-by-city comparison; therefore, they are considered about equal.

Thus, a Texas mill that used all Texas wool to make the products feasible for the State and marketed half of these products in the West might expect to save approximately 600 to 650 thousand dollars as compared with a mill in the Southeast. This would amount to about 6 cents per yard or some 3 to 4 percent of the value of the plant's products.

On the other hand, the mill might market all its products in New York with a 2 cent per pound disadvantage. It might use large volumes of foreign wools landed at Texas ports on which there would be no savings. It might have to buy small volumes of raw wools and specialty fibers at Boston and synthetic fibers from the East with higher transportation costs than the Southeast. Under these conditions, a plant in Texas probably would save only on labor costs as compared with the Southeast.

BIBLIOGRAPHY

Studies

Anderson, Howard C., and Alexander Johnston, "Report of Survey of the Wool Manufacturing Industry in the Eastern and Pacific Coast Regions in the Fall of 1947." Nov. 1947.

Assenderp, Andre' Van, "Inquiry into the Feasibility of Establishing a Wool Processing Plant in New Orleans." Division of Economic and Business Research, College of Commerce and Business Administration, Tulane University, Publication No. 4, 1949.

Bartram, John W., "Wool Scouring, Could it be a Profitable Business in Colorado." Bureau of Business Research, University of Colorado, Boulder, Colo., Dec. 1946.

Broome, Claude A., "Woolen Mill Plan Goes to Sheepmen." Sheep and Goat Raiser's Magazine, Vol. 5, No. 1, San Angelo, Tex., Aug. 1924.

Buck, Warner M., "Scouring Wool in the West." National Wool Grower, Vol. XXIII, No. 7, July 1933.

Dabney, Robert L., and Research Department, Houston Pipe Line Company, "Textile Survey." A report, 1947.

Davis, Stanley P., and J. M. Jones, "Wool and Mohair Manufacturing Prospectus for the Houston Trade Area." Paper prepared for Chemurgic Organization of Houston Chamber of Commerce, July 8, 1944.

Gregg and Co., "The Manufacture of Wool and Mohair in Texas." Sheep and Goat Raiser's Magazine, Vol. 2, Nos. 8 and 9, San Angelo, Tex., Mar. and Apr. 1922.

Harmston, Floyd, "An Economic Study of Sweetwater County, Wyoming." Prepared for the Wyoming Industrial Research Council by Division of Economic Analysis, College of Commerce and Industry, University of Wyoming, 1954.

Hawley, Freese and Nichols, "The Feasibility of Establishing a Wool Scouring Plant in Texas." Report to the Texas Planning Board, 1937.

Hembree, Joel F., "Cotton Textiles: An Opportunity in Texas." Cotton Economic Research, University of Texas, Austin, Tex., 1954.

Hendrickson, Russel M., "Feasibility of Wool Processing in North Dakota." Bulletin No. 7, North Dakota Research Foundation, Bismark, N. Dak., 1952.

Hogan, John A., "Employment and Collective Bargaining Problems in the American Woolen and Worsted Industry." (PhD Thesis) Harvard University, Cambridge, Mass., June 1952.

Johnston, Alexander, "The Proposed Rawlings Wool Processing Plant." National Wool Grower, Vol. XLII, No. 11, Nov. 1952, pages 36-38.

Jones, J. M., Comments on (1) the development and expansion of the wool industry in the United States and (2) the feasibility of establishment of wool processing mills in Texas, and general suggestions pertaining to the postwar textile industry. Unpublished paper prepared Sept. 1944.

Keoppel, Kenneth P., "Wool Products Manufacturing in the Rocky Mountain Region." Thesis, University of Colorado, 1948.

McGinley, James E., "The Possibilities of Bringing Wool Processing Plants to a Certain City in Texas." Texas Power and Light Company, Dallas, Tex., 1954.

Morris, James A., "South Carolina, A Location for the Woolen and Worsted Industry." Bulletin No. 21, Research, Planning and Development Board, State of South Carolina, Columbia, S. C., 1950.

....., Newspapers and magazine articles on attempts to establish plants in Texas. Files of J. M. Jones, A. & M. College, College Station, Tex.

....., Notes on the meeting of a committee of the American Manufacturers Association with leading Texas agriculturists and industrialists at A. & M. College to discuss problems relating to the establishment of wool manufacturing processing plants in Texas. Files of J. M. Jones, A. & M. College, College Station, Tex.

Pent, Robert E., "The Utilization of Wool and Mohair in Texas." Chemurgic Papers, Series 3, No. 559, National Farm Chemurgic Council, 1947.

"Potential Market Outlets for Mohair." A report to the United States Department of Agriculture by the Commodity Marketing Corporation, Industrial Consultants, New York, N. Y., June 1952.

Texas Technological College Research Committee, "Wool Textile Industry Survey for West Texas." Bulletin of the Texas Technological College, Lubbock, Tex., 1949.

Wilson, J. F., "Wool Scouring and Manufacturing on the Pacific Coast." California Wool Grower, Vol. 10, No. 36, Sept. 3, 1935.

Wood, Mark E., "Cotton Textile Industry Survey for West Texas." Bulletin of the Texas Technological College, prepared for the West Texas-Sante Fe Industrial Committee of the West Texas Chamber of Commerce, Abilene, Tex., 1948.

Books

"Bulletin of the Wool Manufacturers." Published by the National Assn. of Wool Manufacturers, 386 Fourth Ave., New York City, (yearly editions).

....., "Climate and Man." The Yearbook of Agriculture 1941, USDA.

....., "Davidson's Textile Blue Book." Davidson Pub. Co., Ridgwood, N. J., (yearly editions).

Hoover, Edgar M., "The Location of Economic Activity." McGraw-Hill Book Co., Inc., 1948.

Hopkins, Giles E., "Wool as an Apparel Fiber." Rinehart and Co., Inc., New York City, 1953.

....., "Industrial Location and National Resources." National Resources Planning Board, Dec. 1942.

Kaswell, Ernest R., "Textile Fibers, Yarns, and Fabrics." Reinhold Pub. Corp., 330 West Forty-Second St., New York 36, N. Y., 1953.

....., "Marketing." The Yearbook of Agriculture 1954, USDA.

Matthews, J. Merritt, "Bleaching and Related Processes." The Chemical Catalog Co., Inc., One Madison Ave., New York, 1921.

McLaughlin, Glenn E., and Stefan Robock, "Why Industry Moves South." National Planning Assoc. Committee of the South, Rpt. No. 3, Kingsport Press, Inc., Kingsport, Tenn., June 1949.

Morris, James A., "Woolen and Worsted Manufacturing in the Southern Piedmont." Univ. of S. C. Press, Columbia, S. C., 1952.

....., "The South, America's Opportunity Number One." Southern Regional Council, Inc., 63 Auburn Ave., N. E., Atlanta 3, Ga., 1945.

Von Bergen, Werner, and Herbert R. Mauersberger, "American Wool Handbook, Second Edition." Textile Book Pub., Inc., New York 16, N. Y., 1948.

Yaseen, Leonard C., "Plant Location." Business Rpt., Inc., Roslyn, N. Y.

U. S. Government Publications

....., "Achieving a Sound Domestic Wool Industry." A report to the Pres. of the U. S. from the Sec. of Agri., prepared by an Inter-Agency Wool Study Group, USDA, Dec., 1953.

....., "Agricultural Prices." (Releases) Agricultural Marketing Ser., USDA.

....., "An Industrial Waste Guide to the Wool Processing Industry." Public Health Ser., Pub. No. 438, U. S. Dept. of Health, Education, and Welfare, 1955.

....., "Annual Survey of Manufacturers 1952." U. S. Bureau of Census, 1953.

....., "Automobile Manufacturers Discuss Fabrics and Fibers for Passenger Cars." Agri. Info. Bul. No. 45, Bureau of Agri. Eco., USDA, Oct. 1951.

Bowden, Witt, "American Labor and the American Spirit." Bul. No. 1145, Bureau of Labor Statistics, USDL, Jan. 4, 1954.

....., Bureau of Customs, U. S. Treasury Dept. Releases: S-1092, May 19, 1949; S-3163, Sept. 12, 1952; S-3274, Dec. 19, 1952; H-113, May 6, 1953; H-413, Mar. 8, 1954; Cir. Letters: No. 2827, Dec. 22, 1952; and Supplement No. 2, Mar. 6, 1953; No. 2469, Supplement No. 2. Dec. 28, 1950.

....., Bureau of Labor Statistics, (Monthly Reports) USDL.

Carr, D. W., and L. D. Howell, "Economics of Preparing Wool for Market and Manufacture," Technical Bulletin No. 1078, Bureau of Agri. Eco., USDA, Nov. 1953.

....., "Census of Agriculture 1950." Vol. 1, Part 26, U. S. Bureau of Census, 1952.

....., "Census of Manufacturers 1947." Vol III, Statistics by States, U. S. Bureau of Census.

....., "Comparative Estimates—Standard House." Federal Housing Administration, Nov. 17, 1955.

Coon, J. M., and C. G. Randell, "Wool Auctions in the United States." Special Rpt. No. 86, Cooperative Res. and Serv. Div., Farm Credit Administration, USDA, May, 1941.

Coon, J. M., "Cooperative Marketing of Fleece Wool." Bul. No. 33, Cooperative Res. and Serv. Division, Farm Credit Administration, USDA, May, 1939.

....., "Current Population Reports, Consumer Income." Bureau of Census, Series P-60, No. 16, USDC, May, 1955.

....., "Domestic Wool Requirements and Sources of Supply." Prepared by the Livestock Branch, Production and Marketing Administration and Bureau of Agri. Eco., USDA, June, 1950.

....., "Earnings of Cotton Textile Workers, ... vember 1954." Bureau of Labor Statistics, US... March 4, 1955.

....., "Employment and Earnings." (Month... Bureau of Labor Statistics, USDL, 1955.

....., "Estimated Costs of Production of W... Sheep and Lambs, in 1945 and 1946 Compared w... Data for the Period 1940-44." (TC 25674) U. S. Tar... Commission, Feb. 1947.

....., "Estimated Costs of Production of W... Sheep, and Lambs in 1948." (TC 26526) U. S. Tar... Commission, May 5, 1949.

....., "Expansion Progress—Projects Under C... tificates of Necessity." Office of Defense Mobilizati... Washington, D. C., Apr. 1, 1955.

....., "Facts for Industry." (Releases) Bureau... Census, USDC.

....., "Farm Costs and Returns, 1953 (with co... parisons)." Agri. Info. Bul. No. 128, Agri. Res. S... USDA, June, 1954.

Goodwell, Wylie D., W. Herbert Brown, Herbert C. Fo... ler, Erling Hole, Edgar B. Hurd, James Vermeer a... Isabel Jenkins, "Farm Costs and Returns, 1953 (W... Comparisons) Commercial Family Operated Farms ... Type and Location." Agri. Info. Bul. No. 128, Ag... Res. Ser., USDA, June 1954.

Hermie, Albert M., "Prices of Apparel Wool." Tech. B... No. 1041, Bureau of Agri. Eco., USDA, Oct. 1951.

Hodde, Walter L., "Influence of Selected Factors in Pr... paring Wool for Cooperative Marketing." Special R... 234, Farm Credit Administration, USDA, Feb. 1952.

Hodde, Walter L., "Problems of Cooperatives in Usi... Future Markets." Ser. Rpt. No. 8, Farmer Cooper... tive Ser., USDA, July 1954.

Hodde, Walter L., "Sales Method Problems of Wool Co... eratives." Ser. Rpt. No. 6, Farmer Cooperative Se... USDA, June 1954.

Howell, L. D., "Marketing and Manufacturing Servic... and Margins for Textiles." Tech. Bul. No. 1062, Bure... of Agri. Eco., USDA, Sept. 1952.

....., "Increasing Domestic Wool Production... Senate Document No. 100, 82nd Congress, 2nd Sessi... Presented by Mr. O'Mahoney, Feb. 5, 1952.

....., "Investigation of the Production, Transp... tation, and Marketing of Wool." Hearings before t... Special Committee to Investigate the Productio... Transportation, and Marketing of Wool. U. S. Senat... 79th Congress, 1st Session Pursuant S. Res. 160 (7... Congress) and S. Res. 58 (79th Congress) Part 6, No... 19, 20, 21, 23, 26, 27 and Dec. 6, 1945.

....., "Livestock and Meat Situation." (Release... Agri. Marketing Ser., USDA.

....., "Livestock Market News Statistics and R... lated Data, 1953." Statistical Bul. No. 143, Livesto... Division, Agri. Marketing Ser., USDA, June, 1954.

....., "Market News." (Weekly) Livestock Divi... ion, Agri. Marketing Ser., USDA.

McMullen, Thomas R., and Ella B. Carter, "Wool and Wo... Manufacturers." Business Info. Ser., Office of D... mestic Commerce, USDC, May 1950.

....., "Potential Market Outlets for Mohair." ... Rpt. to the USDA by the Commodity Marketing Co... poration Industrial Consultants, Marketing and Faci... ties Res. Branch, Production and Marketing Admini... tration, USDA, June 1952.

....., "Raw Wool." War Changes in Industry Se... Rpt. No. 1, U. S. Tariff Commission, Dec. 1943.

....., "Report on Corporate Mergers and Acqu... sitions." Federal Trade Commission, U. S. Govt. Prin... ing Office, May 1955.

....., "Report to the President." Wool, Wool Tops, and Carbonized Wool, Investigation No. 8, Under Sect. 22 of the Agri. Adjustment Act, as Amended, U. S. Tariff Commission, Feb. 1954.

....., "Rules and Regulations Under the Wool Products Labeling Act of 1939." Promulgated by the Federal Trade Commission, effective July 15, 1941.

....., "Summaries of Tariff Information." Vol. II, Wool and Manufactures, (in two parts) Part 1. "Raw Wool and Related Hair," Part 2. "Manufacturers of Wool and Related Hair." U. S. Tariff Commission, 1948.

....., "Summary of State Government Finances." Bureau of the Census, USDC, 1954, 1953, 1952.

....., "Survey of Current Business." Vol. 35, No. 9, Office of Business Economics, USDC, Sept. 1955.

....., "The Angora Goat and Mohair Industry." Miscellaneous Cir. No. 54, prepared by the Inter-departmental Angora Goat and Mohair Committee of USDA and USDC, 1929.

....., "The Demand and Price Situation." (Releases) Agri. Marketing Ser., USDA.

....., "The Domestic Wool Clip." Grades, Shrinkages, and Related Data, prepared by the Livestock Branch, Production and Marketing Administration, USDA, June 1951.

....., "The Merger Movement in the Textile Industry." A Staff Rpt. to Sub-committee No. 5 of the Committee on the Judiciary, House of Representatives, 84th Congress, 1st Session, U. S. Govt. Printing Office, 1955.

....., "The Wool Situation." (Release), Agri. Marketing Ser., USDA

....., "Trading in Wool Top Futures." Cir. No. 604, Commodity Exchange Administration, USDA, Aug. 1941.

....., "Typical Electric Bills 1955 — Cities of 50,000 Population and More." Federal Power Commission, Washington, D. C.

....., "Typical Residential Electric Bills 1954— Cities of 2,500 Population and More." Federal Power Commission, Washington, D. C.

....., United States Treasury Dept. Bureau of Customs Info. Ser. Release S-1092, May 19, 1949; Release S-3163, Sept. 12, 1952; Release S-3274, Dec. 19, 1952; Release H-113, May 6, 1953; Release H-413, Mar. 8, 1954; Cir. Letter No. 2827, Dec. 22, 1952; Cir. Letter No. 2469, Dec. 28, 1950.

....., "Wage Differences and Establishment Practices—17 Labor Markets 1953-54." Bureau of Labor Statistics Bul. No. 1173, USDL.

....., "Wage Structure — Woolen and Worsted Textiles April-May 1952." Series 2, No. 90, Bureau of Labor Statistics, USDL.

....., "Wool and Wool Top Futures." Commodity Exchange Authority, USDA, Oct. 29, 1954.

....., "Wool Grease—The Economics of Recovery and Utilization in the United States." Marketing Res. Rpt. No. 89, Agri. Marketing Ser., USDA, June 1955.

....., "Wool Statistics and Related Data." Statistical Bul. No. 142, Agri. Marketing Ser., USDA, Sept. 1954.

....., "Wool Statistics — Including Mohair and Other Fibers." Bureau of Agri. Eco., CS-37, USDA, 1949.

....., "Woolens and Worsteds." Prepared in Response to Requests from the Committee on Finances of the U. S. Senate and the Committee on Ways and Means of the House of Representatives, War Changes in Industry Ser. Rpt. No. 29, U. S. Tariff Commission, 1949.

State Publications

Adkins, W. G., and R. L. Skrabanek, "The Texas Farm Population, 1954." P. R. 1738, Tex. Agri. Expt. Sta., College Station, Tex., Dec. 23, 1954.

....., "Annual Reports — Board of Water Engineers for the State of Texas." Austin, Tex.

Arbingast, Stanley A., and Robert H. Ryan, "Texas Industry: 1953-1954." Texas Business Review, Vol. XXVIII, No. 2, Bureau of Business Res., University of Texas, Austin, Tex., Feb. 1954.

Bradley, James R., "Out of State Purchases of Textile Mill, Apparel, and Related Products by Texas Organizations, 1952." Res. Rpt. 44, Tex. Eng. Expt. Sta., College Station, Tex., Sept. 1953.

Campbell, Fred R., L. P. Gabbard, and Stanley P. Davis, "Marketing Wool Through Texas Warehouses." Bul. 740, Tex. Agri. Expt. Sta., College Station, Tex., Oct. 1951.

Cella, Francis R., "Factors Affecting Industrial Location in the Southwest." College of Business Administration, University of Oklahoma, Norman, Okla., 1954.

Dale, Alfred G., "Texas Expansive Clothing Industry." Tex. Business Review, Vol. XXVIII, No. 11, Bureau of Business Res., University of Texas, Austin, Tex., Nov. 1954.

Davis, Stanley P., and L. P. Gabbard, "Grading Wool at Shearing Pens and Marketing on a Basis of Quality." P. R. 1363, Tex. Agri. Expt. Sta., College Station, Tex. Apr. 18, 1951.

Davis, Stanley P., and L. P. Gabbard, "Quality Price Relationship of Graded and Ungraded Wool." P. R. 1572, Tex. Agri. Expt. Sta., College Station, Tex., 1952.

Davis, Stanley P., L. P. Gabbard and Alvin B. Wooten, "Marketing Texas Wool on a Quality Basis." Bul. 823, Tex. Agri. Expt. Sta., College Station, Tex., Oct. 1955.

Escott, Florence, "Why Industry Comes to Texas." Tex. Business Review, Vol. XXVIII, No. 12, Bureau of Business Res., University of Texas, Austin, Tex., Dec. 1954.

Fletcher, Hazel M., "Synthetic Fibers and Textiles." Bul. 300, Agri, Expt. Sta., Kansas State College of Agriculture and Applied Science, Manhattan, Kans., Apr. 1952.

Hamilton, T. R., "Trends in the Production, Consumption and Prices of Mohair in Texas." P. R. 945, Tex. Agri. Expt. Sta., College Station, Tex., 1945.

Hamilton, T. R., "Trends in the Sheep and Wool Industry in Texas." P. R. 944, Tex. Agri. Expt. Sta., College Station, Tex., Apr. 1945.

Hughes, William F., and Joe R. Motheral, "Irrigation Agriculture in Texas." Misc. Pub. 59, Tex. Agri. Expt. Sta., College Station, Tex., Sept. 1950.

....., "Laws of Texas Relating to Labor." State of Texas Bureau of Labor Statistics, Austin, Tex., Sept. 1951.

McFadden, Wm. D., P. E. Neal, and P. W. Cockerill, "Economic Considerations in Marketing Fine Wool on the Basis of Both Length and Crimp." Press Bul. 1090, Agri. Expt. Sta., New Mexico College of Agriculture and Mechanical Arts, State College, N. Mex., Dec. 1953.

Paine, L. S., "An Evaluation of Plant Location Factors in Texas." Res. Rpt. 49, Texas Eng. Expt. Sta., College Station, Tex., Oct. 1945.

....., "Texas General Sanitation Law of 1945." Texas State Dept. of Health, Austin, Tex.

....., "Texas Labor Market." (Monthly) Texas Employment Commission, Brown Bldg., Austin, Tex.

Tippit, John W., "Recent Developments in Industrial Foundation Activity in Texas." Supplement No. 1 (Dec. 1955) to Res. Rpt. No. 43, Tex. Eng. Expt. Sta., College Station, Tex.

Wood, Noel H., "Cotton Textiles: An Opportunity in Texas." Tex. Business Review, Vol. XXVII, No. 6, Bureau of Business Res., University of Texas, Austin, Tex. July 1954.

....., "Wool Preparation and Marketing." Bul. 316, Agri. Expt. Sta., University of Wyoming, Laramie, Wyo., June 1952.

Miscellaneous Publications

....., "Chemurgic Papers." National Farm Chemurgic Council.

....., "Distributors of TVA Power." 1954 Annual Rpt., 97 Municipal Electric Systems and the 51 Rural Electric Cooperatives, Tenn. Valley Authority, Chattanooga, Tenn., June 30, 1954.

....., "Fringe Benefits 1953." Eco. Res. Dept., Chamber of Commerce of the U. S., 1954.

....., "Gas Facts — A Statistical Record of the Gas Utility Industry in 1953." American Gas Assn., 420 Lexington Ave., New York 17, N. Y.

Pritchett, W. C., "The Sheep and Wool Industry in Texas." (PhD Dissertation) University of Virginia, 1948.

....., "Report on the New England Textile Industry." Committee appointed by the Conference of New England Governors, 1952.

Robock, Stefan H., and John M. Peterson, "Facts and Fiction about Southern Labor." (Reprint) Harvard Business Review, Mar., Apr. 1954.

....., "Shipping Digest." The National Shipping Weekly of Export Transportation, Shipping Digest, Inc., 8-10 Bridge St., New York 4, N. Y.

....., "Texas Almanac 1956-57." Dallas Morning News, Dallas, Texas.

....., "The Development of the Home Sewing Market and a Look at its Future." Simplicity Pattern Co., Inc., 200 Madison Ave., New York 16, N. Y., Jan. 11, 1955.

....., "The Houston Port Book." (Semiannually) Harris County Houston Ship Channel Navigation Dist., P. O. Box 2562, Houston, Tex., Spring 1955.

....., "The Texas Charter of Equal Rights." Dallas Chamber of Commerce, Dallas, Tex., Oct. 1952.

The Wool Bureau Inc. (Releases) 16 West 46th St., New York 36, N. Y.

....., "What New Industrial Jobs Mean to a Community." Eco. Res. Dept., Chamber of Commerce of the U. S., 1954.

Newspapers and Periodicals

"American Sheep Breeder." (Monthly) (Now out of business).

"California Wool Grower." (Now "California Livestock News") Calif. Wool Growers Assn., 151 Mission St., San Francisco, Calif.

"Daily News Record." (Daily) Fairchild Pub., Inc., 7 East 12th St., New York 3, N. Y.

"Fortune." (Monthly) Time Inc., 540 North Michigan Ave., Chicago 11, Ill.

"Industrial Development." (Bimonthly) Conway Publications, Conway Bldg., North Atlanta 19, Ga.

"Look." (Weekly) Cowles Magazines, Inc., 488 Madison Ave., New York 22, N. Y.

"Manufacturers Record." (Monthly) Manufacturers Record Pub. Co., 109 Market Place, Baltimore 3, Md.

"Monthly Business Review." (Monthly) Federal Reserve Bank of Dallas, Dallas, Tex.

"Monthly Labor Review." Bureau of Labor Statist USDL.

"Readers Digest." (Monthly) Readers Digest Assn. I Pleasantville, N. Y.

"San Angelo Standard Times." (Daily) San Angelo St dard Times, Inc., San Angelo, Tex.

"Southern Chemical Industry." The Southern Assn. Science and Industry, Inc., 3846 Hillcrest Dr., Bo haven, Ga.

"Texas Business Review." Bureau of Business Res., U versity of Texas, Austin, Tex.

"Texas Industry." (Monthly) Tex. Manufacturers As 1014 M & M Bldg., Houston, Tex.

"Textile Industries." (Monthly) W. R. C. Smith Pub. 806 Peach Tree St., N. E., Atlanta 8, Ga.

"Textile Organon." (Monthly) Textile Eco. Bureau, In 10 East 40th St., N. Y. 16, N. Y.

"Textile World." (Monthly) McGraw-Hill Pub. Co., In 99 N. Broadway, Albany 1, N. Y.

"The Bryan Daily Eagle." (Daily) Eagle Printing Bryan, Tex.

"The Commercial Bulletin." (Weekly) Curtis Guild Co., 144 High St., Boston 10, Mass.

"The Houston Press." (Daily) The Houston Press Houston, Tex.

"The National Wool Grower." (Monthly) 414 Pacific N tional Life Bldg., Salt Lake City 1, Utah.

"The Sheep and Goat Raiser." (Monthly), Formerly "T Cooperator", Hotel Cactus Bldg., San Angelo, Tex.

"The Wall Street Journal." (Weekly) Southwest Editi Dow Jones and Co., Inc., 911 Young St., Dallas 2, Te

"The Wyoming Wool Grower." (Monthly) Wyo. Wo Growers Assn., McKinley, Wyo.

"Time." (Weekly) Time, Inc., 540 North Michigan Av Chicago 11, Ill.

"U. S. News and World Report." (Weekly) U. S. Ne Pub. Co., 24th and N. St., N. W., Washington 7, D.C.

Foreign Publications

"Annual Wool Review." Winchcombe, Carson Ltd., Phillip St., Sidney, Australia, 1953-54.

"Dalgety's Annual Wool Review for Australia and Ne Zealand." Dalgety and Co. Limited, 65-68 Leadenha St., London, EC. 3, England, 1950-51 and 1954-55.

"Journal of the Textile Institute." (Monthly) The Textil Institute, 16 St. Mary's Parsonage, Manchester, En land.

McConnell, H. G., "Income Trends in Wool Growing Quarterly Review of Agri. Eco., Commonwealth Australia, Vol. 7 (1); 25-31, Jan. 1954, Canberra, Au tralia.

....., "Natural and Man-made Fibers—A Re view." Bul. No. 26, FAO Commodity Series, Food an Agri. Organization of the U. N., Rome, Italy, No 1954.

"The Pastoral Review and Grazier's Record." (Monthly The Wool Exchange, 122-138 King St., Melbourne, Au tralia.

"The Textile Manufacturer." (Monthly Periodical) 31 Kin St. West, Manchester 3, England.

....., "Wool and Wool Textiles—Devaluation Ha Increased British Exports to United States." Foreig Agri. Cir. FW 4-49, Office of Foreign Agri. Relation USDA, Oct. 21, 1949, Washington, D. C.

....., "World Fiber Survey." Food and Agri. Or ganization of the U. N., Aug. 1947, Washington, D.C.