Chapter 11

Rubber Products

THE rubber products group is composed of establishments which use natural, reclaimed or synthetic rubber or gutta-percha as an important constituent in the manufacture of their products. In 1937 this group made a smaller contribution to value added by all manufacturing than any other group of industries.

TRENDS IN THE PHYSICAL OUTPUT OF THE RUBBER PRODUCTS INDUSTRIES

No index of physical output for any of the rubber products industries is available for the years prior to 1914. Two begin in that year and one begins in 1927 (Table 31 and Chart 13).

Tires and Tubes. Rubber tires and inner tubes increased in output more than six-fold from 1914 to 1937. The gain between 1899 and 1937 must have been very much greater than this, because of the advent of the automobile, but no exact figures are available.[1] Output in 1919 was almost four times the 1914 output, and 1929 production was more than

[1] Automobile production rose 3,500 percent between 1899 and 1909, and 1,500 percent between 1909 and 1919. (See Chapter 21, below.) From 1899 to 1937 the increase in automobile output was 180,000 percent. Corresponding increases must have occurred in the output of tires used as original equipment on new cars. Total tire production includes tires used for replacements, and the quantity of these is difficult to estimate. Rather rough estimates for 1910–14 prepared by the U.S. Bureau of Foreign and Domestic Commerce (Special Circular No. 3500—Rubber Section, Table III) and extended back to 1904 by W. H. Shaw of the National Bureau, indicate the following production of pneumatic tires and casings: 1904: 250,000; 1909: 1,500,000; 1914: 8,021,000.

twice the 1919 output. Between 1929 and 1937, however, there was a decrease of 19 percent.

Production of some types of tires reached a peak before 1929. According to the Census solid and cushion tires fell

TABLE 31

RUBBER PRODUCTS

Physical Output: Indexes and Percentage Changes[a]

	Shoes, Rubber	*Tires and Tubes*	*Rubber Goods, Other*	*Total*
YEAR	INDEX OF PHYSICAL OUTPUT (1929:100)			
1914	69	12	..	..
1919	115	49	..	54
1921	91	39	..	43
1923	111	69	..	72
1925	91	88	..	84
1927	120	91	80	92
1929	100	100	100	100
1931	58	67	83	70
1933	71	65	80	69
1935	83	72	96	79
1937	95	81	112	91
PERIOD	NET PERCENTAGE CHANGE IN PHYSICAL OUTPUT			
1914–1937	+39	+556	..	..
1914–1919	+68	+297	..	..
1919–1929	−13	+103	..	+86
1929–1937	−5	−19	+12	−9

[a] The indexes have been constructed from basic data in the U.S. Census of Manufactures, by methods described briefly in Chapter 2 and in detail in Appendix A. Appendix B presents these data, together with the indexes derived from them. The indexes cited here for individual industries have been adjusted to take account of changes in the coverage of the respective samples, except when such adjustment was impossible.

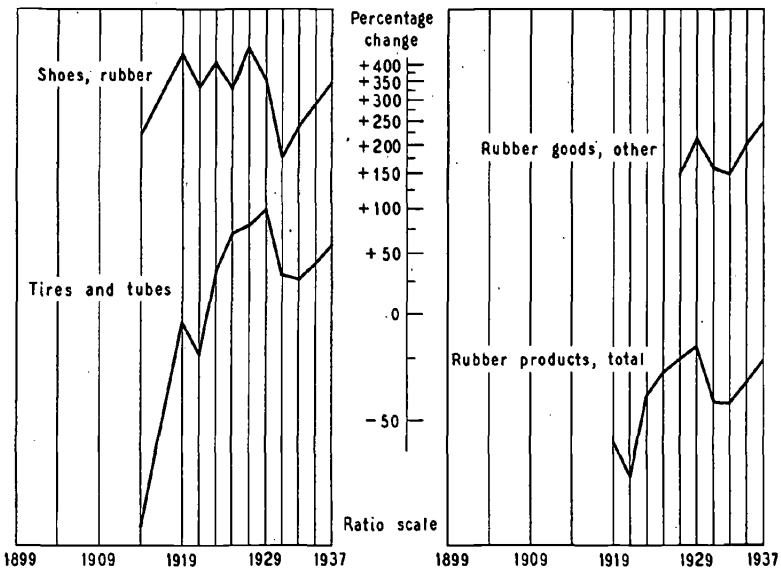
The percentage changes are not always entirely consistent with the indexes given above because the changes were computed from the indexes in Appendix B, which are carried to one decimal place.

from 1.5 million in 1919 (the first year for which separate data are available) to .3 million in 1937, a decline of 80 percent. Output of pneumatic tires, casings and inner tubes used for motorcycles and bicycles changed but slightly between 1914 and 1929 (rising from 3.73 million to 3.74 million), then went

Chart 13

RUBBER PRODUCTS

Indexes of Physical Output



up sharply to 8.5 million in 1937. From a non-Census source [2] we have obtained data on important changes in the types of automobile casings (the output of each is expressed as a percent of total output):

	Construction		
	High Pressure		
Year	Fabric	Cord	Balloon
1910	100	0	0
1915	95	5	0
1920	65	35	0
1925	14	52	34
1930	0	17	83
1933	0	11	89

In addition to the displacement of high pressure tires by balloon tires, there was a considerable increase in the average

[2] Rubber Section of the Bureau of Foreign and Domestic Commerce.

weight of rubber tires, from 16 pounds in 1922 to 22 pounds in 1931.[3]

These two changes were accompanied by great improvements in quality, which resulted in enhanced riding comfort and a lengthened life span of the tires. "In 1914 the average guaranteed mileage per tire did not exceed 3,500 miles. In 1922 the average life of a cord tire was more than 8,000 miles, while in 1930 and 1931 the life of an average tire was conservatively estimated at between 15,000 and 20,000 miles." [4] After 1931 the durability of tires was augmented still further. In terms of average years of life per tire, there was an increase from 2.4 in 1931 to 3.1 in 1937.[5] To be sure, improved roads contributed to these advances, probably more than enough to offset the greater wear attendant upon higher driving speeds, but most of the increase in durability must be credited to better tire construction and greater weight per tire. Inner tubes also were improved, partly through an increase in their weight (an average of 2.6 pounds in 1931 as compared with 2.2 pounds in 1922), but mainly as a result of the adoption of the "molded" tube process of manufacture, which yields a smooth and perfectly fitting tube, less susceptible to dangerous wrinkling and creasing.[6]

Rubber Shoes. This industry—which produces rubber-soled canvas shoes, rubber boots, arctics and rubbers—progressed also, but at a much slower rate than the tires and

[3] Boris Stern, "Labor Productivity in the Automobile Tire Industry," U.S. Bureau of Labor Statistics, *Bulletin No. 585* (July 1933), pp. 2, 7.

Our measure of output is based on the number of tires and tubes. An alternative measure of the physical output of the tires and tubes industry could be constructed on the basis of the weight of the rubber, textiles and chemicals consumed. Such an index has been prepared by the National Research Project for the period 1921–36 (*op. cit.*, Part II, p. 198). This index, of course, rises more rapidly than ours.

[4] Boris Stern, *op. cit.*, p. 2.

[5] U.S. Bureau of Foreign and Domestic Commerce, *Rubber News Letter* (Oct. 15, 1939).

[6] Boris Stern, *op. cit.*, p. 67.

tubes industry. The physical output of rubber shoes increased only 39 percent between 1914 and 1937. The most important rise occurred in the years 1914–19. Between 1919 and 1927 the trend seems to have been horizontal, and since 1927, downward. Among the industry's products, rubber-soled canvas shoes rose in output between 1919 and 1937, while rubber boots fell considerably.

Other Rubber Goods. The third rubber products classification, which covers all other rubber goods, increased its output 40 percent from 1927 to 1937. The output of automobile and carriage fabrics declined, but there were rises in the production of rubber soles, certain types of rubberized fabrics, rubber belting (except for transmission), rubber bands and cement, and rubber gloves.

Summary. The index for the group rose almost 100 percent between 1919 and 1929, but fell 9 percent in the most recent period. Although no group index is available for the years prior to 1919,[7] it is probable that between 1899 and 1937 the output of the rubber products group rose at a much faster rate than population grew and perhaps twice as rapidly as total manufacturing. In the third decade the relative growth in the group's output was slower, though it was nevertheless rapid. In the latest period, 1929–37, the group's output fell 9 percent, while both population and total manufacturing output rose.

[7] An index of the group's output in the period prior to 1919 was not computed because the data were inadequate. Rubber imports, a rather crude index of the output of rubber products, rose 73 percent from 1899 to 1909, 496 percent from 1909 to 1919, 122 percent from 1919 to 1929, and 12 percent from 1929 to 1937. The imports index does not agree well with our index of output, or with annual figures of rubber consumption available since 1922. It should be noted that the imports series is defective as a measure of rubber consumption since it does not include reclaimed rubber. The latter is a fairly important item: in 1937 the consumption of purchased reclaimed rubber amounted to 101,000 tons; the consumption of all reclaimed rubber, to 156,000 tons; and the consumption of all rubber, crude and reclaimed, to 687,000 tons.

CHANGES IN THE INDUSTRIAL PATTERN OF RUBBER PRODUCTS MANUFACTURE

The advance in tires and tubes transformed the industrial composition of the rubber group's output. In terms of relative contributions (Table 32), rubber shoes fell from 14.5 percent in 1919 to 7.0 percent in 1937, whereas all other rubber products, including tires and tubes, increased. In the last period, 1929–37, rubber tires and tubes declined while "other rubber goods" rose. If separate data for tires and tubes were available, they would undoubtedly show a rise in the tire industry's contribution from almost zero in 1899 to more than 50 percent in 1937.

TABLE 32

RUBBER PRODUCTS

Relative Contributions of Component Industries to the Physical Output of the Entire Group[a]

Industry	*Percentage Distribution, Comparable Pairs of Years*					
	1919	1937	1919	1929	1929	1937
Shoes, rubber	14.5	7.0	17.0	7.9	11.3	11.9
Tires and tubes	85.5	93.0	83.0	92.1	63.2	56.7
Rubber goods, other					25.4	31.4
TOTAL[b]	100.0	100.0	100.0	100.0	100.0	100.0

[a] Derived from Table 31. For an explanation of the derivation of the measurements see footnote 10, Chapter 4.

[b] The columns do not add up to 100.0 in every instance because they contain rounded percentages.

The shifts in the pattern of pecuniary output, as revealed by the data on value added in Table 33, do not coincide with the changing pattern of physical output. Between 1919 and 1937 there was only a slight decline in the relative value contribution of the rubber shoes industry, but there was a large decline in its relative contribution to the physical output of

the group. If the data on physical output are accurate, the discrepancy indicates a considerable rise in the value added per unit of physical output in the rubber shoes industry in relation to the corresponding price of fabricational services

TABLE 33

RUBBER PRODUCTS

Relative Contributions of Component Industries to the Value Added by the Entire Group[a]

Industry	*Percentage Distribution*					
	1899	1909	1919	1929 Comparable with earlier years	1929 Comparable with later years	1937
Shoes, rubber	46.5	26.9	12.2	12.7	12.6	10 1
Tires and tubes	53.5	73.1	87.8	87.3	63.2	56.6
Rubber goods, other					24.2	33.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

[a] Basic data are given in Appendix C.

of the rubber group considered as a whole. This suggestion does not appear unreasonable: technological developments in the tires and tubes industry, which were exceptionally rapid, could easily account for the divergence of trends in value added per unit.