UNITED STATES DEPARTMENT OF AGRICULTURE
Economic Research Service

NEW DEVELOPMENTS IN LEATHER PRODUCTS AND FOOTWEAR

Talk by John W. Thompson
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I appreciate the opportunity to participate in the outlook conference. Aside from the personal satisfaction received, I am especially pleased to discuss with you some of the new developments taking place in the hide, leather and footwear industries.

Basically, the important new developments stem from fundamental technological and and economic changes of recent years. These include changes in the way livestock are raised, changes in methods of removing and curing hides, changes in methods of tanning and finishing leather, and the development of new or improved leather products and increasing competition from synthetics.

Research efforts by USDA are expanding. Over the last 5 years, the Department has expended considerable effort to finding new uses for leather, improving leather products and finding more efficient methods for marketing hides, leather, and leather products. Part of this increased effort has come about because of synthetics. However, we often overlook the fact that we have more hides to market. For example, between 1954 and 1964 producers increased their production of beef from 80 pounds per capita to 100 pounds per capita. This resulted in about one third more hides being produced. Yet per capita consumption of leather did not change significantly. The surplus hides were exported. We should also keep in mind that hides and skins are the most valuable byproduct of the livestock industry. Today a cured hide is worth about $10.00. This is equivalent to $1.00 per hundredweight in the price of a 1,000 pound-steer. Increasing the value of hides can increase the farm value of beef cattle. Conversely, if hides fall in value, the farmer receives less for his cattle or the housewife pays more for her meat.

In preparing for today's talk, I thought it might be appropriate to start with an overall view of the hide, leather and shoe industry, then examine each segment with a little detail, and finish up with where the industry is going and what the consumer can expect in the way of new or improved leather products.

The marketing of hides through leather products is big business. Sales of domestically-manufactured leather products are about $5.8 billion a year. (table 1) In addition, exports of hides and skins brought $108 million in 1965, contributing significantly to improvement in our balance of trade. However, the value of hides and skins is only about 4 percent of the retail value of leather products. Most of the consumer's dollar goes to manufacturers and retailers.

Per capita expenditures for leather footwear are about $22 a year, while expenditures for other leather products are about $8 a year--nearly $30, in total.

Table 1.-- Estimated value of hides, skins and leather products at various marketing levels, 1963

Marketing agency	Value	Percentage of retail value
	Million dollars	Percent
Meat packers 1/	223	3.9
Tanners 2/	810	14.0
Leather manufacturers 3/	3,170	55.0
Retail 4/	5,764	--

1/ Bureau of the Census, MC 63 (2) -20A.
2/ Bureau of the Census, MC 63 (2) -31A. Includes belting
3/ Bureau of the Census, MC 63 ( ) -31A and 31B. Shoes and slippers $2,373 billion; other leather products, $797 million.
4/ Estimated by applying a cumulative mark-on of 45 percent to all leather products

Supply and demand for U.S. hides and leather is changing. Commercial production of U.S. cattle hides this year is expected to result in about 34 million hides. Over the last 10 years U.S. use has averaged 21-24 million annually. (table 2).

Table 2.--Meat packers value of hides and skins, commercial cattle slaughter tanners hide purchases and hide exports, 1955 to 1965

Year	Meat packers value of hides and skins 1/	Commercial cattle slaughter 2/	Cattle hide movement to tanners 3/	Hide exports 2/
	$1,000	1,000 head	1,000 hides	1,000 hides
1965	N.A.	32,324	22,567	13,320
1964	218,201	30,818	22,033	11,540
1963	223,421	27,231	20,909	7,972
1962	367,978	26,083	21,590	7,121
1961	355,701	25,635	21,329	7,645
1960	340,296	25,224	20,816	6,899
1959	366,412	22,931	21,551	4,107
1958	195,667	23,555	22,295	5,434
1957	243,895	26,232	23,157	6,518
1956	260,327	26,862	24,442	4,943
1955	228,435	25,722	23,551	5,863

1/ Census of Manufacturers and Annual Survey of Manufactures, Bureau of Census.
2/ Tanners Council of America
3/ Does not include renderer hides Includes imported hides

The remainder of our hide supply has been exported Due to increased leather demand on the part of the military as well as the civilian population, total cattle hides tanned this year is expected to be up a million hides from the 1965 level Looking ahead to 1967, it appears the number of cattle hides available will be down by about 4 percent or 1-2 million from this year

Many changes at the farm and packing house will help improve leather Grub eradication programs have helped eliminate holes in leather and increased shoemakers' cutting yields. More than 20 percent of all cattle are now being treated for grubs New skinning techniques have substantially reduced knife cuts and scores Confinement of cattle to feed lots has reduced barb wire scratches and biological damage to hides. We are even hopeful that a new method of branding will reduce damage to hides.

Half of our cattle are branded. Conservative estimates set the economic loss from hot iron branding at $15 million annually The new method is freeze branding instead of hot iron branding Under this method, a branding iron is cooled to a sub-zero temperature The hair turns white where the brand is applied and the hide is not damaged as severely. However, this method is in the experimental stage

Another new development which looks promising is the removal of hair from hides at the packing house. This would eliminate curing of hides, reduce transportation costs, and could upgrade the quality of leather We have reason to believe this practice--if adopted--could reduce the marketing charges on a hide by about $1.20

The tanning industry is tending toward specialization. There are about 100 firms in the tanning industry today--each tending to specialize in making a new and improved product Five tanners specialize in producing calf skin leather, 9 in glove leather, 9 in sole leather, 4 in upholstery leather and 4 in patent leather. Most of the remaining tanners specialize in side upper leather for shoes, which accounts for more than 80 percent of all leather used

Another example of specialization in tanning can best be illustrated by a new concept USDA recommended last year--the dividing of a hide into various segments or component parts to produce leather for special uses (figure 1). Each segment of a hide has a different fiber structure, and there are variations in thickness and strength Thus, the segmenting of a hide into component portions improves the quality of the final product For example, belly leather is best for gloves, heads can best be utilized in novelty leather such as billfolds and key cases. shoulder leather is best used for belting or handbags, and the back or bend portion of the hide is best used for high quality shoes.

In typical tannery, a hide will pass thru about 85 processes Let's look at the basic steps involved in converting a hide into leather.

1 Wash in water to remove salt.
2 Agitate in lime water to loosen hair
3. Pass the hides through an unhairing machine.
4 Pass the hides through a fleshing machine to remove fat and flesh
5 Tan in revolving drums to preserve the fibers.
6 Split and shave the hide to the desired thickness
7 Dye to the desired color.
8. Agitate in oils for softness
9 Dry the leather with heat to remove wrinkles.

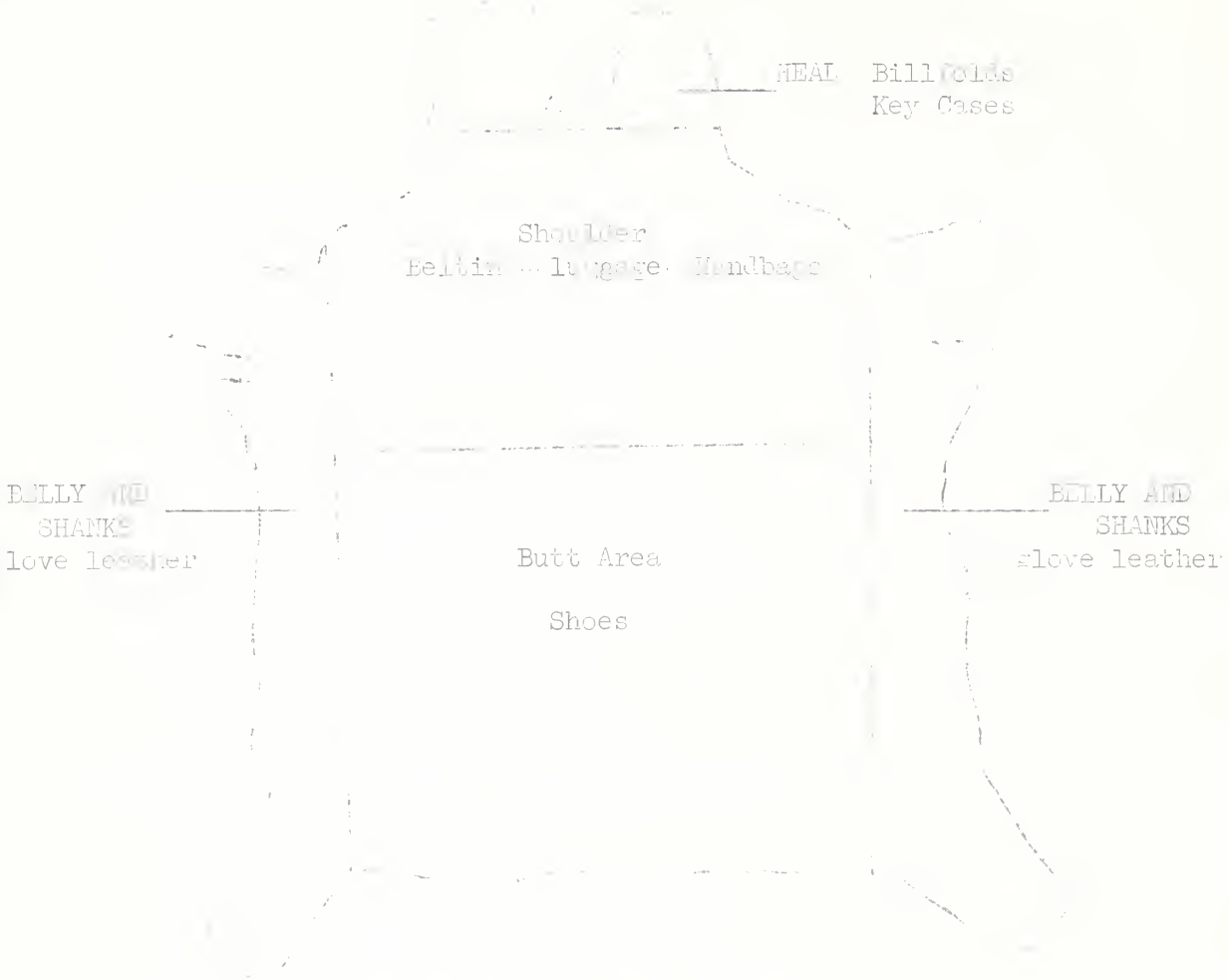

Figure 1 USDA HIDE TRIM PATTERN

10. Finish the leather: for example, emboss a grain on the surface glaze or wax the surface or give it a special effect, such as a patent leather finish.
11. Trim and sort the leather by grades.
12. Package for delivery

Tanning has been one of the last American industries to mechanize or automate Much of this was due to a lack of capital and a lack of technology. Most tanneries are small businesses. The 1963 Census indicated that about one-third of all tanneries employed less than 20 persons. In a typical side upper tannery, the making of fine leather generally took more than 30 days, while sole leather tanneries took 2 to 5 months Today all this is changing. Tanners are cutting the length of time in half It appears that capital investment in equipment by tanneries is at an all-time high Many tanners have made sizable investments in equipment such as 30,000 pound drums for tanning, vacuum driers, flow coaters, and automatic stackers Successful attempts are being made by some tanners to achieve a high degree of mechanization as a result of labor shortages and increasing labor costs Currently, electronic equipment is being used to mix chemicals and control quality in tanning and unhairing operations. Mechanization or automation is being used to maintain uniformity in leather and improve quality.

Shoe manufacturing is important to the U.S. economy. There are over 1,300 shoe factories located in 38 states. Total industry employment (including allied trades) exceeds 300,000 persons. Purchases of leather exceed $800 million annually. More than 80 percent of the leather produced is used in shoes

Leather shoe production this year is expected to be about 650 million pairs. When 150 million pairs of leather shoes and more than 125 million pairs of imported shoes are added to this, total pairage for this year approaches 1 billion pairs

The average factory value of all leather shoes will be about $4.25 per pair this year. Thus, the factory value will exceed $2.6 billion in 1966. Add to this the production of other leather goods such as handbags, wallets, belting, saddles, and so on, and the manufactured value of leather goods will exceed $30 billion this year.

Shoes are seldom appreciated. Yet,--they are a part of our everyday needs. We wear them for comfort and protection as well as appearance. Shoes are difficult to mass-produce. Shoes are made in so many different styles, shapes, sizes, and colors that less than 1 percent of the yearly production of a shoe factory is identical There are many methods of making shoes but each requires 125 to 150 steps. The same number of operations are involved in making children's shoes as are involved in producing adult shoes.

On the average, per capita purchases of shoes exceeds 3 pairs for every man, woman, and child. However women, misses and childrens' purchases generally exceeds 4 pairs per person while father and son purchases are 1.8 and 1.4 pairs per year, respectively (table 3).

Table [illegible] Total leather type shoe production and per capita consumption 1960-1965 1/

Year	Total	Women's	Men's	Misses' and children's	Boys' and youths'	Infants' and babies'	All other	Average
	1,000 Pairs	Pairs	Pairs	Pairs	Pairs	Pairs	Pairs	Pairs
196[illegible]	660,041	4.34	1.63	4.43	1.41	1.75	[illegible]	3.32
1961	592,907	4.17	1.65	4.24	1.31	1.68	0.47	3.23
1962	633,230	4.26	1.75	4.16	1.46	1.78	0.54	3.39
1963	[illegible]4,329	[illegible]	1.70	3.91	1.37	1.62	0.50	3.19
1964	612,78[illegible]	[illegible]	1.80	3.[illegible]	1.44	1.58	0.50	3.19
1965	630,070	3.98	1.81	4.10	1.43	1.59	[illegible]	3.24

Shoe prices are a topic of conversation these days. Most shoe prices increased 3 to 5 percent in 1966. Another increase of 3 to 5 percent is expected in prices of the spring shoe lines. 1/ This increase is not expected on all lines, but on a selective basis, such as children's lines and the top quality adult dress shoes.

Most of the price increase is attributable to higher labor and production costs of tanners, shoe manufacturers and retailers--not higher costs of hides. Also, shoe demand is expected to be as strong next year as this year, while supplies of hides are expected to be down. Despite the fact that shoe prices have increased, the hours you worked to earn the money for a pair of shoes have declined 75 percent in the last 50 years.

The typical consumer knows little about how shoe prices are derived. The following table gives some indication of a breakdown in a typical pair of men's dress shoes (Table 4).

Leather substitutes are increasing. Today, more than 25 substitutes for leather are on the market and more will come. Only one substitute sells for more than leather. In my judgment, substitute materials have only two advantages over leather: they need less upkeep or polishing and (with one price tier), they generally are less costly. I have good reason to believe - the leather industry has or will soon finishes that will match those of the substitutes - thus reducing shoe maintenance.

1/ Leather and Shoes, October 1, 1966, p. 34.

Table 4.--An example of marketing costs and returns for hides in making a pair of men's shoes

Marketing agency	Distribution of retail price	
	Value	Percentage of total
	Dollars	Percent
Packinghouse:		
Value of green hides (5.5 lb. at 9 cents)	0 49	4.9
Curing cost	.05	.5
Fleshing cost	.14	1.4
Value of fleshing hide (3.6 lb. weight)	.68	6.8
Tannery:		
Cost of hide (3.6 lb.)	.68	6.8
Brokerage and freight	.07	.7
Tanning materials	.25	2.5
Labor	.25	2.5
Overhead, selling, shipping and profit	.25	2.5
Value of leather (3 square ft.)	1.50	15 0
Shoe manufacturer:		
Cost of upper leather (3 square ft.)	1.50	15.0
Cost of soles, innersoles, linings	1.00	10.1
Labor, overhead, shipping, and profit	3 00	30.2
Manufacturer's price of shoes 1/	5.50	55.3
Retail store:		
Cost of shoes	5.50	55.3
Salesmen	2.00	20.1
Overhead, selling, and profit	2.45	24.6
Retail price	9.95	100.0

1/ About 0.5 square foot of leather is wasted in manufacturing a pair of shoes.

Meeting the price of low cost synthetics is something else again. The problem is that more than 60 percent of all footwear manufactured in 1962 retailed for less than $7.00 (table 5).

Table 5.- Percentage breakdown in shoe production by price lines 1962 1/

Factory value	Retail value	All footwear	Women's dress	Men's dress	Men's work	Misses' and children's	Youths' and boys'	Infant
Dollars	Dollars	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
.60-4.00	1.00-5.00	47.2	26.0	5.1	2.9	63.2	37.2	78.2
4.01-5.20	5.01-7.00	17.2	28.6	14.0	10.1	17.3	18.2	15.0
5.21-6.50	7.01-10.00	17.6	18.9	37.1	29.3	13.2	30.8	6.8
6.51-8.00	10.01-15.50	13.8	21.6	28.4	43.1	1.8	3.8	---
8.01-12.00	15.51-20.00	2.5	3.2	6.9	11.6	---	---	---
12.00-up	20.01-up	1.9	1.7	8.5	3.0	---	---	---
Million pairs 2/		633	197	83	30	69	25	37

1/ Bureau of Census and National Footwear Manufacturing Association
2/ Does not include 91 million pairs of women's playshoes and sandals and 67 million pairs of house slippers.

It is difficult to make good leather shoes that retail for less than $7.00. In 1962, about 55 percent of the men's dress shoes, women's dress shoes, and work shoes retailed for less than $7.00. Thus, the manufacturers of substitute materials are aiming at this volume market. It is my belief that synthetics will compete with each other in the future for the low priced, high volume market while leather will retain the quality and prestige segment of the shoe and other leather product markets.

Of the five properties important in shoe materials, leather surpassed all synthetics yet developed. The five properties are: 2/

1. The water vapor permeability of the materials.

2. The capacity of the materials to absorb water from the moist air surrounding the foot.

3. The ability of the material to wick perspiration away from points of high sweating and distribute it--either to the outer surface of the shoe where it can dry off or more uniformly throughout the material of the whole shoe.

4 The thermal conductivity of both the upper and bottoming materials.

5 The ability of the shoe materials to increase in dimension as they become moist and thus cause the shoe to increase in size as the feet become hot, sweaty, or swollen.

Also, the published statements of shoe manufacturers indicate that the only property of the new synthetic materials which they prefer above leather is the uniformity of these new materials.

In addition to these five properties, I would like to add a few other comments of why leather can compete favorably with synthetics in the upper price-quality markets. The demand for new fashions, new colors, and changes in the [illegible] composition of most apparel materials becomes more important every day--not only because of higher incomes, but also because of the desire to be different or to try new things. Tanners are versatile. They have the ability to give fashion designers more service than mass material producers For example, a tanner can and will change the color, grain and softness of a few hides to meet a buyer's requirements. In fact, it only requires 10 minutes for a tanner to change from one color to another. Synthetic manufacturers are not nearly as adaptable

The leather industry has many new products with improved properties. Perhaps the single most important new chemical--glutaraldehyde--for tanning in recent years came from the Agricultural Research Service, Eastern Utilization Research Laboratory. It has made it possible to impart many new properties to leather. Let's examine some improved leather products and the advantages the consumer might receive

1 Here are a man's dress and work shoe made from glutaraldehyde treated leather. They are soft yet resistant to perspiration, acids and alkali. In fact, they are nearly 3 times as perspiration-resistant as ordinary leather.

2. The second apparel item is a fine leather coat. It is made of sheepskin and is the letest in fashion design. It is soft and pliable It will resist shrinkage even at high temperatures. It can withstand repeated washings with soap and water.

3. The third item is a woman's golf glove It is colored with a new non-bleeding dye. This glove will withstand repeated washings in warm soapy water without the dye bleeding out. It is not affected by perspiration After repeated washing and drying, the glove will still be soft and the leather will not crack.

4. Shearling bed pads for the prevention of bedsores of elderly persons in hospitals are another new item. The wool pile easily absorbs perspiration and provides good distribution of body pressure. The use of shearling bed pads in the past was limited to one-time use because the wool matted when it was washed. Leather researchers in the Agricultural Research Service found a new method to tan the shearlings so it is now possible to launder them many times.

5. Rubber-impregnated leather is another new, improved product from the tanning industry. It will last 8 times longer than ordinary sole leather and 2½ times longer than the major substitutes for sole leather.

6. "Hushpuppy leather" made from pigskins was a product virtually dormant 10 years ago. Through an excellent research, development, and marketing program, hushpuppy shoes are known in 17 countries throughout the world. Today, the problem is how to get additional supplies of pigskins. Currently, one company purchases nearly 7 million pigskins. They anticipate the demand will triple by 1970.

Industry and Government research is providing many improvements to leather. It is now possible to make dye fast leather. Some leathers have been flexed more than 3 million times without cracking. We can shrink the grain surface or puff it up for new effects. Waterproof and scuff-resistant leathers are being produced on a large scale. Multicolor leathers such as seen a few years ago in patent leather shoes and handbags are good examples of new improved finishes. I was privileged a few months ago to see a unique new finish on some leather. The leather had exceptional eye appeal and the processffor accomplishing the desired effect is so new that it appears patentable. All of these are examples of the leather industry putting forth new efforts to hold their present markets, find new markets, and please the consumer.

There is one other new use for hides--sausage casings. Traditionally all sausage casings were natural casings or made of synthetic cellulose materials. Today--as a result of research--more than 50,000 hides a year are used to make a collagen-type sausage casing. The casing is digestable and helps retain flavor. From our point of view, the product has an excellent future not just as a sausage casing, but as a wrapper for cheese and other food products. It is interesting to note that the meat packing industry spent 20 years educating the consumer to eat skinless frankfurters. Since it costs the meat packer about 5 cents a pound to strip synthetic casings from a pound of hot dogs, packers may want to use the new collagen-type casing and re-educate the consumer to eat hot dogs with the casing left on. Frankfurters and sausages wrapped in collagen are being marketed commercially throughout most of the United States. Presently, two firms manufacture the product and we expect that more firms will market similar products in 1 to 2 years.

Speaking before so many women it would be a mistake if I did not mention style [illegible]. The women's "cossack" boots will continue to abound this winter. Changes in styles will be mainly toward a more masculine look in both women's and men's shoes. The spring lines will feature more strap-type shoes and a more [illegible] toe. The design is often referred to as the "geometric look". [illegible] the "[illegible] look" for today's styles. They give the feeling of lightness [illegible]. They [illegible] the simplicity of the basic pump.

I appreciate the opportunity to speak to you today about the hide, leather and shoe industries. If we can be of any service or answer any questions, we will be more than happy to accomodate you.