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## CHAPTER 2

### WORK AND STRUCTURE OF THE SHOE, LEATHER, HIDE INDUSTRY

It would be possible to follow the story of changes in sales, output, and buying without a general knowledge of the structure or operations of the industries supplying shoes, leather, and hides; when such knowledge is important to a particular point, it must in any event be supplied in context. But it is not comfortable or even wise to embark on an intimate acquaintance without the ritual of customary introductions, and it is to this ritual that the present chapter defers.

The group of industries that supply shoes and the chief material out of which they are made (for convenience, we refer to them in the singular as the shoe, leather, hide industry) constitute a good-sized industrial aggregate as American industries go. They provided the major occupation for a little more than half a million workers and proprietors in 1939, roughly about 1.2 per cent of the employed population.<sup>1</sup> In the same year the final consumer good represented about 1.8 per cent of the value of all consumer goods and services, thus placing shoes tenth in the list of some 150 groups of products and services for which consumer expenditures were separately tabulated by the Department of Commerce.<sup>2</sup>

An over-all picture of the contribution of the various segments of the industry to the finished shoe in 1939 is sketched in Table 1. Out of every 100 cents paid by the consumer, the retailer absorbed for his services 31 cents; the manufacturer of leather shoes, 28; the maker of cut stock and findings, 3; the tanner, 8; and 10 cents went for the purchase of raw hides or skins. Margins of wholesalers, agents, importers, etc. absorbed somewhat over 5 cents, and transportation

costs, another 3. The remaining 11 cents went to manufacturers in other industries producing rubber and rubber goods, tanning materials, power, and the like.

The processes traced in this book do not cover the whole shoe, leather, hide industry as here defined. The study of the early stages—raw materials and leather manufacturing—is confined to hides of adult neat cattle and cattle-hide leathers. These constitute something like 65 per cent of the value of all leather used in shoes. The present chapter, however, continues to deal with the structure of more or less the whole industrial area. It attempts to supply a picture of how raw materials journey through the vertical sequence of operations and to give the few available facts concerning the size of the business units that do the work.

#### *Provision of the Raw Material*

Hides and skins come from three major kinds of sources: from meat-packing plants; from a wide variety of domestic sources associated with the meat industry broadly defined; and from abroad.

The meat-packing industry, according to the *Census of Manufactures, 1939*, consisted of 1,478 establishments averaging eighty-one employees. But most of the work done in these buildings had little to do with hides, which are, of course, only a by-product. Many of the establishments were members of single corporate entities. Four of these—Swift, Armour, Cudahy, and Wilson, known as the "Big Four"—produced about 67 per cent of domestic packer hides in 1935.<sup>3</sup> These companies, together with the Argentine subsidiaries of some of them, occupy a position of strategic importance in the raw hides market. Hides from large slaughterhouses and packing plants, known as "packer hides," have been estimated as constituting about two-thirds of the total hide supply in this country.<sup>4</sup> It was possible to tabulate systematically only the portion coming from slaughterhouses that deal in interstate-commerce—"hides from federally inspected slaughter." They averaged 52 per cent of the total hide supply appearing on American markets during the inter-

<sup>1</sup> The total civilian employed working force in the United States was estimated at about 44.1 million people in 1939 (Clarence Long, *The Labor Force in War and Transition: Four Countries*, National Bureau of Economic Research, Occasional Paper 36, 1952, p. 5, note 1.) Using 1939 census data, we estimate that about 520 thousand workers and proprietors obtained their living from the shoe, leather, hide industry, exclusive of those involved in raising cattle. Though only a portion of the output of many enterprises consisted of shoes, leather, or hides, we have included in our estimate only the same proportion of the workers as applied to the output.

<sup>2</sup> *National Income Supplement, July 1947, Survey of Current Business*, Dept. of Commerce, Table 30. The figure of 150 excludes some of the minor subcategories. All but perhaps three of the nine groups of products that were larger than shoes were produced by more composite industry groups than that of the boot and shoe industry.

<sup>3</sup> "Principal Farm Products," *Report on Agricultural Income Inquiry*, Federal Trade Commission, 1938, Part I, p. 219.

<sup>4</sup> Merrill A. Watson, *Economics of Cattlehide Leather Tanning*, Rumpf, 1950, p. 150.

TABLE 1

Vertical Stages in the Shoe, Leather, Hide Industry: The Contribution of Each to the Finished Shoe, 1939

	Value Sold (millions)	Value Added (millions)	Percentage of Consumer Dollar
<b>Retailing:</b>			
1. Sales	\$1,264.4		100.0
2. Margin		\$397.0	31.4
<b>Wholesaling:</b>			
3. Sales of wholesalers and importers	384.4		
4. Margin		46.9	3.7
5. Transportation of finished shoes		28.7	2.3
<b>Shoe manufacture:</b>			
6. Sales of manufacturers of leather and rubber footwear	788.9		
7. Sales of rubber footwear	52.0		4.1
8. Sales of leather footwear	736.9		
9. Margin in manufacture of leather footwear		353.7	28.0
<b>Leather distribution:</b>			
10. Sales of leather and other materials to manufacturers of leather footwear	383.2		
11. Sales of rubber	20.0		1.6
12. Sales of cartons, fabrics, and other nonleather materials and power	40.0		3.2
13. Sales of leather and cut stock by leather wholesalers, etc.	179.3		
14. Margin in wholesaling of leather and cut stock		15.0	1.2
<b>Cut-stock manufacture:</b>			
15. Sales of manufacturers of shoe cut stock and findings	129.4		
16. Margins		38.9	3.1
17. Transportation of leather		1.3	0.1
<b>Leather tanning:</b>			
18. Tanners' sales of leather to shoe or cut-stock manufacturers	268.0		
19. Margin		100.7	8.0
20. Hides, skins, and other materials sold to tanners and destined for the footwear industry	167.3		
21. Tanning materials	20.9		1.7
22. Fuel and electric energy	4.9		0.4
23. Sales of dealers, etc. in hides and skins	108.7		
24. Margins		6.7	0.5
25. Transportation of hides and skins		4.9	0.4
26. Sales of hides and skins destined for the footwear industry as they move "into sight"	129.9		10.3

Line Notes

- 1 Source: National Bureau of Economic Research estimate (Appendix B, series 31).
- 2 Retail Sales (line 1—\$1,264.4 million) times retail gross margin for shoes and other footwear of 31.4 per cent of retail. The latter is an estimate by Bruce M. Fowler and William H. Shaw, "Distributive Costs of Consumption Commodities," *Survey of Current Business*, July 1942, Table 3.
- 3 and 4 Manufacturers' sales of rubber and leather footwear through wholesalers, including manufacturers' branches, of \$322.8 million (*Census of Business*, Vol. V, *Distribution of Manufacturers' Sales: 1939*, pp. 112 and 119) plus imports for consumption of all rubber and leather footwear of \$2.9 million (*Foreign Commerce and Navigation of the United States: 1939*, Dept. of Commerce, Table I). To this total of \$325.7 million is added transportation costs from producer (or docks) of 3.5 per cent of their value at destination, or \$11.8 million. Wholesalers' gross margin as estimated by Fowler and Shaw (*loc. cit.*) is 12.2 per cent of wholesalers' sales or 13.9 per cent of the wholesalers' cost of \$337.5 million or \$46.9 million. \$46.9 million plus \$337.5 equals \$384.4 million.
- 5 Total transportation for all finished shoes is the sum of costs from manufacturers to wholesalers of \$11.8 million (see previous note) and from manufacturers direct to retailers of \$16.9 million. To obtain the latter figure, the same percentage transportation figure of 3.5 from Fowler and Shaw (see previous note) was applied to retailers' cost of \$483.0 million (lines 1 minus 2 and 3).
- 6 Retail sales (line 1) minus value added by retailer (line 2), wholesaler (line 4), transportation (line 5), and imported shoes (\$2.9 million, see note, lines 3 and 4).
- 7 *Distribution of Manufacturers' Sales: 1939*, p. 112. Sales to exporters and to consumers at retail prices are excluded.
- 8 Line 6 minus line 7. This figure of \$736.9 million obtained by working down from retail sales, should check approximately with direct information on leather production. Value of output of footwear (except rubber) in 1939 was \$734.7 million (*Census of Manufacturers: 1939*, Vol. II, Part 2, *Reports by Industries, Groups 11 to 20*, Table 1, p. 48).
- 9 Line 8 (\$736.9 million) times 48 per cent, the ratio of value added by manufacture to value of output, where value added was calculated as the difference between value of output and cost of materials, supplies, and containers (*ibid.*, Table 2, p. 48).
- 10 Line 8 minus line 9.
- 11 Two-thirds of the output of rubber heels and rubber and composition soles as reported in *ibid.* (rubber products not elsewhere classified), Table 4, p. 28. The two-thirds figure was based on estimates by the Tanners' Council on use of rubber heels and soles in leather shoe manufacture.
- 12 Ten per cent of total material costs as reported in *ibid.*, *passim*. Percentage figure based on information on distribution of costs in shoe manufacture in H. A. Silverman, "The Optimum Firm in the Boot and Shoe Industry," *Oxford Economic Papers*, April 1942, pp. 95-111, and others.
- 13 An estimate of leather and cut stock obtained by raising to industry coverage the information supplied by a limited sample of wholesalers (*Census of Business: 1939*, Vol. II, *Wholesale Trade*, Tables 1 and 8A). The sum was reduced by 20 per cent to allow for sales to other than the footwear industry. (This percentage figure is given by J. G. Schnitzer, *Leather Industry of the United States*, Dept. of Commerce, 1939, p. 9).
- 14 Operating expense ratios (*Wholesale Trade*, Table 1), (Notes continued on next page)

Line	(Notes to Table 1 continued)	Line
	were applied to the estimate of wholesalers' sales of leather and cut stock for each category of wholesaler entering into line 13; the sum was reduced by 20 per cent to allow for the expense of sales to other than the footwear industry (see previous note).	
15	Value of product for "boot and shoe cut stock and findings" industry ( <i>Reports by Industries, Groups 11 to 20, p. 44</i> ).	22
16	Value added for "boot and shoe cut stock and findings" industry.	Cost of fuel and purchased electric energy for cut-stock manufacturers and tanners (regular factories and jobbers engaging contractors) ( <i>Reports by Industries, Groups 11 to 20, Table 2, p. 34 and Table 2, p. 44</i> ), reduced by 20 per cent (see note, line 13).
17	Freight revenue for transporting leather on Class I railroads reduced by 20 per cent to allow for the cost of shipment to other than the footwear industry ( <i>Freight Commodity Statistics, Class I Steam Railways in the United States, Year Ended December 31, 1939, Interstate Commerce Commission, Table 3</i> ).	23
18	Value of total materials purchased by the shoe industry (line 10) adjusted for materials other than leather, operating margins of leather distributors, and transportation cost (line 10 minus the sum of lines 11, 12, 14, 16, and 17). This figure of \$268.0 million, obtained by working down from retail sales, should check approximately with direct information on leather production. Value of output of tanned, curried, and finished leather industries in 1939 was \$322.4 million ( <i>Reports by Industries, Groups 11 to 20, Table 4, p. 37</i> ) and subtracting 20 per cent from this to allow for leather not entering the shoe industry, the figure is \$257.9 million. A note to Table 5 ( <i>ibid.</i> , p. 37) says that the figure of \$322.4 million ". . . understates somewhat the total value of the several classes of leather."	An estimate of wholesalers' sales of hides and skins derived from census data for a limited group of wholesalers ( <i>Wholesale Trade, Tables 1 and 8A</i> ) raised to an industry level in a manner analogous to that followed in line 13. The figure was reduced by 20 per cent (see note, line 13).
19	The ratio of value added in "Leather: tanned, finished and curried" industry to value of product was 0.36 for "regular factories and jobbers engaging contractors" and 0.67 for "contract factories." These ratios were applied to tanners' leather sales to shoe and cut stock manufacturers (line 18—\$268.0 million), which were apportioned as between regular and contract factories using the relation between the value of product for contract factories (\$16.7 million) and regular factories (\$329.7 million) ( <i>ibid.</i> , Tables 2 and 3, pp. 35 and 36).	24
20	Line 18 minus line 19.	Operating expense ratios ( <i>ibid.</i> , Table 1) were applied to the estimates of wholesalers' sales of hides and skins for each category of wholesaler entering into line 23; the sum was reduced by 20 per cent to allow for hides and skins not entering the footwear industry (see note, line 13).
21	An estimated 57.5 per cent of value of product of regular tanning factories represents hides and skins materials costs (Merrill A. Watson, <i>Economics of Cattlehide Leather Tanning</i> , Rumpf, 1950, Table 69, note 3). Cost of all materials, supplies and containers was 64 per cent of value of product. Therefore cost of materials other than hides and skins was estimated at 6.5 per cent. It is assumed that no part of the materials cost for contract factories (33 per cent of value of product) repre-	25
		Freight revenue for transporting green hides on Class I railroads reduced 20 per cent to allow for hides not entering the footwear industry ( <i>Freight Commodity Statistics, Table 3</i> ).
		26
		Tanners' purchased materials (line 20) adjusted for materials other than hides, margins, and transportation costs (line 20 minus 21, 22, 24 and 25). This figure of \$129.9 million, obtained by working down from retail sales, should compare approximately with direct information on hides and skins moving into sight and entering the current flow of finished goods. Estimates have been made by using statistics on imports and census data for the meat-packing industry on quantity and value of output to obtain average values of major classes of hide and skins used in shoe manufacturing (Part 1, <i>Reports by Industries, Groups 1-10, Table 4, p. 57 and Statistical Abstract of the United States, 1940, Dept. of Commerce, Tables 575 and 576</i> ). These were weighted by estimates of consumption of each sort (J. G. Schnitzer, "The Leather Footwear Outlook Through 1943," <i>Survey of Current Business</i> , September 1942, Table 4) to obtain aggregate value of each sort of hides or skins entering leather manufacture. The sum for all sorts was reduced by 20 per cent to obtain raw material flow to the shoe industry. The result is a figure of \$128.2 million. The closeness of the two figures is merely fortuitous, but it does suggest that the order of magnitude is right.

war period. Hides are typically the most valuable of the many by-products of the packing industry, averaging somewhere between 10 and 12 per cent of the value of different classes of carcasses, though they constitute only around 7 per cent of the body weight.<sup>5</sup> Nevertheless, it seems clear that demand for hides could not materially influence the supply of cattle moving toward the slaughterhouses of the country. The supply of domestic packer hides is governed by conditions in the meat industry and constitutes a relatively steady stream within the fluctuating total hide supply.

<sup>5</sup> *Ibid.*, p. 38.

Such hides also constitute the elite, for their "take-off" and cure are commonly superior to that of the rest. The work is done at the large slaughterhouses by a team of men, each of whom sets to work on his assigned section of the carcass immediately after slaughter. When the hide has been cut off, it is removed to a cellar, cooled, spread out with others, and covered with rock salt; another layer of hides is placed on top and likewise sprinkled, until the pack reaches a height of about 40 inches. The edges are turned up to prevent the pickle from escaping. It is then "closed" with an extra cover of salt and allowed to remain at a temperature of 40 to 60 degrees for about thirty days.

Since, in a small establishment, it may take time to assemble a complete pack, the process may take as long as six weeks. The adequacy of both take-off and cure has high commercial importance. As a possible cause of blemishes and poor trim, take-off determines the intensity with which the hide surface may be utilized for the manufacture of leather goods. Cure influences the quality of the leather and the length of time for which a hide may be safely kept before tanning—an interval that may range between one and perhaps ten months.<sup>6</sup>

The second major source of hides with a statistical record are "hides from uninspected slaughter." They constituted 34 per cent of the interwar supply. Some of these are packer hides, but the large slaughterhouses from which they come deal within state lines and therefore are not federally inspected. But most are "country hides" and come from smaller packers or slaughterhouses, butchers, ranchers, or farmers. Though strictly speaking, these hides are also by-products of the meat industry, their supply on the commercial markets of the country is not rigidly geared to the supply of beef. If conditions are not favorable, they do not move through the complicated marketing channels to the central markets. Also hides of fallen cattle, typically about 2 per cent of the cattle population, may or may not be removed and marketed since the carcasses can be sold as glue stock, hides and all. Consequently, this segment of the total hide supply fluctuates considerably from year to year.<sup>7</sup> Many country hides are of poor quality, since their take-off, trim, and cure are usually inferior to the systematic work of the large slaughterhouses.

Even more sensitive to domestic demand is the supply of imported hides which, in American markets, is entirely free of the by-product character. On the average, 14 per cent of the interwar supply of cattle hides came from other countries, though the figure varied widely: it was only slightly over 3 per cent in 1934 or 1938 and between 25 and 30 per cent in 1922, 1928, 1929, and 1941. Some of the imported hides, mostly from the Argentine, are high-quality packer hides. But when supplies are scarce, dried hides from remote corners of the earth may move to American markets. These hides are typically of inferior quality because of both the unskilled take-off and the character of the cure. It is interesting that some of them may be primary products rather than by-products even

<sup>6</sup> John R. Arnold, *Hides and Skins*, A. W. Shaw Co., 1925, p. 68.

<sup>7</sup> It has been estimated that the proportion of fallen cattle whose hides are taken off varies between 50 and 90 per cent of the potential supply. I calculate that this variation can constitute 3 or 4 per cent of total movement into sight and a far larger per cent—between perhaps 8 and 12 per cent—of uninspected slaughter.

at their original source; this is true in Hindu countries, where beef is not eaten and hides are the chief salable product from the carcass.

The first appearance of hides on the American market, then, results partly from the slaughter of cattle for their meat. Partly, however, it results from the demand for hides per se, which, by influencing price, influences the proportions of the total potential supply that is collected and brought to central markets in the United States.

Cattle hides afforded, we have noted, about 65 per cent (by value) of the leather used in shoes. Leather soles are made almost entirely from cattle hides; and uppers for many sorts of heavy shoes or for shoes using artificially surfaced upper leathers such as patent, "buckskin," and various imprinted grains are often made from the hides of adult neat cattle. However, two other sorts of skins play an important part in shoe-making—calf and kid.<sup>8</sup>

#### *Marketing of Hides*

After cure has been completed, the hides are taken up, brushed off, trimmed, and graded according to standardized regulations. In spite of detailed stipulations, the grading of hides—which involves not only matters such as excess tare (salt and foreign matter), grubs, cuts, and scores, but also subtle matters of quality of the hide substance—is a fine art and typically done under the eye of the buyer as well as the seller.

For packer hides, the route from salt pack to tanners' "hide house" is usually direct, though not necessarily immediate. They may be held by packers for a few months, pending a propitious time to sell. Packers' stocks averaged about two and one-half months' supply for the interwar period, and about a month of this would be required for processing. Tanners typically buy directly from the large packing houses, often via their own agents or brokers; occasionally a dealer acts as intermediary.<sup>9</sup> Imports are sometimes acquired in an equally direct fashion. Country hides, on the other hand, may move to central markets through a meandering course often involving

<sup>8</sup> The distinction is made on the basis of weight in the green salted state. A hide weighing less than 15 pounds is called a calfskin; from 15 to 25 pounds, a kip; from 25 to 30, an overweight kip; and 30 or over, a hide. *Hide and Leather and Shoes Encyclopedia*, Ralph B. Bryan, editor-in-chief, Hide and Leather Publishing Co., 1941, p. 192.

<sup>9</sup> Analysis of sales in 1934 or 1935 of nine meat-packing companies by the Federal Trade Commission (*Report on Agricultural Income Inquiry*, Table 285, p. 1023) showed that about 45 per cent of all cattle hides and calfskins were sold directly to tanners (not owned or controlled by the reporting companies) or to shoe or other leather goods manufacturers, often of course through their own agents or brokers. Brokers and commission houses disposed of 30 per cent; and hide and skin dealers and jobbers, of 24 per cent.

three or four different intermediaries—local junk dealer or general stores, small-town dealers, large central-market dealers. The circuitousness of this route has a special implication: if prices are not high enough to cover a number of individual handling costs, the more remote and the poorer of these hides may not be collected or moved to city markets.

About 450 stock-carrying dealers in hides were listed in the *Census of Distribution, 1939*, not to mention the agents or brokers. But it seems likely that over a half of the business was done by sixteen of them, and a quarter or a third by the largest three.<sup>10</sup> Another marketing agency, founded in 1929, was the hide exchange. It grew slowly in importance, but even in 1939 the proportion of actual hides bought or sold through it was small. Nor does trading in "actuals" represent a substantial portion of the work of the exchange. It deals largely in "futures," and its significance lies primarily in this area.<sup>11</sup>

In general, then, a very large proportion of the total supply of hides, especially of packer hides, is sold by a few large packers and dealers. The buying is likewise concentrated. Fourteen companies probably tanned at least 50 per cent of the cattle-hide leather produced in 1935. They bought a third of their domestic supply of hides directly from packers, a third through their brokers, and a third from hide and skin dealers<sup>12</sup>—probably a sizable proportion from the three largest dealers. In other words, most packer hides are sold by very large firms to very large firms. The price at which these mastodons deal with one another has a very strong influence on the price at which the rest of the supply is sold, as well as on how much of it moves to the American market.

### Tanning

The tanning of hides and skins was performed in 1939 by about 450 separate census "establishments," about a quarter of which merely processed, on contract, hides that were owned by others. These estab-

<sup>10</sup> These are highly approximate figures. The hide business reported by the 450-odd firms in 1939 seems roughly equal to the total value of hide deliveries in that year. The proportions in the text are based on information published in the *Report on Agricultural Income Inquiry*, p. 212, Table 56, modified by being expressed as a percentage of total estimated hide wettings in 1935 (at the time the data were published, only 1933 total output figures were available, whereas the company data applied to 1935).

<sup>11</sup> In 1935, the Federal Trade Commission records that the commodity exchange purchased 7,832,409 pounds of actual hides (*ibid.*, Table 286, p. 1024). In that year the *Annual Report of the Commodity Exchange* records a total of 18,166 contracts (at 40 thousand pounds apiece, this is 727 million pounds) traded in one way or another, that is, for actual or future delivery.

<sup>12</sup> *Report on Agricultural Income Inquiry*, Table 288, p. 1027.

lishments ranged in size from ones with only a few employees to the four largest, each of whose output exceeded \$5 million and which averaged 670 employees apiece. It is hard to say how many establishments would be included in the eleven tanning and the three shoe-manufacturing companies that together purchased somewhat over half a billion pounds of domestic hides in 1935,<sup>13</sup> about half of the billion-odd pounds of domestic hides "wet-in."<sup>14</sup> Concentration is still higher in the production of sole leather: three large companies were estimated to have about 75 per cent of the total capacity of the country.<sup>15</sup>

The work done in these tanneries, large and small, is a highly skilled operation in which intricate mechanization is not practicable. Productivity, however, has increased gradually during the years. It may have about doubled since the beginning of the century, and it had also about doubled during the last half of the nineteenth century.<sup>16</sup> Over the period covered by this study, increases in productivity were relatively small and largely the result of improvement in organization.<sup>17</sup>

Tanners perform four types of operations on raw hides. Hides, usually arriving in carload lots, are sorted and stored in a cooled hide house where, if they have been properly cured, they can, if necessary, be kept for several months. But they do not improve with storage, so the average size of tanners' stocks of raw hides in the interwar period was presumably only about a month's supply. The process of sorting is often repeated several times before a hide is finally assigned to the pack in which it will be finished.

The next set of operations involves the removal from the hide of all substances that will not be made into leather. The work is done in the "beam house." First, hides are washed briskly to remove salt and dirt, and soaked until thoroughly "wet-in." The hair is then removed by soaking for several days in some sort of depilatory, after which it is rolled through a dehairing machine that scrapes off the loosened hair. The flesh side of the hide is likewise cleaned until it, too, is a smooth gray. The final beam house operation, "bating," is a more subtle one than the others, and the bate master is somewhat of an artist, however unsavory his palette. Fundamentally, the action of enzymes removes further reticular tissue and conditions the hide for tanning proper.

<sup>13</sup> *Ibid.*, Table 288, p. 1027.

<sup>14</sup> Watson, *op. cit.*, p. 151. The figure that he gives is 1,082,973,000 pounds of hides and kips.

<sup>15</sup> *Ibid.*, pp. 27-29. The companies are United States Leather Co., Howes Brothers Co., and Proctor Ellison Co.

<sup>16</sup> John R. Arnold, *Labor Productivity in the Leather Industry*, Works Progress Administration, National Research Project, Studies in Changing Labor Productivity, Report B-1, 1937, Table 4, p. 6.

<sup>17</sup> *Ibid.*, Table 5, pp. 7-8.

The process of tanning cattle hide is actually a family of processes that are suitable to different sorts and grades of products and raw materials. Two major differences hinge on whether the tanning is done by leached vegetable materials or by mineral chrome salts. Vegetable tanning is used primarily for sole leather. The tanning agent, tannic acid, is obtained from many substances, primarily from the bark of oak, hemlock, chestnut, and quebracho trees. The hides are subjected to the action of the tanning liquor in a series of rocker vats, where the even and properly graded absorption of the acid is highly important to good-quality tanning. They are then placed in lay-away vats for several months; here they soak, without agitation, in tanning fluids. It is this that makes the process of vegetable tanning so lengthy—from two to four months. Chrome tanning is relatively swift. The hides are briskly agitated in a drum or paddle vat containing salt brine; chromium sulphate is then added gradually—the whole process is a matter of hours.

The last set of operations impart the final texture, color, and finish to the leather. For sole leather, drying, oiling, and rolling are the critical steps. Chrome-tanned light leathers are usually split into "grain leather" and "split leather," and the two halves finished separately. Shaving, retanning, coloring, softening with soap or oil or both, drying, aging, and stretching are some of the chief operations included.

It is of interest that after the tanning and basic finishing operations are virtually completed, leather may be dried. For in this dried and partly finished state, "in the crust," leather can be kept for many months, and the brief final finishing, which may involve further coloring, graining, waxing, soaping, and oiling, can be performed to customers' specifications after the orders have been received. Consequently, the "in-process" inventories of side upper leather include this partly finished stock, as well as work in active process. For all sorts of cattle-hide leathers combined, about three months' supply was suspended in process in the interwar period.

### Marketing Leather

After tanning is completed, sole leather is ordinarily cut in sizes and shapes that approximate the finished sole. According to the *Census of Manufactures, 1939*, this operation, as well as the cutting of insoles, heels, and other structural portions of the shoe, was done in 520 separate establishments (including manufacturers of shoe findings); these may have been independent or part of either tanning or shoe-manufacturing companies.

A substantial majority (probably about 70 per cent in 1939) of the completed leather and cut soles moves directly to leather-goods manufacturers, without an independent marketing intermediary.<sup>18</sup> However, there are a large number of mainly small firms that are wholesalers, dealers, importers, exporters, etc., of leather and cut stock (about 850); it is likely that some leather passes through the hands of several of these.<sup>19</sup> The supply from domestic tanneries was augmented by relatively small quantities of imported hides and skins. Exports of domestically tanned leather, however, considerably exceeded imports. On balance, exports averaged 3.5 per cent of the leather output of tanneries for the interwar period.<sup>20</sup>

### Shoe Manufacturing

The manufacture of the finished consumer good was performed in about 1 thousand establishments, and here again firms were of widely different sizes. A substantial portion of the establishments, probably around 25 per cent, produced fewer than 300 pairs of shoes daily in 1939; probably at least 20 per cent produced more than 3 thousand, and these firms may well have made close to 65 per cent of the whole output in 1939. It is, however, an interesting characteristic of shoe manufacturing that small plants are not necessarily marginal ones. This is notably true in the high-priced women's shoe field where a factory turning out only 300 shoes a day can operate quite efficiently, though the optimum size for all sorts of women's shoes is said to be far higher—nearer 3 thousand pairs—and for men's shoes higher still.<sup>21</sup> Perhaps the relatively low optimum size per establishment in the shoe industry was reflected in the fact that the fifty largest establishments made only about 22 per cent of the industry's products, while for tanning

<sup>18</sup> The *Census of Business, Vol. V, Distribution of Manufacturers' Sales: 1939* reports that only about 15 per cent of the product of the leather-tanning industry was sold to independent wholesalers and jobbers, and about the same amount passed through owned and operated branches or offices (p. 119).

<sup>19</sup> The sales of leather and cut stock of these firms seem to have totaled about \$220 million, judging from computations based on the *Census of Business, 1939, Vol. II, Wholesale Trade*. Only about \$100 million worth of leather was reported by tanners as moving to wholesalers or jobbers of any kind. (*Distribution of Manufacturers' Sales: 1939*, p. 119.) This would suggest that even after allowing for imports of finished leather, which amounted to about \$9.5 million in 1939, a substantial portion passed through two or more marketing agents.

<sup>20</sup> The figure is the ratio of net exports to the value of leather tanned, averaged for the ten biennial census years, 1921-1939, inclusive.

<sup>21</sup> The figure is given as 3.5 thousand for women's and 4 thousand for men's shoes (*The New England Economy, Committee on the New England Economy of the Council of Economic Advisers, Washington, 1951, p. 179*).

and even for shoe wholesaling the comparable figure was about 50 per cent.<sup>22</sup> Shifting from establishments to management units, the fourteen largest companies produced a third of all of the shoes made in 1935. The three largest ones produced about a quarter of the total and operated seventy factories.<sup>23</sup> Obviously the optimum size of management units involves all sorts of matters in addition to the optimum size of fabricating units, notably that of efficient procurement and marketing.

There are probably at least three reasons why both the small and the large establishment or management unit can operate efficiently in this industry. Most of the large expensive machines are leased on a royalty basis, so that large capital investment is not necessary. Standardization, typically a prerequisite to truly large-scale manufacture, is limited by the need for variety in size and style. Finally—a not entirely independent reason—the process of shoe manufacture itself is what may perhaps be characterized as a machine-assisted hand operation. “It is divided into a multiplicity of minute, variable, distinctly separate operations, with a large number of separate machines to perform these operations.” “The shoe machine is an improvement on the hand tool insofar as it helps the worker to do a job faster or better or to do something he could not have done by hand. But the machine can do this only when guided by the skillful hands of the operator.”<sup>24</sup> This does not mean, however, that machines have not enormously facilitated and improved shoe production. The second half of the nineteenth century saw about a tenfold increase in output per man-day in the manufacture of men’s shoes. The first half of this century has probably seen a doubling of productivity.<sup>25</sup>

The manufacture of a pair of shoes requires a large number of separate operations (around 200) though the figure differs considerably for different sorts of shoes. The work is ordinarily divided into eight parts, performed in separate “rooms.” In the “upper-cutting room” the various parts of the upper

<sup>22</sup> Calculation based on data by size of establishment, *Census of Manufactures, 1939*, and *Census of Business, 1939*, Vol. II, *Wholesale Trade*. Lorenz curves were drawn for each industry, the per cent of establishments constituting the top 50 was ascertained, and the per cent of business read from the chart. A similar computation for meat packing yielded a figure of 42 per cent, though the Lorenz curve for this industry showed markedly higher relative concentration than those for the other three.

<sup>23</sup> *Report on Agricultural Income Inquiry*, Part I, Table 58, p. 215. The number of factories was obtained from listings in *Moody's Industrials*, 1940.

<sup>24</sup> Boris Stern, *Labor Productivity in the Boot and Shoe Industry*, Works Progress Administration, National Research Project, Studies in Changing Labor Productivity, Report B-6, 1939, p. 4.

<sup>25</sup> *Ibid.*, Table 7, p. 16.

are stamped by machine (clicking machine) or cut by hand from a steel-rimmed cardboard pattern. This is a highly skilled job since it involves making the most out of the costly leather. From the very start of this process, work is done only on specified job lots. The cutter receives a tag indicating the patterns, materials, numbers, and sizes of shoes required. The tag has been made out in the office, typically according to the instructions on customers’ orders. The tag accompanies the lot and guides the entire sequence of work through to completion.

In the “upper-fitting room” the various parts of the upper are finished, sewed together, lined, and, in the “lasting room,” pulled over a last, shaped, and temporarily attached to the insole. In the meantime, in the “stock-fitting room,” the sole of the shoe, its heels, and box toes have been assembled and prepared. The work of these departments differs considerably depending upon which of the many techniques of shoe manufacture is used. There are three main sorts of methods, differing primarily in how the upper and lower are joined together—they may be sewn, cemented, or nailed. The joining of upper to lower takes place in the “bottoming room,” and these operations are quite different for sewed shoes, such as the Good-year Welt, McKay, or turned shoe, or the increasingly important cemented constructions. The final operations include a series of subsidiary processes oddly enough called “making”—attaching, trimming, and burnishing heels and trimming the edges of the sole; finishing by “scouring” and waxing the sole; pulling out the last and completing the inside of the shoe; and, finally, “treeing and packing.”

The whole sequence of work can be completed in about a week, but two weeks would be a highly efficient routing schedule; more often a somewhat longer time is required to pass a given order through the factory. If the period required to collect sequences of orders for efficient operations is included, the time is usually considerably longer. But even including “raw” stocks of leather, total raw and in-process stocks of shoe manufacturers only averaged about a seven-week supply between 1921 and 1937. After 1937, they dropped far lower.

### Shoe Marketing

About 60 per cent of the shoes completed in 1939 moved to retailers directly from the manufacturer. The rest passed through either independent or manufacturer-owned wholesaling establishments. In the early twenties, the proportion of shoes passing through wholesalers was certainly considerably larger, and the downward trend seems to have continued after



World War II.<sup>26</sup> Neither exports nor imports of shoes were quantitatively important.<sup>27</sup> Most of the independent wholesalers specialized in shoes. There were about 460 of these "services and limited-function wholesalers," and, on the average, they sold about \$260 thousand worth of shoes per establishment in 1939. The relative size distribution of establishments was not notably different from that of tanning. But if shoe wholesalers are anything like other wholesalers in this respect, large multiple-establishment corporations were far less important than in the other major stages, so corporate concentration was certainly less.<sup>28</sup> But the independent wholesaler was dwarfed by shoe wholesalers associated with shoe manufacturers. There were, in 1939, sixty-two manufacturers' sales branches carrying stock and selling an average of \$2.14 million worth of shoes a year. Total sales were around 22 per cent of the value of shoes distributed during the year, a figure that fell substantially in the next ten years.

A good three-quarters of the shoe wholesalers in 1939 were in sixteen of the country's large cities; New York, Boston, Philadelphia, St. Louis, and Chicago were the major centers.<sup>29</sup> Clustered together within easy range of the passing buyer are wholesalers specializing in men's shoes, in women's play shoes or slippers, in women's staple shoes, in children's shoes. To these streets the retailer may come to pick up needed merchandise. However, many of the wholesalers' customers buy from salesmen visiting their establishments at regular intervals. Customers are supplied with the usual dealer's service of assembly of goods and rapid delivery of at least a substantial portion of the order from stock on hand or on order. The wealthier companies also sometimes offer a factoring service by postponing the due date on bills

<sup>26</sup> The *Census of Business, 1948*, Vol. IV, *Wholesale Trade*, Table 1E, reports 645 merchant wholesalers and this figure may be contrasted with 463 in 1940. But the larger number did a smaller proportion of all shoe marketing and the proportion handled by manufacturer-owned wholesalers declined still more.

<sup>27</sup> The value of imports was well under 1 per cent of the total, except in 1929 when it was almost 2 per cent, and in 1928, 1930, and 1931 when it added just about 1 per cent to the domestic supply. Exports exceeded imports before 1929, and were typically less than imports thereafter. In 1921, net exports were about 5 per cent of the domestic total, but dropped abruptly to about 1.5 per cent for the next four years; dwindled and turned to net imports of a small fraction of 1 per cent in 1929 to 1939.

<sup>28</sup> Eighty-six per cent of the establishments conducting 68 per cent of the sales of all service and limited-function wholesalers in 1939 were single establishment enterprises, and only 5.6 per cent of the establishments conducting 17 per cent of the sales belonged in management units of six or more establishments (*Census of Business, 1939*, Vol. II, *Wholesale Trade*, Table 10, p. 201).

<sup>29</sup> *Census of Business, 1939*, Vol. II, *Wholesale Trade*, Table 1, p. 289.

until after most of the merchandise has been sold by the retailer.

The amount of stock a wholesaler carries, and consequently the speed with which he can serve his customers, differs enormously depending on the sort of merchandise he sells—stocks of children's, men's, and staple women's shoes are a far less precarious investment than those of women's high-style merchandise. It differs also depending on the capitalization of the company—a firm with considerable capital may invest it in stock. On the average, full-service wholesalers carried stocks in 1939 equal to about two months' sales, though stock turnover was more rapid in manufacturers' wholesale branches.<sup>30</sup>

### Retailing

At the retail stage, which is financed by about a third of the consumer's dollar, a great many enterprises participate—perhaps 100 thousand of the 1.8 million retail stores that were in business in 1939. But this number includes both the specialized shoe store selling little else but shoes and the variety store or drug store that may carry only a few "play" shoes. It includes the chain store, the mail order house, the independent company, and the proprietorship; and these various retailing institutions may in turn be joined in buying or management groups. It includes the tiny store selling less than \$10 thousand worth of shoes a year as well as the huge chain organizations, the largest of which sold over \$38 million worth of shoes in 1939. It includes the integrated company as well as the retailing specialist.

The big majority—perhaps 70 per cent—of the approximately \$1.25 billion worth of shoes that were sold in 1939 was retailed through a relatively small proportion—perhaps a quarter—of the total number of stores that carried shoes of some kind.<sup>31</sup> Allow-

<sup>30</sup> Stocks (as given in the 1939 *Census of Distribution*) were raised, on the basis of statistics on gross margins, to an approximate wholesalers' selling price. When divided by sales, the figure for service and limited-function wholesalers was 2.0 months' sales carried in stock, and for manufacturers' sales branches 1.4.

<sup>31</sup> According to the data on commodity sales for the whole general merchandise group, from the *Census of Business, 1939*, Vol. I, *Retail Trade*, Part 1, Table 18, shoes were a fraction of all sales, between 6 and 16 per cent for the various types of stores; and they were even a smaller fraction, between 2 and 10 per cent, of total sales of stores selling diversified clothing. Of specialized shoe stores there were only about 20 thousand, though they sold about half of the shoes dispensed through retail outlets. Department stores, of which about 4 thousand were reported in 1939, sold, in spite of the fact that shoes seemed on the average to constitute only about 6 per cent of their total sales, about 22 per cent of the shoes sold at retail. The figure is swelled by the sales of mail order houses. Thus 24 thousand, or about a quarter, of the stores selling shoes sold over 70 per cent of all shoes.

ing for chain organizations, this might have involved 15 thousand management units. Clearly this constitutes a widely competitive market for the output of shoe manufacturer and wholesaler. But here, as at the other stages, quite a small number of companies were responsible for quite a large proportion of total sales. Fifty-four chain shoe and department store organizations<sup>32</sup> sold about \$300 million worth of shoes, or somewhat over one-quarter of all the shoes marketed in 1939,<sup>33</sup> and four of the largest chains accounted for about 7 per cent of all shoe sales.<sup>34</sup> The influence of these largest buyers, who in some cases are also producers, is of great importance in determining the nature of the market contest between retailer and supplier.

Nevertheless, these widely diverse institutions share essential functions. They typically offer prospective customers assistance in finding what they want (or in wanting what they find)—the shoe salesman is an aristocrat among retail salesmen. But his art is secondary to that of good merchandising. In a shoe store, the problem of having the proper goods in stock at the right time is a five-dimensional one involving price, style, color, size, and time (since demand is highly seasonal). As a result, stocks must be large in order to service sales adequately; at the same time they must not be so large as to threaten profits. In 1939, stocks for all shoe stores were about four and a third months' supply.<sup>35</sup> The average figure combined widely diverse experience. For example, in some of the more successful women's shoe stores, where the fatal danger

of style obsolescence lurks, stocks amounting to a two months' supply are often achieved.

Later we shall need to study in some detail the merchandising problems that arise from the retailers' function of assembly and display of merchandise in an industry where customers expect to be able to select merchandise and walk out with it. From this expectation follows the fact that stocks were greater in terms of months' supply at the retail stage than at any other stage except tanning, and, even then, they were clearly greater only for sole-leather tanning. In view of the highly particularized character of retailers' shoe stocks, the implications of this statistic are numerous and form an important part of the story.

### *Interstage Relationships*

The diverse aggregate of economic activity that we call for convenience the shoe, leather, hide industry consists of at least seven vertically associated branches—primary sources, dealers in hides, tanners, dealers in leather or cut stock, shoe manufacturers, shoe wholesalers, and retailers. Further, each one of these groups is really a class comprising many significantly different subgroups.

In each there are very large and very small firms. In general, corporate concentration is probably higher at earlier stages of the sequence than at later ones. But I might add that the economic consequences of this fact have not made themselves apparent in this study. Not that consequences relevant to the problems here studied do not exist, but merely that they are not sufficiently assertive, relative to all other variables, to be caught on the same tackle with which one angles for facts about business fluctuation. The selection of techniques was addressed to the latter problem, and with this equipment we catch no more than an occasional hint as to how the degree of concentration may bear on the genesis or intensity of business fluctuation.

In addition to large and small firms in each stage, some firms reach across the major stages to compose vertically integrated units. The Endicott-Johnson Corp. spans the entire sequence: this company tans most of its own leather, manufactures shoes, and sells many of them through a large chain of owned or leased retail stores. The other two members of the "big three" manufacturers—International Shoe Co. and Brown Shoe Co.—operate large tanneries but during the period covered by the study terminated their distribution systems in shoe-wholesaling divisions. (Since then they too have acquired large retailing facilities.) The integration of two stages—shoe retailing and pro-

<sup>32</sup> This includes the 11 men's, 27 family, and 10 women's shoe chain organizations with over 26 units per organization, and 6 department-store chains in the same category (*ibid.*, Table 20, p. 180).

<sup>33</sup> The 48 largest shoe chains did \$247 million worth of business in 1939, or 72 per cent of the total of \$344 million of business of all shoe chains. Assuming on the basis of census data that about 90 per cent of total sales are shoe and other footwear (estimate based on *Census of Distribution, 1929, Retail Distribution, Merchandising Series, Shoe Chains*, p. 14, Table 11), shoe chains, including chain-leased shoe departments, did perhaps 24.5 per cent of total shoe sales in 1939. This figure may be compared with estimates of 23.4 per cent in 1935 and 20.6 per cent in 1929 (based on computations made from data in *Retail Trade*, Part 1, Table 82, p. 180).

But these figures should not be read as expressing the growth in chain store distribution of shoes, since they do not take into account the possible growth of chains in other than specialty shoe stores which sell shoes. Compared with sales of shoe stores alone, chain shoe stores did 49.7 per cent of the business in 1939, 50.0 per cent in 1935, and only 38.0 per cent in 1929 (*ibid.*, Table 3A, p. 63).

<sup>34</sup> Melville Shoe Corp., \$38.3 million; G. R. Kinney, \$15.5 million; Edison Bros. Stores, Inc., \$24.9 million; and The Schiff Co. (now Shoe Corporation of America), \$13.4 million.

<sup>35</sup> Based on *Retail Trade*, Part 1, Table 2A, p. 58. Stocks given at cost were raised by an assumed maintained margin of 32 per cent of selling price.

duction—is common for many of the other largest shoe-manufacturing plants. At the other end of the shoe, leather, hide sequence, two of the large packers controlled an estimated 15 per cent of the cattle-hide tanning capacity in 1939.<sup>36</sup>

The entire sequence is thus interlocked not only because one function articulates with the previous and following ones, but because management teams cap the functional joints. Here again, however, it is hard to stipulate the economic significance of this vertical bridging. The integrated firms are equally at home in all markets; their action in any one are based presumably on knowledge of all. Yet to some extent this knowledge must be shared with the single-stage firms whose binoculars are trained on their actions. At least it is clear that the presence of the vertically integrated companies eases the transmission of information from one stage to the next; what else results we cannot say.

For the whole range of activities to take place—that is, for hides to move from the back of a newly slaughtered steer to the feet of the man who may wield the knife—at least five months are required.<sup>37</sup> But the typical economic process is not so swift. Hides are not always shipped the moment cure is completed nor wet-in as they enter tanners' yards. Still less usual is it for the hand of the cutter to be poised above the clicking machine waiting for tanned and finished leather to emerge from its final waxing. It is common for hides, leather, and shoes to rest in stock piles for

various intervals prior to moving to the next station of their journey. Even within a single enterprise, all output does not flow at a maximum rate most of the time. Were individual items used up in the order in which they are received, the size of various stock pools over the interwar period would suggest that on the average almost a year and a half might pass before the sequence was completed.<sup>38</sup> Of course this figure is high, since the presence of some exceedingly slow-moving merchandise causes the majority of goods in stock to move considerably faster than its average age suggests. But whatever the average time required for goods to flow through the whole range of activities that have been described, the critical fact for the purpose of this investigation is that the time is highly variable. The telephone can achieve an almost immediate, though limited, response to changing demand by virtue of the license to draw down or build up stocks in process as well as those awaiting processing.

It is amusing to reflect, as one contemplates this whole complicated industrialized process, that some hundred years ago a good proportion of the shoes worn, at least on the farms of this country, were made by an itinerant cobbler sitting in the shed or kitchen and making a pair of shoes out of the hide of cow or steer slaughtered by the farmer and tanned by a local tanner who received, for his trouble, one-half of the hide.

<sup>36</sup> Average number of months' supply of packer hides in hands of packers or dealers, 2.6; raw hides, hands of tanners, 1.1; in-process leather, 2.8; finished leather, all hands, 3.9; finished shoes, all commercial hands, 7.0. Total, 17.4 months.

<sup>36</sup> Watson, *op. cit.*, pp. 32-33.

<sup>37</sup> I figure one month in cure, three months for sole tanning, and one month for shoemaking, transportation, and sale.