A REVIEW: CURRENT GRADES, QUALITIES AND USES OF WOOL IN THE UNITED STATES[1]

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Summary

The evolution of U.S. grade standards for wool is described. Current specifications for grades of grease wool and top are presented and discussed. Trends in U.S. wool production are reviewed in the broader context of world production and recommendations are made for reversing the current domestic decline. Finally, recent trends in wool consumption by end-use are summarized and expanding categories are identified.

(Key words: Wool, wool grades, end-uses)

Wool grades

The grade (or fiber diameter) is determined primarily by the breed of sheep on which the fibers are produced although the range of grades within a particular breed is often broader than commonly appreciated. Grade is also affected by health, nutrition and other environmental factors during the growth period. Fiber diameter has a major influence on the grade, value and end-use in which the wool will be used. Table 1 lists the more important sheep breeds and ranges for average fiber diameter.

The first U.S. grade standards for wool were introduced in 1926. These standards were based entirely on subjective, visual appraisal of average fiber diameter. The grade of an unclassified sample was determined by visual comparison with samples representing the standard grades. Recognizing the limitations of this method of quality assessment and with advancements in fiber sampling and objective measurements, the United States Department of Agriculture (USDA) developed and introduced a revised set of official standards for grades of wool (USDA, 1966). Assignment of grade was based on objectively determined average fiber diameter and standard deviation of diameter. For each of 16 grades, the USDA specified a range for average diameter and a maximum standard deviation. Provision was made that samples with standard deviation greater than the maximum allowed would be put into the next lowest classification.

Current standards still contain instructions for the visual classification of wool by grade. While both objective and visual methods are official, when the grade determined by the visual and the objective method differ, the latter must prevail. The standards document also contains specific instructions on sampling, scouring, measurement, pertinent calculations and assignment of grade. The American Society for testing and Materials (ASTM) adopted identical specifications for numerous standard methods and practices for sampling, washing, sample preparation and conditioning, measurements and assignment of grade (ASTM, 1987).

Official standards of the U.S. for grade of wool top were published in the Federal Register on December 21, 1968. Grades of wool top are based on objectively measured average fiber diameter. A range and fiber diameter dispersion are specified for each grade. When a wool top fails to meet the same grade specifications in both average diameter and dispersion, a dual grade is assigned. The first grade corresponds to average diameter and the second designation indicates the next coarser grade. Again, the physical methods for determining grade were made part of the standard. Later, ASTM also provided standard test methods, practices and specifications for determination and assignment of grade for wool top (ASTM, 1987).

Samples representative of all the official grade standards of the U.S. for wool and wool top may be purchased from the USDA. Descriptions of individual official grades of wool and wool top are presented in two USDA documents. This information is summarized in ASTM Standard Specifications D 3991 and D 3992 and presented in tables 2 and 3.

It is interesting to note that the numbers used to express wool and wool top grade (i.e. 54s, 64s, etc.) are the same as those used in the Bradford Worsted Yarn Count System from which they were derived. When used to quantify yarn count, the number and letter represent the number of 560 yard lengths of yarn that weigh one pound. At one time, it was theoretically possible to manufacture 64s yarn from 64s wool. Because of increas-

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ed machine speeds and greater productivity, this is no longer practical in today's worsted industry. The double meaning of the symbol for count has been a source of confusion for many people involved with the sheep and wool industries.

At least one technical problem exists with the specifications. The micron values of fiber diameter range and maximum standard deviation are expressed to two decimal places. This implies that mean diameters of wool fibers are normally measured to an accuracy equal to or greater than 0.01 μm. In practice, enough fibers are routinely measured to permit confidence limits of the mean of $\pm$ 0.2 - 0.5 μm at the 95% probability level. It is impractical to utilize confidence limits of $\pm$0.01 μm, even with modern instrumentation that allows relatively rapid measurements. Further, the U.S. practice of using wool grades in production, marketing and manufacturing situations is declining with grade being gradually replaced with a direct quotation of fiber diameter in microns. Similar practices are declining in the major producing and manufacturing nations of the world. Thus, it seems likely that the use of specifications for grades of wool and wool top will continue to decline in the U.S. and be replaced by a measurement of actual diameter and variability.

Wool production

Estimated world production of raw wool reached record levels in 1986 when 6,560 m lb (greasy basis) were harvested (Commonwealth Secretariat, 1986; table 4 and figures 1 and 2). Leading producing nations were Australia, Russia, New Zealand, China, Argentina, South Africa and Uruguay. Since the 1935-44 decade, grease wool production in the U.S. has dropped from an average of 450 m lb a year (11.3% of world total) to about 86 m lb (1.3%) in 1986. Estimated U.S. wool production by state and grade was recently summarized by The Market Information Services of the American Sheep Producers Council (ASPC). This information is summarized in table 5. The nation's major wool producing states are Texas, Wyoming, California, Colorado, Montana, South Dakota, Utah, New Mexico, Iowa, Oregon and Idaho. Over 75% of U.S. wool production is expected to have occurred in these 11 states in 1987.

Following a period of decline, the total disappearance (total utilization) of wool in the U.S. has recently increased from 227 m lb (clean basis) in 1980 to 381 m lb in 1985 (table 6, figure 3). The total disappearance in this context includes U.S. mill consumption of domestic and imported wool and wool content of imports in all types of products.

Table 1. Sheep Breeds and Wool Diameter Ranges[a]

Breeds	Range of average diameter (μm)	Grease fleece weight (ewe, lb)	Range of yield (%)
Border Leicester	35 - 40	8 - 12	65 - 80
Cheviot	27 - 33	5 - 10	50 - 75
Columbia	22 - 31	10 - 16	45 - 55
Corriedale	25 - 33	10 - 17	50 - 60
Debouillet	18 - 23	10 - 18	35 - 55
Delaine - Merino	18 - 23	8 - 14	35 - 55
Dorset	25 - 32	5 - 9	50 - 75
Finnsheep	22 - 31	4 - 8	55 - 70
Hampshire	25 - 31	6 - 10	50 - 62
Lincoln	36 - 41	12 - 20	65 - 80
Montadale	25 - 31	8 - 12	45 - 60
Oxford	28 - 34	8 - 12	50 - 62
Rambouillet	19 - 25	8 - 18	35 - 65
Romney	31 - 40	8 - 12	65 - 80
Shropshire	25 - 31	6 - 10	50 - 75
Southdown	22 - 28	5 - 8	40 - 55
Suffolk	28 - 35	5 - 8	50 - 62
Targhee	22 - 25	10 - 14	50 - 55

[a] Source: American Wool Council, Division of American Sheep Producers Council (AWC, ASPC)

This statistic is similar to consumer demand and in 1986, the value was 435 m lb., which represents a consumption of close to two clean pounds per person.

With domestic production of wool on the decline and consumer demand increasing rapidly, the difference is being made up with imported wool and imported manufactured articles containing wool produced overseas. Two questions remain. First, why did sheep numbers and wool production decline? Secondly, can the trend be reversed?

The principal reasons for the decline were the acceptance of synthetic fibers by the U.S. consumer that resulted in reduced demand for wool by the textile industry and secondly, the changes in food preferences of the U.S. consumer that resulted in a reduction of the per capita intake of lamb and mutton (Collins and Lawler, 1984).

Initial acceptance of synthetic fibers was assured by the easy-care, shrink-free, relatively long-wearing properties of apparel and carpets composed of nylon, polyester and acrylic fibers. Add to this the comparatively predictable quality, supply, low prices and price stability of synthetics that were influenced little by overseas factors and it is easy to rationalize why so many traditional wool end-uses were replaced with synthetics. Following a period when it looked as though wool might disappear from the market altogether, consumers began to realize that many garments composed of 100% synthetic fibers were uncomfortable. Subsequently, blended fabrics containing natural fibers in combination with synthetics were developed having the comfort, absorbency, resilience and flame resistance characteristics of wool and the durability of synthetics. We are now experiencing a trend of increasing consumption of wool and other natural fibers in apparel textiles that is being influenced by a fashion-, quality- and comfort-conscious population. The same cannot be said for the carpet industry that is still heavily dominated by nylon and polyester, primarily, if not entirely, because of price differentials between wool and the synthetics.

Other factors that have affected the decline include conversion of range land to urban uses and reduced profitability due to predator losses, increased labor costs and labor shortages. Also the discovery of oil on thousands of

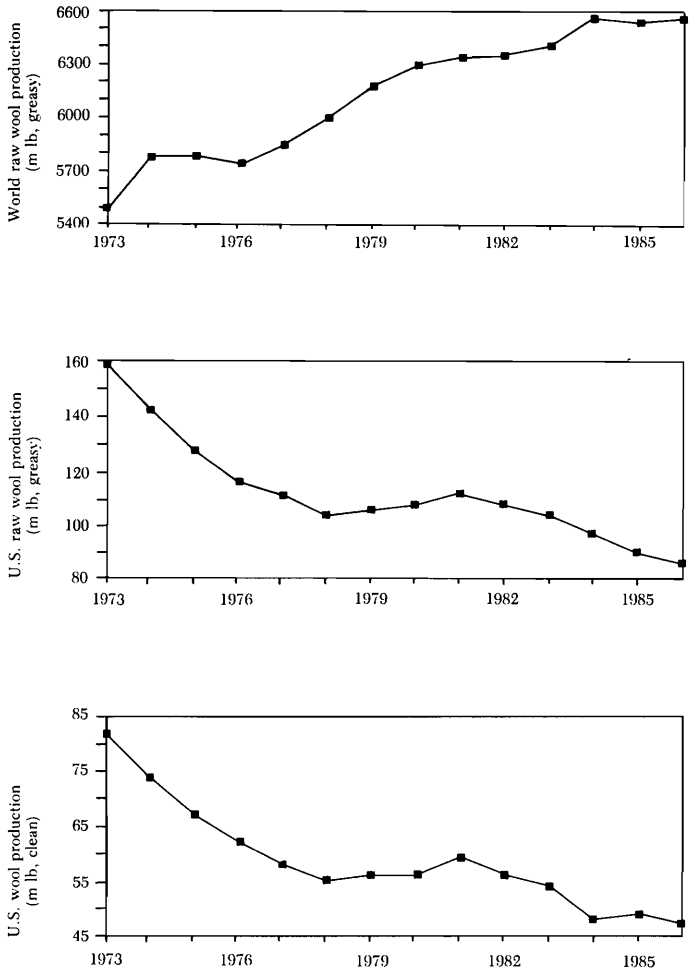
Table 2. Specifications for Grades of Wool

Grade	Range for average fiber diameter, μm	Standard deviation max, μm
Finer than 80s	under 17.70	3.59
80s	17.70 to 19.14	4.09
70s	19.15 to 20.59	4.59
64s	20.60 to 22.04	5.19
62s	22.05 to 23.49	5.89
60s	23.50 to 24.94	6.49
58s	24.95 to 26.39	7.09
56s	26.40 to 27.84	7.59
54s	27.85 to 29.29	8.19
50s	29.30 to 30.99	8.69
48s	31.00 to 32.69	9.09
46s	32.70 to 34.39	9.59
44s	34.40 to 36.19	10.09
40s	36.20 to 38.09	10.69
36s	38.10 to 40.20	11.19
Coarser than 36s	over 40.20	

Table 3. Specifications for Grades of Wool Top

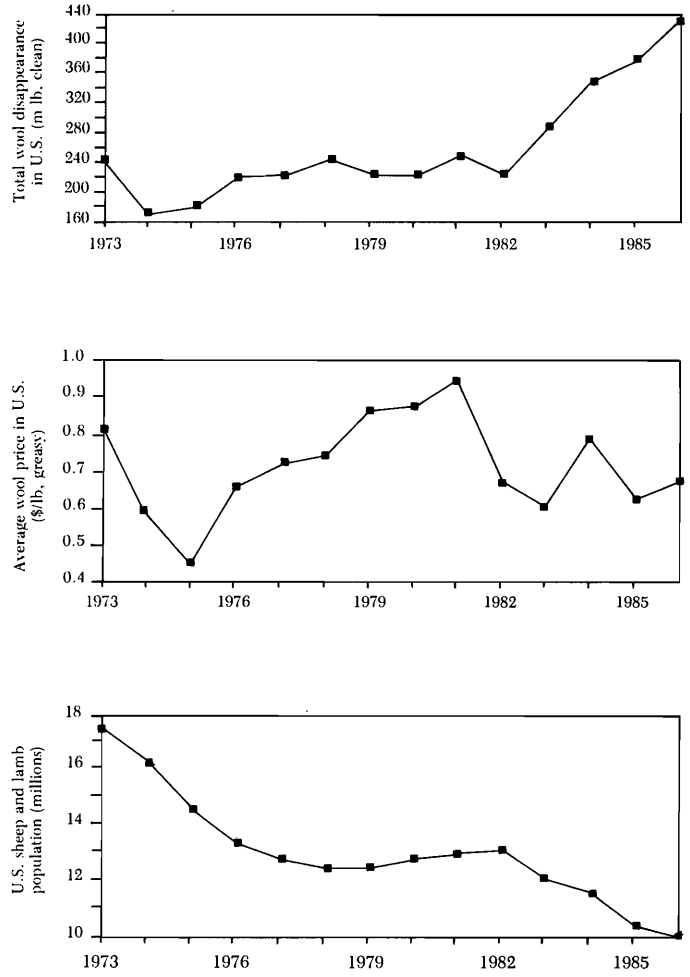
Grade	Average diameter range, μm	Fiber diameter distribution, %							
		25 μm and under, min	30 μm and under, min	40 μm and under, min	25.1 μm and over, max	30.1 μm and over, max	40.1 μm and over, max	50.1 μm and over, max	60.1 μm and over, max
Finer than 80s	under 18.10	95	...	...	5	1	...	...	...
80s	18.10 - 19.59	91	...	...	9	1	...	...	...
70s	19.60 - 21.09	83	...	...	17	3	...	...	...
64s	21.10 - 22.59	...	92	...	...	8	1	...	...
62s	22.60 - 24.09	...	86	...	...	14	1.5	...	...
60s	24.10 - 25.59	...	80	...	...	20	2	...	...
58s	25.60 - 27.09	...	72	...	...	28	...	1	...
56s	27.10 - 28.59	...	62	...	...	38	...	1	...
54s	28.60 - 30.09	...	54	...	...	46	...	2	...
50s	30.10 - 31.79	...	44	...	...	56	...	2	...
48s	31.80 - 33.49	...	...	75	...	...	25	...	1
46s	33.50 - 35.19	...	...	68	...	...	32	...	1
44s	35.20 - 37.09	...	...	62	...	...	38	...	2
40s	37.10 - 38.99	...	...	54	...	...	46	...	3
36s	39.00 - 41.29	...	...	44	...	...	56	...	4
Coarser than 36s	over 41.29	...	...	...	...	...	...	...	...

FIGURE 1. WORLD AND U.S. WOOL PRODUCTION [f]



[f] Sources: Commonwealth Secretariat/Textile Organon/USDA/ASPC

FIGURE 2. DISAPPEARANCE AND PRICE OF WOOL AND SHEEP POPULATION IN THE U.S. [g]



[g] Sources: USDA/ASPC/Bureau of Census

acres of sheep country has reduced the incentive of many producers to continue in the business. Changing life styles, improved standards of living and the level of care and protection required by sheep compared to other species have deterred many producers from continuing and potential producers from entering the sheep business.

In recent years, wool production has declined at a slightly faster rate than sheep numbers. This is attributable to the declining wool production of individual sheep. In 1970, the average production was 8.43 lb/sheep. The average weight per fleece in 1985 was 7.83 lb. This is a discouraging statistic especially when compared with the 11.5 lb/sheep average of Australia and New Zealand. It probably reflects a preoccupation with lamb production that, typically, accounts for more than 70% of a producer's income from sheep. However, this situation could rapidly be turned around through increased use of dual purpose sheep breeds, particularly with the current added incentive of relatively high wool prices.

Another factor affecting wool (and other fiber) prices and consumption is general economic activity. For example, mill requirements dropped drastically in the 1982 recession but increased again as recovery took place in 1983.

Table 4. World and U.S. Wool Production, Price and Sheep Population

Year	World raw wool production (m lb, greasy)[b]	U.S. raw wool production (m lb, greasy)[b]	U.S. wool production (m lb, clean)[d]	Total wool disappearance in U.S. (m lb, clean)[d]	Average U.S. wool price ($/lb, greasy)[d]	U.S. sheep + lamb population (millions)[c]
1973	5474	159	82	241	.827	17.6
1974	5771	143	74	168	.591	16.3
1975	5774	128	67	178	.447	14.5
1976	5734	117	62	220	.657	13.3
1977	5838	112	58	225	.720	12.7
1978	5983	104	55	245	.745	12.4
1979	6168	106	56	226	.863	12.4
1980	6285	108	56	227	.881	12.7
1981	6335	112	59	252	.945	12.9
1982	6358	108	56	228	.684	13.0
1983	6407	104	54	290	.612	12.0
1984	6557	97	48	352	.795	11.5
1985	6536[e]	90[e]	49	381	.633	10.4
1986	6560[e]	86[e]	47	435	.680	10.0

[b]source: Commonwealth Secretariat/Textile Organon

[c]source: USDA/ASPC

[d]source: Bureau of Census/ASPC

[e]preliminary estimate

In the long term, the growth of raw wool imports (from Australia, New Zealand, South Africa, Argentina and the United Kingdom) and textiles containing wool (from Hong Kong, Italy, S. Korea, U.K., China and Japan) has been a consequence of and a contributor to the decline in domestic wool production and wool textile manufacturing. Numerous legislative attempts have failed to reduce importation levels. Legislation that has affected the sheep industry in a positive way is the National Wool Act of 1954. Policy makers recognized that wool is an "essential and strategic commodity which is not produced in quantitites and grades in the U.S. to meet domestic needs." Thus an incentive program was initiated to encourage production of higher quality wool and to improve wool marketing. This has functioned since 1955 by providing direct payments to producers. There is little doubt that this program has slowed the decline in sheep numbers, although a minority has claimed the program has accelerated the decline. Tariffs on imported yarn, fabric and clothing provide some protection for the domestic wool processing industry, while the tariff on grease wool imports, which has been decreased dramatically since the passing of the Wool Act in 1954, was designed to give some protection to the wool producer. The money collected in the form of tariffs more than offsets the cost of the wool program. Although this is advantageous to the U.S. producer, some economists (Collins and Lawler, 1984) claim it is disadvantageous to the U.S. consumer since tariffs raise the prices of both raw wool to the U.S. textile mills and imported textiles. Further discussion of the pros and cons of wool tariffs and the wool program is beyond the scope of this review. The interested reader will find many alternative sources of information (Whipple, 1987).

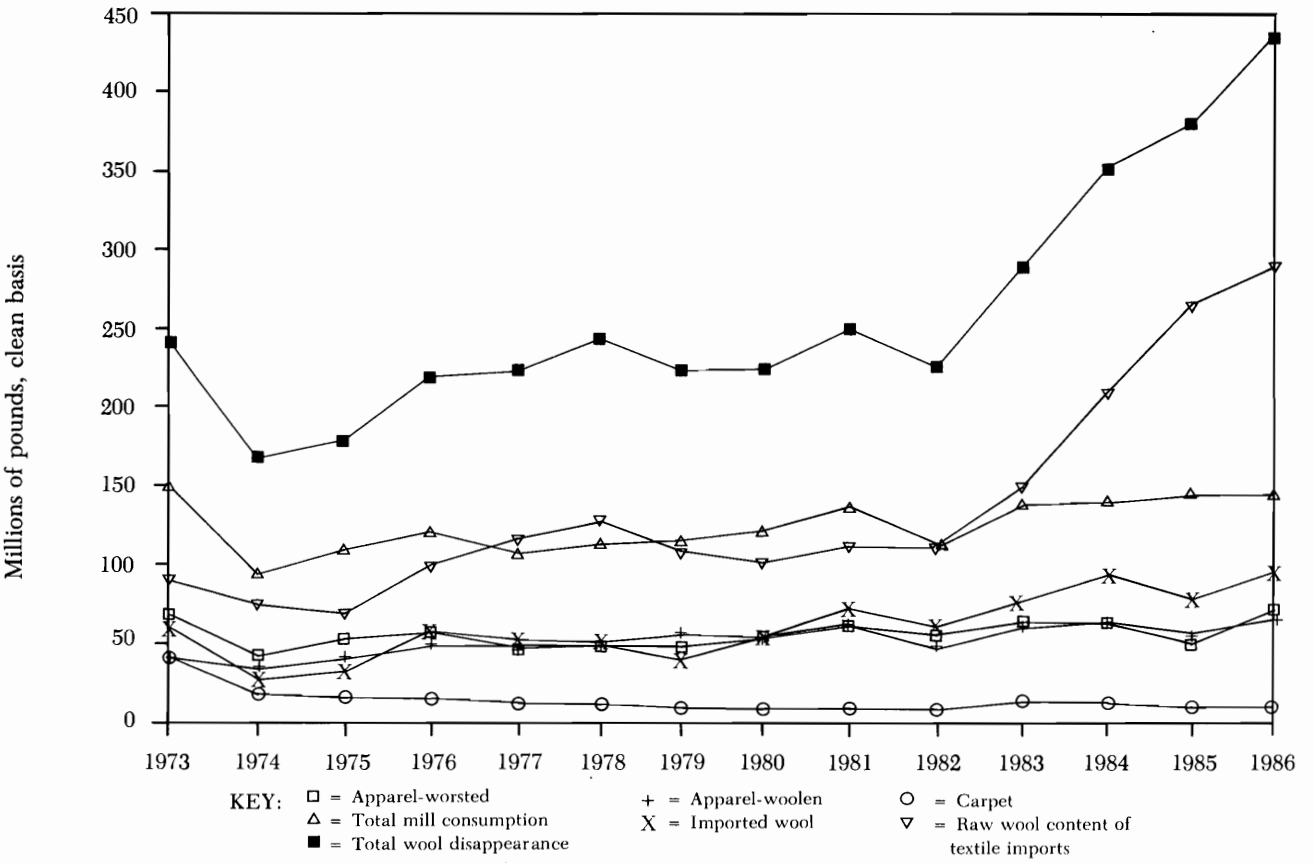
The brightest statistic in the U.S. wool industry is consumer demand. As mentioned previously, demand has increased from 227 m lb in 1980 to 435 m lb in 1986. Annual per capita wool consumption in the U.S. has risen from .7 to 1.7 lb since 1975. Unfortunately, very little of this increase has been provided by domestic wool or domestically produced textiles. The big increase has been in imported textiles. Nevertheless, consumer demand for wool in the U.S. is increasing. This provides a golden opportunity for wool producers and textile manufacturers to rebuild wool operations and take avantage of the favorable consumer trend towards increased consumption of natural fibers. Record high wool and lamb prices should help to accelerate these expansions.

Table 5. 1987 Estimated Domestic Wool Clip [h] (Greasy Pounds)

State	64 s & finer	60 - 62 s	56 - 58 s	50 - 54 s	48 s/coarser	Total
AL	-	600	6,000	5,400	-	12,000
AK	-	-	-	5,000	15,000	20,000
AZ	506,000	1,113,200	303,600	101,200	-	2,024,000
AR	3,000	12,000	9,000	4,500	1,500	30,000
CA	2,628,150	3,754,500	750,900	375,450	-	7,509,000
CO	625,500	2,502,000	2,502,000	625,500	-	6,255,000
CT	-	-	16,8000	28,000	11,200	56,000
DE	-	-	3,000	3,000	-	6,000
FL	-	-	8,000	12,000	-	20,000
GA	-	3,000	27,000	30,000	-	60,000
ID	133,4000	400,000	1,066,800	933,450	133,350	2,667,000
IL	-	95,000	190,000	427,500	237,500	950,000
IN	-	55,900	167,700	223,600	111,800	559,000
IA	162,000	324,000	972,000	1,296,000	486,000	3,240,000
KS	345,000	517,500	517,500	345,000	-	1,725,000
KY	-	12,250	122,500	110,250	-	245,000
LA	-	2,950	29,500	23,600	23,600	59,000
ME	-	-	23,900	66,500	22,600	113,000
MD	-	-	7,800	70,200	78,000	156,000
MA	-	-	31,800	53,000	21,200	106,000
MI	-	112,650	262,850	300,400	75,100	751,000
MN	-	95,300	667,100	953,000	190,600	1,906,000
MS	-	-	19,250	15,750	-	35,000
MO	77,000	115,500	192,500	346,500	38,500	770,000
MT	563,900	1.973,650	2,255,600	563,900	281,950	5,639,000
NE	129,000	322,500	451,500	387,000	-	1,290,000
NV	285,250	448,250	81,500	-	-	815,000
NH	-	-	23,100	38,500	15,400	77,000
NJ	-	-	23,400	39,000	15,600	78,000
NM	1,407,000	2,010,000	402,000	201,000	-	4,020,000
NY	21,400	42,800	171,200	171,200	21,400	428,000
NC	-	-	17,200	43,000	25,800	86,000
ND	77,700	155,400	621,600	621,600	77,700	1,554,000
OH	63,840	106,400	425,600	1,000,160	532,000	2,128,000
OK	189,000	226,800	226,800	113,400	-	756,000
OR	-	406,200	812,400	947,800	541,600	2,708,000
PA	36,250	72,500	290,000	253,750	72,500	725,000
RI	-	-	7,500	12,500	5,000	25,000
SC	-	-	2,000	2,000	-	4,000
SD	751,500	1,753,500	1,252,500	1,002,000	250,500	5,010,000
TN	-	4,000	26,400	48,000	1,600	80,000
TX	12,614,040	3,409,200	852,300	170,460	-	17,046,000
UT	665,100	1,773,600	1,773,600	221,700	-	4,434,000
VT	-	-	33,300	55,500	22,200	111,000
VA	27,600	110,000	207,000	759,000	276,000	1,380,000
WA	-	55,000	192,500	192,500	40,000	550,000
WV	10,600	26,500	148,400	26,500	29,500	530,000
WI	-	75,400	226,200	301,600	150,800	754,000
WY	1,887,500	3,020,000	2,265,000	377,500	-	7,550,000
Total	23,209,730	25,108,450	20,686,100	14,142,870	3,904,850	87,052,000

[h]Source: ASPC Market Information Services

FIGURE 3. WOOL CONSUMPTION OF U.S. MILLS, IMPORTED WOOL, AND WOOL CONTENT OF TEXTILE IMPORTS [j]



[j] Sources: Bureau of Census/ASPC

Other countries (Australia, New Zealand and South Africa) have reserve wool price systems that reflect world supply and demand and have the effect of stabilizing higher wool prices internationally. Perhaps it is time for the U.S. (government or private sector) to initiate a similar system. Although such a system would likely have little effect on international wool prices (since the U.S. produces only 1.3% of the world total) it could have a tremendous stimulating effect upon domestic production. Improved marketing systems, generally, are also expected to have an impact on the wool industry.

One final observation. The National Wool Act was passed to increase the quantity and quality of wool produced in the U.S. It has failed to increase production since its initiation in 1955. However, the program has undoubtedly slowed the decline in wool production and preparation. There is little evidence that wool quality has improved in the U.S. since 1955. Before the Wool Act requires further renewal, producers must rise to the challenge of improving wool quality using the many options at their disposal: selection and use of superior breeding stock; improved nutrition and management methods; increased attention to animal health; and, lastly, improved preparation and marketing techniques. With documented quality improvements and stabilized or incresed wool production, policy makers and legislators are more likely to act favorably in the future.

To assist with a genuine turn-around in the sheep industry, continued aggressive advertising is required to help convince consumers to wear more wool and eat more lamb. Agricultural research must assist the industry to identify practical methods of producing more wool of

Table 6. Wool Consumption of U.S. Mills, Imported Wool, and Wool Content of Textile Imports (m lb, clean basis)[i]

Year	Apparel		Carpet	Total Mill consumption	Imported wool	Imported wool, % of U.S. mill consumption	Raw wool content of textile imports	Total wool disappearance in U.S.
	Worsted system	Woolen system						
1973	68.2	41.7	41.4	151.3	60.1	39.7	90.0	241.3
1974	41.9	33.0	18.6	93.5	26.9	28.8	74.2	167.7
1975	53.1	41.0	15.9	110.0	33.6	30.5	68.4	178.4
1976	56.8	49.8	15.1	121.7	57.5	47.2	98.6	220.3
1977	46.9	48.6	12.5	108.0	53.0	49.1	116.6	224.6
1978	49.2	53.0	13.0	115.2	50.4	43.7	129.4	244.6
1979	49.1	57.4	10.5	117.0	42.3	36.2	109.5	226.5
1980	56.4	57.0	10.0	123.4	56.5	45.8	103.3	226.7
1981	63.2	64.5	10.9	138.6	74.2	53.6	113.6	252.6
1982	57.5	48.3	9.8	115.6	61.4	53.1	112.2	227.8
1983	66.1	60.7	13.9	140.7	78.1	55.5	149.8	290.5
1984	63.8	65.2	13.1	142.1	94.2	66.3	210.2	352.3
1985	50.3	55.7	10.6	116.6	79.5	68.2	264.8	381.4
1986	70.4	65.0	10.2	145.6	94.6	65.0	289.4	435.0

[i]Sources: Bureau of Census/ASPC

higher quality, raise more lambs having greater palatability and consumer appeal. Continued economic research must provide answers on how producers can best prepare and market their products in order to optimize profitability. Product developers must continue to improve the performance of existing wool products and also identify new product niches for U.S. wools.

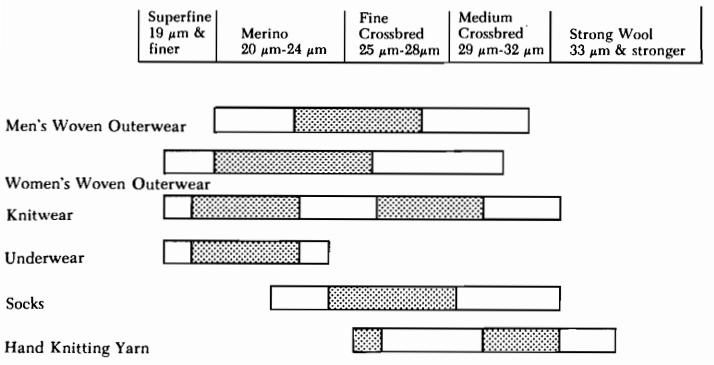
Uses of wool in the U.S.

The suitability of wool for a particular end use is determined primarily by mean fiber diameter. The specific roles of wool in international textile markets were the subject of a recent article by Piercy (1987) of the International Wool Secretariat. Ranges of wool fiber diameter for the major apparel and non-apparel products were outlined in this article and are duplicated here (figures 4 and 5, in which the shaded areas represent the primary ranges).

As is well known, the specific grade of wool used in a particular type of product is quite variable. However, these figures give a general idea of the overall range and also the relatively small range from which the bulk of products are composed. Generally, the average fiber diameters required for underwear and one segment of knitwear are finer than those required for women's woven outerwear. Women's outerwear tends to be composed of finer fibers than men's outerwear. Socks, in turn, tend to be composed of higher grade fibers than most hand knitting yarns. With the possible exceptions of felts and blankets, most non-apparel products are manufactured with coarser wools than apparel merchandise.

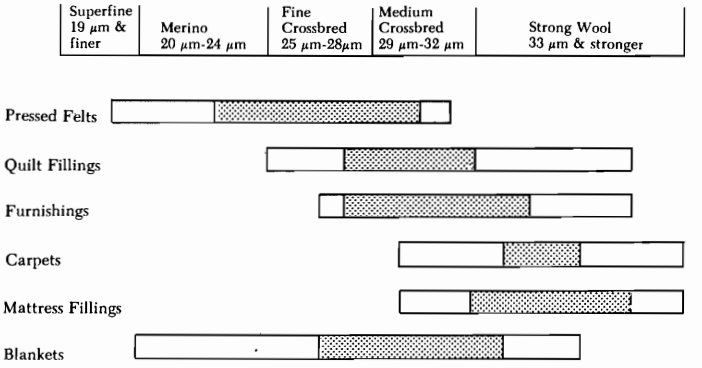
Globally, approximately two-thirds of wool consumption is in apparel articles with the remainder being consumed in other textile applications such as carpets, blankets, felts and upholstery. Consumption trends in the U.S. are summarized in tables 7, 8 and 9 that contain data supplied by the Wool Bureau, Inc. (Newman, 1987). Comparison of the totals in tables 6 and 7 reveal that in some years the quantities reported by different agencies are substantially different. Nevertheless, major trends are the

FIGURE 4. WOOL DIAMETER RANGES FOR APPAREL PRODUCTS [k]



[k] Source: International Wool Secretariat

FIGURE 5. WOOL DIAMETER RANGES FOR NON-APPAREL PRODUCTS [l]



[l] Source: International Wool Secretariat

same. These differences probably reflect the enormous difficulties encountered when collecting this type of data.

In 1986, the top four categories, in order of decreasing wool consumption, were women's outerwear, carpets, men's outerwear and knitwear. Comparison with table 6 reveals that approximately 60% of apparel but only 12% of wool used in carpets is processed in the U.S. The balance enters the U.S. in semi-processed and fully manufactured textiles. The steady increase in wool consumption in women's outerwear is most encouraging. The more than three-fold increase of wool consumption in carpet yarns represents tremendous progress and an opportunity for U.S. manufacturers to enter an expanding market. Wool disappearance in men's outerwear appears to be holding steady whereas consumption in knitwear is declining slightly. Although not yet up to 1978 levels, wool use in upholstery has increased steadily since 1981. The suitability and relative safety of wool fabrics in airplanes, other forms of transportation and public buildings would appear to indicate a strong future for wool in both upholstery and carpets. Unlike upholstery, wool consumption in felts and retail piece goods has been slowly declining.

In the U.S., by far the fastest expanding end use for wool is in mattress pads. Consumption in this new product has risen from zero to over five million pounds in three years time. Our industry could use the development of a few more products like this! Another five million pounds of wool is used in hand knitting yarns. This quantity has been relatively constant over the past ten years, decreasing considerably between 1985 and 1986. Another five million pounds of wool are consumed in blankets, a value that has not changed very much in ten years. There does not appear to be a positive or negative trend for wool usage in socks, although a modest, increasing trend is observed in the case of uniforms. Consumption of wool in children's outerwear has been on a steady decline for ten years and the amount of wool used in children's and infant's knitwear is at a nine year low level.

Individual categories composing men's outerwear are shown in table 8. Most wool is consumed in the three major groups; trousers, suits and jackets. Although the quantity used in suits has been fairly constant, the amounts used in jackets and trousers have almost doubled since 1976. Unfortunately, the same progress is not observed in men's outer jackets and coats. The brightest category in women's outerwear (table 9) is outer jackets and coats. Consumption has increased from 26 to nearly 42 million pounds since 1983. The annual disappearance of wool in women's jackets, dresses and skirts appears to be declining slowly, consumption having peaked for each of these categories in 1982. Wool usage in dress slacks and pant and skirt suits seems to be holding steady and possibly increasing in the case of the suits sub-group.

Table 7. Wool Consumption in the U.S. (m lb, clean)[m]

End use/year	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Knitwear	21.13	26.96	25.20	23.23	26.16	30.67	38.72	43.68	49.54	48.60	45.12
Men's Outerwear	44.76	47.86	45.97	44.65	45.91	44.31	48.70	51.99	60.25	60.35	60.75
Women's Outerwear	45.28	52.64	64.30	68.70	73.33	78.80	86.75	91.41	91.94	95.96	101.24
Children's Outerwear	8.42	7.56	5.53	4.93	5.37	5.03	4.86	4.76	4.30	4.30	2.39
Children's & Infant's Knitwear	.76	.44	.90	1.04	.79	1.08	1.36	1.40	1.03	1.04	.68
Carpets	26.30	26.55	31.02	29.54	29.49	29.99	37.64	52.53	72.52	84.01	86.84
Blankets	5.05	5.10	6.18	6.26	6.68	3.02	4.62	3.90	4.49	4.16	4.91
Hand Knitting Yarn	6.00	4.61	4.80	4.01	3.89	4.45	4.92	5.17	6.03	6.81	5.01
Retail Piece Goods	6.29	9.93	9.52	9.95	10.06	11.53	9.48	9.53	9.74	8.65	8.63
Socks	2.30	3.01	3.82	4.55	4.73	4.26	5.29	4.39	4.60	3.94	4.76
Underwear	.00	.00	.00	.00	.00	.00	.00	.13	.13	.11	.10
Upholstery	15.20	16.79	21.11	9.06	10.43	7.86	9.08	11.53	14.89	16.44	17.41
Felts	11.01	18.58	16.45	15.98	14.09	14.40	11.58	14.02	13.78	11.52	8.88
Uniforms	3.09	2.52	1.93	1.67	1.64	1.66	2.09	1.93	1.94	2.16	2.92
Men's Leisure	.20	.17	.12	.12	.03	.08	.21	.07	.03	.04	.03
Miscellaneous	.00	.00	.00	.00	.00	.07	9.16	11.64	15.94	15.64	16.95
Mattress Pads	.00	.00	.00	.00	.00	.00	.00	.00	1.54	3.66	5.14
Total	195.79	222.72	236.85	223.69	232.60	237.21	274.46	308.08	352.69	367.39	371.80

[m]Source: The Wool Bureau, Inc.

Table 8. Wool Consumption in Men's Outerwear in the U.S. (m lb, clean)[n]

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Jackets	7.98	8.40	9.73	9.56	10.77	11.51	14.14	15.67	16.01	15.31
Suits	16.14	14.39	13.51	14.15	15.67	16.01	15.49	18.22	17.04	16.57
Dress and Sport Trousers	10.02	12.07	11.07	12.31	11.86	14.05	15.31	18.30	16.92	17.80
Outer Jackets	9.35	5.43	6.76	6.70	3.62	4.33	4.28	4.75	7.49	7.88
Coats	4.37	5.69	3.58	3.18	2.39	2.80	2.76	3.30	2.89	3.24
Total	47.86	45.98	44.65	45.90	44.31	48.70	51.98	60.24	60.35	60.80

[n]Source: The Wool Bureau, Inc.

Table 9. Wool Consumption in Women's Outerwear in the U.S. (m lb, clean)[p]

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Jackets	3.12	4.28	5.95	8.39	11.62	11.80	11.71	10.15	8.73	8.91
Outer Jackets and Coats	-	-	-	-	-	-	26.39	28.95	35.92	41.93
Dresses	9.37	8.06	7.81	9.61	9.21	11.35	7.30	8.17	7.40	6.16
Dress Slacks	-	-	-	-	13.62	16.23	16.46	17.55	17.84	17.67
Skirts	8.69	9.10	10.27	14.14	20.20	21.14	20.72	18.55	18.42	17.77
Pant and Skirt Suits	5.98	6.26	7.28	4.85	5.26	7.63	8.83	8.58	7.65	8.81
Total	52.64	64.30	69.70	73.33	78.80	86.75	91.41	91.95	95.96	101.25

[p]Source: The Wool Bureau, Inc.

Conclusions

The consumption of wool in the U.S. has increased rapidly since 1982. This does not appear to be a short-term trend inspired by the vagaries of fashion but rather a steady, general return to textiles having superior comfort and quality characteristics and being composed of natural fibers. Up to the present time, the bulk of the increased consumption has been composed of wool that was grown and processed overseas and imported into the U.S. in manufactured textiles. To provide sufficient raw materials for our domestic mills in 1986, it was necessary to import 94.6 m lb (clean basis) of wool which represented 65% of overall mill consumption. Since less than 5% of U.S. wool production is exported, the message from the U.S. woolen and worsted textile manufacturers to domestic wool growers is clear. Grow more wool. With prices of wool and lamb at record levels, the time would appear to be ripe for a prompt response from the sheep industry.

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