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# INVESTIGATION OF CONCENTRATION OF ECONOMIC POWER

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## TEMPORARY NATIONAL ECONOMIC COMMITTEE

A STUDY MADE UNDER THE AUSPICES OF THE DEPARTMENT OF COMMERCE FOR THE TEMPORARY NATIONAL ECONOMIC COMMITTEE, SEVENTY-SIXTH CONGRESS, THIRD SESSION, PURSUANT TO PUBLIC RESOLUTION NO. 113 (SEVENTY-FIFTH CONGRESS), AUTHORIZING AND DIRECTING A SELECT COMMITTEE TO MAKE A FULL AND COMPLETE STUDY AND INVESTIGATION WITH RESPECT TO THE CONCENTRATION OF ECONOMIC POWER IN, AND FINANCIAL CONTROL OVER, PRODUCTION AND DISTRIBUTION OF GOODS AND SERVICES

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MONOGRAPH No. 27

### THE STRUCTURE OF INDUSTRY

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MONOGRAPH No. 27

## THE STRUCTURE OF INDUSTRY

BY

WILLARD L. THORP, WALTER F. CROWDER, AND ASSOCIATES

II

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The Temporary National Economic Committee is greatly indebted to these authors for this contribution to the literature of the subject under review.

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(Signed) JOSEPH C. O'MAHOONEY,  
*Chairman, Temporary National Economic Committee.*



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## FOREWORD

Any attempt to blueprint our national industrial processes would take the form of a maze of lines, sideways, forwards, backwards—starting at innumerable points and ending everywhere. Hundreds of different raw materials are exposed to wide varieties of machines and labor skills at many places, and they may be combined or subdivided in numberless ways to yield the final volume and variety of products turned out by our economic system. Many of the products in turn feed back into the process, facilitating or maintaining the flow at some earlier stage. Furthermore, as one follows any single line, from raw material to finished product, it takes the form of a series of steps or stages, which may be separated in time and place or may be integrated into a single smooth operation; in fact, both conditions may exist simultaneously for different sets of producers.

This complicated productive system may be examined in terms of its organization; that is, its structural units—its factories, companies, and industries, as well as in terms of its products. From the operating point of view, the lowest common denominator in the manufacturing sector is the establishment or factory. Here in a single spot, and under a single ownership, materials undergo certain processes and new commodities appear on the shipping platform.

One is inclined to think of manufacturing enterprise in the United States as operating on a large scale. The usual mental image is in terms of a cluster of enormous, sky-lighted buildings, hundreds of workers, and numerous foremen and higher officials. Such enormously complex productive units are the flower of the industrial revolution, the economic result of modern technology.

Only to a limited extent is such a picture true. This country has always had, and still has, thousands of tiny establishments with only one or two workers. Part I of this report concerns itself with the over-all trends in the size of establishments since the turn of the century, as well as the trends in many individual industries. The materials for such measurement are exceedingly inadequate, yet the answer is important, for the manufacturing establishment is the minimum unit of our business structure. Separate establishments are frequently grouped to make larger enterprises but are seldom subdivided. The measure used in this study is primarily that of wage earners, and it is apparent that a strong tendency is present in the direction of increased size on such a basis. Had it been possible to measure establishments in terms of capital (in the economic rather than its financial sense), there might have been clear evidence that plant-size was also on the increase in such terms.

Two new measures of establishment concentration are introduced in part I, intended to indicate the extent to which the operations within individual industries are concentrated in a few establishments. The new measures distinguish the problem of concentration from that of size. A plant may be fairly small when compared with all plants, yet may be large in its own industry.

From any examination of the establishment picture in manufacturing, it quickly becomes apparent that in many instances establishments operate in groups, commonly owned and directed in varying degrees from a central office. As technology and mass production have developed, it has become increasingly possible to make a living through some form of minute specialization, such as a factory making nothing but dolls' voices. This subdividing process in turn has led to the counter tendency to group establishments into operating units. The extent, nature, and functional relationships within such central-office companies is the subject of part II of the study.

The only possible comparisons with the past for central-office companies relate to 1919 and to 1929. It is evident that over the period since 1919 their importance has increased markedly. In fact, the trend toward the operation of establishments in groups is much more pronounced than for further expansion in the size of individual plants. Well over one-half of all manufacturing activity at the present time is carried on in such central-office groups.

Parts III and IV of this report discuss other aspects of the trend toward concentration in company terms.<sup>1</sup> The data presented in part III trace the history of the merger movement in manufacturing and mining. Twice in recent times have there been periods when concentration increased with unusual rapidity. Both were periods when mergers and consolidations were momentarily regarded as providing a sure path to lower costs, higher profits, and securities for an eager market. The last 10 years, however, have shown very little activity of this type.

The history of concentration in seven selected industries is traced in part IV. There is no evidence of any uniform dominating trend. Positions of dominance once achieved were not always maintained.

In the last two parts of this report, new territory is explored. The analysis shifts from an investigation in terms of organization units to an examination of concentration in strictly product terms. In the past, special studies of individual industries have sometimes provided useful specific product data in such fields as agricultural implements and petroleum. But the problem of monopoly, as distinguished from that of size, must be studied in product terms. A large enterprise may manufacture many products and dominate in none. A small company may be the only producer of its specialty.

Part V describes the degree of concentration in the production of 1,807 manufactured products. It appears at once that concentration in product terms is much greater than had been indicated in other studies using industries as the basis. Additional analyses relate the degree of concentration to the price-quantity behavior of the products in periods of recession and recovery. These analyses suggest that concentration is not an important factor in determining cyclical price policy.

The concentration of control in the hands of large corporations has been measured in earlier studies in terms of assets and total sales. In part VI of the report, concentration for the largest 50 manufacturing corporations is measured in terms of specific products. Each company manufactured a number of different products, and the data

<sup>1</sup> A study of the association of companies themselves in joint operating units is covered in the monograph on "Trade Associations," also prepared by the Department of Commerce.

permitted the study of how important each product was to the company and how much each company produced of the total output of each product. Some interesting material was also developed as to why companies develop on a multi-product basis.

The rough conclusion of parts V and VI seems to be that size is by no means synonymous with monopoly. Many products, small in importance, are produced under conditions approaching monopoly. Many large companies manufacture a wide variety of products in most of which, if not all, they do not reach a position of dominance.

At least two broad qualifications need to be kept in mind as we examine the evidence presented in the last two parts of this report. The first is that these studies have been based primarily on census data, and no allowances have been made for the possibility that collusion may exist among companies, so that monopoly power in fact may exceed that shown by the record. The measures of concentration presented in this report may, in many cases, be an understatement. In other words, there is at least this much concentration, and the extent to which there may be more falls in the incalculable field of "restraints of trade."

On the other hand, when problems of competition are being considered, products may be so closely available for substitution that some sort of use-class ought to be established, rather than to limit the analysis to individual commodities. Certainly, the freedom of a monopolistic company or group of companies is limited by the possibility of competition from producers of substitute products. For this reason, concentration figures for individual products may present a greater picture of monopoly power than actually exists.

WILLARD L. THORP.



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PART I

**TRENDS IN THE SCALE OF MANUFACTURING  
OPERATIONS**

BY

**WILLARD L. THORP  
DON D. HUMPHREY  
MARTHA H. PORTER**



# TRENDS IN THE SCALE OF MANUFACTURING OPERATIONS

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# TRENDS IN THE SCALE OF MANUFACTURING OPERATIONS <sup>1</sup>

## CHAPTER I

### GENERAL TRENDS IN SIZE OF MANUFACTURING ESTABLISHMENTS

The basic structural unit in manufacturing is the plant or factory. Enterprises or concerns may include a number of such units. From the point of view of monopolistic problems and the effectiveness of competition, the size of plant is important chiefly as it is indicative of the ease or difficulty of entrance into the industry, since a single plant is presumably a minimum requirement. Financial and, to a lesser extent, management problems are dealt with more often in terms of companies than of plants, though the nature and extent of such problems bear a close relationship to factory size. Nevertheless, the size of plant is itself a significant social and economic fact. It reflects the requirements of technology for efficient production. It measures the social unit within which employer and employee relations must be adjusted. It indicates the degree to which productive machinery itself has affected small-scale business enterprise, for enterprises are seldom smaller than plants, though they may be larger. This study, therefore, concerns itself with the size and concentration of manufacturing establishments, a concept which approximates the idea of plant or factory.

Two measures of the average size of establishment are readily available from census material, though neither is free from serious defects. These measures are wage earners and output (either value or volume of production) per establishment. Both of these are indirect measures of the scale of manufacturing operations and the relation they bear to the size of the plant is influenced by a variety of factors which differ from year to year. For most purposes, proper interpretation of the measures of the size of establishments presented in this report requires an awareness of the limitations of the data as indicators of the changes in establishment size.

Both measures are affected by business conditions, a plant appearing to be smaller when its output and its pay roll are reduced. For many purposes, such a statement is true; yet, if one thinks of establishments in terms of square feet of floor space, machinery, or capacity, its size is unchanged, whether idle or active. If one considers the size of establishments in terms of capital value, cost of construction or cost of replacement, the measures are also subject to qualification as the

<sup>1</sup> The basic material relative to establishment size was prepared by Martha H. Porter who was completely responsible for ch. II. The concentration indexes were prepared by Don D. Humphrey, who was also completely responsible for chs. IV and V. Credit is due John Lindeman for valuable assistance.

impact of changing business conditions would exercise a somewhat different effect on the wage-earner and output figures than on the value figures mentioned. The wage-earner measure does not reflect changes in productive capacity brought about through increased use of machinery and through technical and administrative improvements increasing the output per worker. On the other hand, the marked reduction in working hours in recent years makes the employment figures overstate the increases' in productive capacity. The value-of-products figures reflect changes in price as well as in the physical values of production, and the extreme price changes of the period make any such measures of little value for some purposes. The volume figures presented are more relevant, but they are subject to technical difficulties present in any such index numbers. These limitations and qualifications must be kept in mind in analyzing the data presented.

#### AVERAGE SIZE OF ESTABLISHMENTS, 1914-37

In table 1 is presented a summary of principal items of census statistics pertinent to the size of industrial units and table 2 gives the averages based on these statistics. Since 1921 the Census of Manufactures has been limited to establishments which report products valued at \$5,000 or more and data for previous years have been adjusted to a similar scope.<sup>2</sup> These figures are given in the first section of the table.

A second set of figures excluding establishments employing less than six wage earners is also shown. The latter data may well give a truer picture of general size trends than the more inclusive figures for all establishments covered by the census. Concerns with less than six wage earners account for a large proportion of the total number of manufacturing units with products valued at \$5,000 or more (40-45 percent), but only a small proportion of the wage earners and products (2-3 percent). The \$5,000 minimum results in a variation from census to census in the number of these small concerns that are included

<sup>1</sup> "As a rule, the term 'establishment' signifies a single plant or factory. In 1937 one report might be counted as one, two, or more establishments, depending on the answer given by the respondent to the question 'How many plants does this report cover?' The respondent's answer to this question was taken as the number of establishments. The number of establishments for the United States was increased approximately 2,000 by this change in definition of establishments. The change does not materially affect the number of establishments in any particular industry.

"As at previous censuses, separate reports were occasionally obtained for different lines of manufacturing activity carried on in the same plant, and in some cases a single report was obtained covering two or more plants operated under a common ownership and located in the same city, or in the same county but in different municipalities or unincorporated places having fewer than 10,000 inhabitants.

"The censuses are confined, in general, to manufacturing industries proper. Data are collected for a few industries, however, whose activities are not manufacturing in the sense in which the term is generally understood, the most important example being printing and publishing. The following classes of establishments were not covered by the 1937 Census of Manufactures (the coverage of the Census in other years is described in the Census volumes for those years):

- (1) Establishments which were idle throughout the year or reported products valued at less than \$5,000.
- (2) Establishments engaged principally in the performance of work for individual customers, such as custom tailor shops, dressmaking and millinery shops, and repair shops. (This does not apply to large establishments manufacturing to fill special orders.)
- (3) Establishments operated in the building industries, other than those manufacturing building materials for the general trade.
- (4) Establishments engaged in the so-called neighborhood industries and hand trades, in which little or no power machinery is used, such as carpentry, blacksmithing, tinsmithing, etc.
- (5) Cotton ginneries.
- (6) Small grain mills (gristmills) engaged exclusively in custom grinding.
- (7) Wholesale and retail stores which incidentally were also engaged in manufacturing on a small scale, particularly where it is impossible to obtain separate data for the manufacturing and for the mercantile operations.
- (8) Educational, eleemosynary, and penal institutions engaged in manufacturing. (Data for the production of binder twine in penal institutions and of brooms in institutions for the blind were, however, collected.)
- (9) Manufactured gas was excluded from the 1937 figures because data covering only the manufacturing of gas could not be satisfactorily obtained.
- (10) Railroad repair shops (both electric and steam) were excluded in 1937 as not being manufacturing. (Census of Manufactures, 1937, pp. 4 and 5.)

since in some years higher prices bring a much larger proportion within the scope of the census. Moreover, in a census year when a large field force is used, as in 1914 and in the decennial census years 1919 and 1929, the canvass is undoubtedly more complete with reference to moderately sized concerns than in a year when only a small field force is available and the canvass must be largely conducted by mail, as, for example, in 1933 and 1937. By omitting data for establishments with less than six wage earners from the totals, inconsistencies in the proportion of the smaller establishments included are largely eliminated. Only establishments and wage earners can be presented on this basis.<sup>3</sup>

TABLE 1.—*Summary of selected data for all manufacturing industries, 1914-37*<sup>1</sup>

Year	Establishments with products valued at \$5,000 or more				Establishments employing 6 or more wage earners <sup>2</sup>		Index of volume of manufacturing production <sup>3</sup>
	Number of establishments <sup>4</sup>	Wage earners (average for the year)	Value of products (thousands of dollars)		Number of establishments	Wage earners (average for the year)	
			In current dollars	In 1914 dollars <sup>5</sup>			
1914.....	173,656	6,478,713	23,065,565	23,065,565	98,890	6,297,147	100
1919.....	210,426	8,431,157	60,053,895	29,510,000	105,346	8,189,426	126
1921.....	192,148	6,478,188	41,671,288	29,080,000	99,004	6,261,417	99
1923.....	192,196	8,196,371	58,201,863	39,405,000	105,652	7,986,336	155
1925.....	183,976	7,873,935	60,831,938	40,021,000	-----	-----	162
1927.....	187,659	7,848,600	60,337,372	43,067,000	-----	-----	161
1929.....	206,669	8,369,752	67,994,238	48,602,000	104,572	8,092,944	183
1931.....	171,450	6,163,144	39,829,888	37,155,000	-----	-----	121
1933.....	139,325	5,787,611	30,557,328	31,567,000	78,040	5,631,084	113
1935.....	167,916	7,203,794	44,993,699	38,292,000	90,987	7,013,605	137
1937.....	166,794	8,569,231	60,710,073	47,916,000	97,745	8,399,057	178

<sup>1</sup> Data for establishments reporting products valued at less than \$5,000 were deducted from the original census figures for 1914 and 1919 since such data were not included in statistics for later years. In addition, data for several industries which were not canvassed or which were not treated as a manufacturing industry in recent years were eliminated as follows: "Automobile repairing" for 1914 and 1919; "Coffee and spices, roasting and grinding" for 1914 to 1931; "Peanuts, walnuts, and other nuts, processed or shelled" for 1927 to 1931 (no comparable data for earlier years); "Motion pictures" for 1923 to 1931 (no comparable data for earlier years); "Railroad repair shops" and "Gas, manufactured" for 1914 to 1935.

<sup>2</sup> The distribution of establishments according to wage earners employed was not made for 1925, 1927, and 1931.

<sup>3</sup> Data from Biennial Census of Manufactures, 1937 (table 2, pp. 18-19).

<sup>4</sup> See text, p. 2, for definition of "establishment."

<sup>5</sup> Current values expressed in dollars were adjusted for price changes by use of the index of wholesale prices of all commodities compiled by the Department of Labor.

Source: Reports of the Bureau of the Census, except as noted.

The value of products in table 1 is given in both current dollars, and, in order to eliminate the effects of price changes, in dollars of 1914 purchasing power.<sup>4</sup> The latter figures were used in computing value of products per establishment. The result yields figures comparable to the volume of production index.

Whether size is measured in terms of employment or output per establishment, the averages in table 2 show an increase from 1914 to 1937. In terms of wage earners the average establishment was one-third larger in 1937 than in 1914; in terms of value of product (in

<sup>3</sup> The point is made clear by the record. For example, the total number of establishments declined from 207,000 in 1929 to 139,000 in 1933, while the drop in those with 6 or more wage earners was from 105,600 to 78,000. The difference is believed to reflect, in part, the different methods of census-taking.

<sup>4</sup> Values were expressed in 1914 dollars by applying the Department of Labor index of wholesale prices of all commodities. This is the most satisfactory index available for the purpose although it includes raw materials as well as manufactured products. In addition to differences in coverage, the price index possesses limitations owing to the changing composition of manufacturing production particularly during the war period.

dollars of equal purchasing power), more than twice as large; in terms of quantity of product, over four-fifths larger. While comparison of the 1914 and 1937 figures for average wage earners per establishment shows a sizable increase, this increase took place largely from 1935 to 1937. Except for the decline between 1919 and 1921 and that between 1929 and 1931, the wage-earner figures show considerable stability from 1919 to 1935. As measured by value or volume of output, the greater part of the growth in size occurred between 1919 and 1929.

TABLE 2.—Growth in the average size of establishments in all manufacturing industries, 1914-37

Year	Establishments with products valued at \$5,000 or more				Establishments reporting 6 or more wage earners <sup>1</sup>				
	Average wage earners per establishment		Value of products per establishment (1914 dollars)		Index of volume of production per establishment	Average wage earners per establishment		Index of volume of production per establishment	Index of volume of production per wage earner
	Number	Index	Actual	Index		Number	Index		
1914.....	37.3	100	132,823	100	100	63.7	100	100	100
1919.....	40.1	108	140,242	106	104	77.7	122	118	97
1921.....	33.7	90	151,340	114	90	63.2	99	100	100
1923.....	42.6	114	205,027	154	140	75.6	119	145	122
1925.....	42.8	115	217,534	164	153				
1927.....	41.8	112	229,498	173	149				
1929.....	40.5	109	235,168	177	154	77.4	122	173	142
1931.....	35.9	96	216,709	163	123				
1933.....	41.5	111	226,574	171	141	72.2	113	143	126
1935.....	42.9	115	228,046	172	142	77.1	121	149	123
1937.....	51.4	138	287,279	216	185	85.9	135	180	133

<sup>1</sup> Not available for 1925, 1927, and 1931 as data for these years were not distributed according to the number of wage earners employed per establishment.

Source: Calculated from data in table 1.

The measure for all establishments with products valued at \$5,000 or more and for those with six or more wage earners are very much alike in the 23-year comparison. According to the figures for establishments with six or more wage earners, there was a marked increase in the size of establishments from 1914 to 1919 as measured by wage earners and another pronounced increase from 1935 to 1937. It is important to note that between these two periods there was little change except for sharp declines in the depression years 1921 and 1933 which were practically recovered in each case by the time of the following census.

Although the 1914-37 percentages are quite similar, somewhat different trends within the 1914 to 1937 period are apparent from averages for all establishments reporting products valued at \$5,000 or more, and for only those establishments within the group with six or more wage earners. The latter averages appear to be the more acceptable measure of changes for the reasons set forth above and in view of the fact that the 22 percent increase in average wage earners per establishment from 1914 to 1919 shown by these data is approximately the same as the increase (23.2 percent) indicated by the figures for all establishments that reported to the Bureau of the Census in those years, including data for establishments with products valued at less than \$5,000 but over \$500.

Both wage earners per establishment and volume of production per establishment declined sharply in 1921 and 1933 and subsequently resumed the previous upward trend. It is to be expected that the general reduction in employment and production in these years of acute depression would be reflected in the averages. The severity of the declines illustrates the extent to which abnormal business conditions may influence the averages and raises a question as to the effect of different levels of business activity on comparisons for other years. The year 1914 was also a depression year, but to a smaller extent than 1921, while 1919 was a year of expanding business activity in many industries. Presumably, therefore, the 1914 averages are somewhat depressed by conditions prevailing in that year while the 1919 averages reflect to some extent a temporary increase in output and employment and a more complete utilization of existing capacity. The figures for 1919 are influenced by the expansion and more complete utilization of certain industries in connection with the war effort—notably the iron and steel, chemicals and allied products, electric apparatus, tire, and steel shipbuilding industries. The increase from 1935 to 1937 is to be accounted for, in large measure, by a more complete utilization of plants in the latter year. Before the averages for 1937 can be taken as establishing a new and higher level in the average size of plants rather than a temporary increase due to the general situation in manufacturing industries in that year, it will be necessary to have them confirmed by succeeding censuses.

It is not possible to weigh the various factors that account for differences in the increases shown by the wage-earner and production figures as measures of size. The factor which perhaps is most capable of statistical measurement is the change in working hours. From 1914 to 1937 there was a large reduction in working hours as indicated by the available data on average weekly hours per worker in factories. These figures show that there has been a decline from an average 51.5 hours in the work-week in 1914 to 38.7 in 1937.<sup>5</sup> There was little change in the average working hours from 1920 to 1929, but from 1929 to 1933 hours were sharply reduced and, though slightly higher in 1935 and 1937 than in 1933, remained about 20 percent below 1929 in those years. Any radical reduction in working hours might be expected to be reflected in a disproportionate increase in average wage earners as compared with the output per establishment. That there was only a small difference in the percentage increase registered by these two measurements of size from 1914 to 1919 and that production per establishment continued to register large gains from 1919 to 1929 while the average number of wage earners per establishment showed no material change, may be largely attributed to the introduction of labor-saving machinery and other factors tending to increase output per worker. The increased use of mechanical power during this period is roughly indicated by a gain of approximately 90 percent in installed horsepower.

On the basis of these somewhat inadequate data, it does appear that there probably has been some increase over the period since 1914 in the average size of establishments. In the 1914-19 period and again in the 1935-37 period the increase in the scale of operations was quite rapid but, as was pointed out in the preceding paragraphs, this change

<sup>5</sup> Data from the National Industrial Conference Board. See Survey of Current Business, 1940 Supplement, p. 39. The 1914 figure is for July 1914 and is not a monthly average as are the other figures.

may be accounted for in the main by the more nearly complete utilization of capacity in 1919 and in 1937 than in 1914 and 1935, respectively. However, when the size of establishments is measured in terms of the value of products, an increase in the average size of establishments did take place during the decade from 1919 through 1929.

AVERAGE SIZE OF ESTABLISHMENTS, 1899-1919 COMPARED WITH 1914-37

Chart 1 shows a comparison of the growth in average size of plants for two overlapping periods, 1899-1919 and 1914-37. Figures for the earlier period were taken from a Census Monograph ("The Integration of Industrial Operation" by Willard L. Thorp) and are slightly different from those of the later period in that the lower limit on

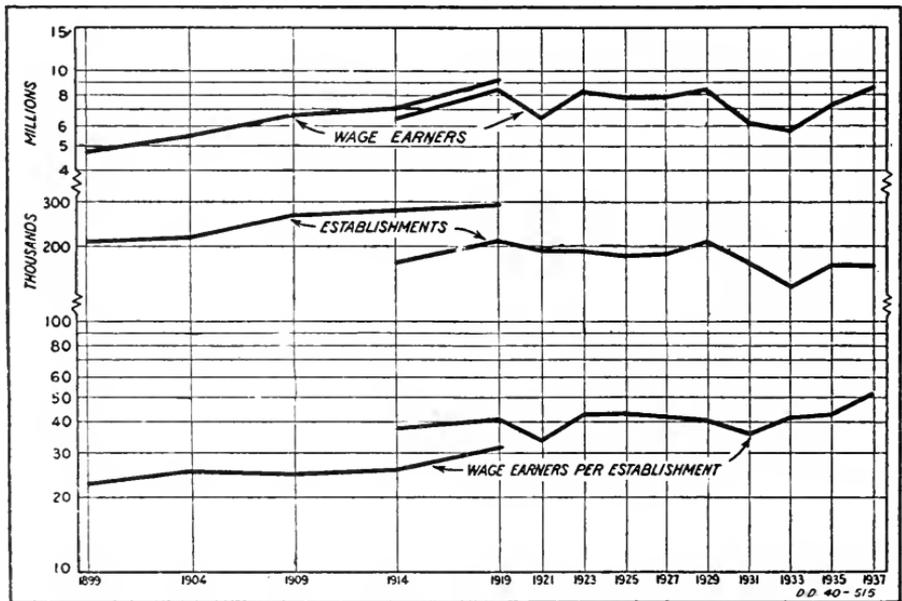


CHART 1.—WAGE EARNERS AND ESTABLISHMENTS, 1899-1937.

establishments was a value of product of \$500 instead of \$5,000. Consequently, although movements of the two series can be fairly well compared, the actual figures cannot.

During the period from 1899 to 1919 there was a steady increase both in the total number of wage earners and in the number of establishments. The average number of wage earners per establishment, however, did not vary greatly except for the rise from 1914 to 1919 which has already been discussed. It is interesting to note that the movements of the indicators of the average size of establishments—wage earners and value of product—were quite similar during the period from 1899 to 1919<sup>6</sup> in contrast to a marked increase from 1919 to 1929 in the value of product per establishment and virtually no change in the average number of wage earners per establishment.

It happens that the earlier quinquennial censuses did not fall in peak and trough years, so that patterns like the dips in 1919-21 and

<sup>6</sup> Willard L. Thorp, "The Integration of Industrial Operation," Census Monograph III, Government Printing Office, Washington, D. C., 1924, pp. 40 and 43.

1929-33 do not appear in the record though they may have existed. Over the whole period from 1899 the average size of establishment, as measured by the annual average number of wage earners per establishment, displayed considerable stability with evidence of some upward trend. There were increases from 1914 to 1919 and from 1935 to 1937 which were traceable, in part, to a more complete utilization of plants.

#### ESTABLISHMENTS BY SIZE-GROUPS

The record of the national averages is merely the first step in considering the problem of establishment size. These summary figures represent manufacturing establishments of widely varying size. Fortunately, frequency distributions are available for the various census years, except 1925, 1927, and 1931, and these data shed considerable light on the size of establishments and also on the meaning and significance of the statistics presented thus far. The actual figures are given in table 3, and percentage distributions in table 4.

TABLE 3.—Distribution of number of establishments and number of wage earners by size of establishment,<sup>1</sup> (measured by the number of wage earners)

Wage earners per establishment	Number of establishments									
	1914	1919	1921	1923	1929	1933	1935	1937		
None.....	74,766	105,080	{	8,679	8,402	4,517	6,896	6,885		
1 to 5.....	74,766	105,080	{	84,465	78,142	7,361	70,033	62,164		
Cumulative total.....	74,766	105,080	{	93,144	86,544	102,097	76,929	69,049		
6 to 20.....	53,033	53,419	{	52,751	53,581	52,410	46,136	46,402		
Cumulative total.....	127,799	158,499	{	145,895	140,125	154,507	123,065	115,451		
21 to 50.....	22,380	24,592	{	23,278	24,612	24,330	20,910	23,138		
Cumulative total.....	150,179	183,091	{	169,173	164,737	178,837	143,975	138,589		
51 to 100.....	10,728	11,986	{	10,619	11,332	12,057	10,373	11,911		
Cumulative total.....	160,907	195,077	{	179,792	176,069	190,894	154,348	150,500		
101 to 250.....	8,090	9,548	{	8,047	9,519	9,690	8,231	9,745		
Cumulative total.....	168,997	204,625	{	187,839	185,588	200,584	162,579	160,245		
251 to 500.....	2,882	3,326	{	2,658	3,567	3,585	3,141	3,911		
Cumulative total.....	171,879	207,951	{	190,497	189,155	204,169	165,740	164,156		
501 to 1,000.....	1,200	1,570	{	1,075	1,592	1,579	1,421	1,660		
Cumulative total.....	173,079	209,521	{	191,572	191,847	205,748	167,161	165,816		
Over 1,000.....	577	905	{	576	849	921	755	978		
1,001 to 2,500 <sup>2</sup> .....	.....	.....	{	.....	.....	724	579	737		
2,500 and over <sup>2</sup> .....	.....	.....	{	.....	.....	197	176	241		
Cumulative total.....	173,656	210,426	{	192,148	192,196	206,669	167,916	166,794		
Establishments employing 6 or more.....	98,890	105,346	{	99,004	105,652	104,572	90,987	97,745		

Number of wage earners (average for the year)

1 to 5.....	181,566	241,731	216,771	210,035	276,808	156,527	190,189	170,174
6 to 20.....	592,005	602,746	583,906	599,889	582,968	437,059	509,255	514,487
<i>Cumulative total.....</i>	<i>773,571</i>	<i>844,477</i>	<i>800,677</i>	<i>809,924</i>	<i>859,776</i>	<i>633,586</i>	<i>699,444</i>	<i>683,661</i>
21 to 50.....	724,591	804,045	756,084	798,342	791,326	585,707	674,900	750,922
<i>Cumulative total.....</i>	<i>1,498,162</i>	<i>1,648,522</i>	<i>1,556,761</i>	<i>1,608,266</i>	<i>1,651,102</i>	<i>1,179,293</i>	<i>1,374,344</i>	<i>1,434,583</i>
51 to 100.....	766,277	857,732	757,692	853,337	861,863	633,941	821,823	852,373
<i>Cumulative total.....</i>	<i>2,264,439</i>	<i>2,506,254</i>	<i>2,314,453</i>	<i>2,461,603</i>	<i>2,512,965</i>	<i>1,812,234</i>	<i>2,196,167</i>	<i>2,287,956</i>
101 to 250.....	1,260,853	1,498,678	1,252,921	1,494,743	1,509,461	1,112,696	1,292,789	1,522,670
<i>Cumulative total.....</i>	<i>3,525,292</i>	<i>4,004,932</i>	<i>3,567,374</i>	<i>3,956,346</i>	<i>4,022,426</i>	<i>2,925,630</i>	<i>3,408,956</i>	<i>3,810,626</i>
251 to 500.....	997,585	1,153,262	921,376	1,237,261	1,241,336	905,030	1,086,782	1,363,000
<i>Cumulative total.....</i>	<i>4,522,877</i>	<i>5,158,194</i>	<i>4,488,750</i>	<i>5,193,607</i>	<i>5,263,762</i>	<i>3,830,660</i>	<i>4,495,738</i>	<i>5,173,626</i>
501 to 1,000.....	824,625	1,076,925	741,790	1,095,247	1,073,277	751,137	976,462	1,133,323
<i>Cumulative total.....</i>	<i>5,347,502</i>	<i>6,235,119</i>	<i>5,230,540</i>	<i>6,288,854</i>	<i>6,344,159</i>	<i>4,581,797</i>	<i>5,474,962</i>	<i>6,306,949</i>
Over 1,000.....	1,131,211	2,196,038	1,247,648	1,907,517	2,026,713	1,216,114	1,731,594	2,292,282
1,001 to 2,500 <sup>1</sup> .....	.....	.....	.....	.....	.....	( <sup>2</sup> )	852,550	1,080,534
2,500 and over <sup>1</sup> .....	.....	.....	.....	.....	.....	( <sup>3</sup> )	879,044	1,181,748
<i>Cumulative total.....</i>	<i>6,478,713</i>	<i>8,431,157</i>	<i>6,478,188</i>	<i>8,196,371</i>	<i>8,369,752</i>	<i>5,787,611</i>	<i>7,203,794</i>	<i>8,662,231</i>
Establishments employing 6 or more.....	6,297,147	8,189,426	6,261,417	7,986,336	8,092,944	5,631,084	7,013,605	8,399,057

<sup>1</sup> See note 1, table 1, in regard to revisions in the figures for years prior to 1935. In revising the figures for 1914 and 1919, data for establishments with products valued at less than \$5,000 were deducted from the original figures for establishments reporting less than 6 wage earners. Census statistics for 1925, 1927, and 1931 were not tabulated according to size of establishment as measured by wage earners employed.

<sup>2</sup> Not available for years prior to 1929.

<sup>3</sup> In revising figures for this group, wage earners for 1 establishment excluded were estimated.

<sup>4</sup> Figures for the "501 to 1,000 wage earners" group include wage earners for 3 establishments in the "Manufactured gas" industry and figures for the "Over 1,000 wage earners" group include wage earners for 2 establishments in the "Manufactured gas" industry for which separate figures are not available for deduction. The combined total number of wage earners (10,300) for these 5 establishments was excluded from the total for all industries.

<sup>5</sup> In revising these figures, data for 2 establishments in the gas industry employing over 2,500 wage earners were combined with wage earners for establishments in that industry with "1,001 to 2,500 wage earners" and were, therefore, deducted from totals for the latter group.

<sup>6</sup> Revised figures not compiled.



Number of wage earners

1 to 5.....	2.8	2.9	3.3	3.3	2.6	2.6	3.3	2.7	2.6	2.0	9.4	7.4	9.3	7.5	7.2	7.8	7.3	6.1
6 to 20.....	9.1	7.1	9.0	7.0	7.3	7.1	7.0	7.6	7.1	6.0	9.4	9.4	9.3	7.5	7.2	7.8	7.3	6.1
<i>Cumulative total.....</i>	11.9	10.0	12.4	10.3	9.9	9.7	10.3	10.3	9.7	8.0	9.4	7.4	9.3	7.5	7.2	7.8	7.3	6.1
21 to 50.....	11.2	9.5	11.7	9.5	9.7	9.4	9.5	10.1	9.4	8.8	11.5	9.8	12.1	10.0	9.8	10.4	9.6	8.9
<i>Cumulative total.....</i>	23.1	19.6	24.0	19.7	19.6	19.1	19.7	20.4	19.1	16.8	20.9	17.2	21.4	17.5	17.0	18.2	16.9	16.1
51 to 100.....	11.8	10.2	11.7	10.3	10.4	10.3	10.3	10.9	10.3	9.9	12.2	10.5	12.1	10.7	10.6	11.3	10.6	10.1
<i>Cumulative total.....</i>	35.0	29.7	35.7	30.0	30.0	29.4	30.0	31.3	29.4	26.7	33.1	27.7	33.5	28.2	27.6	29.4	27.5	25.2
101 to 250.....	19.5	17.8	19.3	18.0	18.2	17.9	18.0	19.2	17.9	17.8	20.0	18.3	20.0	18.7	18.7	19.8	18.4	18.1
<i>Cumulative total.....</i>	54.4	47.5	55.1	48.0	48.2	47.3	48.1	50.5	47.3	44.5	53.1	46.0	53.5	46.9	46.3	49.2	46.9	43.3
251 to 500.....	15.4	13.7	14.2	14.8	15.1	15.1	14.8	15.6	15.1	15.9	15.8	14.1	14.7	15.5	15.3	16.1	15.5	16.2
<i>Cumulative total.....</i>	69.8	61.2	69.3	62.9	63.4	62.4	62.9	66.2	62.4	60.4	68.9	60.0	68.2	62.4	61.6	65.2	61.4	59.6
501 to 1,000.....	12.7	12.8	11.5	12.9	13.4	13.6	12.9	12.9	13.6	13.2	13.1	13.2	11.8	13.7	13.3	13.3	13.9	13.5
<i>Cumulative total.....</i>	82.6	74.0	80.7	75.8	76.7	76.0	75.8	79.1	76.0	73.6	82.0	73.2	80.1	76.1	75.0	78.5	76.3	73.1
Over 1,000.....	17.5	26.0	19.3	24.2	23.3	24.0	24.2	20.9	24.0	26.4	18.0	26.8	19.9	23.9	25.0	21.5	24.7	26.9
<i>Cumulative total.....</i>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> See footnotes to table 3.

Source: Computed from table 3. Each percentage is correct to the nearest tenth of 1 percent. The percentages may not, therefore, add exactly to 100 or to the cumulative totals.

The average size of establishment in 1937 was 51.4 wage earners. The outstanding fact is that only about one-sixth of the establishments were actually as large as the average, although they accounted for nearly five-sixths of the wage earners. In other words, the great number of manufacturing establishments were small, but the relatively large establishments accounted for a large part of the employment. In 1937, the census recorded 166,794 establishments with 8,569,231 wage earners. The 69,049 establishments (41.4 percent) with less than 6 employees accounted for only 170,174 wage earners, or 2 percent. At the other extreme in terms of size, were 978 establishments (0.6 percent) with over 1,000 wage earners, accounting for 2,262,282 wage earners, or 26.4 percent of the total.

It is evident from the detailed data in the tables that there has been some trend in the direction of the larger establishment. Table 5 gives a simple comparison of the years 1914 and 1937. The pattern of change is quite clear but it is exaggerated due to the difference in business conditions in the 2 years.

TABLE 5.—Percent change in the number of establishments and wage earners by size-groups, 1914-37

Size groups (wage earners per establishment)	Percent change, 1914-37		Size groups (wage earners per establishment)	Percent change, 1914-37	
	Estab-lishments	Wage earners		Estab-lishments	Wage earners
Total.....	-4.0	+32.3	51 to 100.....	+11.0	+11.2
Less than 6.....	-7.7	-6.3	101 to 250.....	+20.5	+20.8
6 to 20.....	-12.5	-13.1	251 to 500.....	+35.7	+36.6
21 to 50.....	+3.4	+3.6	501 to 1,000.....	+38.3	+37.4
			Over 1,000.....	+69.5	+100.0

Source: Table 3.

If one divides the record by periods, three different patterns emerge. From 1914 to 1919, the greatest increases were in the smallest and in the very large enterprises. The increases in the large establishments were nearly as great as shown in the preceding comparison of 1914 and 1937. From 1919 to 1929, there was surprisingly little change, some small increases in number being recorded in the upper-middle brackets and some decrease in the number of small establishments. Comparing 1937 with 1929, there was a marked reduction in the smaller groups and moderate increases in the larger groups. In 1937 there were 39,875 less establishments than in 1929 with most of this decline being accounted for by the group with less than 6 wage earners. There were 32,572 fewer establishments employing from 1 to 5 wage earners in 1937 than in 1929. While a small part of this difference may be due to differences in the method of census-taking noted at an earlier point, a substantial decline in the number of small establishments appears to have taken place since 1929. In 1937, each group above 100 wage earners set a new high level for the number of establishments reported. The wage-earner figure for the largest group increased more than the number of establishments, indicating that within that group there are still further elements of growth, since new units entering the group would undoubtedly tend to be near the lower limit. Recently records have been available for establishments with 2,500 wage earners and over. In 1937, the 241

establishments in this group accounted for about 14 percent of all wage earners engaged in manufacturing. The outstanding points in this record are the increase in the number of large plants, during both the war period and recent years, and the marked reduction in the number of small establishments since 1929.

#### SIZE OF ESTABLISHMENTS IN INDIVIDUAL INDUSTRIES

Much of the variation in size of manufacturing establishments is due to the fact that the broad category includes industries of widely differing characteristics and requirements. The analysis therefore turns at this point to individual industries.<sup>7</sup>

In order to study the trends in the average size of units in individual industries, data were tabulated for 204 industries or combinations of industries for which essentially comparable figures for the years 1914 to 1937 could be compiled from published data. The development of new industries or of new lines of manufacture within older industries and declines of other industries during the period under study resulted in numerous changes in the census classifications. These changes necessitated the making of many combinations of present industries in order to obtain figures covering approximately the same classes of establishments throughout the period. In a majority of cases, two or more lines of manufacture were combined because they were not classified separately at either early or recent censuses. In a number of instances, however, a combination of industries was necessary because of a shift between two classifications of some large group of establishments. The combinations in some cases include industries in which establishments differed widely in size or showed trends in opposite directions. In other cases expanding and declining industries were brought together. Averages based on these data, therefore, do not always give a reliable indication of changes in the size of establishments.

These 204 industries or industry combinations include 265 of the 350 industry classifications distinguished by the Bureau of the Census in 1937. For the remaining industries, changes in the classifications were of such a nature that no comparable figures could be compiled. These 204 industries represent all broad types of industrial activity, although the representation for some groups, notably machinery and paper, is much less complete than for others, and include industries representing extremes in the scale of production. The industries also

<sup>7</sup> "Although there are thousands of more or less distinct lines of manufacturing activity, manufacturing establishments were classified for census purposes in [separate] industries.

"The production of each specific class of finished commodities, however small, might be looked upon as a separate industry; and in some cases certain of the distinct processes in the manufacture of a single commodity might be treated as separate industries, as, indeed, is sometimes actually done in the census reports. Manifestly, however, there must be some grouping of commodities and processes, not only in order to bring the number of industries within reasonable compass, but also in order to avoid the extensive overlapping which would result from an attempt to distinguish so large a number of industries. Each establishment must, as a rule, be treated as a unit, and the data reported by it must be assigned in toto to some industry. In many cases an establishment manufactures several related articles or commodities, or performs several related operations. It is desirable, therefore, that the classification be broad enough to cover all the activities—or, at least, the principal activities—of such establishments.

"An effort has been made to distinguish, so far as practicable, each well-defined or well-recognized industry. The classification has been based on prevailing conditions as to the actual organization of industry and the distribution of the various branches of production among individual establishments. It has been necessary, however, in some cases to combine the data for two or more industries which are usually considered fairly distinct from one another, because of the considerable amount of overlapping among them. Such cases arise where, although the majority of the establishments concerned confine their business to one or another of the industries, a few important establishments combine the activities of two or more industries to such an extent as to render it impracticable to obtain separate data for the different lines of activity." (Census of Manufactures, 1937, pp. 5 and 6.)

vary greatly in importance. The detailed material is given in appendix A.

Heading the list in average size of establishments in 1914, as measured by wage earners, was the locomotive industry with an average of 915 wage earners per establishment, and in 1937, the rubber boots and shoes industry with an average of 1,530 wage earners per establishment. The motor-vehicles industry was second in 1937, with an average of 1,485. At the bottom of the list in both years was the cheese industry with an average of only 1.0 wage earner in 1914, and 1.7 in 1937.

The distribution of all industries according to average size of establishments in 1937 is shown in chart 2. This chart clearly shows both the great range of size and the skewness of the distribution toward the small end. Although there seems to be a fairly normal distribution, the uneven classes conceal a concentration in the lower end.

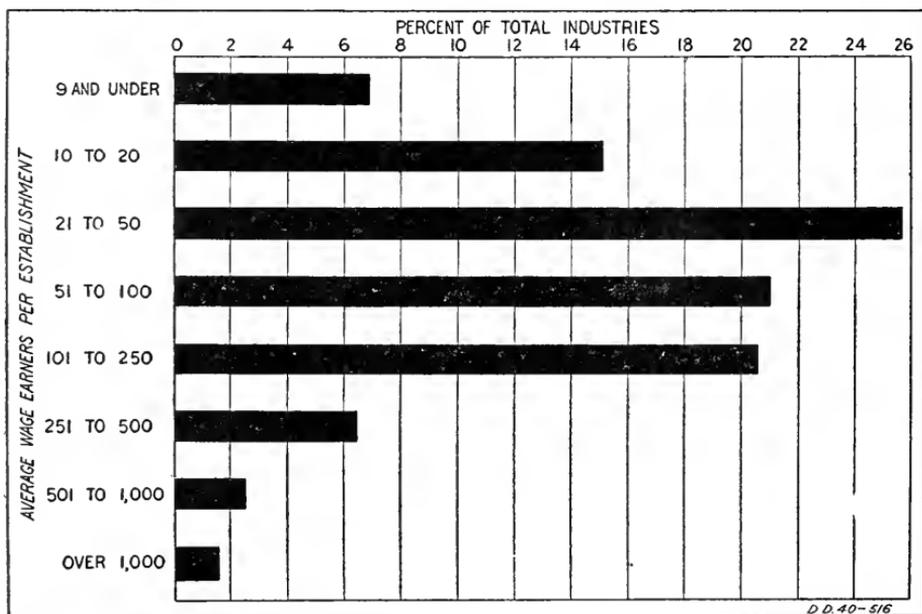


CHART 2.—PERCENTAGE DISTRIBUTION OF INDUSTRIES ACCORDING TO AVERAGE NUMBER OF WAGE EARNERS PER ESTABLISHMENT.

Nearly half of the industries have "typical" plants employing 50 or fewer wage earners. The modal class is 21 to 50 workers per establishment, over 25 percent of the industries falling in this class.

In 8 industries, plants averaged over 500 wage earners in 1937. These industries, and the number of wage earners per establishment were—

Boots and shoes, rubber.....	1, 530
Motor vehicles, not including motorcycles.....	1, 485
Steel-works and rolling-mill products.....	1, 169
Locomotives, railroad, mining, and industrial, not made in railroad repair shops.....	692
Smelting and refining, copper.....	631
Sugar refining, cane.....	610
Carpets and rugs, wool (other than rag).....	560
Asphalted-felt-base floor covering; linoleum.....	507

At the other end of the scale are 15 industries in which plants had an average of 9 or fewer employees in 1937. These are:

Cheese.....	2
Lapidary work.....	4
Bluing.....	5
Butter.....	5
Ice, manufactured.....	5
Theatrical scenery and stage equipment.....	8
Vinegar and cider.....	8
Cleaning and polishing preparations.....	9
Concrete products.....	9
Feathers, plumes, and manufactures thereof.....	9
Foundry supplies.....	9
Hand stamps and stencils and brands.....	9
Liquors, vinous.....	9
Models and patterns not including paper patterns.....	9
Statuary and art goods (except concrete), factory production.....	9

It is interesting to note the contrast in importance of the large-scale and small-scale industries. The first type includes some of our most important economic activities; the latter type does not include any industry with as many as 25,000 wage earners.

The range of variation in size of establishments in the group of 19 large industries, having an average employment of at least 100,000 wage earners for the period 1914-37 (see appendix C), is almost as great as the range for all industries. The average number of wage earners per establishment in 2 of the 19 industries, steel works and motor vehicles, was 1,169 and 1,485, respectively. At the lower extreme, 3 industries, book printing and publishing, bread and bakery products, and newspaper printing and publishing, had plants averaging 13, 14, and 15 employees. Obviously a large industry is not necessarily characterized by large establishments.

A full list of these industries, together with the average number of wage earners per establishment in 1937 follows:

Printing and publishing—book, music, and job.....	13
Bread and other bakery products.....	14
Printing and publishing, newspaper and periodical.....	15
Clothing—women's, misses', and children's, not elsewhere classified.....	38
Lumber and timber products not elsewhere classified.....	42
Furniture, including store and office fixtures.....	55
Clothing—men's, youths', and boys', etc.....	71
Meat packing, wholesale.....	110
Cigarettes; cigars.....	113
Ship and boat building, steel and wooden, including repair work.....	115
Knit goods: Hosiery, knitted cloth, knitted underwear, knitted outerwear, knitted gloves and mittens.....	127
Electrical machinery, apparatus, and supplies; radios, radio tubes, and phonographs.....	192
Boots and shoes, other than rubber.....	200
Rubber tires and inner tubes; other rubber goods, except boots and shoes.....	239
Motor-vehicle bodies and motor-vehicle parts.....	304
Wool combing; worsted woven goods; and worsted yarn.....	352
Cotton woven goods (over 12 inches in width); cotton yarn and thread.....	394
Steel-works and rolling-mill products.....	1, 169
Motor vehicles, not including motorcycles.....	1, 485

An examination of the changes in the average number of wage earners per establishment for the entire list of 204 industries reveals the presence of quite dissimilar trends. Individual industry records may be inaccurate due to shifts in census classification, although every effort has been made to obtain consistency, and the possible errors should

not destroy the total picture. It should be kept in mind, however, that the coverage of small concerns was undoubtedly more complete in 1929 than in 1937. A summary tabulation of individual industry changes is given in table 6. It may be helpful to keep in mind that the over-all average for all establishments increased 7.5 percent for 1914-19, 1.0 percent for 1919-29, and 26.9 percent for 1929-37. The over-all increase from 1914 to 1937 was 37.8 percent.

TABLE 6.—*Change in average number of wage earners per establishment for 204 industries, 1914-37*

Percent change	Number of industries				Percent change	Number of industries			
	1914-37	1914-19	1919-29	1929-37		1914-37	1914-19	1919-29	1929-37
+101 and over.....	31	6	3	5	-1 to -10.....	7	43	34	22
+51 to +100.....	32	18	12	22	-11 to -20.....	19	29	20	16
+41 to +50.....	11	11	8	17	-21 to -30.....	15	13	18	4
+31 to +40.....	15	10	7	21	-31 to -40.....	11	9	8	4
+21 to +30.....	19	9	16	27	-41 to -50.....	4	1	12	-----
+11 to +20.....	16	23	25	38	-51 and over.....	7	1	7	-----
+1 to +10.....	17	27	31	25	Total.....	204	204	204	204
No change.....	-----	4	3	3					

Approximately one-third of the industries, 63 in number, were operating on a smaller scale in 1937 than in 1914. On the other hand, 31 industries had more than doubled their average size of establishment. The increase in the median industry from 1914-37 falls considerably below the average increase. This is an interesting illustration of the importance of shifting weights. The large-scale industries were becoming of increasing importance during this period. Thus, the 50 industries with largest establishment averages in 1914 reported an increase in total wage earners employed by 1937 of 37 percent, although the increase for all manufacturing was 32.3 percent. Another way of demonstrating the point is to observe that 5 large-scale industries—steel mills, motor vehicles, motor-vehicle bodies and parts, electrical machinery, and chemicals—were responsible for one-third of the entire increase in plant size during the 23-year period. They not only increased their own size, but nearly trebled their employment. Without them, the average would have increased only 25 percent instead of 37.

Looking again at table 6, it is interesting to note that the median industry for the 1914-19 period increased only 1 percent and for 1919-29 was at 0 percent. In other words, the actual increases during this period did not come about through any general movement through most industries. Rather, it resulted from the fact that the large-scale industries were growing more rapidly and that some few industries were increasing their scale in major proportions, influencing arithmetic averages but not medians. However, the period from 1929 to 1937 shows a different picture, for the median increase here was 18 percent. Of the 204 industries, only 46 showed a decrease during that period.

There were 63 industries which showed a decrease in the average scale of operation (as measured by wage earners per establishment) in 1937 compared with 1914. The 11 cases where the decline exceeded 40 percent are listed below:

Lapidary work.....	67
Feathers, plumes, and manufactures thereof.....	60
Ice, manufactured.....	55
Galvanizing and other coating, done in plants not operated in connection with rolling mills.....	53
Condensed and evaporated milk.....	53
Corsets and allied garments.....	53
Window shades (textile and paper) and fixtures.....	51
Cars, electric and steam railroad, not built in railroad repair shops.....	47
Fish nets and seines.....	42
Screw-machine products and wood screws.....	41
Sewing machines and attachments.....	40

It should not necessarily be assumed that a decline in the scale of operation indicates a declining industry. The scale of operation depends upon the ratio between the number of establishments and the number of wage earners. Of the 63 cases of smaller establishments, 22 reported increases in both establishments and wage earners, the first having exceeded the second. Another 22 reported decreases in both establishments and wage earners, the second having exceeded the first. In the remaining 19 cases, establishments increased in number while employment declined.

At the other extreme of the distribution were 31 industries which more than doubled their scale of operations between 1914 and 1937. They are as follows:

Aircraft and parts.....	1, 833
Washing machines, wringers, driers, and ironing machines, for household use.....	601
Motor vehicles, not including motorcycles.....	441
Motor-vehicle bodies and parts.....	389
Corn sirup, corn sugar, corn oil, and starch.....	384
Asbestos products other than steam packing and pipe and boiler covering....	333
Card cutting and designing.....	262
Pens, fountain and stylographic; pen points, gold, steel, and brass.....	226
Cigarettes; cigars.....	219
Engraving (other than steel, copperplate, or wood), chasing, etching, and diesinking.....	207
Agricultural implements (including tractors); engines, turbines, water wheels and windmills.....	186
Chewing gum.....	176
Flour and other grain-mill products.....	174
Oils, essential.....	173
Wood distillation and charcoal manufacture.....	171
Sugar, cane, not including products of refineries.....	166
Fire extinguishers, chemical.....	158
Bone black, carbon black, and lamp black.....	156
Furs, dressed and dyed.....	145
Gold, silver, and platinum, refining and alloying.....	142
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint..	134
Coke-oven products.....	133
Perfumes, cosmetics, and other toilet preparations.....	111
Steel-works and rolling-mill products.....	110
Bread and other bakery products.....	108
Asphalted-felt-base floor covering; linoelum.....	106
Saddlery, harness, and whips.....	105
Baking powder, yeast, and other leavening compounds.....	103
Baskets and rattan and willow ware, not including furniture.....	103
Musical instruments and parts and materials, not elsewhere classified....	103
Wool pulling.....	101

In four instances—cigars and cigarettes, flour, coke-oven products, and saddlery—both the number of establishments and employment declined, the first so much more rapidly than the second as to leave

survivors who averaged more than twice the size of the original group. In nine instances both factors expanded. In the bulk of the cases, 18 in number, the number of establishments decreased while employment increased.

What is the total picture? It is one of a slow but definite increase in the size of establishment since the turn of the century. This increase should be considered, however, against the background of a general increase in population and wealth, as well as a trebling in the aggregate volume of production. To a considerable degree, the increase has been the result not of a universal trend toward size, but rather the increasing importance of certain of the large-scale industries. The point has been reached where less than 2 percent of the plants employ 40 percent of the workers. Until the 1929-33 depression, there was no evidence that small-scale operators were being affected, but since then there has been a noticeable decline in small plants.

## CHAPTER II

### TRENDS IN THE SCALE OF OPERATIONS IN SELECTED INDUSTRIES

It is already evident that within the general trends of manufacturing are widely differing patterns for individual industries. In this chapter, this fact is conclusively demonstrated by looking at a number of specific cases in somewhat more detail. In addition, it is possible to suggest some of the controlling factors where the inquiry is limited to specific industries.

Data for 40 selected industries are given in special text tables. In making the selection of industries, an attempt was made to include cases that would illustrate the different trends already suggested and to include industries operating on various scales of production. In general, industries with less than 100 establishments were excluded because in such cases the number in the various size-groups was too small to indicate definite trends and might be materially affected by the omission of data for even a few establishments temporarily idle during some census year or by the loss or addition of a few establishments which might have shifted their major product between two census years.<sup>1</sup> Several industries with a comparatively small number of establishments which showed pronounced tendencies were, however, included in the selection. Many industries were excluded because the changes in the size distributions appeared indefinite or erratic or because the figures were markedly affected by abnormal conditions in the industry during part of the period.

Since the figures for 1921 and 1933 for nearly all industries and for 1935 for many industries appear to have been markedly affected by depressed economic conditions, changes in these years have usually been ignored. In the absence of data on size of establishments for 1925 and 1927, changes which may have occurred in this period could only be determined from the average number of wage earners per establishment.

The grouping of the industries in separate tables, with exception of the selected industries in table 7, is based on trends in the scale of production between 1914 and 1937. Tables are presented showing trends in the scale of operations for industries in which the scale of operations (1) increased, (2) moved irregularly or showed no pronounced changes, and (3) decreased. For the most part size changes of establishments are indicated by the wage-earner data.

<sup>1</sup>The Bureau of the Census classifies establishments manufacturing two or more classes of products according to the product of chief value.

TABLE 7.—Distributions of establishments and wage earners for 11 large-scale industries in which more than half of the employees were in establishments employing more than 1,000 wage earners, 1914-37

(NOTE.—In the distribution of establishments and wage earners, the figures for certain classes were combined and printed in italics. An "x" indicates the group from which an item was omitted and it appears at the right of the italicized figure which represents the combined data.)

Industry	Num-ber of estab-lish-ments	Wage earners (average for the year)	Average number of wage earners per estab-lish-ment	Distribution of establishments by number of wage earners employed—						Distribution of wage earners by wage-earner size of establishment—							
				Less than 51	51 to 100	101 to 250	251 to 500	501 to 1,000	1,001 to 2,500	Over 2,500	Less than 51	51 to 100	101 to 250	251 to 500	501 to 1,000	1,001 to 2,500	Over 2,500
<b>IRON AND STEEL INDUSTRIES</b>																	
Blast-furnace products: <sup>1</sup>																	
Number:																	
1914	160	29,356	183.5	26	40	61	20	17	1	620	3,034	10,016	6,266	8,157	1,263		
1919	209	43,296	207.2	27	46	71	31	12	3	628	3,496	10,902	10,313	11,842	4,479		
1929	105	24,960	237.7	6	24	43	21	9	2	211	1,883	7,022	7,608	8,936	x		
1937	87	23,075	265.2	7	13	33	23	10	1	239	1,040	5,237	8,771	7,788	x		
Percentage distribution:																	
1914				16.3	25.0	38.1	12.5	7.5	0.6	2.1	10.3	34.2	21.3	27.8	4.3		
1919				13.8	23.6	36.4	15.9	8.8	1.5	2.4	8.4	26.2	24.7	28.4	10.8		
1929				5.7	22.9	40.9	20.0	8.6	1.9	.8	-7.6	28.1	30.5	53.0	x		
1937				8.0	15.0	37.9	26.5	11.5	1.1	1.0	4.5	22.7	38.0	53.8	x		
Steel-works and rolling-mill products:																	
Number:																	
1914	456	253,954	556.9	51	52	106	100	88	59	1,391	4,119	17,715	35,781	61,704	153,244	x	
1919	521	378,210	725.9	56	52	105	106	102	100	1,401	3,972	18,384	39,386	72,797	243,870	x	
1929	486	394,574	811.9	46	65	87	94	85	74	35	1,135	14,612	33,850	60,606	113,483	165,756	
1937	410	479,342	1,169.1	34	33	83	71	67	69	53	2,549	14,846	25,513	48,320	108,244	278,826	
Percentage distribution:																	
1914				11.2	11.4	23.2	22.0	19.3	12.9	.5	1.7	6.9	14.1	24.3	52.5	x	
1919				10.7	10.0	20.2	20.3	19.6	19.2	.4	1.0	4.9	10.4	19.2	67.1	x	
1929				9.5	13.3	17.9	19.4	17.5	15.2	.3	1.3	3.7	8.6	15.3	28.8	42.0	
1937				8.3	8.0	20.3	17.3	16.3	16.9	.2	.5	3.1	5.4	10.0	22.6	58.2	
<b>AUTOMOTIVE INDUSTRIES</b>																	
Motor vehicles, not including motorcycles:																	
Number:																	
1914	289	79,266	274.3	162	34	46	23	10	14	x	2,551	7,564	8,703	7,501	50,565	x	
1919	308	210,553	683.6	120	42	50	44	19	55	x	2,642	8,155	13,215	12,800	168,715	x	
1929	244	226,116	926.7	103	20	25	17	31	28	20	1,657	4,069	6,120	23,297	43,871	145,769	
1929 <sup>4</sup>	210	224,688	1,069.9	75	16	25	15	31	28	20	1,318	10,453	x	23,297	43,871	145,769	
1937	131	194,527	1,484.9	36	10	16	9	14	27	19	1,663	2,357	3,113	10,068	42,313	135,258	

Percentage distribution:													
1914	56.1	11.7	15.9	8.0	3.5	4.8	x	3.2	3.0	9.6	10.9	9.5	63.8
1919	39.0	13.6	16.2	14.3	6.2	10.7	x	1.3	1.3	3.9	7.2	6.2	80.1
1929 <sup>3</sup>	42.2	8.2	10.3	6.9	12.7	11.5	8.2	7.7	.6	1.8	2.7	10.3	19.4
1937	35.7	7.6	11.9	7.1	14.8	13.4	9.5	.6	4.6	x	x	10.4	19.5
	27.5	7.6	12.2	6.9	10.7	20.6	14.5	.3	.4	1.2	1.6	5.2	21.7
Motor-vehicle bodies and motor-vehicle parts:													
Number:													
1914	764	54	57	26	11	6	x	7.434	3,701	8,616	9,674	8,106	10,010
1919	2,123	127	92	41	34	21	x	18,030	9,305	14,740	14,722	24,164	51,562
1929 <sup>3</sup>	1,154	852	75	83	49	39	17	10,777	5,641	13,579	17,526	28,466	55,796
1937	1,188	222,780	880	79	83	51	39	11,146	57,805	x	x	28,466	55,796
	936	304.3	644	39	48	33	24	9,211	5,456	11,310	14,172	32,879	54,578
Percent distribution:													
1914	79.8	7.1	7.5	3.4	1.4	.8	x	15.6	7.8	18.1	20.4	17.0	21.1
1919	85.2	5.9	4.4	1.6	1.0	1.0	x	13.6	7.1	11.1	11.1	18.3	28.8
1929 <sup>3</sup>	73.8	6.5	7.2	4.3	3.3	3.4	1.5	4.9	2.5	6.2	7.9	12.8	25.2
1937	74.1	6.6	7.0	4.3	3.3	3.3	1.4	5.0	17.0	x	x	12.8	23.0
	68.8	8.4	7.4	4.2	5.1	3.5	2.6	3.2	1.9	4.0	5.0	11.5	40.5
RUBBER INDUSTRIES													
Rubber tires and tubes and other rubber goods, except boots and shoes:													
Number:													
1914	263	33	35	22	21	8	x	2,935	2,501	5,589	7,667	14,057	22,554
1921	472	83	68	31	16	15	x	4,245	6,106	11,049	10,993	11,002	55,990
Percentage distribution:													
1914	59.4	11.2	12.0	7.5	7.2	2.7	x	5.3	4.5	10.1	13.9	25.4	40.8
1921	55.3	17.6	14.4	6.6	3.3	2.8	x	5.3	7.7	14.0	13.8	13.9	46.3
Rubber tires and inner tubes:													
Number:													
1914	178	48	38	17	8	11	x	1,252	3,511	5,956	6,241	4,976	22,560
1921	91	11	11	14	9	9	7	568	819	1,963	5,195	6,429	55,013
1937	46	1	8	4	9	11	8	599	x	1,387	1,410	7,065	37,998
Percentage distribution:													
1914	31.5	26.9	21.4	9.5	4.5	6.2	x	2.3	6.3	10.7	11.3	8.9	60.5
1921	33.0	12.1	12.0	15.4	9.9	9.9	7.7	2.7	1.0	2.3	6.3	7.7	66.1
1937	2.2	10.8	17.4	8.7	19.6	23.9	17.4	.6	x	2.2	2.3	11.1	33.8

<sup>1</sup> In the blast-furnace products industry the proportion of employees in establishments employing over 1,000 wage earners was less than half of the total number of wage earners; this industry was included, however, because of its close relationship to the steel industry.

<sup>2</sup> Figures by wage-earner groups exclude data for 14 establishments employing 1,636 wage earners engaged in the manufacture of blast-furnace ferro-alloys for which the distribution according to the number of wage earners is not available. Data for such establishments are included in the totals for 1919 and in all figures for other years.

<sup>3</sup> Comparable with data for preceding years.

<sup>4</sup> Comparable with data for succeeding years.

TABLE 7.—*Distributions of establishments and wage earners for 11 large-scale industries in which more than half of the employees were in establishments employing more than 1,000 wage earners, 1914-37*—Continued

[NOTE.—In the distribution of establishments and wage earners, the figures for certain classes were combined and printed in italics. An "x" indicates the group from which an item was omitted and it appears at the right of the italicized figure which represents the combined data]

Industry	Num-ber of estab-lish-ments	Wage earners (average for the year)	Average number of wage earners per estab-lish-ment	Distribution of establishments employed— of wage earners by number						Distribution of wage earners by wage-earner size of establishment—							
				Less than 51	51 to 100	101 to 250	251 to 500	501 to 1,000	1,001 to 2,500	Over 2,500	Less than 51	51 to 100	101 to 250	251 to 500	501 to 1,000	1,001 to 2,500	Over 2,500
<b>RUBBER INDUSTRY—continued</b>																	
Rubber goods other than tires, inner tubes, and boots and shoes: <sup>3</sup>																	
Number:	294	23,880	81.3	205	30	14	8	x	2,993	2,595	5,093	4,752	6,026	2,430	x		
1921.....	412	40,226	97.6	260	51	30	11	6	3,553	3,778	7,780	10,721	7,116	7,878	x		
1929.....	420	48,172	114.7	234	71	64	35	6	3,520	5,116	10,245	12,593	7,683	9,063	x		
1937.....																	
Percentage distribution:																	
1921.....				69.7	11.9	10.2	4.8	2.7	12.5	10.9	21.3	19.9	25.2	10.9	x		
1929.....				63.1	12.4	13.1	7.3	2.6	8.8	9.4	19.4	26.6	17.7	18.1	x		
1937.....				55.7	16.9	15.3	8.3	2.6	7.3	10.6	21.3	26.1	15.9	18.8	x		
Rubber boots and shoes:																	
Number:	23	18,687	812.5	3	2	7	6	5	46	355	355	2,935	4,824	10,527	x		
1914.....	25	32,875	1,315.0	3	5	4	43	x	13	294	3,711	1,983	2,925	27,954	x		
1919.....	22	25,659	1,166.3	2	1	5	5	9	2	x	9,711	x	17,866	81,654	x		
1929.....	12	18,356	1,529.7	2	1	2	5	1	3		9,990	x	17,866	x	x		
1937.....																	
<b>OTHER LARGE-SCALE INDUSTRIES</b>																	
Agricultural implements (including trac-tors); engines, turbines, water wheels, and windmills:																	
Number:	830	79,799	96.1	565	103	36	18	11	8,736	6,945	16,734	12,881	11,763	22,740	x		
1914.....	799	133,820	167.5	480	114	45	36	26	6,920	6,925	18,079	15,962	27,611	58,329	x		
1919.....	507	104,365	205.8	323	63	46	33	26	4,549	3,611	19,870	17,584	27,335	31,916	x		
1929.....	401	110,367	275.2	236	47	43	33	16	3,655	3,359	6,478	12,711	11,397	72,767	x		
1937.....																	
Percentage distribution:																	
1914.....				68.1	11.7	12.4	4.3	2.2	10.9	8.8	20.9	16.2	14.7	28.5	x		
1919.....				60.1	12.2	14.3	5.6	4.5	5.2	5.1	13.6	11.9	20.6	48.6	x		
1929.....				63.7	10.5	9.0	6.5	3.2	3.4	3.4	18.6	x	16.8	20.2	x		
1937.....				58.9	11.7	10.7	8.2	4.0	3.3	3.1	5.8	11.5	10.4	65.9	x		

Aircraft and parts:		Number:		1914		1919		1929		1937		1914		1919		1929		1937		1914		1919		1929		1937			
12	162	13.5	11	1	4	2	103	59	320	1,656	1,137	320	1,656	1,137	320	1,656	1,137	320	1,656	1,137	320	1,656	1,137	320	1,656	1,137	320	1,656	1,137
29	3,543	122.2	19	2	4	2	239	191	27,800	29,449	2,169	27,800	29,449	2,169	27,800	29,449	2,169	27,800	29,449	2,169	27,800	29,449	2,169	27,800	29,449	2,169	27,800	29,449	
132	14,710	111.4	82	16	19	9	1,218	1,134	16,828	14,004	3,665	16,828	14,004	3,665	16,828	14,004	3,665	16,828	14,004	3,665	16,828	14,004	3,665	16,828	14,004	3,665	16,828	14,004	
92	24,003	260.9	53	9	13	4	791	665	14,936	37,523	4,642	14,936	37,523	4,642	14,936	37,523	4,642	14,936	37,523	4,642	14,936	37,523	4,642	14,936	37,523	4,642	14,936	37,523	
Percentage distribution:		91.7		8.3	6.9	6.9	63.6	36.4	9.1	46.7	32.1	9.1	46.7	32.1	9.1	46.7	32.1	9.1	46.7	32.1	9.1	46.7	32.1	9.1	46.7	32.1	9.1	46.7	
1914	65.5	6.9	6.9	13.8	6.9	6.9	6.7	5.4	20.5	24.4	14.8	20.5	24.4	14.8	20.5	24.4	14.8	20.5	24.4	14.8	20.5	24.4	14.8	20.5	24.4	14.8	20.5	24.4	
1919	62.1	14.4	6.9	2.2	2.3	2.3	8.3	7.7	7.7	6.2	19.3	7.7	6.2	19.3	7.7	6.2	19.3	7.7	6.2	19.3	7.7	6.2	19.3	7.7	6.2	19.3	7.7	6.2	
1929	57.6	9.8	14.1	4.4	6.5	5.4	3.3	2.8	9.1	6.2	19.3	2.8	6.2	19.3	2.8	6.2	19.3	2.8	6.2	19.3	2.8	6.2	19.3	2.8	6.2	19.3	2.8	6.2	
1937	36	322.8	15	25	7	6	811	1,163	4,143	2,399	3,956	4,143	2,399	3,956	4,143	2,399	3,956	4,143	2,399	3,956	4,143	2,399	3,956	4,143	2,399	3,956	4,143	2,399	
73	22,933	314.2	24	12	17	9	544	839	2,716	3,183	2,266	2,716	3,183	2,266	2,716	3,183	2,266	2,716	3,183	2,266	2,716	3,183	2,266	2,716	3,183	2,266	2,716	3,183	
67	32,623	486.9	18	12	12	11	420	926	1,931	4,062	6,150	1,931	4,062	6,150	1,931	4,062	6,150	1,931	4,062	6,150	1,931	4,062	6,150	1,931	4,062	6,150	1,931	4,062	
55	30,779	559.6	17	4	9	10	289	317	3,173	37,523	46,551	3,173	37,523	46,551	3,173	37,523	46,551	3,173	37,523	46,551	3,173	37,523	46,551	3,173	37,523	46,551	3,173	37,523	
Percentage distribution:		37.1		15.5	25.8	7.2	2.6	3.7	13.2	7.7	12.6	13.2	7.7	12.6	13.2	7.7	12.6	13.2	7.7	12.6	13.2	7.7	12.6	13.2	7.7	12.6	13.2	7.7	
1914	32.9	16.4	23.3	12.3	5.5	9.6	2.4	3.6	11.9	13.9	9.8	11.9	13.9	9.8	11.9	13.9	9.8	11.9	13.9	9.8	11.9	13.9	9.8	11.9	13.9	9.8	11.9	13.9	
1919	26.9	17.9	17.9	16.4	11.9	3.0	1.3	2.8	5.9	12.5	17.4	5.9	12.5	17.4	5.9	12.5	17.4	5.9	12.5	17.4	5.9	12.5	17.4	5.9	12.5	17.4	5.9	12.5	
1929	30.9	7.3	16.3	18.2	16.4	3.6	.9	1.1	4.4	11.5	20.0	4.4	11.5	20.0	4.4	11.5	20.0	4.4	11.5	20.0	4.4	11.5	20.0	4.4	11.5	20.0	4.4	11.5	
1937	611	142.7	100	95	45	21	8,626	7,094	15,031	15,183	14,653	15,031	15,183	14,653	15,031	15,183	14,653	15,031	15,183	14,653	15,031	15,183	14,653	15,031	15,183	14,653	15,031	15,183	
892	127,255	1,470	995	134	171	85	14,051	9,719	27,800	29,449	30,305	27,800	29,449	30,305	27,800	29,449	30,305	27,800	29,449	30,305	27,800	29,449	30,305	27,800	29,449	30,305	27,800	29,449	
1,470	241,008	184.4	1,212	193	231	114	16,828	14,004	35,666	31,010	36,928	35,666	31,010	36,928	35,666	31,010	36,928	35,666	31,010	36,928	35,666	31,010	36,928	35,666	31,010	36,928	35,666	31,010	
1,861	343,138	191.6	987	185	191	107	14,936	13,618	31,735	37,523	46,551	31,735	37,523	46,551	31,735	37,523	46,551	31,735	37,523	46,551	31,735	37,523	46,551	31,735	37,523	46,551	31,735	37,523	
1,897	306,003	68.5	11.2	10.7	5.0	2.4	6.8	5.5	11.9	11.9	11.5	11.9	11.9	11.5	11.9	11.9	11.5	11.9	11.9	11.5	11.9	11.9	11.5	11.9	11.9	11.5	11.9		
1914	67.7	9.1	11.6	5.8	2.8	2.8	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	
1919	65.1	10.4	12.4	6.1	2.9	2.0	4.9	4.4	10.4	14.8	16.0	10.4	14.8	16.0	10.4	14.8	16.0	10.4	14.8	16.0	10.4	14.8	16.0	10.4	14.8	16.0	10.4	14.8	
1929	61.8	11.6	11.9	6.7	4.2	4.2	4.9	4.4	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	
1937	61.8	11.6	11.9	6.7	4.2	4.2	4.9	4.4	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	15.2	10.4	12.4	

\* Statistics for 1914 and 1919 are not strictly comparable with those for later years for the reason that establishments engaged primarily in the manufacture of aircraft parts, other than engines and tires, were classified with the aircraft industry beginning with 1921, while at earlier censuses only establishments manufacturing complete aircraft were classified in this industry.

† Figures for 1937 are not strictly comparable with those for earlier years.

‡ Figure for the "251-500" group includes wage earners for one establishment each in the "501-1,000" and "over 2,500" groups.

§ See note on base figure.

## CHANGES IN SELECTED LARGE-SCALE INDUSTRIES

The group of industries in table 7 includes the three large-scale industries—steel, the two motor vehicle industries, and rubber tires—which showed the highest degree of concentration of wage earners in establishments employing more than 1,000 wage earners in 1937 and in which there was a notable development of large establishments during the 1914 to 1937 period and a severe decline in the number of smaller or medium-size plants. The blast-furnace industry showed no increase in the number of large units as measured by wage earners as did the other four industries, but is considered here because of its close relationship to the steel industry. The rubber goods (other than boots and shoes and tires and tubes) industry is included because it was combined with the tire industry in the earlier years.

*Iron and Steel Industries.*

A tendency toward concentration of production in large establishments and toward integrated operations has long been characteristic of the iron and steel industry. A majority of the blast furnaces are now operated in conjunction with steel mills, but for census purposes they are classified as separate establishments.

Trends in the blast-furnace products industry may be measured by changes in establishments and wage earners or in the number and capacity of furnaces. By either measure, there was an increase in the number and average size of units from 1914 to 1919 and a movement toward concentration in fewer as well as in larger units from 1919 to 1937. Part of the large increase in establishments and wage earners in the earlier period may be attributed to the depressed condition of the iron and steel industry in 1914 when many furnaces were idle. During the entire period from 1914 to 1937, the average wage earners per establishment increased 45 percent, while the average capacity of furnaces in active plants more than doubled, a large part of the increase in capacity of furnaces occurring between 1923 and 1929. The increase in average productive capacity of establishments was even greater than that of furnaces since there was a substantial increase in furnaces per establishment between 1919 and 1929. This smaller increase in average wage earners per establishment than in average capacity reflects the large reduction in the total number of wage earners from 1919 to 1929 made possible by greatly increased output per worker. It is significant that this notable reduction in employment occurred during the period in which there was the greatest increase in average capacity of furnaces. A special tabulation<sup>2</sup> of blast-furnace statistics for 1933 indicates that the direct labor per ton of pig iron in furnaces with a daily capacity of more than 500 tons was only one-half or one-third as great as in the lower capacity furnaces, although all of the difference cannot be attributed to differences in size of units. There was also a large reduction from 1919 to 1929 in the number of establishments using sand casting machines which require more labor per unit of product than establishments which use machine casting or deliver the metal in a molten state.

The distribution of establishments by size-groups according to wage earners employed shows a marked decrease in the relative importance of smaller establishments throughout the 1914 to 1937

<sup>2</sup> "Economics of the Iron and Steel Industry," C. R. Daugherty, M. G. Chazau, and S. S. Stratton. Special tabulation prepared by Bureau of the Census.

period, establishments employing fewer than 101 wage earners declining from 41.3 percent of the total to 23.0 percent in 1937. Establishments in the highest groups showed marked actual and relative gains from 1914 to 1919, and also increased in proportion of the total from 1929 to 1937. In the 1919 to 1929 period, when the number of establishments in all size-groups was greatly reduced, establishments in the medium groups employing 101 to 250 and 251 to 500 wage earners declined least and, therefore, increased in relative importance. The latter group also recorded an actual and proportional gain from 1929 to 1937, while the number employing over 500 wage earners was the same in the two years. The increasing importance of establishments with 250 to 500 wage earners is also indicated by the fact that they accounted for 38 percent of the total wage earners in 1937 compared with 21 percent in 1914, while establishments employing over 500 workers accounted for approximately one-third in both years, the proportion being only slightly higher in 1937.

The distribution of blast furnaces in active establishments according to daily capacity (table 8) presents a somewhat different picture of size changes in that it shows a much more severe decline in the number and proportion of small furnaces and an actual as well as proportional increase in furnaces in the highest size-groups. Moreover, these data indicate that the highest size-groups recorded the greatest gains throughout the entire period from 1914 to 1937, in contrast with a greater relative increase in importance of establishments in the medium than in the largest size-groups from 1919 to 1929, as measured by wage earners.

TABLE 8.—*Blast furnaces in active establishments*

Year	Number of establishments	Number of furnaces <sup>1</sup>	Average daily capacity (tons)	Number of furnaces with daily capacity of— <sup>1</sup>			
				Under 400 tons	400-499 tons	500-799 tons	800 tons and over
1914.....	160	352	311	208	78	65	
1919 <sup>2</sup> .....	195	411	337	219	78	114	
1929.....	105	273	543	50	39	163	21
1937.....	87	225	631	25	21	133	46

<sup>1</sup> Includes all furnaces both active and idle in plants in which any furnaces were operated during any part of the year.

<sup>2</sup> Excludes data for 14 establishments engaged in the manufacture of blast furnace ferro-alloys.

The total number of furnaces in active establishments followed the same general trend as establishments but declined less severely from 1919 to 1929. Furnaces with less than 500 tons daily capacity, which represented over three-fourths of the total in 1914, increased only slightly from 1914 to 1919 and declined thereafter from 297 to only 46, or 20 percent of the total, in 1937. On the other hand, the number of furnaces with over 500 tons capacity almost doubled from 1914 to 1929 and the number with over 800 tons daily capacity, distinguished in the more detailed distribution for 1929 and 1937, more than doubled between these years.

The concentration of production of blast-furnace products in fewer and larger units reflects the abandonment or dismantling of small, isolated furnaces and the erection of larger and more efficient furnaces operated in connection with steel mills. As an example of the differ-

ence in size of new and abandoned furnaces, the 29 new or rebuilt furnaces completed in 1917 and 1918, when the greatest number was built, had an average annual capacity of 145,000 tons, while the average capacity of 18 furnaces dismantled or abandoned was less than 40,000 tons.<sup>3</sup> Since 1922 the number of furnaces dismantled has greatly exceeded the number of new furnaces.

The number of establishments in the steel-works and rolling-mill products industry apparently reached a peak in 1919 and declined more than 20 percent between that year and 1937, while the total number of wage earners not only increased more rapidly than establishments from 1914 to 1919 but was further expanded and in 1937 was higher than in any other year. As a result of these changes, the average wage earners per establishment more than doubled from 1914 to 1937.

The most significant feature indicated in the distribution of establishments by size according to wage earners was the increasing tendency toward concentration in very large units which was in evidence throughout the 1914-37 period though less pronounced from 1919 to 1929 than in earlier or later years. Large establishments employing over 1,000 wage earners not only accounted for the greater part of the total increase of 65 establishments in the industry from 1914 to 1929 but increased further from 1929 to 1937, while the number employing less than 1,000 wage earners declined substantially from 1919 to 1929 and severely after 1929. Moreover, all of the increase noted for the large establishments from 1929 to 1937 was accounted for by those employing over 2,500 wage earners, which increased from 35 to 53. The increasing importance of very large units and the extent of concentration in such establishments is more evident from the fact that in 1937 the 53 establishments with over 2,500 workers accounted for 58 percent of the wage earners in the industry, while establishments employing 1,000 to 2,500 wage earners accounted for 23 percent in comparison with 53 percent in 1914 for the two groups combined.

Although wage-earner data indicate a slackening in the movement toward concentration in large establishments in the 1919-29 period, a size distribution of establishments according to productivity, or productive capacity, would probably show a considerable increase in large establishments in this period as in the case of blast furnaces. Production in the steel industry, according to an index computed by the Works Progress Administration, increased 65 percent from 1919 to 1929.<sup>4</sup> This would indicate an increase of 78 percent in production per establishment compared with an increase of only 12 percent in average wage earners.

The integration of iron and steel operations, which influenced the increase in importance of large plants in both branches of the iron and steel industry, has been a contributing factor to the greater increase in productivity than in wage earners per establishment, since in integrated plants the labor of casting and subsequent remelting is eliminated. The introduction in 1927 of the process of continuous strip-sheet rolling is another important factor which has contributed to a greater increase in output than wage earners in steel mills.

<sup>3</sup> Data from Annual Report of American Iron and Steel Institute.

<sup>4</sup> See study, "Production, Employment, and Productivity in 59 Manufacturing Industries," National Research Project, pt. II, p. 92.

*Automotive Industries.*

The motor vehicles industries are conspicuous examples of industries in which the average size of units has increased and large establishments have grown in importance. In average wage earners per establishment the motor vehicles branch recorded an increase of 441 percent from 1914 to 1937 and rose from sixteenth place to second place among the 204 industries included in the study, while the average for the bodies and parts branch increased 389 percent (see appendix A). These gains in average size of units reflect an increase in the number of large plants and also a severe decline in the total number of establishments that began between 1919 and 1929. From 1923 to 1937 the total establishments in these industries declined more than 60 percent.

The motor vehicles industry was highly concentrated in a few large establishments in 1914 when 64 percent of the wage earners were found in 14 establishments employing over 1,000 wage earners (establishments of this size represented less than 5 percent of all establishments). In 1937 there were 46 establishments in this class and they included 91 percent of the industry's wage earners, while there were only 85 establishments employing less than 1,000 workers as against 275 in this class in 1914 and 1919. Moreover, 70 percent of the wage earners in 1937 were employed in 19 establishments with over 2,500 workers. This tendency to increase the concentration in very large establishments was markedly in evidence throughout most of the 23-year period but, as in many other industries, the change was not uninterrupted. This tendency was reflected in a proportional decline for the largest establishments employing over 1,000 wage earners in 1923, which on the basis of the slight change in average wage earners per establishment from 1923 to 1927 may have continued through the latter year. The proportional increase for the larger establishments from 1929 to 1937 resulted entirely from a drastic decline in the number in all lower size-groups, since the larger establishments declined slightly for the period.

The bodies and parts branch showed no concentration in very large units in 1914. Three-fourths of the wage earners were distributed among establishments employing over 100 wage earners and only 21 percent of the total were employed in the six establishments with over 1,000 workers. By 1937, there were 57 establishments, 6 percent of the total number, in the latter class and they accounted for 74 percent of all the wage earners. The increase in large units was marked throughout the 23-year period. There was a large increase in the number of small establishments from 1914 to 1919, which accounts for the fact that the average number of wage earners per establishment did not change from 1914 to 1919, but establishments in other lower size-groups increased less rapidly than the number in the highest groups in this period, and both smaller and medium-size establishments declined severely after 1923.

*Rubber Industries.*

Since 1921 the Bureau of the Census has classified in separate industries establishments engaged in the manufacture of rubber tires and inner tubes and those producing other rubber goods except boots and shoes, but for earlier years only combined figures for the two industries are available.

The combined figures indicate an increase of approximately 50 percent in the number of establishments in the two industries and in the average size of units in terms of wage earners from 1914 to 1919, followed by a further substantial increase in establishments to 1921 but a severe decline in average wage earners per establishment to below the 1914 average. During the earlier period, when establishments in practically all size-groups increased in number, those employing over 1,000 wage earners recorded the greatest gain, while from 1919 to 1921 establishments in the medium groups recorded actual and relative gains, the larger units employing over 250 wage earners declining in number and in proportion of the total. For the 1914 to 1921 period as a whole, both establishments in the medium groups, employing 51 to 250 wage earners, and those employing over 1,000 wage earners, increased in number and relative importance. Changes between 1919 and 1921, no doubt, reflect in part the general reduction in employment in the depression of 1920-21 but the same trends are observable if data for the active business year 1923 are compared with 1919, although the average wage earners per establishment in 1923 was substantially higher than in 1914. It may be pointed out that in the 1914 to 1919 period the rubber industries employed a large number of inexperienced and inefficient workmen to meet the rapid increase in production demands and, in the severe contraction that followed in late 1920 and early 1921, employment was drastically cut and the industry put on a more efficient basis. Although production was much higher in 1923 than in 1919, the increased output was accomplished with a considerably reduced wage force. The 45 percent increase in installed horse-power during this period is also significant. Aside from these factors which affected the wage earner figures and limited their usefulness as a standard of measure, size trends indicated by the data for 1919 to 1921, or 1923, probably in a large measure reflect the changing relative importance in the totals and in the various size-groups of establishments in the tire industry, in which large-scale operation predominates, and in the other rubber goods except boots and shoes industry, which largely comprises small- or medium-size units.

The marked tendency of the rubber tires and inner tubes industry toward concentration in fewer and larger establishments since 1921 is indicated by the decline in the total number of establishments from 178 in that year to 46 in 1937, the practical disappearance of establishments employing less than 51 wage earners, which numbered 56 in 1921, and the increase in the number employing over 1,000 wage earners from 11 to 19. The proportion of the total establishments represented by the latter group increased from 6.2 percent in 1921, or 7.5 percent in 1923, to 41.3 percent in 1937. The proportion of wage earners employed in establishments classified in this group rose during this period from 60.5 percent to 83.8 percent of the total.

With the rapid development of the automobile and the abnormal demands on the tire industry created by the World War, a large number of companies which were unable to survive entered the field in early years. Many companies went out of business before 1921. Failures appear to have accounted for a large proportion of the decline in the number of establishments since that year, although consolidation of units was a contributing factor (according to estimates by Dun & Bradstreet, Inc., there were 52 insolvencies among firms in this line

from 1927 to 1934). Although there has been a movement during the last decade by large manufacturers in Akron to decentralize their production and to establish branch factories in a number of States, this movement was not reflected in a decline in the size of establishments.

Unlike the tire industry, the trend in the rubber goods other than tires, tubes, and boots and shoes industry has been toward the development of medium size establishments. The number of establishments expanded considerably from 1921 to 1929 and slightly from 1929 to 1937, notwithstanding a large number of failures, while the number of wage earners recorded a considerable increase in each period. Although from 1921 to 1923 the higher size-groups showed the greatest gains, the apparent trend toward larger units in this period may largely result from comparing data for a year when employment was generally low with data for an active business year. The increasing importance of establishments in the "51 to 500 wage earners" class is emphasized by the fact that this group accounted for 40.5 percent of the establishments and 58.0 percent of the wage earners in the industry in 1937 as against 28.4 percent of the establishments and 46.1 percent of the wage earners in 1923, while both the smaller and larger establishments suffered declines in proportion of the totals.

The manufacture of rubber boots and shoes has been highly concentrated since early years. In average wage earners per establishment, this industry ranked second in 1914 and first in 1937. The most notable change in the industry was the reduction in the number of establishments from 22 to 12 between 1929 and 1937, as the result of a movement by one large company to concentrate production, which was reflected in a large increase in the average size of units. The increase in size of establishments from 1914 to 1919 apparently resulted largely from expansion of employment in existing establishments. Declining demand for rubber footwear, especially for rubber boots and shoes, which require more labor than other products of the industry, was an important factor in the large reduction in employment which was reflected in a decline in the number and relative importance of the largest establishments employing over 1,000 wage earners from 1919 to 1937 and also in the average wage earners per establishment from 1919 to 1929.

#### *Other Selected Industries.*

*Agricultural implements and engines, turbines, water wheels, and windmills.*—This group is one of the outstanding examples of industries in which large establishments greatly increased in importance. Although the intensity of the trend toward concentration in large units may have differed for the two separate industries which have been combined because of a shift in the classification of an important group of establishments between 1929 and 1937, the trend toward concentration appears to have been pronounced in both industries. The outstanding changes indicated by the combined figures were the increase from 29 to 62 in the number of establishments employing more than 500 wage earners from 1914 to 1919 in comparison with only small increases or declines in the lower size-groups and the large reduction in the number in all size-groups employing less than 1,000 wage earners from 1919 to 1937. A notable feature of the reduction

is that establishments in all size-groups employing less than 250 wage earners, which suffered most, showed approximately the same relative declines. There was no increase in the total number of establishments employing over 1,000 wage earners from 1919 to 1937, but the wage earners employed indicate a small increase in the average size of such establishments from 1919 to 1929 and a pronounced increase from 1929 to 1937.

The growing importance of these large establishments, which represented only 1.3 percent of the total number in 1914 and 6.5 percent in 1937, is evident from the increase in the proportion of the total wage earners employed by this class from 28 percent in 1914 to 66 percent in 1937.

*Aircraft and parts.*—Since this industry was only in the experimental stage in the earlier years, comparisons between 1914 and 1937 have little significance but changes since 1929 appear noteworthy. After 1929 the number of small and medium-size establishments was greatly reduced while the number in the highest size-groups increased slightly in number and accounted for an increasing proportion of the wage earners. The average size of establishment (in terms of wage earners) more than doubled between 1929 and 1937. In the latter year 59 percent of the total number of wage earners were in establishments employing more than 1,000 workers; the corresponding proportion in 1929 was only 24 percent.

*Carpets and rugs, wool.*—The small decline in the average number of wage earners per establishment in the carpet and rug industry from 1914 to 1919 and the decline shown for establishments in the higher size-groups in this period reflected the depressed condition of the industry in the latter year when production as well as employment was reduced. For the 1914-37 period as a whole, establishments employing over 1,000 wage earners declined in number but increased in proportion of the total establishments and recorded a slight gain in proportion of total wage earners. The 501 to 1,000 wage-earner group, however, showed an actual as well as a proportional gain.

*Electrical machinery, apparatus, and supplies; radio apparatus and phonographs.*—The outstanding change in this group of industries was the large decline from 1929 to 1937 in the total number of wage earners employed in establishments with over 2,500 wage earners. This was a feature of the substantial reduction in the total wage earners in the industry, and the decline in the average size of these large establishments. Although establishments in the higher size-groups increased in proportion of the total establishments from 1929 to 1937 as well as in earlier years, the group employing over 2,500 wage earners accounted for a smaller proportion of the wage earners in 1937 than in 1929, while the next lower groups recorded gains. There was a substantial gain over the whole period 1914 to 1937 in the proportion of total wage earners employed in establishments with 251 to 1,000 wage earners and practically no change in the proportion employed in the larger establishments.

## SELECTED INDUSTRIES SHOWING INCREASES IN SCALE OF OPERATIONS

Data for a group of selected industries in which the scale of operations increased are included in table 9. In each of these industries the total number of establishments in 1937 was less than that in 1914 or in later years (1919 or 1929), but the number of large-size establishments increased. The group includes industries which differ widely both in number and size of units. For example, in 1937 there were 17,193 establishments in the bakery products industry, but these plants averaged only 14 wage earners. In the washing machine industry, on the other hand, employment in the 40 establishments averaged 233 workers per plant.





TABLE 9.—Distributions of establishments and wage earners by size of establishments for 9 selected industries showing increases in the scale of operations, 1914-37—Continued

Industry	Number of establishments	Wage earners (average for the year)	Average number of wage earners per establishment	Distribution of establishments by number of wage earners employed—					Distribution of wage earners by wage-earner size of establishment—								
				Under 6		6 to 50		51 to 100		101 to 250		251 to 500		501 to 1,000		Over 1,000	
				6	Under 6	6 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000	Over 1,000	Under 6	6 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000
Washing machines, wringers, driers, and ironing machines, for household use:																	
Number:																	
1914.....	68	2,257	33.2	21	37	8	1	1	55	632	581	1,407	483	506	1,988	-----	
1919.....	93	5,944	63.9	22	40	18	1	3	53	844	1,347	2,099	304	1,988	4,699	X	
1929.....	65	8,189	126.0	12	24	12	2	4	39	505	847	2,099	X	4,699	X	-----	
1937.....	40	9,302	232.6	5	10	8	3	4	12	259	573	1,106	1,060	2,247	4,045	-----	
Woolen woven goods, including woven felts, and woolen yarns:																	
Number:																	
1914.....	444	49,069	110.5	14	136	120	28	4	18	3,517	9,231	22,452	9,242	2,677	1,932	-----	
1919.....	526	62,929	119.6	28	144	122	176	5	86	3,893	9,469	27,527	16,613	3,504	1,837	-----	
1929.....	460	58,474	127.1	43	121	98	134	7	107	3,154	7,301	21,295	17,792	4,682	4,143	-----	
1937.....	373	64,680	173.4	10	81	75	125	9	31	2,030	5,527	20,778	23,839	5,564	6,911	-----	
Percentage distribution:																	
1914.....	-----	-----	-----	3.2	30.6	27.0	31.8	0.9	0.2	7.2	18.8	45.8	18.8	5.5	3.9	-----	
1919.....	-----	-----	-----	5.3	27.4	23.2	33.5	9.5	.2	0.1	15.1	43.7	26.4	5.6	2.9	-----	
1929.....	-----	-----	-----	9.3	26.4	21.3	29.1	11.7	.7	0.2	12.5	36.4	30.4	8.0	7.1	-----	
1937.....	-----	-----	-----	2.7	21.7	20.1	33.5	18.2	1.3	3.2	8.5	32.2	436.8	8.6	10.7	-----	

<sup>1</sup> Less than 1/10 of 1 percent.

<sup>2</sup> See base note on figures.

<sup>3</sup> Figures for 1937 are not strictly comparable with those for earlier years.

<sup>4</sup> Wage earners for 2 establishments in the "1-5 wage earners" group are included with figures for the "6-20" group.

<sup>5</sup> Wage earners for 1 establishment in the "251-500" wage earners" group are included with figures for the "101-250" group.

*Bakery Products and Canned Goods Industries.*

In the bread and other bakery products and canned vegetables, fruits, etc., industries, which include a large number of small concerns, the number of establishments in the lowest size-groups, and hence the total number in the industries, was affected to a marked degree by the application of the \$5,000 value of products limit and possibly by differences in the completeness of the canvass of small concerns. Data for all establishments, including those with products under \$5,000 in value, covered in the 1914 and 1919 censuses indicated a small decline in the number of establishments employing less than six wage earners and a large increase in the average size of establishments from 1914 to 1919, in contrast with the changes indicated in the tabulated data in table 9. Excluding from consideration figures for the group employing less than six wage earners, there was a decline throughout the period in the relative importance of the smaller concerns. There was no apparent tendency in either of these industries to develop very large establishments. The larger establishments in the canning industry recorded gains but establishments in the medium size-groups remained the most important in terms of employment. In the bread and other bakery products industry, establishments in the medium groups increased more rapidly than the larger ones after 1919 and recorded gains in the proportion of total establishments and total wage earners.

*Cigar and Cigarette Industries.*

Combined figures for the cigar and cigarette industries (table 9) which were not shown separately in census distributions of establishments by size-groups prior to 1933, do not afford a satisfactory basis for studying changes in the scale of production in these industries because they differ materially in type and size of establishments and have shown opposite trends in production and employment since 1914. The figures indicate, however, the strong tendency toward concentration in fewer and larger establishments which was characteristic of both cigar and cigarette manufacturing. The reduction in the number of small establishments was striking throughout the entire period,<sup>5</sup> but no definite tendency to increase the number of larger units is evident from these data until after 1919. The number of establishments employing less than 51 wage earners, which suffered the greatest loss, declined from 3,637 in 1914 to 547 in 1937. Only the middle groups employing 51 to 250 wage earners recorded actual gains from 1914 to 1919, although it is noted that the 10 establishments in the "over 1,000 wage earners" group in 1919 was larger in terms of wage earners than the 16 establishments in this class in 1914. There was a marked increase in the number of establishments employing over 500 wage earners from 1919 to 1929 and an increase in the number employing over 1,000 wage earners from 1929 to 1937, the number in all lower groups declining in each period. While there were only 22 establishments in the group employing over 1,000 wage earners in 1937 out of a total of 727, these large establishments accounted for almost half of the total wage earners as against 15 percent of the total for establishments in this class in 1914.

<sup>5</sup> Although the tabulated figures indicate a large increase in the number of establishments in the smallest size-group from 1914 to 1919, a decline in establishments employing less than six wage earners is indicated by figures for establishments included in the 1914 and 1919 canvasses if establishments with products under \$5,000 in value are included. See text, p. 2, in regard to the effect of the minimum value-of-products limit on the number included in the "less than 6 wage earners" group.

The high degree of concentration in the cigarette industry is indicated by the fact that 14 of the 34 cigarette establishments included in the statistics for 1937 employed over 1,000 wage earners and accounted for 92 percent of the 26,149 wage earners reported for this industry. In the cigar industry, on the other hand, less than one-fourth of the total wage force was reported by establishments with over 1,000 wage earners, while nearly 50 percent of the total was accounted for by establishments employing 251 to 1,000 wage earners.

In 1914, cigars were largely produced by skilled hand labor and small-scale operation predominated. The 13,300 establishments (including those with products valued at \$500 to \$5,000) reporting to the Bureau of the Census in 1914 averaged only 11 wage earners per establishment. With the perfection in 1917 of a cigar-making machine and its gradual introduction into the industry, the number and size of cigar establishments changed radically. This machine was not suited to small-scale operation and because of its high cost was unavailable to operators with little capital. Declining demand for cigars after 1920 was also a factor which influenced the decline in the number of establishments and concentration of production in the larger units. No figures by size-groups are available for cigar establishments prior to 1921, but since the total number of establishments declined more severely than the total number of wage earners from 1914 to 1919 there was a substantial increase in the average number of wage earners per establishment during this period.

The greatest increase in size of units appears to have occurred after 1921. The number of cigar establishments with products over \$5,000 in value declined from 4,078 in 1921 to 693 in 1937, while wage earners were reduced from 111,855 to 55,879. The average size of establishment in terms of wage earners, therefore, approximately trebled. A frequency distribution of cigar factories according to annual output, available since 1921 from reports of the Commissioner of Internal Revenue, shows that of the 14,578 cigar factories<sup>6</sup> in operation in that year, 13,149 each produced less than 500,000 cigars annually and together accounted for 14 percent of the total output. The bulk of the production, 61 percent, was accounted for by factories with an annual output of 500,000 to 20,000,000 cigars, while 11 factories, each producing over 40,000,000, contributed 16 percent. By 1937 the total number of factories had been reduced to 4,853, while the number of factories producing over 40,000,000 cigars had increased from 11 to 27 and their share of the total production to 60 percent.

Unlike the cigar industry, cigarette factories were highly mechanized in 1914 but there have been many technical improvements since that year. According to statistics compiled by the Bureau of Internal Revenue, the number of cigarette factories in operation declined from 381 on December 31, 1914, to 81 at the close of 1937, while total production of cigarettes increased tenfold. Census statistics of cigarette establishments and wage earners for 1914 and 1937 are not on a comparable basis, but available figures showing the trend from 1921 to 1937 indicate a reduction of 50 percent in the number of establish-

<sup>6</sup> The number of factories reported by the Bureau of Internal Revenue exceeds the census figures for number of establishments principally because the former data include many small establishments reporting products valued at less than \$5,000 and represent individual plants or factories, whereas census returns may treat as a single establishment two or more factories operated under the same ownership in the same town or city. Also the Bureau of Internal Revenue includes in the count of both cigar factories and cigarette factories a plant manufacturing both cigars and cigarettes whereas the Census Bureau classifies such establishments according to their product of chief value.

ments and an increase of 143 percent in the average number of wage earners per establishment.

#### *Glass Industry.*

In the glass industry the larger establishments increased in number and importance throughout the 1914-37 period, but it is notable that the smaller establishments employing less than 51 wage earners showed a substantial gain from 1914 to 1919 and increased slightly in proportion to the total from 1919 to 1937, while establishments in the medium groups declined in number and importance. After 1919 the number of establishments in the groups employing 51 to 250 workers declined severely. The number of establishments in the largest size-groups increased moderately during this period.

#### *Petroleum Refining Industry.*

The petroleum refining industry recorded a notable gain from 1914 to 1919 in the number of establishments employing over 1,000 wage earners. Furthermore, the proportion of total wage earners employed by these large plants increased from 39 to 54 percent over the 5-year period, but declined thereafter to 48 percent of the total in 1937. After 1919, the principal gains shifted to the medium-size establishments. For example, plants employing 51 to 500 wage earners represented 30 percent of the total number in 1919 compared with 45 percent in 1937, and the proportion of the total number of wage earners advanced from 26 percent in 1919, to 31 percent in 1929, and to 34 percent in 1937. Changes in the proportion of the small and large establishments in the petroleum refining industry are likely to vary with the opening of new flush pools.

#### *Woolen Goods Industry.*

The woolen goods industry showed a trend toward larger units from 1919 to 1937. In the earlier period there was a slight tendency toward greater concentration in medium-size establishments. Establishments in all size-groups employing over 250 wage earners increased in number and in proportion of the total from 1919 to 1937, while the number in the lower size-groups declined, but there was only slight concentration in establishments in the highest size-groups. In 1937, 52 percent of the establishments and 69 percent of the wage earners were accounted for by establishments employing 101 to 500 workers, as against 38 percent of the establishments and 65 percent of the wage earners for establishments in this class in 1914, while 19 percent of the wage earners in 1937 were in establishments with over 500 workers compared with 9 percent in 1914 and 1919.

#### *Leather and Flour Industries.*

As in the cigar industry, there was a decline in the number of wage earners in the leather tanning and finishing industry and in the flour milling industry accompanied by an even more than proportionate decrease in the number of establishments; thus, these industries were characterized by an increasing scale of operations. Counter to the general trend in these industries, there was an increase in the number of establishments tanning and finishing leather in the larger size-groups (251 to 1,000 wage earners) and the number of flour milling establishments in the medium size-groups (51 to 250 wage earners) also increased.

SELECTED INDUSTRIES SHOWING IRREGULAR OR NO PRONOUNCED  
CHANGE IN SCALE OF OPERATIONS

In the industries thus far considered the trend toward larger units was more or less in evidence during practically the entire 23-year period. There were, however, a number of industries which showed irregular or no significant change in the scale of operations between 1914 and 1937. Data for a selected group of such industries are presented in table 10. In some cases there were minor increases in operations but, by and large, the changes were not particularly outstanding. In general, these selected industries are old, well-established industries and are active in the production of consumers' goods.







## CONCENTRATION OF ECONOMIC POWER

TABLE 10.—Distributions of establishments and wage earners for 13 selected industries showing irregular or no pronounced change in scale of operations, 1914-37—Continued

Industry	Num-ber of estab-lish-ments	Wage earners (aver- age for the year)	Average number of wage earners per estab-lish-ment	Distribution of establishments by number of wage earners employed—							Distribution of wage earners by wage-earner size of establishment—								
				Under 6	6 to 20	21 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000	Over 1,000	Under 6	6 to 20	21 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000	Over 1,000
<b>Silk and rayon manufactures:</b>																			
Number:																			
1914.....	856	108,003	126.2	19	170	213	179	161	77	23	11	19	2,227	7,332	13,578	25,545	26,514	15,551	17,237
1919.....	1,317	126,715	96.2	98	327	340	232	218	69	19	14	329	4,192	11,797	17,067	33,339	24,487	13,458	22,016
1929.....	1,491	130,467	87.5	187	363	329	268	235	81	18	10	524	4,473	11,048	19,564	36,799	26,497	15,878	15,684
1937.....	848	116,839	137.8	47	150	297	156	164	72	39	13	1,999	x	7,004	11,272	26,487	70,077	x	x
Percentage distribution:																			
1914.....	.....	.....	.....	2.2	10.9	24.9	20.9	19.1	9.0	2.7	1.3	(1)	2.1	6.8	12.6	23.6	24.5	14.4	10.0
1919.....	.....	.....	.....	7.4	24.9	25.8	17.6	16.6	5.2	1.4	1.1	0.3	3.3	9.3	13.5	26.3	19.3	10.6	17.4
1929.....	.....	.....	.....	12.5	24.4	22.1	17.9	15.8	5.4	1.2	.7	.4	3.4	8.5	15.0	28.2	20.3	12.2	12.0
1937.....	.....	.....	.....	5.5	17.7	24.4	18.4	19.4	8.5	4.6	1.5	.1	1.6	6.0	9.7	22.6	260.0	x	x
<b>Women's, misses', and children's apparel, not elsewhere classified:</b>																			
Number:																			
1914.....	4,931	166,729	33.8	518	2,132	1,436	562	233	44	5	1	1,005	26,795	46,324	39,428	33,841	14,395	3,448	1,493
1919.....	7,206	164,983	22.9	1,594	3,284	1,649	483	176	16	4	4	4,974	40,127	52,625	33,390	25,907	5,524	2,446	.....
1929.....	8,082	187,500	23.2	1,886	3,763	1,680	537	204	28	4	.....	9,291	45,605	52,482	37,353	30,789	9,701	2,319	.....
1937.....	6,337	242,879	38.3	906	1,908	2,297	792	356	63	11	4	2,070	21,823	74,664	104,548	106,768	x	x	x
Percentage distribution:																			
1914.....	.....	.....	.....	10.5	43.2	29.2	11.4	4.7	0.9	0.1	(1)	0.6	16.1	27.8	23.6	20.3	8.6	2.1	0.9
1919.....	.....	.....	.....	22.1	45.6	22.9	6.7	2.4	.2	.1	.....	3.0	24.3	31.9	20.3	15.7	3.3	1.5	.....
1929.....	.....	.....	.....	23.3	46.6	20.5	6.7	2.5	.4	(1)	.....	5.0	24.3	28.0	19.9	16.4	5.2	1.2	.....
1937.....	.....	.....	.....	14.3	30.1	36.3	12.5	5.6	1.0	.1	0.1	.9	10.2	30.7	22.5	25.7	x	x	x
<b>Worsted goods (wool combing, worsted woven goods, worsted yarn, and hair cloth):</b>																			
Number:																			
1914.....	311	110,112	354.1	11	34	29	48	82	62	20	25	22	444	1,074	3,601	13,663	22,066	14,936	54,286
1919.....	308	104,243	338.5	4	30	41	49	82	52	25	25	6	455	1,482	3,700	13,191	18,187	16,610	50,633
1929.....	277	88,995	321.1	11	23	37	32	82	53	23	16	863	x	11,501	12,497	113,513	15,680	18,488	86,883
1937.....	258	90,782	351.9	2	24	19	55	59	56	25	17	12,887	x	x	12,432	12,944	57,289	37,813	38,143
Percentage distribution:																			
1914.....	.....	.....	.....	3.5	11.0	9.3	15.4	26.4	19.9	6.5	8.0	(1)	0.4	1.0	3.3	12.4	20.0	13.6	49.3
1919.....	.....	.....	.....	1.3	9.7	13.4	15.9	26.6	16.9	8.1	8.1	(1)	.4	1.5	3.5	12.7	17.4	15.9	48.6
1929.....	.....	.....	.....	4.0	8.3	13.3	11.6	29.6	19.1	8.3	5.8	.....	x	1.8	2.8	15.2	17.5	20.8	41.5
1937.....	.....	.....	.....	.8	9.3	7.3	21.4	22.8	21.7	10.1	6.6	.....	x	x	2.5	10.9	41.1	x	42.0

<sup>1</sup> Wage earners for 2 establishments in the "251-500" group are included with the combined total for the "51-100" and "101-250" groups.

<sup>2</sup> See note on base figures.

<sup>3</sup> For 1929 and earlier years the dyeing and finishing departments of cotton, silk, and rayon mills were treated as integral parts of the mills; for 1937, such departments, except those engaged in dyeing raw stock or yarns for use in the same plants, were classified in a separate industry. In the censuses of 1929 and prior years, all establishments producing mixed goods in which the material of chief value was silk or rayon were classified in the "silk and rayon goods" industry; but in the 1937 census, manufacturers of such mixed goods having a cotton warp were assigned to the "cotton woven goods" industry.

<sup>4</sup> Less than  $\frac{1}{10}$  of 1 percent.

<sup>5</sup> Figures for 1937 include data for establishments engaged primarily in dyeing and finishing hosiery knitted by others, which were formerly classified elsewhere. Wage earners for 1 establishment in the "51-100" group are included in figures for the "21-50" group, while wage earners for 2 establishments classified in the former group are included in figures for the "101-250" group.

<sup>6</sup> At the census of 1929, for census purposes, a sawmill was treated as an establishment with products valued at \$5,000 if it produced 200,000 feet of lumber, or its equivalent. Wage earners for 3 establishments in the "251-500" group are included in figures for the "101-250" group.

<sup>7</sup> The 8 industries here combined for 1937 were treated as a single industry prior to 1935. They cover establishments whose principal products are women's, misses', and children's clothing (except that made in knitting mills) such as coats, suits, skirts, blouses, dresses, aprons, nightwear, and underwear and infants' and children's outerwear.

<sup>8</sup> Figures for the "51-100" group include wage earners for 1 establishment in the "101-250" group.

<sup>9</sup> Figures for the "21-50" group include wage earners for 1 establishment each in the "51-100" and "101-250" groups.

<sup>10</sup> Figures for the "51-100" group include wage earners for 1 establishment in the "21-50" group and 2 establishments in the "101-250" group.

Three of these industries—silk and rayon goods, knit goods, and women's clothing—showed a pronounced trend toward smaller units in the earlier part of the period under review and a tendency toward larger units in later years. In two industries—butter and meat packing—there was a considerable development of larger units in the 1914-19 period which was followed by a decided tendency to increase the number of establishments in the medium size-groups.

#### *Irregular Changes in Scale of Operations.*

*Meat packing and butter industries.*—The meat packing industry is one of the few industries that showed little change in the total number of establishments from 1914 to 1937, but shifts in the relative importance of very large and small or medium-size establishments were striking. This industry includes a very large number of small units, but approximately half of the wage earners in 1914 were found in establishments employing over 1,000 workers. These large establishments increased greatly in number and relative importance from 1914 to 1919 but declined in number and importance from 1919 to 1937 when establishments in all size-groups employing less than 1,000 but over 20 wage earners recorded large gains. Most of the change in the latter period occurred from 1919 to 1929. The number of very small establishments declined in each census year.

The increasing importance of large establishments in the earlier years and of establishments in the medium groups from 1919 to 1937 is apparent from changes in the proportion of the total wage earners employed in such establishments. The proportion of the total wage earners in establishments employing over 1,000 wage earners increased from 49 percent in 1914 to 64 percent in 1919 at the expense of all lower size-groups, and then declined to 38 percent in 1937, while the proportion for establishments employing less than 1,000 wage earners increased throughout this latter period. The decline in the proportion of total wage earners employed in establishments with over 1,000 wage earners in 1937 as compared with 1914, despite an increase in number for the entire period, reflects a decline in the average size of such establishments in terms of wage earners.

The butter industry, which is composed almost entirely of small establishments and offers a sharp contrast in scale of production to the meat packing industry, showed trends similar to that industry from 1914 to 1929 in that the larger establishments recorded the greatest gains from 1914 to 1919 and declined severely in later years, while the medium groups recorded the only gains in establishments from 1919 to 1929. Apparently, there was a slight trend toward smaller units from 1929 to 1937, although medium groups registered further small gains in that period. There was little change in the total number of establishments in this industry from 1919 to 1937, or in the proportion of wage earners accounted for by the predominant group employing less than six wage earners. In connection with the large number in this group it should be noted that since the wage-earner data represent an average of monthly figures, in a highly seasonal industry, establishments appear to be smaller in terms of wage earners than is actually the case in periods of activity.

*Silk and rayon industries.*—Census statistics for manufacturers of silk and rayon goods, which were assigned to a single industry classification prior to 1935, indicate that in number and size of establishments this group has passed through three stages of development

since 1914. The first period from 1914 to 1921 was marked by a rapid increase in the number of establishments to almost double the original figure, largely through a multiplication of small units and a pronounced decline in their average size. In the second period from 1921 to around 1927, there was little change in the number or average size of units, available data indicating a possible increase in medium-size establishments, while from 1929, and probably from 1927, the number of small- and medium-size establishments declined sharply and the number of large establishments increased. This pronounced reversal of the earlier trend reduced the total number of establishments to approximately the 1914 figure and establishments employing less than 51 wage earners, which had increased from 402 (47 percent of the total) in 1914 to 1,029 (65.8 percent of the total) in 1921, to approximately the same number and also the same proportion of the total as in the earlier year. Medium-size establishments also declined from 1929 to 1937, but somewhat less severely than the smaller ones, and were fewer in number in 1937 than in 1914. In contrast, large establishments employing over 500 wage earners, which had numbered 34 in 1914 and 28 in 1921 and 1929, increased to 52 in 1937 and from 4 percent of the total in 1914 and less than 2 percent in 1921 and 1929 to 6.1 percent in 1937. These large establishments employed around two-fifths of the wage earners in 1937 compared with less than one-third in 1914.

An important factor in the rapid rise in the number of small establishments from 1914 to 1921 was the increase in commission weavers operating small establishments with comparatively few looms (usually second-hand) and the increase in many "family shops" with only four or five workers. The growth of this type of business was particularly marked immediately following the war when the heavy demand for silk products induced concerns unable to fill their orders to contract work to small operators. While the commission system was extended in later years, particularly in the depression following 1929, a study of the broad-silk industry in Paterson, where the system is most prevalent, indicates that the average size of such shops, in terms of looms at least, increased.<sup>7</sup>

A second factor affecting the size of units was the change in the relative importance in the national totals of the New Jersey output which throughout the period under study included a greater proportion of small establishments than that of any other important State. Establishments in this State accounted for 40 percent of the total establishments and 26 percent of the total wage earners in 1914 and 50 percent of the establishments from 1919 to 1927, declining thereafter to only 26 percent of the total in 1937.

Separate statistics for the rayon and silk industries, available only for 1935 and 1937, show that rayon factories are much larger on the average than factories in the older silk branch of the industry and that the number of large rayon establishments increased during the 2-year period. The growth of the rayon industry, which first became important in the early twenties, undoubtedly has influenced the trend toward larger establishments so evident in the figures since 1927. Ten of the thirteen establishments with over 1,000 wage earners and 34 of the 39 with 501 to 1,000 wage earners reported for 1937 in the combined totals for the silk and rayon goods industries were rayon

<sup>7</sup> Paterson Broad-Silk Works, Works Progress Administration, National Research Project, p. 113.

establishments, while the total number of establishments was about equally divided between the silk and rayon branches. Between 1935 and 1937 the number of establishments in the silk group declined from 658 to 425, the large- and medium-size establishments declining less severely than the smaller units.

*Knit goods and women's and children's clothing industries.*—The knit goods industry is composed largely of small units although there were establishments reported which employed over 2,500 wage earners in 1937. Despite rather pronounced increases in the number and relative importance of the larger establishments as compared with 1914, those employing "101 to 250 and 251 to 500 wage earners remained the most important groups in terms of employment throughout the 1914-37 period and together accounted for approximately 45 percent of all wage earners. The proportion for the larger establishments ranged from a low of 26 percent in 1923 to a high of nearly 40 percent in 1937.

The number of establishments in all size-groups increased from 1914 to 1929 but those employing less than 50 wage earners recorded the largest actual gains. The increase from 1919 to 1929 in the number of establishments employing over 1,000 wage earners, however, was notable. While there were fewer establishments in this class in 1937 than in 1929, they were larger on the average, and together employed slightly more wage earners than the larger number of establishments in 1929. They showed little change, however, between these years in the proportion of the total wage earners employed.

There has been no apparent tendency to develop extremely large units in the women's and children's clothing industry. Although there was an increase in the number and relative importance of the larger establishments in the industry from 1919 to 1937, there was also a large gain in the number of establishments employing 21 to 100 workers. In the earlier years from 1914 to 1919, the number of small units increased considerably while the number in higher size-groups declined. Small establishments showed little change from 1919 to 1929 and declined after 1929 while the number employing over 20 wage earners, taken together, increased in both periods.

*Lumber and timber products.*—In terms of total wage earners employed, the lumber and timber products industry (embracing logging camps, merchant sawmills, and combined sawmills and planing mills) ranked third among all industries in 1937. Because of the fact that the majority of the mills are small, however, the average size of units in this industry is comparatively small in spite of the existence of a number of very large establishments. Excluding consideration of the group reporting less than six wage earners for which statistics are definitely not comparable,<sup>8</sup> there was a sharp decline from 1914 to 1929 and a pronounced increase from 1929 to 1937 in the number of smaller establishments, while the larger establishments employing over 500 wage earners recorded a gain in the early period and declined from 1929 to 1937. It should be noted in connection with the increase in the latter group from 1914 to 1929 that, although the number in 1929 exceeded the 1919 figure, the number of such establishments apparently reached a peak around 1923 to 1925, when lumber production was higher than in any other year since 1916. These establishments employing over 500 wage earners, however, formed a smaller propor-

<sup>8</sup> See footnote, table 10, and text, p. 2.

tion of the total in the 1923-25 period than in 1929. As a net result of the opposite changes in the proportion of larger and smaller units in the 1914 to 1929 period and in subsequent years, the largest establishments showed a gain for the entire period both in proportion of total establishments and total wage earners, while the smaller establishments recorded a large actual and relative loss. In point of employment, the medium groups reporting 101 to 500 wage earners remained the most important throughout the period, accounting for over two-fifths of the total wage earners.

A frequency distribution of merchant sawmills producing over 50,000 board feet of lumber, by quantity of lumber produced, indicates the same general size trend as the distribution according to wage earners. It was noted from these data that, while the number of mills producing over 10,000,000 board feet of lumber reached a peak around 1924, the number producing over 50,000,000 board feet, which was not distinguished in statistics prior to that year, was highest in 1929. There were 120 of these large mills in the latter year compared with 110 in 1924 and 63 in 1936, the latest year for which data are available.

The increase in the number and relative importance of large mills in the 1914-29 period may be attributed largely to the shift in the geographical center of the lumber industry from the southern region, where small mills predominate, to the Pacific Coast States where the density of the timber areas and the necessity of having establishments capable of handling logs of great size have influenced the erection of a greater proportion of large units than in other regions. At the beginning of the period in 1914, the southern and North Carolina pine States accounted for nearly half of the total lumber production in comparison with approximately one-fifth of the total for the Pacific Coast States. Production in the latter area rose rapidly after 1915, resulting in an increase in the number of large mills, while production in the southern regions reached a peak around 1916. By 1928 production in the two areas was approximately equal, together accounting for four-fifths of the total, while after 1929 the Pacific States supplanted the southern as the principal lumber region, although production in the Pacific States, as in other areas, declined severely after 1929. The effect of the increasing importance of the industry in the Pacific Coast States on the proportion of large establishments is apparent from a comparison of the two areas. In 1919 and 1929 less than 5 percent of the 6,800 mills in the southern and North Carolina pine States, produced over 10,000,000 board feet of lumber, while in the Pacific Coast States 20 percent of the 1,200 mills in 1919 and 22 percent of the 1,300 mills in 1929 were in this class. Moreover, 72 of the 110 mills cutting over 50,000,000 board feet reported in 1924 and 92 of the 120 such mills reported in 1929 were located in the Pacific Coast States compared with 23 and 10, respectively, in the southern and North Carolina pine States.

Size changes in the past decade reflect the severe decline in the demand for lumber, which has resulted in greatly reduced production and in the liquidation of many large mills, and the gradual depletion of large southern timber areas with the resultant reversion to smaller establishments. These utilize small or second growth timber which is not available or not accessible in sufficient quantity to supply the

larger mills. Many of the small mills are of the portable type, and are engaged in what has been described as a "mopping up" process.

*Cottonseed oil, cake, and meal industry.*—The total number of establishments in the cottonseed, oil, cake, and meal industry declined nearly 50 percent from 1914 to 1937. The distribution of establishments according to wage earners indicates that the smaller establishments declined severely from 1914 to 1919 and from 1929 to 1937, while the larger establishments increased over the period as a whole; from 1919 to 1929, however, the number of larger establishments was greatly reduced, while the number in the medium groups recorded relative gains. The increase in the number of larger establishments in the 1914-19 period and the decline from 1919 to 1929 was noteworthy. In sharp contrast with the changes indicated by the wage-earner data in the latter period, a distribution of mills according to quantity of seed crushed indicates that in terms of productivity there was not only an increase in the number and relative importance of large mills and a decline in the number of small mills from 1919 to 1929 as well as in later years but that the movement was more pronounced in the 1919-29 period than from 1914 to 1919. The largest mills, crushing over 20,000 tons of seed, accounted for approximately 3 percent of the total number in the cotton marketing year 1913-14 and in 1918-19 but increased to 8 percent of the total in 1928-29 and to 12 percent in 1936-37.

#### *No Pronounced Change Over the Period.*

The discussion in the preceding section was concerned with specific industries in which the scale of operations experienced rather wide, irregular movements during the period from 1914 to 1937. For six industries included in table 10 there is no strong evidence in the wage-earner data of a definite tendency toward either larger- or smaller-scale operations during all or the greater part of this time.

In three industries—boots and shoes, cotton goods, and worsted goods—there was a large reduction in the total number of establishments from 1919 to 1937, following an increase from 1914 to 1919 for the former two industries. There was, however, no clear-cut tendency for the smaller establishments to decline in importance until after 1929, when all the reduction in the total was accounted for by a severe decline in the number in the lower size-groups which include establishments employing less than 100 wage earners in the boot and shoe industry and less than 250 in the larger-scale textile goods industries. In the boots and shoes and worsted goods industries the largest establishments employing over 1,000 wage earners decreased in number and relative importance between 1914 and 1937. In the latter industry the decline occurred between 1919 and 1929, whereas in the boot and shoe industry a still further decline in 1937 was noted.

The same tendency to decrease the number of establishments employing over 1,000 workers and to increase the number in the next lower size-groups was in evidence in the cotton goods industry between 1919 and 1929 but the larger establishments increased in number after 1929. For the 1914 to 1937 period as a whole, establishments in all size-groups employing over 250 wage earners recorded gains in number and in proportion of total establishments as well as small increases in the proportion of the total wage earners employed.

Some tendency toward larger units was apparent in the paints, pigments, and varnish industry from 1914 to 1919, but there was no development of larger establishments in later years. There was a considerable expansion in the number of establishments from 1919 to 1937; throughout the period, however, the industry consisted almost entirely of small and medium-size establishments.

In the furniture industry and the combined group—confectionery, ice cream, and chewing gum—changes in the proportional distribution of establishments and wage earners were not sufficiently pronounced or regular to indicate any definite trend.

#### SELECTED INDUSTRIES SHOWING DECREASES IN SCALE OF OPERATIONS

Table 11 presents data for a number of industries which were operating on a smaller scale in 1937 than in 1914. With the exception of the electric and steam railroad car industry, small and medium-size establishments predominated in these industries in the earlier as well as later years. For a few of the industries the trend toward smaller units appears to have been more or less in evidence during the entire period since 1914, but in most cases this trend began only after 1919. A comparatively small number of the 204 industries studied, however, showed a trend toward manufacturing on a smaller scale throughout the entire period. Moreover, as previously noted, industries that showed an appreciable decline in the average size of units for the 1914-37 period as a whole were far less numerous than those that showed appreciable gains. Examination of the data for the industries in table 10 reveals considerable irregularity in the changes. This appears characteristic of industries in which the size of units declined. About the only similarity in the changes for the group in table 11 was a decline in the relative importance of establishments in the largest size-groups between 1919 or 1923 and 1929.

TABLE 11.—Distributions of establishments and wage earners by size of establishment for 7 selected industries showing decreases in the scale of operations, 1914-37

[NOTE.—In the distribution of wage earners, the figures for certain classes were combined and printed in italics. An "x" indicates the group from which an item was omitted and it appears at the right of the italicized figure which represents the combined data]

Industry	Number of establishments	Wage earners (average for the year)	Average number of wage earners per establishment	Distribution of establishments by number of wage earners employed—						Distribution of wage earners by wage-earner size of establishment—								
				Under 6	6 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000	Over 1,000	Under 6	6 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000	Over 1,000	
<b>Cars, electric and steam railroad, not built in railroad repair shops:</b>																		
Number:																		
1914.....	117	58,128	496.8	6	22	16	24	10	14	16	35	615	1,287	3,659	6,725	9,714	36,083	
1919.....	106	55,218	520.9	.....	21	14	23	14	19	15	.....	450	1,026	3,874	5,589	12,947	31,332	
1929.....	147	40,015	272.2	6	53	20	23	25	9	11	23	1,379	1,469	3,543	9,220	6,715	17,666	
1937.....	154	40,466	262.8	12	65	12	19	22	13	11	44	1,524	841	3,019	7,958	8,691	18,389	
Percentage distribution:																		
1914.....	.....	.....	.....	5.1	18.8	13.7	20.5	16.3	11.9	13.7	0.1	1.0	2.2	6.3	11.6	16.7	62.1	
1919.....	.....	.....	.....	.....	19.8	13.2	21.7	13.2	17.9	14.2	.....	3.8	1.9	7.0	10.1	23.5	56.7	
1929.....	.....	.....	.....	4.1	36.0	13.6	15.7	17.0	6.1	7.5	.....	3.4	3.7	8.8	23.1	16.8	44.1	
1937.....	.....	.....	.....	7.8	42.2	7.8	12.3	14.3	8.5	7.1	.....	3.8	2.1	7.4	19.7	21.5	45.4	
<b>Cement:</b>																		
Number:																		
1914.....	129	27,907	216.3	4	14	18	57	28	7	1	12	345	1,392	10,128	9,714	4,675	1,641	
1919.....	121	25,524	210.9	2	13	25	56	19	4	2	6	376	2,091	9,694	6,951	3,160	3,246	
1929.....	174	33,368	191.8	3	15	39	79	31	5	2	11	454	2,994	13,338	10,065	6,666	x	
1937.....	158	26,426	167.3	.....	10	34	88	22	4	.....	.....	300	2,616	13,626	7,186	2,698	.....	
Percentage distribution:																		
1914.....	.....	.....	.....	3.1	10.9	13.9	44.2	21.7	5.4	0.8	( )	1.3	5.0	36.3	34.8	16.7	5.9	
1919.....	.....	.....	.....	1.7	10.7	20.7	46.2	15.7	3.3	1.7	( )	1.5	8.2	38.0	27.2	12.4	12.7	
1929.....	.....	.....	.....	1.7	8.6	22.5	45.4	17.8	2.9	1.1	( )	1.4	9.0	39.9	30.2	19.5	x	
1937.....	.....	.....	.....	.....	6.3	21.5	55.7	14.0	2.5	.....	.....	1.1	9.9	51.6	27.2	10.2	.....	
<b>Condensed and evaporated milk:</b>																		
Number:																		
1914.....	189	6,092	31.8	40	111	32	4	2	.....	.....	140	2,336	2,219	658	619	.....	.....	
1919.....	400	13,675	34.2	79	216	82	23	.....	.....	.....	270	4,852	5,642	2,911	.....	.....	.....	
1929.....	535	7,065	13.2	255	260	18	2	.....	.....	.....	393	5,073	1,389	x	.....	.....	.....	
1937.....	601	8,967	14.9	275	291	31	4	.....	.....	.....	600	5,744	2,086	537	.....	.....	.....	
Percentage distribution:																		
1914.....	.....	.....	.....	21.2	58.7	16.9	2.1	1.1	.....	.....	2.3	38.0	36.9	11.0	10.8	.....	.....	
1919.....	.....	.....	.....	19.8	54.0	20.5	5.7	.....	.....	.....	2.0	35.5	41.2	21.3	.....	.....	.....	
1929.....	.....	.....	.....	47.7	48.6	3.3	.....	.....	.....	.....	8.4	71.8	19.8	x	.....	.....	.....	
1937.....	.....	.....	.....	45.8	48.4	5.1	.....	.....	.....	.....	6.7	64.0	23.3	6.0	.....	.....	.....	

CONCENTRATION OF ECONOMIC POWER

<b>Fertilizers:</b>														
Number:														
1914	734	22,742	31.0	287	301	89	50	7					2,676	1,205
1919	584	26,278	45.0	185	245	70	61	12	2				3,860	x
1929	638	20,926	32.8	165	342	65	31	3	2				4,049	
1937	743	20,893	28.1	200	440	64	32	7					4,825	
Percentage distribution:														
1914				39.1	41.0	12.1	6.8	1.0					31.7	11.8
1919				31.7	41.9	13.6	10.4	2.1	0.3				35.8	4.6
1929				25.9	53.6	14.9	4.8	.5	.3				22.2	x
1937				26.9	59.2	8.7	4.3	.9					23.1	11.0
Ice, manufactured:														
Number:														
1914	2,055	22,259	10.8	988	1,024	34	8	1					1,390	283
1919	1,500	29,865	12.0	1,222	1,211	48	17	1					2,682	468
1929	4,110	32,184	7.8	2,438	1,885	32	5		1				2,262	576
1937	3,847	18,705	4.9	2,832	1,011	4							237	
Percentage distribution:														
1914				48.1	49.8	1.7	0.4	( <sup>1</sup> )					10.0	1.3
1919				48.9	48.4	1.9	.7	0.1	( <sup>1</sup> )				10.6	1.6
1929				60.5	38.6	.8	.1						7.0	2.5
1937				73.6	26.3	.1							2.5	1.9
Screw-machine products and wood screws:														
Number:														
1914	70	8,071	115.3	11	38	5	10	3					1,440	1,308
1919	147	15,144	103.0	25	75	14	21	6	3				3,170	2,082
1929	273	19,881	72.8	53	144	28	31	9	5	3			4,846	2,883
1937	311	21,287	68.4	55	171	42	22	13	6	2			3,606	4,454
Percentage distribution:														
1914				15.7	54.3	7.1	14.3	4.3					17.8	16.2
1919				17.0	51.0	9.6	14.2	4.1	2.1	2.0			21.0	13.6
1929				19.4	52.8	10.2	11.4	3.3	1.8	1.1			24.4	14.5
1937				17.7	55.0	13.5	7.0	4.2	2.0	.6			17.0	20.9
Structural and ornamental metal work, made in plants not operated in connection with rolling mills:														
Number:														
1914	1,042	46,887	45.0	281	570	89	63	26	12	1			8,898	8,217
1919	1,035	43,805	42.4	352	507	74	75	17	6	4			12,050	6,349
1929	1,482	54,947	37.1	438	791	121	78	25	5	4			12,032	8,652
1937	1,132	38,814	34.3	343	630	80	57	17	2	3			8,809	5,565
Percentage distribution:														
1914				27.0	51.7	8.5	6.1	2.5	1.1	0.1			21.7	18.9
1919				34.0	49.0	7.1	7.3	1.6	0.6	.4			27.5	14.4
1929				30.9	53.4	8.1	5.3	1.7	.3	.3			21.9	15.8
1937				30.3	55.7	7.0	5.1	1.5	.1	.3			22.7	14.3

<sup>1</sup> Less than one-tenth of 1 percent.

x Includes some employees engaged in delivery service.

*Steam and Electric Railroad Car Industry.*

Few industries, and no other large-scale industry, showed as great a decline in average size of units from 1914 to 1937 as the electric and steam railroad car industry. Practically all of the decline occurred between 1923 and 1929 following a substantial increase in the average size of units in the earlier period. The figures in table 11 and data for 1923, which show a continuation of the 1914-19 trend, indicate that there was little change from 1914 to 1923 or from 1929 to 1937 in the relative importance of large establishments with over 1,000 wage earners, which account for a large proportion of the wage earners in the industry, but that the next lower group employing 500 to 1,000 wage earners increased substantially in number and relative importance. In the intervening years from 1923 to 1929, however, establishments in both of these size-groups declined severely in number and proportion of the total, while the number in all lower size-groups increased. The smaller establishments with less than 51 wage earners also increased from 1929 to 1937 which accounts for the slight decrease in average wage earners per establishment in this period despite the increase for the large establishments noted above. Trends in the scale of production in this industry appear to have reflected rather closely changes in production which increased considerably from 1914 to 1923 and declined severely from 1923 to 1929 but did not show any marked change in 1937 as compared with 1929.

*Ice Industry.*

The ice industry, which shows a somewhat greater decline in average wage earners per establishment than the other industries included in table 11, consists largely of small units, the advantages of proximity to markets favoring small-scale operations. The wage-earner data indicate that there was a marked trend toward larger units from 1914 to 1919 but that from 1919 to 1937 the smaller establishments increased rapidly while the number of larger establishments was greatly reduced. In 1937, establishments with less than six wage earners accounted for 40 percent of the total wage earners in the industry compared with 13 percent in 1919.

The decline in the average wage earners per establishment between 1919 and 1929, as well as the apparent shift of establishments to lower size-groups indicated by the data, may result largely from the improper inclusion of some employees engaged in delivery service in the figures for the earlier years and the consequent inflation of the size of establishments in 1914 and 1919. A comparison of ice production (which reached a peak in 1929 and declined severely from 1929 to 1937) with changes in the number of establishments indicates that the average size of establishments in terms of volume of production increased from 1919 to around 1925-27, but whether measured by production or wage earners there was a large decline in the average size of establishments after 1927.

This trend in the ice industry toward smaller units apparently reflects the effects of the development of mechanical refrigeration and the tendency to set up plants in small communities, or in large communities close to the place of consumption, and to develop ice manufacturing as an auxiliary operation in connection with other lines of business, such as cold-storage plants, creameries, etc.

*Screw-machine Products and Wood Screws Industry.*

In the screw-machine products and wood screws industry both the number of establishments and wage earners recorded large increases from 1914 to 1937, but establishments increased more rapidly than wage earners as the result of a large increase in the number of smaller units. The most notable changes in the size distributions were the decline in the relative importance of establishments employing over 500 wage earners which, though embracing only 3 of the 70 establishments in 1914, included more than half of the wage earners in the industry in that year, and the increasing importance of establishments employing 100 or fewer wage earners. Most of the change occurred after 1919. The proportion of the total wage earners employed in establishments in the "over 500 wage earners" class fell from 53 percent in 1914 to 48 percent in 1919 and 31 percent in 1937, while the proportion for those employing 100 or fewer wage earners increased from 14 percent of the total in 1914 to 31 percent in 1937. Similarly, the proportion of the total establishments represented by the former group declined despite an increase in number from 1914 to 1929, while the proportion represented by the smaller size-groups increased.

*Other Selected Industries.*

The cement and structural and ornamental metal work industries showed no definite trends from 1914 to 1919 but a tendency toward larger units from 1919 to 1923, probably reflecting the increase in building activity that began in the latter period. From 1923 to 1937 the average size of units (in terms of wage earners) in both industries declined. The decline in the structural and ornamental metal work industry reflected a pronounced trend toward smaller units but the decline for the cement industry resulted from a movement toward greater concentration in medium-size establishments. Similar trends were slightly in evidence in the 191-419 period. Concentration in medium-size establishments appears to characterize the cement industry. In 1914, establishments with 101 to 250 wage earners accounted for 44 percent of all establishments and 36 percent of the wage earners, the remaining establishments being equally divided between higher and lower size-groups, while in 1937 this group accounted for 56 percent of the establishments and 52 percent of the wage earners.

Of the industries studied, the condensed and evaporated milk industry, which is composed of small and a few medium-size establishments in terms of average employment, showed one of the most pronounced declines in average wage earners per establishment. All of this decline occurred between 1919 and 1929 and reflected a large increase in the number of small units and a drastic decline in the number of establishments in the higher size-groups. In both earlier and later years, from 1914 to 1919 and from 1929 to 1937, the larger establishments increased more rapidly than the smaller, but for the 1914-37 period as a whole there was a striking increase in the number and relative importance of small units.

As a consequence of the sharp drop in number of establishments in the fertilizer industry and the pronounced rise in total employment, the average number of wage earners per establishment was considerably higher in 1919 than in 1914 but declined sharply between 1919 and 1929 and again in 1937. The decline in number of establishments in the earlier period occurred among plants employing 100 or less wage earners. The larger establishments recorded actual and relative gains from 1914 to 1919 but declined in importance in later years.

## CHAPTER III

### GENERAL TRENDS IN CONCENTRATION OF OPERATIONS AMONG MANUFACTURING ESTABLISHMENTS

In discussing the scale of production in the previous chapters, the analysis was in terms of the size of establishments. The approach now shifts to the problem of concentration, a concept which refers to the distribution of employment among the various establishments in an industry. For the purposes of this study, the number of establishments employing one-half of the wage earners in an industry is taken as the measure of the concentration of operations in big establishments. Concentration of operations in terms of establishment units, then, is really a measure of the extent to which the business of an industry is done in a small number of its larger plants, or conversely, how evenly it is spread over the various establishments in the industry. Growth of concentration refers to expansion of some units at the expense of others. Concentration increases when the growth in size of establishments, as measured by the number of wage earners employed, is among the larger establishments and decreases when the growth in size is among the smaller establishments. There are, of course, various other combinations of circumstances which would account for increases or decreases in concentration.

#### MEASURES OF CONCENTRATION

In order that changes in the concentration of operations in the various industries may be appraised, two measures of concentration have been developed. The first measure, which is called the absolute index, is based on the actual number of establishments required to account for half the wage earners in each industry. The second measure, which is called the proportionate index, is based on the proportion of the total number of establishments which is required to account for half the wage earners in each industry. Thus, the first index is concerned solely with the number in the concentrated group, while the second index reflects changes in the total number of all establishments in the industry.

The establishments in each industry were arrayed in order of the number of wage earners employed by each and the number of the largest establishments required to account for half the total wage earners was thus determined.<sup>1</sup> This figure was calculated for 7 different years throughout the period from 1914 to 1937, inclusive, and for 195 industries (or combinations of industries) for which comparable data were available (see appendix B). For ease in comparison

<sup>1</sup> Actually, frequency distributions were prepared from published census data of the number of establishments and the number of wage earners per establishment expressed in given intervals. By means of interpolation the nearest whole number of large establishments employing half the wage earners was determined. Interpolations were considered unreliable in the case of nine of the industries analyzed in the earlier chapter so that these industries were excluded from the present analysis.

the figures were converted to an index with 1914 as the base. In this form an increase in the absolute index from one period to another means that more establishments are necessary to account for half the workers, and thus concentration has decreased. The same general reasoning applies to the proportionate index. A final step was thus necessary in the calculation of the indexes in order that they would reflect directly the changes in concentration. This involved the calculation of the reciprocals of the indexes for each year. The absolute index of concentration used in this study, then, is the reciprocal of the index representing the actual number of establishments employing half the workers. The proportionate index of concentration of operations in the larger establishments was calculated in the same manner.

The difference between the two indexes is revealed in the following example. There were 84 establishments in 1914 and 27 establishments in 1937 in the corn sirup and other products industry and the number of wage earners in these 2 years was 4,500 and 7,000 respectively. The number of establishments employing half the workers was 4 in 1914 and 3 in 1937; this represented 4.8 and 11 percent of the establishments, respectively. The absolute index of concentration, therefore, increased from 100 in 1914 to 133 in 1937, while the proportionate index decreased from 100 in 1914 to 44 in 1937.

If an industry is static or if all the establishments have the same proportionate increase or decrease in the number of wage earners employed, the two indexes will be the same.

In measuring the growth or decline of concentration over a period of time, it is important to remember that a good deal depends upon the degree of concentration in the base year. If, for example, the proportion of establishments employing half the workers decreased from 50 to 25 percent, the proportionate index of concentration would increase from 100 to 200. The index would also rise from 100 to 200 if the percentage of establishments employing half the workers declined from 4 to 2 percent. The significance of the two changes may be quite different. If the degree of concentration is exceedingly high to begin with (as in the latter example), the same relative growth or decline in concentration may not be as significant as if the degree of concentration were low at the outset.

In the sewing machine industry, for example, 1 establishment, out of 30 to 40, employed half the workers in 1914, 1919, 1921, and 1929. In 1935 and 1937, 2 establishments employed half the workers. The percent of establishments employing half the workers rose from 2.9 in 1914 to 5.6 in 1937. During this period, moreover, there was a substantial decline in total employment in the industry. The increase in the number of establishments required to account for half the workers, therefore, means that the largest establishment "suffered" relatively more than the industry as a whole. Both indexes of concentration declined by almost 50 percent. Concentration of operations, however, remained sufficiently high in 1937 so that the decline in concentration would seem to be of minor significance.

#### CHANGES IN CONCENTRATION OF OPERATIONS FOR ALL INDUSTRIES

When one applies this sort of analysis to the general manufacturing data, the most surprising fact is the high degree of establishment concentration in 1914; half of the workers were employed in 3.4 percent

of the establishments and, further, 25 percent of the workers were employed in 0.69 percent of the establishments.

On an absolute basis, the changes in concentration since 1914 have been small against the background of this exceptionally high degree of concentration. The absolute number of establishments employing half the workers declined from 5,950 in 1914 to 4,885 in 1937. This change is reflected by the absolute index which increased from 100 in 1914 to 122 in 1937. (See chart 3.)

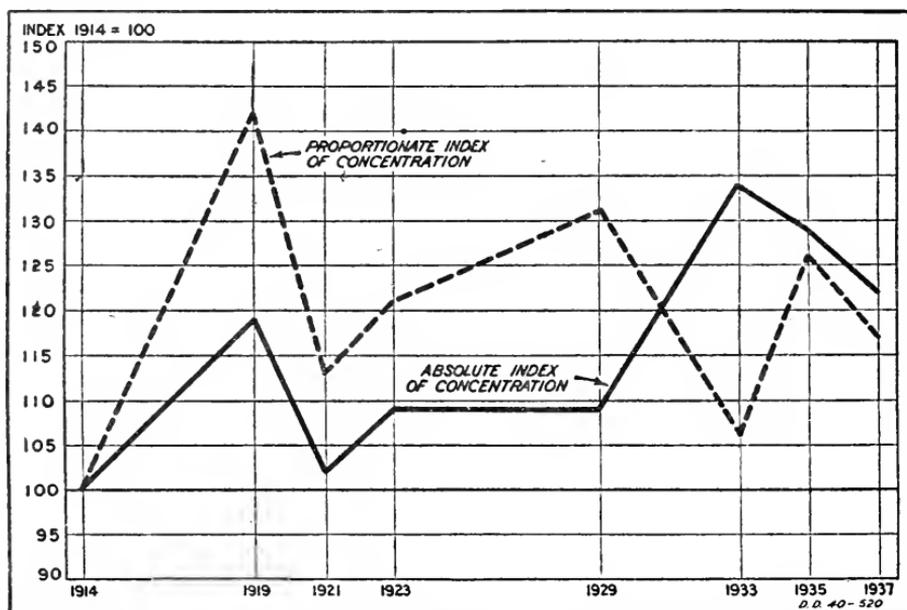


CHART 3.—ABSOLUTE INDEX AND PROPORTIONATE INDEX OF CONCENTRATION FOR ALL INDUSTRIES, 1914-37.

Similarly, the absolute number of establishments employing 25 percent of the workers declined from 1,194 in 1914 to 866 in 1937 so that the absolute index (computed on a 25 percent basis) stood at 138 in the latter year. Thus, the growth in the scale of operations was concentrated in the largest establishments in the upper half.

The virtue of the absolute index is that it is unaffected by shifts in the large number of small establishments in many industries that may change without significantly affecting the concentration problem. If, for example, 4 out of 100 establishments employ half the workers in an industry, it may be much more significant in the concentration picture if the number of larger establishments employing half the workers increases from 4 to 8, than if 100 small establishments are added and 4 large establishments continued to account for half the workers.

Between 1914 and 1937 the percentage of establishments employing half the workers declined from 3.4 to 2.9 percent. This change is reflected by the proportionate index which stood at 117 in 1937. The percentage of establishments employing 25 percent of the workers declined from 0.69 to 0.52 percent during this period so that, on a 25 percent basis, the proportionate index stood at 133 in 1937.

The greatest increase in concentration measured by the proportionate index occurred during the war period. In 1919, it reached an all-time high of 142 when 2.4 percent, or 5,016 of 210,400 establishments, employed half the workers. Similarly, for the percentage of establishments employing 25 percent of the workers, the proportionate index reached an all-time high of 177 in 1919.

The absolute index also increased during the war period. The absolute number of establishments employing half the workers declined from 5,950 to 5,016, despite the increase in total employment from 6,479,000 to 8,431,000. Thus, from a base of 100 in 1914, the absolute index of concentration rose to 119 in 1919, which compares with 102 in 1921, 109 in 1923 and 1929, 134 in 1933, 129 in 1935, and 122 in 1937. In other words, when measured absolutely, concentration in 1919 was markedly above that of the 1920's, well below that of the depression years, and not far from the 1937 figure.

In the post-war depression, concentration, as measured by both indexes, dropped precipitately though the 1921 low was still above the base level of 1914. The absolute index stood at 102 in 1921 and the proportionate index at 113. The period of prosperity in the 1920's brought no striking change in concentration. Concentration, measured absolutely, was constant between 1923 and 1929, while the proportionate index rose slightly.

During the great depression the absolute index increased from 109 in 1929 to 134 in 1933, and the proportionate index fell from 131 to 106. This means that there was a reduction in the absolute number of establishments employing half the workers. However, since the number of establishments employing half the workers fell less than the total number of establishments, the percentage of establishments employing half the workers rose from 2.6 to 3.2.

From the 1933 level of 134, the absolute index declined slightly in 1935 to 129 and again in 1937 to 122. The proportionate index advanced sharply in 1935 to 126, and was at 117 in 1937. The point seems to be that the depression reduced the number of enterprises necessary to employ one-half the workers, but did not reduce it as rapidly as the reduction in all establishments. The recovery on the other hand, increased the number necessary to include one-half the workers, but less rapidly than the increase in other establishments.

These measures support the conclusion suggested in the earlier chapter on quite different evidence, that the tendency toward dominance by a small number of establishments is increasing.

## CHAPTER IV

### EXTREME CHANGES IN ESTABLISHMENT CONCENTRATION BY INDUSTRIES

In the previous chapter an analysis for all manufacturing was presented. It concerned itself with concentration in the large establishments of the country. But in many small-scale industries, there may be a high degree of concentration and yet no plant would be included among the great. Its size is relative to the others in its own industry. For many purposes, the most significant measure of concentration is that which considers each industry as a separate basis for analysis. On the basis of such studies, this chapter presents cases of extreme change in concentration between 1914 and 1937.

#### DECLINING CONCENTRATION

##### *Absolute Index.*

Thirty-seven industries showed a decline in concentration to 50 or lower from 1914 to 1937 according to the absolute index; this means that more than twice as many establishments were required to cover one-half the workers in 1937 than in 1914 (see table 12). Outstanding features of these industries were:

(a) *The relatively small size of the industries*<sup>1</sup>.—Only 2 of the 37 industries in this group employed over 100,000 wage earners and two employed between 25,000 and 100,000. Of the remaining 33 industries, 18 employed between 5,000 and 25,000 while 15 employed fewer than 5,000 wage earners.

(b) *The expansion of the industries*.—For the group as a whole, employment increased 93.8 percent and establishments 80.2 percent.

In each of the two large industries, meat packing and electrical machinery, the degree of concentration was exceptionally high at the outset. In 1914, 1.9 and 1.8 percent of the establishments employed half the workers in the electrical machinery and meat-packing industries, respectively. The radio and phonograph industries were included in the electrical machinery industry and this fact doubtless helps explain its growth and establishment decentralization.

In 28 of the 37 industries, there was an expansion in total employment, and in 33 there was a substantial expansion in total establishments. It is to be remembered that the measure here used represents the absolute number of establishments employing half the workers and is not directly affected by changes in total number of establishments as is the proportionate index. The proportionate index, however, also declined (though usually more moderately) in 28 out of the 37 industries. The exceptions were (with proportionate index indicated in parentheses): Aluminum products (100); stamped and pressed

<sup>1</sup> Unless otherwise stated, the size of an industry is calculated on the basis of the average employment throughout the period 1914-37. See appendix C.

metal products (100); fuel briquettes (105); asbestos products (106); condensed and evaporated milk (107); ink, printing (110); wood preserving (117); doors, shutters, etc. (119); and aircraft and parts (315).

TABLE 12.—*Industries with unusual declines in concentration as measured by the absolute index*

Industry	1937 index (1914=100)
Jute goods	13
Screw-machine products and wood screws	16
Aluminum products	20
Galvanizing and other coating, done in plants not operated in connection with rolling mills	22
Bone black, carbon black, and lampblack	23
Signs and advertising novelties	26
Sporting and athletic goods, not including firearms and ammunition	29
Doors, shutters, and window sash and frames, molding and trim, metal	31
Ammunition and related products; fireworks and allied products	33
Electrical machinery, apparatus and supplies; radios, radio tubes and phonographs	33
Asbestos products other than steam packing and pipe and boiler covering	33
Smelting and refining, nonferrous metals other than gold, silver, and platinum not from the ore	33
Candles	33
Liquors, vinous	34
Condensed and evaporated milk	35
Corsets and allied garments	36
Ink, printing	37
Wood preserving	39
Aircraft and parts	40
Wire drawn from purchased rods	40
Stamped and pressed metal products; enameling, japanning, and lacquering	40
Hat and cap materials, men's	40
Ice, manufactured	41
Furs, dressed and dyed	42
Lapidary work	43
Petroleum refining	43
Foundry supplies	43
Sugar, beet	47
Bags, paper, exclusive of those made in paper mills	48
Fuel briquettes	50
Saws	50
Surgical and orthopedic appliances and related products	50
Artists' materials; pencils, lead (including mechanical), and crayons	50
Meat packing, wholesale	50
Fire extinguishers, chemical	50
Matches	50
Sewing machines and attachments	50

It might be supposed that the growing industries, petroleum, aluminum, aircraft, etc., were also industries of growing concentration. The opposite is more generally the case. Employment in petroleum refining between 1914 and 1937 increased from 25,400 to 83,200. Total establishments doubled so that average wage earners per establishment increased from 144 to 228. The growth, however, was concentrated in the smaller establishments. The number of establishments employing half the workers increased from 9 to 21 so that the percentage increased from 5.1 to 5.8. This is an outstanding example of an industry in which size of establishment increased and concentration declined.

In the electrical machinery and radio industry, employment and establishments almost doubled between 1914 and 1937. The growth was concentrated in the smaller establishments, while the average number of wage earners per establishment declined from 3,743 to 2,942 for the larger segment. At the same time both the absolute number and the percentage of establishments employing half the workers declined greatly, the two indexes reaching 33 and 58, respectively, in 1937.

*Proportionate Index.*

On the basis of the proportionate index, 14 industries showed a decline in concentration to 50 or lower from 1914 to 1937. This means that the percentage of all establishments required to cover one-half the wage earners more than doubled. Half of these industries were growing industries. With two exceptions, the absolute index also declined in each industry.

The industries showing an increase in the absolute index were the saddlery industry and the corn sirup industry. In the saddlery industry the number of establishments employing half the workers fell from 66 to 15 so that the absolute index rose to 440, while the percentage of establishments employing half the workers increased from 5.4 to 11 percent. The reason is that the total number of establishments declined from 1,220 to 139 and total employment declined from 13,000 to 3,000. In the corn sirup industry the number of establishments employing half the workers declined from 4 to 3, while the percentage increased from 4.8 to 11. This is because the total number of establishments declined from 84 to 27 while employment increased from 4,500 to 7,000.

In spite of the extreme decline in the proportionate index of the 14 industries cited above, concentration in these industries remained very high. The decline of concentration should be interpreted in the light of the exceptionally high degree of concentration in the base year. In half of these industries there was a growth in employment and a marked growth in the average number of wage earners per establishment. This again indicates the fact that the growth of size and the growth in concentration are not at all the same thing and, in fact, as often as not move in opposite directions.

In the motor vehicle industry, for example, total employment increased from 79,300 to 194,500. At the same time the total number of establishments declined from 289 to 131 so that the average number of wage earners per establishment increased from 274 to 1,485. Furthermore, the growth occurred in both the larger and smaller establishments. In the larger segment the average number of wage earners increased from 5,700 to 10,800; in the smaller segment, the increase in average number of wage earners per establishment was even greater, from 141 to 797. Despite the growth of size, the absolute index declined, the number of establishments employing half the workers increasing from 7 to 9. The proportionate index also declined to 35 because, owing to the decline in total establishments, the percentage of establishments employing half the workers increased from 2.4 to 6.9.

The bulk of the decline in concentration occurred in the war period for the smelting industry (nonferrous metals) and between 1914 and 1921 in the lapidary industry, between 1921 and 1929 in the galvanizing and corn sirup industries, and by 1923 the tobacco and foundry industries had reached their lows. In the remaining industries the decline in concentration was rather generally distributed throughout the period 1914 to 1937 or the period 1919 to 1937. In several instances there was an increase in concentration during the war period.

## INCREASING CONCENTRATION

*Absolute Index.*

Among the 28 industries for which concentration increased to 200 or more according to the absolute index (see table 13), the cigar and cigarette industry is the only one in the group of 19 large industries employing over 100,000.

The patterns in this group of industries with unusual growth in concentration are less well established than in those with declining concentration.

Perhaps the outstanding characteristic of these industries was the comparatively low degree of concentration in 1914. In 21 of the industries, the percentage of establishments employing half the workers was 10 percent or more, the mean figure<sup>2</sup> being 13.96 percent. The mean figure for those below 10 percent was 5.24 percent.

Those industries with a relatively high degree of concentration at the outset and, contrary to the above, showing exceptional growth of concentration are: Cigars and cigarettes, 3.2 percent; saddlery, 5.4 percent; flour and other grain mill products, 6 percent; agricultural implements, 4.9 percent; cooperage, 7 percent; organs, 8.3 percent; and writing ink, 7 percent.

In 23 of the 28 industries, the proportionate index also indicated growing concentration.

Of those 28 industries showing unusual growth in concentration, 5 had only 2 establishments and 3 had only 4 establishments employing half the workers at the beginning of the period in 1914. The 5 were the oilcloth, fish nets, linen goods, locomotives, and writing ink; the 3 were the rubber boots and shoes, china firing, and firearms industries.

TABLE 13.—*Industries with unusual increases in concentration as measured by the absolute index*

Industry	1937 index (1914=100)
Engraving (other than steel, copperplate, or wood), chasing, etching, and diesinking	2,300
Musical instruments: Pianos	750
Cigarettes; cigars	520
Saddlery, harness, and whips	440
Hair work	420
Flour and other grain-mill products	408
Mirrors and other glass products made of purchased glass	354
Musical instrument parts and materials: Piano and organ	350
Gold leaf and foil	350
Agricultural implements (including tractors); engines, turbines, water wheels, and windmills	293
Boxes, cigar, wooden and part wooden	260
Sheet-metal work, not specifically classified	259
Cooperage	257
Wood distillation and charcoal manufacture	250
Feathers, plumes, and manufactures thereof	245
Jewelers' findings and materials; jewelry	234
Oil, cake, and meal, cottonseed	226
Sand-lime brick	220
Glass	207
China firing and decorating, not done in potteries	200
Musical instruments: Organs	200
Oilcloth	200
Fish nets and seines	200
Ink, writing	200
Linen goods	200
Boots and shoes, rubber	200
Locomotives, railroad, mining, and industrial, not made in railroad repair shops	200
Firearms	200

<sup>2</sup> Average weighted by number of establishments.

In only three of these industries was the growth more or less gradual throughout the period: Gold leaf and foil, agricultural implements, and cottonseed oil, cake, and meal. In only two of these industries was the growth chiefly during the war period.

In the remaining 23 industries the exceptional growth in concentration was in either or both of the periods 1921 to 1929 and 1929 to 1937. In only one case, the feather industry, was the growth exclusively in the 1920's.

In 11 of these 23 industries the growth in concentration extended through both periods, 1921-29 and 1929-37. It appears, then, that in almost half the cases the depression neither stopped nor started the growth of concentration. These industries are as follows: Pianos (also in the 1920's), cigars and cigarettes, saddlery, flour, wooden cigar boxes, sheet-metal work, cooperage, wood distillation, jewelry, glass, and writing ink.

In 11 of the 23 industries, however, the growth in concentration was highly concentrated in the depression following 1929. These industries are as follows: Hair work, mirrors, musical instrument parts, sand-lime brick, china firing, organs, oilcloth, fish nets, linen goods, rubber boots and shoes, and firearms.

#### *Proportionate Index.*

Only 5 industries showed an increase in concentration to more than 200 in the proportionate index; 15 additional industries showed an increase to more than 150 (see table 14). Sixteen of these industries showed an unusual growth in total employment.

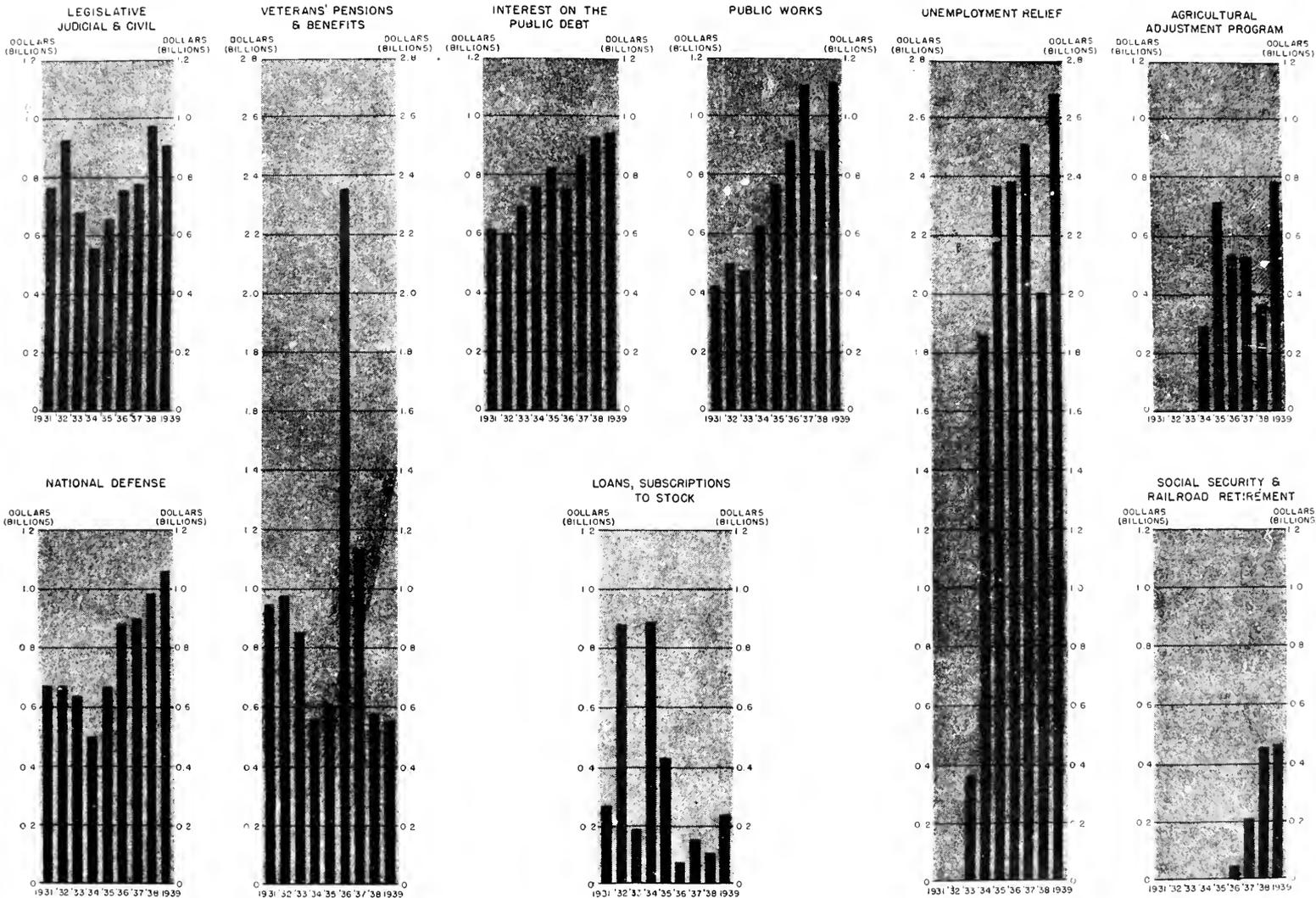
TABLE 14.—*Array of industries showing increases in concentration as measured by the proportionate index*

Industry	1937 index (1914=100)
Engraving (other than steel, copperplate, or wood), chasing, etching, and diesinking.....	1,308
Aircraft and parts.....	315
Mirrors and other glass products made of purchased glass.....	306
Perfumes, cosmetics, and other toilet preparations.....	250
Cleaning and polishing preparations.....	218
Motor-vehicle bodies and motor-vehicle parts.....	195
Printing and publishing, newspaper and periodical.....	191
Jewelers' findings and materials: jewelry.....	190
Electroplating.....	183
Firearms.....	179
Chemicals not elsewhere classified.....	176
Chocolate and cocoa products, not including confectionery.....	176
Bookbinding and blank-book making.....	172
Fish nets and seines.....	164
Wirework not elsewhere classified.....	160
Needles, pins, hooks and eyes, and slide and snap fasteners.....	160
Stereotyping and electrotyping, not done in printing establishments.....	157
Artificial and preserved flowers and plants.....	156
Silverware and plated ware.....	155
Printing and publishing, book, music, and job.....	152

There are industries of all sizes in this group. Three industries employed more than 100,000 wage earners, and 2 between 25,000 and 100,000. Of the remaining 15 industries, 9 employed between 5,000 and 25,000 wage earners while the other 6 industries fell in the lowest size-group.

Sixteen of the industries also showed increases in the absolute index; 9 of these had increases to 150 or more. Just 4 industries showed a decline, and in only 1 case was the decline substantial. These were

# EXPENDITURES OF THE UNITED STATES GOVERNMENT BY FUNCTION, 1931-1939



Source Computed from data in SUMMARY BUDGET STATEMENT, 1941, p. 1037.



aircraft and parts, in which the number of establishments employing half the workers increased from 2 to 5 while the percentage declined from 17 to 5.4 between 1914 and 1937; the electroplating industry, in which the absolute number of establishments increased from 56 to 68 while the percentage declined from 22 to 12; the chemicals industry, in which the absolute number increased from 19 to 39 while the percentage declined from 5.1 to 2.9 percent; and the book printing and publishing industry, in which the absolute number increased very slightly while the percentage declined from 6.4 to 4.2 percent. Except for the last one, all 4 of these are industries in which there was an exceptional growth in total employment. In such instances, it is to be expected that the number of establishments employing half the workers would increase owing to the great expansion.

All 5 of the industries showing increases in the proportionate index to 200 or more were characterized by relatively low concentration in the base period. The upper 2 began at 17 percent, the next at 15, 11, and 8.5 percent.

Of the 15 industries showing increased proportionate concentration, above 150 but less than 200 according to the proportionate index, all are growing industries as measured by volume of employment with 4 exceptions: The jewelry, firearms, fish nets, and silverware industries.

Ten of these industries had relatively low concentration in 1914. The motor vehicles, newspaper printing and publishing, book printing and publishing, and chemicals industries had relatively high concentration in 1914. The percentage of establishments employing half the workers in these industries in 1914 was 3.9, 4.0, 6.4, and 5.1, respectively.

Despite the high degree of concentration and the enormous growth in the motor-vehicle parts industry, both indexes of concentration increased, the absolute index to 158 and the proportionate index to 195, by 1937. Both of these figures, however, are far below the highs of 1935.

Among the 20 industries showing an unusual growth in proportionate concentration the growth was mainly a depression phenomenon only in the single case of the needles and pins industry. In the majority of cases it was distributed over the whole period. In the case of perfumes, electroplating, chemicals, fish nets, and wirework, concentration reached its peak by 1929 with no further growth during the later years. In the case of motor vehicles, the peak was reached in 1923.

#### EXTREMES IN DEGREE OF CONCENTRATION

##### *Industries with a Low Degree of Concentration.*

There were 25 industries in which 15 percent or more of the establishments were required to account for one-half the wage earners in 6 of the 7 years for which we have data. These industries and the percent of establishments employing half the wage earners in 1937 are shown in table 15. There were 21 additional industries with percentages of 15 or more in 1937, but these industries were not characterized by such a low degree of establishment concentration in previous years.

Most of the industries were comparatively small in terms of total employment. Three had an average employment between 25,000 and

100,000 wage earners, 13 employed from 5,000 to 25,000 wage earners, and 9 employed less than 5,000 wage earners.

Despite the fact that these are industries with the lowest degree of concentration throughout the period, there were 9 industries in which the absolute number of establishments employing half the workers was five or less. Three of these were very small industries and 6 were industries with few establishments but all of the establishments were large.

Among the 25 industries listed, there were 15 in which 20 percent or more of the establishments were required to account for half the wage earners in 1937. Two of these employed between 25,000 and 100,000 wage earners, 8 employed between 5,000 and 25,000 wage earners, and 5 employed less than 5,000 wage earners throughout the period under study.

TABLE 15.—*Industries with low degree of concentration (15 percent or more of establishments employing half the workers in 6 out of 7 census years)*

[Arrayed on the basis of total employment]

Industry	Percent of establishments employing half the wage earners, 1937
Woolen woven goods, including woven felts; woolen yarns.....	18
Cement.....	25
Blast-furnace products.....	22
Condensed and evaporated milk.....	14
Bags, paper, exclusive of those made in paper mills.....	16
Lime.....	17
Cast-iron pipe and fittings.....	20
Oil, cake, and meal, cottonseed.....	21
Sugar, beet.....	34
Sugar refining, cane.....	26
Wood preserving.....	18
Smelting and refining, copper.....	22
Boots and shoes, rubber.....	17
Smelting and refining, zinc.....	20
Smelting and refining, lead.....	28
Salt.....	22
Wallpaper.....	19
Sugar, cane, not including products of refineries.....	24
Rice cleaning and polishing.....	26
Lasts and related products.....	31
Oilcloth.....	13
Oil, cake, and meal, linseed.....	17
Fuel briquettes.....	19
Wool pulling.....	21
Sand-lime brick.....	22

### *Industries With High Degree of Concentration.*

There were 19 industries in which 5.0 percent or less of the establishments accounted for half the wage earners in 6 of the 7 census years. The most outstanding feature of this group, as compared with the industries with the lowest degree of concentration, is the difference in size. Eight of the 19 industries with a high degree of concentration throughout the period employed an average of more than 100,000 wage earners during the same period. These industries were, as follows:

Motor-vehicle bodies and motor-vehicle parts.  
 Ship and boat building, steel and wooden, including repair work.  
 Printing and publishing, newspaper and periodical.  
 Electrical machinery, apparatus, and supplies; radios, radio tubes, and phonographs.  
 Cigarettes; cigars.  
 Bread and other bakery products.  
 Rubber tires and inner tubes; other rubber goods, except boots and shoes.  
 Meat packing, wholesale.

Five of the 19 industries employed from 25,000 to 100,000 wage earners:

Nonferrous-metal alloys; nonferrous-metal products, except aluminum, not elsewhere classified.  
 Drugs and medicines; insecticides, and fungicides, and industrial and household chemical compounds, not elsewhere classified.  
 Agricultural implements (including tractors); engines, turbines, water wheels, and windmills.  
 Chewing gum; confectionery; and ice cream.  
 Hardware, not elsewhere classified.

Four of the 19 industries employed from 5,000 to 25,000 wage earners:

Surgical and orthopedic appliances and related products.  
 Aluminum products.  
 Soap.  
 Ammunition and related products; fireworks and allied products.

Two of the 19 industries employed less than 5,000 wage earners:

Saws.  
 Window shades (textile and paper) and fixtures.

Operations in an additional 20 industries were such that 6.0 percent or less of the establishments accounted for half the wage earners in 6 of the 7 census years. While these industries were, on the whole, somewhat smaller than those with a higher degree of concentration, they were larger than those with the lowest degree of concentration. Two of the 20 industries employed an average of 100,000 wage earners throughout the period. They were:

Printing and publishing, book, music, and job.  
 Lumber and timber products not elsewhere classified.

Four of the 20 industries employed from 25,000 to 100,000 wage earners:

Chemicals not elsewhere classified.  
 Carpets and rugs, wool (other than rag).  
 Petroleum refining.  
 Flour and other grain-mill products.

Eight of the 20 industries employed from 5,000 to 25,000 wage earners:

Perfumes, cosmetics, and other toilet preparations.  
 Artists' materials; pencils, lead (including mechanical), and crayons.  
 Lighting equipment.  
 Tobacco (chewing and smoking) and snuff.  
 Sewing machines and attachments.  
 Hats, fur-felt.  
 Screw-machine products and wood screws.  
 Signs and advertising novelties.

Six of the 20 industries employed less than 5,000 wage earners:

Belting and packing, leather.

Gold, silver, and platinum, refining and alloying.

Blacking, stains, and dressings.

Soda fountains and related products.

Ink, writing.

Pens, fountain and stylographic; pen points, gold, steel, and brass.

There were an additional 12 industries in which less than 6.0 percent of the establishments accounted for half the wage earners in 1937, but they were not characterized by such a high degree of concentration in 6 of the 7 census years from 1914 to 1937. These industries were engraving (other than steel, copperplate, or wood), chasing, etching, and diesinking; cleaning and polishing preparations; silverware and plated ware; bookbinding and blank-book making; mirrors and other glass products made of purchased glass; wirework not elsewhere classified; aircraft and parts; engraving, steel, copperplate, and wood, and plate printing; cooperage; jewelers' findings and materials, and jewelry; needles, pins, etc.; structural and ornamental metal work, made in plants not operated in connection with rolling mills.

## CHAPTER V

### ESTABLISHMENT CONCENTRATION PATTERNS OF SELECTED INDUSTRIES

#### NINETEEN INDUSTRIES EMPLOYING OVER 100,000 EACH

These 19 large industries employed almost 3,000,000 workers in 1914 and grew more rapidly than the smaller manufacturing industries during the war. Employment in this group exceeded 4,000,000 in 1919 and varied somewhat under that figure, except for the depression years, until 1937 when the 1919 high was exceeded by a slight margin. These large industries were especially vulnerable to depressions. Total employment declined from 4 to 3.1 million between 1919 and 1921. Total employment was 3.5 million in 1935.<sup>1</sup>

The change in concentration during the period 1914-37 was comparatively small. Of 68,700 establishments, 4,200 employed half the workers in 1914;<sup>2</sup> the corresponding figure in 1937 was 4,000 out of 67,500. Expressing the absolute number of establishments hiring half of the workers as an index (1914=100), we find a decline in concentration in 1919 to 94 with the index remaining below 100 during the 1920's. If concentration is expressed as the percentage of establishments employing half the workers (1914=100) the results are somewhat different, for 1919 equals 120 and the index remains above 100 during the 1920's. Furthermore, this proportionate index declined from 1929 through 1935 and 1937 while the absolute index increased. This means that while the absolute number of establishments employing half the workers declined during this period, from 4,500 to 4,000, the total number of establishments declined still more from 87,000 to 68,000 so that the percentage of establishments employing half the workers increased.

#### *Steel Works and Rolling Mills.*

Employment in this industry increased from 254,000 in 1914 to a high of 479,000 in 1937. During the same period the total number of establishments declined from 456 to 410, the high being 521 in 1919. Fifty-three establishments employed half the workers in 1914; the number declined to 39 in 1937, the absolute index standing at 136 in that year. Over the same period, the percentage of firms employing half the workers declined from 12 to 9.5 percent, and the proportionate index stood at 126 in 1937.

There was growth in the size of both large and small establishments; the average number of wage earners for the large establishments rose from 2,400 to 6,100 and for small establishments from 315 to 646.

<sup>1</sup> 1933 data are available only for "all industries."

<sup>2</sup> Unless specifically noted otherwise, measures of concentration for the four size groups as a whole were obtained by summing the number of establishments employing half the workers for the component industries of the group. Indexes were based on the figures thus obtained. These measures are not comparable with other indexes used in this report.

During the war period the absolute index dropped 10 percent while the proportionate index rose by about the same amount. That is, while the absolute number of establishments hiring half the workers increased from 53 in 1914 to 59 in 1919, the percentage of establishments employing half the workers declined from 12 to 11 percent since the total number of establishments rose from 456 to 521, an all-time high in the industry.

#### *Cigars and Cigarettes.*

Employment in the cigar and cigarette industries declined from 1914 continuously, except for a slight increase between 1935 and 1937. The total number of establishments, however, declined very much faster than employment so that the absolute index rose from 100 in 1914 to 520 in 1937. The actual number of establishments employing half the workers declined from 130 in 1914 to 25 in 1937. On a percentage basis, however, there was but a slight change from 1914 to 1937 since the total number of establishments declined about the same extent as the number employing half the wage earners. Thus, 3.2 percent of all establishments employed half the workers in 1914 and 3.4 percent in 1937.

For the large establishment, the average wage earners per establishment rose from 560 to 1,640 during the period and similarly, for the smaller establishments, the average number of wage earners per establishment increased from 18 to 58. This industry is one of the notable cases of great technological change during this period; while employment declined almost one-half and the number of establishments declined by four-fifths, the value of product increased from approximately \$300,000,000 in 1914 to \$1,138,000,000 in 1937.

#### *Boots and Shoes, Other Than Rubber.*

Employment in the boot and shoe industry increased somewhat during the period though not nearly as much as the increase in value of product or value added by manufacture. The increase in average number of wage earners per establishment from 157 to 200 was influenced by a decline in the total number of establishments of approximately 10 percent. Both indexes of concentration went down. The absolute number of establishments employing half the workers increased from 130 in 1914 to a high of 174 in 1937, while the percentage of establishments employing half the workers rose from 11 in 1914 to 16 percent in 1937.

The growth was in the smaller segment of the establishments where the average number of wage earners per establishment increased from 88 to 119 between 1914 and 1937. In the larger establishments, the average number of wage earners per establishment declined from 736 to 619 during this period.

#### *Electrical Machinery, Apparatus, and Supplies; Radios, Radio Tubes, and Phonographs.*

Employment in this industry more than doubled between 1914 and 1937, while the number of establishments increased from 900 to 1,600. As a result, the average number of wage earners per establishment increased markedly, from 143 to 192. However, this growth was entirely in the smaller establishments, for the average number of wage earners per establishment in the larger segment declined from 3,700 to 2,900. As a result of the great increase in the total number

of establishments, the percentage of establishments employing half the workers increased from 1.9 to 3.3.

Noteworthy is the fact that the industry was highly concentrated to begin with when 17 out of 892 establishments employed half the workers. Furthermore, the change was probably due to the inclusion of radio apparatus. The growth of this new field has meant a structural change in the industry.

#### *Meat Packing, Wholesale.*

The absolute index declined from 100 to 50 between 1914 and 1937, the only increase during the period being to 110 in 1919. This is because the number of establishments employing half the workers increased from 23 to 46.

The average number of wage earners per establishment for the larger establishments declined from 2,100 to 1,400. In the smaller segment the average number of wage earners per establishment increased from 40 to 57.

This is a notable case of an industry in which the total number of establishments declined, but the number of establishments employing half the workers increased on both an absolute and percentage basis. This decline in concentration, however, should be interpreted in light of the exceptionally high concentration in 1914 when 1.8 percent of the establishments employed half the workers.

#### *Motor Vehicles, not Including Motorcycles.*

Motor vehicles is an industry where employment almost trebled between 1914 and 1929 but where the indexes of concentration declined owing to the decline in the total number of establishments. The average number of wage earners per establishment increased greatly from 274 in 1914 to a high of 1,485 in 1937. For the larger segment the corresponding figure was 5,662 to 10,807 and for the smaller segment from 141 to 797 during this period. Here, clearly, there was phenomenal growth in the size of establishments. The concentration, however, among the number of establishments was becoming more equal rather than less equal. The fact that the total number of establishments declined more than 50 percent (from 289 to 131), while the number of establishments employing half the workers changed but slightly (from 7 to 9) means that the percentage of establishments hiring half the workers increased from 2.4 to 6.9 percent.

#### *Motor-vehicle Bodies and Motor-vehicle Parts.*

Since employment was rising very rapidly in this industry while the number of establishments was increasing much less rapidly, the average number of wage earners per establishment increased from 62 to 304. The growth of concentration was quite marked; 30 out of 764 establishments employed half the workers in 1914, while 19 out of 936 establishments employed half the workers in 1937. Thus the absolute index rose from 100 to 158, the high being 300 in 1935 when 10 out of 825 establishments employed half the 241,000 workers. On a percentage basis, concentration also increased; the percentage of establishments employing half the workers dropped from 3.9 in 1914 to 1.8 in 1919, increased in the twenties to 2.7, dropped to 1.2 in 1935, and stood at 2 percent in 1937. Apparently the great expansion during the war period was altogether in the larger establishments in which the average number of workers per establishment increased

from 792 to 1,696, while the average wage earners per establishment in the smaller establishment remained at 32.

*Ship and Boat Building, Steel and Wooden, Including Repair Work.*

Employment in this industry in 1937 was well above both the 1929 and 1914 levels. The peak, of course, was 387,000 in 1919 as compared with 62,000 in 1937. Concentration was exceedingly high with 2 percent of the establishments employing half the workers in 1937. Absolute concentration, however, declined, especially during the twenties; 9 establishments employed half of the 44,000 workers in 1914 and 19 establishments employed half of the 387,000 workers in 1919. Twenty-one establishments employed half of the 55,000 workers in 1929. The depression greatly increased the degree of concentration so that 9 establishments employed half of the 45,000 workers in 1935.

*Printing and Publishing, Newspaper and Periodical.*

Employment in this industry expanded gradually from 101,000 in 1914 to 135,000 in 1937. Concentration greatly increased. The number of establishments employing half the workers declined from 327 to 190 between 1914 and 1937, while the total number of establishments increased from 8,175 to 9,244. Thus the absolute index rose from 100 to 172, while the proportionate index rose from 100 to 190.

*Printing and Publishing, Book, Music, and Job.*

The employment pattern was similar to that in newspaper and periodical publishing. However, the absolute index stood at 98 in 1937 and the proportionate index at 152, the percentage of establishments employing half the workers having declined from 6.4 in 1914 to 4.2 in 1937.

*Lumber and Timber Products, not Elsewhere Classified.*

Employment declined slightly between 1914 and 1929 and had not recovered in 1937 from the drop following 1929. Between 1929 and 1935 there was a large decline in the number of establishments (from 13,000 to 6,000) as well as a large decline in employment (from 419,000 to 255,000). The absolute index increased to 188 in 1935 and fell to 147 in 1937. The growth of concentration was apparently in part a consequence of the depression state of the industry. On the other hand, the proportionate index declined from 150 in 1929 to 96 in 1935, the percentage of establishments employing half the workers having increased from 3.6 to 5.6 percent.

*Furniture, Including Store and Office Fixtures.*

Employment in the furniture industry in 1937 was well above the 1914 level but below the 1929 high of 193,000. There was no great change in concentration except an absolute increase between 1929 and 1935 and a proportionate increase between 1923 and 1929.

*Rubber Tires and Inner Tubes; Other Rubber Goods, Except Boots and Shoes.*

Employment more than doubled in this industry between 1914 and 1919. The 1929 level of 123,000 was still somewhat below the all-time high in 1919. In 1937, the industry had still not fully regained the 1929 level of employment. The increase in the value of products and value added by manufacture was much greater than the increase in employment. For the larger establishments, the average number of wage earners per establishment in 1929 was about the same

as in 1919; for the smaller establishments, there was an increase. The absolute index stood at 127 in 1919, 1929, and 1935. It fell to 78 in 1937 when the number of establishments employing half the workers increased from 11 to 18. The industry is, however, highly concentrated. Two percent of the establishments employed half the workers in 1929, a change from 4.8 percent in 1914, most of which had already occurred, however, by 1919.

*Bread and Other Bakery Products.*

Employment in this industry has doubled since 1914, reaching an all-time high of 239,000 in 1937. The total number of establishments changed comparatively little—from 17,500 in 1914 to 20,800 in 1929 to 17,200 in 1937. The average number of wage earners per establishment increased markedly for both the larger and smaller segments. There was considerable growth in concentration, which reached a high in the early twenties, the absolute index declining from 154 in 1923 to 138 in 1937.

*Knit Goods: Hosiery; Knitted Cloth; Knitted Underwear; Knitted Outerwear; Knitted Gloves and Mittens.*

Employment in 1937 exceeded the 1929 level by a substantial margin. Absolute concentration declined during the period but was remarkably constant on a proportionate basis. Between 8 and 9 percent of the establishments employed half the workers during the entire period. The absolute number of establishments employing half the workers increased from 123 in 1914 to approximately 150 in 1935 and 1937.

*Clothing, Leather and Sheep-Lined; Clothing, Men's, Youths', and Boys', not Elsewhere Classified; Clothing, Work, and Sports Garments, Except Leather; Trousers, Wash Suits, and Washable Service Apparel.*

The men's clothing industry also employed more workers in 1937 than in 1929. While there was an increase in the average number of wage earners per establishment from 43 to 71 between 1914 and 1937, there was a decline in concentration. The number of establishments employing half the workers increased from 243 to 274, while the total number of establishments declined from 4,000 to 3,200.

*Clothing, Women's, Misses', and Children's, not Elsewhere Classified.*

The pattern of employment in the women's apparel industry was similar to that in the men's clothing industry except that the latter was more concentrated. The percentage of establishments employing half the workers in the men's clothing industry rose from 6.1 to 8.6 percent between 1914 and 1937. The corresponding figures for the women's apparel industry were 14 and 15 percent. The number of establishments employing half the workers increased faster than did the total number of establishments.

*Cotton Woven Goods (Over 12 Inches in Width); Cotton Yarn and Thread.*

Employment in this industry in 1937 approximated the 1929 level. The number of establishments employing half the workers increased during the period. Like the women's apparel industry, the degree of concentration was lower than in most manufacturing industries, with 15 percent of the establishments employing half the workers in 1937.

*Wool Combing; Worsted Woven Goods; and Worsted Yarn.*

Employment in the worsted goods industry in 1937 as well as in 1929 was somewhat below the 1914 level. On both the absolute and the percentage bases the number of establishments employing half the workers was remarkably constant during the entire period.

SELECTED INDUSTRIES FROM AMONG THE INDUSTRIES EMPLOYING  
25,000 TO 100,000 WAGE EARNERS

*Glass.*

While employment in 1939 was only slightly above the 1929 and 1914 levels in the glass industry, the value added by manufacture rose from \$77,000,000 in 1914 to \$200,000,000 in 1929 to almost \$250,000,000 in 1937.

The total number of establishments declined markedly from 345 in 1914 to 232 in 1937 so that the average number of wage earners per establishment increased from 216 to 341. At the same time the absolute number of establishments employing half the workers declined from 62 to 30, while the percentage of establishments employing half the workers declined from 18 to 13. Thus the absolute index stood at 207 in 1935 and 1937 and the proportionate index stood at 138 in 1937. The average number of wage earners per establishment more than doubled for the larger segment and increased, but not as much, for the smaller segment.

*Chemicals, not Elsewhere Classified.*

Employment in this industry in 1937 exceeded the 1929 level by more than one-third. The number of establishments employing half the workers changed from 24 out of 934 to 29 out of 990 between the two dates. There was less absolute concentration during later years than in 1914 but more than in 1919. The total number of establishments more than doubled between 1914 and 1919. The number of establishments employing half the workers also more than doubled from 19 in 1914 to 46 in 1919.

On a percentage basis, however, the opposite trend is indicated. Between 5 and 6 percent of the establishments employed half the workers in both 1914 and 1919. During the subsequent period, this declined so that the proportionate index stood at 196 in 1929 and 176 in 1937. The average number of wage earners per establishment increased much more for the larger than for the smaller establishments.

*Sheet-metal Work, not Specifically Classified.*

With some decline in employment from 27,000 to 23,000, total number of establishments declined 50 percent (from 2,800 to 1,400) between 1914 and 1937. The number of establishments employing half the workers declined more than 50 percent, from 313 to 121. At the same time, the percentage of establishments employing half the workers declined much less than the absolute number; in 1937 the proportionate index stood at 126 compared with a level of 259 for the absolute index. The number of small establishments employing half the workers declined from 2,463 to 1,271 in this period.

*Agricultural Implements (Including Tractors); Engines, Turbines, Water Wheels, and Windmills.*

Employment in this industry in 1937 exceeded the 1929 level. The total number of establishments, however, declined by one-fifth

between 1929 and 1937 and by more than one-half from 1914 to 1937. The number of establishments employing half the workers declined from 41 in 1914 to 20 in 1929 and to 14 in 1937, while the percentage of establishments employing half the workers declined from 4.9 to 3.5 percent.

#### *Flour and Other Grain-mill Products.*

There is evidence of a secular decline in this industry. Employment was 39,000 in 1914; 45,000 in 1919; 35,000 in 1921 and 1923; 27,000 in 1929; and 26,000 in 1935 and 1937. The total number of establishments has declined drastically from 8,900 to 2,200 between 1914 and 1937. There was a slightly greater decline in the number of establishments employing half the workers which declined from 531 to 130. Thus the index of absolute concentration was above 400 in 1935 and 1937. The change in the percentage of establishments employing half the workers did not follow the same pattern. The proportionate index reached a high of 187 in 1919 and declined in the early twenties, stood at 175 in 1929, and was back almost to the 1914 level in 1937.

#### *Marble, Granite, Slate, and Other Stone, Cut and Shaped.*

The secular decline in this industry reduced employment by more than one-half during the period under consideration. The number of establishments declined at about the same rate. There was no increase in concentration, however, on a percentage basis. In fact, the percentage of establishments employing half the workers rose from 5.8 to 8 percent. This is an illustration of the limitation of the absolute index. It shows an increase to 169 in 1937 because the absolute number of establishments employing half the workers declined from 193 to 114. But the small establishments employing half the workers declined much faster from 3,200 to 1,300.

#### *Planing-mill Products and Other Wooden Products, not Elsewhere Classified, Made in Planing Mills not Connected With Sawmills.*

Recovery in this industry in 1937 had not regained the 1929 level in employment. Likewise, the number of establishments was 2,858 in 1937 compared with 4,849 in 1929. The number of establishments employing half the workers declined along with the total number of establishments so that 8.7 percent of the establishments employed half the workers in both 1929 and 1937, a decline from 11 percent in 1914.

#### *Wooden Boxes, Except Cigar Boxes.*

In the wooden box industry 12 percent of the establishments employed half the workers in 6 out of 7 census years. Together with a decline in the total number of establishments, the absolute number of establishments employing half the workers declined one-fifth.

#### *Woolen Woven Goods, Including Woven Felts; Woolen Yarns.*

Employment in 1937 exceeded the 1929 level. There was some increase in absolute concentration, the index rising gradually from a low of 84 in 1919 to a high of 127 in 1937.

#### *Blast-furnace Products.*

Employment in this industry has been very unstable; beginning with 29,000 in 1914, it increased sharply to 43,000 in 1919, dropped even more sharply to 19,000 in 1921, returned to 37,000 in 1923, dropped off to 25,000 in 1929, reached a low of 15,000 in 1935, and

increased to 23,000 in 1937. The indexes show a growth of absolute concentration while there was a decline in proportionate concentration. The reason for this is that the absolute number of establishments employing half the workers declined from 29 to 19 between 1914 and 1937. But since the total number of establishments declined from 160 to 87, the percentage of establishments employing half the workers actually increased from 18 to 22 percent.

There was an increase in the average number of wage earners per establishment in both the smaller and larger establishments.

The most outstanding thing about the industry is the decline in the total number of establishments which was not concentrated in either the larger or the smaller establishments.

#### *Paper Boxes, not Elsewhere Classified.*

Employment in the paper box industry increased from forty-five to sixty-five thousand between 1914 and 1937. Total number of establishments rose from 968 to 1,257. While the number of establishments employing half the workers increased from 132 to 171, the percentage of establishments employing half the workers was 14 percent in 1914, 1929, and 1937. The average number of workers per establishment increased similarly in both the large and small establishments.

#### *Electric and Steam Railroad Cars, not Built in Railroad Repair Shops.*

While employment declined somewhat in the railroad car industry, the total number of establishments increased as did the number of establishments employing half the workers. The percentage of establishments employing half the workers was around 8.5 percent in 1914, 1929, 1935, and 1937 and was somewhat higher in 1919, 1921, and 1923.

#### *Cement.*

Employment was roughly at the same level in 1937 as in 1914 in the cement industry, but the number of establishments employing half the workers had increased from 28 to 41. Since this represents a much greater increase than that in the total number of establishments, there was a decline in concentration on both an absolute and a proportionate basis.

#### *Nonferrous-metal Alloys; Nonferrous-metal Products, Except Aluminum.*

Employment doubled in the nonferrous-metal alloys industry, the 1937 level surpassing the 1929. The number of establishments employing half the workers increased from 24 to 27. There was great concentration in this industry, around 2.5 percent of the establishments employing half the workers throughout the period.

#### *Petroleum Refining.*

In this industry employment more than trebled during the period. The total number of establishments doubled. The number of establishments employing half the workers increased from 9 to 21 but the percentage of establishments employing half the workers rose only slightly. Concentration reached a peak in 1923 when 3.4 percent of the establishments employed half the workers.

*Stamped and Pressed Metal Products; Enameling, Japanning, and Lacquering.*

Employment doubled. Total number of establishments increased from 300 to 743 during the period and the number of establishments employing half the workers rose from 23 to 57. The percentage of establishments employing half the workers remained close to 8 percent throughout the period.

*Jewelers' Findings and Materials; Jewelry.*

The jewelry industry illustrates a case in which there was growing concentration that is unmistakably indicated by a rise in both indexes with about the same level of employment and a slight increase in the number of establishments between 1914 and 1929. The number of establishments employing half the workers declined by almost one-third; the percentage of establishments employing half the workers declined even more.

*Canned and Dried Fruits and Vegetables; Canned and Bottled Juices; Preserves, Jellies, Fruit Butters, Pickles, and Sauces.*

Employment in the canned and dried fruits industry doubled. The number of establishments employing half the workers increased still more than total establishments, however, so that both indexes declined somewhat. This is a notable illustration of an industry in which both indexes declined but in which the size of establishments increased—the average number of wage earners per establishment almost doubled. That is, the absolute number of establishments employing half the workers increased more than the total number of establishments even though the average size of establishment almost doubled.

*Tin Cans and Other Tinware not Elsewhere Classified.*

Employment in 1937 exceeded that of 1929; both indexes were fairly steady except between 1914 and 1919 when they fell markedly.

*Pottery, Including Porcelain Ware.*

Employment in the pottery industry showed some growth in concentration. The percentage of establishments employing half the workers declined from 14 and 15 percent during the early years to 11 and 12 percent in 1935 and 1937.

*Chewing Gum; Confectionery; Ice Cream.*

In the confectionery industry there is evidence of slightly increased concentration; the number of establishments employing half the workers declined from 217 in 1921 to 146 in 1937 and the percentage of establishments employing half the workers declined from 4.5 to 3.5 percent.

## INDUSTRIES CHARACTERIZED BY A DECLINE IN TOTAL NUMBER OF ESTABLISHMENTS

It appears to be a fairly typical pattern that an increase in absolute concentration (that is, when half the workers are employed by a declining number of establishments) is a product of a decline in the total number of establishments. This may mean (a) that the very

large establishments are growing larger or (b) that the small establishments are being eliminated. This pattern of a declining number of establishments is more often than not associated with a rise in proportionate concentration, that is, with a decline in the percentage of establishments employing half the workers.

Among the industries characterized by this pattern are the following:

- Agricultural implements (including tractors); engines, turbines, water wheels, and windmills.
- Boxes, wooden, except cigar boxes.
- Carpets and rugs, wool (other than rag).
- Clay products, other than pottery; nonclay refractories.
- Flour and other grain-mill products.
- Hardware not elsewhere classified.
- Leather: tanned, curried, and finished.
- Marble, granite slate, and other stone, cut and shaped.
- Planing-mill products and other wooden products not elsewhere classified, made in planing mills not connected with sawmills.
- Sheet-metal work, not specifically classified.
- Woolen woven goods, including woven felts; woolen yarn.

#### INDUSTRIES CHARACTERIZED BY AN INCREASE IN THE TOTAL NUMBER OF ESTABLISHMENTS

Whereas industries in which there was a decline in the total number of establishments are likely to show an increase in concentration if measured on an absolute basis and a smaller increase in proportionate concentration, industries in which there is an increase in the total number of establishments are likely to show an absolute decline and usually no great change proportionately. Industries in this group are—

- Boxes, paper, not elsewhere classified.
- Cars, electric and steam railroad, not built in railroad repair shops.
- Cement.
- Jewelry; jeweler's findings and materials.
- Nonferrous-metal alloys; nonferrous-metal products, except aluminum, not elsewhere classified.
- Petroleum refining.
- Stamped and pressed metal products; enameling, japanning, and lacquering.

The following industries include those in which the change in concentration was mixed and not of great magnitude:

- Canned and dried fruits and vegetables; canned and bottled juices; preserves, jellies, fruit butters, pickles, and sauces.
- Chewing gum; confectionery; ice cream.
- Drugs and medicines; insecticides and fungicides, and industrial and household chemical compounds not elsewhere classified.
- Heating and cooking apparatus, except electric.
- Pottery, including porcelain ware.
- Structural and ornamental metal work, made in plants not operated in connection with rolling mills.
- Tin cans and other tinware not elsewhere classified.

## 80 INDUSTRIES EMPLOYING 5,000 TO 25,000 WAGE EARNERS

Total employment in these 80 industries was slightly more than 1,000,000 in 1919, 1929, and 1937. The total number of establishments increased from 23,800 in 1914 to 27,000 in 1919 to 32,200 in 1929 and declined to 28,800 in 1937.

The impression that concentration is high only in large industries is certainly disproved by these data. Approximately 10 percent of the establishments employed half the workers throughout the period.<sup>3</sup> The year in which concentration was highest was 1919, when 9.2 percent of the establishments employed half the workers; it was lowest in 1937, when 11.4 percent of the establishments employed half the workers.

Furthermore, this measure, as noted above, was not obtained by taking the largest establishments out of the total number of establishments in all industries together but by taking the largest establishments in each industry separately, so that the 3,300 establishments out of 28,800 which employed half the workers in 1937 does not represent the largest establishments in the total, but the sum of the largest establishments in each industry. A fewer number of establishments and a smaller percentage of the total would employ half the workers if only the totals were used, but this would have the effect of giving the highly concentrated and the large industries greater weight than the less concentrated and small ones.

The average number of wage earners per establishment for these 80 industries was 37 in both 1914 and 1937. There was a decline in both indexes of concentration. The number of establishments employing half the workers increased from 2,546 to 3,278 and the percentage increased from 10.7 to 11.4 between 1914 and 1937.

The most general pattern of increasing concentration, measured absolutely and usually proportionally as well, is found in those industries in which the total number of establishments has declined. Conversely, the most general pattern of declining concentration, as measured absolutely though less often followed by a similar decline in the proportionate index, is in those industries in which the total number of establishments has increased.

Examples of the pattern of increasing concentration are the 13 following industries:

*Cooperage.*

Total establishments declined between 1914 and 1937 from 838 to less than half that number. Total employment declined by one-third. The number of establishments employing half the workers declined in even greater proportion. The percentage of establishments employing half the workers declined from 7 to 5.8 percent.

*Mirrors and Other Glass Products Made From Purchased Glass.*

A decline in the total number of establishments in the mirror and glass products industry was accompanied by a very marked drop from 92 to 26 in the number of establishments employing half the workers between 1914 and 1937. The percentage of establishments employing half the workers similarly declined by two-thirds so that both indexes of concentration stood above 300 in 1937 on a 1914 base.

<sup>3</sup>3.6 percent if based on the largest establishment regardless of the industry.

*Pianos.*

Employment in the piano industry declined from 24,000 to 6,000 between 1914 and 1937. During the same period the number of establishments employing half the workers dropped from 30 to 4, and the percentage of establishments employing half the workers declined very little.

*Rubber Boots and Shoes.*

In the rubber boot and shoe industry the total number of establishments declined about 50 percent, from 23 to 12. Similarly, the small establishments declined from 19 to 10. On a percentage basis, concentration remained unchanged. This is an interesting example of an industry which shows relatively low concentration, 17 percent of the establishments employing half the workers both at the beginning and at the end of the period, but the average number of wage earners per establishment doubled in both large and small establishments.

*Trunks and Other Luggage.*

The total number of establishments declined by one-third in the trunk and other luggage industry. The number of establishments employing half the workers also declined, though not quite as much. The percentage of establishments employing half the workers actually increased.

*Explosives.*

Fairly typical is explosives, an industry in which, with relatively stable employment, total establishments declined by one-fourth, the number of establishments employing half the workers by almost one-half, and the percentage of establishments employing half the workers by one-fourth, so that both indexes of concentration increased during the period between 1914 and 1937.

*Musical Instrument Parts and Materials, Piano and Organ.*

In the case of musical instruments, the decline in the number of establishments employing half the workers from 14 to 4 did not result in any substantial change in the percentage of establishments employing half the workers because total establishments declined from 117 to 32 and total wage earners dropped enormously, from 10,600 to 1,800.

Exceptions to this pattern wherein a decline in the total number of establishments resulted in a rise in the absolute index of concentration are the following industries: Motorcycles, grease and tallow, chewing and smoking tobacco, and needles, etc.

In the motorcycle industry, for example, with little change in total employment between 1914 and 1937, the total number of establishments dropped 50 percent. At the same time the number of establishments employing half the workers increased from 3 to 5, and the percentage of establishments employing half the workers increased from 5.4 to 17. In the chewing and smoking tobacco industry the number of wage earners fell from 25,900 to 10,000 while the total number of establishments declined from 212 to 125. The number of establishments employing half the workers rose from 5 to 6 and the percentage of establishments employing half the workers rose from 2.4 to 4.8 percent. We have in this case an example of a declining industry if measured by volume of employment (though not by value of products) in which the average number of wage earners per establishment declined, as did both indexes of concentration.

A second pattern is found in the following industries in which the total number of establishments increased. However, the absolute number of establishments employing half the workers also increased, so the percentage of establishments employing half the workers usually showed no great change in either direction.

#### *Corsets and Allied Garments.*

The number of establishments in the corset industry increased from 126 to 215 between 1914 and 1937. The number employing half the workers increased in greater proportion from 8 to 22. The percentage employing half the workers also rose from 6.3 to 10 percent.

#### *Caskets, Coffins, etc.*

In the casket industry the number of establishments more than doubled, which is a proportionally greater increase than that in employment, but the percentage of establishments employing half the workers varied only slightly.

#### *Cane and Beet Sugar Refining.*

Both the cane and sugar beet refining industries showed a decline in concentration. The total number of establishments increased; the percentage of establishments employing half the workers increased in the case of beet sugar and declined only slightly in cane sugar. In both cases concentration was exceptionally low, from one-fourth to one-third of the establishments employing half the workers.

#### *Surgical and Orthopedic Appliances.*

At the other extreme in this group is the surgical appliance industry in which concentration was relatively high, from 2 to 2.5 percent of the establishments employing half the workers. The total number of establishments, however, increased, though not quite as fast as total employment.

Exceptions to this pattern in which total establishments increased but concentration did not decline are the following industries: Perfumes and cosmetics, book binding, and cutlery.

In the perfume industry the total number of establishments almost doubled, total employment increased in still greater proportion, but the number of establishments employing half the workers declined from 29 to 21 and the percentage of establishments employing half the workers declined from 11 to 4.4 percent.

In the case of the cutlery industry, with about the same level of employment in both 1914 and 1937, the number of establishments increased materially, while the percentage of establishments employing half the workers declined.

A third pattern is found in those industries in which changes in the number of establishments were comparatively small between 1914 and 1937 and in which changes in concentration were also relatively limited. These industries include the following: Canned and cured fish, ammunition, and firearms.

In the case of the canned fish industry, the total number of establishments was 335 in 1914 and 325 in 1937. Thirty-eight establishments employed half the workers in each of these years and the percentage of establishments employing half the workers changed only from 11 to 12 percent. Some of the industries in this group showed exceptionally high concentration at the beginning so that relatively great percentage changes are misleading.

For example, in the ammunition industry, with practically no change in the number of establishments, the number of establishments employing half the workers increased from one to three between 1914 and 1937.

Firearms is similar except that the number of establishments employing half the workers declined from four to two and the percentage declined from 17 to 9.5 between 1914 and 1937.

#### SEVENTY-EIGHT INDUSTRIES EMPLOYING LESS THAN 5,000 WORKERS

Total employment in this group of industries increased from 163,000 in 1914 to an all-time high of 189,000 in 1919. There was evidence of a secular decline from there on, 1929 being below 1923. The decline from 189,000 to 148,000 between 1919 and 1921, and from 174,000 to 148,000 between 1929 and 1933 shows a relatively smaller decline than that in the larger industries. In 1937 employment had regained the 1929 levels.

The increase in the number of establishments was roughly proportional to the increase in employment from 1914 to 1929, but the number of establishments continued to decline from 1933 to 1937 in sharp contrast to the recovery in employment. Thus, for this group of small industries the recovery in employment did not mean a reversal of the decline in the total number of establishments.

In 1929, 711 out of the 7,650 establishments employed half the workers. In 1937 the figure was 659 out of 6,350. The percentage employing half the workers increased from 9.3 to 10.4 between the 2 years. Again it may be remarked that this percentage is obtained by adding the number of establishments employing half the workers in each industry rather than by taking the largest establishments in all industries together. The percentage of establishments employing half the workers would, of course, be smaller if the industries were not treated separately.

It is more difficult to find well established and significant patterns among these small industries than among large industries. There are numerous cases in which concentration apparently declined when employment was increasing as well as when employment was declining. Thus, in the bone black and carbon black industry employment rose more than six-fold but the number of establishments employing half the workers increased from 3 to 13 and the percentage of establishments employing half the workers increased from 13 to 21 percent between 1914 and 1937.

In the feather industry employment dropped from 4,400 to 550 and the number of establishments declined similarly. The number of establishments employing half the workers declined from 27 to 11 but the percentage of establishments employing half the workers increased from 14 to 18 percent.

Industries showing a decline in the concentration indexes were, among others, flags, rice polishing, vinegar, essential oils, drug grinding, bluing, and oleomargarine. Industries showing a marked increase in the indexes of concentration include fish nets, engraving other than steel, gold leaf and foil, wool scouring, wood distillation, and many others.

In the wood distillation industry, employment increased from 3,000 to 4,500 while the number of establishments declined from 106 to 60

between 1914 and 1937. At the same time the number of establishments employing half the workers declined from 20 to 8 and the percentage declined from 19 to 13.

In the fish nets industry, employment declined 50 percent from 1,000 in 1914. Total establishments declined slightly. The percentage of establishments employing half the workers declined one-third to 11 percent in 1937 and the absolute number of establishments employing half the workers declined from two to one.

An enormous growth in concentration occurred in the engraving industry in which employment almost doubled to more than 2,000 between 1914 and 1937. The number of establishments employing half the workers dropped from 23 to 1 and the percentage dropped from 17 to 1.3. A large part of this decline occurred during the war period. In 1919, 6 out of 215 establishments employed half the workers.

In the baking powder industry where employment has been relatively stable, the percentage of establishments employing half the workers has declined enormously from 17.9 to 1.3 percent owing to the sharp drop in total number of establishments from 76 to 40. Since the number of establishments employing half the workers changed only from 6 to 5, this means that the major change was in the smaller establishments which grew during the period 1914 to 1937.

#### SEVENTEEN SMALL INDUSTRIES EMPLOYING FEWER THAN 1,000<sup>4</sup>

Total employment in these small industries has not recovered to the pre-depression levels though there is some evidence of a secular decline. In these 17 small industries 844 establishments employed 12,400 workers in 1914, 893 establishments employed 11,600 workers in 1929, and 570 establishments employed 9,000 workers in 1937. The number of establishments employing half the workers declined in this period from 113 to 90 but the percentage of establishments employing half the workers increased from 13.4 to 15.8.

<sup>4</sup> These were included in the 78 industries employing less than 5,000 workers.

## APPENDIX A

### BASIC DATA FOR 204 SELECTED INDUSTRIES, 1914-37

Industries	Establishments		Wage earners		Wage earners per establishment			
	1914	1937	1914	1937	Average number 1914	Index, 1914=100		
						1919	1929	1937
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Locomotives, railroad, mining, and industrial, not made in railroad repair shops.....	19	13	17,391	9,000	915.3	171.7	75.4	75.6
Boots and shoes, rubber.....	23	12	18,687	18,356	812.5	161.8	143.5	188.3
Sugar refining, cane.....	18	23	11,253	14,024	625.2	145.6	106.0	97.5
Steel-works and rolling-mill products.....	456	410	253,964	479,342	556.9	130.3	145.8	209.9
Cars, electric and steam railroad, not built in railroad repair shops.....	117	154	58,128	40,466	496.8	104.9	54.8	52.9
Smelting and refining, copper.....	37	23	17,731	14,514	479.2	106.4	116.7	131.7
Sewing machines and attachments.....	34	36	14,297	9,019	420.5	108.5	63.8	59.6
Wool combing; worsted woven goods; and worsted yarn.....	311	258	110,112	90,782	354.1	95.6	90.7	99.4
Smelting and refining, lead.....	21	14	7,384	4,036	351.7	73.2	72.1	82.0
Smelting and refining, zinc.....	28	25	9,617	11,265	343.5	103.0	112.8	131.2
Wize drawn from purchased rods <sup>1</sup> .....	54	93	17,600	24,580	325.9	93.2	85.1	81.1
Cotton woven goods (over 12 inches in width); cotton yarn and thread <sup>2</sup> .....	1,168	1,072	379,348	422,310	324.8	103.8	102.1	121.4
Clocks, watches, time-recording devices, and materials and parts except watch-cases.....	61	75	19,783	23,223	324.3	99.0	81.7	100.9
Carpets and rugs, wool (other than rag) <sup>3</sup> .....	97	55	31,309	30,779	322.8	97.3	150.8	173.4
Firearms.....	24	21	7,058	6,847	294.1	174.3	110.7	110.8
Motor vehicles, not including motorcycles <sup>4</sup> .....	289	131	79,266	194,527	274.3	249.2	337.8	541.3
Wrought pipe, welded and heavy riveted, made in plants not operated in connection with rolling mills.....	34	53	8,841	14,125	260.1	81.8	87.8	102.5
Asphalted-felt-base floor covering; linoleum.....	18	16	4,428	8,107	246.0	104.8	152.7	206.0
Jute goods.....	33	32	7,987	6,522	242.0	118.0	101.9	84.2
Cast-iron pipe and fittings.....	58	75	12,557	17,613	216.5	98.8	126.7	108.5
Cement.....	129	152	27,907	26,426	216.3	97.5	88.7	77.3
Glass.....	345	232	74,493	79,051	215.9	97.0	118.9	157.8
Ammunition and related products; and fireworks and allied products.....	64	65	12,806	8,356	200.1	144.7	63.6	64.3
Matches.....	19	25	3,795	5,261	199.7	93.3	89.6	105.4
Lace goods.....	39	57	7,440	8,109	190.8	81.0	85.5	74.6
Rubber tires and inner tubes; other rubber goods, except boots and shoes.....	293	466	55,303	111,462	188.7	152.4	130.1	126.8
Blast-furnace products.....	160	87	29,356	23,075	183.5	112.9	129.5	144.5
Linen goods.....	20	12	3,567	1,862	178.4	105.9	76.9	87.0
Corsets and allied garments.....	126	215	20,426	16,385	162.1	87.6	39.6	47.0
Cordage and twine.....	98	118	15,761	14,043	160.8	95.3	73.3	74.0
Boots and shoes, other than rubber.....	1,217	1,080	191,305	215,438	157.2	96.4	97.5	127.0
Aluminum products.....	30	153	4,601	23,695	153.4	92.9	92.2	101.0
Petroleum refining.....	175	366	25,366	83,182	144.1	129.4	143.4	158.2
Electrical machinery, apparatus, and supplies; radios, radio tubes, and phonographs.....	892	1,597	127,255	306,003	142.7	114.9	129.2	134.3

<sup>1</sup> Figures for 1914 and 1919 are not strictly comparable with those for 1929 to 1937 because of the fact that at the census of 1929 certain large establishments engaged primarily in rolling nonferrous metals and manufacturing nonferrous wire, formerly assigned to the wire industry, were transferred to the nonferrous metals industry. The classified wire industry proper does not include the extensive operations of the wire-drawing departments of the steel works and rolling mills industry, as well as of the nonferrous rolling mills.

<sup>2</sup> Figures for 1937 exclude data for the dyeing and finishing departments of cotton mills, which were treated as integral parts of the mills prior to 1937 and include data for manufacturers of certain mixed fabrics (those having a cotton warp in which the material of chief value is silk or rayon) which were assigned to the "Silk and rayon goods" industry prior to 1937.

<sup>3</sup> Figures for 1937 are not strictly comparable with those for earlier years.

<sup>4</sup> At the censuses of 1914 to 1929, establishments engaged primarily in the manufacture of trailers were assigned to the motor vehicle industry, while for 1937 such establishments were classified in the motor-vehicle bodies and parts industry.

## Basic data for 204 selected industries, 1914-37—Continued

Industries	Establishments		Wage earners		Wage earners per establishment			
	1914	1937	1914	1937	Average number 1914	Index, 1914=100		
	(1)	(2)	(3)	(4)		(5)	1919	1929
Watchcases.....	25	29	3,508	2,451	140.3	89.7	60.7	60.2
Sugar, beet.....	60	87	7,997	9,366	133.3	104.0	68.6	80.8
Files.....	34	21	4,312	3,715	126.8	98.8	95.0	139.5
Rayon and silk manufactures: rayon broad woven goods; rayon narrow fabrics; rayon throwing and spinning; rayon yarn and thread; silk broad woven goods; silk narrow fabrics; silk throwing and spinning; and silk yarn and thread <sup>5</sup> .....	856	848	108,003	116,839	126.2	76.2	69.3	109.2
Needles, pins, hooks and eyes, and slide and snap fasteners.....	43	52	5,320	9,580	123.7	89.3	117.4	148.0
Chocolate and cocoa products, not including confectionery <sup>6</sup> .....	34	40	4,160	7,402	122.4	154.6	86.6	151.2
Tobacco (chewing and smoking) and snuff.....	212	125	25,857	10,130	122.0	64.7	58.3	66.4
Motorcycles, bicycles, and parts.....	55	29	6,664	6,938	121.2	199.5	172.5	197.4
Screw-machine products and wood screws.....	76	311	8,071	21,287	115.3	89.3	63.1	59.3
Hats, fur-felt.....	185	140	21,266	15,926	115.0	103.1	90.4	99.0
Woolen woven goods, including woven felts; and woolen yarns <sup>7</sup> .....	444	373	49,069	64,680	110.5	108.2	115.0	156.9
Artists' materials; pencils, lead (including mechanical), and crayons.....	46	86	4,925	6,148	109.4	116.5	59.2	65.4
Pottery, including porcelain ware.....	244	251	26,538	33,060	108.8	96.7	104.0	121.0
Bolts, nuts, washers, and rivets, made in plants not operated in connection with rolling mills.....	99	138	10,657	16,840	107.6	120.9	128.4	113.4
Knit goods: Hosiery; knitted cloth; knitted underwear; knitted outerwear; knitted gloves and mittens <sup>8</sup> .....	1,428	1,821	150,125	231,064	105.1	86.1	105.0	120.9
Wallpaper.....	47	42	4,738	4,543	100.8	88.1	83.3	107.3
Stamped and pressed metal products; enameling, japanning, and lacquering <sup>9</sup> .....	300	743	30,147	61,092	100.5	89.4	68.4	81.8
Musical instruments: Pianos.....	242	38	23,861	5,698	98.6	123.8	124.8	152.0
Silverware and plated ware.....	161	136	15,763	11,361	97.9	100.5	89.8	85.3
Fish nets and seines.....	11	9	1,058	502	96.2	52.5	49.4	68.0
Agricultural implements (including tractors); engines, turbines, water wheels, and windmills.....	830	401	79,799	110,367	96.1	174.3	214.2	286.4
Chemicals not elsewhere classified <sup>10</sup> .....	374	990	35,306	138,704	94.4	104.1	118.8	148.4
Coke-oven products.....	224	94	21,057	20,603	94.1	114.6	142.7	232.9
Oilcloth.....	13	8	1,223	1,269	94.1	109.1	166.7	168.5
Hardware not elsewhere classified.....	477	428	43,581	53,000	91.4	100.8	117.9	135.4
Tin cans and other tinware not elsewhere classified <sup>9</sup> .....	249	224	22,529	33,145	90.5	138.6	150.1	163.5
Musical-instrument parts and materials: Piano and organ.....	117	32	10,594	1,778	90.5	115.8	50.9	61.4
Cutlery (not including silver and plated cutlery) and edge tools.....	182	261	16,457	16,830	90.4	82.4	69.4	74.2
Cork products.....	39	35	3,442	3,599	88.3	72.9	124.3	116.4
Leather: Tanned, curried, and finished.....	672	402	55,858	50,681	83.1	134.8	127.6	151.7
Heating and cooking apparatus, except electric.....	769	830	63,596	89,287	82.7	120.2	122.9	130.1
Envelopes.....	85	162	6,596	9,511	81.8	94.6	74.1	71.8
Carriages and sleds, children's.....	73	54	5,876	5,218	80.5	96.5	111.7	120.0
Bags, other than paper.....	117	186	9,339	12,075	79.8	65.0	73.4	81.3

<sup>5</sup> At the censuses of 1929 and earlier years, the dyeing and finishing departments of silk and rayon mills were treated as integral parts of the mills; for 1937 such dyeing and finishing departments (except those engaged in dyeing and finishing yarns for use in the same plants) were excluded from the data for the silk and rayon goods industry. Figures for 1937 also exclude data for establishments producing certain mixed goods (silk-and-cotton, or rayon-and-cotton goods having a cotton warp in which the material of chief value is rayon or silk) which were assigned to the "Silk and rayon goods" industry prior to 1937.

<sup>6</sup> Figures for 1929 and later years include data for chocolate manufacturing departments of establishments engaged primarily in the manufacture of confectionery. The chocolate-manufacturing departments of confectionery manufacturers apparently were of minor importance in the earlier years.

<sup>7</sup> Figures for 1937 are not strictly comparable with those for earlier years.

<sup>8</sup> Figures for 1937 include data for establishments engaged primarily in dyeing and finishing hosiery knitted by others, which were formerly classified elsewhere, and are therefore not strictly comparable with figures for earlier years.

<sup>9</sup> Figures are not strictly comparable.

<sup>10</sup> Includes "Rayon and allied products" and "Compressed and liquefied gases"; these were treated as a part of the "Chemicals, not elsewhere classified" industry for 1914 and 1919.

## Basic Data for 204 Selected Industries, 1914-37—Continued

Industries	Establishments		Wage earners		Wage earners per establishment			
	1914	1937	1914	1937	Average number 1914	Index, 1914=100		
						1919	1929	1937
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Artificial leather.....	10	25	795	2,541	79.5	148.8	191.7	127.8
Meat packing, wholesale.....	1,254	1,160	98,807	127,477	78.8	159.3	121.7	139.5
Pipes (tobacco).....	30	25	2,333	2,382	77.8	75.4	90.0	122.5
Ship and boat building, steel and wood- en, including repair work.....	598	544	43,931	62,274	73.5	668.7	120.1	155.8
Salt.....	76	46	5,045	4,616	66.4	132.1	141.7	151.1
Saws.....	69	80	4,517	4,384	65.5	88.4	78.0	83.7
Scales and balances.....	68	57	4,447	3,299	65.4	118.3	106.7	88.5
Glue and gelatin.....	48	75	3,125	3,547	65.1	116.9	62.1	72.7
Bags, paper, exclusive of those made in paper mills.....	54	107	3,499	10,360	64.8	91.7	113.3	149.4
Cardboard, not made in paper mills.....	18	16	1,159	877	64.4	138.4	72.7	85.1
Motor vehicle bodies and motor-vehicle parts <sup>1</sup> .....	764	936	47,541	284,814	62.2	100.2	308.4	489.2
Oil, cake, and meal, linseed.....	24	23	1,487	2,628	62.0	134.8	151.0	184.4
Forgings, iron and steel, made in plants not operated in connection with steel works or rolling mills.....	187	194	11,239	18,255	60.1	197.8	159.4	156.6
Explosives.....	105	77	6,298	5,406	60.0	131.8	98.5	117.0
Sporting and athletic goods, not includ- ing firearms or ammunition.....	102	204	5,522	11,392	54.1	87.1	82.4	103.1
Oleomargarine (margarine), not made in meat-packing establishments.....	17	16	917	1,214	53.9	126.0	69.4	140.8
Corn sirup, corn sugar, corn oil, and starch.....	84	27	4,505	7,010	53.6	279.7	358.8	484.3
Lithographing.....	285	552	15,141	24,079	53.1	101.3	95.1	82.1
Doors, shutters, and window sash and frames, molding, and trim, metal.....	39	154	1,981	8,408	50.8	75.6	127.2	107.5
Furniture, including store and office fixtures.....	2,710	3,097	133,344	170,072	49.2	101.6	104.1	111.6
Soap.....	289	232	14,112	14,008	48.8	149.8	104.3	123.8
Boxes, paper, not elsewhere classified.....	968	1,257	45,108	65,158	46.6	104.1	95.7	111.2
Nonferrous-metal alloys; nonferrous metal products, except aluminum, not elsewhere classified <sup>1</sup> .....	911	1,103	42,166	83,016	46.3	147.5	139.5	162.6
Wool scouring.....	23	20	1,059	1,252	46.0	147.8	134.8	136.1
Nails, spikes, etc., not made in wire mills or in plants operated in connec- tion with rolling mills.....	58	42	2,635	2,432	45.4	117.4	81.3	127.5
Structural and ornamental metal work, made in plants not operated in connec- tion with rolling mills.....	1,042	1,132	46,887	38,814	45.0	94.2	82.4	76.2
Boxes, wooden, except cigar boxes.....	872	634	38,089	25,981	43.7	98.9	88.3	93.8
Clothing, leather and sheep-lined; cloth- ing, men's, youths', and boys' not elsewhere classified; clothing, work, and sports garments, except leather; trousers, wash suits, and washable service apparel <sup>11</sup> .....	3,975	3,202	171,174	227,708	43.1	83.1	123.5	165.0
Musical instruments: Organs.....	72	34	3,047	1,086	42.3	75.2	91.0	75.4
Wood preserving.....	67	197	2,830	12,401	42.2	131.0	155.7	149.1
Clay products, other than pottery; non- clay refractories.....	2,348	1,238	97,843	65,226	41.7	86.8	127.6	126.4
Asbestos products other than steam backing and pipe and boiler covering <sup>12</sup> .....	23	73	948	13,023	41.2	206.1	293.2	433.0
Buttons.....	348	291	14,217	12,026	40.9	86.8	91.2	101.0
Drug grinding.....	26	21	1,056	699	40.6	114.3	64.0	82.0
Soda fountains and related products.....	58	51	2,221	1,655	38.3	111.2	133.7	84.9
Lime.....	313	203	11,997	9,751	38.3	89.8	94.3	125.3
Caskets, coffins, burial cases, and other morticians' goods.....	249	521	9,426	13,678	37.9	97.1	83.1	69.4
Lumber and timber products not else- where classified <sup>13</sup> .....	11,684	7,647	443,118	323,928	37.9	77.3	85.5	111.9

<sup>1</sup> Figures for 1914 and 1919 are not strictly comparable with those for 1929 to 1937 because of the fact that at the census of 1929 certain large establishments engaged primarily in rolling nonferrous metals and manufacturing nonferrous wire, formerly assigned to the wire industry, were transferred to the nonferrous metals industry. The classified wire industry proper does not include the extensive operations of the wire-drawing departments of the steel works and rolling mills industry, as well as of the nonferrous rolling mills.

<sup>11</sup> Covers manufacturers of men's, youths', and boys' suits, overcoats, topcoats, separate coats and trousers and sport, work, and service clothing, except that work shirts are not included prior to 1937.

<sup>12</sup> Data for 1914 and 1919 are not strictly comparable with those for later years. It appears that establishments manufacturing asbestos roofing were assigned to the roofing materials industry for 1914 and 1919 and to the asbestos products industry beginning 1921.

<sup>13</sup> For all years except 1929, data for all establishments reporting products under \$5,000 in value are excluded. At the census of 1929, a mill was treated as an establishment with products valued at \$5,000 if it produced 200,000 feet of lumber (or its equivalent).

## Basic Data for 204 Selected Industries, 1914-37—Continued

Industries	Establishments		Wage earners		Wage earners per establishment			
	1914	1937	1914	1937	Average number 1914	Index, 1914=100		
						1919	1929	1937
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Galvanizing and other coating, done in plants not operated in connection with rolling mills.....	42	64	1,570	1,119	37.4	90.6	46.3	46.8
Gloves and mittens, leather <sup>14</sup> .....	285	221	10,596	11,637	37.2	87.9	93.5	141.7
Toys (not including children's wheel goods or sleds), games, and playground equipment <sup>15</sup> .....	210	344	7,721	17,547	36.8	90.5	95.1	138.6
Lasts and related products.....	58	48	2,088	1,444	36.0	136.7	84.2	83.6
Cigarettes, cigars.....	4,110	727	145,660	82,028	35.4	89.0	181.9	318.6
Lighting equipment.....	511	466	17,929	21,743	35.1	110.3	109.4	133.0
Chewing gum.....	58	25	2,020	2,401	34.8	160.3	175.9	275.9
Smelting and refining, nonferrous metals other than gold, silver, and platinum, not from the ore.....	75	103	2,579	4,973	34.4	79.7	113.4	140.4
Clothing, women's, misses', and children's, not elsewhere classified <sup>16</sup> .....	4,931	6,337	166,729	242,879	33.8	67.8	68.6	113.3
Washing machines, wringers, driers, and ironing machines, for household use.....	68	40	2,257	9,302	33.2	192.5	379.5	700.6
Canned and cured fish, crabs, shrimps, oysters, and clams.....	335	325	10,927	18,229	32.8	88.4	119.2	171.0
Wirework not elsewhere classified.....	366	563	11,885	33,471	32.5	108.6	125.8	183.1
Boxes, cigar, wooden and part wooden.....	179	69	5,716	3,296	31.9	99.1	116.3	149.8
Condensed and evaporated milk.....	189	601	6,002	8,967	31.8	107.5	41.5	46.9
Pens, fountain and stylographic; pen points, gold, steel, and brass.....	62	42	1,966	4,343	31.7	202.2	190.9	326.2
Turpentine and rosin.....	1,037	993	32,447	32,386	31.3	81.8	108.3	104.2
Fertilizers.....	734	743	22,742	20,893	31.0	145.2	105.8	90.6
Baking powder, yeast, and other leavening compounds.....	76	40	2,230	2,380	29.3	185.7	213.7	203.1
Artificial and preserved flowers and plants.....	162	189	4,721	5,657	29.1	73.9	57.7	102.7
Boot and shoe cut stock and findings.....	495	470	14,379	18,755	29.0	104.8	115.9	137.6
Bookbinding and blank-book making.....	725	997	20,950	25,333	28.9	80.6	77.2	87.9
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint <sup>12</sup> .....	141	111	4,038	7,418	28.6	199.7	206.6	233.6
Candles.....	14	22	387	725	27.6	121.7	141.7	119.6
Wood distillation and charcoal manufacture.....	106	60	2,916	4,467	27.5	137.5	185.8	270.9
Brushes, other than rubber.....	264	243	7,097	7,915	26.9	95.2	89.2	121.2
Tanning materials, natural dyestuffs, mordants and assistants, and sizes.....	106	158	2,836	2,812	26.8	116.4	71.6	66.4
Wood turned and shaped and other wooden goods, not elsewhere classified <sup>17</sup> .....	656	755	17,418	23,087	26.6	89.1	78.6	115.0
Canned and dried fruits and vegetables; canned and bottled juices; preserves, jellies, fruit butters, pickles, and sauces.....	2,259	2,772	59,839	137,064	26.5	98.5	124.5	186.4
Oil, cake, and meal, cottonseed.....	879	447	21,807	16,583	24.8	152.0	115.3	149.6
Engraving, steel, copperplate, and wood, and plate engraving.....	284	435	6,597	7,831	24.5	82.4	86.9	73.5
Handbags and purses, women's; small leather articles; leather goods not elsewhere classified.....	344	593	8,390	20,852	24.4	86.5	98.8	144.3
Trunks, suitcases, briefcases, bags, and other luggage.....	408	277	9,754	8,708	23.9	97.1	101.7	127.2
Umbrellas, parasols, and canes.....	198	81	4,729	3,088	23.9	90.4	84.5	159.4
Baskets and rattan and willow ware, not including furniture.....	182	194	4,319	9,308	23.7	97.5	144.7	202.5
Flags, banners, regalia, vestments, robes, and related products.....	145	121	3,386	2,146	23.4	91.9	88.0	67.9
Surgical and orthopedic appliances and related products.....	200	323	4,617	8,423	23.1	99.1	94.4	113.0
Feathers, plumes, and manufactures thereof.....	191	61	4,399	559	23.0	77.4	28.7	40.0

<sup>14</sup> The figures for 1914 and 1919 are not strictly comparable with those for 1929 to 1937 because of the inclusion in the figures for the earlier years and the exclusion from the figures for 1929 to 1937 of data for certain establishments manufacturing gloves and mittens of cloth and leather combined.

<sup>15</sup> Figures for 1914 and 1919 include data for establishments engaged primarily in the production of toy balloons and other rubber toys which were classified elsewhere for 1929 to 1937.

<sup>16</sup> The 8 industries here combined for 1937 were treated as a single industry prior to 1935. They cover establishments whose principal products are women's, misses', and children's clothing (except that made in knitting mills) such as coats, suits, skirts, blouses, dresses, aprons, nightwear, and underwear and infants' and children's outerwear.

<sup>17</sup> Data for 1937 include establishments engaged primarily in the manufacture of felloes, spokes, and hubs, and are not strictly comparable with figures for earlier years which do not include such establishments.

## Basic Data for 204 Selected Industries, 1914-37—Continued

Industries	Establishments		Wage earners		Wage earners per establishment			
	1914	1937	1914	1937	Average number 1914	Index, 1914=100		
						1919	1929	1937
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Window and door screens and weather strip.....	135	144	3, 111	2, 833	23.0	60.9	62.6	85.7
Hat and cap materials, men's.....	77	69	1, 747	2, 444	22.7	115.9	100.9	155.9
Paints, pigments, and varnishes.....	715	1, 124	16, 929	31, 664	22.4	123.2	122.8	125.9
Sugar, cane, not including products of refineries.....	164	72	3, 604	4, 221	22.0	164.1	150.5	266.4
Rice cleaning and polishing.....	58	61	1, 253	2, 218	21.6	117.6	122.7	168.5
Furs, dressed and dyed.....	70	121	1, 497	6, 343	21.4	182.2	97.2	244.9
Ink, printing.....	65	184	1, 387	2, 793	21.3	108.5	78.4	71.4
Window shades (textile and paper) and fixtures.....	189	304	4, 013	3, 166	21.2	91.5	46.2	49.1
Signs and advertising novelties.....	442	1, 001	9, 227	16, 042	20.9	90.4	77.0	76.6
Belting and packing, leather.....	141	182	2, 940	2, 829	20.9	80.4	60.3	74.2
Wool pulling.....	34	19	708	794	20.8	141.3	159.1	201.0
Planing-mill products and other wooden products not elsewhere classified, made in planing mills not connected with sawmills.....	4, 555	2, 858	94, 537	66, 814	20.8	93.3	89.4	112.5
Jewelers' findings and materials; jewelry.....	1, 348	1, 045	27, 667	22, 838	20.5	89.3	88.8	106.8
Musical instruments and parts and materials, not elsewhere classified.....	86	83	1, 743	3, 409	20.3	157.6	147.8	202.5
Cooperage.....	838	397	16, 671	9, 588	19.9	79.4	91.5	121.6
Stereotyping and electrotyping, not done in printing establishments.....	175	218	3, 429	4, 766	19.6	113.3	143.9	111.7
Photoengraving, not done in printing establishments.....	321	641	6, 129	12, 364	19.1	91.6	99.0	101.0
Confectionery: Ice cream.....	3, 271	4, 111	60, 802	72, 386	18.6	97.3	89.2	94.6
Gold leaf and foil.....	61	26	1, 123	625	18.4	67.4	85.3	130.4
Mirrors and other glass products made of purchased glass.....	618	534	10, 984	12, 652	17.8	77.5	82.6	133.1
Ink, writing.....	28	17	496	366	17.7	108.5	80.8	121.5
Grease and tallow, not including lubricating greases.....	282	266	4, 989	5, 200	17.7	94.4	104.0	110.2
Mirror and picture frames.....	272	163	4, 658	3, 382	17.1	92.4	146.2	121.1
Fire extinguishers, chemical.....	15	25	241	1, 041	16.1	185.7	164.0	258.4
Printing and publishing, book, music, and job.....	6, 834	10, 587	110, 091	141, 368	16.1	84.5	73.3	83.2
Statuary and art goods (except concrete) factory production.....	120	99	1, 917	858	16.0	68.8	77.5	54.4
Marble, granite, slate, and other stone, cut and shaped.....	3, 355	1, 403	53, 459	20, 816	15.9	61.6	126.4	93.1
Bone black, carbon black, and lamp-black.....	24	62	332	2, 190	13.8	144.2	180.4	255.8
Sand-lime brick.....	40	23	546	414	13.7	119.0	103.6	131.4
Aircraft and parts <sup>18</sup> .....	12	92	162	24, 003	13.5	905.2	825.2	1, 932.6
Blacking, stains, and dressings.....	127	147	1, 714	1, 536	13.5	100.0	70.4	77.0
Fuel briquettes.....	10	21	132	457	13.2	117.4	140.2	165.2
Lapidary work.....	43	51	557	217	13.0	90.8	39.2	33.1
Drugs and medicines: Insecticides, and fungicides, and industrial and household chemical compounds not elsewhere classified.....	1, 688	1, 586	21, 802	28, 417	12.9	131.8	107.8	138.8
Theatrical scenery and stage equipment.....	7	50	88	397	12.6	73.8	78.6	62.7
Foundry supplies.....	41	51	507	466	12.4	116.1	116.9	73.4
Printing and publishing, newspaper and periodical.....	8, 175	9, 244	101, 001	135, 215	12.4	93.5	91.1	117.7
Brooms.....	431	289	5, 273	4, 067	12.2	85.2	91.8	115.6
China firing, and decorating, not done in potteries.....	21	16	255	306	12.1	68.6	96.7	157.9
Card cutting and designing.....	41	77	489	3, 315	11.9	149.6	280.7	362.2
Ice, manufactured <sup>19</sup> .....	2, 055	3, 847	22, 269	18, 705	10.8	111.1	72.2	45.4
Saddlery, harness and whips.....	1, 220	139	13, 081	3, 049	10.7	94.4	118.7	204.7
Liquors, vinous.....	209	337	2, 202	3, 005	10.5	45.7	74.3	84.8
Perfumes, cosmetics, and other toilet preparations <sup>20</sup> .....	276	478	2, 781	10, 158	10.1	128.7	159.4	210.9

<sup>18</sup> Statistics for 1914 and 1919 are not strictly comparable with those for later years for the reason that establishments engaged primarily in the manufacture of aircraft parts, other than engines and tires, were classified with the aircraft industry beginning with 1921, while, at earlier censuses, only establishments manufacturing complete aircraft were classified in this industry.

<sup>19</sup> Manufacturers were requested to report only wage earners employed in factory operations; but it was evident that in some cases employees engaged in delivery service were included in the figures for 1914 and 1919.

<sup>20</sup> Owing to a change in classification, figures for 1937 are not strictly comparable with those for earlier years. Only a few establishments were involved in the change.

## Basic Data for 204 Selected Industries, 1914-37—Continued

Industries	Establishments		Wage earners		Wage earners per establishment			
	1914	1937	1914	1937	Average number 1914	Index, 1914=100		
						1919	1929	1937
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sheet-metal work, not specifically classified.....	2, 776	1, 392	26, 795	22, 973	9. 7	79. 4	136. 1	170. 1
Models and patterns, not including paper patterns.....	420	594	3, 876	5, 728	9. 2	103. 3	91. 3	104. 3
Engraving (other than steel, copperplate or wood), chasing, etching, and die-sinking.....	138	77	1, 249	2, 152	9. 1	91. 2	130. 8	306. 6
Electroplating.....	257	547	2, 258	8, 256	8. 8	87. 5	128. 1	171. 6
Hair work.....	123	35	1, 086	434	8. 8	87. 5	69. 3	140. 9
Hand stamps and stencils and brands.....	193	266	1, 593	2, 375	8. 3	102. 4	107. 2	107. 2
Bluing.....	29	14	220	67	7. 6	109. 2	69. 7	63. 2
Concrete products.....	1, 063	1, 382	7, 542	12, 840	7. 1	81. 7	95. 8	131. 0
Gold, silver, and platinum, refining and alloying.....	66	65	454	1, 085	6. 9	123. 2	195. 7	242. 0
Bread and other bakery products.....	17, 549	17, 193	118, 246	239, 388	6. 7	95. 5	144. 8	207. 5
Sausage, meat puddings, headcheese, etc., not made in meat-packing establishments.....	404	817	2, 538	10, 217	6. 3	100. 0	138. 1	198. 4
Cleaning and polishing preparations.....	188	363	1, 139	3, 341	6. 1	106. 6	103. 3	150. 8
Oils, essential.....	34	13	188	195	5. 5	120. 0	218. 2	272. 7
Vinegar and cider.....	191	117	1, 004	974	5. 3	107. 5	107. 5	156. 6
Flour and other grain-mill products.....	8, 912	2, 238	38, 757	26, 390	4. 3	114. 0	155. 8	274. 4
Butter.....	4, 107	3, 716	14, 025	19, 437	3. 4	141. 2	158. 8	152. 9
Cheese.....	2, 785	2, 567	2, 776	4, 482	1. 0	120. 0	120. 6	170. 0

## APPENDIX B

### THE ABSOLUTE INDEX AND THE PROPORTIONATE INDEX FOR EACH INDUSTRY ANALYZED, 1914-37

Industries	Absolute index							Proportionate index						
	1914	1919	1921	1923	1929	1935	1937	1914	1919	1921	1923	1929	1935	1937
<b>FOOD, AND KINDRED PRODUCTS GROUP</b>														
Bread and other bakery products.....	100	145	155	154	112	130	138	100	179	179	163	133	141	133
Butter.....	100	162	154	-----	96	94	87	100	145	130	-----	79	79	79
Canned and cured fish, crabs, shrimps, oysters, and clams.....	100	78	97	86	90	136	100	100	100	92	92	92	110	92
Canned and dried fruits and vegetables; canned and bottled juices; preserves, jellies, fruit butters, pickles, and sauces.....	100	81	109	92	84	89	75	100	105	92	100	112	108	92
Chewing gum; confectionery; and ice cream.....	100	85	69	76	78	110	102	100	136	100	113	122	125	129
Chocolate and cocoa products, not including confectionery.....	100	75	60	60	100	150	150	100	106	97	102	173	195	176
Condensed and evaporated milk.....	100	39	43	-----	37	41	35	100	79	83	-----	100	100	107
Corn sirup, corn sugar, corn oil, and starch.....	100	133	133	133	100	133	133	100	83	51	49	44	58	44
Flour and other grain-mill products.....	100	178	201	252	385	439	408	100	188	146	150	177	109	103
Ice, manufactured.....	100	97	82	60	45	45	41	100	115	107	94	88	88	79
Liquors, vinous.....	100	143	1,000	1,000	500	43	34	100	137	345	185	58	66	56
Meat packing, wholesale.....	100	110	79	82	59	58	50	100	113	75	90	60	55	45
Oleomargarine (margarine), not made in meat-packing establishments.....	100	40	40	50	50	67	67	100	100	109	92	120	57	63
Rice cleaning and polishing.....	100	68	81	72	87	81	81	100	96	105	85	88	92	85
Sausage, meat puddings, head-cheese, etc., not made in meat-packing establishments.....	100	104	98	113	79	54	-----	100	142	130	141	134	108	-----
Sugar, beet.....	100	54	61	54	58	50	47	100	74	92	74	79	64	68
Sugar, cane, not including products of refineries.....	100	123	46	90	193	135	159	100	123	36	64	80	59	67
Sugar refining, cane.....	100	71	83	83	71	83	83	100	80	93	93	85	85	108
Vinegar and cider.....	100	88	117	122	100	165	122	100	155	136	125	94	107	75
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>														
Asphalted-felt-base floor covering; linoleum.....	100	100	100	100	100	150	150	100	121	106	89	121	131	131
Bags, other than paper.....	100	83	79	75	60	-----	54	100	149	118	108	108	-----	87
Carpets and rugs, wool (other than rag).....	100	100	167	125	125	-----	167	100	76	124	102	87	-----	95
Clothing, leather and sheep-lined; clothing, men's, youths', and boys' not elsewhere classified; clothing, work, and sports garments, except leather; trousers, wash suits, and washable service apparel.....	100	82	-----	-----	103	-----	89	100	102	-----	-----	111	-----	71
Clothing, women's misses', and children's, not elsewhere classified.....	100	66	66	70	62	-----	73	100	100	100	100	108	-----	93
Cordage and twine.....	100	70	64	50	47	-----	54	100	83	76	59	59	-----	65
Corsets and allied garments.....	100	57	57	42	35	-----	36	100	76	78	72	57	-----	63
Cotton woven goods (over 12 inches in width); cotton yarn and thread.....	100	94	94	84	81	-----	92	100	108	108	100	93	-----	87
Fish nets and seines.....	100	100	100	100	100	-----	200	100	150	138	150	164	-----	164
Flags, banners, regalia, vestments, robes, and related products.....	100	100	113	129	113	-----	69	100	107	107	122	102	-----	56
Hat and cap materials, men's.....	100	100	50	67	40	-----	40	100	149	67	90	58	-----	35
Hats, fur-felt.....	100	150	171	200	200	-----	150	100	127	144	176	171	-----	114
Jute goods.....	100	50	100	50	50	-----	13	100	38	71	30	30	-----	14
Knit goods: Hosiery; knitted cloth; knitted underwear; knitted outerwear; knitted gloves and mittens.....	100	79	68	61	74	83	77	100	106	99	99	98	108	99

*The Absolute Index and the Proportionate Index for Each Industry Analyzed, 1914-37—Continued*

Industries	Absolute index						Proportionate index							
	1914	1919	1921	1923	1929	1935	1937	1914	1919	1921	1923	1929	1935	1937
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>														
Lace goods.....	100	100	100	100	83	71	71	100	100	100	100	83	71	71
Linen goods.....	100	100	100	67	67	---	200	100	50	77	59	53	---	120
Oilcloth.....	100	100	100	100	100	---	200	100	83	75	68	68	---	115
Woolen woven goods, including woolen felts; and woolen yarns.....	100	84	92	94	113	---	127	100	100	100	106	119	---	106
Wool scouring.....	100	100	100	100	100	---	150	100	138	100	108	93	---	130
Wool combing; worsted woven goods; and worsted yarn.....	100	96	93	90	113	---	96	100	95	101	104	101	---	84
<b>FOREST PRODUCTS GROUP</b>														
Baskets and rattan and willow ware, not including furniture.....	100	150	136	111	83	103	120	100	160	145	123	123	114	123
Boxes, cigar, wooden and part wooden.....	100	113	108	100	173	289	260	100	107	107	100	115	115	107
Boxes, wooden, except cigar boxes.....	100	87	89	99	109	128	133	100	100	92	100	100	100	100
Caskets, coffins, burial cases, and other morticians' goods.....	100	86	79	82	66	61	54	100	109	100	100	109	129	109
Cooperage.....	100	123	137	140	159	211	257	100	121	101	104	111	101	121
Cork products.....	100	100	100	100	100	100	100	100	140	115	100	90	88	90
Furniture, including store and office fixtures.....	100	104	93	89	89	116	98	100	106	101	100	119	125	108
Lasts and related products.....	100	91	77	77	77	91	67	100	89	89	85	77	74	55
Lumber and timber products not elsewhere classified.....	100	95	128	120	137	188	147	100	132	100	96	150	96	96
Matches.....	100	67	67	50	67	33	50	100	73	78	61	78	44	69
Mirror and picture frames.....	100	124	---	131	117	131	162	100	133	---	107	77	81	96
Planing-mill products and other wooden products not elsewhere classified, made in planing mills not connected with sawmills.....	100	126	110	116	115	191	195	100	126	110	110	126	118	126
Window and door screens and weather strip.....	100	78	54	64	41	64	64	100	88	63	78	85	67	68
Wood preserving.....	100	88	82	67	44	40	39	100	95	95	105	131	111	117
Wood turned and shaped and other wooden goods, not elsewhere clas- sified.....	100	90	91	84	69	107	85	100	98	101	96	96	123	98
<b>PAPER AND ALLIED PRODUCTS GROUP</b>														
Bags, paper, exclusive of those made in paper mills.....	100	80	80	80	53	50	48	100	107	83	94	94	100	94
Boxes, paper, not elsewhere classi- fied.....	100	97	87	87	74	89	77	100	117	108	117	100	117	100
Cardboard, not made in paper mills.....	100	100	100	100	200	100	67	100	85	110	85	143	85	58
Card cutting and designing.....	100	63	63	83	56	83	71	100	92	75	92	92	152	132
Envelopes.....	100	87	78	72	67	59	59	100	107	107	107	115	115	107
Wallpaper.....	100	129	150	113	90	129	113	100	127	136	119	106	106	100
<b>PRINTING, PUBLISHING, AND ALLIED INDUSTRIES GROUP</b>														
Bookbinding and blank-book mak- ing.....	100	107	84	95	89	113	126	100	127	100	127	135	159	172
Engraving (other than steel, copper- plate, or wood), chasing, etching, and die sinking.....	100	383	128	256	460	1150	2300	100	607	183	395	654	850	1308
Engraving, steel, copperplate, and wood, and plate printing.....	100	86	67	64	90	78	75	100	107	91	90	154	107	115
Lithographing.....	100	104	87	82	71	66	51	100	106	95	95	95	86	99
Photoengraving, not done in print- ing establishments.....	100	92	78	80	49	56	71	100	107	100	107	100	115	136
Printing and publishing, book, mus- ic, and job.....	100	85	82	---	75	94	98	100	112	119	---	139	149	152
Printing and publishing, news- paper and periodical.....	100	118	122	---	131	173	172	100	143	154	---	182	191	191
Stereotyping and electrotyping, not done in printing establishments.....	100	123	131	119	141	146	123	100	116	122	122	183	169	157
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>														
Ammunition and related products, fireworks and allied products.....	100	50	50	50	33	33	33	100	67	52	52	38	35	35
Blacking, stains, and dressings.....	100	67	44	80	80	40	57	100	94	60	107	107	62	65
Bluing.....	100	67	100	133	133	133	133	100	100	117	117	93	70	67

The Absolute Index and the Proportionate Index for Each Industry Analyzed,  
1914-37—Continued

Industries	Absolute index						Proportionate index							
	1914	1919	1921	1923	1929	1935	1937	1914	1919	1921	1923	1929	1935	1937
<b>CHEMICALS AND ALLIED PRODUCTS GROUPS—continued</b>														
Bone black, carbon black, and lamp-black.....	100	60	43	38	27	27	23	100	87	81	108	93	65	62
Candles.....	100	100	50	50	33	33	33	100	113	71	75	47	55	51
Chemicals not elsewhere classified.....	100	41	53	73	79	73	66	100	86	104	160	196	182	176
Cleaning and polishing preparations.....	100	100	94	133	84	89	114	100	155	139	213	193	185	218
Drug grinding.....	100	100	200	200	100	200	100	100	110	214	183	100	160	81
Drugs and medicines, insecticides, and fungicides, and industrial and household chemical compounds not elsewhere classified.....	100	123	90	85	78	96	104	100	141	97	89	89	91	97
Explosives.....	100	163	108	108	144	163	186	100	176	109	109	126	109	132
Fertilizers.....	100	116	97	100	91	101	87	100	90	76	76	76	90	90
Glue and gelatin.....	100	150	120	120	86	75	86	100	183	113	130	136	113	140
Grease and tallow, not including lubricating greases.....	100	117	117	117	81	81	70	100	164	109	104	84	74	67
Ink, printing.....	100	117	88	88	58	41	37	100	157	134	135	134	123	110
Ink, writing.....	100	100	200	100	200	200	200	100	117	233	117	233	140	117
Oil, cake, and meal, cottonseed.....	100	157	164	193	149	198	226	100	126	114	109	92	104	114
Oil, cake, and meal, linseed.....	100	83	100	100	100	167	125	100	91	117	140	124	175	124
Oils, essential.....	100	150	100	150	300	100	150	100	205	80	73	196	35	59
Paints, pigments, and varnishes.....	100	94	75	78	61	70	64	100	101	84	90	90	105	100
Perfumes, cosmetics, and other toilet preparations.....	100	132	138	152	112	126	138	100	204	220	268	344	220	250
Salt.....	100	100	109	109	120	109	120	100	100	114	107	94	70	73
Soap.....	100	129	113	113	129	100	113	100	124	111	103	124	82	91
Tanning materials, natural dye-stuffs, mordants and assistants, and sizes.....	100	87	81	76	81	81	81	100	109	92	86	92	120	120
Wood distillation and charcoal manufacture.....	100	105	111	111	200	286	250	100	136	112	127	173	158	146
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>														
Fuel briquets.....	100	67	200	50	50	50	50	100	74	286	74	118	125	105
Petroleum refining.....	100	69	60	70	47	41	43	190	124	124	150	104	91	88
<b>RUBBER PRODUCTS GROUP</b>														
Boots and shoes, rubber.....	100	80	80	80	80	200	200	100	85	81	85	74	100	100
Rubber tires and inner tubes; other rubber goods, except boots and shoes.....	100	127	82	100	127	127	78	100	192	133	171	218	200	123
<b>LEATHER AND ITS MANUFACTURES GROUP</b>														
Belting and packing, leather.....	100	42	56	56	42	63	71	100	49	65	68	62	84	95
Boot and shoe cut stock and findings.....	100	85	93	100	93	91	91	100	105	108	119	111	92	86
Boots and shoes, other than rubber.....	100	92	87	80	91	96	75	100	110	110	110	100	85	68
Gloves and mittens, leather.....	100	76	91	93	97	121	104	100	83	83	83	83	91	77
Handbags and purses, women's; small leather articles; leather goods not elsewhere classified.....	100	61	60	52	58	59	62	100	91	100	100	110	119	103
Leather: Tanned, curried and finished.....	100	124	111	109	135	174	126	100	122	100	100	100	100	79
Saddlery, harness, and whips.....	100	140	160	169	264	508	440	100	123	75	67	58	65	49
Trunks, suitcases, brief cases, bags, and other luggage.....	100	113	100	95	106	138	133	100	135	124	117	121	104	91
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>														
Asbestos products other than steam packing and pipe and boiler covering.....	100	50	40	67	33	40	33	100	94	70	161	97	126	106
Cement.....	100	122	97	97	74	68	68	100	116	96	100	100	81	88
China firing and decorating, not done in potteries.....	100	80	80	80	100	200	200	100	106	127	127	127	173	146
Clay products, other than pottery; nonclay refractories.....	100	101	110	106	124	193	162	100	93	93	93	100	93	87
Concrete products.....	100	96	109	170	59	85	73	100	115	115	176	136	94	94
Glass.....	100	103	122	124	148	207	207	100	113	113	120	113	129	138
Lime.....	100	81	85	83	111	122	111	100	80	75	75	80	71	71

The Absolute Index and the Proportionate Index for Each Industry Analyzed,  
1914-37—Continued

Industries	Absolute index						Proportionate index							
	1914	1919	1921	1923	1929	1935	1937	1914	1919	1921	1923	1929	1935	1937
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP—continued</b>														
Marble, granite, slate, and other stone, cut and shaped.....	100	93	108	116	138	187	169	100	92	95	94	78	79	72
Mirrors and other glass products made of purchased glass.....	100	107	101	111	130	438	354	100	115	107	115	155	385	306
Pottery, including porcelain ware.....	100	83	83	72	89	122	106	100	93	93	93	117	127	117
Sand-lime brick.....	100	138	157	138	122	275	220	100	108	104	108	122	140	127
Statuary and art goods (except concrete), factory production.....	100	92	85	55	50	73	69	100	100	98	70	70	65	58
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>														
Blast-furnace products.....	100	67	153	100	138	161	153	100	86	129	106	90	72	82
Bolts, nuts, washers, and rivets, made in plants not operated in connection with rolling mills.....	100	83	91	83	111	83	83	100	115	114	105	130	114	115
Cast-iron pipe and fittings.....	100	100	100	92	92	86	80	100	105	124	117	117	105	105
Cutlery (not including silver and plated cutlery) and edge tools.....	100	85	100	100	100	89	94	100	124	115	115	131	129	129
Doors, shutters, and window sash and frames, molding, and trim, metal.....	100	80	80	80	36	44	31	100	107	91	71	135	149	119
Files.....	100	100	100	100	100	100	150	100	135	114	109	97	63	93
Firearms.....	100	133	133	100	133	200	200	100	121	113	89	121	187	179
Forgings, iron and steel, made in plants not operated in connection with steel works or rolling mills.....	100	89	133	141	104	120	104	100	118	183	186	118	118	108
Galvanizing and other coating, done in plants not operated in connection with rolling mills.....	100	100	25	29	20	33	22	100	117	30	34	32	52	34
Hardware not elsewhere classified.....	100	95	140	117	124	162	131	100	100	133	116	126	138	119
Heating and cooking apparatus, except electric.....	100	141	116	97	91	104	97	100	147	117	103	100	112	104
Nails, spikes, etc., not made in wire mills or in plants operated in connection with rolling mills.....	100	120	120	100	75	150	150	100	127	112	102	67	108	105
Saws.....	100	50	50	50	50	50	50	100	67	56	56	56	58	56
Screw-machine products and wood screws.....	100	43	50	33	19	17	16	100	90	119	91	73	72	70
Stamped and pressed metal products; enameling, japanning, and lacquering.....	100	100	74	85	47	47	40	100	131	96	117	92	110	100
Steel-works and rolling-mill products.....	100	90	108	90	106	143	136	100	109	121	100	120	129	126
Structural and ornamental metal work, made in plants not operated in connection with rolling mills.....	100	109	90	92	69	120	88	100	109	88	94	97	129	97
Tin cans and other tinware not elsewhere classified.....	100	62	81	87	84	104	96	100	67	77	83	77	83	83
Wire drawn from purchased rods.....	100	67	67	60	60	40	40	100	79	73	69	92	65	69
Wirework not elsewhere classified.....	100	135	115	124	119	124	103	100	157	131	152	177	131	160
Wrought pipe, welded and heavy riveted, made in plants not operated in connection with rolling mills.....	100	100	100	100	80	67	67	100	146	171	160	120	92	109
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>														
Aluminum products.....	100	17	25	17	14	17	20	100	44	72	66	70	94	100
Electroplating.....	100	81	73	74	85	90	82	100	122	110	129	183	200	183
Fire extinguishers, chemical.....	100	50	33	100	50	50	50	100	87	69	176	94	84	84
Gold leaf and foil.....	100	117	117	175	175	350	350	100	139	133	175	208	149	143
Gold, silver, and platinum, refining and alloying.....	100	100	100	100	133	133	133	100	115	117	115	142	179	133
Jewelers' findings and materials; jewelry.....	100	111	97	110	149	255	234	100	143	125	138	175	212	190
Lighting equipment.....	100	112	116	91	91	145	132	100	102	106	95	110	142	121
Needles, pins, hooks and eyes, and slide and snap fasteners.....	100	57	67	100	100	200	133	100	112	106	113	100	233	16
Nonferrous-metal alloys; nonferrous-metal products, except aluminum, not elsewhere classified.....	100	100	100	92	89	100	89	100	123	113	115	118	118	108

*The Absolute Index and the Proportionate Index for Each Industry Analyzed, 1914-37—Continued*

Industries	Absolute index						Proportionate index							
	1914	1919	1921	1923	1929	1935	1937	1914	1919	1921	1923	1929	1935	1937
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP—continued</b>														
Sheet-metal work, not specifically classified.....	100	96	99	155	175	254	259	100	120	110	138	133	125	126
Silverware and plated ware.....	100	122	110	92	100	183	183	100	121	115	103	111	158	155
Smelting and refining, copper.....	100	117	117	87	117	175	140	100	106	86	68	83	95	86
Smelting and refining, lead.....	100	100	100	100	100	120	150	100	121	112	97	91	94	104
Smelting and refining, nonferrous metals other than gold, silver, and platinum, not from the ore.....	100	44	67	100	44	36	33	100	48	53	54	62	48	44
Smelting and refining, zinc.....	100	83	125	83	83	125	100	100	120	129	106	90	120	90
Watchcases.....	100	100	100	100	150	150	100	100	124	148	226	240	174	120
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT, GROUP</b>														
Agricultural implements (including tractors); engines, turbines, water wheels, and windmills.....	100	121	158	195	205	315	293	100	114	126	136	126	148	140
Electrical machinery, apparatus, and supplies; radios, radio tubes, and phonographs.....	100	52	77	50	40	37	33	100	86	127	100	83	66	58
Scales and balances.....	100	150	200	150	120	120	120	100	154	191	142	104	99	100
Sewing machines and attachments.....	100	100	-----	-----	100	50	50	100	96	-----	-----	112	57	52
Washing machines, wringers, driers, and ironing machines, for household use.....	100	43	43	50	75	100	75	100	59	60	62	71	60	44
<b>TRANSPORTATION EQUIPMENT, AIR, LAND, AND WATER, GROUP</b>														
Aircraft and parts.....	100	67	67	50	22	40	40	100	170	122	142	250	270	315
Cars, electric and steam railroad, not built in railroad repair shops.....	100	83	67	71	77	77	77	100	77	65	85	97	98	101
Locomotives, railroad, mining, and industrial, not made in railroad repair shops.....	100	200	100	200	200	100	200	100	186	120	208	174	79	143
Motorcycles, bicycles, and parts.....	100	100	100	100	150	75	60	100	81	83	70	57	32	32
Motor-vehicle bodies and motor-vehicle parts <sup>1</sup> .....	100	77	55	91	97	-----	-----	100	217	139	244	144	-----	-----
Motor vehicles, not including motorcycles <sup>1</sup> .....	100	88	100	100	64	-----	-----	100	92	133	120	53	-----	-----
					64	78	78					46	32	35
<b>TRANSPORTATION EQUIPMENT, AIR, LAND, AND WATER, GROUP</b>														
Ship and boat building, steel and wooden, including repair work.....	100	47	82	60	43	100	82	100	63	88	58	44	94	75
<b>MISCELLANEOUS INDUSTRIES GROUP</b>														
Artificial and preserved flowers and plants.....	100	96	96	105	96	105	129	100	117	127	149	117	127	156
Artists' materials; pencils, lead (including mechanical), and crayons.....	100	67	67	67	40	40	50	100	79	102	119	94	83	94
Brooms.....	100	74	90	100	118	121	144	100	110	100	110	115	100	100
Brushes, other than rubber.....	100	100	131	113	106	113	113	100	116	136	131	121	107	103
Buttons.....	100	112	97	115	141	146	131	100	141	100	112	100	125	110
Carriages and sleds, children's.....	100	90	100	129	150	180	113	100	100	120	171	158	132	80
Cigarettes; cigars.....	100	96	108	115	295	565	520	100	103	110	97	118	107	94
Coats, hats, plumes, and manufactures thereof.....	100	96	169	135	270	225	245	100	100	117	93	54	88	78
Foundry supplies.....	100	43	60	33	38	50	43	100	64	70	50	50	54	50
Furs, dressed and dyed.....	100	45	36	31	25	42	42	100	84	65	141	88	99	72
Hair work.....	100	131	175	210	210	-----	420	100	142	181	193	100	-----	121
Hand stamps and stencils and brands.....	100	117	122	133	104	104	93	100	153	153	183	185	155	136
Lapidary work.....	100	30	25	23	30	60	43	100	70	37	47	70	84	50
Models and patterns, not including paper patterns.....	100	81	65	76	61	82	77	100	142	100	121	113	113	106
Musical-instrument parts and materials, piano and organ.....	100	108	117	117	175	467	350	100	100	92	100	100	136	92
Musical instruments and parts and materials, not elsewhere classified.....	100	114	160	133	100	114	133	100	169	216	163	124	126	129

<sup>1</sup> Due to Census revisions in the composition of the industry after 1929, the index number for 1929 has been calculated on two bases, the first comparable with earlier years and the second comparable with later years. The change is so small that the picture is not materially affected by it.

*The Absolute Index and the Proportionate Index for Each Industry Analyzed, 1914-37—Continued*

Industries	Absolute index						Proportionate index							
	1914	1919	1921	1923	1929	1935	1937	1914	1919	1921	1923	1929	1935	1937
<b>MISCELLANEOUS INDUSTRIES GROUP—continued</b>														
Musical instruments:														
Organs.....	100	75	120	86	120	200	200	100	64	93	69	103	75	94
Pianos.....	100	115	120	150	333	750	750	100	86	86	92	109	109	109
Pens, fountain and stylographic; pen points, gold, steel, and brass..	100	100	75	75	75	100	100	100	112	80	87	91	81	68
Pipes (tobacco).....	100	100	100	150	150	75	100	100	143	120	149	120	71	83
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint.....	100	92	109	109	71	86	75	100	101	109	94	50	65	61
Signs and advertising novelties.....	100	100	70	74	32	40	26	100	124	98	108	93	98	60
Soda fountains and related products.....	100	150	100	100	100	100	100	100	158	108	116	93	83	88
Sporting and athletic goods, not including firearms or ammunition.....	100	63	50	45	29	36	29	100	83	74	75	70	69	59
Surgical and orthopedic appliances and related products.....	100	100	67	80	40	57	50	100	154	100	118	71	87	80
Tobacco (chewing and smoking) and snuff.....	100	71	56	42	83	83	83	100	80	60	41	62	46	50
Toys (not including children's wheel goods or sleds), games, and playground equipment.....	100	54	58	54	51	84	72	100	109	101	105	116	154	119
Umbrellas, parasols, and canes.....	100	138	79	85	110	157	157	100	108	62	80	79	67	65
Window shades (textile and paper) and fixtures.....	100	16	100	100	44	70	78	100	218	128	161	112	119	123
Wool pulling.....	100	117	140	140	233	175	175	100	84	91	111	124	87	100

## APPENDIX C

### DISTRIBUTION OF INDUSTRIES BY AVERAGE NUMBER OF WAGE EARNERS EMPLOYED, 1914-37

#### GROUP I. INDUSTRIES EMPLOYING AN AVERAGE OF MORE THAN 100,000 WAGE EARNERS, 1914-37

Boots and shoes, other than rubber.  
Bread and other bakery products.  
Cigarettes; cigars.  
Clothing, leather and sheep-lined; clothing, men's, youths', and boys', not elsewhere classified; clothing, work and sports garments, except leather; trousers, wash suits, and washable service apparel.  
Clothing, women's, misses', and children's, not elsewhere classified.  
Cotton woven goods (over 12 inches in width); cotton yarn and thread.  
Electrical machinery, apparatus, and supplies; radios, radio tubes, and phonographs.  
Furniture, including store and office fixtures.  
Knit goods: hosiery; knitted cloth; knitted underwear; knitted outerwear; knitted gloves and mittens.  
Lumber and timber products not elsewhere classified.  
Motor-vehicle bodies and motor-vehicle parts.  
Meat packing, wholesale.  
Motor vehicles, not including motorcycles.  
Printing and publishing, book, music, and job.  
Printing and publishing, newspaper and periodical.  
Rubber tires and inner tubes; other rubber goods, except boots and shoes.  
Ship and boat building, steel and wooden, including repair work.  
Steel-works and rolling-mill products.  
Wool combing; worsted woven goods; and worsted yarn.

#### GROUP II. INDUSTRIES EMPLOYING AN AVERAGE OF 25,000 TO 100,000 WAGE EARNERS, 1914-37

Agricultural implements (including tractors); engines, turbines, water wheels, and windmills.  
Blast-furnace products.  
Boxes, paper, not elsewhere classified.  
Boxes, wooden, except cigar boxes.  
Canned and dried fruits and vegetables; canned and bottled juices; preserves, jellies, fruit butters, pickles, and sauces.  
Carpets and rugs, wool (other than rag).  
Cars, electric and steam railroad, not built in railroad repair shops.  
Cement.  
Chemicals not elsewhere classified.  
Chewing gum; confectionery; and ice cream.  
Clay products, other than pottery; nonclay refractories.  
Drugs and medicines; insecticides, and fungicides, and industrial and household chemical compounds not elsewhere classified.  
Flour and other grain-mill products.  
Glass.  
Hardware not elsewhere classified.  
Heating and cooking apparatus, except electric.  
Jewelers' findings and materials; jewelry.  
Leather: Tanned, curried, and finished.  
Marble, granite, slate, and other stone, cut and shaped.  
Nonferrous-metal alloys; nonferrous-metal products, except aluminum, not elsewhere classified.

Petroleum refining.

Planing-mill products and other wooden products not elsewhere classified, made in planing-mills not connected with sawmills.

Pottery, including porcelain ware.

Sheet metal work, not specifically classified.

Stamped and pressed metal products; enameling, japanning, and lacquering.

Structural and ornamental metal work, made in plants not operated in connection with rolling mills.

Tin cans and other tinware not elsewhere classified.

Woolen woven goods, including woven felts; and woolen yarns.

GROUP III. INDUSTRIES EMPLOYING AN AVERAGE OF 5,000 TO 25,000 WAGE EARNERS, 1914-37

Aircraft and parts.

Aluminum products.

Ammunition and related products; fireworks and allied products.

Artists' materials; pencils, lead (including mechanical), and crayons.

Asbestos products other than steam packing and pipe and boiler covering.

Asphalted-felt-base floor covering; linoleum.

Bags, other than paper.

Bags, paper, exclusive of those made in paper mills.

Baskets and rattan and willowware, not including furniture.

Bolts, nuts, washers, and rivets, made in plants not operated in connection with rolling mills.

Bookbinding and blankbook making.

Boot and shoe cut stock and findings.

Boots and shoes, other than rubber.

Brushes, other than rubber.

Butter.

Buttons.

Canned and cured fish, crabs, shrimps, oysters, and clams.

Carriages and sleds, children's.

Caskets, coffins, burial cases, and other morticians' goods.

Cast-iron pipe and fittings.

Chocolate and cocoa products, not including confectionery.

Concrete products.

Condensed and evaporated milk.

Cooperage.

Cordage and twine.

Corn sirup, corn sugar, corn oil, and starch.

Corsets and allied garments.

Cutlery (not including silver and plated cutlery) and edge tools.

Engraving, steel, copperplate, and wood, and plate printing.

Envelopes.

Explosives.

Fertilizers.

Firearms.

Forgings, iron and steel, made in plants not operated in connection with steel-works or rolling mills.

Gloves and mittens, leather.

Grease and tallow, not including lubricating greases.

Handbags and purses, women's; small leather articles; leather goods not elsewhere classified.

Hats, fur-felt.

Ice, manufactured.

Jute goods.

Lace goods.

Lighting equipment.

Lime.

Lithographing.

Locomotives, railroad, mining, and industrial, not made in railroad repair shops

Mirrors and other glass products made from purchased glass.

Models and patterns, not including paper patterns.

Motorcycles, bicycles, and parts.

Musical-instrument parts and materials: Piano and organ.

Musical instruments: Pianos.

Needles, pins, hooks and eyes, and slide and snap fasteners.

Oil, cake, and meal, cottonseed.  
 Paints, pigments and varnishes.  
 Perfumes, cosmetics, and other toilet preparations.  
 Photoengraving, not done in printing establishments.  
 Roofing, built-up and roll; asphalt shingles; roof coatings other than paint.  
 Salt.  
 Sausage, meat puddings, headcheese, etc., not made in meat-packing establishments.  
 Screw-machine products and wood screws.  
 Sewing machines and attachments.  
 Signs and advertising novelties.  
 Silverware and plated ware.  
 Smelting and refining, copper.  
 Smelting and refining, lead.  
 Smelting and refining, zinc.  
 Soap.  
 Sporting and athletic goods, not including firearms and ammunition.  
 Sugar, beet.  
 Sugar refining, cane.  
 Surgical and orthopedic appliances and related products.  
 Tobacco (chewing and smoking) and snuff.  
 Toys (not including children's wheel goods and sleds), games, and playground equipment.  
 Trunks, suitcases, briefcases, bags, and other luggage.  
 Washing machines, wringers, driers, and ironing machines, for household use.  
 Wire drawn from purchased rods.  
 Wirework not elsewhere classified.  
 Wood preserving.  
 Wood turned and shaped and other wooden goods, not elsewhere classified.  
 Wrought pipe, welded and heavy riveted, made in plants not operated in connection with rolling mills.

GROUP IV. INDUSTRIES EMPLOYING AN AVERAGE OF UNDER 5,000 WAGE EARNERS,  
 1914-37

Artificial and preserved flowers and plants.  
 Baking powder, yeast, and other leavening compounds.  
 Belting and packing, leather.  
 Blacking, stains, and dressings.  
 Bluing.  
 Bone black, carbon black, and lampblack.  
 Boxes, cigar, wooden and part wooden.  
 Brooms.  
 Candles.  
 Cardboard, not made in paper mills.  
 Card cutting and designing.  
 China firing and decorating, not done in potteries.  
 Cleaning and polishing preparations.  
 Cork products.  
 Doors, shutters, and window sash and frames, molding and trim, metal.  
 Drug grinding.  
 Electroplating.  
 Engraving (other than steel, copperplate, or wood), chasing, etching, and die-sinking.  
 Feathers, plumes, and manufactures thereof.  
 Files.  
 Fire extinguishers, chemical.  
 Fish nets and seines.  
 Flags, banners, regalia, vestments, robes, and related products.  
 Foundry supplies.  
 Fuel briquettes.  
 Furs, dressed and dyed.  
 Galvanizing and other coating, done in plants not operated in connection with rolling mills.  
 Glue and gelatin.  
 Gold leaf and foil.  
 Gold, silver, and platinum, refining and alloying.  
 Hair work.

Hand stamps and stencils and brands.  
Hat and cap materials, men's.  
Ink, printing.  
Ink, writing.  
Lapidary work.  
Lasts and related products.  
Linen goods.  
Liquors, vinous.  
Matches.  
Mirror and picture frames.  
Musical instruments and parts and materials, not elsewhere classified.  
Musical instruments: Organs.  
Nails, spikes, etc., not made in wire mills or in plants operated in connection with rolling mills.  
Oil, cake, and meal, linseed.  
Oilcloth.  
Oils, essential.  
Oleomargarine (margarine), not made in meat-packing establishments.  
Pipes (tobacco).  
Pens, fountain and stylographic; pen points, gold, steel, and brass.  
Rice cleaning and polishing.  
Saddlery, harness, and whips.  
Sand-lime brick.  
Saws.  
Scales and balances.  
Smelting and refining, nonferrous metals other than gold, silver, and platinum, not from the ore.  
Soda fountains and related products.  
Statuary and art goods (except concrete), factory production.  
Stereotyping and electrotyping, not done in printing establishments.  
Sugar, cane, not including products of refineries.  
Tanning materials, natural dyestuffs, mordants and assistants, and sizes.  
Umbrellas, parasols, and canes.  
Vinegar and cider.  
Wallpaper.  
Watchcases.  
Window and door screens and weather strip.  
Window shades (textile and paper) and fixtures.  
Wood distillation and charcoal manufacture.  
Wool pulling.  
Wool scouring.



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PART II

**THE INTEGRATION OF MANUFACTURING  
OPERATIONS**

BY  
**WALTER F. CROWDER**

Assisted by  
K. Celeste Stokes



# THE INTEGRATION OF MANUFACTURING OPERATIONS

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# THE INTEGRATION OF MANUFACTURING OPERATIONS<sup>1</sup>

## CHAPTER I

### THE SCOPE OF THE STUDY

The extremely complex and interrelated nature of the economic system makes it imperative in any formulation of wise social policy that all pertinent information be brought before those groups entrusted with the final decisions on matters of policy. In no segment of our economic and political life is this need more evident than in all those social and economic problems which are related to the concentration of control of industrial operations. Such problems might run in terms of the control exercised over industrial operations by various types of combinations and in terms of the effect of this control over the supply of products in the market. It is the purpose of this study to present an over-all picture of the structure of manufacturing operations and to appraise the significance and extent of operating combinations in various industries. In corollary studies the analysis is carried a step further and an answer is supplied to the question: To what extent is the supply of the various individual manufactured commodities controlled by leading producers?

The problem of measuring the extent and the nature of combinations among manufacturing enterprises and of appraising the structure of manufacturing operations might be approached from any one of its numerous aspects. One might study the financial relations and lines of control among manufacturing enterprises, or one might study the informal and less tangible forms of effecting control such as communities of interest, common banking connections, gentlemen's agreements, etc., or finally, one might study the more objective operating relationships among the establishments. For a complete picture of the control of manufacturing operations, it would be necessary to investigate all these types of control. For the purposes of this study, however, the field of inquiry is limited to the more tangible and objective lines of control as reflected in the "central-office" records of the Bureau of the Census. The structure and control within mining (and other extractive industries) and within distributive operations do not come within the purview of this study. Neither are the interrelations of these lines of activity with manufacturing considered in more than a cursory manner. While this study is thus limited to an analysis of the operating combinations among manufacturing establishments, it, nevertheless, covers the leading single segment of economic activity.<sup>2</sup>

<sup>1</sup> Acknowledgment is made of the substantial contribution of Franklin M. Aaronson at one stage of the work.

<sup>2</sup> In 1937, the income produced in manufacturing accounted for 23.9 percent of the total national income. In this same year wholesale and retail trade accounted for 12.8 percent of the total; agriculture, 9 percent; transportation, 7.1 percent; and mining, 2.1 percent. (See article "National Income in 1939" in Survey of Current Business, June 1940 issue, Bureau of Foreign and Domestic Commerce.)

The basic unit of measurement of the Census of Manufactures is the establishment or plant which is classified in one industry, operates in one locality, and for which a separate set of books or records is kept.<sup>3</sup> In taking the Census of Manufactures, schedules are sent by mail to all individuals or concerns which are believed to be eligible for enumeration. Where the office records for an establishment or plant are maintained at an address other than that of the plant or where more than one plant is operated from a single office, the schedules for all plants operated from such an office are mailed to that office. In order to facilitate the sending of inquiries and the collection of data, a separate central-office file is maintained by the Bureau of the Census.

Each schedule that is returned is marked with the identifying number of the central-office group to which it belongs and later in the process of punching cards for machine tabulations the central-office number is punched on the card for each plant. It is thus possible to separate by machine methods independently operated plants from those that are operated as part of a central-office group and to carry out extensive analyses of these central-office groups. The use of machine methods of tabulation greatly reduces the arduousness of the task and makes a more extended analysis possible. As contrasted with the earlier and somewhat similar study of the integration of industrial operations,<sup>4</sup> where the tabulations were made by hand methods, it has been possible by the method outlined above to give a more complete picture of the structure of these central-office groups. Dr. Thorp's study was largely confined to an analysis based on the number of central offices by census industry groups and the number of establishments operated by these central offices. In the present study, which is based on the reports for 1937, it has been possible to cover much the same field of inquiry that was covered in the earlier study which made use of data from the 1919 schedules. In addition it has been possible to extend the analysis to other measures of the significance of central-office operations, i. e., number of wage earners

<sup>3</sup> "As a rule, the term 'establishment' signifies a single plant or factory. In 1937 one report might be counted as one, two, or more establishments, depending on the answer given by the respondent to the question, 'How many plants does this report cover?' The respondent's answer to this question was taken as the number of establishments. The number of establishments for the United States was increased approximately 2,000 by this change in definition of establishments. The change does not materially affect the number of establishments in any particular industry.

<sup>4</sup> As at previous censuses, separate reports were occasionally obtained for different lines of manufacturing activity carried on in the same plant, and in some cases a single report was obtained covering two or more plants operated under a common ownership and located in the same city, or in the same county but in different municipalities or unincorporated places having fewer than 10,000 inhabitants.

<sup>5</sup> "The censuses are confined, in general, to manufacturing industries proper. Data are collected for a few industries, however, whose activities are not manufacturing in the sense in which the term is generally understood, the most important example being printing and publishing. The following classes of establishments were not covered by the 1937 Census of Manufactures:

"(1) Establishments which were idle throughout the year or reported products valued at less than \$5,000.

"(2) Establishments engaged principally in the performance of work for individual customers, such as custom tailor shops, dressmaking and millinery shops, and repair shops. (This does not apply to large establishments manufacturing to fill special orders.)

"(3) Establishments operated in the building industries, other than those manufacturing building materials for the general trade.

"(4) Establishments engaged in the so-called neighborhood industries and hand trades, in which little or no power machinery is used, such as carpentry, blacksmithing, tinsmithing, etc.

"(5) Cotton ginneries.

"(6) Small grain mills (gristmills) engaged exclusively in custom grinding.

"(7) Wholesale and retail stores which incidentally were also engaged in manufacturing on a small scale, particularly where it is impossible to obtain separate data for the manufacturing and for the mercantile operations.

"(8) Educational, eleemosynary, and penal institutions engaged in manufacturing. (Data for the production of binder twine in penal institutions and of brooms in institutions for the blind were, however, collected.)

"(9) Manufactured gas was excluded from the 1937 figures because data covering only the manufacturing or gas could not be satisfactorily obtained.

"(10) Railroad repair shops (both electric and steam) were excluded in 1937 as not being manufacturing." (Census of Manufactures, 1937, pp. 4 and 5.)

<sup>6</sup> See "The Integration of Industrial Operation" by Willard L. Thorp, Bureau of the Census Monograph III, 1924.

and wages paid, cost of materials, value of products, and value added by manufacture. The material has also been broken down by census industries as well as by industry groups.

A central-office group exists, in the meaning employed by the Census, when two or more plants are controlled or operated by one ownership interest.<sup>5</sup> The evidence of control arises out of an avowal and acknowledgment on the part of the ownership interest. The files and records of central-office affiliations are kept up to date in the Bureau of the Census by checking them against the submitted reports of the central offices themselves. Several months before the schedules are mailed to the reporting units a form is sent to all central-office groups that reported in the preceding census. In this questionnaire the central offices are asked to list (1) all the plants under their ownership or control, (2) all the plants over which they have acquired ownership or control since the last census, and the name and address of the seller or lessor, (3) all the plants previously under their ownership or control which they have disposed of or dismantled and the name and address of the purchaser or lessee in case of sale and (4) all the plants owned or controlled by them which were idle during the year. This information is checked against the records and in case of discrepancies the reporting units are further questioned. On the schedules, which must be filled out for each plant, there is a further inquiry relating to the ownership or control of the plant. As a result of this continuous, careful checking the central-office files of the Bureau of the Census present one of the most exhaustive and exact records of avowed and acknowledged control or operating relationship among manufacturing establishments. The more subtle forms of control mentioned previously are, however, not reflected in the central-office records and as a consequence are not covered by this study.

It frequently happens that, when one corporation obtains control over another under the holding company form of organization, the units continue to operate on an independent or semi-independent basis. In the mailing lists of the Bureau of the Census these operating units may continue to report for those plants under their ownership or control but the total operations of the two are brought together under a master number. For example, corporation A buys the stock of corporation B, but corporation B continues to operate as an independent unit. The schedules for the plants under the ownership or control of corporation B may still be sent to corporation B but the central-office number of corporation B is keyed to corporation A so that the manufacturing operations of both concerns are listed under one central-office group. It would be true, of course, that minority interests of corporation A are not reflected in the operations of the group. Only acknowledged ownership or control appears in the record.

Since the inquiries in subsequent chapters relate to operating combinations in terms of specific industries or industry groups, it is necessary to investigate the meaning and nature of an industry. The term "industry" is widely used in common parlance but is extremely difficult to define precisely. From a purely theoretical standpoint an industry may be defined as a group of firms producing the same com-

<sup>5</sup> For administrative purposes in mailing schedules, the Bureau of the Census also employs the central-office technique for those situations in which the office of a concern and a single plant operated by it are located at different addresses. These one-plant central offices are not included in the tabulations of the present study, since the interest here is in multiple-plant groups.

modity for the same market. Practically, however, it would be almost, if not completely, impossible to find a group of firms which view themselves as an industry under existing conditions that would qualify as an industry under such a definition.

In the first place, there is a tendency for each member of a group of producers to create the impression that his products are distinct from those of his competitors and thus to establish small segregated markets for his goods. Each manufacturer tries to "carve out" a separate market and a separate demand for his own goods by making them, if only in name, slightly different, and by cajoling the public by advertising into thinking them different. From a theoretical standpoint, each differentiated item is a separate economic commodity. To the extent the manufacturer is able to distinguish his product in the mind of the public he has decreased the elasticity of the demand for the product and can act as a monopolist of this commodity—a monopolist within very narrow limits to be sure, since direct and indirect substitute commodities present an ever effective source of competition.

In the second place, there have grown up through long custom and habit certain feelings of common interest among producers, not based on the fact that they produce a like product, which have led to the formation of other types of so-called industries. During the life of the National Recovery Administration, 776 codes for industries were approved and approximately 5,000 were applied for. In many cases, the grouping of firms under one code was quite arbitrary. For example, producers of blankets and piece goods up to and inclusive of 25 percent wool were included under the Cotton Textile Code and over 25 percent under the Wool Textile Code. In other cases the boundaries of the industry covered by the code were determined by the raw materials used. The Underwear and Allied Products Code included the manufacture of all types of underwear made from purchased knit fabrics, whereas ladies' underwear and undergarments made from woven fabrics came under the Undergarment and Negligee Code. Furthermore, in fixing the limits of an industry for code purposes, the members of that industry were forced to decide where the production of a commodity started and stopped. This led to many arbitrary decisions.

In the third place, it is quite common for a firm or an establishment to manufacture several and in some cases hundreds of commodities. Since these different products would qualify the firm for membership in several industries some arbitrary decision must be made. Under the N. R. A. codes, instances of overlapping and of multiple-code coverage were among the most troublesome problems from an administrative point of view. These same problems of setting the limits of an industry arise in the administration of the Fair Labor Standards Act and of the Public Contracts Act.

While the definitions and limits of an industry are quite arbitrary, it is necessary in any statistical measurement of such a complex field as manufacturing to establish some basic, manageable unit for analysis. The only practical solution of this problem for agencies entrusted with the duty of measuring is to formulate limits that are reasonable and logical. The industry limits which have been used

in this study are those which have been developed over a long period of years by the Bureau of the Census.<sup>6</sup>

Although this report presents material somewhat similar to that shown in Dr. Thorp's monograph covering the year 1919, it is emphasized that, because of certain changes in coverage by the census, precise comparisons of the statistics cannot be made. The data for 1919 included reports from all manufacturers having establishments with an annual value of products of \$500 or more, whereas in this analysis only those establishments with products valued at \$5,000 and over are represented. Of the 290,105 establishments reporting to the Bureau of the Census in 1919, approximately 65,490, or 23 percent, were plants in the \$500 to \$5,000 classification. The value of products of these 65,490 plants, however, comprised less than 1 percent of the value of products of all reporting establishments; hence, the exclusion of the small plants does not materially affect the statistics except for the number of establishments.

In the analysis for 1919, all the establishments forming a central-office company were classified in the industry group in which the largest number of establishments were operated. In this study, on the other hand, all the establishments operated by a central office are assigned to the industry or industry group in which the establishments having the greatest value of products are classified. To facilitate the analysis in other parts of this report, each establishment of a central-office group has been classified in the industry in which it actually belongs. The basis of classification in either case, however, is the value of products and not the number of establishments.

Other obstacles to direct comparisons of data for 1937 with those for 1919 are the revisions and shifts in industry and industry-group classifications. For example, in 1919 the group entitled "metals and metal products other than iron and steel" included practically all machinery except agricultural implements and electrical machinery, whereas machinery is now shown as a separate group and includes agricultural implements and electrical machinery. Railroad repair shops, automobile repair shops, and manufactured gas plants, which were included in the data for 1919, are excluded from the census statistics for 1937.

As part of the census of 1900 a special study<sup>7</sup> of industrial combinations was made, but only those combinations consisting of a number of formerly independent plants brought together into one company under a charter obtained for that purpose were considered. All of

<sup>6</sup> "Although there are thousands of more or less distinct lines of manufacturing activity, manufacturing establishments were classified for census purposes in 1937 into 351 industries.

"The production of each specific class of finished commodities, however small, might be looked upon as a separate industry; and in some cases certain of the distinct processes in the manufacture of a single commodity might be treated as separate industries, as, indeed, is sometimes actually done in the census reports. Manifestly, however, there must be some grouping of commodities and processes, not only in order to bring the number of industries within reasonable compass, but also in order to avoid the extensive overlapping which would result from an attempt to distinguish so large a number of industries. Each establishment must, as a rule, be treated as a unit, and the data reported by it must be assigned in toto to some one industry. In many cases an establishment manufactures several related articles or commodities, or performs several related operations. It is desirable, therefore, that the classification be broad enough to cover all the activities—or, at least, the principal activities—of such establishments.

"An effort has been made to distinguish, so far as practicable, each well-defined or well-recognized industry. The classification has been based on prevailing conditions as to the actual organization of industry and the distribution of the various branches of production among individual establishments. It has been necessary, however, in some cases to combine the data for two or more industries which are usually considered fairly distinct from one another, because of the considerable amount of overlapping among them. Such cases arise where, although the majority of the establishments concerned confine their business to one or another of the industries, a few important establishments combine the activities of two or more industries to such an extent as to render it impracticable to obtain separate data for the different lines of activity." (Census of Manufactures, 1937, pp. 5 and 6.)

<sup>7</sup> Twelfth Census of the United States, 1900, vol. VII, p. LXXXV.

those companies comprising a number of establishments which had grown up, not by combination with other plants, but the erection of new plants or the purchase of old ones, were excluded. This concept of industrial combinations, therefore, precludes a comparison with data for central-office combinations. Both Dr. Thorp's study and the present one are concerned only with the actual composition of the central-office groups in 1919 and in 1937 and not with a historical description of how the groups developed.

The emergence of the large-scale multi-unit enterprise is largely a phenomenon of the last decade of the nineteenth and of the twentieth century. Moreover, the combination movement during this period has occurred in waves. The formation of many of these large enterprises must be explained in financial terms, but a complete explanation must also include consideration of the influences and developments of modern technology. Without modern technology large-scale production would be impossible. True, many of the developments which are commonplace in our industrial life existed in their rudimentary forms long before they attained the vital role they now occupy. Simple devices for the use of steam were known long before the improvements of Newcomen and Watt made them an important source of power. The uses to which technological developments have been put by business enterprises have certainly contributed heavily to their improvement and expansion. Furthermore, in the actual development, extension, and exploitation of innovations and inventions, the large research laboratories of many industrial concerns have played no small part.

But the causal forces flow both ways. The large corporation would have been impossible without the development of power generation on a huge scale. The development of fast and efficient means of communication and transportation made it possible to coordinate and to control the scattered activities of large multi-unit enterprises and to distribute their products throughout the world. The standardization of parts and the testing of materials which are basic to large-scale production are only possible with the development of precision instruments and laboratory techniques. All these and many other technological factors have conditioned the development of the large multi-unit enterprises with which this study is concerned.

The present study is limited to a statistical description of the structural aspects of central-office groups and to an analysis of the functional relation of the constituent establishments to the entire operating unit. The material presented will undoubtedly shed much light on the relations of these multi-unit concerns to other aspects of the functioning economy, such as price control, extent and effectiveness of competition, control of supply, etc., but a detailed analysis of the influence of these relations cannot be followed through in this study. The major task here is the less difficult one of picturing in statistical terms the manner in which manufacturing activity is organized from an operating point of view by this simplest and most obvious type of industrial combination—the central-office group.

## CHAPTER II

### EXTENT AND SIGNIFICANCE OF CENTRAL-OFFICE OPERATIONS

There were 5,625 central-office groups active in manufacturing during 1937. Of the 166,794 manufacturing establishments operated during the year, 25,699 establishments or 15.4 percent of the total number were controlled by these central-office groups. Perhaps a more revealing indicator of the true significance of central-office operation in manufacturing is the fact that in 1937 these 5,625 central offices employed 51.1 percent of the total number of wage earners and the wages paid by them were 55.3 percent of the total wage bill in manufacturing. Furthermore, the value of products of establishments under central-office control was 61.1 percent of the total value of products in manufacturing.<sup>1</sup> In the following sections these various measures of the significance of central-office operations will be analyzed in terms of the census industry groups in which the central offices were active.

#### NUMBER OF ESTABLISHMENTS CONTROLLED BY CENTRAL OFFICES

In tables 1 and 2 the number of central offices active in the various census industry groups is shown in detail. For the construction of table 1, all the establishments operated by a central office are classified in the industry group in which the central office is predominantly active as determined by the value of products of the establishments under its control. For example, if a central-office group operated three establishments in the "ice cream" industry in the food and kindred products group, with a total value of products of \$150,000, one establishment in the "paper box" industry in the paper and allied products group with a value of products of \$20,000, and one establishment in the "refrigerators and refrigerating and ice-making apparatus" industry in the machinery group with a value of products of \$75,000, the five establishments controlled by this central office would all be arbitrarily assigned to the ice cream industry and, of course, to the food and kindred products group. Under this predominant classification, and with the machine methods of calculation used herein, a certain distortion in the number of establishments operated by central offices in each industry group exists, but an accurate count of the number of central offices is afforded.<sup>2</sup>

<sup>1</sup> Although data for 1929 and 1937 are not precisely comparable, a comparison of percentages for the two census periods affords a measure of the increasing importance of central-office operations. In 1929, about 12 percent of the total number of manufacturing establishments were operated by central administrative offices; these central-office establishments employed 48 percent of all wage earners in manufacturing and accounted for 54 percent of the value of all manufactured products. It will be observed that corresponding percentages for 1937, shown in the text above, are somewhat higher. (For summary data concerning central-office operations in 1929, see "Fifteenth Census of the United States, Manufactures: 1929," vol. 1, p. 95)

<sup>2</sup> In the Bureau of the Census each manufacturing establishment as a whole (a single plant was counted as two or more establishments in certain cases, as explained in footnote 3, ch. 1) was assigned, on the basis of its product or group of products of chief value, to some one industry classification. The data for number of establishments, wage earners, wages, cost of material, fuel, etc., value of products, and value added by manufacture for any particular industry cover the total manufacturing activities of establishments classified in that industry. This treatment of each establishment as a unit and its assignment to one industry according to its product of chief value sometimes results in overrating the importance of some industries and underrating that of others.

*Distribution of Establishments by Industry Groups.*<sup>3</sup>

An inspection of table 1 and chart 1 reveals the fact that 1,660 or 29.5 percent of the total number of central-office groups were active in the food and kindred products group, and these central offices that were classified in this group on the basis of predominant activity, as measured by value of products, controlled 9,546 establishments or 37.1 percent of the total establishments operated by central offices. (A comparison of the total number of manufacturing establishments in each industry group and the number of central-office establishments actually operating in these groups is presented in table 2.) In the textiles group there were 810 central offices predominantly active; they constituted 14.4 percent of the total number of central offices and controlled 2,671 establishments or 10 percent of the total number of establishments operated by central offices. At the lower end of an array, only 30 and 66 central offices were active in the rubber products group and in the products of petroleum and coal group, respectively, and central offices in these groups operated 115 and 430 establishments.

TABLE 1.—*Number of Central Offices and Controlled Establishments, by Industry Groups, 1937*

[NOTE.—In this table each central office and all establishments operated by it are classified in the industry group in which the central office is predominantly active as measured by its establishments having the major value of products]

Group No.	Industry group	Central offices		Establishments operated by central offices		Total manufacturing establishments	
		Number	Per cent	Number	Per cent	Number	Per cent
	All industries.....	5, 625	100. 0	25, 699	100. 0	166, 794	100. 0
1	Food and kindred products.....	1, 660	29. 5	9, 546	37. 1	48, 727	29. 2
2	Textiles and their products.....	810	14. 4	2, 671	10. 4	20, 616	12. 4
3	Forest products.....	636	11. 3	2, 305	9. 1	18, 012	10. 8
4	Paper and allied products.....	193	3. 4	886	3. 4	3, 053	1. 8
5	Printing, publishing, and allied industries.....	232	4. 1	817	3. 2	22, 751	13. 6
6	Chemicals and allied products.....	389	6. 9	2, 229	8. 7	7, 419	4. 4
7	Products of petroleum and coal.....	66	1. 2	430	1. 7	675	. 4
8	Rubber products.....	30	. 5	115	. 4	478	. 3
9	Leather and its manufactures.....	127	2. 3	499	1. 9	3, 364	2. 0
10	Stone, clay, and glass products.....	343	6. 1	1, 316	5. 1	6, 071	3. 6
11	Iron and steel and their products, not including machinery.....	336	6. 0	1, 620	6. 3	8, 345	5. 0
12	Nonferrous metals and their products.....	94	1. 7	394	1. 5	5, 303	3. 2
13	Machinery, not including transportation equipment.....	393	7. 0	1, 429	5. 6	9, 961	6. 0
14	Transportation equipment, air, land, and water.....	91	1. 6	561	2. 2	1, 942	1. 2
15	Railroad repair shops <sup>1</sup> .....						
16	Miscellaneous industries.....	225	4. 0	881	3. 4	10, 077	6. 0

<sup>1</sup> This group was abandoned as an industry group in 1937 by the Bureau of the Census and will not be carried in subsequent tables showing industry-group data.

<sup>3</sup> To facilitate the comparison of one broad class of manufacturing industries with another, the industries, as constituted for census purposes, were distributed in 1937 into 15 general industry groups. This grouping was based in most cases on the character of the principal materials used, but several of the groups were constituted on the basis of the purpose or use of the chief products, and two, "printing, publishing, and allied industries" and "chemicals and allied products," on the character of the processes employed. It was necessary in some cases to include in a particular group certain industries that use considerable quantities of materials or manufacture considerable quantities of products other than those treated as basic for the group. For example: The "furniture, including store and office fixtures" industry, included in the forest products group, embraces the manufacture of metal as well as of wood furniture. (For a more extended discussion of the method of classification used by the Bureau of the Census see "Census of Manufactures, 1937," pp. 5 and 6.)

A complete tabulation of the number of central offices in each industry, as contrasted with the industry-group data presented here, may be found in appendix A. It must be noted, however, that in appendix A a central office is counted in each industry in which it operates establishments and that all establishments and data relating thereto are shown in the industry in which the establishments are actually classified by the Bureau of the Census. Because of the duplicate counting, no group totals for the number of central offices

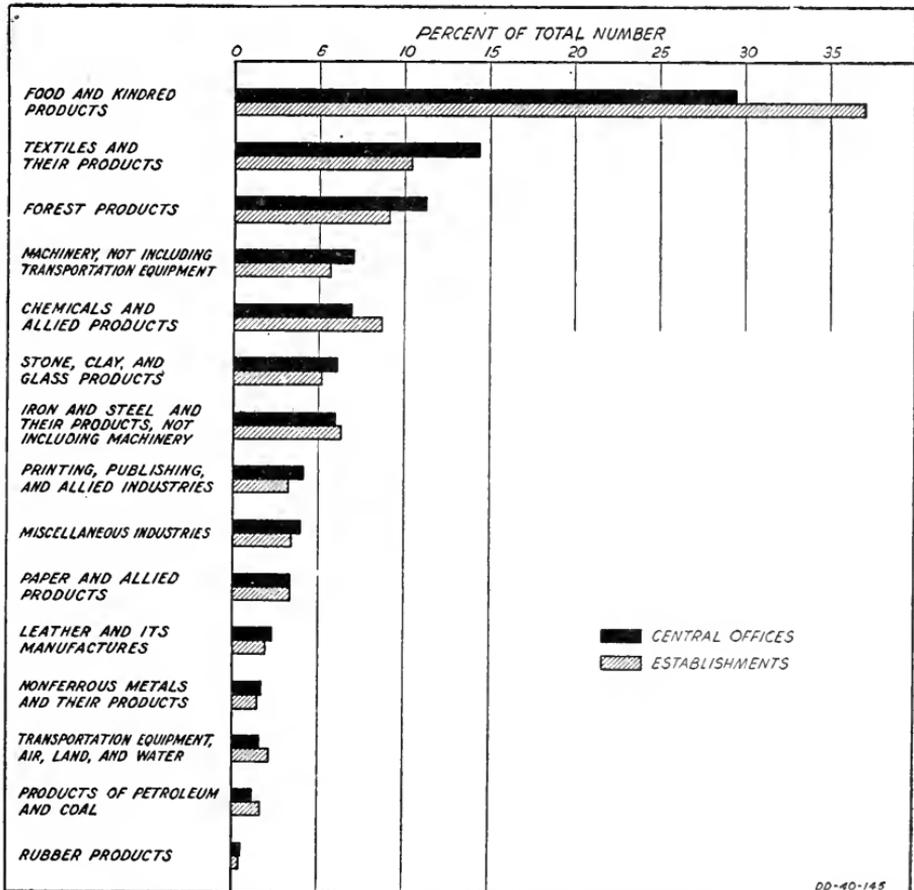


CHART 1.—PERCENTAGE OF TOTAL NUMBER OF CENTRAL OFFICES AND CENTRAL OFFICE ESTABLISHMENTS IN EACH INDUSTRY GROUP, 1937.

are given. From this material, however, it may be seen that in the food group more central offices were active in the “manufactured ice,” the “canned and dried fruits and vegetables,” and in the “bread and other bakery products” industries than in any of the other industries within the group. The establishments controlled by central offices in these three industries represented 46 percent of the total number of establishments operated by central offices in the food group.

For purposes of comparison, the number and the percentage distribution of all manufacturing establishments among the various industry groups are shown in columns 5 and 6 of table 1. Some idea may be gained from this table of the relative importance of establish-

ments operated by central offices in the various industry groups as contrasted with the distribution of all manufacturing establishments. For the reasons mentioned above, there is some distortion in this table, since all establishments operated by central offices are classified in the industry group in which the predominant value of products of the central office occurs.

A more accurate picture of the true significance of central-office operations is afforded by the material in table 2 in which the establishments operated by central offices are classified in the census industry group in which they properly belong. From this table it is possible to appraise the extent and distribution of central-office activity throughout the industry groups, but, for the reasons heretofore mentioned, the number of central offices in each group is not shown. Here, it is apparent that there were 9,267 establishments controlled by central offices in the food products group, representing 19 percent of the total manufacturing establishments classified in this industry group.

TABLE 2.—*Significance of central-office operations as measured by number of establishments, 1937*

NOTE.—In this table each establishment is classified in the industry in which it is actually classified by the Bureau of the Census and not in the industry in which the central office has its major value of products]

Group No.	Industry group	Total number of manufacturing establishments	Establishments operated by central offices.	
			Number	Percent of total
	All industries.....	166, 794	25, 699	15. 4
1	Food and kindred products.....	48, 727	9, 267	19. 0
2	Textiles and their products.....	20, 616	2, 703	13. 1
3	Forest products.....	18, 012	2, 516	14. 0
4	Paper and allied products.....	3, 053	960	31. 4
5	Printing, publishing, and allied industries.....	22, 751	905	4. 0
6	Chemicals and allied products.....	7, 419	2, 348	31. 6
7	Products of petroleum and coal.....	675	326	48. 3
8	Rubber products.....	478	110	23. 0
9	Leather and its manufactures.....	3, 364	503	15. 0
10	Stone, clay, and glass products.....	6, 071	1, 325	21. 8
11	Iron and steel and their products, not including machinery.....	8, 345	1, 519	18. 2
12	Nonferrous metals and their products.....	5, 303	470	8. 9
13	Machinery, not including transportation equipment.....	9, 961	1, 435	14. 4
14	Transportation equipment, air, land, and water.....	1, 942	459	23. 6
16	Miscellaneous industries.....	10, 077	853	8. 5

The degree to which central-office activity extends across industry and industry-group lines is shown in table 3. For example, there were 1,660 central offices whose predominant activity was in the food group, and these central offices controlled 9,546 establishments, although only 9,267 establishments were actually operating in the food industries. The extent to which establishments were shifted as a result of this method of classifying central offices on the basis of predominant activity is shown in column 4 of table 3. It may be seen that, by the predominant basis of classification, the number of establishments in the food group was overstated by 279. On the other hand, there were 32 more central-office establishments actually operating in the textiles group than the predominant method of classifying would indicate.

As an aside, it may be pointed out here that some light is thrown on the extent of interindustry-group integration by this material. It would appear from the table that such industry groups as rubber

products, leather and its manufactures, stone, clay, and glass products, and machinery were more self-contained than the food and textiles groups. In the former there were few net additions or subtractions to the number of establishments controlled by central offices as indicated by the predominant classification.

The validity of the conclusions which may be drawn from the information presented in table 3, however, is subject to limitations. The figures in column 4 of this table are net items and represent the

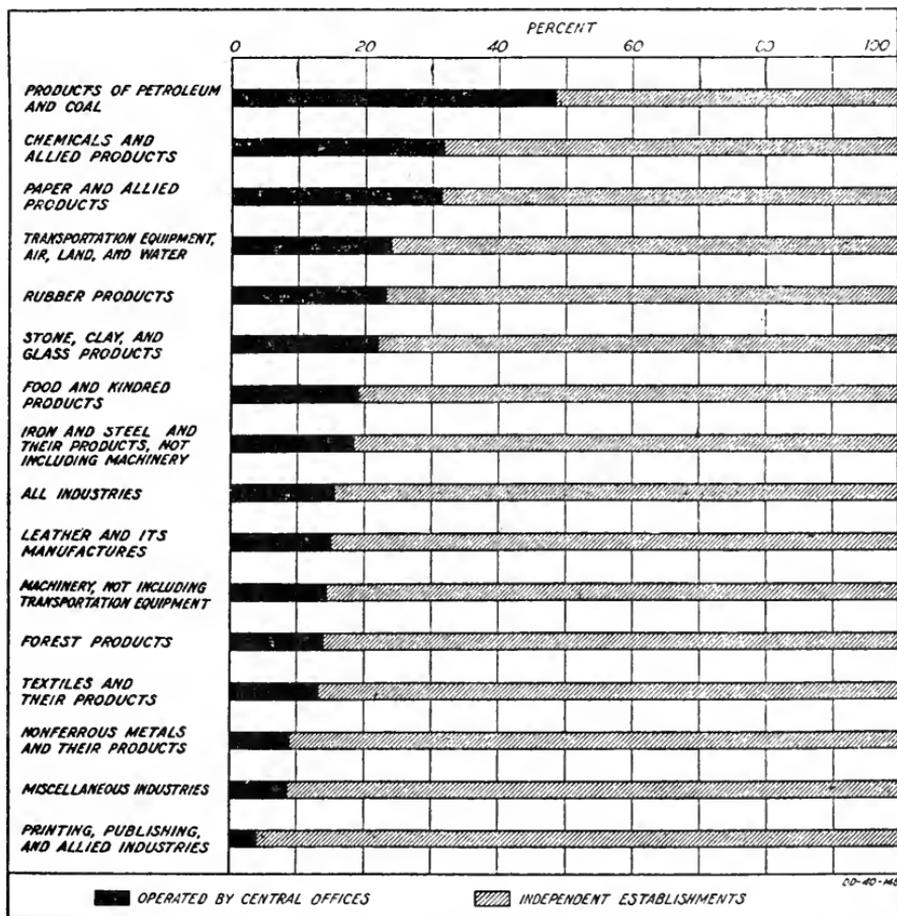


CHART 2.—PERCENTAGE OF TOTAL NUMBER OF ESTABLISHMENTS OPERATED BY CENTRAL OFFICES AND BY INDEPENDENTS, BY INDUSTRY GROUPS, 1937.

differences between the establishments brought to the industry by the predominant method of classification and those actually operating in the industry that might under the predominant method of classification be counted in an industry in another group. Thus, it might happen that while 115 establishments were operated by the 30 central offices predominantly active in the rubber products group only 30 of the establishments of these central offices would actually be operating in the group. It is almost impossible, however, that this extreme situation would exist.

TABLE 3.—Extent to which the operations of central offices are confined to the industries in which they are predominantly active, by industry groups, 1937

Group No.	Industry group	Number of central offices with predominant activity in each group	Number of establishments		
			Operated by central offices whose predominant activity is in each group	Whose actual operations are in the group	Net additions (+) or subtractions (-) in each industry group arising from method of classifying on predominant basis
	All industries.....	5, 625	25, 699	25, 699	-----
1	Food and kindred products.....	1, 660	9, 546	9, 267	+279
2	Textiles and their products.....	810	2, 671	2, 703	-32
3	Forest products.....	636	2, 305	2, 516	-211
4	Paper and allied products.....	193	886	960	-74
5	Printing, publishing, and allied industries.....	232	817	905	-88
6	Chemicals and allied products.....	389	2, 229	2, 348	-119
7	Products of petroleum and coal.....	66	430	326	+104
8	Rubber products.....	30	115	110	+5
9	Leather and its manufactures.....	127	499	503	-4
10	Stone, clay, and glass products.....	343	1, 316	1, 325	-9
11	Iron and steel and their products, not including machinery.....	336	1, 620	1, 519	+101
12	Nonferrous metals and their products.....	94	394	470	-76
13	Machinery, not including transportation equipment.....	393	1, 429	1, 435	-6
14	Transportation equipment, air, land, and water.....	91	561	459	+102
16	Miscellaneous industries.....	225	881	853	+28

A much more accurate and extended analysis of the degree of inter-industry integration is presented in the second half of this study. It is sufficient at this time to indicate the differences that arise from the two methods of classification used in tables 1 and 2. With this note of caution, the material presented in table 2 may be analyzed in some detail.

Although considerable variation exists in the extent to which establishments in the different industry groups are controlled by central offices, the wide distribution of central offices among the various industrial groups is a fair indication of the fact that this form of organization is not restricted to any particular industry but is a development which extends throughout all manufacturing operations.

#### *Extent of Control of Establishments by Central Offices, by Industry Groups.*

The greatest control by central offices over the number of active establishments was found in the petroleum and coal group. In this group 326 establishments or 48.3 percent of the total number of establishments were operated by central offices. (See table 2 and chart 2.) The next highest concentration occurred in the chemical and paper groups in which 31.6 and 31.4 percent, respectively, of the establishments were operated by central offices. Greater than average concentration was present in the transportation group, in the rubber products group, in the stone, clay, and glass products group, in the food group, and in the iron and steel group.

The lowest concentration was found in the printing, publishing, and allied industries group where only 4 percent of the active establishments were controlled by central offices. This low percentage may be accounted for by the inherent nature of the activities included in this industry group. Approximately 80 percent of the establish-

ments were in (1) the job, music, and book printing and publishing industry and (2) the newspaper and periodical printing and publishing industry. In each of these industries the process can hardly be considered manufacturing in the ordinary meaning of the word; thus comparisons with other and more strictly manufacturing industries are of questionable value. Although there were a few large multi-plant units in these industries, the great majority of concerns were under local and individual management or were large single-unit enterprises. Low percentage of central-office control was also found in the miscellaneous<sup>4</sup> and in the nonferrous metals groups in which the ratio of the number of establishments operated by central offices to the total number of establishments in the groups was 8.5 and 8.9 percent, respectively.

Although central offices were active in all industry groups, there were 15 out of the total of 351 industries in which there were no establishments controlled by central offices. The names of these industries are given in appendix B along with the measures of their significance. A mere reading of the names will adequately demonstrate the fact that they are of minor importance. It is sufficient at this time to point out that these 15 industries accounted for only 0.5 percent of the total number of establishments, 0.2 percent of the total number of wage earners in all manufacturing, and produced only 0.1 percent of the total value of products. Thus, by all three measures, the industries covered by the present study embraced at least 99.5 percent of all manufacturing activity. Of course, this does not mean that all the establishments in these industries were controlled by central offices.

*Size of Central-Office Groups—Average Number of Establishments per Central Office.*

The size of central offices may be measured in terms of the number of establishments controlled by them. Although size may be measured also on the basis of value of products or number of wage earners, the number of plants is the best available criterion of the size of central-office concerns from the point of view of their structural organization. Two central-office companies may differ greatly in terms of value of products or number of wage earners, but if they control the same number of establishments, they represent equal degrees of combination and, accordingly, may be considered as of equal importance in an evaluation of the extent of this form of combination throughout manufacturing.<sup>5</sup>

In table 4, the average number of establishments controlled by a central office in the various industry groups is shown. The most extensive control of establishments was in the petroleum and coal and in the transportation groups where there was an average of 6.5 and 6.2 establishments, respectively, per central office. There were considerably more than the average number of establishments per central office in the food and in the chemical groups. At the other

<sup>4</sup> For a list of the industries included in the miscellaneous group, as well as for those industries included in other industry groups, see appendix A.

<sup>5</sup> Each reporting plant may be viewed as a separate and distinct activity or operation. The fact that a plant reports as a distinct operating unit to the Bureau of the Census implies that a separate set of books is kept and that different major products are produced. Thus, in the view of the concern itself, these different operations are distinct units of activity, and the aggregation of these operations under one control is a form of combination. In using the term "combination" or "central-office combination" in this study, the words should not carry any of the connotations associated with "combinations in restraint of trade". These combinations are, in their simplest terms, managerial devices for organizing production.

extreme in an array, the central offices in the textile group controlled only 3.3 establishments per concern.

TABLE 4.—Average number of establishments per central office, by industry groups, 1937

[NOTE.—In this table each central office and all establishments operated by it are classified in the industry group in which the central office is predominantly active as measured by its establishments having the major value of products]

Group No.	Industry group	Central offices	Establishments operated by central offices	Average number of establishments per central office
	All industries.....	5,625	25,699	4.6
1	Food and kindred products.....	1,660	9,546	5.8
2	Textiles and their products.....	810	2,671	3.3
3	Forest products.....	636	2,305	3.6
4	Paper and allied products.....	193	886	4.6
5	Printing, publishing, and allied industries.....	232	817	3.5
6	Chemicals and allied products.....	389	2,229	5.7
7	Products of petroleum and coal.....	66	430	6.5
8	Rubber products.....	30	115	3.8
9	Leather and its manufactures.....	127	499	3.9
10	Stone, clay, and glass products.....	343	1,316	3.8
11	Iron and steel and their products, not including machinery.....	336	1,620	4.8
12	Nonferrous metals and their products.....	94	394	4.2
13	Machinery, not including transportation equipment.....	393	1,429	3.6
14	Transportation equipment, air, land, and water.....	91	561	6.2
16	Miscellaneous industries.....	225	881	3.9

A more adequate and comprehensive analysis of the extent of control of establishments by central offices is possible by referring to table 5 and chart 3. In this table and chart, the 5,625 central offices are distributed according to the number of establishments operated. Over half of the central offices operated only 2 establishments while about four-fifths of the central offices operated either 2, 3, or 4 establishments. At the other extreme in size there were 11 central offices, each of which operated 100 or more establishments and 28 central offices that operated 50 to 99 establishments. Seven of the central offices in the food group, 2 of the central offices in the chemical group, and 1 central office in both the forest products and in the iron and steel products groups operated more than 100 establishments. The distribution appears quite regular with no sudden breaks which might indicate a definite point above which central-office operation was not feasible. In all industry groups except the petroleum and coal group, the heaviest concentration was in the two-establishment class.

TABLE 5.—Distribution of central-office companies according to number of establishments operated, by industry groups, 1937

[NOTE.—In this table each central office and all establishments operated by it are classified in the industry group in which the central office is predominantly active as measured by its establishments having the major value of products]

Group No.	Industry group	Number of central offices	Number of establishments operated by central offices	Distribution of central offices, by number of establishments operated									
				2	3 and 4	5 to 7, inclusive	8 to 12, inclusive	13 to 19, inclusive	20 to 29, inclusive	30 to 49, inclusive	50 to 99, inclusive	100 and over	
		Number											
	All industries.....	5, 625	25, 699	2, 996	1, 519	598	241	132	66	34	28	11	
1	Food and kindred products...	1, 660	9, 546	830	446	201	80	44	24	15	13	7	
2	Textiles and their products...	810	2, 671	464	221	77	34	10	4				
3	Forest products.....	636	2, 305	372	175	53	16	11	5	2	1	1	
4	Paper and allied products.....	193	886	78	70	25	6	8	4	2			
5	Printing, publishing, and allied industries.....	232	817	140	57	19	11	1	2	2			
6	Chemicals and allied products.....	389	2, 229	191	106	40	18	12	13	3	4	2	
7	Products of petroleum and coal.....	66	430	22	23	8	4	4	4		1		
8	Rubber products.....	30	115	23	1	2	2	1	1				
9	Leather and its manufactures.....	127	499	77	29	13	4	2		1	1		
10	Stone, clay, and glass products.....	343	1, 316	192	82	34	22	9	2	1	1		
11	Iron and steel and their products, not including machinery.....	336	1, 620	172	90	44	14	7	1	3	4	1	
12	Nonferrous metals and their products.....	94	394	53	26	6	3	3	2	1			
13	Machinery, not including transportation equipment.....	393	1, 429	224	109	37	13	5	1	2	2		
14	Transportation equipment, air, land, and water.....	91	561	39	24	14	4	6	2	1	1		
16	Miscellaneous industries.....	225	881	119	60	25	10	9	1	1			
		Percentage distribution											
	All industries.....	100.0	-----	53.3	27.0	10.6	4.3	2.3	1.2	0.6	0.5	0.2	
1	Food and kindred products...	100.0	-----	50.0	26.9	12.1	4.8	2.7	1.4	.9	.8	.4	
2	Textiles and their products...	100.0	-----	57.3	27.3	9.5	4.2	1.2	.5				
3	Forest products.....	100.0	-----	58.5	27.5	8.3	2.5	1.7	.8	.3	.2	.2	
4	Paper and allied products.....	100.0	-----	40.4	36.3	13.0	3.1	4.1	2.1	1.0			
5	Printing, publishing, and allied industries.....	100.0	-----	60.3	24.6	8.2	4.7	.4	.9	.9			
6	Chemicals and allied products.....	100.0	-----	49.1	27.3	10.3	4.6	3.1	3.3	.8	1.0	.5	
7	Products of petroleum and coal.....	100.0	-----	33.3	34.8	12.1	6.1	6.1	6.1		1.5		
8	Rubber products.....	100.0	-----	76.7	3.3	6.7	6.7	3.3	3.3				
9	Leather and its manufactures.....	100.0	-----	60.6	22.8	10.2	3.2	1.6		.8	.8		
10	Stone, clay, and glass products.....	100.0	-----	56.0	23.9	9.9	6.4	2.6	.6	.3	.3		
11	Iron and steel and their products, not including machinery.....	100.0	-----	51.2	26.8	13.1	4.1	2.1	.3	.9	1.2	.3	
12	Nonferrous metals and their products.....	100.0	-----	56.4	27.6	6.4	3.2	3.2	2.1	1.1			
13	Machinery, not including transportation equipment.....	100.0	-----	57.0	27.7	9.4	3.3	1.3	.3	.5	.5		
14	Transportation equipment, air, land, and water.....	100.0	-----	42.8	26.4	15.4	4.4	6.6	2.2	1.1	1.1		
16	Miscellaneous industries.....	100.0	-----	52.9	26.7	11.1	4.5	4.0	.4	.4			

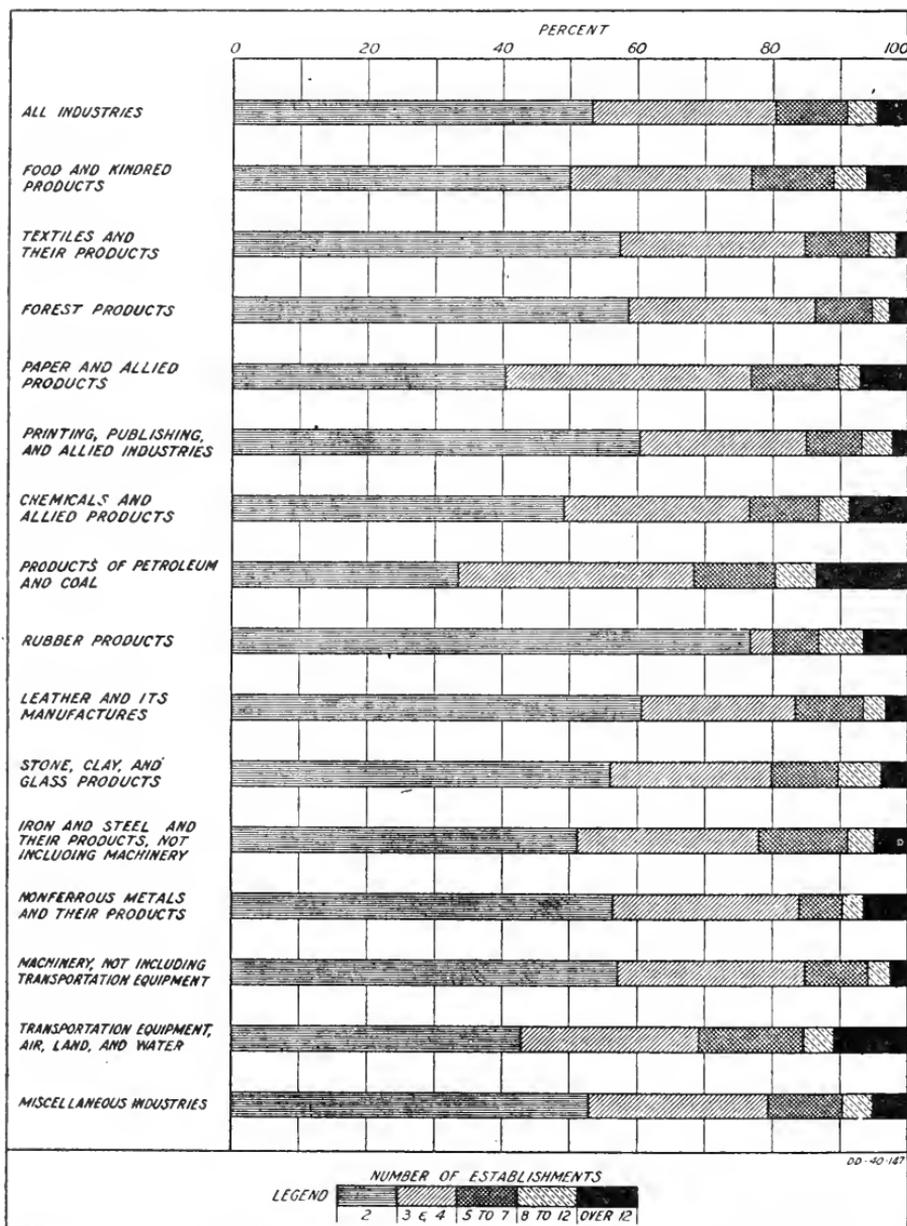


CHART 3.—PERCENTAGE DISTRIBUTION OF CENTRAL-OFFICE COMPANIES ACCORDING TO NUMBER OF ESTABLISHMENTS OPERATED, BY INDUSTRY GROUPS, 1937.

The factors conditioning the development of central-office concerns with a large number of establishments appear more favorable in certain industry groups than in others. There seems to be some *prima facie* evidence that there are potent limiting factors in some of the industry groups on the number of establishments which may be economically operated under a single central-office control. For example, 77 percent of the central offices in the rubber products group operated only 2 establishments. The high concentration in the 2-establishment classification in the rubber group is accounted for by the large number of 2-establishment central offices in the "rubber goods, other than tires, tubes, boots and shoes" industry. The chief products of this industry are rubber belting and hose, rubberized fabrics, druggists' and stationers' sundries, rubber mats, hard-rubber goods, rubber heels and soles, etc. Of the 30 central offices in the rubber group, 22 were classified in this industry, which is one of three industries in the group.<sup>6</sup> Of these 22 there were 19 central offices which operated only 2 establishments. At the other end of the distribution, almost 20 percent of the central offices in the petroleum and coal group operated 8 or more establishments, while less than 6 percent of the central offices in the forest products and the machinery groups operated 8 or more establishments.

To summarize, central-office groups active in manufacturing usually operate a small number of establishments—the average in 1937 was 4.6 establishments per central office. According to Dr. Thorp's study,<sup>7</sup> the average central office in 1919 controlled 3.68 establishments. About half of the central offices in the present study operated only two establishments each, but a considerable number of central offices operated many establishments. In fact, one central office operated 497 and another 373 establishments. Organizations in which many establishments were brought together were relatively most frequent in the petroleum and coal group. In general, the factors that are conducive to the aggregation under one control of a large number of units appear to be present in some industry groups to a much greater extent than in others.

#### *Diversity of Central-Office Operations.*

The analysis of the size of central offices as measured by the number of establishments which they operated raises another question about the nature of these central-office organizations: To what extent were central-office groups active in more than one industry? Do central-office groups tend to become specialized in one line of activity operating several establishments in similar lines, or are the establishments operated by central offices spread over different industries and industry groups? An over-all picture of the interindustry activities of central offices is presented in the following discussion, while in a later chapter the results of a detailed analysis of the structure of each central-office group are made available. There, each central office was classified on the basis of the structural form taken by the establishments in each group. The analysis here is limited to a tabulation of the distribution of central offices in terms of the number of industries in which they operated establishments.

Of the 5,625 central offices active in manufacturing during 1937, there were 3,574 central offices, or 63.5 percent, which operated

<sup>6</sup> The other two industries included in the rubber products group are rubber boots and shoes and rubber tires and inner tubes.

<sup>7</sup> See "The Integration Of Industrial Operation." p. 113.

establishments in only one manufacturing industry, according to the data presented in table 6 and chart 4. These 3,574 central offices operated 11,321 establishments or 44 percent of all central-office-operated establishments. On the average, the one-industry combinations operated 3.2 establishments per central office which is about two-thirds the size (number of establishments) of the average central office in all manufacturing. (See table 4 above.)

In the stone, clay, and glass products group, in the food group, and in the printing and publishing group more than 70 percent of the number of central offices active were of this one-industry type. As contrasted with this situation, the transportation group and the paper group were characterized by a relatively low concentration of central offices in this one-industry category—42 and 43 percent, respectively. Although there was wide dispersion in the relative proportion of central offices in each industry group that were in this one-industry classification, it should be noted that this was the typical category. In each industry group a larger number of central offices were of the one-industry type than of any other. Organizations of this simple or one-industry type will be examined in greater detail in a later chapter when the structural form of central offices is the subject for analysis. It might be pointed out here, however, that these simple central offices are classified structurally as horizontally integrated companies.

While the one-industry type of central office was predominant in each industry group, the central offices in certain groups tended to be active in many industries. There were no central offices in the printing and publishing group active in more than 5 industries, while central offices in 2 groups, the forest products and the miscellaneous industries groups, operated establishments in no more than 9 census industries. This situation is undoubtedly conditioned in part by the relatively small number of industries included in these industry groups as well as by the diverse nature of the activities of the constituent industries. In contrast, there was one concern in the food group that operated establishments which were classified in 25 census industries. This widely spread type of company is, of course, not typical. In all manufacturing, there were only 34 central offices that operated in 10 or more industries.

It should be noted, however, that these central offices, though few in number, accounted for a high proportion of the number of establishments. For example, in the transportation group, two concerns, or 2.2 percent of the central offices in the group, operated establishments in 15 or more industries and controlled almost one-fourth of the establishments in the group. Or again, in the petroleum and coal group, 3 concerns, or 4.5 percent of the central offices in the group, operated 123 establishments, or 28.6 percent of the total establishments classified in the group. Furthermore, the 34 concerns mentioned above that operated in 10 or more industries controlled more than 10 percent of the total number of central-office controlled establishments. In terms of the value of products, the percent of the total controlled by these concerns would very likely have been even larger than the control in terms of establishments. That material may not be presented here, however, because of its confidential nature. Other measures of the significance of large central-office combinations are presented in part VI of this study.

TABLE 6.—*Distribution of central-office companies according to number of manufacturing industries in which establishments are operated, by industry groups, 1937*

[NOTE.—In this table each central office and all establishments operated by it are classified in the industry group in which the central office is predominantly active as measured by its establishments having the major value of products]

Group No.	Industry group	Distribution of central offices and establishments by number of industries										Total number of central offices		Total number of establishments							
		1		2		3		4 and 5		6 and 7		8 and 9		10 to 14, incl.		15 to 19, incl.		20 and over			
		Central offices	Establishments	Central offices	Establishments	Central offices	Establishments	Central offices	Establishments	Central offices	Establishments	Central offices	Establishments	Central offices	Establishments	Central offices	Establishments	Central offices	Establishments		
		5,625	25,699	3,574	11,321	1,413	5,327	343	2,252	190	2,122	45	1,077	26	856	23	1,349	9	1,015	2	380
1	All industries.....	1,680	9,546	1,222	4,851	307	1,377	67	680	40	520	10	259	4	196	7	777	2	555	1	331
2	Food and kindred products.....	810	2,671	512	1,554	224	778	42	212	24	205	4	52	2	26	1	15	1	29		
3	Textiles and their products.....	636	2,305	430	1,181	171	671	24	126	8	150	2	162	1	15						
4	Forest products.....	193	886	83	210	67	238	19	120	16	154	6	96	1	46	1	22				
5	Paper and allied products.....	232	817	167	493	48	208	13	90	4	26										
6	Printing, publishing, and allied industries.....	389	2,229	220	580	99	401	35	302	20	327	6	162	4	241	4	136	1	80		
7	Chemicals and allied products.....	66	430	30	85	18	88	9	62	6	72										
8	Products of petroleum and coal.....	30	115	16	32	8	17	1	5	3	30	1	8			3	123				
9	Rubber products.....	127	499	83	212	28	91	10	49	4	46	1	37			1	23				
10	Leather and its manufactures.....	343	1,316	260	816	65	289	10	52	4	59	2	26	1	52	1	22				
11	Stone, clay, and glass products.....																				
12	Iron and steel and their products, not including machinery.....	336	1,620	134	325	129	377	41	214	18	165	6	159	3	86	2	69	3	225		
13	Nonferrous metals and their products.....	94	394	51	126	23	78	8	31	10	93	1	26					1	40		
14	Machinery, not including transportation equipment.....	393	1,429	186	471	145	410	37	165	17	149	2	28	4	108	2	98				
15	Transportation equipment, air, land, and water.....	91	561	38	135	25	99	13	77	9	50	1	19	3	46			1	86	1	49
16	Miscellaneous industries.....	225	881	142	450	56	205	14	67	7	76	3	43	3	40						

TABLE 6.—Distribution of central-office companies according to number of manufacturing industries in which establishments are operated, by industry groups, 1937—Continued

Group No.	Industry group	Distribution of central offices and establishments by number of industries																			
		1		2		3		4 and 5		6 and 7		8 and 9		10 to 14, incl.		15 to 19, incl.		20 and over			
		Total number of central offices	Total number of establishments	Central offices	Establishments																
		100.0	100.0	63.5	44.1	25.1	20.7	6.1	8.8	3.4	8.3	0.8	4.2	0.5	3.3	0.4	5.2	0.2	3.9	0.1	1.5
1	All industries.....	100.0	100.0	73.6	50.8	18.5	14.4	4.0	7.1	2.4	5.5	.6	2.7	.2	2.1	.4	8.1	.1	5.8	0.1	3.5
2	Food and kindred products.....	100.0	100.0	63.2	50.7	27.7	23.1	5.2	7.9	3.0	7.7	.5	1.9	.2	1.0	.1	.6	.1	1.1		
3	Textiles and their products.....	100.0	100.0	67.6	51.2	26.9	23.1	3.8	5.5	1.3	6.5	.3	7.0	.2	.7	.5	2.5				
4	Forest products.....	100.0	100.0	43.0	23.7	34.7	26.9	9.9	13.5	8.3	17.4	3.1	10.8	.5	5.2						
5	Paper and allied products.....	100.0	100.0	72.0	60.3	20.7	25.5	5.6	11.0	1.7	3.2	1.5	7.3	1.0	10.8	1.0	6.1	.3	3.6		
6	Printing, publishing, and allied industries.....	100.0	100.0	56.6	26.0	25.5	18.0	9.0	13.5	5.1	14.7										
7	Chemicals and allied products.....	100.0	100.0	45.5	19.8	27.3	20.5	13.6	14.4	9.1	16.7	3.3	7.0			4.5	28.6				
8	Products of petroleum and coal.....	100.0	100.0	53.3	27.8	26.7	14.8	3.3	4.3	10.0	26.1	.8	7.4			3.3	20.0				
9	Rubber products.....	100.0	100.0	65.4	42.5	22.0	18.2	7.9	9.8	3.1	9.2	.6	2.0	.3	4.0	.8	12.8				
10	Leather and its manufactures.....	100.0	100.0	75.8	62.0	18.9	22.0	2.9	4.0	1.2	4.5					.3	1.7				
11	Stone, clay, and glass products. Iron and steel and their products, not including machinery, not including machinery.....	100.0	100.0	39.9	20.1	38.4	23.3	12.2	13.2	5.4	10.2	1.8	9.8	.9	5.3	.6	4.3	.9	13.9		
12	Nonferrous metals and their products.....	100.0	100.0	54.3	32.0	24.5	19.8	8.5	7.9	10.0	23.6	1.1	6.6					1.1	10.2		
13	Machinery not including transportation equipment.....	100.0	100.0	47.3	33.0	36.9	28.7	9.4	11.5	4.3	10.4	.5	2.0	1.0	7.6	.5	6.9				
14	Transportation equipment, air, land, and water.....	100.0	100.0	41.8	24.1	27.5	17.7	14.3	13.7	9.9	8.9	1.1	3.4	3.3	8.2						
16	Miscellaneous industries.....	100.0	100.0	63.1	51.1	24.9	23.3	6.2	7.6	3.1	8.6	1.3	4.9	1.3	4.5						

<sup>1</sup> Less than one-tenth of 1 percent.

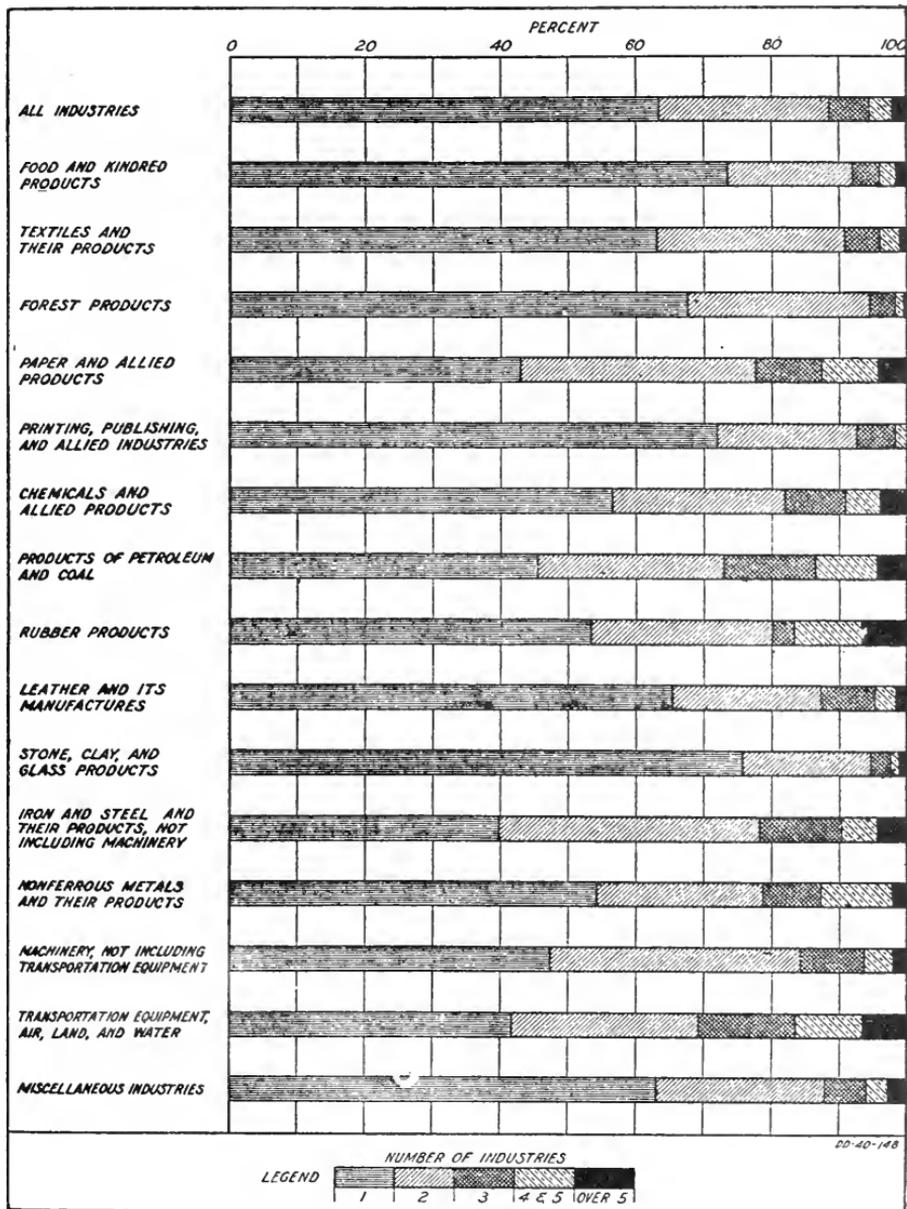


CHART 4.—PERCENTAGE DISTRIBUTION OF CENTRAL-OFFICE COMPANIES ACCORDING TO NUMBER OF MANUFACTURING INDUSTRIES IN WHICH ESTABLISHMENTS ARE OPERATED, BY INDUSTRY GROUPS, 1937.

WAGE EARNERS AND WAGES PAID IN ESTABLISHMENTS CONTROLLED BY  
CENTRAL OFFICES

The material relative to the size of central-office companies and the data on the areas within which central-office operations are particularly concentrated throw much light on the instances and places where central offices are active. Data in this form, however, are not especially revealing of the extent or degree of control over employment opportunities, or over the supply of commodities on the market which these central-office companies command. For information bearing on these latter phases of the problems of combinations, it is necessary to turn to other measures of significance of central-office operation.

Manufacturing establishments controlled by central offices employed 4,380,123 wage earners<sup>8</sup> in 1937, or 51.1 percent of the total number of wage earners employed in all manufacturing establishments during that year. (See table 7.) Wages paid these workers in establishments controlled by central offices amounted to \$5,595,087,000 or 55.3 percent of the total wage bill in all manufacturing establishments. It should be noted that in table 7 and in the following tables throughout this chapter the operating data are shown in the industry group in which the establishments were actually operating and not in the group in which the central office was predominantly active as determined by the value of products of the establishments under its control.

*Distribution of Wage Earners Among Industry Groups.*

The importance of central-office operations as measured by wage earners employed and wages paid varied greatly from one industry group to another. Establishments controlled by central offices in the petroleum and coal group employed 90 percent of the total number of wage earners in that group and the wages paid in the establishments controlled by these enterprises amounted to 91 percent of the wage bill in the group. Considerably more than average concentration was also present in the transportation, the chemicals, the rubber products, and the iron and steel groups. At the other extreme, only 21 percent of the wage earners in the printing and publishing group were employed in establishments controlled by central offices. Low concentration in central-office establishments was also shown in the forest products and the miscellaneous industries groups.

<sup>8</sup> Wage earners were defined by the Bureau of the Census as all time and piece workers employed in the plant (including the power plant and maintenance, shipping, warehousing, and other departments). Working foremen and "gang and straw bosses" were treated as wage earners, but foremen whose duties were primarily supervisory were classed as supervisory employees. The questionnaires called for the number of wage earners on the pay rolls for the week that ended nearest the 15th day of each month, if that was a normal week, or for some normal week in the month. The average for the year exceeds somewhat the number that would have been required for the work performed if all had been continuously employed throughout the year, because it is impracticable to take into account the extent to which some or all of the wage earners may have been on part-time or for some other reason may not actually have worked on a full-time basis during the entire week covered by the entry for a given month. Moreover, in cases in which a plant was in operation during only a part of a month, the number of wage earners reported for the week selected would almost certainly be above the average for the month.

The "wages paid" item represents the total amount paid to wage earners during the year, including amounts deducted for social-security purposes. The quotient obtained by dividing the amount of wages (the total amount paid to wage earners during the year) by the average number of wage earners should not, therefore, be accepted as representing the average wage received by full-time wage earners. (For a more extended discussion of the method of classification used by the Bureau of the Census see "Census of Manufactures, 1937," pp. 7 and 8.)

TABLE 7.—Significance of central-office operations as measured by number of wage earners employed and wages paid, 1937

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Wage earners (average for the year)			Wages paid (thousand dollars)		
		Total	In establishments operated by central offices		Total	In establishments operated by central offices	
			Number	Percent		Amount	Percent
	All industries.....	8,569,231	4,380,123	51.1	10,112,883	5,595,087	55.3
1	Food and kindred products.....	888,298	425,187	47.9	977,776	491,540	50.3
2	Textiles and their products.....	1,814,387	745,883	41.1	1,549,559	621,179	40.1
3	Forest products.....	694,341	231,879	33.4	636,724	226,118	35.5
4	Paper and allied products.....	264,455	145,560	55.0	307,270	178,597	58.1
5	Printing, publishing, and allied industries.....	353,108	74,290	21.0	532,985	127,361	23.9
6	Chemicals and allied products.....	314,520	224,802	71.5	381,405	285,714	74.9
7	Products of petroleum and coal.....	106,473	95,774	90.0	176,904	161,437	91.3
8	Rubber products.....	129,818	88,531	68.2	171,305	125,268	73.1
9	Leather and its manufactures.....	331,955	144,559	43.5	311,293	140,390	45.1
10	Stone, clay, and glass products.....	300,278	163,108	54.3	348,521	202,057	58.0
11	Iron and steel and their products, not including machinery.....	1,166,287	745,873	64.0	1,661,045	1,132,501	68.2
12	Nonferrous metals and their products.....	270,327	132,862	49.1	349,276	182,557	52.3
13	Machinery, not including transportation equipment.....	955,975	520,432	54.4	1,375,506	779,617	56.7
14	Transportation equipment, air, land, and water.....	623,845	497,238	79.7	967,231	789,585	81.6
16	Miscellaneous industries.....	355,164	144,145	40.6	366,083	151,066	41.3

*Average Number of Wage Earners Per Central-Office Establishment.*

It is interesting to note at this point that central-office companies controlled 15.4 percent of the total number of manufacturing establishments (see table 2), while these controlled establishments employed 51.1 percent of the total number of wage earners in manufacturing. Thus, it is evident that the establishments operated by central offices were considerably larger in size (as measured by wage earners employed) than independent establishments. On the average, there were 170 wage earners per central-office establishment or almost 6 times the 30 workers per independent establishment. (See table 8.) The average employment in the central-office establishments in the transportation group was almost 13 times that in the independent establishments in this same group and the number of wage earners in the nonferrous metals and the petroleum and coal groups was 10 times that in independent establishments in these groups.

At the other extreme, the number of wage earners per central-office establishment in the paper and in the forest products groups was only about three times as great as that in independent establishments. Thus, there appears to be a wide spread in the degree to which establishments controlled by central offices are larger than non-central-office establishments within any group. Furthermore, there is an equally great spread in the size of establishments as measured by the number of wage earners when the comparison is between establishments in one industry group and those in another. The average size of establishments controlled by central offices in the transportation group was 13 times as large as the average in the printing and publishing group, while among non-central-office establishments

the average employment in the rubber products group was 9 times the average in the food products group.

TABLE 8.—Average number of wage earners in establishments operated by central offices and in independently operated establishments, 1937

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Establishments operated by central offices			Establishments not operated by central offices		
		Wage earners (average for the year)	Number of establishments	Average number of wage earners per establishment	Wage earners (average for the year)	Number of establishments	Average number of wage earners per establishment
	All industries.....	4, 380, 123	25, 699	170	4, 189, 108	141, 095	30
1	Food and kindred products....	425, 187	9, 267	46	463, 111	39, 460	12
2	Textiles and their products....	745, 883	2, 703	276	1, 068, 504	17, 913	60
3	Forest products.....	231, 879	2, 516	92	462, 462	15, 496	30
4	Paper and allied products.....	145, 560	960	152	118, 895	2, 093	57
5	Printing, publishing, and allied industries.....	74, 290	905	82	278, 818	21, 846	13
6	Chemicals and allied products.....	224, 802	2, 348	96	89, 718	5, 071	18
7	Products of petroleum and coal.....	95, 774	326	294	10, 699	349	31
8	Rubber products.....	88, 531	110	805	41, 287	368	112
9	Leather and its manufactures.....	144, 559	503	287	187, 396	2, 861	66
10	Stone, clay, and glass products.....	163, 108	1, 325	123	137, 170	4, 746	29
11	Iron and steel and their products, not including machinery.....	745, 873	1, 519	491	420, 414	6, 826	62
12	Nonferrous metals and their products.....	132, 862	470	283	137, 465	4, 833	28
13	Machinery, not including transportation equipment.....	520, 432	1, 435	363	435, 543	8, 526	51
14	Transportation equipment, air, land, and water.....	497, 238	459	1, 083	126, 607	1, 483	85
16	Miscellaneous industries.....	144, 145	853	169	211, 019	9, 224	23

A comparison of the average number of wage earners per central-office establishment and per independent establishment is shown graphically in chart 5.

#### *Wages Paid and Average Wage Payment per Worker.*

In table 7 it may be seen that 55.3 percent of the total wages paid in all manufacturing was paid in establishments controlled by central offices. The proportion which wages paid in central-office establishments bears to the total wage bill of all establishments in the various industry groups is, of course, very closely correlated with the percentage which wage earners in central-office establishments represent of the total wage earners in each group.

This wage material is broken down by industry groups in table 9 and chart 6 to show the average wage payment per wage earner in the central-office establishments and in the independent establishments. For interindustry-group comparisons, certain limitations on the data should be kept in mind. In industries and industry groups where employment is sporadic, intermittent, or of a highly seasonal nature, the average will be lower than in industries or industry groups where employment is continuous, although the wage rate may be similar. The schedules call for the number of wage earners on the pay roll in the week ending nearest the middle of each month, and

these 12 monthly figures are averaged to give the data used in these tables. The material on wages paid represents the actual amount paid in wages during the year. A part-time or intermittent worker would thus be counted in the average number of wage earners if he should happen to be on the pay roll of a reporting concern for a few days at any one of the 12 periods near the middle of the month when the count is taken, although the wages paid the individual would be

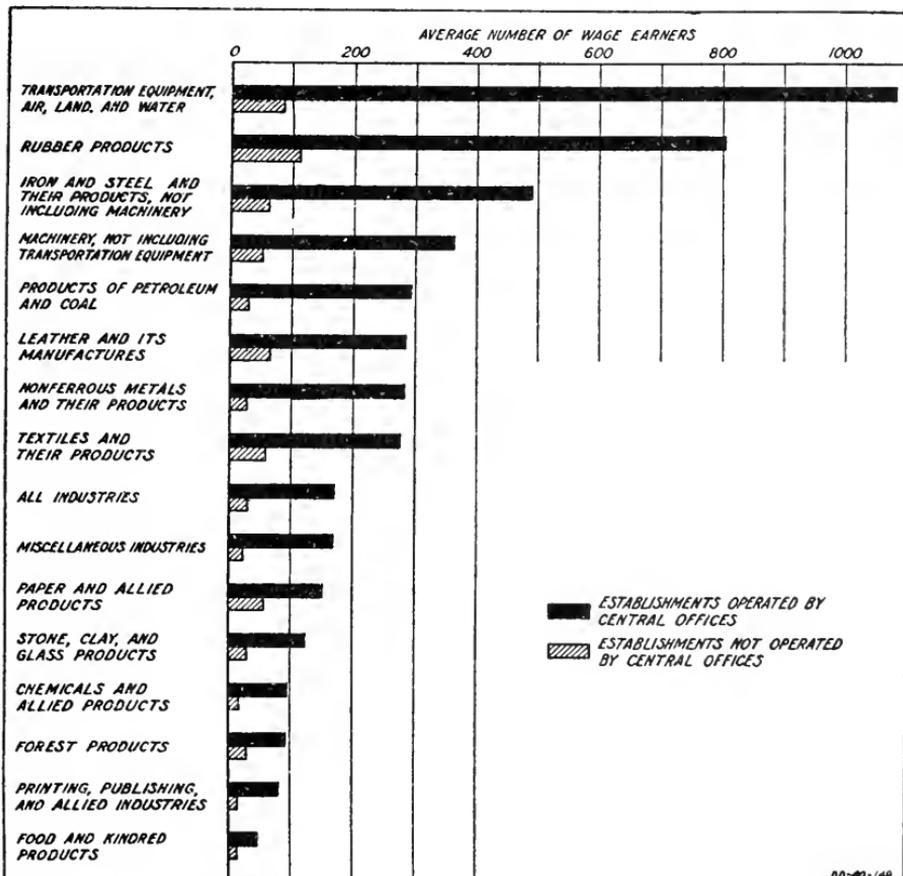


CHART 5.—AVERAGE NUMBER OF WAGE EARNERS IN ESTABLISHMENTS OPERATED BY CENTRAL OFFICES AND IN INDEPENDENTLY OPERATED ESTABLISHMENTS, BY INDUSTRY GROUPS, 1937.

for only these few days of work. In industries and industry groups where casual labor is common, there is a considerable amount of this type of counting that would tend to reduce the average wage paid per worker. For this reason the material in table 9 should not be viewed as an annual rate. If the data were put on a full-time equivalent basis or if wage-hour data were assembled, it would be possible to make interindustry comparisons in terms of rates.

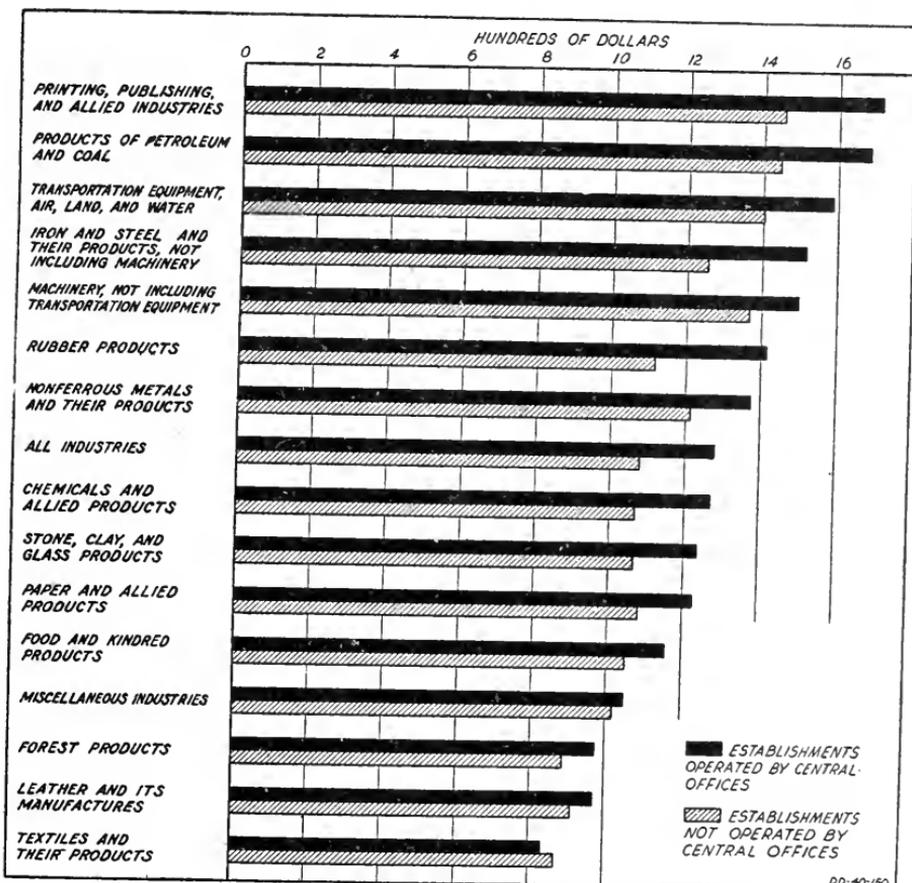
TABLE 9.—*Wages paid per wage earner in establishments operated by central offices and in independently operated establishments, 1937*

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Establishments operated by central offices			Establishments not operated by central offices		
		Wages paid (thousand dollars)	Wage earners (average for the year)	Wages paid per wage earner (dollars)	Wages paid (thousand dollars)	Wage earners (average for the year)	Wages paid per wage earner (dollars)
	All industries.....	5,595,087	4,380,123	1,277	4,517,796	4,189,108	1,078
1	Food and kindred products...	491,540	425,187	1,156	486,236	463,111	1,050
2	Textiles and their products....	621,179	745,883	833	928,380	1,068,504	869
3	Forest products.....	226,118	231,879	975	410,606	462,462	888
4	Paper and allied products.....	178,597	145,560	1,227	128,673	118,895	1,082
5	Printing, publishing, and allied industries.....	127,361	74,290	1,714	405,624	278,818	1,455
6	Chemicals and allied products.....	285,714	224,802	1,271	95,691	89,718	1,067
7	Products of petroleum and coal.....	161,437	95,774	1,686	15,467	10,699	1,446
8	Rubber products.....	125,268	88,531	1,415	46,037	41,287	1,115
9	Leather and its manufactures.....	140,390	144,559	971	170,903	187,396	912
10	Stone, clay, and glass products.....	202,057	163,108	1,239	146,464	137,170	1,068
11	Iron and steel and their products, not including machinery.....	1,132,501	745,873	1,518	528,544	420,414	1,257
12	Nonferrous metals and their products.....	182,557	132,862	1,374	166,719	137,465	1,213
13	Machinery, not including transportation equipment.....	779,617	520,432	1,498	595,889	435,543	1,368
14	Transportation equipment, air, land, and water.....	789,685	497,238	1,588	177,546	126,607	1,402
16	Miscellaneous industries.....	151,063	144,145	1,048	215,017	211,019	1,019

In addition to the limitations on interindustry-group wage comparisons cited above, there are other possible factors responsible for wage differences, several of which deserve special comment. In the first place the geographical area in which the concerns operating in the industry group are predominantly active, or the localization of the industry, may be such that different wage levels prevail. Certain industries tend to be centered in well-defined areas in response to various location economies. These advantages as well as such factors as cost of living, degree of urbanization, availability of workers, etc., are quite significant in the determination of wage rates. In the second place, average wage levels vary with the degrees of mechanization of industries. In the more highly mechanized lines the skilled workman has been supplanted in considerable measure by modern machine techniques. As a consequence of this development, the proportion of unskilled workers in the total labor requirements of such industries has increased; this situation must, of course, be taken into account when making wage comparisons among different industries. Finally, wage rates in different industries vary directly with the degree to which labor is organized. The drive toward organization has made more rapid progress in certain industries than in others. While the existence of strong unions is undoubtedly reflected in wage levels, the possibility that organized workers may receive higher wages than unorganized workers is contingent upon the general degree of prosperity in an industry as well as upon the available labor supply.

These limitations on interindustry-group comparisons do not apply to so great an extent to comparisons between average wages paid per worker in central-office establishments and in independent establishments when the comparisons are within one industry group. Comparisons of average wages paid per worker in central-office establishments and in independent establishments are fairly reliable when confined to a single industry group because (1) there is no a priori reason to assure that labor turnover is less in central-office establish-



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CHART 6.--AVERAGE WAGE PAID PER WAGE EARNER IN ESTABLISHMENTS OPERATED BY CENTRAL OFFICES AND IN INDEPENDENTLY OPERATED ESTABLISHMENTS, BY INDUSTRY GROUPS, 1937.

ments than in non-central-office establishments, since the effective physical forces that condition each industry and the management devices for spreading work over the season or for reducing the casualness of labor tend to be common to all establishments, and (2) central-office establishments are not concentrated in the industries within industry groups that have low labor turnover to a degree that would impose any serious limitations on the general conclusions that may be drawn from the table. On the contrary, central-office establishments are operated in all industries with the exception of those minor cases noted in appendix B.

With the exception of the textile group, the average of the wages paid per wage earner was greater in establishments operated by central offices than in independent units. In the rubber products group the excess ran as high as 27 percent, while in the miscellaneous industries group it was only 3 percent.

#### COST OF MATERIALS AND VALUE OF PRODUCTS OF ESTABLISHMENTS CONTROLLED BY CENTRAL OFFICES

The cost of materials<sup>9</sup> used in establishments controlled by central offices represented 65.1 percent of the costs of all materials used in manufacturing establishments in 1937, while the value of products<sup>10</sup> manufactured in central-office establishments was 61.1 percent of the total value of all manufacturing production. (See table 10.) The value added by manufacture<sup>11</sup> in the establishments controlled by central offices was 56 percent of the total value added in all manufacturing. (The value added by central offices is analyzed in more detail later.) Owing to the double counting that occurs as goods go through successive stages of manufacturing, the "value added by manufacture" figure is a more accurate measure of the net contribution of manufacturing operations to the national product. If one is interested in measuring the significance marketwise of a company or group of companies, however, the value of products figure is more revealing, since the control of supply in the market is best measured by the value of products. Both a vertically integrated and a non-integrated concern may have equal value of products and thus may be equally significant in the market, but the value added by the

<sup>9</sup> Cost of materials includes materials, supplies, and containers, fuel, purchased electric energy, and contract work. A separate entry was made for each of these items but they were all added together to arrive at a total cost of materials, etc., to be deducted from value of products to obtain value added by manufacture. The cost of fuel covers coal, fuel oil, gasoline, etc., used for power purposes, for heating buildings, and for smelting and other forms of industrial heating, but does not cover the cost of coal and oil used as materials in the manufacture of gas and coke. (For a more extended discussion of the method of classification used by the Bureau of the Census, see "Census of Manufactures, 1937," p. 8.)

<sup>10</sup> The amounts included under value of products are the selling values at the factory or plant of all commodities produced (or, for some industries, receipts for work done) during the census year, whether sold-transferred to other plants, or in stock, and consequently, under normal conditions, the total value of products covers the cost or production (including overhead expenses) and profits. It also covers selling expenses except in cases where separate sales departments were operated, in which cases the values at which the products were turned over to the sales departments were reported. The value of products manufactured, as given in the census reports, is, of course, the total of the actual values reported by the manufacturers themselves and not the result of computations made by the Bureau of the Census.

Some establishments make partly finished products, or containers and auxiliary articles, for the use of other manufacturing establishments under the same ownership. For example: A blast furnace may produce pig iron for use in the production of steel in plants under the same ownership. In such cases, the "transfer value" assigned by the manufacturer is accepted as the value of the product in question. This transfer value is usually based on market prices or on the cost of manufacture, but sometimes it is purely arbitrary. The products made by the establishments in a given industry, on the one hand, usually include minor products different from those covered by the industry designation, and, on the other hand, may not include the entire output of products normally belonging to the industry, because some of this class of commodities may be made as secondary products by establishments classified in other industries. In the case of each industry, the value of the minor or secondary products normally belonging to it is offset to a greater or a less extent by that of commodities normally belonging to it but made as secondary products by establishments engaged primarily in other lines of manufacture. In most cases, therefore, the total value of the products of an industry, as reported, does not differ greatly from the value of the total output, in all industries, of the classes of products covered by the industry designation. (For a more extended discussion of the method of classification used by the Bureau of the Census, see "Census of Manufactures, 1937," pp. 8 and 9.)

<sup>11</sup> The value of products is not a satisfactory measure of the importance of a given industry, because only a part of this value is actually created within the industry, another part, and often a much larger one, being contributed by the value of the materials used. For some purposes, the most satisfactory measure is the "value added by manufacture"—that is, the increment in value, as measured by the price of goods produced and of materials processed. This measures the net addition to the value of commodities, and is almost free from the duplication that is a factor in the total value of products. It is calculated for all industries by subtracting the cost of materials, supplies, containers, fuel, purchased electric energy, and contract work from the value of products. In comparing manufacturing industries with one another the relation between the value of finished products and the cost of materials should be kept constantly in mind. The products of one industry may be valued at the same amount as those of another, but the one may have added several times as much value to the materials as the other, and may therefore have been of correspondingly greater economic importance. (For a more extended discussion of the method of classification used by the Bureau of the Census, see "Census of Manufactures, 1937," pp. 10 and 11.)

vertically integrated concern will be much larger as more of the stages of manufacturing or processing of a commodity toward the final finished goods are counted in the total for that concern than for the non-integrated one.

TABLE 10.—*Significance of central-office operations as measured by cost of materials used and value of products, 1937*

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Cost of materials, etc., and contract work (thousand dollars)			Value of products (thousand dollars)		
		Total	In establishments operated by central offices		Total	In establishments operated by central offices	
			Amount	Percent		Amount	Percent
	All industries.....	35, 539, 333	23, 131, 821	65. 1	60, 712, 872	37, 106, 858	61. 1
1	Food and kindred products.....	7, 911, 368	4, 636, 009	58. 6	11, 265, 610	6, 390, 431	56. 7
2	Textiles and their products.....	4, 089, 124	1, 629, 750	39. 9	7, 061, 609	2, 791, 107	39. 5
3	Forest products.....	1, 173, 931	454, 851	38. 7	2, 439, 530	901, 829	37. 0
4	Paper and allied products.....	1, 208, 154	748, 417	61. 9	2, 060, 849	1, 258, 838	61. 1
5	Printing, publishing, and allied industries.....	793, 092	182, 909	23. 1	2, 585, 699	609, 040	23. 6
6	Chemicals and allied products.....	1, 927, 948	1, 382, 172	71. 7	3, 721, 531	2, 642, 664	71. 0
7	Products of petroleum and coal.....	2, 366, 802	2, 132, 174	90. 1	2, 954, 465	2, 641, 392	89. 4
8	Rubber products.....	514, 260	391, 514	76. 1	883, 033	653, 555	74. 0
9	Leather and its manufactures.....	899, 469	451, 478	50. 2	1, 491, 513	721, 195	48. 4
10	Stone, clay, and glass products.....	523, 112	336, 953	64. 4	1, 395, 358	889, 098	63. 7
11	Iron and steel and their products, not including machinery.....	4, 047, 687	3, 104, 995	76. 7	7, 480, 360	5, 431, 569	72. 6
12	Nonferrous metals and their products.....	1, 926, 526	1, 497, 672	77. 7	2, 783, 285	1, 960, 150	70. 4
13	Machinery, not including transportation equipment.....	2, 424, 495	1, 408, 592	58. 1	5, 891, 599	3, 356, 470	57. 0
14	Transportation equipment, air, land, and water.....	4, 099, 756	3, 699, 693	90. 2	5, 985, 889	5, 247, 030	87. 7
16	Miscellaneous industries.....	1, 633, 610	1, 074, 642	65. 8	2, 712, 042	1, 612, 490	59. 5

### *Value of Products Manufactured in Establishments Controlled by Central Offices.*

The proportion of the total value of products manufactured in establishments controlled by central offices in the various industry groups is shown in table 10. Almost 90 percent of the value of products in the petroleum and coal group and 88 percent in the transportation group were produced in establishments controlled by central offices. The proportions of the total value of products accounted for by central-office establishments in the nonferrous metals, the iron and steel, the chemical, and the rubber products groups were closely clustered between 70 and 74 percent. At the other extreme, the contribution of central-office establishments to the total value of products of the printing and publishing group was only 24 percent, while decidedly less than average contributions were also recorded by the central-office establishments in the forest products and in the textile groups—37 and 40 percent of the totals for the groups, respectively.

Thus, in terms of value of products, the establishments operated by central-office enterprises, controlled approximately nine-tenths of the supply of the products of the petroleum and coal and of the transportation groups. This fact alone affords no a priori basis for assuming any lack of competition. Quite the contrary, intense competition may be present among the central-office companies active

in the groups. Referring to the material in table 1, it may be seen that 66 central offices were predominantly active in the petroleum and coal group and 91 central offices were predominantly active in the transportation group. One is warranted in inferring from these data, however, that there were certain adventitious circumstances present in these groups that led to the establishment of central-office companies as the typical form of organization.

*Average Value of Products per Establishment.*

In table 11 and chart 7 the fact is again demonstrated, in terms of another measure, that establishments operated by central offices were larger than those operated as independent concerns. On the average, the value of products per central-office establishment was \$1,443,900 as compared with an average value of products in non-central-office establishments of \$167,300. In other words, the value of products of the average central-office establishment was almost 9 times as great as that of the non-central-office establishment. The comparison is even more striking in certain industry groups. For example, the value of products of establishments controlled by central offices in the nonferrous metals group and in the transportation group was 24 and 23 times, respectively, greater than that in the average independent establishment in the same groups. The difference in size was much less pronounced in the paper and in the forest products groups—in these groups the establishments operated by central-office enterprises were only about 3.5 times as large, in terms of value of products, as establishments independently operated.

TABLE 11.—Average value of products per establishment in establishments operated by central offices and in independently operated establishments, 1937

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Establishments operated by central offices			Establishments not operated by central offices		
		Value of products (thousand dollars)	Number of establishments	Value of products per establishment (dollars)	Value of products (thousand dollars)	Number of establishments	Value of products per establishment (dollars)
	All industries.....	37, 106, 858	25, 699	1, 443, 903	23, 606, 014	141, 095	167, 306
1	Food and kindred products....	6, 390, 431	9, 267	689, 590	4, 875, 179	39, 460	123, 547
2	Textiles and their products....	2, 791, 107	2, 703	1, 032, 596	4, 270, 502	17, 913	238, 402
3	Forest products.....	901, 829	2, 516	358, 438	1, 537, 701	15, 496	99, 232
4	Paper and allied products....	1, 258, 838	960	1, 311, 290	802, 011	2, 093	383, 187
5	Printing, publishing, and allied industries.....	609, 040	905	672, 972	1, 976, 659	21, 846	90, 482
6	Chemicals and allied products.	2, 642, 664	2, 348	1, 125, 496	1, 078, 867	5, 071	212, 752
7	Products of petroleum and coal.....	2, 641, 392	326	8, 102, 429	313, 073	349	897, 057
8	Rubber products.....	653, 555	110	5, 941, 409	229, 478	368	623, 582
9	Leather and its manufactures.	721, 195	503	1, 433, 787	770, 318	2, 861	269, 247
10	Stone, clay, and glass products.....	889, 098	1, 325	671, 017	506, 760	4, 746	106, 776
11	Iron and steel and their products, not including machinery.....	5, 431, 569	1, 519	3, 575, 753	2, 048, 791	6, 826	300, 145
12	Nonferrous metals and their products.....	1, 960, 150	470	4, 170, 532	823, 135	4, 833	170, 316
13	Machinery, not including transportation equipment....	3, 356, 470	1, 435	2, 339, 003	2, 535, 129	8, 526	297, 341
14	Transportation equipment, air, land, and water.....	5, 247, 030	459	11, 431, 438	738, 859	1, 483	498, 219
16	Miscellaneous industries.....	1, 612, 490	853	1, 890, 375	1, 099, 552	9, 224	119, 205

The validity of size comparisons among the various industry groups is subject to some rather sweeping limitations. In the first place, in some of the industry groups, the raw material coming into the manufacturing process has a much higher value, either intrinsic or because of extensive pre-manufacturing operations, than in other industry groups, and this higher value is carried through in the final value-of-products figure. Thus, to cite the extremes, the average value of products of central-office establishments in the nonferrous

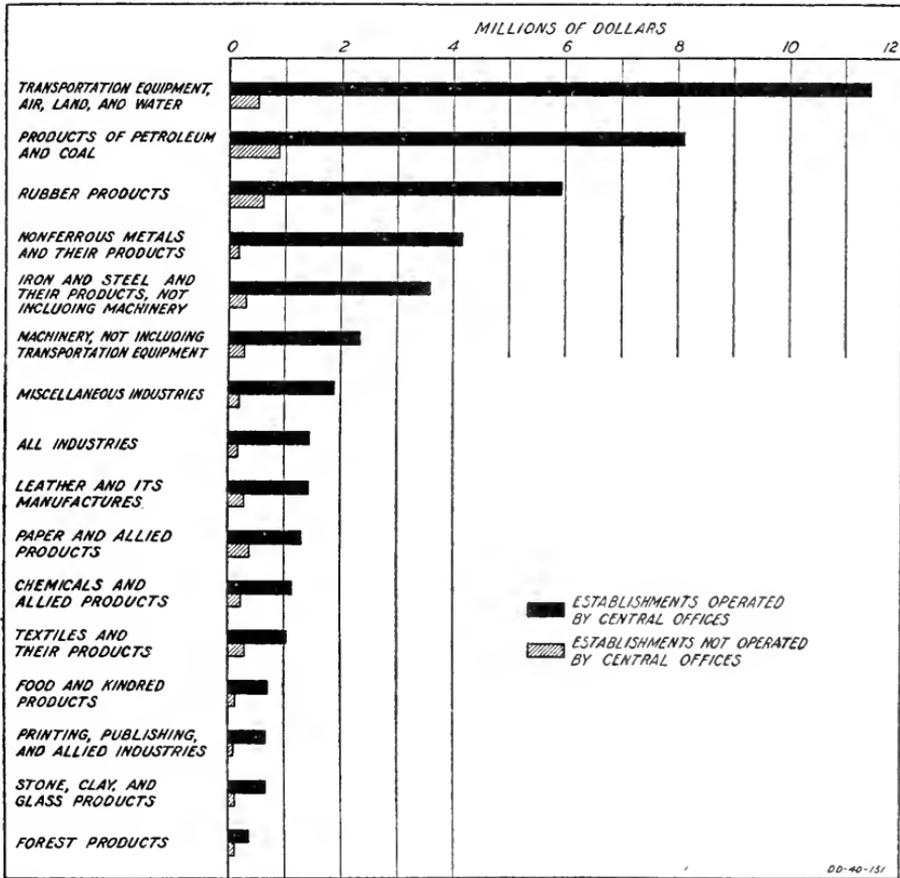


CHART 7.—AVERAGE VALUE OF PRODUCTS PER ESTABLISHMENT IN ESTABLISHMENTS OPERATED BY CENTRAL OFFICES AND IN INDEPENDENTLY OPERATED ESTABLISHMENTS, BY INDUSTRY GROUPS, 1937.

metals group (this group includes such industry classifications as aluminum products, gold leaf and foil, gold, silver, and platinum for refining and alloying, silverware and plated ware, smelting and refining of copper, lead, zinc, and other nonferrous metals) was almost 12 times as large as the average value of products of central-office establishments in the forest products group. Obviously, much of this difference may be accounted for by the differences in the prices of timber and of gold, silver, lead, zinc, and aluminum ores.

In the second place, the validity of comparisons among industry groups is subject to limitations because there are wide differences

among industry groups in the amount of activity of a strictly manufacturing nature that goes into the products on their journey from the mine or the farm through manufacturing to the wholesaler and retailer. In some lines extensive fabrication is necessary before the product goes to the wholesaler or retailer, as in the transportation group, while in other lines the manufacturing process is more simple in nature and the value added by manufacture thus constitutes a smaller proportion of the value of the finished product, as in certain industries in the food group.

There are other limitations that relate to the nature of the data. Among some of the industry groups there is a tendency for the wholesaling activity to be carried on by the manufacturer and, since the data in many cases are not kept separately by the manufacturer, a portion of the value of products reported by the manufacturer to the Bureau of the Census is not strictly the result of manufacturing operations. To the extent that the practice in this regard varies from industry to industry, comparisons based on the data do not give a true picture of the variations among industry groups of the average value of manufactured products per establishment in the group.

#### *Average Value of Products per Wage Earner.*

The average value of products per wage earner in establishments operated by central offices was \$8,470, as contrasted with an average value of products of \$5,640 in establishments not operated by central offices. (See table 12.) With the exception of the textile, the chemical, and the petroleum and coal groups, the value of products per wage earner was higher in central-office establishments than in independent establishments. In the case of the nonferrous metals group, the average value of products per wage earner in central-office establishments was almost two and one-half times the average value of products in independent establishments.

The exceptions noted in these industry groups may be accounted for by the peculiar characteristics of the manufacturing set-up in the industries that made up these groups. In the textile group, a very sizeable portion of the value of products of the group was produced under the contract system. Under this system, a manufacturing jobber lets out the work to a contract factory and each reports his value of products on the same piece of work. In the case of the schedules returned to the Bureau of the Census by the manufacturing jobbers, there were many instances in which no wage earners were reported but a high value of products was shown. Furthermore, these manufacturing jobbers were predominantly independent concerns. The wage earners were reported once by the contract factory, but both the contract factory and the manufacturing jobbers reported the value of products.

The larger value of products per wage earner in non-central-office establishments in the petroleum and coal and in the chemical groups is to be accounted for by several different factors or combinations of factors present in varying degrees in different industries within the groups. An examination of the schedules submitted for central offices and independent establishments indicates that the following factors may account for the exceptional situation in these groups.

TABLE 12.—Average value of products per wage earner in establishments operated by central offices and in independently operated establishments, 1937

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Establishments operated by central offices			Establishments not operated by central offices		
		Value of products (thousand dollars)	Wage earners (average for the year)	Value of products per wage earner (dollars)	Value of products (thousand dollars)	Wage earners (average for the year)	Value of products per wage earner (dollars)
	All industries.....	37, 106, 858	4, 380, 123	8, 472	23, 606, 014	4, 189, 108	5, 635
1	Food and kindred products.....	6, 390, 431	425, 187	15, 026	4, 875, 179	463, 111	10, 527
2	Textiles and their products.....	2, 791, 107	745, 883	3, 742	4, 270, 502	1, 068, 504	3, 997
3	Forest products.....	901, 829	231, 879	3, 889	1, 537, 701	462, 462	3, 325
4	Paper and allied products.....	1, 258, 838	145, 560	8, 648	802, 011	118, 895	6, 745
5	Printing, publishing, and allied industries.....	609, 040	74, 290	8, 198	1, 976, 659	278, 818	7, 089
6	Chemicals and allied products.....	2, 642, 664	224, 802	11, 756	1, 078, 867	89, 718	12, 025
7	Products of petroleum and coal.....	2, 641, 392	95, 774	27, 579	313, 073	10, 699	29, 262
8	Rubber products.....	653, 555	88, 531	7, 382	229, 478	41, 287	5, 558
9	Leather and its manufactures.....	721, 195	144, 559	4, 989	770, 318	187, 396	4, 111
10	Stone, clay, and glass products.....	869, 098	163, 108	5, 451	506, 760	137, 170	3, 694
11	Iron and steel and their products, not including machinery.....	5, 431, 569	745, 873	7, 282	2, 048, 791	420, 414	4, 873
12	Nonferrous metals and their products.....	1, 960, 150	132, 862	14, 753	823, 135	137, 465	5, 988
13	Machinery, not including transportation equipment.....	3, 356, 470	520, 432	6, 449	2, 535, 129	435, 543	5, 821
14	Transportation equipment, air, land, and water.....	5, 247, 030	497, 238	10, 552	735, 859	126, 607	5, 836
16	Miscellaneous industries.....	1, 612, 490	144, 145	11, 187	1, 099, 552	211, 019	5, 211

In the first place, one schedule was used in the collection of data for an industry, but inquiries on activity in several different lines were included on the same schedule. It so happened that many of the independent establishments were engaged in these "other" operations included in the industry, while establishments operated by central offices were active in the main line in the industry. Owing to the very nature of these "other" lines—the products were produced for the custom trade or were special orders requiring specialized operations—the establishments therein turned out a higher value of products per wage earner. The reports for the independent establishments thus tended to cover a different type of manufacturing operation and one would not expect the general tendency (namely, that central-office establishments have a higher value of products per wage earner than non-central-office establishments) to prevail in these industry groups. Thus, a valid basis for comparison was lacking when the value of products per wage earner in independent establishments was the result of one type of operation and that of central-office establishments was the result of another.

Although there were 351 separate industries listed by the Bureau of the Census, it was not possible within that number to include all the different types of manufacturing operations without placing in the same industry category some lines that were not exactly comparable. This limitation holds for all industry groups. It was only in the industries cited above, however, that the central-office activity was largely confined to one line included under an industry classification, while non-central-office establishments were in another line.

A second cause for the different situation in these industry groups is associated with the more or less unusual situation that existed in one industry. The schedules for this industry revealed that approximately 90 percent of the total value of products of the independent establishments in the industry was produced in two establishments where the value of products per wage earner was higher than that in any central-office establishment.

An examination of the schedules revealed two other industries in which the average work period for the year was longer in independent establishments than in central-office establishments. If one may assume equal efficiency (equal value of products per man-hour) the value of products per wage earner in the independent establishments would obviously be larger than that in the central-office establishments.

A fourth reason for the exceptional situation existing in these two industry groups was the presence in two industries within the groups of an apparently higher efficiency in independent establishments than in central-office establishments, as measured by value of products per wage-earner hour. These four possible explanations for the unusual situation in these industry groups were not present uniformly in each industry within the groups. Rather, one of the factors was operative in one industry and another in a second industry, while in a third industry a combination of several of the factors was the causal element.

#### VALUE ADDED BY MANUFACTURE IN ESTABLISHMENTS CONTROLLED BY CENTRAL OFFICES

Since the value added figure is a residual obtained by subtracting cost of materials, etc., from the value of products, the magnitudes obtained reflect variations in the basic series—cost of materials and value of products—and from these variations the character of the value added series may have been anticipated from a study of the primary data. For the sake of completeness and in order to show the relative portions of the total manufacturing operations accounted for by each industry group, tables 13, 14, and 15 were compiled.

Establishments operated by central offices accounted for 55.5 percent of the total value added by manufacture. More than four-fifths of the total value added by manufacture in the petroleum and coal group and in the transportation group was contributed by central-office establishments. At the other extreme, only about one-fourth of the total value added in the printing and publishing group was the result of central-office operations.

Columns 4, 5, and 6 of table 13 show the relative amounts each industry group contributed to the total value added by manufacture. This material was broken down to show the distribution among industry groups of the contribution of establishments controlled by central offices and the contribution of independent establishments. Slightly more than 40 percent of the total value added by manufacture was accounted for by the food, the iron and steel, and the machinery groups, each of these groups accounting for more than 13 percent of the total. The rubber products group was least important in terms of the proportion contributed by it to the total value added by manufacture. In a picture of all manufacturing activity, this material is indicative of the relative significance of the manufacturing operations in each industry group.

Of the total value added in establishments controlled by central-office companies (see column 5), value added in the iron and steel group accounted for 17 percent and the value added in the machinery group and the food group was 14 percent and 13 percent, respectively. The central-office establishments in the rubber products group made the smallest contribution to the total value added by central-office establishments.

Among the independent establishments (see column 6, table 13), the contribution of the textile group was the largest of any single group, accounting for over 16 percent of the total value added in non-central-office establishments. A sizable part of the total was also contributed by establishments in the food group, the machinery group, and the printing and publishing group. The independent establishments in the petroleum and coal group and in the rubber group made the least significant contribution to the total value added by independent establishments. The variations in the amounts contributed by central-office establishments and non-central-office establishments are accounted for by the relative position of the industry group in the distribution shown in column 4 and by the extent of central-office operations in the various industry groups.

TABLE 13.—*Significance of central-office operations as measured by value added by manufacture, 1937*

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Value added by manufacture					
		Total (thousand dollars)	In establishments operated by central offices		Percentage distribution		
			Amount (thousand dollars)	Percent	Total	In establishments operated by central offices	In establishments not operated by central offices
	All industries.....	25, 173, 539	13, 975, 037	55. 5	100. 0	100. 0	100. 0
1	Food and kindred products.....	3, 354, 242	1, 754, 422	52. 3	13. 3	12. 6	14. 3
2	Textiles and their products.....	2, 972, 485	1, 161, 357	39. 1	11. 8	8. 3	16. 2
3	Forest products.....	1, 265, 599	446, 978	35. 3	5. 0	3. 2	7. 3
4	Paper and allied products.....	852, 695	510, 421	59. 9	3. 4	3. 7	3. 1
5	Printing, publishing, and allied industries.....	1, 792, 607	426, 131	23. 8	7. 1	3. 0	12. 2
6	Chemicals and allied products.....	1, 793, 583	1, 260, 492	70. 3	7. 1	9. 0	4. 8
7	Products of petroleum and coal.....	587, 663	509, 218	86. 7	2. 3	3. 6	. 7
8	Rubber products.....	368, 773	262, 041	71. 1	1. 5	1. 9	1. 0
9	Leather and its manufactures.....	592, 044	269, 717	45. 6	2. 4	1. 9	2. 9
10	Stone, clay, and glass products.....	872, 746	552, 145	63. 3	3. 5	4. 0	2. 9
11	Iron and steel and their products, not including machinery.....	3, 432, 673	2, 326, 574	67. 8	13. 6	16. 6	9. 9
12	Nonferrous metals and their products.....	856, 759	462, 478	54. 0	3. 4	3. 3	3. 5
13	Machinery, not including transportation equipment.....	3, 467, 104	1, 947, 878	56. 2	13. 8	13. 9	13. 6
14	Transportation equipment, air, land, and water.....	1, 886, 133	1, 547, 337	82. 0	7. 5	11. 1	3. 0
16	Miscellaneous industries.....	1, 078, 432	537, 848	49. 9	4. 3	3. 8	4. 8

*Average Value Added by Manufacture per Establishment.*

The average value added per central-office establishment was seven times as large as the value added per non-central-office establishment—\$543,800 and \$79,400 per establishment, respectively. (See table 14

and chart 8.) The value added by central-office establishments in the transportation group was approximately 15 times the value added per independent establishment and the value added by central-office establishments in the nonferrous metals group was 12 times that added by independent establishments. At the other extreme, central-office establishments in the forest products group and in the paper group had a value added per establishment a little more than three times as high as the value added by independent establishments in these groups.

TABLE 14.—Average value added by manufacture per establishment in establishments operated by central offices and in independent establishments, 1937

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products]

Group No.	Industry group	Establishments operated by central offices			Establishments not operated by central offices		
		Value added (thousand dollars)	Number of establishments	Value added per establishment (dollars)	Value added (thousand dollars)	Number of establishments	Value added per establishment (dollars)
	All industries .....	13,975,037	25,699	543,797	11,198,502	141,095	79,369
1	Food and kindred products.....	1,754,422	9,267	189,319	1,599,820	39,460	40,543
2	Textiles and their products.....	1,161,357	2,703	429,655	1,811,128	17,913	101,107
3	Forest products.....	446,978	2,516	177,654	818,621	15,496	52,828
4	Paper and allied products.....	510,421	960	531,689	342,274	2,093	163,533
5	Printing, publishing, and allied industries.....	426,131	905	470,863	1,366,476	21,846	62,550
6	Chemicals and allied products.....	1,260,492	2,348	536,836	533,091	5,071	105,125
7	Products of petroleum and coal.....	509,218	326	1,562,018	78,445	349	224,771
8	Rubber products.....	262,041	110	2,382,191	106,732	368	290,033
9	Leather and its manufactures.....	269,717	503	536,217	322,327	2,861	112,662
10	Stone, clay, and glass products.....	552,145	1,325	416,713	320,601	4,746	67,552
11	Iron and steel and their products, not including machinery.....	2,326,574	1,519	1,531,648	1,106,099	6,826	162,042
12	Nonferrous metals and their products.....	462,478	470	983,996	394,281	4,833	81,581
13	Machinery, not including transportation equipment.....	1,947,878	1,435	1,357,406	1,519,226	8,526	178,187
14	Transportation equipment, air, land, and water.....	1,547,337	459	3,371,105	338,796	1,483	228,453
16	Miscellaneous industries.....	537,848	853	630,537	540,584	9,224	58,606

Some variation occurs in the relative ranks of the industry groups when they are arrayed on the basis of the value added per establishment by (1) central-office and (2) independent organizations. Among the industry groups and when the comparison was limited to the establishments operated by central offices, the highest value added per establishment was in the transportation group and the lowest in the forest products group, while the highest value added per establishment in the non-central-office break-down occurred in the rubber group and the lowest was in the food group.

*Average Value Added by Manufacture per-Wage Earner.*

The average value added per wage earner in central-office establishments was almost 20 percent higher than the average value added per wage earner in independent establishments, as may be seen in table 15. With the exception of the petroleum and coal, the chemical, and the textile groups, the average value added per wage earner in central-office establishments was higher in each industry group than the value added per wage earner in non-central-office establishments. The

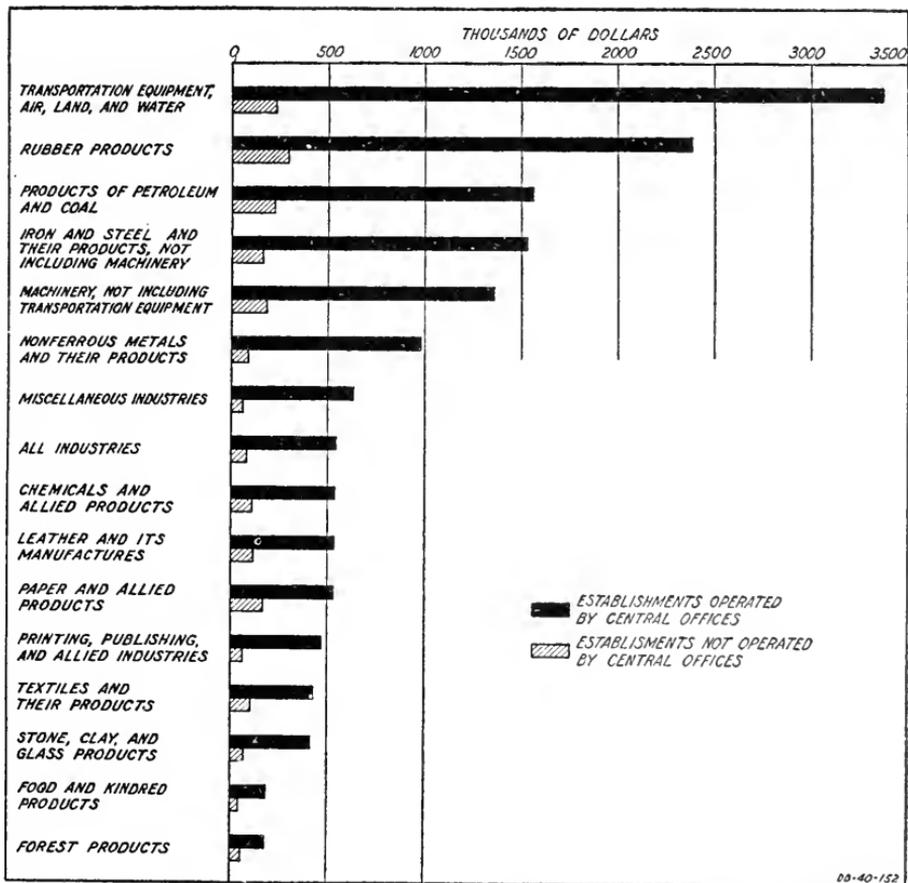


CHART 8.—AVERAGE VALUE ADDED BY MANUFACTURE PER ESTABLISHMENT IN ESTABLISHMENTS OPERATED BY CENTRAL OFFICES AND IN INDEPENDENTLY OPERATED ESTABLISHMENTS, BY INDUSTRY GROUPS, 1937.

average value added per wage earner in central-office-controlled establishments in the stone, clay, and glass group and in the miscellaneous industries group was approximately 45 percent higher than that in the non-central-office establishments for the same groups. The causes for the divergence from the general pattern in the petroleum and coal, chemical, and textile groups were set forth in the discussion above relative to the average value of products per wage earner. This analysis is relevant to the value-added picture as well.

TABLE 15.—Average value added by manufacture per wage earner in establishments operated by central offices and in independently operated establishments, 1937

[NOTE.—In this table data are shown in the industry group in which the establishments are classified by the Bureau of the Census and not in the group in which the central office has its major value of products.]

Group No.	Industry group	Establishments operated by central offices			Establishments not operated by central offices		
		Value added (thousand dollars)	Wage earners (average for the year)	Value added per wage earner (dollars)	Value added (thousand dollars)	Wage earners (average for the year)	Value added per wage earner (dollars)
	All industries.....	13, 975, 037	4, 380, 123	3, 191	11, 198, 502	4, 189, 108	2, 673
1	Food and kindred products....	1, 754, 422	425, 187	4, 126	1, 599, 820	463, 111	3, 455
2	Textiles and their products....	1, 161, 357	745, 883	1, 557	1, 811, 128	1, 068, 504	1, 690
3	Forest products.....	446, 978	231, 879	1, 928	818, 621	462, 462	1, 770
4	Paper and allied products.....	510, 421	145, 560	3, 507	342, 274	118, 895	2, 879
5	Printing, publishing, and allied industries.....	426, 131	74, 290	5, 736	1, 366, 476	278, 818	4, 901
6	Chemicals and allied products.....	1, 260, 492	224, 802	5, 607	533, 091	89, 718	5, 942
7	Products of petroleum and coal.....	509, 218	95, 774	5, 317	78, 445	10, 699	7, 332
8	Rubber products.....	262, 041	88, 531	2, 960	106, 732	41, 287	2, 585
9	Leather and its manufactures.....	269, 717	144, 559	1, 866	322, 327	187, 396	1, 720
10	Stone, clay, and glass products.....	552, 145	163, 108	3, 385	320, 601	137, 170	2, 337
11	Iron and steel and their products, not including machinery.....	2, 326, 574	745, 873	3, 119	1, 106, 099	420, 414	2, 631
12	Nonferrous metals and their products.....	462, 478	132, 862	3, 481	394, 281	137, 465	2, 868
13	Machinery, not including transportation equipment.....	1, 947, 878	520, 432	3, 743	1, 519, 226	435, 543	3, 488
14	Transportation equipment, air, land, and water.....	1, 547, 337	497, 238	3, 112	338, 796	126, 607	2, 676
16	Miscellaneous industries.....	537, 848	144, 145	3, 731	540, 584	211, 019	2, 562

## A SUMMARY COMPARISON

In a sense, the data which have been presented showing various characteristics of establishments operated by multi-plant concerns and those of independently operated units may be viewed as a comparison between "big" and "little" business. Central offices and the units they control may correctly be considered "big" since in 1937 these 5,625 concerns (1) controlled 25,699 out of a total of 166,794 establishments (2) employed 4,380,123 of the 8,569,231 wage earners in manufacturing (3) accounted for 55 percent of the wage bill and produced 61 percent of the total value of all manufactured goods. Stated in another way, 141,095 independent manufacturers employed less than half the wage earners and accounted for less than two-fifths of the total value of manufacturing production. It should not be overlooked, however, that there are many large single-unit concerns as well as many small-scale central offices.

The variation in the scale of operation between central offices and single-unit concerns is even more striking when the data are reduced to an establishment basis. Establishments operated by central offices employed, on the average, 170 wage earners while the average independent concern employed 30 wage earners. The average value of products per central-office establishment was \$1,443,900 as contrasted with an average value per independent plant of \$167,300. The value added by manufacture per central-office establishment was \$543,800 and that for the independent was \$79,370.

The higher output per wage earner, arising from either superior capital equipment or superior organization, or both, is a significant characteristic of central-office establishments. In establishments controlled by central offices, the average value added by manufacture per wage earner was \$3,190 as contrasted with \$2,670 in independent units. The benefits from this greater output per wage earner were passed on almost in their entirety in higher average wages. The average wage paid per wage earner in central-office establishments was \$1,280 in 1937, while the average wage paid per wage earner in independently operated concerns was \$1,080. Thus, while the production per wage earner in central-office establishments was 19.5 percent higher than in non-central-office establishments, the average wage paid per worker was 18.5 percent higher in the establishments operated by central offices. While there are limitations on the data arising from inconsistencies in methods of classification and reporting, the margin of error is small and the basic validity of the relationships presented here need not be questioned.

## CHAPTER III

### THE STRUCTURE OF CENTRAL-OFFICE GROUPS

In the preceding chapter the extent and significance of central-office operations were examined. There the analysis was in terms of the number of central offices and their operations among the various industries and industry groups. In the succeeding chapters, the structure or conformation of each central-office company will be the subject of analysis. Here the internal structure of these enterprises will be investigated and the interrelation of the various plants controlled by central offices to the entire functioning combination will be examined.

Each central-office company controls two or more plants or establishments and the relations, in a functional sense, of these plants in the productive processes that comprise the activity of the central office reflect or indicate the structural form of the enterprise. For example, a central-office company might report the operation of a blast furnace and of a steel mill. The functioning of such a group involves the intake of ore, the combination of ore with lime-stone and coke, the blast-furnace operation that results in pig iron, the conversion of pig iron in the steel mill into ingots, and the transformation of ingots into sheets in rolling mills. The whole process in which this central-office group engages is the function of the organization. In a structural sense, the company is made up of several units that perform certain successive steps in the process of making sheets from ore. This type of organization is commonly called a vertical combination; that is, the constituent units are related in the sense that they perform successive operations on the product as it passes from raw material to finished manufacture. At each stage in the process a different product or a product in a slightly different form is turned out and passed on to the next unit in the group which in turn carries the product a step further. In the chapters which follow, the structural form of the central-office enterprises will be analyzed in terms of the functional relationship of each unit to the manufacturing processes carried on by the group.

Before discussing the scheme of functional analysis under which the structure of each central-office group is to be classified, some explanation of the nature of the data is necessary. Each establishment, the basic unit in the Census of Manufactures, is assigned, on the basis of its product or group of products of chief value, to some one industry classification. It frequently happens that production of this major product is supplemented by various subsidiary products. The function of each establishment, however, has been taken to be the production of this predominant product. It would have been possible to consider these subsidiary products in the present study, but the gain in completeness by such an addition would have been quite small compared with the great amount of clerical work that would have

been required. In any event, these subsidiary products are usually so closely related to the major product and of so little importance in the total combination that they seldom enter into the relationship between the separate establishments, but are of significance chiefly in connection with the establishment which produces them.

Within some industries operations of quite different nature are grouped together. Thus establishments classified in the steel-works and rolling-mill products industry are engaged in the manufacture of steel and in the rolling of iron and steel. The products included in the industry are steel ingots and direct steel castings; rolled iron and steel, such as rails, splice bars, rail joints, bars and rods, tin-plate bars, wire rods, structural shapes, hoops, bands, and cotton ties; plates and sheets, including black plates and sheets for tinning; nail and tack plates; car axles, rolled and hammered; car wheels; armor plate; gun forgings, etc. With such a diversity of products within the industry, how much does it mean, for the purposes of this study, to use this establishment basis of classification for an analysis of the functional relationship within a central-office group? How may the functional relation of a combination be interpreted in which a central office operates one establishment in the "blast-furnace products" industry and one in the "steel-works and rolling-mill products" industry? Obviously, from the data which form the basis of this study, it is impossible to say which of the products listed in the "steel-works and rolling-mill products" industry the establishment classified in that industry had actually produced. For some purposes this would be a serious limitation. Here, however, the interest is not in the study of the production of the particular product but rather in the fact that a central office operated establishments in these two industries. A functional relation exists regardless of which product was produced and it is the extent and nature of this functional relationship in the many central-office groups that we wish to measure. The form in which the data are available results in some understatement of the extent of integration. This less-than-complete picture is most frequent in those cases where the integration is vertical and occurs as a result of the inclusion of the performance of several steps in the productive process within an establishment classified in one industry.

It should be pointed out, however, that the census industry classifications have been set up in response to the demand of business men and others and thus reflect the opinions of those individuals in the industry as to the limits of the industry and what the industry should include. Constant changes and adjustments in the old classifications and the establishment of new ones keep the products included in an industry quite closely in line with the accepted view of the men in the industry.

The basic material for this part of the study consists of a list of all central-office companies and an enumeration under each central office of the industries in which that central office operated or controlled establishments. The determination of the functional relation of these establishments to the operating combination was supplemented in many cases by an examination of the file of permanent central-office record cards of the Bureau of the Census.

In this scheme of functional analysis, each central office and all establishments operated by it are classified in the industry group in

which the central office is predominantly active as measured by the establishments controlled by it which have the major value of products.

For the purposes of this analysis, the central-office companies have been grouped into five general classifications on the basis of the possible functional relationships exhibited by the establishments controlled by the central offices. These possible relationships are as follows:

1. Uniform functions:
  - (a) Uniform functions within simple central offices.
  - (b) Uniform functions within complex central offices.
2. Divergent functions:
  - (a) Joint products.
  - (b) By-products.
  - (c) Like processes.
3. Convergent functions:
  - (a) Complementary products.
  - (b) Auxiliary products.
  - (c) Like markets.
4. Successive functions.
5. Unrelated functions.

Of the five major classifications, the first and last are perhaps easiest to define. In the first group all instances are listed in which a central office operated or controlled more than one establishment in one industry. This grouping under one central-office control of several establishments engaged in the same operations is by far the most common type of relationship. For a better and more complete picture of this type of relationship, the central offices have been classified in two subgroups. In the first there is a listing of all central offices operating two or more establishments in only one industry, while in the second subgroup, the central offices operating two or more establishments in one industry but also operating one or more establishments in other industries are listed. Those companies in the first subclassification may be called simple central offices in that they operate in only one industry and those in the second, where operations are carried on in more than one industry, may be called complex central offices. The matter of classification is relatively simple in this group. The Bureau of the Census assigns an industry number to each establishment and where central offices were found having establishments with similar industry numbers an instance of this type of uniform functional relation was recorded.

In the last and smallest major group the matter of classification is extremely difficult. This group includes all those cases in which central offices control establishments having no apparent relationship to the other establishments in the organization. The reasons underlying the formation of these heterogeneous or conglomerate companies is the subject matter of another study (see the chapter on "The Causes of Product Diversification" in part VI of this report, "The Product Structures of Large Corporations"). Here we shall be content with a listing and brief review of the cases in which establishments engaged in unrelated operations are brought together under the control of a central office.

The functional relationships that occur in the second, third, and fourth major classifications are particularly significant. The different

types of relationship may be more clearly understood when expressed in the graphic form of the accompanying chart. (See chart 9.) One may think of the function of an establishment as a line starting at a point, the raw materials, and ending at a point or points, the finished products. Thus if two establishments under the control of a central office start with the same raw material and end with different final products, the function lines are divergent. For example, purchased milk, the raw material, may be made into cheese in one establishment and into butter in another, or purchased leather may be made into boots and shoes in one establishment and into trunks and suit cases in another establishment. Conversely, a central office, whose main activity is the manufacture of automobiles, may operate establishments engaged in the production of automobile bodies, artificial leather, lighting equipment, automobile engines, and plate glass. Production in these various establishments begins far apart with different raw materials but finishes in the same final product; thus, the function lines are convergent. Each of these major categories—central offices with divergent and convergent functions—has been broken down into subclassifications which may be enlarged upon separately.

In general, divergent functional relationships occur when central offices operate establishments whose functions meet at some point in the operating process, but subsequently diverge, the result being the manufacture of different products. This major classification is divided into three subgroups:

*Joint products.*—Central offices classified in this subgroup operate establishments which make different products out of the same raw material. The functional relationship is one of different processes being applied to a common material and two different products being the result. The manufacture of either of these products could be discontinued without affecting the manufacture of the other. For example, this type of integration occurs when a central office operates establishments manufacturing cotton shirts and cotton house dresses. Starting with the same basic material, cotton woven goods, the manufacturer applies two different processes to the cotton goods and produces two different products. The decision to make the shirts and dresses was a voluntary one and the manufacture of either could be discontinued without affecting the manufacture of the other.

*By-products.*—The central offices included under this classification, like those under joint products, operate establishments which make different products out of the same raw materials. There is a sharp line of distinction, however, between these two classifications—in the manufacture of joint products the divergence is optional, the manufacturer decides voluntarily to make two different products; in the case of by-products, however, the divergence is not the result of a decision on the part of the manufacturer but is a result of the manufacturing process itself. At some point in the manufacturing process the original raw material diverges into two parts, one being used in the major product and the other, having no further use in the manufacture of the major product, is a by-product. The appearance of this by-product is a natural result of the process and must be made as long as the process is used; the only decision the manufacturer

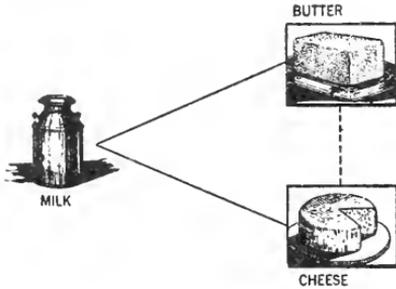
**UNIFORM FUNCTIONS**

Horizontal Integration

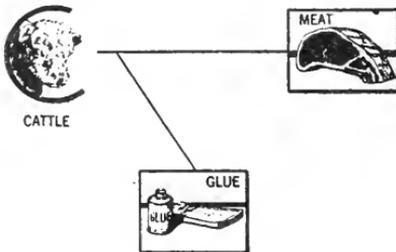


**DIVERGENT FUNCTIONS**

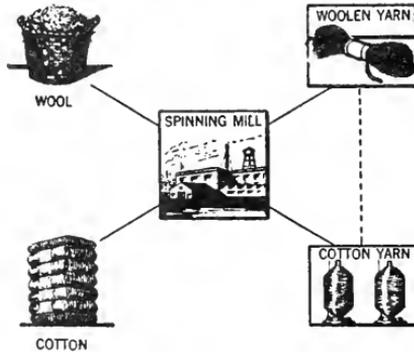
Joint Products



By Products



Like Processes



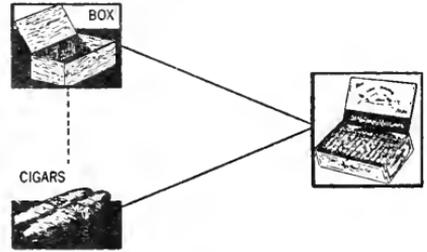
**SUCCESSIVE FUNCTIONS**

Vertical Integration

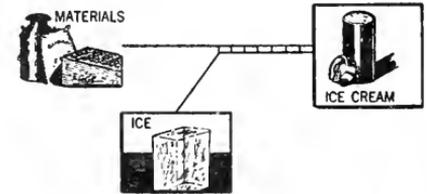


**CONVERGENT FUNCTIONS**

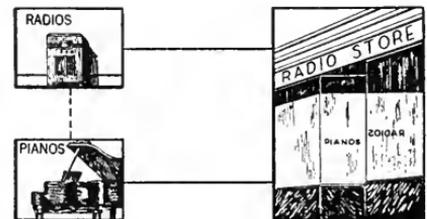
Complementary Products



Auxiliary Products



Like Markets



(2745 35)

CHART 9.—DIAGRAM OF FUNCTIONAL RELATIONSHIPS WITHIN CENTRAL-OFFICE COMPANIES.

has in the matter is whether or not he will utilize the by-product. Many instances of the manufacture of by-products are found in the food and chemical industries. The development during late years of processes now utilized on cottonseed to extract the cottonseed oil affords an example of by-product manufacture. The cottonseed is put through a process in which the primary purpose is to obtain cottonseed oil. After the oil has been extracted, the remaining hulls are by-products of the process. These hulls may be used in fertilizers, as fuel, or as feed. The manufacturer has no choice in obtaining the by-product; as long as he wants to obtain the oil he also obtains the hulls. The situation here is quite distinct from that explained above under joint products—here the production of two commodities is involuntary, while in the case of joint products it was voluntary.

*Like processes.*—The central offices classified in this subgroup operate establishments which apply the same process to different raw materials, the result being the manufacture of different products. Examples of this structural type are found in considerable number in the textile industry. A central office may operate establishments which spin cotton yarn and silk yarn. The same process, spinning, is applied to different raw materials, the result being the manufacture of cotton and silk yarn.

The central offices having convergent relationships operate establishments whose functions meet at some point in the manufacturing process, the products of the different establishments either being combined into a single product or meeting in a common market. This major classification is also divided into three subgroups:

*Complementary products.*—The establishments operated by the central offices classified in this group manufacture products which complement each other—these complementary parts are necessary for the major finished product of the central office. An example of this type of relationship occurs in the case of a central office whose major product is machinery. Here the central office operates different establishments producing such complementary parts as nuts, bolts, foundry products, wire, steel, brass, etc. Another important example of establishments which have complementary functional relationships is given by those companies making a major product and also the container in which the product is made ready for the market. The manufacture of containers is particularly prevalent in the food and chemical industries.

*Auxiliary products.*—There is a very close connection between this classification and that of complementary products discussed above, the major difference being that auxiliary products assist in the production while complementary products are an integral part of the product itself. Such functions as machine shops operated for repair of machinery, the manufacture of ice to preserve products in the establishments, etc., are examples of auxiliary operations.

*Like markets.*—This classification covers central offices in which the establishments make products which are sold in the same markets or converge in use. For example, a central office may have two establishments, one making non-alcoholic bever-

ages and the other ice cream. There is no particular relation between these products either in raw materials or in processes used, but they do converge in a common market.

Instances in which the establishments controlled by a central office perform necessary operations on a product as it passes from establishment to establishment are classified in the fourth major classification. Grouped under this head are those central offices which show a successive functional relationship. Here are recorded (within the limitations of the data of the study) vertically integrated manufacturing concerns. Examples of this type of relationship occur when the central office operates establishments producing lumber and timber products, planing-mill products, and furniture, or again the central office might operate establishments spinning cotton yarn and thread, dyeing and finishing yarn, and weaving cotton goods. In these cases each establishment picks up the product of the preceding establishment and advances it a step nearer the final form.

It is difficult in many instances to separate the successive functional relationship from the complementary or auxiliary relationship. In general, if the identity of the product was maintained through a number of distinct steps, the relationship was taken as successive; whereas the relationship was said to be either auxiliary or complementary if the product lost its identity in the process regardless of the fact that it might have been indispensable to the productive operation, or if it was possible to manufacture simultaneously, and not in a sequence of operations, the separate products necessary to complete the ultimate product.

Such then are the five major classifications into which the relationships among establishments in the various central offices are grouped. There are many instances in which two, three, or four of these types of relationship were present in a single central-office group. Each relationship was counted as a separate instance; thus, in this sense, there was considerable duplication or double counting of central offices. At this stage of the analysis, however, we are concerned only with a record of the number of relationships of the different types; thus the impossibility of deriving an accurate count of central offices from these data is no handicap.

## CHAPTER IV

### SIMPLE AND COMPLEX CENTRAL-OFFICE GROUPS

In the foregoing chapter five general classifications (uniform, divergent, convergent, successive, and unrelated) were formulated to distinguish various types of functional relations of establishments within central-office groups. Before discussing these patterns of integration it is desirable to consider the forms of organization in terms of two general structural types, namely, the simple central office and the complex central office. The simple type embraces those central offices controlling establishments which operate exclusively in one industry. Such central offices may be described as horizontally integrated, since each enterprise involves a coordination of plants engaged in similar activities or in the same general line of business. The complex group, on the other hand, comprises those central offices whose establishments operate in more than one industry; for example, such a group might include an establishment making leather, another making tanning materials, and a third producing boot and shoe cut stock and findings. The several types of integration that occur in the complex category are discussed in subsequent chapters. They include all those non-horizontal combinations commonly known as diagonal, conglomerate, and vertical.

#### NUMBER OF SIMPLE AND COMPLEX GROUPS

The simple organization is the most frequent structural type among central-office groups. Of the entire number of multiple-plant central offices in 1937, a total of 3,574 central offices, or 63.5 percent, controlled establishments having parallel or uniform activities and were classified, therefore, as simple enterprises. (See table 16 and chart 10.) A comparison of the aforementioned percentage with the corresponding ratio for the year 1919 indicates a tendency toward the complex type of organization. In a study of central-office groups for 1919, it was revealed that simple central offices comprised 68.8 percent<sup>1</sup> of the total number studied. Because of differences in the basic data, however, the two ratios are not precisely comparable. If the 1919 data are adjusted by deducting mining companies and railroad repair shops, since they are not included in the present study, the percentage of simple central offices in 1937 is lower than that for the earlier year. That is, there appears to have been at least some decline in the proportion of simple structures in favor of the complex type.

Table 16 shows that the industrial groups having the highest proportion of simple structures were stone, clay, and glass products; food and kindred products; and printing, publishing, and allied industries. In the former group, the clay products (except pottery) and the concrete products industries accounted primarily for the high percentage of simple central offices, while in the food group the high

<sup>1</sup> See "The Integration of Industrial Operation," p. 126.

percentage representation of simple central offices in the canning and the manufactured ice industries was largely responsible for the predominance of this type of structure in that group. Obviously, the simple nature of the process in these industries renders them less conducive to the complex form of organization. In the printing and publishing group, most of the simple central offices were engaged in printing and publishing newspapers and periodicals. The ratios for simple central offices in the various groups ranged from 75.8 percent in the stone, clay, and glass products group to 39.9 percent in the iron and steel group.

TABLE 16.—*Number of simple and complex central offices, by industry groups, 1937*

[NOTE.—In this table and in the following tables each central office and all establishments controlled by it are classified in the industry group in which the central office is predominantly active as measured by its establishments having the major value of products]

Group No.	Industry group	Total number of central offices	Simple central offices		Complex central offices	
			Number	Percent of total	Number	Percent of total
	All industries.....	5,625	3,574	63.5	2,051	36.5
1	Food and kindred products.....	1,660	1,222	73.6	438	26.4
2	Textiles and their products.....	810	512	63.2	298	36.8
3	Forest products.....	636	430	67.6	206	32.4
4	Paper and allied products.....	193	83	43.0	110	57.0
5	Printing, publishing, and allied industries..	232	167	72.0	65	28.0
6	Chemicals and allied products.....	389	220	56.6	169	43.4
7	Products of petroleum and coal.....	66	30	45.5	36	54.5
8	Rubber products.....	30	16	53.3	14	46.7
9	Leather and its manufactures.....	127	83	65.4	44	34.6
10	Stone, clay, and glass products.....	343	260	75.8	83	24.2
11	Iron and steel and their products, not including machinery.....	336	134	39.9	202	60.1
12	Nonferrous metals and their products.....	94	51	54.3	43	45.7
13	Machinery, not including transportation equipment.....	393	186	47.3	207	52.7
14	Transportation equipment, air, land, and water.....	91	38	41.8	53	58.2
16	Miscellaneous industries.....	225	142	63.1	83	36.9

As the manufacturing processes become more involved it is apparent that the industries are characterized by a higher percentage of complex central offices. In the iron and steel group, more than 60 percent of the central offices were of the complex type. Other groups in which the complex structural form predominated were transportation equipment, with 58.2 percent of the central offices operating plants in more than one industry; paper and allied products, 57 percent; products of petroleum and coal, 54.5 percent; and machinery, 52.7 percent. The high concentration of complex central offices in the iron and steel group may be accounted for in large part by the predominance of this type of structure in the steel works and rolling mills industry. These central-office groups operated establishments in other industries; otherwise, they would not be regarded as complex organizations. It may be well to emphasize again, however, that those central offices having establishments operating in more than one industry were classified in the industry in which they were predominantly active as measured by the value of products. In the transportation equipment group most of the complex central offices were classified in the motor vehicle bodies and parts industry, while in the paper and allied products group nearly half of the companies had plants engaged chiefly in producing various

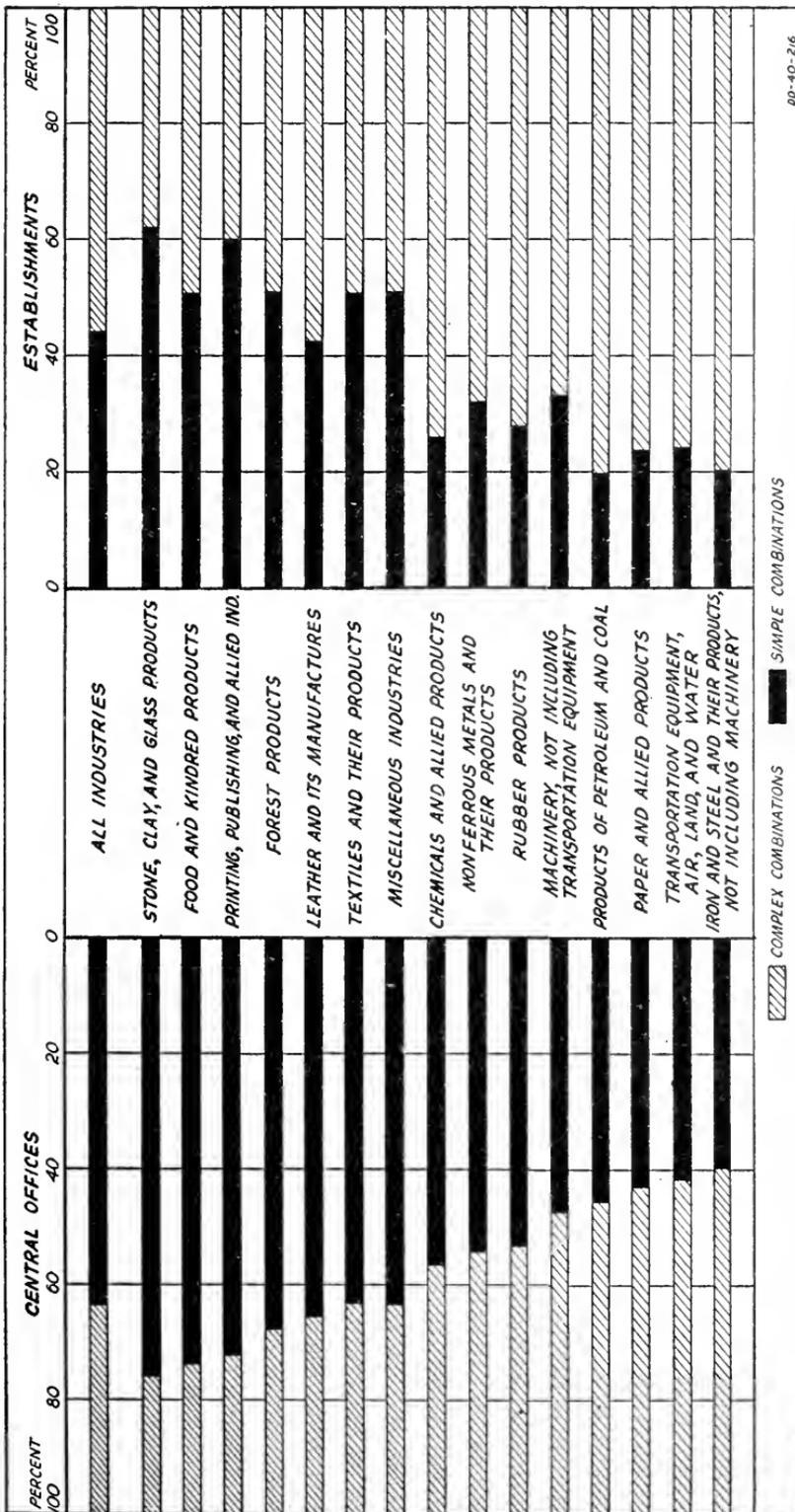


CHART 10.—PERCENTAGE DISTRIBUTION OF SIMPLE AND COMPLEX CENTRAL OFFICES AND ESTABLISHMENTS, BY INDUSTRY GROUPS, 1937.

kinds of paper and paperboard. The petroleum refining industry accounted for 24 out of a total of 36 complex offices in the petroleum and coal group, and the "electrical machinery" and "machinery not elsewhere classified" industries for about half of those in the machinery group.

TABLE 17.—*Number of establishments in simple and complex central-office companies, by industry groups, 1937*

[NOTE.—See headnote to table 16]

Group No.	Industry group	Total number of central-office establishments	Simple central-office establishments		Complex central-office establishments	
			Number	Percent of total	Number	Percent of total
	All industries.....	25,699	11,321	44.1	14,378	55.9
1	Food and kindred products.....	9,546	4,851	50.8	4,695	49.2
2	Textiles and their products.....	2,671	1,354	50.7	1,317	49.3
3	Forest products.....	2,305	1,181	51.2	1,124	48.8
4	Paper and allied products.....	886	210	23.7	676	76.3
5	Printing, publishing, and allied industries.....	817	493	60.3	324	39.7
6	Chemicals and allied products.....	2,229	580	26.0	1,649	74.0
7	Products of petroleum and coal.....	430	85	19.8	345	80.2
8	Rubber products.....	115	32	27.8	83	72.2
9	Leather and its manufactures.....	499	212	42.5	287	57.5
10	Stone, clay, and glass products.....	1,316	816	62.0	500	38.0
11	Iron and steel and their products, not including machinery.....	1,620	325	20.1	1,295	79.9
12	Nonferrous metals and their products.....	394	126	32.0	268	68.0
13	Machinery, not including transportation equipment.....	1,429	471	33.0	958	67.0
14	Transportation equipment, air, land, and water.....	561	135	24.1	426	75.9
16	Miscellaneous industries.....	881	450	51.1	431	48.9

#### ESTABLISHMENTS IN SIMPLE AND COMPLEX GROUPS

Although 63.5 percent of the total number of multiple-plant companies were classified as simple central offices, the number of establishments controlled by these simple central offices represented less than one-half of all establishments operated by central offices and only 6.8 percent of the total number of manufacturing establishments. (See table 17.) In only 6 of the 15 industry groups were the establishments in complex organizations outnumbered by those in simple structures, and the plants in the stone, clay, and glass industries (the simple group with the highest proportion of central-office establishments) were only slightly more than one-eighth of all manufacturing establishments in that industry group. It is significant that four-fifths of the central-office establishments in the petroleum and coal group were under complex management. Many of the central offices operating petroleum refineries apparently found it profitable to extend their activities into allied fields of endeavor. For example, certain central offices set up separate plants for the manufacture of lubricating greases and various types of containers such as steel barrels and drums, tin cans, and the like, thereby creating complex structures.

As measured by the number of plants per central office, the simple central offices were, in general, considerably smaller than the complex structures. To further emphasize, the average number of establishments per central office in the complex group was more than double that for the simple central offices. The extent of this variation is portrayed graphically in chart 11.



ever, to determine how many of the remaining plants were in complex groups and how many were independent plants. Hence, it is not definitely known whether the shift in the nature of the organization was from the independent company to the simple central-office company or from the complex to the simple structural type, but it is believed that the former assumption is more probable.

TABLE 18.—*Industries with over 20 percent of establishments in simple central-office companies, 1937*

Industry	Manufacturing establishments		
	Total number	In 3,574 simple central-office companies	
		Number	Percent
Sugar, beet.....	87	66	75.9
Cars, electric and steam railroad.....	154	66	42.9
Cement.....	158	64	40.5
Paving materials (not brick or stone).....	148	55	37.2
Ice, manufactured.....	3,847	1,415	36.8
Hat bodies, carded wool-felt.....	14	5	35.7
Underwear, men's, contract factories.....	9	3	33.3
Fireworks and allied products.....	50	16	32.0
Wood distillation and charcoal manufacture.....	60	19	31.7
Wood preserving.....	197	59	30.0
Minerals and earths, ground and treated.....	157	47	29.9
Canned fruits and vegetables.....	2,772	822	29.7
Gloves and mittens, cloth and cloth and leather.....	107	31	29.0
Fuel briquettes.....	21	6	28.6
Cast iron pipe and fittings.....	75	21	28.0
Carpets and rugs, wool.....	55	15	27.3
Stik throwing and spinning, commission.....	96	23	24.0
Drug grinding.....	21	5	23.8
Sausage casings, not made in meat-packing establishments.....	31	7	22.6
Bluing.....	14	3	21.4
Rice cleaning and polishing.....	61	13	21.3
Clay products, not pottery.....	1,198	255	21.3
Buttons.....	291	59	20.3

Among the industries represented in table 18, the largest number of establishments was in the manufactured ice industry. More than 36 percent of all plants in this industry were in simple organizations, 15 percent were in complex, and over 48 percent were independently operated. The largest industry in terms of value of products included in this table was the canning industry. In this classification 30 percent of all establishments were controlled by central offices operating in but one industry, while 62 percent were independent establishments.

#### DISTRIBUTION OF CENTRAL OFFICES ACCORDING TO NUMBER OF ESTABLISHMENTS OPERATED

Evidence of the extent to which central offices expand their activities without entering other fields of manufacture is demonstrated by chart 12. It may be observed that as the number of establishments operated by a central office increased, the proportion of simple central offices to the total number tended to decline. Companies controlling 5 or more establishments were preponderantly complex in organization. The higher proportion of simple structures operating 30 to 49 plants than of those controlling 20 to 29 plants was due to

the fact that an unusually large number of concerns operating in the food group happened to fall in the former class, as well as to the doubling of the class interval.

Although 64 percent of all simple central offices operated only 2 establishments, the percentages among the industry groups showed considerable variation. (See table 19.) In the petroleum and coal group, half of the single-industry offices had but 2 establishments, while the 16 central offices engaged in making rubber products controlled only 2 plants each. These plants were active in the manufacture of miscellaneous rubber goods, such as rubber belting and hose, rubberized fabrics and cloth, druggists' and stationers' sundries, rubber mats, rubber heels, and soles, etc.

About one-fourth of the simple central offices had either 3 or 4 establishments but the concentration in the larger subdivisions was

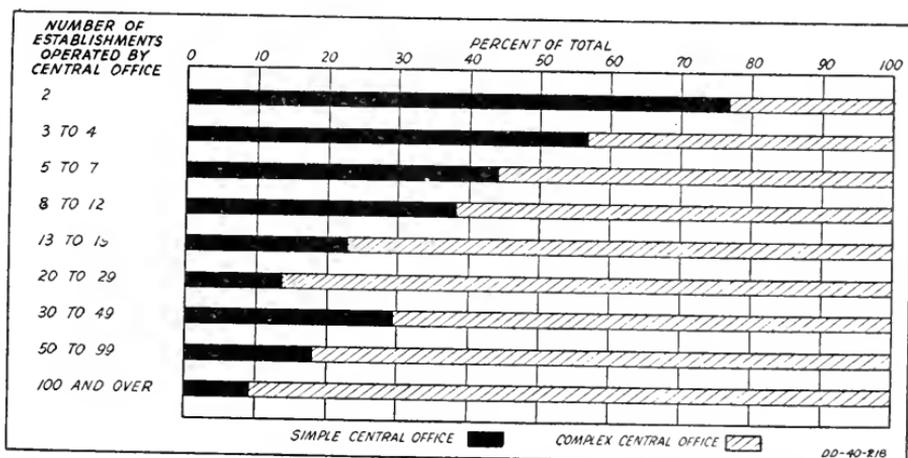


CHART 12.—PERCENTAGE DISTRIBUTION OF SIMPLE AND COMPLEX CENTRAL OFFICES, BY NUMBER OF ESTABLISHMENTS OPERATED, 1937.

negligible. Only one-eighth of the central offices had more than 5 plants. With one exception, all the companies operating 30 or more factories were classified in the food group and most of these concerns operated ice plants or bakeries, activities in which the advantages of expanding into other fields of manufacture are probably unimportant. It is significant that the percentage distribution of simple central offices in 1937, by number of establishments operated, followed very closely the general pattern of the distribution for 1919, the year covered in Dr. Thorp's study.

In contrast with the high concentration of simple central offices in the two-plant classification, a distribution of complex offices reveals that most of these controlled more than two establishments. Specifically, 34 percent of all complex central offices operated five or more plants, 32 percent had three or four plants, and 34 percent had only two establishments. (See table 20.) Stated in another way, 66 percent of all complex central offices operated three or more establishments, whereas 64 percent of all simple companies controlled but two establishments.

TABLE 19.—*Distribution of simple central offices by number of establishments operated, by industry groups, 1937*

[NOTE.—See headnote to table 16]

Group No.	Industry group	Simple central offices	Establishments operated by simple central offices	Distribution of simple central offices by number of establishments operated—									
				2	3 and 4	5 to 7, inclusive	8 to 12, inclusive	13 to 19, inclusive	20 to 29, inclusive	30 to 49, inclusive	50 to 99, inclusive	100 and over	
				Number									
				2,301	862	264	92	30	9	10	5	1	
		3,574	11,321										
				Percentage distribution									
				64.4	24.1	7.4	2.6	0.8	0.3	0.3	0.1	(1)	
		100.0	100.0										
				57.0	25.6	10.8	3.3	1.6	.5	.7	.4	0.1	
		100.0	100.0	70.1	22.1	5.7	1.9	.2					
		100.0	100.0	66.7	24.2	6.5	2.1	.5					
		100.0	100.0	69.9	26.5	2.4	1.2						
		100.0	100.0	68.3	22.1	5.4	3.0	.6					
		100.0	100.0	67.3	26.4	5.0	2.3						
		100.0	100.0	50.0	43.4	3.3	3.3						
		100.0	100.0	69.9	22.9	7.2	4.6	.8					
		100.0	100.0	62.3	22.7	9.2	4.6						
				Number									
				2,301	862	264	92	30	9	10	5	1	
		1,222	4,851										
		1,512	359										
		430	1,181										
		83	210										
		167	493										
		220	680										
		30	85										
		16	32										
		83	212										
		260	816										
		134	325										
		51	126										
		186	471										
		38	135										
		142	450										
				Percentage distribution									
				64.4	24.1	7.4	2.6	0.8	0.3	0.3	0.1	(1)	
		100.0	100.0										
				57.0	25.6	10.8	3.3	1.6	.5	.7	.4	0.1	
		100.0	100.0	70.1	22.1	5.7	1.9	.2					
		100.0	100.0	66.7	24.2	6.5	2.1	.5					
		100.0	100.0	69.9	26.5	2.4	1.2						
		100.0	100.0	68.3	22.1	5.4	3.0	.6					
		100.0	100.0	67.3	26.4	5.0	2.3						
		100.0	100.0	50.0	43.4	3.3	3.3						
		100.0	100.0	69.9	22.9	7.2	4.6	.8					
		100.0	100.0	62.3	22.7	9.2	4.6						

TABLE 20.—*Distribution of complex central offices by number of establishments operated, by industry groups, 1937*

Group No.	Industry group	Complex central offices	Establishments operated by complex central offices	Distribution of complex central offices by number of establishments operated—									
				2	3 and 4	5 to 7, inclusive	8 to 12, inclusive	13 to 19, inclusive	20 to 29, inclusive	30 to 49, inclusive	50 to 99, inclusive	100 and over	
		2,051	14,378	695	657	334	149	102	57	24	23	10	
11	Iron and steel and their products, not including machinery.....	100.0	4,695	134	133	69	40	24	18	6	8	6	
12	Nonferrous metals and their products.....	100.0	1,317	105	108	48	24	9	5	4	1	1	
13	Machinery, not including transportation equipment.....	100.0	1,124	85	71	25	7	9	5	2	1	1	
14	Transportation equipment, air, land, and water.....	100.0	676	20	48	23	5	8	4	2	2	2	
15	Miscellaneous industries.....	100.0	324	26	20	10	2	6	6	2	4	2	
			1,649	43	50	29	13	12	13	3	4	2	
			36	7	10	7	4	4	4	1	1	1	
			83	7	1	2	2	1	1	1	1	1	
			287	19	10	7	4	2	2	1	1	1	
			500	30	23	10	10	7	1	1	1	1	
			1,295	68	38	12	7	7	1	3	4	1	
12	Nonferrous metals and their products.....	43	17	13	4	3	3	3	2	1	2	1	
13	Machinery, not including transportation equipment.....	207	91	62	34	11	11	11	1	2	2	2	
14	Transportation equipment, air, land, and water.....	53	11	20	11	3	5	5	1	1	1	1	
15	Miscellaneous industries.....	83	431	32	20	17	6	7	1	1	1	1	

<sup>1</sup> Less than 1/4 of 1 percent.

[NOTE.—See headnote to table 16]

TABLE 20.—*Distribution of complex central offices by number of establishments operated, by industry groups, 1937*—Continued

[NOTE.—See headnote to table 16]

Group No.	Industry group	Complex central offices	Establishments operated by complex central offices	Distribution of complex central offices by number of establishments operated—							
				2	3 and 4	5 to 7, inclusive	8 to 12, inclusive	13 to 19, inclusive	20 to 29, inclusive	30 to 49, inclusive	50 to 99, inclusive
Percentage distribution											
1	All industries.....	100.0	33.9	32.0	16.3	7.2	5.0	2.8	1.2	1.1	0.5
2	Food and kindred products.....	100.0	30.6	30.4	15.7	9.1	5.5	4.1	1.4	1.8	1.4
3	Textiles and their products.....	100.0	35.2	36.2	16.1	8.1	3.0	1.4	.....	.....	.....
4	Forest products.....	100.0	41.2	34.5	12.1	3.4	4.4	2.4	1.0	.5	.5
5	Paper and allied products.....	100.0	18.2	43.6	20.9	4.6	7.3	3.6	1.8	.....	.....
6	Printing, publishing, and allied industries.....	100.0	40.0	30.8	15.4	9.2	.....	1.5	3.1	.....	.....
7	Chemicals and allied products.....	100.0	25.4	29.6	17.1	7.7	7.1	7.7	1.8	2.4	1.2
8	Products of petroleum and coal.....	100.0	19.5	27.8	19.5	8.3	11.1	11.1	.....	2.7	.....
9	Rubber products.....	100.0	50.0	7.2	14.3	14.3	7.1	7.1	2.3	.....	.....
10	Leather and its manufactures.....	100.0	43.2	22.7	15.9	9.1	4.5	.....	1.2	.....	.....
11	Stone, clay, and glass products.....	100.0	36.1	27.7	12.1	12.1	8.4	1.2	1.2	.....	.....
12	Iron and steel and their products, not including machinery.....	100.0	33.7	33.7	18.8	5.9	3.4	.5	1.5	2.0	.5
13	Nonferrous metals and their products.....	100.0	39.5	30.2	9.3	7.0	7.0	4.7	2.3	.....	.....
14	Machinery, not including transportation equipment.....	100.0	44.0	29.9	16.4	5.3	1.9	5.5	1.0	.....	.....
15	Transportation equipment, air, land, and water.....	100.0	20.8	37.7	20.7	5.7	9.4	1.9	1.9	.....	.....
16	Miscellaneous industries.....	100.0	38.6	24.1	20.5	7.2	8.4	1.2	.....	.....	.....

Eighty percent of the number of central offices in the paper and allied products group, in the petroleum and coal group, and in the transportation equipment group operated more than three establishments each. Other groups having a higher than average concentration in the brackets of three or more establishments were food and kindred products, chemicals, and iron and steel and their products.

A comparison of the distribution of complex central offices in 1919 with data for 1937 indicates a very definite transition toward larger companies, i. e., larger at least in terms of the number of plants operated. Complex central offices operating two plants declined from 43 percent of the total in 1919 to 34 percent in 1937; those controlling three or four plants increased from 28 percent to 32 percent, while for the companies having five or more establishments the change was from 29 percent to 34 percent in 1937.<sup>3</sup>

#### MEASURES OF THE IMPORTANCE OF SIMPLE AND COMPLEX STRUCTURES

As was shown in chart 12, the average complex central office operated more than twice as many establishments as the average simple central office. Several other criteria against which the relative importance of the two types of central-office structures may be measured are presented in the following tabulation:

	All central offices	Simple central offices	Complex central offices
Number of establishments per central office.....	4.6	3.2	7.0
Wage earners (average for the year).....	4,380,123	1,023,293	3,356,830
Number of wage earners per central office.....	779	286	1,637
Wages paid (thousand dollars).....	5,595,087	1,106,573	4,488,514
Wages paid per central office (thousand dollars).....	995	310	2,188
Value added by manufacture (thousand dollars).....	13,975,037	2,574,922	11,400,115
Value added by manufacture per central office (thousand dollars).....	2,484	720	5,558

From the above data for 1937, it may be seen that complex central offices, i. e., central offices operating establishments in more than one industry, employed about 77 percent of all central-office wage earners and paid 80 percent of the wage bill. Furthermore, the value added by manufacture in complex structures represented 82 percent of that for all central-office groups. It is probable that these ratios would vary considerably among industries and industry groups if the data were distributed on that basis, but such information was not available for this study.

Since the complex central offices controlled about 56 percent of all central-office establishments in 1937, it is to be expected that they would account for a higher proportion of such items as wage earners, wages paid, value added by manufacture, etc., than the simple groups. The typical complex central office employed almost six times as many wage earners as the average simple central office, while the value added by manufacture in the former structure was about eight times that in the latter. A comparison of the size of establishment in the two forms of organization reveals that the average

<sup>3</sup> For a discussion of central offices according to the number of industries in which they operate establishments, see chapter II of this study. These data are presented statistically in table 6 of that chapter. Obviously, the column in the table showing central offices operating in but one industry relates to simple structures, whereas the distribution of central offices operating in two or more industries pertains to complex structures.

establishment in complex groups (as measured by wage earners, wages paid, and the value added by manufacture) was approximately three times as large as the average simple central-office plant.

Thus, central offices which extend their activities into different industries are larger, in general, than those which expand along parallel lines. These data, however, do not afford a basis for answering the questions: Are complex central offices large because they have extended their operations into several industries? Or, are they integrated because they are large? Or, are the two developments concomitant?

## CHAPTER V

### UNIFORM FUNCTIONS

The inquiry in the preceding chapter was directed toward measuring the extent of simple and complex central-office operations in manufacturing. Since the simple structures represent groupings of industrial units on the same plane of production or of those making the same type of products, the discussion of such structures is likewise a discussion of a large segment of uniform functional relations among establishments controlled by central offices. For this reason the present chapter, for the most part, is only an extension of the analysis of simple central offices to include the uniform functions of establishments within complex central-office groups and to cite the probable economic forces motivating expansion in parallel lines of production.

#### THE EXTENT OF HORIZONTAL INTEGRATION WITHIN COMPLEX CENTRAL-OFFICE GROUPS

As has already been stated, establishments operating under one management and producing similar or uniform products constitute instances of horizontal integration and this is the most prevalent form of integration among manufacturing establishments. Over 63 percent of all central-office organizations in 1937 were simple in structure; that is, the establishments within these companies were related through the performance of uniform functions. If, however, consideration is given the instances within complex central offices in which the functions of the establishments are uniform in nature, horizontal integration in the manufacturing segment of our economy assumes even greater significance. For example, if a complex central office controls 10 establishments in the ice cream industry and one in the cheese industry, there is thus within this complex central office an instance in which the functions of establishments are related on a uniform basis. When the complex central offices which operated at least some establishments having uniform functions are added to the companies which were purely simple in structure, the proportion of central offices with horizontally integrated establishments approximates 85 percent of the total number of central offices. Of the 2,051 complex central offices in 1937, there were 1,219 which controlled two or more establishments engaged in parallel lines of activity within a single industry. Furthermore, 10,696 of the 14,378 establishments under complex management were related in this horizontal fashion.

To give further emphasis to the importance of horizontal integration within complex structures, it may be said that the 832 central offices in which there was no horizontal expansion controlled but 1,851 establishments, or only 7 percent of all central-office establishments. Since no 2 of these 1,851 establishments under the same central-office management were operating in the same industry, most of the 832 central offices controlled plants in only two industries. In other words, central offices which were active in more than two industries tended also to expand horizontally.

The total number of central offices and the number of establishments horizontally integrated are shown in table 21. There it may be seen that when the instances of uniform activities in complex structures are

taken into account the relative importance of horizontal integration is greatly increased among the several industry groups, though in varying magnitude. When only simple organizations are considered, it is apparent that the uniform functional relation of establishments was most common in the stone, clay, and glass products group. The inclusion of uniform functions within complex structures, however, results in a change in the relative rank of this group and brings the food group to first position.

TABLE 21.—Extent of horizontal integration within central-office companies, 1937

[NOTE.—See headnote to table 16]

Group No.	Industry group	Number of central offices				
		Total	Simple plus complex with establishments having uniform functions	Simple	Complex with establishments having uniform functions	
	All industries.....	5,625	4,793	Percent of total 85.2	3,574	1,219
1	Food and kindred products.....	1,660	1,508	90.8	1,222	286
2	Textiles and their products.....	810	692	85.4	512	180
3	Forest products.....	636	543	85.4	430	113
4	Paper and allied products.....	193	163	84.5	83	80
5	Printing, publishing, and allied industries.....	232	200	86.2	167	33
6	Chemicals and allied products.....	389	329	84.6	220	109
7	Products of petroleum and coal.....	66	57	86.4	30	27
8	Rubber products.....	30	22	73.3	16	6
9	Leather and its manufactures.....	127	106	83.5	83	23
10	Stone, clay, and glass products.....	343	310	90.4	260	50
11	Iron and steel and their products, not including machinery.....	336	253	75.3	134	119
12	Nonferrous metals and their products.....	94	72	76.6	51	21
13	Machinery, not including transportation equipment.....	393	277	70.5	186	91
14	Transportation equipment, air, land, and water.....	91	74	81.3	38	36
16	Miscellaneous industries.....	225	187	83.1	142	45

Group No.	Industry group	Number of central-office establishments				
		Total	Establishments in simple groups plus establishments with uniform functions in complex groups	Simple	Establishments with uniform functions in complex groups	
	All industries.....	25,699	22,017	Percent of total 85.7	11,321	10,696
1	Food and kindred products.....	9,546	8,810	92.3	4,851	3,959
2	Textiles and their products.....	2,671	2,182	81.7	1,354	828
3	Forest products.....	2,305	1,994	86.5	1,181	813
4	Paper and allied products.....	886	703	79.3	210	493
5	Printing, publishing, and allied industries.....	817	708	86.7	493	215
6	Chemicals and allied products.....	2,229	1,893	84.9	580	1,313
7	Products of petroleum and coal.....	430	353	82.1	85	268
8	Rubber products.....	115	77	67.0	32	45
9	Leather and its manufactures.....	499	413	82.8	212	201
10	Stone, clay, and glass products.....	1,316	1,181	89.7	816	365
11	Iron and steel and their products, not including machinery.....	1,620	1,236	76.3	325	911
12	Nonferrous metals and their products.....	394	298	75.6	126	172
13	Machinery, not including transportation equipment.....	1,429	1,012	70.8	471	541
14	Transportation equipment, air, land, and water.....	561	422	75.2	135	287
16	Miscellaneous industries.....	881	735	83.4	450	285

Furthermore, 91 percent of all central offices in the food group operated establishments which were horizontally integrated and 92 percent of all establishments in this group were related to other establishments horizontally. In fact, the 286 central offices in the food group which expanded horizontally as well as into different industries controlled only 401 establishments which were not horizontally related to other establishments, while 3,959 establishments operated by these central offices were horizontally related to other establishments under the same management. In no group did the ratio for the number of central offices fall below 70 percent nor that for the number of establishments below 67 percent. A comparison of the percentages shown in table 21 with those in tables 16 and 17 gives the incremental effect among the various groups of the inclusion of the complex central offices which controlled plants having uniform functions. The relative increase in terms of the number of central offices was largest in the paper and allied products group, while the largest increase in the number of establishments occurred in the petroleum and coal group.

#### THE FORMATION OF HORIZONTAL COMBINATIONS

The combinations of establishments at the same stage of manufacture and operating under one central office may have come into being through a merger of previously independent plants operating in the same industry, or the combinations may have been the result of expansion through the building of additional plants to manufacture the same or closely allied products as those produced by the parent plant. As was indicated at an earlier point, the present analysis is not concerned with a historical study of how the groups were built up. Rather, interest here is centered in a description of the groups as they existed in 1937. An understanding of this horizontal type of combination wherein establishments operating at the same stage of manufacture are grouped under one management control is facilitated, however, by an examination of the possible economic forces which might have served to motivate the formation of such a central-office concern.

The possible economic forces which operate either singly or in combination may be briefly set forth in general terms. As enumerated here, the economic advantages to be secured through the combination of manufacturing plants into a horizontally integrated concern do not necessarily afford the motivating force for any particular central office, though they may be the general causes of combination. If these economic advantages are to be thought of as forces in a rational decision to expand horizontally, they should be viewed as net economies; that is, the economies to be gained by combination should outweigh the diseconomies inherent in the costs of cohesion.

(1) It may have been economically advisable to add a second establishment to the productive set-up of a concern when the existing plant was operating at its optimum point and the demand warranted it, rather than to derive additional output from the original plant under rising cost conditions.

(2) If the product is bulky and freight costs on it are relatively high, it may have been advantageous from the point of view of distribution costs to establish plants at widely scattered points. This force has undoubtedly been operative in the development of large automobile concerns. The assembly plants maintained by these concerns have a functional relation to the entire central-office group which has been distinguished herein as uniform.

(3) If the product has relatively high value in relation to freight costs and if the optimum size plant is relatively small, it may have been advantageous to decentralize production and gain the benefit of the lower cost conditions present in small communities. This combination of factors may have been of influence in the decision of shoe manufacturers, for example, to establish plants in many small communities throughout the country.

(4) The economies of financing, advertising, buying, etc., may make it desirable to bring under one management a number of plants tied to local areas by their supplies of resources or by the necessity of producing perishable commodities close to the consumers. This combination of forces may account for the tendency of concerns producing and distributing dairy products, sawmill products, paper products, etc., to bring under one operating control several such establishments. The economies to-be derived from combinations of this nature, however, may be emphasized too strongly, especially when each of the plants so brought together is of optimum size. In many such cases the factors responsible for the formation of the combination are not economic. Rather, the motivation arises from the understandable desire on the part of the management to extend its control over a wider area.

(5) It may have happened that a group of independent concerns operating at stage "two" in the productive process were confronted by tightly organized market control at stage "one" and possibly at stage "three." Thus, it may have been necessary for these independent concerns to combine for bargaining purposes into a single concern with several different plants. Such a combination would improve the strategic position of these concerns by reducing the "ruinous" price competition that may have existed previously.

(6) In each of the foregoing cases, a combination of other economic factors of a general nature may have been present to supply a favorable environment for expansion. That is, the concerns might have been operating in expanding industries or in expanding markets and under profitable conditions. Thus, there would be a reason for expansion and there would also be available surplus capital for investment to finance such a move. The presence of undistributed earnings and successful past operations in a particular line would seem to afford a favorable background of experience for the operation of a second or third plant in that same line.

As a concern grows, the ordinary procedure is for it to reinvest first in its own industry. Thus, the simple central office is a first step in the development of a larger combination. The reasons for the expansion of a simple central office into more than one industry are usually associated with the desire to insure an adequate supply of some necessary raw material or to perfect the disposal of its product (either the main product or any by-product). But here, also, the motivating forces work both ways. It may be necessary to have several plants before it becomes profitable, for example, to operate a separate plant supplying containers or a by-product plant. No one plant would warrant the acquisition of a by-product or container plant, but a combination might profitably utilize such plants. In any event, the simple central office tends to enter other industries and thus to become a complex enterprise. The various types of interrelationships among plants controlled by these complex or multiple-function organizations are discussed in considerable detail in subsequent chapters.

## CHAPTER VI

### DIVERGENT FUNCTIONS

Up to this point, the analysis has been concerned with those central offices which controlled two or more establishments in the same industry or those groups in which the establishments were related through the performance of uniform activities. In this chapter and in the chapters dealing with convergent, successive, and unrelated functions, consideration will be given primarily to the functional relationships among the establishments of complex central offices.

Before discussing in detail the functional organization of multiple-industry central offices, it is desirable to present a general picture of the diverse patterns of integration in manufacturing. (See table 22 and chart 13.) Since in this table and chart all the different types of relationships existing among establishments within a single central-office group were taken into account, the data by no means give an accurate count of the actual number of central offices. They are merely a summarization of the horizontal types of integration already discussed, together with those instances of multiple functional relations which are to follow, so that the relative importance of each type may be evaluated. It may be seen that for the central-office companies classified in the iron and steel group, the two types of integration are about equally significant. In the stone, clay, and glass products industries and in the food industries, where the manufacturing processes are not particularly complicated, the nonhorizontal functional relationships are of relatively less importance. Although no extended analysis of the data in table 22 and chart 13 will be given, their materials afford a helpful over-all picture of the functional relations of establishments under central-office management.

It was pointed out earlier in the discussion that the larger a central-office company becomes the more likely it is to engage in diverse lines of manufacture, so that the simple central office is the precursor of complex organizations. The analysis in this chapter and in the subsequent chapters pertains to the probable functional relationships that existed in 1937 among manufacturing establishments under complex management. No attempt is made in this study to determine precisely all the individual products of establishments and their interrelationships. The various functions assigned were based primarily upon industry classifications and the relationships of the principal products of one industry to those of other industries in the operating combination.

TABLE 22.—Total number of different types of integration in central-office companies, by industry groups, 1937

Group No.	Industry group	Uniform functions		Multiple functions					
		Total, all types	Total, including uni-form in complex groups	In simple groups only	Total	Divergent <sup>1</sup>	Convergent <sup>2</sup>	Successive	Unrelated
	All industries.....	7,292	4,793	3,574	2,499	781	1,058	565	95
1	Food and kindred products.....	2,049	1,508	1,222	541	217	284	29	11
2	Textiles and their products.....	1,025	692	512	333	123	72	131	7
3	Forest products.....	778	543	430	235	23	58	146	8
4	Paper and allied products.....	310	163	83	147	43	23	78	3
5	Printing, publishing, and allied industries.....	277	200	167	77	44	21	10	2
6	Chemicals and allied products.....	550	329	220	221	63	108	18	32
7	Products of petroleum and coal.....	106	57	30	49	18	23	5	3
8	Rubber products.....	42	22	16	20	8	12	.....	1
9	Leather and its manufactures.....	160	106	83	54	8	25	20	1
10	Stone, clay, and glass products.....	403	310	260	93	18	62	5	8
11	Iron and steel and their products, not including machinery.....	503	253	134	250	104	75	66	5
12	Nonferrous metals and their products.....	137	72	51	65	18	33	12	2
13	Machinery, not including transportation equipment.....	517	277	186	240	53	158	20	9
14	Transportation equipment, air, land, and water.....	137	74	38	63	17	37	8	1
16	Miscellaneous industries.....	298	187	142	111	24	67	17	3
Percentage distribution									
	All industries.....	100.0	65.7	49.0	34.3	10.7	14.5	7.7	1.3
1	Food and kindred products.....	100.0	73.6	59.6	26.4	10.6	13.9	1.4	.5
2	Textiles and their products.....	100.0	67.5	50.0	32.5	12.0	7.0	12.8	.7
3	Forest products.....	100.0	69.8	55.3	30.2	3.0	7.5	18.8	1.0
4	Paper and allied products.....	100.0	52.6	26.8	47.4	13.9	7.4	25.2	1.0
5	Printing, publishing, and allied industries.....	100.0	72.2	60.3	27.8	15.9	7.6	3.6	.7
6	Chemicals and allied products.....	100.0	59.8	40.0	40.2	11.5	19.6	3.3	5.8
7	Products of petroleum and coal.....	100.0	53.8	28.3	46.2	17.0	21.7	4.7	2.8
8	Rubber products.....	100.0	52.4	38.1	47.6	19.0	28.6	.....	.....
9	Leather and its manufactures.....	100.0	66.3	51.9	33.7	5.0	15.6	12.5	.6
10	Stone, clay, and glass products.....	100.0	76.9	64.5	23.1	4.5	15.4	1.2	2.0
11	Iron and steel and their products, not including machinery.....	100.0	50.3	26.6	49.7	20.7	14.9	13.1	1.0
12	Nonferrous metals and their products.....	100.0	52.6	37.2	47.4	13.1	24.1	8.8	1.5
13	Machinery, not including transportation equipment.....	100.0	53.6	36.0	46.4	10.3	30.6	3.9	1.7
14	Transportation equipment, air, land, and water.....	100.0	54.0	27.7	46.0	12.4	27.0	5.8	.7
16	Miscellaneous industries.....	100.0	62.8	47.7	37.2	8.1	22.5	5.7	1.0

<sup>1</sup> Includes duplications among joint products, by-products, and like processes.

<sup>2</sup> Includes duplications among complementary products, auxiliary products, and like markets; does not include duplications among complementary materials, parts, and products comprising the complementary products subgroup, nor duplications between auxiliary services and commodities comprising the auxiliary products subgroup.

Manifestly, any one or all of the functions designated may occur within a single complex central-office group, i. e., uniform, divergent, convergent, successive, or unrelated. When two or more manufacturing processes carried on by establishments within a central-office group begin at a certain point and at some place along the line of process branch off in different directions so that different final products are obtained, the functional relations of the establishments in such a group have been classified as divergent. To facilitate the analysis, divergent functions have been subdivided according to the manufacture of joint products, by-products, and the exploitation of like processes. (See table 23.)

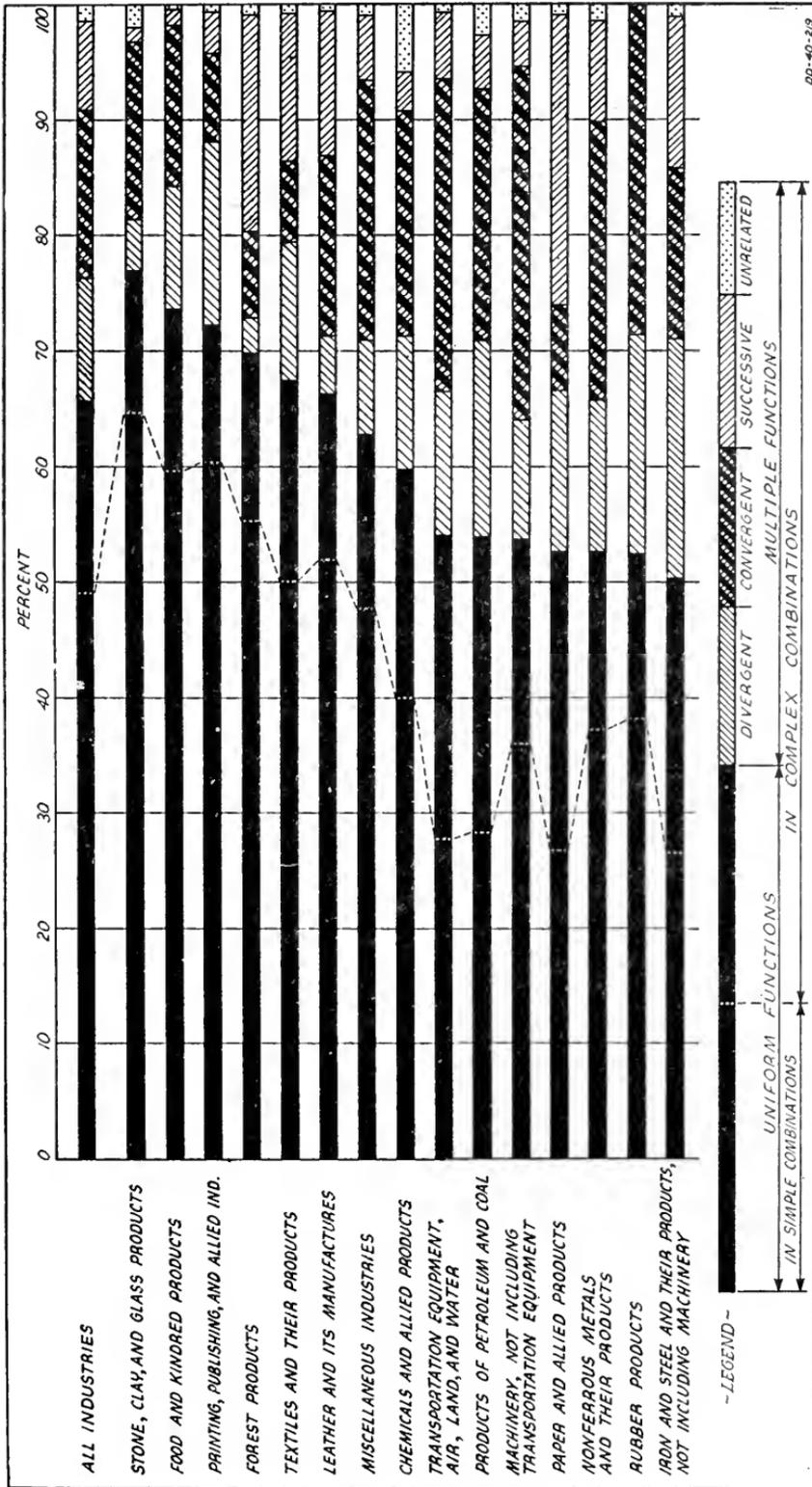


CHART 13.—PERCENTAGE DISTRIBUTION OF DIFFERENT TYPES OF FUNCTIONAL RELATIONSHIPS WITHIN CENTRAL-OFFICE COMPANIES, BY INDUSTRY GROUPS, 1937.

TABLE 23.—Central-office companies having divergent functions, by industry groups, 1937

[NOTE.—See headnote to table 16]

Group No.	Industry group	Number of central offices having divergent functions (unduplicated total) <sup>1</sup>	Number of central offices having divergent functions (duplicated total) <sup>1</sup>	Number of central offices operating establishments related through—		
				Joint products	By-products	Like processes
	All industries.....	757	781	564	113	104
1	Food and kindred products.....	209	217	173	34	10
2	Textiles and their products.....	121	123	83	9	31
3	Forest products.....	23	23	16	7	-----
4	Paper and allied products.....	42	43	40	3	-----
5	Printing, publishing, and allied industries.....	43	44	-----	1	43
6	Chemicals and allied products.....	60	63	35	27	1
7	Products of petroleum and coal.....	16	18	3	15	-----
8	Rubber products.....	8	8	8	-----	-----
9	Leather and its manufactures.....	8	8	2	1	5
10	Stone, clay, and glass products.....	18	18	10	5	3
11	Iron and steel and their products, not including machinery.....	100	104	96	3	5
12	Nonferrous metals and their products.....	16	18	6	6	6
13	Machinery, not including transportation equipment.....	53	53	53	-----	-----
14	Transportation equipment, air, land, and water.....	17	17	17	-----	-----
16	Miscellaneous industries.....	23	24	22	2	-----

<sup>1</sup> The duplicated total includes duplications among joint products, by-products, and like processes; in the unduplicated total, duplications among the 3 divergent subgroups have been eliminated.

## JOINT PRODUCTS

The improved methods in machine technique and the advancement in chemical processes have contributed largely to the wide diversification of products made from common raw materials. New uses of raw materials continue to be found, so that the manufacturing industry is characterized by an increasing variety of commodities fabricated from the same base. Different products made from the same material are designated as joint products, provided the divergence is not essential to the manufacture of either product. In other words, one line of activity may be discontinued without affecting other operations, except indirectly. Since each establishment is classified by the Bureau of the Census in a single industry according to its product of major value, it is not only necessary that joint products be made from the same raw material, but they also must fall within different census categories. In the case of two plants under common central-office management, one plant producing butter and the other making ice cream, the functional relationship of the two establishments would be based upon the manufacture of joint products, since both commodities are made from milk and they are also classified in separate industry categories by the Bureau of the Census. Conversely, if one plant manufactures corn sirup and another corn starch, they would not be distinguished as producing joint products because both commodities fall within the same census classification.

Among the 5,625 multiple-plant central offices in 1937, 564 companies or approximately 10 percent, controlled separate establishments engaged in the manufacture of joint products. (See table 24.) When the comparison is made within complex organizations alone,

27.5 percent of this type of central office operated establishments making products from a common raw material. A comparison of the aforementioned percentages with corresponding data for the year 1919 indicates a slight upward tendency in the proportion of central-office groups manufacturing joint products.<sup>1</sup> This is one of the most prevalent types of complex organizations, ranking about equal in numerical importance to those producing successive products. More than three-fifths of all instances of the manufacture of joint products occurred in the food and kindred products, iron and steel, and textile groups.

*Food and Kindred Products.*

Although the diversity of food products which can be made from a common raw material is comparatively small, central offices manufacturing different products from a single food material totaled 173, a greater number than was recorded for any other industrial group. Of this total, 125 companies utilized milk or cream as a raw material. The large number of central-office companies in the food products group is accounted for chiefly by those concerns making creamery products. The principal products made were butter, cheese, condensed and evaporated milk, and ice cream. There were 97 companies producing 2 of these major commodities, 19 producing 3, and 9 producing 4. Only 20 of the 125 central offices having establishments engaged in the output of creamery products controlled plants active in other major lines as well. Furthermore, in most of these cases the establishments manufactured products which were sold in the same market as creamery products or were engaged in operations of an auxiliary nature, such as the manufacture of ice for use in making ice cream or in the preservation of the milk products.

TABLE 24.—Central-office companies producing joint products, by industry groups, 1937

[NOTE.—See headnote to table 16]

Group No.	Industry group	Total number of central offices	Total number of complex central offices	Central-office companies producing joint products		
				Number	Percent of—	
					Total	Complex
	All industries.....	5,625	2,051	564	10.0	27.5
1	Food and kindred products.....	1,660	438	173	10.4	39.5
2	Textiles and their products.....	810	298	83	10.2	27.9
3	Forest products.....	636	206	16	2.5	7.8
4	Paper and allied products.....	193	110	40	20.7	36.4
5	Printing, publishing, and allied industries.....	232	65			
6	Chemicals and allied products.....	389	169	35	9.0	20.7
7	Products of petroleum and coal.....	66	36	3	4.5	8.3
8	Rubber products.....	30	14	8	26.7	57.1
9	Leather and its manufactures.....	127	44	2	1.6	4.5
10	Stone, clay, and glass products.....	343	83	10	2.9	12.0
11	Iron and steel and their products, not including machinery.....	336	202	96	28.6	47.5
12	Nonferrous metals and their products.....	94	43	6	6.4	14.0
13	Machinery, not including transportation equipment.....	393	207	53	13.5	25.6
14	Transportation equipment, air, land, and water.....	91	53	17	18.7	32.1
16	Miscellaneous industries.....	225	83	22	9.8	26.5

<sup>1</sup> See "The Integration of Industrial Operation," p. 178.

The use of grains as a raw material occurred in 37 central-office companies classified in the food group. Major commodities such as flour, cereal preparations, feeds for fowls, etc., were produced. In the remaining 11 concerns, fruit was the principal raw material utilized and various liquors, vinegar and cider, canned fruit, and the like were the finished products.

#### *Iron and Steel and Their Products.*

The iron and steel industry is characterized by a number of definite steps in the process from raw material to finished product. In the early stages of manufacture there is little opportunity for divergence, except in the case of by-products, so that most instances of joint products come in the more advanced stages. The principal raw materials used in the manufacture of iron and steel are iron ore, coke, and limestone or dolomite (the former being more commonly used). The initial stage in the process is the extraction of iron from its ore in the blast furnace. Pig iron thus obtained can be used without refining for making iron castings, but for conversion into steel or wrought iron most of the impurities must be removed through refining operations.

Following the blast-furnace operations, there are several possible lines of divergence. Establishments making such items as foundry products, cast iron pipe and fittings, plumbers' supplies, cast iron heating boilers, radiators, stoves, ranges, etc., utilize pig iron direct from the blast furnace as their raw material. Products of most of the industries in the iron and steel group, however, require a further refined basic material and the principal divergence of products from a common material occurs after the operations of steel works and rolling mills. That more than 80 percent of the total pig iron output of blast furnaces in 1937 was used as a material by steel mills gives further evidence that diversity of products, for the most part, takes place after the product has gone through the steel-works and rolling-mill stage.

Among the 202 complex central-office companies classified in the iron and steel group, 96 controlled plants which were related through the utilization of a common raw material. Steel, as it left the converters and rolling mills, constituted the raw material for 64 of these central offices, while both steel and pig iron were raw material for 25 central offices. Steel works and rolling mills were operated as separate establishments in 21 of the combinations using steel in further manufacture and 9 of these central offices also operated their own blast furnaces and coke ovens, thus placing them in the vertical category as well as among the manufacturers of joint products. In seven instances pig iron alone was employed as a raw material, five of these involving groupings of establishments classified in the steel works and rolling mills industry and in the foundry products industry.

#### *Textiles and Their Products.*

In this group 93 separate industries with different major products were distinguished by the Bureau of the Census for the year 1937. Since there are numerous final products and comparatively few basic textile materials, one would expect to find many instances of joint products in the textile group. Like the iron and steel group, the major opportunity for divergence is in the more advanced manufacturing stages. The spinning of the yarn and thread and the weaving and

dyeing of cloth usually follow a single line, but after the material has left these processes numerous possibilities for diversification of products are available to the manufacturer. In some instances, however, joint products occur immediately after the spooling, twisting, or winding of yarn and thread. Certain central offices controlled establishments engaged in the aforementioned activities and also operated plants engaged in weaving cloth from the yarn as well as other plants which knitted the yarn into underwear.

Eighty-three central offices operated establishments which were related through the manufacture of joint products. These structures represented about 28 percent of the total number of complex companies classified in the textile group. Many of the items manufactured were various types of clothing fabricated from a common textile material. Specifically, groupings of factories produced various types of women's clothing and men's shirts and collars; rayon broad woven goods and rayon hosiery; cotton underwear and nightwear and shirts and collars; shirts, work clothing, men's underwear, dresses, and miscellaneous clothing for women, misses, and children; knitted cloth and knitted gloves and mittens; and cotton narrow fabrics and trimmings.

#### *Other Industry Groups.*

Of the 564 central-office companies producing joint products, 212 were operating primarily in industry groups other than food, iron and steel, and textiles. More than half of these 212 central offices were classified in the machinery, paper and allied products, and chemical groups. The 53 central offices classified in the machinery group consisted chiefly of those utilizing steel in the fabrication of various machinery products. Obviously, these products would include the more advanced manufactures of iron and steel, whereas the joint products of those central offices classified in the iron and steel group represented, for the most part, crude and intermediate commodities. In practically all instances the central offices controlled plants operating in but two or three separate industries, indicating that only a few major commodities were made from the same raw material. Undoubtedly, numerous minor products were manufactured, but an analysis of the functional relationship of establishments on an industry basis does not reveal these items. There were eight central offices operating in more than three industries, but some of the establishments controlled by them were engaged in industries not utilizing a common raw material.

Joint products derived from paper and pulp were produced by 40 central-office companies. Pulp was used by plants classified in the paper industry for the manufacture of such products as newsprint, book, writing, wrapping, tissue, building papers, and the like; and in the "paper goods not elsewhere classified" industry for making crepe paper, surface-coated paper, corrugated paper, toilet paper, playing cards, confetti, milk-bottle caps, and various other miscellaneous paper products. One central office utilized pulp in separate plants to make paper, miscellaneous paper goods, and molded and pressed pulp fabricated articles. Paper constituted the basic material for the production of paper boxes, paper bags, envelopes, etc.

Joint products were manufactured by 35 of the 169 central-office groups operating primarily in the chemical and allied products indus-

tries. Establishments producing soap, fertilizers, glue and gelatin, grease and tallow, and bone black utilized animal fats and bones in the manufacture thereof. Advances in the field of chemistry are reflected in the use of a common raw material by plants engaged in the output of drugs and medicines and in the production of numerous miscellaneous chemicals falling within the "chemicals not elsewhere classified" industry. Although the remaining 84 central offices which manufactured joint products were distributed among eight separate industry groups, 22 of these were included in the miscellaneous industries group, 8 of which utilized tobacco in the production of cigarettes, chewing and smoking tobacco, and snuff. Separate plants producing buttons and condensed and evaporated milk utilized milk as a common raw material, the casein from milk being made into buttons.

#### BY-PRODUCTS

In manufacturing it frequently happens that certain subsidiary commodities are produced in addition to the principal product; that is, they are merely incidental to the manufacture of the primary product and their eventuation is entirely beyond the control of the operator. Such commodities, if purchased by other establishments within a central-office group and subjected to further processing, were treated as by-products in this analysis. Both joint products and by-products have a common raw material and diverge at some point along the line of production. The distinction between the two, however, is that in the production of joint products the manufacturer may discontinue the output of one commodity without affecting any other, except indirectly; whereas, in the case of by-products, the discontinuance of the main product automatically suspends the output of the by-product.

Although a by-product may be secondary or subsidiary in that it is less important than the main product, the terms are not used synonymously in this discussion. A by-product must result naturally, and more or less in the nature of a waste material, from the production of some principal commodity. Manifestly, an establishment may utilize its waste within the plant itself, but in the present discussion of by-products consideration was given only to those cases in which separate establishments were maintained for the processing of waste. Hence, the separate by-product plants reported by central-office concerns are by no means an indication of the extent to which by-products are utilized by the companies. Generally speaking, it is only the larger concerns that find the amount of material available for by-product manufacture of sufficient importance to justify the operation of separate plants to take care of it.

The manufacture of by-products ranked second in importance among the divergent functions of central-office groups in 1937, 113 cases being found in which by-product plants were operated within such groups. (See table 23.) Separate by-product plants were developed principally in the food, chemical, and petroleum and coal groups. In the food group, 34 central offices maintained by-product plants and 8 of these were predominantly active in the wholesale meat-packing industry. By-product plants operated in conjunction with the basic industry of meat packing produced such commodities as fertilizer, glue and gelatin, grease and tallow, soap, shortenings made of mixed

animal and vegetable fats and oils, sausage casings, and various meat products made from meat scraps. Three companies engaged in the canning and curing of fish, crabs, etc., also maintained separate plants to produce either fish oils or fertilizers.

Central offices active primarily in the manufacture of vegetable products also maintained plants for the processing of by-products. The refuse from plants utilizing grains and other vegetable products as raw materials was converted by other plants under the same control into fertilizer and feeds for animals and fowls. In the production of cane sugar, the excess material was reclaimed by separate establishments and made into animal feeds and blended and compounded sirups. There were 15 central offices which used some form of vegetable product as their principal raw material and maintained by-product plants.

The chemical industry is another field which lends itself readily to the manufacture of by-products. Of the 27 central offices which operated by-product establishments in this industry group, 9 were predominantly active in the output of cottonseed oil, cake, and meal and utilized some of the meal, hulls, cake, etc., in the production of fertilizer or animal feeds. Other by-products of the chemical industry were paving materials made from coal-tar products, pulp from the manufacture of cottonseed oil, grease from reclaimed soap stock, and household and industrial compounds from the manufacture of miscellaneous primary chemical products. Ice may also be included as a by-product of the chemical industry. The relationship, however, is based upon the utilization of excess power and the fact that ammonia is an important element in the manufacture of ice.

Although only 36 complex central offices were predominantly active in the petroleum and coal group, 15 of these maintained separate by-product plants. The oil refining industry is especially conducive to by-product manufacture, since the products of petroleum are obtained by successive refining processes and the output of any one commodity is contingent upon the removal of certain other products. Obviously, if these by-products were all produced and treated in one establishment they were not recognized in this study. It is significant, however, that 11 petroleum refineries operated separate plants for the production of lubricating oils and greases.

The development of by-product coke ovens has resulted in the recovery of numerous by-products formerly wasted, so that at the present time practically all coke is produced in by-product ovens. The principal by-products obtained from coke-oven operations are tar and tar derivatives, sulfate of ammonia, gas, light oil and derivatives, and naphthalene. It is apparent that most of the by-product materials are recovered and processed within the same establishment, since in 1937 only six combinations of coke ovens and separate by-product plants were noted and in only two of these instances was the coking of coal the principal business.

Certain operators in the textile industries have found it advantageous to maintain establishments for cleaning or otherwise preparing the waste from cotton, wool, and other fiber. Some of the material recovered is spinnable stock, while other waste is used in such products as batting, wadding, and oakum. Of the nine central offices in the textile group designated as having by-product establishments, five had separate plants for the processing of waste or the production of

batting, padding, and wadding and two central-office companies utilized excess power in the operation of ice plants.

The operation of small ice plants in connection with lumber mills or box factories occurred in seven instances, shavings and other waste being turned into fuel. Most of the remaining examples of separate by-product establishments were combinations of smelters and refineries and plants producing paints and pigments from lead and zinc oxides. These paint factories have been included in the by-product category since, undoubtedly, their existence is dependent upon the operation of the smelters. In addition to the miscellaneous by-product plants cited above, there were several combinations of blast furnaces and cement plants, the latter utilizing furnace slag in the production of puzzolan cement.

#### DISSIMILAR PRODUCTS OF LIKE PROCESSES

The divergent functional relationships of central-office establishments discussed thus far have centered around the processing of a common raw material, the progression along different lines resulting from the varying uses made of a single basic material. The establishments producing both joint products and by-products arrived at different products by the application of dissimilar processes to a common material. Conversely, in this section the analysis is extended to include the application of like processes to unlike materials. In other words, a basic process is exploited rather than a basic material. Shown graphically, the picture is that of the letter X instead of a V.

Examples of the manufacture of dissimilar products by applying similar processes to different materials were found in 104 central-office groups. They occurred principally among the central offices classified in the printing and publishing, textile, and food groups. (See table 23.)

##### *Printing and Publishing.*

Although the problem of determining the functional relationships existing among establishments engaged in printing and allied industries is somewhat difficult, it has seemed wisest to include 43 central offices controlling such establishments with this classification of groups having similar processes. In the field of printing and publishing the Bureau of the Census recognizes two industries, namely, (1) newspaper and periodical and (2) book, music, and job. Hence, all combinations of plants classified in the aforementioned industries have been treated with those employing similar processes. It is pointed out that some establishments are engaged solely in the publication of material printed by others and perform no printing or other manufacturing processes of any kind. The Bureau of the Census, however, has found it necessary to include such establishments within the printing industry in order to make a complete statistical presentation for that industry. This necessity arises because commercial printers are not in a position to report the selling values of publications printed for others, this information being obtainable only from the publishers for whom the commercial printing is done.

Nearly half of the 43 central offices operating primarily in the printing and allied industries group and classified as having similar processes were engaged in printing and publishing newspapers and periodicals and in book, music, and job printing and publishing. It

is the manuscript which determines the nature of the final product, and since the same process was applied to different types of manuscript, whether newspaper, book, music, or job, plants classified in the separately defined industries noted above were said to be functionally related because they employed like processes.

Also included under the "like process" classification were 18 groups of plants active in the printing and publishing industry and in lithographing. Establishments classified in the latter industry were engaged in preparing lithograph plates of stone or of metal and in printing from such plates. The actual reproduction on paper, whether from stone or metal, is accomplished in a manner very similar to printing from type or plates engraved in relief. The greater part of the work done in this industry is lithographing on a job or a custom basis to individual order, but in some cases calendars, commercial forms, maps, illustrated cards, posters, etc., are made for sale.

#### *Textiles and Their Products.*

There were 298 complex central offices operating primarily in the textile industries. Table 23 reveals that 31 of these structures maintained separate plants which were active in the same type of business but which utilized different raw materials and, therefore, produced different final products. Most of these cases centered around the weaving industry. Plants under common management produced worsted and cotton woven goods, rayon and silk broad woven goods, rayon and cotton woven goods, silk and rayon narrow fabrics, and the like. One central office had separate plants manufacturing worsted, woolen, cotton, and rayon fabrics, but in the majority of instances not more than two basic textile materials were used.

Separate dyeing and finishing plants were maintained by six central offices, each plant specializing in the dyeing of a particular type of fabric or yarn. There were five central offices engaged in rayon throwing and spinning and in silk throwing and spinning. Cloth and leather were utilized in separate factories under unified management in the output of gloves and mittens, thereby exploiting the sewing process. Since the cloth glove business was the larger in terms of value of product, this central office was naturally classified in the textile group.

It is interesting to note that about one-third of the 31 central offices in the textile industries which operated plants engaged in similar processes also had other plants engaged in successive operations, either reaching back into the raw material field or carrying on the more advanced stages of manufacture. A concrete example is that of a central office controlling separate establishments engaged in spinning silk yarn and thread, in weaving rayon and silk narrow fabrics, and in dyeing and finishing rayon and silk fabrics. Since separate plants were maintained for weaving rayon and for weaving silk, the interrelationships existing within the central-office group were those of like processes as well as successive operations.

#### *Other Industry Groups.*

The Bureau of the Census recognizes but two distinct industries involving the canning process. This, in part, accounts for the small number of central offices in the food group operating plants related through similarity of process. The canning and curing of fish, crabs, shrimps, oysters, and clams constitute one industry, while the second

industry includes canned and dried fruits and vegetables, canned and bottled juices, preserves, jellies, fruit butters, pickles, and sauces. Only eight central offices classified in the food group controlled plants which were engaged in both of the above-named industries.

The tendency of central offices to expand by establishing plants having similar processes is indicated by six central offices engaged principally in the smelting and refining business. Manifestly, there are special advantages derived from operating smelters in proximity to such raw materials as copper, lead, zinc, etc. One company operated separate plants in all four of the smelting and refining industries which are distinguished by the Bureau of the Census, i. e., smelting and refining copper, lead, and zinc, and smelting and refining scrap metals and dross of all kinds, except gold, silver, and platinum, for which there is a special classification.

In three central-office groups some of the plants were engaged in the output of baked or burnt clay products, such as brick, building and wall tile, and draintile, while other plants produced various types of pottery and porcelain ware. The fact that both industries involve the molding and hardening of clay materials seems to warrant the inclusion of such combinations with those having similar processes, although the basic raw materials are not distinctly different. In the pottery and porcelain industry, however, a higher degree of refinement and a mixture of other products with the clay are necessary before the material is ready for molding. Similarity of process was noted in the case of five central offices whose establishments manufactured gloves and mittens, some from leather and others from cloth; they were classified in the leather group, since the making of leather gloves and mittens was their principal business.

By way of summary, it may be pointed out that the building up of central-office groups in which the constituent establishments are related through the performance of divergent functions is a characteristic of large-scale production and is dependent on modern technology. The research laboratories of concerns primarily interested in one raw material may develop many new products from this material. To the extent the production of these products becomes important, the establishment of a new plant may be justified and, as a separate unit, will come within the scope of the study. Furthermore, the economical utilization of by-products is dependent on the innovations of the research laboratory. In many concerns the difference between profit and loss is dependent on the successful use of by-products. Thus, there is a continuous search for new ways to reclaim waste materials that were previously consigned to the scrap heap. As the concern becomes large, separate establishments may be maintained for the processing of these by-products. The extent to which joint products and by-products are manufactured varies, of course, with the nature of the industry. The output of joint products was most frequent among plants operating in the food, iron and steel, and textile industries, while by-product manufacture occurred chiefly among plants in the food and chemical groups.

## CHAPTER VII

### CONVERGENT FUNCTIONS

The discussion in this chapter centers in an analysis of those instances in which the relationships of establishments in complex central offices are convergent in nature. Here the function lines begin apart but gradually approach each other and meet at a common point. The types of convergent functions recognized in this study are as follows:

1. Complementary products:
  - (a) Complementary materials.
  - (b) Complementary parts.
  - (c) Complementary products.
  - (d) Complementary industries.
2. Auxiliary products:
  - (a) Auxiliary services.
  - (b) Auxiliary commodities.
3. Dissimilar products for like markets.

TABLE 25.—Central-office companies having convergent functions, by industry groups, 1937

[NOTE.—See headnote to table 16]

Group No.	Industry group	Number of central offices having convergent functions (unduplicated total) <sup>1</sup>	Number of central offices having convergent functions (duplicated total) <sup>1</sup>	Number of central offices operating establishments related through—		
				Complementary products	Auxiliary products	Like markets
	All industries.....	938	1,058	386	183	489
1	Food and kindred products.....	241	284	70	71	143
2	Textiles and their products.....	72	72	26	8	38
3	Forest products.....	54	58	16	7	35
4	Paper and allied products.....	22	23	5	7	11
5	Printing, publishing, and allied industries...	21	21	1	11	9
6	Chemicals and allied products.....	88	108	44	17	47
7	Products of petroleum and coal.....	20	23	12	8	3
8	Rubber products.....	9	12	5	4	3
9	Leather and its manufactures.....	23	25	12	5	8
10	Stone, clay, and glass products.....	58	62	10	6	46
11	Iron and steel and their products, not including machinery.....	69	75	32	11	32
12	Nonferrous metals and their products.....	28	33	7	10	16
13	Machinery, not including transportation equipment.....	144	158	85	8	65
14	Transportation equipment, air, land, and water.....	33	37	31	1	5
16	Miscellaneous industries.....	56	67	30	9	28

<sup>1</sup> The duplicated total includes duplications among complementary products, auxiliary products, and like markets; in the unduplicated total, duplications among the three convergent subgroups have been eliminated.

<sup>2</sup> Figures do not include duplications among complementary materials, parts, and products comprising the complementary products subgroup nor those between auxiliary services and commodities comprising the auxiliary products subgroup.

Table 25 shows the number of central offices operating establishments whose functions are convergent. In numerous central-office.

groups it was found that the convergent relationships existing among the establishments were of more than one type. This can be ascertained by a comparison of the duplicated and unduplicated totals given in the table. In all but four of the industry groups (textiles, paper and its products, printing and publishing, and iron and steel) convergent functions, as a whole, were more prevalent than divergent functions. The large number of establishments functionally related because they were producing for the same market accounted chiefly for this excess of convergent functions.

#### COMPLEMENTARY PRODUCTS

Mass output, improvements in machine technology, and the specialization of labor have split up production into an ever-increasing number of separate processes. Few products today are made completely from one material and in one part, and the desire on the part of management to have control over the supply and quality of these materials and parts has been at least one of the factors leading to the establishment of multi-unit concerns. The manufacture of an automobile, for example, involves the bringing together of many separately fabricated parts and the utilization of numerous materials. Even some very simple commodities are composed of a considerable number of parts.

TABLE 26.—*Central offices operating establishments having complementary functions, by industry groups, 1937*

[NOTE.—See headnote to table 16]

Group No.	Industry group	Number of central offices (unduplicated total) <sup>1</sup>	Number of central offices (duplicated total) <sup>1</sup>	Number of central offices operating establishments related through—			
				Complementary materials	Complementary parts	Complementary products	Complementary industries
	All industries.....	386	402	2 100	3 151	4 78	73
1	Food and kindred products.....	70	74	18		23	33
2	Textiles and their products.....	26	26	7	3	12	4
3	Forest products.....	16	16	3	5	1	7
4	Paper and allied products.....	5	5	3	1	1	
5	Printing, publishing, and allied industries.....	1	1	1			
6	Chemicals and allied products.....	44	49	29		16	4
7	Products of petroleum and coal.....	12	12			7	5
8	Rubber products.....	5	6	5	2	1	
9	Leather and its manufactures.....	12	13	5	2	4	2
10	Stone, clay, and glass products.....	10	11	6	2	2	1
11	Iron and steel and their products, not including machinery.....	32	32	2	23	2	5
12	Nonferrous metals and their products.....	7	7	1	5	1	
13	Machinery, not including transportation equipment.....	85	89	9	71	2	7
14	Transportation equipment, air, land, and water.....	31	31		27		4
16	Miscellaneous industries.....	30	30	11	12	6	1

<sup>1</sup> The duplicated total includes duplications among complementary materials, parts, and products; in the unduplicated total, duplications among the complementary subgroups have been eliminated.

<sup>2</sup> 12 duplications with complementary products; 3 duplications with complementary parts.

<sup>3</sup> 3 duplications with complementary materials; 1 duplication with complementary products.

<sup>4</sup> 12 duplications with complementary materials; 1 duplication with complementary parts.

When separate establishments under unified management manufacture articles which converge in a final product within the organization, the central-office group is said to produce complementary prod-

ucts. For the sake of clarity at this stage of the presentation it is perhaps advisable to distinguish the uses that have been made in this study of complementary functions and successive functions (to be discussed later). Generally speaking, in the manufacture of complementary products, the separate items which compose the final product may be produced simultaneously. In the output of successive products, however, several operations are performed in sequence, each step bringing the product nearer its ultimate form. For convenience in presentation, complementary products have been subdivided according to complementary materials, complementary parts, complementary products, and complementary industries. These subgroups are shown in detail in table 26 and a description of them is given under their respective headings.

#### *Complementary Materials.*

In contrast with the manufacture of parts which are joined together in the final product without undergoing any significant change, the manufacture of complementary materials involves the output of products which are not in their final form but which are to be further changed in their combination with other products. Complementary materials frequently lose their identity in the ultimate product or they cause some change in the product with which they are combined. It was found that 100 central offices operated establishments which manufactured complementary materials. Twelve of these central offices also had plants producing complementary products and three controlled plants making complementary parts.

Twenty-nine central offices producing complementary materials were classified in the chemical group, 18 in the food group, 11 in the miscellaneous industries group, 9 in the machinery group, and 7 central offices in the textile group. Since the diversification of products in the chemical industries precludes any specific grouping of the materials used, only some of the significant combinations in which the interrelationship of establishments was based on the output of complementary materials will be mentioned. There were seven central offices engaged in the output of fertilizers which operated separate plants to produce the various constituent materials. A list of some of the more important materials consumed in the manufacture of fertilizer would include sulphate of ammonia, nitrate of soda, calcium cyanimid, cottonseed meal, tankage, fish scrap and meal, guano, ground bones, superphosphates, muriate and sulphate of potash, manure salts, kainite, ammonia, urea and calurea, ammonium phosphate, and various other inorganic and organic nitrogenous materials. Other central-office structures classified in the chemical group which produced complementary materials included plants making soap and the miscellaneous oils used therein; drugs and medicines and miscellaneous chemical products; and paints and varnishes and linseed oil.

Among the central offices classified in the food group, seven companies were primarily active in the output of malt liquors and operated malt houses in connection with breweries. Since malt is of paramount importance among the materials used in making malt liquors, the functional relationship in these cases might have been considered successive. In this study, however, the functions of establishments in the two industries have been treated as convergent only. There were three central offices which produced flavoring extracts and sirups

and nonalcoholic beverages. Although most of the flavoring products were sold outside the central-office group for soda-fountain use and to bakers, confectioners, etc., at least some of the flavors were consumed within the organization in the production of beverages and have been treated, therefore, as complementary materials. Although a large part of the total output of vinegar and cider is made as a by-product of canning companies, four central-office groups operated separate plants producing vinegar which was used in pickling and allied processes by other plants in the group.

Of the 11 central offices classified in miscellaneous industries, 7 such organizations included plants manufacturing various types of roofing and the paper used therein. One establishment specializing in sporting goods was under unified management with another producing cordage, rope, twine, etc., for baseballs, fishing and gymnasium equipment, and similar goods. Another central office operated plants making mattresses and batting, padding, wadding, and upholstery filling.

Chemicals used in batteries, as well as rubber goods, asbestos products, and paints, were produced in separate plants by central offices also engaged in making products classified in the machinery group. In the textile group certain central offices controlled plants manufacturing rayon-mixed broad goods and operated additional establishments for spinning the cotton or silk yarn to be combined with the rayon. In the boot and shoe industry there were five instances in which central offices maintained separate establishments producing cut stock and findings.

#### *Complementary Parts.*

Both complementary materials and parts connote something that is necessary to complete a whole. In the case of complementary parts, however, the separate products in themselves do not undergo any significant change when combined with the ultimate product. Bolts, nuts, and washers are used in machinery, but they retain their identity as such and frequently can be taken out and used again. Electric motors are used in various types of machinery, but they are not subjected to any inherent change when installed.

Central offices with establishments manufacturing complementary parts constituted the largest subgroup among those organizations whose functions were complementary. Nearly half of the structures producing complementary parts controlled establishments primarily active in the machinery industries. Of the 71 structures classified in the machinery group, 22 central offices apparently found it advantageous to maintain separate shops for the purpose of machining castings and making gears and other parts for machines. By this means they were assured of an adequate supply of parts as well as the desired quality and the proper specifications. Separate foundries to produce rough castings were operated by 15 central offices. Other instances noted were those of plants manufacturing radios and necessary miscellaneous electrical apparatus; electrical machinery and electrical porcelain; and textile machinery and the various required wooden parts.

Classified in the transportation group were 23 central offices active in the manufacture of motor vehicles, some parts for which were produced in separate factories. In manufacturing motor vehicle bodies, one central office had plants engaged in seven other industries,

as follows: Bolts, nuts, washers, etc.; springs; wire drawn from purchased rods; wirework; stamped and pressed metal products and enameling, japanning, etc.; foundry products; and machine shop products. Several shipbuilding concerns also maintained separate shops for the production of parts.

Of the 23 central offices predominantly active in the iron and steel group, approximately one-half were engaged in the production of various types of heating and cooking apparatus, and these concerns also controlled separate establishments for making rough castings, pipe and fittings, and commercial and industrial instruments and apparatus, such as gages for measuring pressure, speed, temperature, or direction, and automatic control devices. The heating and cooking apparatus industry embraces all heating and cooking appliances using coal, gas, oil, and other fuel. These include, among other products, steam and hot-water heating apparatus, heating and cooking stoves, ranges, and furnaces; gas fireplaces, logs, and grates; gas and oil water heaters; hot water tanks; domestic oil burners; radiators, valves, gages, thermostats, etc. In the manufacture of tools several central offices maintained plants producing turned and shaped wooden parts such as handles for tools. It is again stressed that because a central office operates separate factories to produce parts for the main line of business, this does not imply that all parts are sold within the central-office structure. In numerous instances, the value of the parts sold outside the organization bulks large.

#### *Complementary Products.*

It was pointed out that a criterion for distinguishing complementary materials and parts is that the materials usually undergo some change when combined with other products, whereas parts retain their identity to a considerable degree. So it is with complementary products; no fundamental change is made in them when combined with other things. In the case of complementary products, however, their combination occurs at the latest possible stage just before they are ready for distribution. Practically all examples of complementary products shown in table 26 represented the grouping of plants producing the main commodities with other plants engaged solely in the manufacture of containers or wrappers for them.

Undoubtedly there are very definite advantages to be derived from the manufacture of containers under the same management as the main product. The manufacture of containers within a central-office company guarantees to the enterprise the desired supply and the proper type to meet its requirements. The extent to which this is done in manufacturing is not fully reflected by the data in table 26, since in this study the instances in which containers were made in separate departments of the plant making the main product could not be ascertained.

Typical complementary products were tin cans, pails, and boxes; paper and wooden boxes; glass containers; tanks for liquids and gases; paper bags; bags made of various textiles; and miscellaneous paper for wrappings. The manufacture of complementary products occurred most frequently among central offices primarily active in the food, chemical, and textile industries. Several instances of the manufacture of complementary products were found in which one of the manufacturing processes was of a seasonal nature, for example, the canning business in combination with a box factory. In this case,

the value of the products of the box factory was in excess of that of the canned goods, indicating that, while some of the boxes were used in connection with the cannery, most of them were sold outside the combination. Since the canning business is seasonal in nature, operation of the box factory could be carried on during slack periods and the labor supply shifted from one industry to the other.

#### *Complementary Industries.*

In this category are listed, for the most part, those combinations of establishments operated by concerns whose main activity does not lie in the field of manufacturing. Rather, their main line of endeavor may be in the extractive industries or distribution, service, transportation, etc. Since the Bureau of the Census canvasses all known manufacturing establishments whose production during the year covered by the census was valued at \$5,000 or more, it necessarily includes the manufacturing operations of many companies engaged primarily in nonmanufacturing businesses. Such secondary manufacturing enterprises merely form a part of or complete the principal functioning line and thus have been considered as constituting instances of complementary industries.

It is a well-established fact that our economic society is characterized by numerous business enterprises that extend their operations from the extraction of raw materials through manufacturing to distribution. With the resources available to this study, it was possible to recognize at least 62 central offices which were not essentially manufacturing concerns but which did operate establishments which were properly classified in manufacturing. It is believed, however, that this is by no means a complete coverage and that other such central offices are included with those whose functions fell outside the complementary industries classification. These 62 central offices may be classified according to the following types of enterprise: Distribution channels (chiefly retail stores), 18; public utilities, 16; cooperatives, 14; railroads, 8; mining and fuel companies, 3; religious societies, 2; and restaurants, 1.

In the field of distribution, one company controlled manufacturing establishments classified in 19 separately designated industries; two companies had establishments in 11 manufacturing industries; and two companies had plants in 8 or 9 manufacturing industries. For the most part, the public utilities operated factories in no more than four separate industries. In one case, however, a utility company had extensive petroleum refineries and also had additional factories in nine allied manufacturing industries. The cooperative agencies were engaged essentially in the manufacture of butter, cheese, condensed and evaporated milk, and ice cream. In several instances, however, they maintained poultry dressing and packing establishments and factories producing feeds for animals and fowls.

A manufacturing activity common to railroad companies was that of wood preserving which involves the treating of wood to prevent decay and to protect it against insects. Among the products of this industry are railway ties, piles, poles, and cross arms. Several railroads maintained printing and publishing plants to print tickets, time tables, and other required material. One company built its own cars and two railroads were also engaged in the ship and boat building and repair industry. Since railroad repair shops were not

treated as manufacturing industries in the 1937 Census of Manufactures, the numerous instances of the manufacture of cars in these shops are not included in this study.

It would be of interest if this study could be extended beyond the manufacturing industries to include all activities under the supervision of a single central office, for example, the extractive industries, wholesale and retail trade, construction, etc. Such data, however, for the year 1937 were not available. As part of the more complete decennial census of 1940, the schedule calls for the name of the principal business of each organization, as well as the number of units operated in each of the following classifications: Manufacturing plants; mines and quarries; wholesale and retail establishments; service businesses and places of amusement; hotels; construction offices; and central or district administrative offices, chain-store warehouses and other auxiliary units. As these data become available, it will be possible to present a more comprehensive picture of integration in the whole business economy.

## AUXILIARY PRODUCTS

The converging functions considered up to this point, except those instances of complementary industries, have involved the combination of different products to form the ultimate product. There are, however, additional cases in which several manufacturing operations classified in various industries are required to produce a final product. Although these activities are essential, they do not add any physical material to the finished article. They merely assist in the process, serving in an accessory capacity to the main line of production.

TABLE 27.—Central offices operating establishments having auxiliary functions, by industry groups, 1937

[NOTE—See headnote to table 16]

Group No.	Industry group	Number of central offices (unduplicated total) <sup>1</sup>	Number of central offices (duplicated total) <sup>1</sup>	Number of central offices operating establishments related through—	
				Auxiliary services	Auxiliary commodities
	All industries.....	183	190	123	67
1	Food and kindred products.....	71	75	19	56
2	Textiles and their products.....	8	8	6	2
3	Forest products.....	7	7	7	-----
4	Paper and allied products.....	7	7	7	-----
5	Printing, publishing, and allied industries.....	11	11	11	-----
6	Chemicals and allied products.....	17	17	17	-----
7	Products of petroleum and coal.....	8	8	8	-----
8	Rubber products.....	4	4	2	2
9	Leather and its manufactures.....	5	6	5	1
10	Stone, clay, and glass products.....	6	6	5	1
11	Iron and steel and their products, not including machinery.....	11	12	10	2
12	Nonferrous metals and their products.....	10	11	8	3
13	Machinery, not including transportation equipment.....	8	8	8	-----
14	Transportation equipment, air, land, and water.....	1	1	1	-----
16	Miscellaneous industries.....	9	9	9	-----

<sup>1</sup> The duplicated total includes duplications between auxiliary services and commodities; in the unduplicated total, duplications between the 2 auxiliary subgroups have been eliminated.

In certain enterprises a large amount of repair work is necessary and it has been found economical to maintain separate establishments to conduct this activity; or separate establishments are operated to produce some special commodity, such as ice or fuel, which is indispensable in the performance of other plants in the group. The relationships of establishments under these circumstances come within the scope of auxiliary functions. The data have been segregated according to auxiliary services and auxiliary commodities and are presented in table 27. It is apparent that, of the 2,051 complex central offices, 183 concerns operated establishments having auxiliary functions. Seven of these central offices controlled plants performing an auxiliary service as well as plants producing auxiliary commodities.

### *Auxiliary Services.*

Data with respect to auxiliary services provide some measure of the extent to which manufacturing combinations controlled separate plants for the performance of necessary minor activities. The auxiliary services of central-office groups may be classified according to the following types: Printing, 66; maintenance and repair, such as the operation of machine shops or foundries, 29; building or repair of transportation facilities, 7; and "other" accessory shops, 21.

Foremost among the auxiliary services noted for central offices in 1937 was the development of separate printing establishments in conjunction with the principal activity. Since it was not possible in this study to investigate the purposes for which individual printing plants were established, it has been assumed that in all central offices in which the printing business was not of primary importance, at least some of the printing was in the nature of an auxiliary service. These plants were engaged in the necessary printing in connection with advertising, as well as in printing catalogs, bulletins, price lists, letterheads, and special labels and tags.

For the most part, separate printing establishments were operated by central offices predominantly active in the chemical, food, machinery, and miscellaneous industries. A comparison of the number of central offices operating auxiliary printing plants in 1937 with corresponding data for 1919<sup>1</sup> indicates a strong upward tendency in the intervening years. Although a precise comparison of the data for the two census periods cannot be made, they are sufficiently comparable to give evidence of the trend.

Second in importance among auxiliary services was the operation of separate plants for maintenance and repair. Most of these were machine shops set up for the purpose of making gears and other parts for the machinery equipment of the factories within the central-office group. It frequently happens, however, that these machine shops perform job work for unrelated concerns, since their full-time operation is not always required by the factories within the combination. Although the 29 maintenance and repair shops were operated in conjunction with central offices scattered throughout practically all industrial groups, most of them occurred in central offices primarily active in the output of stone and clay products.

Only seven central offices operated auxiliary establishments for the construction or repair of transportation equipment. Four of these

<sup>1</sup> See "The Integration of Industrial Operation," p. 219.

were interested principally in the meat packing or petroleum refining industries and controlled shops for building or repairing cars for use in transporting the manufactured products. Three central offices, primarily active in the output of petroleum products, structural and ornamental metal work, and coke-oven products, also maintained plants for boat building and repair work.

"Other" accessory shops were operated as part of 21 central-office groups. Eight of these were printing and publishing houses with auxiliary establishments engaged in photoengraving. Such establishments make photoengraved plates for printing illustrations, art work, post cards, greeting cards, magazine covers, half-tone engravings, etc.; they do not, as a rule, print from the plates which they make, but prepare them for use by others. Other central offices which maintained separate auxiliary shops were active in the following industries: Wirework and galvanizing and other coating; silverware and plated ware and engraving or electroplating; boots and shoes and signs and advertising novelties; tin cans and signs and advertising novelties.

#### *Auxiliary Commodities.*

Plants producing auxiliary commodities actually turned out separable products, whereas plants in the preceding classification were engaged in operations more nearly akin to servicing. Central offices controlling establishments manufacturing auxiliary commodities were slightly more than half as numerous as those with establishments performing auxiliary services. Practically all auxiliary commodities were produced in organizations whose chief interest was in the food industries. Of the 67 central offices with establishments producing auxiliary commodities, 50 such organizations had separate plants manufacturing ice to be used in the preservation of perishable foods or in the production of ice cream. One large meat-packing company produced its own salt, while four central offices active in the dairy or poultry dressing business had separate plants to prepare special animal and poultry feeds.

The various fuels consumed in the manufacturing processes would come within the auxiliary products category, but since it was not possible in this study to determine those central offices that reached back into the mining field, no account of the fuels thus utilized is available. In one instance, however, the production of coke in combination with smelting and refining was noted.

#### DISSIMILAR PRODUCTS FOR LIKE MARKETS

Thus far in the analysis dealing with convergent functions, consideration has been given only to those types in which the separate lines are united before leaving the manufacturer. There are, however, numerous products made from different materials and by different processes which do not converge within the manufacturing process but which finally meet in the market place. This final convergence in the market was, in many instances, the only known explanation for the combination of certain products produced within a central-office group. True it is that many apparently unrelated products converge in use, such as bread and butter, but since most products that come together in use can be obtained from the same market, no separate account of this phase of analysis was taken.

It must be borne in mind that the cases included in this section are by no means all those in which similarity of market is a factor in explaining why different products are produced by separate establishments within the same central office. Knitted outerwear and knitted underwear made from wool may be sold in the same market, but since the same material is used for both, they have been classified as joint products rather than products for like markets. In other words, if any basis for the association of plants other than the inducement to produce a full line for the same market could be ascribed to the functions of central-office establishments, that policy was followed in the present analysis.

There were, of course, many central offices which, in addition to controlling establishments related functionally as suggested above in the case of knitted goods, also controlled establishments which were related only in the sense that they produced for a like market. That is, in a central-office structure composed of four establishments, for example, two plants might be related through the production of joint products and two because the products were for like markets. There were 327 combinations in which the sole relationship between the constituent establishments was that these establishments produced items for a like market but there were also 162 other central offices that controlled establishments some of which were related in this fashion, and in addition these central offices controlled other establishments that were related through some other means.

The functional relationships based on similarity of market may be open to some criticism, since it may be said that almost any type of commodity is found in a department, mail order, or general merchandise store. The basis for classification in the present study, however, was much more restricted than this. It is known that certain combinations of commodities, for example, miscellaneous food products or the various types of electrical apparatus, are sold in a common market, and it is only such usual instances as these that have been included in the category of like markets.

Most of the central-office groups producing dissimilar products for the same market were predominantly active in the food and kindred products group. (See table 25.) The food market is characterized by a wide diversity of products required to satisfy consumer demands and the nature of distribution channels is conducive to the production of a number of products. After a manufacturer has established a reputation for one product, he is in a position to expand into the production of other related food products.

This section, however, does not adequately measure the multiplicity of food produced for a common market, since it includes only those groupings of plants functionally related solely in the sense that they produced for the same market. It will be recalled that a large number of central offices; especially those dealing in creamery products, were classified as producing joint products. There were also numerous occurrences of the combination of food materials to produce an ultimate product and these were included in the discussion of complementary materials. The manufacture of ice in connection with the output of perishable foods was treated as an auxiliary commodity, while by-product plants were frequently operated by meat-packing establishments.

There were 143 central offices classified in the food group which operated plants the relationships of which were based on the output of goods for a single market. Of this number, 84 central offices controlled establishments operating in but 2 of the food industries. Lack of homogeneity in these companies precludes a definite grouping of all of them. The 2-industry central offices noted most frequently, together with the number of central offices involved, were as follows: Butter and poultry killing and dressing, 21; bakery products and confectionery, 18; ice cream and nonalcoholic beverages, 9; and ice cream and confectionery, 9. At the other extreme, there were several central offices with separate plants operating in as many as 10 of the food industries, most products of which could be found in the same market. Many of these establishments, however, were functionally related because of reasons other than that they produced for like markets.

Next to the food industries, the machinery group had the largest number of central offices producing for a common market. Sixty-five central offices were listed in this classification. It is adequate here to mention some of the products of separate establishments under the same management, such as typewriters, cash registers, and carbon paper; radios and pianos; water filtration and softening equipment and water softening materials; hoisting cranes and lifting machinery and pile hammers; electric refrigerators and electric food grinding machines; refrigerators and radios; lift trucks, barrel racks and platforms; agricultural implements and carriages and wagons; and radial and sensitive drills and dynamite. Obviously, not all of these products were classified in the machinery group, but in each case the principal business (on the basis of the value of products) was the production of machinery.

One interesting organization was that of a central office producing equipment and materials required at soda fountains. The products noted were bottle washers, pasteurizers, bottle fillers, crowners, extracts and sirups, dry ice, and soda fountains and bars. Another central office with establishments classified in nine separate industries manufactured typewriters and miscellaneous writing equipment and materials.

A large number of central offices producing for like markets were also classified in the stone, clay, and glass group; chemical group; textile group; and in the forest products group. In the former group, most of the commodities produced were those used in the building industries; for example, concrete products, clay products, glass, gypsum products, cement, nonclay refractories, asbestos products, wallboard and plaster, and marble, granite, slate, etc. Here, again, the majority of central offices operated in only 2 industries. The largest central office (that is, largest in terms of the number of separate industries in which it operated establishments) controlled plants in 9 industries, and all principal products of these industries found their markets in the building trades. In 40 of the 46 central offices classified in the stone, clay, and glass products group, the incentive to produce for a common market was the sole bond of relationship between the establishments that could be determined.

The policy of producing a full line for a common market was quite common in the field of chemistry. The wide variety of merchandise carried by drug stores is undoubtedly an impelling reason for manu-

facturers of chemicals to expand into different fields. Whereas in the food, machinery, and stone, clay, and glass industries, most of the central offices producing for like markets operated establishments in only 2 industries, those in the chemical group operated establishments in several industries. In fact, 17 of the 47 central offices classified in the chemical group operated establishments in 4 or more industries, and 3 of these were engaged in 10 or more separate industries. One large chemical company had plants in 17 different industries. The primary factor in expansion here, however, was not that of producing for the same market and many of the products manufactured were outside the chemical field.

Numbered among the firms manufacturing different commodities for like markets were 38 central offices predominantly active in the textile industries. Various types of clothing or textile materials were the principal products of many of these concerns, whereas the plants of secondary importance to the companies manufactured articles such as handbags, millinery, fur goods, gloves, miscellaneous housefurnishings, etc. A firm producing clothing was also engaged in the output of trunks, suitcases, and other luggage. Two central offices manufactured cloth gloves and leather gloves in separate plants. Here, it could also be said that the organizations grew out of the exploitation of like processes, but it is believed that the desire to produce a fuller line was the more probable reason for expansion.

Of the 35 central offices classified in the forest products group that manufactured goods for the same market, 25 concerns controlled separate establishments in only two industries. Furniture was an important commodity produced by many of the companies. There were several concerns making furniture under the same management with other plants making mattresses and bed springs. Five box factories were in central-office groups with other plants manufacturing baskets and rattan and willow ware.

Since an accurate comparison of the data in this study and in Dr. Thorp's monograph<sup>2</sup> cannot be made, it is possible only in general terms to measure the change from 1919 to 1937 in the number of central-office structures whose sole motive for unified control of plants was that they produced for like markets. It may be said, however, that there is a growing tendency on the part of manufacturers to produce more and more of the commodities that can be sold in a common market place.

To summarize, the number of instances of convergent relationships among establishments under common control is sufficient to demonstrate the importance of this functional type in central-office organizations. Approximately half of the 2,051 complex central offices operated plants related through the performance of convergent functions. It was pointed out earlier in this chapter that many commodities in their final form involve the assembly of numerous separate parts or products, each complete and distinct in themselves. Furthermore, certain operations of a more or less subsidiary nature are necessary to the functioning of the main line of activity. It is the desire to control the supply and quality of these separate products or to direct specific secondary operations that has led to the formation of numerous central-office groups of this structural form. The reasons for and

<sup>2</sup> See "The Integration of Industrial Operation," p. 225.

advantages of such organizations correspond quite closely to those of concerns engaged in the manufacture of successive products. These reasons are discussed in some detail in the following chapter. The area of the market for goods has been increased by modern transportation and extensive advertising. As a consequence, numerous multi-plant businesses have emerged whose plants are functionally related only in the sense that they produce for a common market. Economies in marketing have undoubtedly been a prime motive in the development of this type of central office.

## CHAPTER VIII

### SUCCESSIVE FUNCTIONS

The central-office groups heretofore considered have involved the centralized control of establishments related through the performance of uniform, divergent, or convergent functions. Another type of organization, involving a more complex structural pattern than the types analyzed in the preceding discussion, occurs when establishments under unified management are related through the production of goods at various successive manufacturing stages. In other words, such vertically integrated enterprises exist when the final product of one factory is used as a raw material for another plant within a single company. It is with this type of relation among central-office establishments that the present chapter is concerned.

The extent of vertical integration throughout the total economy is not reflected in this analysis. The activities of many companies extend from the extractive industries, through manufacturing, to the distributive stage. In this analysis, however, attention was centered on vertical integration in manufacturing. By way of explanation, the larger steel companies own and operate iron ore mines, quarry the necessary limestone, mine their own coal and convert it into by-product coke for use in their blast-furnace operations, roll their own steel and convert it into more advanced manufactures, and, finally, maintain a selling organization for the distribution of their products. For such enterprises, however, the measure of integration here does not reach back of the blast-furnace or coking processes, nor does it extend beyond the manufacturing operations. The control of wholesale and retail outlets has been developed to a considerable degree in many lines of manufacturing, but the measurement of the extent of such forward expansion lies outside this study.

"Vertical integration" is employed here in a somewhat restricted sense. In its looser meaning the expression sometimes covers those instances in which all related branches or all necessary processes are brought together to form one unified whole. The vertically integrated structures presently discussed, however, comprise only those central offices in which the final product of one establishment is passed on to another plant within the same central office and subjected to a still further degree of fabrication. It is pointed out that such instances as the manufacture in separate plants of engines and various finished parts required in the assembly of an automobile were not included here with successive functions, but were treated under convergent functions in the section relating to the manufacture of complementary parts. Although the coverage of the material presented here is restricted to structural types under this narrow meaning, the data are in such form that combinations may easily be made.

Within the manufacturing segment of the economy the extent of vertical integration is understated because of the fact that census

industry classifications, on which this analysis is based, are widely inclusive and several successive steps in manufacturing may thus be merged within an industry. For example, in numerous rolling mills the manufacturing processes are carried beyond the rolling stage into the production of pipes and tubes, bolts and nuts, nails, etc. It was only possible to segregate the successive steps, however; when these products were made in separate plants.

#### REASONS FOR VERTICAL INTEGRATION

Although the data contained in this study are not of the nature to permit an appraisal of the advantages and disadvantages of vertical integration, it is appropriate at this point to consider some of the reasons frequently advanced for this type of integration. The various factors which will be set forth, however, are not limited in their relevance to vertical integration as strictly defined here. Rather, they relate to all organizations in which establishments operating at various levels are brought together under one management.

It has been said that horizontal combinations seek control of the market, whereas vertical combinations aim to achieve independence of the market. Market freedom can be accomplished either by forward or backward integration. Reaching backward into the prior stages of the industrial process gives assurance of an adequate and dependable source of supplies, while forward expansion provides a definite market for a product.

Generally, it may be said that the formation of integrated enterprises is motivated by the desire to increase profits. That is, the organizers expect the aggregate of establishments to be more successful financially than the separately operated plants. The emergence of integrated concerns may, therefore, be broadly attributed to this "financial motive." But it is expedient to direct attention to the fact that the formation of combinations, irrespective of type, is not altogether related to the profitability of the concerns themselves. Rather, during the late twenties, the combination movement became quite the fashion in finance, and promoters were quick to supply the public demand for the securities of merged concerns.

As Dr. Thorp has pointed out:

One important element which stimulates the merger movement in time of prosperity is the condition of the money market. Many mergers, and some acquisitions, involve the flotation of new securities. In periods like 1928 and early 1929, when there is almost an insatiable demand for securities, the merger movement will be certain to flourish. Its most active sponsor is the investment banker. Reputable business houses merely carrying on their business under their existing organization bring a very slight volume of new securities for the banker to handle. But if they can be brought together into a new organization it may mean a large flotation of stock. \* \* \* The fact that the public will take the securities makes possible a sharing of the increased capitalization between the banker and the original owners and makes the owners willing to join the merger even when they can see little technical advantage to be gained from the new organization.<sup>1</sup>

The general financial motive which lies back of the formation of vertically integrated concerns resolves itself into specific constituent factors which deserve special comment. As frequently cited in the

<sup>1</sup> Thorp, Willard L., "The Persistence of the Merger Movement," *The American Economic Review Supplement*, March 1931, pp. 85 and 86. See also "The Merger Movement," part III of this study.

literature, economic advantages accrue under this type of integration because it is possible to—

- (1) Seize intermediate profits;
- (2) Stabilize operations;
- (3) Operate continuously (technical);
- (4) Reduce inventories; and/or
- (5) Spread administrative or managerial costs.

Although the belief that these economies will result may serve as a motivating force, the actual realization of the gains does not always follow. Rather, they may be only acceptable rationalizations for which there is no justification in theory or experience.

The seizing of intermediate profits has undoubtedly inspired the formation of many integrated concerns. In other words, there will be a tendency to expand either forward or backward when the profit margins of suppliers or distributors appear attractive. It is not to be implied, however, as one writer has stated, "that the final real cost of the product sold by an integrated industry will, ordinarily, be less than the final cost of a nonintegrated product by the cumulative amount of these profit margins."<sup>2</sup> On the contrary, the better argument appears to be advanced by those who come to quite an opposite conclusion. "As the integrated concern must have invested capital in all the stages of production, there must, in the long period, be a return to that capital at least equal to the return which could be obtained by investment elsewhere."<sup>3</sup> And again, "Integration does not buy its material 'at cost,' if by this is meant 'prime cost.' When two capitals are joined, it still remains necessary to pay the normal interest on both."<sup>4</sup>

The gains anticipated through the control of intermediate stages in the productive process may not always be realized for other reasons. In periods of rising prices it may be profitable to produce a required commodity or to control a necessary service. On the other hand, when prices are depressed, losses may be incurred through the compulsory purchase of materials or services from a given internal source when those items could be purchased more cheaply in the open market.

The gain to the vertically integrated company through stabilized operations is a frequently cited source of economy. Failure to maintain a steady flow of the necessary supplies may bring the productive facilities of certain plants to a standstill. To avoid this risk, the integrated concern may attempt to secure direct control over raw materials. In addition to the assurance of an adequate supply of raw materials, the integrated structure is in a position to produce the exact quality and type of product required in each stage of production. It should be remembered, however, that the nature of the supply of raw materials is an important factor influencing integration. When a manufacturer utilizes a wide range of raw materials which frequently change in character, it is unlikely that he will be tempted to control the supply of all of them. Other economies of stabilized production are those effected through the maintenance of a uniform and specialized labor force. In employing specialized labor, it is necessary, of course, that

<sup>2</sup> Frank, L. K., "The Significance of Industrial Integration," *Journal of Political Economy*, April 1925, p. 190.

<sup>3</sup> Dennison, S. R., "Vertical Integration and the Iron and Steel Industry," *The Economic Journal*, June 1939, p. 247.

<sup>4</sup> MacGregor, D. H., "Industrial Combination," pp. 97 and 98.

the firm be sufficiently large to obtain the maximum profitable division of labor.

Economies arising from technical advantages may be realized through continuous plant operations. Thus, in the combination of blast furnaces and steel mills there may be considerable savings in fuel by avoiding the necessity of reheating the metal; while in a combination of pulp and paper mills it is possible to transfer the pulp direct to the paper mill without the expense of drying. It is not to be overlooked, however, that there are technical disadvantages in integration. According to one writer—

Technical changes often deprive integration of its independence of the market. Twenty years ago the amount of scrap iron used in making steel was small and an integrated concern could largely supply itself with its own primary raw material from its own blast furnaces. Changes in technique have made it possible to use scrap iron on a much larger scale; \* \* \* since no concern has enough of its own, the vertical firms are forced to go outside for this raw material.<sup>5</sup>

When the output of one plant is passed directly to the next plant, inventory accumulations are held to a minimum and less working capital is required. Furthermore, it is possible for an integrated company to budget its production so that the output of one plant will exactly meet the requirements of the plant at the succeeding manufacturing stage. To achieve balanced plant operations, however, it is frequently necessary to sacrifice the highest technical efficiency of certain individual plants within the combinations. It seldom happens that the optimum size plant at each stage will utilize the exact output or supply the requirements of the optimum size plants at preceding or succeeding stages. Burns has expressed the conviction that "It is possible that no vertically integrated firm operates at the highest level of efficiency available in all stages of production in which it is engaged."<sup>6</sup>

One might infer that integration per se would free a concern from the open market at each stage of production. Such, however, is not the case. Almost invariably some products will be sold or purchased outside the combination. A cursory examination of manufacturers' reports for 1937 reveals little evidence that plant operations within integrated concerns were balanced. In numerous instances it was found that only a portion of the raw materials or commodities required by establishments operating at the succeeding stage was produced within the central-office group. On the other hand, in many cases a significant part of the output of certain plants was sold outside the central-office groups, and not to other plants within the organization which might have utilized the products either as raw materials or in combination with other commodities.

Other advantages claimed for the vertically integrated structure are those associated with the spread of administrative or managerial costs over more productive units. With the unified direction and control of production through the several stages of the whole manufacturing process, it is possible to effect considerable savings in selling operations, advertising, bad debts, etc. Furthermore, it is possible to achieve a technical coordination of plant operations necessary for the successful and uninterrupted prosecution of work if, through central management, the entire machinery is directed toward the output of

<sup>5</sup> Jewkes, John, "Factors in Industrial Integration," *Quarterly Journal of Economics*, August 1930, p. 635.

<sup>6</sup> Burns, A. R., "The Decline of Competition," p. 432.

the ultimate product. Although it is frequently argued that there are size limits beyond which companies may not be competently managed, the existence of a number of very large, complex, and yet efficient organizations leads one to speculate on the limits within which this contention is tenable.

In this connection it is held that the large integrated concern does not easily adjust itself to change. Vertical integration may cause inflexibility within a concern and may make it less capable of shifting to newer and more improved methods of production.

Vertical integration may diminish the responsiveness of the firm to changes in knowledge of methods of production. It assumes, within limits which vary from industry to industry, the use of certain materials and certain methods of production, and when changes occur, the vertically integrated firm is tempted to continue using the former raw material in order to secure as great a return as possible from investment in prior processes which have now become partly obsolete.<sup>7</sup>

To summarize briefly, vertical integration has both advantages and disadvantages. Whether the gains outweigh the losses, or vice versa, is dependent upon numerous determining forces. Among them may be mentioned such factors as market conditions, efficiency of management, variety and type of raw material required, character of ultimate product, and capriciousness of consumer demand. Moreover, there can be no unanimity of opinion with respect to the advantages or disadvantages of the vertical organization of industry as a whole. Rather, in such an evaluation it is expedient to give separate consideration to the varying problems associated with each industry. To cite the possibility that the economies to be realized through vertical integration may be overstated is not to gainsay the prevalence of this structural type of organization in our economy. A measure of the extent of vertical integration is the object of the ensuing analysis.

#### INTEGRATION AMONG INDUSTRY GROUPS

Of the total number of multiple-plant central offices in 1937, 565 central offices, or 10 percent, controlled establishments which operated at successive stages or levels and may thus be described as vertically integrated. Among complex central offices, vertically related concerns accounted for 27.5 percent of the structures. Groupings of plants related through the manufacture of successive products and through the manufacture of joint products were the most prevalent structural types among complex central-office organizations.

The number of vertically integrated concerns among the various industry groups is indicated in table 28. In terms of the total number of complex central offices classified in each group, 71 percent of the central offices in the forest and the paper products groups were vertically integrated. Furthermore, a sizable proportion of the concerns in the leather, the textile, and the iron and steel groups were engaged in the output of successive or vertical products. This, of course, does not signify that all plants within these central offices manufactured commodities produced in sequence.

As it is measured here, there was no evidence of vertical integration in the rubber group. The products of the rubber group, to a considerable degree, are manufactured in large-unit plants; thus the

<sup>7</sup> Ibid.

separate processes are not reflected in the statistics. Several of the larger tire companies maintained separate plants for the production of cotton fabric. This pattern of integration, however, was given consideration in the section relating to complementary materials.

TABLE 28.—Central-office companies producing successive products, by industry groups, 1937

[NOTE.—See headnote to table 16]

Group No.	Industry group	Total number of central offices	Total number of complex central offices	Central-office companies producing successive products		
				Number	Percent of—	
					Total	Complex
	All industries.....	5,625	2,051	565	10.0	27.5
1	Food and kindred products.....	1,660	438	29	1.7	6.6
2	Textiles and their products.....	810	298	131	16.2	44.0
3	Forest products.....	636	206	146	23.0	70.9
4	Paper and allied products.....	193	110	78	40.4	70.9
5	Printing, publishing, and allied industries.....	232	65	10	4.3	15.4
6	Chemicals and allied products.....	389	169	18	4.6	10.7
7	Products of petroleum and coal.....	66	36	5	7.6	13.9
8	Rubber products.....	30	14	.....	.....	.....
9	Leather and its manufactures.....	127	44	20	15.7	45.4
10	Stone, clay, and glass products.....	343	83	5	1.5	6.0
11	Iron and steel and their products, not including machinery.....	336	202	66	19.6	32.7
12	Nonferrous metals and their products.....	94	43	12	12.8	27.9
13	Machinery, not including transportation equipment.....	393	207	20	5.1	9.7
14	Transportation equipment, air, land, and water.....	91	53	8	8.8	15.1
16	Miscellaneous industries.....	225	83	17	7.6	20.5

The four industrial groups having the largest number of central-office enterprises producing successive products, were, in the order named, forest products, textiles, paper and allied products, and iron and steel. An analysis of the structures comprising each of these groups follows.

#### *Forest Products.*

As previously noted, the data on vertical integration are understated to the extent that several successive steps in production are carried on in one plant or are included in one industry classification. Successive stages in the manufacture of forest products are reflected in the following census industry classifications: (1) The lumber and timber products industry, embracing logging camps producing logs, bolts, and rough timber products such as hewn crossties, poles, posts, mine timbers, etc.; and sawmills producing rough lumber, laths, shingles, staves, heading, hoops, veneer stock, veneers, and other products from logs and bolts; (2) planing-mill products and other wooden products industry,<sup>8</sup> covering dressed lumber, sash, doors, blinds, interior woodwork, and moldings; and (3) industries at the more advanced stages of manufacture, producing such products as furniture, caskets and coffins, billiard and pool tables, mirror and picture frames, etc.

<sup>8</sup> It should be borne in mind that, in this study, only the independent planing mills can be identified as operating at a stage succeeding the sawmill activities, since planing mills operated in conjunction with sawmills are included by the Bureau of the Census in the lumber and timber products industry.

Of the 206 complex central offices classified in the forest products group, 146 central offices controlled plants performing successive steps in manufacturing. For the most part, however, the individual steps were rather simple in nature and 119 of these central offices operated establishments in but 2 separately distinguished industries, 56 of which were combinations of plants active in the lumber and timber products industry and in the planing-mill products industry. There were 15 additional central offices which controlled separate sawmills and planing mills, but each of these operated establishments in other industries as well.

Among the industries comprising the forest products group, the manufacture of furniture probably involves the most complex process. Only 14 central offices classified in the forest products group operated furniture factories in addition to other plants in some of the less complex industries within the group. There were 32 central offices engaged in the lumber and timber products industry and in the manufacture of boxes or cooperage, such as barrels, casks, kegs, tubs, tanks, and the like. Here, again, the manufacturing process is comparatively simple. In 12 central-office groups certain plants produced lumber and timber products, while others treated the wood to prevent decay and to protect it against fire, insects, etc. Seven central offices controlled establishments in the lumber and timber products industry and had separate plants making turned and shaped wooden goods.

To emphasize the fact that central-office companies predominantly active in the forest products industries did not expand into many different fields of manufacture, it may be said that only eight central offices operated establishments in more than three industries and only two of these central offices involved more than five industries. An indication of the direction of this diversification is suggested by the case of a central-office company which operated in the following industries: Lumber and timber products; wooden boxes; cooperage; paper boxes; steel barrels, kegs, etc.; wirework; and sheet metal work.

#### *Textiles and Their Products.*

The textile group includes those industries utilizing cotton, wool, silk, rayon, flax, hemp, manila, juté, and hair as their basic materials. At the census for 1937, there were 93 separately distinguished industries in this group. They were divided into three subgroups, as follows:

- (1) Textile-mill products industries: Those whose principal activities are preparing fiber, spinning, weaving, knitting, braiding, lace-making, felting, and related operations.
- (2) Cutting-up industries: Those in which clothing and other cut-and-sewed products are made from purchased woven or knitted fabrics.
- (3) Processing industries: Those in which articles other than cut-and-sewed products are made from purchased woven or knitted fabrics, such as embroideries, trimmings, artificial leather, linoleum, etc.

The nature of the above-named general lines of activity provides some indication of the successive steps in the textile industries. Major products manufactured in succession are yarns, gray goods, finished goods, clothing, and other fabricated textile products. The

intermediate step of dyeing and finishing yarn or fabric comes within the scope of the textile-mill products subgroup. This operation is frequently conducted in a separate department of the same plant which produces the yarn or fabric, and in such cases is not recognized here as a successive step. It is only those instances in which central offices maintain separate establishments for dyeing and finishing that this activity is included among the successive or continuing steps. Of the 810 central offices operating predominantly in the textile industries in 1937, there were only 298 concerns that controlled plants engaged in more than one industry. Very likely, many of the central offices in the one-industry category did their own dyeing and finishing in the same plant with the major business.

Successive products were manufactured by 131 central-office enterprises classified in the textile group. (See table 28.) Approximately half of these concerns maintained separate dyeing and finishing establishments and 85 central offices operated plants in only two industries. A distribution of the remaining 46 central offices according to the number of industries in which their controlled establishments operated is as follows: 26 central offices in 3 industries; 8 in 4 industries; 9 in 5 industries; 2 in 6 industries; and 1 in 7 industries.

Thirty-three central offices operating in but 2 industries controlled dyeing and finishing plants and other establishments producing either yarns and thread or various types of fabric. In many instances the yarn is dyed before the weaving or knitting process, although it is frequently made up in the gray and subsequently dyed. Among the central offices operating establishments related vertically, there were 13 combinations producing cotton yarn and thread and woven or knitted goods; 11, silk yarn and thread and hosiery, silk woven goods, or silk underwear; 7, woolen or worsted yarn and woven goods or knitted wear; 7, woven goods of either cotton, silk, wool, or worsted and various articles of clothing; and 4, rayon yarn and thread and rayon broad woven goods. Three companies manufactured cotton or jute goods and made bags of these materials.

Those central offices which operated establishments in 3 vertically related textile industries represented, for the most part, a coordination of plants engaged in spinning, dyeing, and the fabrication of woven materials. Of the 46 central offices which controlled plants in 3 or more industries, only 21 groups operated plants at 3 successive industry levels. In fact, no more than 3 successive steps occurred in any central office. The single central office that controlled plants in 7 different industries operated in only 3 successive textile industries, as follows: Cotton woven goods; dyeing and finishing cotton fabric; and the cotton bag industry. The other 4 industries were outside the textile field, the largest 2 involving the manufacture of paper and paper bags. The fact that paper mills were operated in conjunction with textile mills may be accounted for by the use of textile scrap in the manufacture of paper.

#### *Paper and Allied Products.*

The activity comprehended within this industry group lends itself readily to vertical integration. Successive steps in the manufacture of paper or paper products are reflected in the following census industry classifications: (1) Lumber and timber products; (2) pulp; (3) paper; and (4) industries involving the manufacture of paper

products. Seventy-eight central offices, or 71 percent of all complex central offices predominantly active in the paper group, controlled plants operating at successive manufacturing stages. In terms of the total number of central-office enterprises in each industry group, more than 40 percent of the companies in the paper industries controlled vertically integrated plants, a higher proportion than in any other industry group.

The central-office groups noted above may be distributed according to successive manufacturing stages as follows: Lumber and pulp, 2 central offices; pulp and paper, 23; paper and paper manufactures, 24; lumber, pulp, and paper, 7; pulp, paper, and paper manufactures, 12; and lumber, pulp, paper, and paper manufactures, 8 central offices. Two central offices not included in the foregoing distribution controlled plants engaged in the manufacture of paper products machinery as well as in the output of paper products themselves.

Over three-fourths of the wood pulp produced in this country is converted into paper or paperboard in establishments integrated with pulp mills. Specifically, the production of wood pulp in 1937 amounted to 6,573,000 short tons and of this quantity, 5,276,000 tons were consumed in the producing plant or transferred to and consumed in other plants operated by the same companies. Pulp-producing concerns may own timberland or they may own the right to cut timber within a stated time and under given conditions of management and reforestation. Some indication of the extent of this activity is provided by the number of central offices engaged in lumbering. Of the total number of central offices classified in the paper group, there were 17 concerns operating plants in the lumber industry and in the output of pulp.

The advantages of integration are most pronounced in the production of those types of paper which are made in large runs of uniform specifications from one or two kinds and grades of wood pulp—for example, newsprint and coarse wrapping paper and kraft board. Conversely, the benefits are less marked in the manufacture of paper and paperboard produced in smaller quantities, or which are of varied pulp composition, or made largely from other materials mixed with new wood pulp. Fifty of the 78 vertically integrated companies classified in the paper industries produced pulp in connection with their paper-making activities. Considerable savings may be effected if the paper plants are operated in proximity to the pulp mills, since the pulp can then be used without first being dried. Manifestly, the drying operation is an added expense.

Many central-office groups active in paper making also manufactured miscellaneous paper commodities classified in several different census industries, so that the controlled plants were interrelated because of the output of joint products as well as of successive products. One central-office organization worthy of mention was primarily active in the manufacture of paper, but also produced its own pulp and made paper boxes. In addition to the above-named industries, which are successive, this combination included establishments classified in seven other census industries outside the paper and

allied products group. The products of most of these establishments could be used in the building trades; hence the functional relationship of the plants was based upon similarity of market.

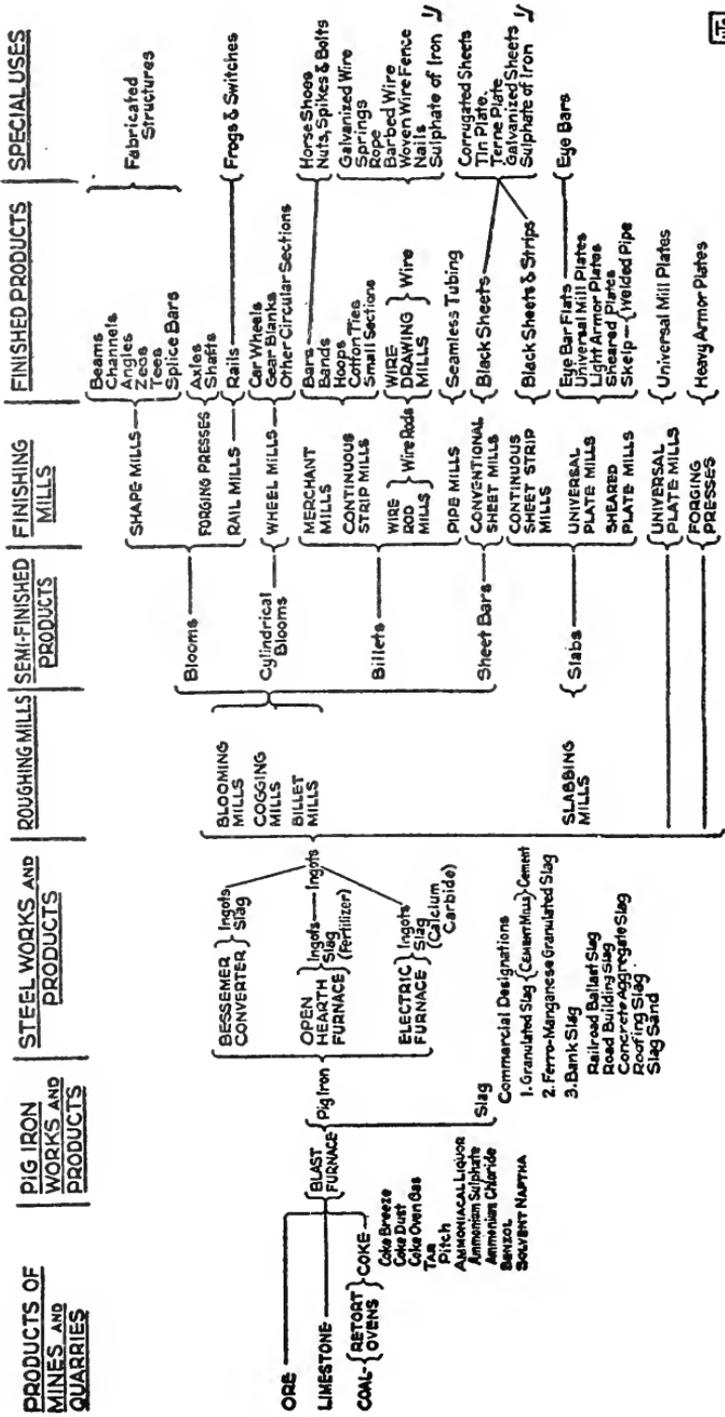
### *Iron and Steel and Their Products.*

Vertical integration in the iron and steel industry has long been a subject of comment and study. The data developed here reflect the prevalence of this structural type in this industry. The various stages in the manufacture of steel are shown in chart 14. As indicated in this diagram, iron ore, coke, and limestone are the principal raw materials charged in the blast furnace for the manufacture of pig iron. Pig iron, which is produced in different grades, according to the purpose for which it is to be used, is for the most part to be considered an intermediate stage in the making of steel. Some pig iron, however, is used in the production of castings and wrought iron. The process of making steel involves the elimination of certain non-metallic impurities from the iron. Obviously, it is more economical to convert molten iron into steel without reheating; for this reason, steel works have been developed in conjunction with blast furnaces. With the production of the ingot the essential processes of steel-making end. Later stages involve the shaping of the steel to meet the varied requirements of the different industries. Even for these semifinished products there are technical and economic reasons for operating on a continuous basis. Thus, sheets, strips, bars, rods, etc., are produced without the necessity of cooling and reheating.

The Bureau of the Census divides the iron and steel industries into two broad subgroups, namely, (1) industries whose output consists of crude iron and steel and of rolled products, e. g., blast furnaces and steel works and rolling mills; (2) industries in which are manufactured other iron and steel products (except certain advanced manufactures of iron and steel which are classified in the machinery, the transportation, or the nonferrous metal products group). The industries in this second subgroup use as their principal materials the products of the industries in the first subgroup.

As pointed out earlier in this chapter, it was not possible to determine the numerous successive steps in the manufacture of iron and steel from the broad census industry classifications. In addition to changing the character of the raw material, steel is frequently reworked several times. Also, the establishments which roll iron and steel and operate departments adjacent to the same plants for the conversion of rolling-mill products into wrought pipe, bolts and nuts, wire, tin plate and terneplate, etc., are assigned in their entirety to the "steel works and rolling-mill products" industry; in such cases, therefore, the successive stages are not reflected in the statistics.

This study reveals that 66 central offices, or about one-third of all the complex concerns predominantly active in the iron and steel industries, controlled establishments engaged in the manufacture of successive products. (See table 28.) In general, the following steps have been recognized: (1) coke-oven products; (2) blast-furnace products; (3) steel-works and rolling-mill products; and (4) iron and steel manufactures not produced in steel works and rolling mills.



By-product of pickling operations.

CHART 14.—DIAGRAM OF THE STAGES OF MANUFACTURE IN THE IRON AND STEEL INDUSTRY.

On the basis of the different combinations of stages at which they operate, vertically integrated central-office companies predominantly active in the iron and steel industries may be distributed as follows:

	<i>Number of central offices</i>
Coke-oven and blast-furnace products.....	4
Coke-oven, blast-furnace, and steel-works and rolling-mill products.....	4
Coke-oven, blast-furnace, and steel-works and rolling-mill products, and iron and steel products not made in steel-works and rolling mills.....	10
Blast-furnace and steel-works and rolling-mill products, and iron and steel products not made in steel works and rolling mills.....	2
Steel-works and rolling-mill products, and iron and steel products not made in steel works and rolling mills.....	29
Intermediate and advanced manufactures not made in steel works and rolling mills.....	13
Total number of central offices.....	62

Four central-office companies were precluded from the above classifications because of their peculiar organization. The output of iron and steel products was the principal business of each of these enterprises, but their successive operations were outside this field and were represented by the manufacture of paper and paper boxes, lumber and turned and shaped wooden products, lumber and wooden boxes, and lumber and charcoal. The charcoal may have been used as fuel for the blast furnace and the paper boxes and lumber for containers and packing boxes.

Coke is the principal source of heat in the blast furnace and the means of reducing iron and oxide to metallic iron. In 1937, approximately 65 percent of the coke produced in the United States was consumed in blast furnaces. Eighteen of the sixty-six vertically integrated central offices in the iron and steel group produced coke for use in their blast-furnace operations. Other instances of the unified management of coke ovens and blast furnaces were noted, but the enterprises were not predominantly active in the manufacture of iron and steel and, for this reason, were not classified in this industry group.

#### *Other Industry Groups.*

Approximately three-fourths of the vertically integrated central-office enterprises were classified in the four industry groups discussed above, i. e., the forest products, the textile, the paper and allied products, and the iron and steel groups. Among the remaining industry groups, instances of vertical integration were recorded in 29 central offices active in the food group, 20 each in the leather and machinery industries, 18 in the chemical, and 17 in the miscellaneous industries.

The successive operations in the food group occurred, for the most part, in the distilling of liquors and the blending and rectifying of these liquors in separate plants and in the production of flour and bread. Two central offices operated establishments manufacturing cottonseed oil and maintained additional plants to produce shortenings and cooking and salad oils. It is of interest to recall at this point that the horizontal combination was the most prevalent form of organization among the food industries. In fact, only about one-fourth of all central-office enterprises classified in the food group were complex structures and less than 7 percent of these manufactured successive products.

Most of the central offices primarily active in the leather industries were likewise horizontally integrated, but nearly half of the complex central offices in the leather group operated establishments producing successive products. In general, the initial manufacturing stage of the leather companies was the tanning and finishing of leather, although 4 of the 20 central offices extended their operations backward to include the production of tanning extracts and solutions. Two of the organizations manufactured only leather in addition to the tanning materials, whereas the other two controlled establishments producing either boot and shoe cut stock and findings<sup>9</sup> or the finished boots and shoes, so that in the latter instances three manufacturing stages were involved.

The remaining 16 central offices classified in the leather group controlled but two stages of production which, for the most part, included the output of leather and the fabrication of various articles from the leather. Those central offices which operated their own tanneries utilized the leather in the production of boots and shoes; boot and shoe cut stock and findings; gloves and mittens; belting and packing; and miscellaneous leather goods, such as belts, handles, corners, and straps for luggage, dog furnishings, desk sets, embossed leather goods, razor strops, etc.

The majority of vertically integrated structures classified in the machinery industries represented groupings of plants producing iron and steel or nonferrous metals and the various types of machinery manufactured from these materials. Manifestly, only two successive stages could be recognized in these instances, many of the continuing steps being obscured by the widely comprehensive nature of the industry classifications. One of the most outstanding examples of integration through many stages was noted in the case of a company whose ultimate products were agricultural implements and whose activities reached as far back as the manufacture of coke and extended through the operation of blast furnaces and steel works and rolling mills.

Among the central offices classified in the chemical industries, there were a number of concerns operating plants related through the production of such successive products as greases or oils and soap, lamp-black and printing ink, rayon and rayon cloth, and distilled and rectified or blended liquors.

As the name implies, the miscellaneous industry group includes all those industries which do not properly fit in any of the other groups. Successive operations were apparent among establishments in 17 central-office structures in the miscellaneous group. Some of the most common products manufactured in succession by plants under centralized management were: cotton goods and surgical products (bandages, dressings, prepared gauze, and belts and other devices made largely of cotton goods); silk woven goods and umbrellas; lumber and toys, games, and playground equipment; refined graphite and lead pencils; and felt goods and musical instrument parts. A large tobacco company operated vertically related plants producing cotton goods and cotton bags. Since the bags were used as con-

<sup>9</sup> The "boot and shoe cut stock and findings" industry includes such articles as soles, tips, heels, inner soles, uppers, shoe pegs, metal tips, and heelplates, boot and shoe laces, counters, shanks, wooden heels, shoe trimmings, etc.

tainers for the tobacco, there also existed a complementary relationship between the establishment manufacturing bags and the plant producing tobacco.

Summarizing briefly, it may be said that instances of vertical integration appeared in almost 28 percent of all complex central-office groups. In the majority of cases the integration extended over only two industries though, in some instances, as many as four industries were covered. A relatively greater proportion of the central-office structures in the paper, forest products, leather, textile, and iron and steel groups were vertically integrated, while this form of combination was least common in the food and the stone, clay, and glass groups, and did not appear at all in the rubber group.

## CHAPTER IX

### UNRELATED FUNCTIONS

The inference to be drawn from the analyses in the foregoing chapters is that the great majority of manufacturing establishments operating under central-office control were functionally related. It may be said, therefore, that a rational basis exists for the grouping of a number of plants under unified management. This does not imply that all plants within a central office are related in the functional manner. It does signify, however, that establishments or groups of establishments under the same management are interrelated. For example, a central office may control four plants, one making butter, another cheese, and the other two manufacturing silk yarn and thread and silk hosiery. Obviously, the first two plants are functionally related because they utilize a common raw material and the latter two because they operate at successive steps to produce an ultimate product, but there is no relationship between the butter and the cheese factories and the silk and hosiery mills.

Of the 2,051 complex central offices studied, there were only 95 concerns for which it was impossible to determine a functional relationship among the constituent establishments. It is possible, however, that a more intensive analysis of these 95 central offices might have revealed certain relationships among the plants which could not be ascertained in this study.<sup>1</sup>

About one-third of the central offices which operated apparently unrelated establishments were classified in the chemical group, while the remainder were scattered throughout all other industry groups, with the exception of the rubber products group. Among the central offices whose principal business was in the chemical industries, concerns operating plants in the following industries were noted: toilet preparations and sporting goods; fertilizers and nonferrous metal alloys; insecticides and fungicides and machine-shop products; drug grinding and paper; soap, flavoring extracts, and paints; compressed and liquefied gases and machinery; linseed oil and foundry supplies; and fertilizers and carpets and rugs. A company manufacturing explosives and ammunition controlled other plants producing condensed and evaporated milk, pulp, grease and tallow, and tanning materials.

Several central offices active in the canning industries controlled other establishments manufacturing such unrelated products as agricultural implements, turned and shaped wooden products, lumber, and various types of machinery. The seasonal characteristics of the

<sup>1</sup> In chapter IV, "The Causes of Product Diversification," part VI of this study, information was obtained on the causes of product diversification through personal interviews with the executives of a number of corporations. This chapter throws some light on the reasons that certain concerns manufacture seemingly unrelated products.

canning business were undoubtedly responsible for the diverse industry patterns in these instances. The advantages to be derived from stabilized employment may have induced the firms in these lines to take on the production of dissimilar products. An unusual case among the central-office structures classified in the food industries was that of a grain mill and a plant producing woolen goods. Another company which made shortenings and cooking and salad oils also had under its management plants producing turpentine and rosin, miscellaneous chemicals, and a smelter for nonferrous metals.

No apparent functional relationship existed between establishments manufacturing printers' machinery and dyeing and finishing establishments. Other peculiar groupings of plants controlled by the same central office occurred in the case of concerns manufacturing miscellaneous machinery and malt liquors and another manufacturing machinery and soap. A combination of establishments in the electrical machinery and apparatus industry and in the radio apparatus industry has a logical basis, but the operation of a cement plant by the same company cannot be explained. Another group which defied classification was that of a concern manufacturing motor vehicle bodies and parts and miscellaneous house-furnishings, such as sheets and pillow cases.

It is believed that the examples cited above will give some indication of the unrelated manufacturing activities which sometimes appear under the control of a single central office. With the resources available to this study, no extended company-by-company investigation of these unusual groupings could be undertaken. It is possible that such an investigation would have revealed relationships among the plants which were obscured by the data in their present form. For certain concerns, however, no explanation in functional terms is possible. Reasons which lie outside our scheme of functional analysis may be equally relevant in accounting for the grouping under unified management of unlike lines of activity. It is only surprising that so many of the central offices control plants which are related in this functional sense. The extent of unrelated activities within central-office groups is not measured here but a cursory examination of the data indicates that it is a rather common practice. For example, there may be a functional relation among the plants within any line of activity but the varying lines of activities may be quite unrelated, as was the case of the central office mentioned above which controlled plants making butter and cheese and, in another line, plants making silk yarn and thread and silk hosiery.

In general, it may be said that investment in totally dissimilar lines is frequently identified with the desire to spread risks over more than one branch of activity. Although there is a high degree of interaction among all elements of the economy so that any up or down impulse in operations has a wide-spread effect, these cycles do not touch upon all phases of business at the same time, nor with like intensity. There are, therefore, certain benefits to be derived from the unified management of dissimilar lines of endeavor.

## CHAPTER X

### SUMMARY AND CONCLUSIONS

In part I of this study of "The Structure of Industry," attention was confined to the changes which have taken place over the last two decades in the scale of manufacturing operations. The long-time trend among the various industries and the degree of concentration in manufacturing were measured in terms of the basic producing unit, the establishment.

In the present report, which is part II of "The Structure of Industry," the investigation of concentration was carried a step further through the measurement of the extent and significance of central-office control of manufacturing establishments. This analysis of the role of multi-plant enterprises was made possible through the use of the central-office records of the Bureau of the Census.

There were 5,625 central-office companies engaged in manufacturing in 1937, and these central offices operated 25,699 establishments, or 15 percent of all manufacturing plants active in that year. The extent of control of establishments varied widely among the industry groups, from 48 percent of the total number in the petroleum and coal group to 4 percent of the establishments in the printing and publishing group. The average central office had avowed control over approximately 5 establishments, although 1 central office operated 497 establishments. About two-thirds of the total number of central offices were active in only 1 industry. At the other extreme, however, a single central office controlled establishments operating in 25 industries.

Obviously, a mere count of establishments or industries does not adequately reflect the relative importance of central-office operations. In terms of another measure, 51 percent of all wage earners in manufacturing were employed in establishments under central-office management and the wages paid in these establishments amounted to 55 percent of the total wage bill. By this measure also, there were wide variations among the industry groups. To illustrate, 90 percent of the wage earners employed in establishments classified in the petroleum and coal group and 80 percent of those in the transportation group were in establishments operated by central offices, whereas only 21 percent of the wage earners in the printing and publishing group and 33 percent of those in the forest products group were in central-office establishments.

The size of central-office establishments and independently operated establishments varied greatly. For all industries, the average central-office establishment employed 170 wage earners per plant as contrasted with 30 wage earners per plant in independent units. In the transportation equipment group the discrepancy was even wider—establishments operated by central offices employed an average of 1,083 wage earners per establishment, while independent plants in the same industry group averaged 85 workers.

There was an equally wide range in size among the central-office establishments themselves. In the food group, the average central-office establishment employed 46 wage earners as compared with the

aforementioned total of 1,083 wage earners per plant in the transportation equipment group.

Not only did establishments controlled by central offices employ a larger number of wage earners per plant than the independent establishments, but the value of products per central-office establishment was much greater than that of the average independent establishment, \$1,443,900 and \$167,300, respectively. Thus, the average value of products per wage earner in establishments operated by central offices was 50 percent higher than the average value of products per wage earner in independent establishments. Specifically, the average value of products per wage earner in central-office establishments was \$8,470 as contrasted with \$5,640 in independent establishments.

In chapters III through IX of this study, the determination of the relationships of establishments within central-office groups was the object of the investigation. A scheme of analysis was developed in which five general types of functional relationships were distinguished. Each central-office group was examined and classified on this basis.

Of the 5,625 central offices in existence in 1937, approximately 64 percent operated in only one industry and thus were simple in structure. Among the remaining so-called complex central offices, there were a large number of instances in which several plants in a single industry were operated under one management. A combination of these two types of situations in which plants are related through the performance of uniform functions indicates the wide-spread nature of horizontal integration. Specifically, 85.7 percent of all establishments under central-office control were related in this fashion. The diversity of this form of integration was quite wide, however, among the industry groups. In the food group, 92 percent of the establishments operated by central offices were horizontally related, while the corresponding ratio in the rubber group was only 67 percent.

The greatest number of complex central offices were found to operate establishments engaged in the manufacture of successive products and joint products. It will be remembered that the successive products represent the output of the so-called vertically integrated organizations. The number of instances of the various types of functional relations within central-office structures may be summarized as follows:

Type of functional relationship:	<i>Number of instances</i>
Uniform functions, total.....	4, 793
In simple central-office groups.....	3, 574
In complex central-office groups.....	1, 219
Divergent functions, total.....	781
Joint products.....	564
Byproducts.....	113
Like processes.....	104
Convergent functions, total.....	1, 058
Complementary products.....	386
Auxiliary products.....	183
Like markets.....	489
Successive functions.....	565
Unrelated functions.....	. 95

A cross-section picture of the structural form of a large segment of manufacturing has been presented in this study. The extent of combinations and their functional organization has been examined on the most apparent level of control, i. e., the control effected when a number of establishments are linked together under one central-office management. Other less tangible methods of control undoubtedly tie together many apparently separate plants, but it is only those combinations of plants where the control is acknowledged that are reflected here. To the extent the measure of concentration developed in this study does not include these more subtle types of control, the concentration in manufacturing has been understated. The data which have been made available, however, should indicate the areas within which concentration is high. Furthermore, the analysis as developed here affords striking evidence of the extremely complex and varied nature of manufacturing operations.

CONCENTRATION OF ECONOMIC POWER

APPENDIX A

Measures of significance of central-office operations, by industry groups and industries, 1937

[NOTE.—In this table the establishments are classified in the industries in which they actually operate and not in the industry in which the central office has its major value of products. Railroad repair shops, formerly comprising group 15, were not treated as manufacturing industries in 1937]

Industry group and industry	Manuf'cturing establishments		Wage earners (average for the year)		Wages paid (thousand dollars)		Cost of materials, etc., and contract work (thousand dollars)		Value of products (thousand dollars)		
	Total	Establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	
											Number
All industries	166,794	25,699	15.4	4,380,123	51.1	10,112,883	55.3	35,539,333	65.1	60,712,872	61.1
Group 1. Food and kindred products	48,727	9,267	19.0	888,298	425,187	47.9	977,776	491,540	58.6	11,265,610	56.7
Beverages, nonalcoholic	158	3,920	531	27,979	6,591	23.6	30,981	7,645	24.7	276,779	33.1
Bread and other bakery products	261	17,193	1,222	239,388	100,491	42.0	293,935	135,475	43.7	1,426,163	46.7
Butter	197	3,716	650	19,437	9,025	46.4	19,619	9,039	46.1	589,767	42.3
Canned and cured fish, crabs, shrimps, oysters, and clams	36	325	88	18,229	8,417	46.2	8,705	4,507	51.8	78,410	49.4
Canned and dried fruits and vegetables; jellies, fruit butters, preserves, and sauces	311	2,772	1,043	137,064	79,146	57.7	92,638	57,938	62.5	788,927	64.9
Cereal preparations	13	112	23	8,133	5,145	63.3	10,792	6,883	63.8	164,495	66.6
Cheese	112	2,567	658	4,482	2,171	48.4	4,359	2,244	51.5	112,786	39.7
Chocolate and cocoa products, not including confectionery	10	40	12	7,402	3,619	48.9	8,129	4,310	53.0	102,346	55.9
Condensed and evaporated milk	84	601	439	8,907	8,012	89.3	9,964	8,819	88.8	210,717	89.8
Confectionery	62	1,226	123	53,722	11,280	21.0	43,441	9,927	22.9	305,839	24.8
Corn syrup, corn sugar, corn oil, and starch	5	27	8	7,010	3,988	56.9	10,411	6,290	69.4	135,820	66.6

In this column a central office is counted in each industry in which it operates establishments; for this reason, no group totals are shown.



8	23	14	60.9	14,024	8,944	63.8	15,973	10,545	362,653	64.9	424,631	275,747	64.9
15	117	43	36.8	9,974	535	34.9	836	449	3,774	54.4	27,007	15,017	54.4
9	72	20	27.8	4,480	2,297	51.2	5,473	2,999	52,290	57.8	107,824	66,422	57.8
Group 2. Textiles and their products													
	20,616	2,703	13.1	1,814,387	745,883	41.1	1,549,559	621,179	4,089,124	39.9	7,061,009	2,791,107	39.9
9	26	9	36.0	2,541	1,409	55.5	3,475	2,019	18,414	54.6	27,007	15,017	54.6
6	13	8	61.5	3,280	2,663	81.2	4,773	3,929	17,630	77.8	33,547	26,933	77.8
12	367	23	6.3	4,732	543	11.5	4,843	485	17,506	14.2	30,324	3,874	12.9
22	186	69	37.1	12,075	7,435	61.6	9,749	6,407	103,725	70,355	130,001	87,965	67.7
10	110	22	20.0	4,645	2,151	46.3	4,353	2,084	23,888	10,593	36,870	16,646	45.1
	64			2,554			1,660		145		2,435		
	35			429			290		647		1,336		
10	55	21	38.2	30,779	13,767	44.7	32,171	14,150	83,574	53.2	162,187	78,613	48.5
41	1,282	108	8.4	94,361	33,351	35.3	101,042	35,478	353,884	69,648	558,997	128,367	23.0
6	935	10	1.1	43,953	681	1.5	41,215	493	4,519	47	59,200	766	1.3
28	654	49	7.5	26,897	4,803	17.9	20,613	3,421	98,374	13,760	149,968	23,091	15.4
69	675	191	28.3	69,502	36,194	52.1	41,265	21,604	132,868	71,913	204,390	107,907	52.8
17	1,005	33	3.3	20,690	2,279	11.0	23,708	3,064	201,551	13,172	290,124	20,693	7.1
5	762	9	1.2	18,923	627	3.3	22,004	941	2,163	20	31,096	1,073	3.5
17	118	30	25.4	14,043	5,680	40.5	11,683	4,785	38,022	16,803	66,418	27,843	41.9
14	215	27	12.6	16,385	2,706	16.5	13,255	1,832	5,135	15.8	70,789	10,700	15.1
15	156	25	16.0	12,616	4,012	31.8	11,131	3,768	22,115	6,591	43,486	13,542	31.1
114	677	325	48.0	336,104	201,380	59.9	255,655	154,161	525,947	321,523	967,110	591,776	61.2
57	395	135	34.2	80,206	38,608	44.8	56,834	26,627	155,093	72,277	290,604	119,624	45.9
13	284	29	10.2	8,034	1,417	15.9	5,908	930	37,253	6,147	52,517	7,968	15.2
34	1,147	76	6.6	48,217	6,521	13.5	64,278	5,781	258,464	16,369	403,074	30,272	7.5
8	1,275	16	1.3	43,874	985	2.2	42,654	757	2,635	36	58,503	1,111	1.9
25	403	60	14.9	28,250	10,783	38.2	17,165	6,090	55,684	18,051	93,892	29,909	31.9
56	246	88	35.0	49,635	30,491	61.4	49,112	30,155	106,171	79,035	204,052	139,941	68.6
18	159	26	16.4	18,003	4,882	27.1	19,633	5,172	22,809	6,301	57,599	14,642	25.4

See footnote at end of table.

## Measures of significance of central-office operations, by industry groups and industries, 1937—Continued

Industry group and industry	Manufacturing establishments		Wage earners (average for the year)		Wages paid (thousand dollars)		Cost of materials, etc., and contract work (thousand dollars)		Value of products (thousand dollars)						
	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices					
		Number		Per cent of total		Amount		Per cent of total		Amount	Per cent of total	Amount	Per cent of total		
Dyeing and finishing yarn (cotton, rayon, and silk)—for sale or on commission.....	17	24	18.8	7,344	3,566	48.6	6,986	3,312	47.4	6,815	3,450	50.6	21,611	10,443	48.3
Fabricated textile products not elsewhere classified.....	9	101	10.9	2,903	1,064	36.7	2,874	1,347	46.9	11,567	4,495	38.9	19,771	7,739	39.1
Felt goods, except woven felts.....	9	39	46.2	3,711	2,307	62.2	4,529	2,974	65.7	18,649	12,971	69.6	23,649	20,079	87.7
Furnishing goods, men's, not elsewhere classified:															
Regular factories.....	6	333	7.2	12,144	1,237	10.2	9,794	848	8.7	37,080	3,163	8.5	60,064	4,851	8.1
Contract factories.....	31			759			533			81			854		
Gloves and mittens, cloth or cloth and leather combined, made from purchased materials.....	17	107	41.1	12,679	7,773	61.3	7,847	624	61.5	18,705	11,598	62.0	32,560	20,376	62.6
Handkerchiefs:															
Regular factories.....	6	58	13.8	4,065	1,534	37.7	2,548	1,007	39.5	13,470	4,465	33.1	18,776	6,009	32.0
Contract factories.....	16			932			586			134			944		
Hats, fur-felt.....	10	140	12.9	15,926	5,407	34.0	17,705	6,482	36.6	34,732	11,328	32.6	66,775	23,186	34.7
Hosiery.....	70	168	22.3	150,460	59,811	39.8	136,264	56,281	41.3	159,917	60,124	37.6	361,578	147,695	40.8
Housefurnishings not elsewhere classified, including all sheets and pillowcases.....	19	404	8.2	11,346	3,606	31.8	9,230	3,180	34.5	44,710	10,481	23.4	69,391	17,549	25.3
Jute goods.....	9	32	13	6,322	4,504	69.1	6,190	3,847	74.1	13,174	8,442	64.1	25,565	17,648	69.0
Knitted cloth.....	18	213	26	11,360	3,267	28.8	10,558	3,166	30.0	44,298	13,712	31.0	68,001	21,157	31.1
Knitted underwear.....	14	505	4.6	23,424	2,766	11.8	19,604	2,056	10.5	58,887	3,709	6.3	102,544	7,819	7.6
Regular factories.....	164			2,715			2,050			658			4,592		
Contract factories.....	22	179	20.1	39,923	14,968	35.2	28,560	10,643	37.3	63,419	23,279	36.7	117,767	43,269	36.7
Lace goods.....	6	57	7	8,109	2,001	24.7	9,037	2,189	24.2	10,534	2,297	21.8	28,342	6,641	23.4
Millinery:															
Regular factories.....	4	723	6.8	21,321	543	2.5	22,654	618	2.7	40,855	1,112	2.7	87,544	2,868	3.3
Contract factories.....	32			239			268			152			697		

18	346	44	12.7	15,962	5,101	32.0	13,295	3,821	28.7	46,731	10,304	22.0	77,522	18,556	23.9
5	106	8	7.5	5,157	850	16.5	3,308	558	16.9	270	55	19.9	4,941	741	15.0
8	126	10	7.9	5,560	622	11.2	4,801	469	9.8	26,598	2,080	7.8	38,185	3,363	8.8
44	237	88	37.1	57,949	28,701	49.7	48,946	24,599	50.3	149,192	75,823	50.8	229,773	118,416	51.5
11	112	17	15.2	5,568	1,857	33.4	4,830	1,840	38.1	8,347	2,674	32.0	18,535	6,447	34.8
6	25	8	32.0	1,937	1,305	67.4	1,191	767	64.4	472	280	59.3	2,400	1,514	63.1
10	51	14	27.5	5,399	3,342	61.9	3,652	2,021	55.3	14,800	8,123	54.9	21,729	11,454	52.7
55	409	155	37.9	55,570	34,324	61.8	34,948	21,160	60.5	102,835	54,102	52.6	174,988	96,409	55.1
6	120	13	10.8	12,024	1,118	9.3	6,107	431	7.1	1,214	65	5.4	9,240	620	6.7
26	194	47	24.2	17,697	8,000	45.5	14,010	6,165	44.0	38,886	16,899	43.5	63,098	26,788	42.5
8	81	17	21.0	4,827	1,878	41.5	4,201	1,701	40.5	5,525	2,457	44.5	13,770	5,496	39.9
22	96	41	42.7	13,290	8,021	60.4	7,789	4,831	62.0	3,633	2,643	72.7	15,278	9,862	64.0
24	52	32	61.5	10,572	6,541	61.9	7,820	4,703	60.1	27,415	14,043	51.2	40,152	20,916	52.1
8	203	12	5.9	4,362	832	19.1	3,710	796	21.5	20,241	6,218	30.7	30,285	8,436	27.9
26	232	47	20.3	15,817	5,131	32.4	9,532	2,942	30.9	28,779	9,447	32.8	46,778	14,650	31.3
9	122	22	18.0	8,835	2,385	27.0	5,511	1,357	24.6	19,600	4,677	23.9	30,050	6,843	22.8
10	113	18	15.9	10,453	4,118	39.4	6,562	2,416	36.8	21,418	7,006	32.7	36,373	13,339	36.7
14	50	22	44.0	7,888	4,333	54.9	4,213	2,271	53.9	13,707	6,602	48.2	20,285	9,928	48.9
5	53	5	9.4	2,563	120	4.7	2,807	113	4.0	4,675	715	15.3	11,063	1,103	10.0
36	332	91	27.4	61,931	25,446	41.1	62,598	25,915	41.4	173,054	78,407	45.3	288,748	126,552	43.5
20	20	73	41.5	1,252	1,393	100.0	1,393	55,488	78.0	1,916	222,547	80.4	408,842	327,134	80.0
23	176	73	41.5	70,227	54,672	77.9	71,101	4,469	30.3	276,905	19,082	28.8	408,842	26,664	29.6
10	71	16	22.5	17,303	5,360	31.0	14,847	4,469	30.3	66,303	19,082	28.8	89,741	26,664	29.6
50	2,039	76	3.7	69,134	14,896	21.5	61,211	13,430	25.2	143,190	42,402	29.6	272,444	81,375	29.9
	18,012	2,516	14.0	694,341	231,879	33.4	636,724	226,118	35.5	1,173,931	454,851	38.7	2,439,530	901,829	37.0
19	194	35	18.0	9,308	3,128	33.6	5,126	1,699	33.1	6,963	2,392	34.4	16,661	5,389	32.4
23				530			538			1,838			5,647		

Group 3. Forest products.....

Baskets and rattan and willow ware,  
not including furniture.....Billiard and pool tables, bowling al-  
liays, and accessories.....

See footnote at end of table.

## Measures of significance of central-office operations, by industry groups and industries, 1937—Continued

Industry group and industry	Total central-office companies	Manufacturing establishments		Wage earners (average for the year)		Wages paid (thousand dollars)		Cost of materials, etc., and contract work (thousand dollars)		Value of products (thousand dollars)			
		Total	Establishments operated by central offices	Total	In establishments operated by central offices		Total	In establishments operated by central offices		Total	In establishments operated by central offices		
					Number	Per cent of total		Amount	Per cent of total		Amount	Per cent of total	
Boxes, cigar, wooden and part wooden	6	14	20.3	3,296	1,348	40.9	2,322	2,681	1,032	38.5	7,128	2,923	41.0
Boxes, wooden, except cigar boxes	74	173	27.3	25,981	11,306	43.5	19,543	45,454	23,196	51.0	86,346	43,119	49.9
Caskets, coffins, burial cases, and other morticians' goods	21	60	11.5	13,678	3,508	25.6	15,120	4,145	7,576	22.5	71,757	17,180	23.9
Cooperage	46	397	247	9,588	6,410	66.9	9,177	6,238	22,832	70.2	50,225	35,134	70.0
Furniture, including store and office fixtures	105	3,097	198	170,072	37,140	21.8	172,558	40,692	71,564	23.2	638,467	154,971	23.5
Lumber and timber products not elsewhere classified	387	7,647	1,005	323,928	117,129	36.2	275,034	111,411	136,776	39.6	848,481	338,057	39.8
Matches	5	25	12	5,261	3,429	65.2	5,392	3,548	14,753	73.0	30,902	20,665	66.9
Planing-mill products and other wooden products not elsewhere classified, made in planing mills; not connected with sawmills	170	2,858	310	66,814	16,989	25.4	67,745	16,093	50,365	28.8	312,552	82,659	26.4
Synthetic-resin, cellulose-plastic, vulcanized-fiber, and molded and pressed pulp fabricated articles, not elsewhere classified	26	160	41	16,673	8,772	52.6	19,822	11,301	18,511	57.8	77,716	45,497	58.5
Turpentine and rosin	44	993	126	1,506	252	16.7	350	73	22,670	27.5	29,026	7,564	26.1
Window and door screens and weather strip	6	144	9	2,833	765	27.0	3,034	727	1,808	24.5	14,748	3,607	24.5
Wood preserving	50	197	152	12,401	10,963	88.4	11,338	10,084	74,812	88.3	116,700	103,284	88.5
Wood turned and shaped and other wooden goods, not elsewhere classified	49	755	100	23,087	7,375	31.9	19,493	6,261	11,988	36.5	70,268	22,795	32.4
Other industries <sup>1</sup>	11	298	34	9,385	3,364	35.8	10,132	3,970	11,021	49.9	43,016	18,985	44.1

Group 4. Paper and allied products.....	3,053	960	31.4	264,455	145,560	55.0	307,270	178,597	58.1	1,208,154	748,417	61.9	2,060,849	1,258,838	61.1
Bags, paper, exclusive of those made in paper mills.....	18	107	42	10,360	5,698	55.0	9,850	5,417	55.0	53,424	31,801	59.5	82,458	48,161	58.4
Boxes, paper, not elsewhere classified.....	108	1,257	257	65,158	25,729	39.5	66,025	28,959	43.9	288,500	131,488	55.1	409,475	211,062	51.5
Card cutting and desigining.....	6	77	11	3,315	1,721	51.9	4,138	2,497	60.3	9,369	6,719	71.7	21,138	14,412	68.2
Envelopes.....	10	29	17.9	9,511	4,191	44.1	10,503	4,799	45.7	23,107	11,760	46.8	51,290	23,110	45.1
Paper.....	149	647	344	110,809	68,261	61.6	142,080	89,313	62.9	597,449	369,575	64.6	957,940	616,482	64.4
Paper goods not elsewhere classified.....	73	551	133	32,888	16,617	50.5	34,835	18,517	53.2	145,809	69,778	47.9	269,206	131,716	50.8
Pulp (wood and other fiber).....	64	194	131	26,994	21,181	78.5	33,570	26,563	79.1	153,652	125,136	81.4	247,192	201,225	81.4
Other industries ?.....	6	58	13	5,420	2,162	39.9	6,289	2,532	40.4	14,844	5,220	35.2	32,150	12,670	39.4
<b>Group 5. Printing, publishing, and allied industries.....</b>	22,751	905	4.0	353,108	74,290	21.0	532,985	127,361	23.9	793,092	182,909	23.1	2,585,699	609,040	23.6
Bookbinding and blank-book making.....	21	997	46	25,333	5,432	21.4	28,665	6,689	23.4	30,745	8,292	27.0	94,821	25,522	26.9
Engraving (other than steel, copper-plate, or wood), chasing, etching, and desigining.....	77			2,152			2,771			2,865			8,881		
Engraving, steel, copperplate, and wood, and plate printing.....	9	435	20	7,831	1,474	18.8	9,883	2,447	24.8	8,115	1,054	13.5	29,436	6,038	20.5
Lithographing.....	35	552	61	24,079	6,325	26.3	35,928	9,386	26.1	54,319	13,455	24.8	137,731	35,943	23.4
Photoengraving, not done in printing establishments.....	20	641	37	12,364	3,088	24.7	29,113	7,113	24.4	15,303	7,362	48.1	77,062	22,215	28.5
Printing and publishing.....	156	10,587	297	141,368	25,761	18.2	195,050	37,767	19.4	283,571	50,569	17.8	809,795	138,253	17.1
Book, music, and job.....	144	9,244	415	135,215	30,744	22.7	221,881	60,899	27.4	393,021	100,155	25.5	1,396,031	370,103	26.5
Newspaper and periodical.....	12	218	29	4,766	1,496	31.4	9,694	3,050	31.5	5,153	1,982	38.5	31,043	11,866	38.2
Stereotyping and electrotyping, not done in printing establishments.....															
<b>Group 6. Chemicals and allied products.....</b>	7,419	2,348	31.6	314,520	224,802	71.5	381,405	285,714	74.9	1,927,948	1,382,172	71.7	3,721,531	2,642,664	71.0
Baking powder, yeast, and other leavening compounds.....	10	40	20	2,380	1,668	70.1	3,761	2,546	67.7	13,330	8,980	67.4	30,279	20,156	66.6
Backings, stains, and dressings.....	10	147	16	1,536	520	33.9	1,480	525	35.5	7,988	2,410	30.2	19,183	7,345	38.3
Chemicals not elsewhere classified.....	111	601	362	78,991	68,362	86.6	117,221	102,358	87.3	455,062	384,169	84.4	932,750	796,486	85.3
Cleaning and polishing preparations.....	20	363	32	3,341	741	22.2	6,943	863	21.9	23,644	5,571	23.6	57,871	13,616	23.5
Compressed and liquefied gases.....	22	358	32	4,655	4,289	92.1	6,991	6,084	92.3	14,244	13,000	91.3	56,418	52,201	92.5
Drugs and medicines.....	41	1,013	88	24,098	10,903	44.0	26,116	12,031	46.1	98,822	48,298	48.9	345,918	160,398	49.0
Explosives.....	10	77	53	5,495	4,958	91.7	8,620	8,017	93.0	24,213	21,707	89.7	58,181	52,147	89.6
Fertilizers.....	75	743	339	20,863	14,771	70.7	15,364	11,846	77.1	130,081	91,575	70.4	195,759	140,201	71.6
Fireworks and allied products.....	9	50	22	1,760	1,104	62.7	1,621	1,033	63.2	3,695	2,336	63.2	8,128	5,243	64.5
Glue and gelatin.....	18	75	34	3,547	2,867	80.8	4,565	3,768	82.3	23,391	18,111	77.4	40,650	31,866	78.4
Grease and tallow, not including lubricating greases.....	23	266	63	5,290	1,831	35.2	6,763	2,499	37.0	32,980	12,020	36.4	52,269	19,851	37.9
Ink, printing.....	19	184	72	2,793	1,710	61.4	4,085	2,506	61.3	25,104	18,572	74.0	47,347	32,707	69.1
Insecticides and fungicides, and industrial and household chemical compounds not elsewhere classified.....	54	573	95	4,322	1,596	36.9	4,659	1,825	39.2	34,103	13,728	40.3	71,108	26,546	37.3

See footnote at end of table.



	3,364	503	15.0	331,955	144,559	43.5	311,293	140,390	45.1	899,469	451,478	50.2	1,491,513	721,195	48.4
Group 9. Leather and its manufactures.....	9	12	6.6	2,829	1,369	48.4	3,355	1,471	43.8	15,929	7,766	50.0	37,901	14,176	50.8
Belting and packing, leather.....	39	470	18.3	8,755	9,489	50.0	17,844	9,064	55.8	95,988	60,642	63.2	132,660	70,964	60.3
Foot and shoe cut stock and findings.....	66	1,080	23.1	215,438	105,443	48.9	191,305	96,470	50.4	416,305	229,299	55.1	768,327	410,738	53.5
Boots and shoes, other than rubber.....	11	221	5.9	11,637	1,696	14.6	9,039	1,357	15.0	15,720	2,339	14.9	30,718	4,665	16.3
Gloves and mittens, leather.....	7	203	2.9	11,306	1,598	14.1	9,084	1,129	12.5	24,756	2,984	12.1	43,440	5,460	12.6
Handbags and purses, women's.....	10	322	3.7	7,103	391	8.3	6,389	482	7.5	15,679	1,293	8.2	31,084	2,428	7.8
Leather goods not elsewhere classified.....	29	331	101	48,132	22,464	46.7	58,333	27,950	47.9	279,220	143,594	51.4	387,908	196,287	50.6
Leather—regular factories.....	6	277	8	8,708	1,653	19.0	8,459	1,332	15.7	20,534	3,201	15.6	38,721	6,585	17.0
Trunks, suitcases, briefcases, bags, and other luggage.....	6	278	9	8,047	256	3.2	7,505	235	3.1	15,738	360	2.3	30,748	862	2.8
Other industries.....	6,071	1,325	21.8	300,278	163,108	54.3	348,521	202,057	58.0	523,112	336,953	64.4	1,395,858	889,098	63.7
Group 10. Stone, clay, and glass products.....	12	103	17	9,670	6,781	70.1	14,280	10,862	76.2	29,339	19,363	66.0	77,954	56,228	72.1
Abrasive wheels, stones, paper, and cloth, and related products.....	14	73	30	13,023	11,441	87.9	14,157	12,710	89.8	29,494	26,271	89.1	63,794	56,852	86.1
Asbestos products other than steam packing and pipe and boiler covering.....	36	158	111	26,426	19,100	72.3	34,070	24,537	72.0	69,979	49,626	70.9	183,201	132,268	72.2
Cement.....	16	104	336	306	25,628	43.0	359	26,792	46.3	762	24,819	48.7	1,690	77,613	47.5
China firing and decorating, not done in potteries.....	89	1,198	283	59,585	3,975	31.0	57,844	4,479	32.5	35,453	13,334	37.6	163,262	28,437	37.3
Clay products, other than pottery.....	29	232	106	79,051	56,412	71.4	101,588	75,569	74.4	140,705	113,778	80.9	387,710	312,179	80.5
Concrete products.....	13	79	53	5,207	4,688	89.6	6,591	5,932	90.0	16,681	14,716	88.2	42,617	38,453	90.2
Glass.....	38	203	77	9,751	6,068	52.0	9,610	5,391	56.1	13,287	7,762	58.4	33,022	19,956	57.0
Gypsum products.....	31	157	79	4,539	2,724	60.0	4,898	3,243	66.2	11,613	7,478	64.4	27,101	17,676	65.1
Minerals and earths, ground or otherwise treated.....	19	534	50	12,652	4,724	37.3	13,981	6,047	43.3	40,744	25,018	61.4	88,009	52,765	60.0
Mirrors and other glass products made of purchased glass.....	14	40	25	5,641	4,918	87.2	6,331	5,466	86.3	12,538	11,237	89.6	28,457	24,816	87.2
Nonclay refractories.....	24	251	38	33,060	10,176	30.8	38,329	13,040	34.0	26,252	9,778	37.2	94,726	36,478	38.5
Pottery, including porcelain ware.....	99	863	863	863	1,126	1.1	1,126	1,015	1.1	1,015	3,330	3.3	3,330	3,330	3.3
Statuary and art goods (except concrete), factory production.....	19	114	32	6,383	3,646	57.1	6,691	3,846	57.5	15,652	9,056	57.9	41,049	22,618	55.1
Wallboard and plaster (except gypsum), building insulation, and floor composition.....	37	1,432	88	21,286	3,847	18.1	24,915	4,143	16.6	28,623	4,717	16.5	81,702	12,759	15.6
Other industries.....	8,345	1,519	18.2	1,166,287	745,873	64.0	1,661,045	1,132,501	68.2	4,047,687	3,104,995	76.7	7,480,360	5,431,569	72.6
Group 11. Iron and steel and their products, not including machinery.....	31	87	80	23,075	22,254	96.5	38,002	36,883	97.1	544,881	534,302	98.1	672,526	659,701	98.1
Blast-furnace products.....	32	453	47	24,485	10,660	43.5	33,842	15,469	45.7	82,979	38,326	46.2	165,280	77,759	47.0
Boiler-shop products.....															

See footnote at end of table.

## Measures of significance of central-office operations, by industry groups and industries, 1937—Continued

Industry group and industry	Total cen- tral- office com- pan- ies	Manufacturing establishments		Wage earners (average for the year)		Wages paid (thousand dollars)		Cost of materials, etc., and contract work (thou- sand dollars)		Value of products (thou- sand dollars)			
		Total	Estab- lish- ments oper- ated by central offices	Total	In estab- lish- ments oper- ated by central offices	Total	In estab- lish- ments oper- ated by central offices	Total	In estab- lish- ments oper- ated by central offices	Total	In estab- lish- ments oper- ated by central offices		
												Num- ber	Per- cent of total
Bolts, nuts, washers, and rivets, made in plants not operated in connection with rolling mills.....	12	28	20.3	16,840	6,243	37.1	22,088	44,342	19,521	44.0	98,079	42,032	42.9
Cast-iron pipe and fittings.....	16	39	52.0	17,613	10,421	59.2	15,083	25,441	16,174	63.6	61,119	37,727	61.7
Cutlery (not including silver and plated cutlery) and edge tools.....	21	23	11.2	16,830	4,802	28.5	18,634	18,737	5,624	30.0	68,194	18,592	27.3
Doors, shutters, and window sash and frames, molding, and trim, metal.	13	154	19	8,408	3,072	36.5	11,879	20,053	7,521	37.5	49,915	21,169	42.4
Firearms.....	5	21	7	3,715	3,274	88.1	4,816	3,344	2,982	89.2	12,310	90.2	90.2
Firearms, iron and steel, made in plants not operated in connection with steel works or rolling mills.....	4	21	6	6,847	4,410	64.4	9,670	4,333	3,003	69.3	21,553	13,466	62.5
Foundry products (gray-iron and malleable-iron).....	24	194	42	18,255	5,936	32.5	27,659	63,224	22,203	35.1	122,835	44,398	36.1
Hardware not elsewhere classified.....	108	1,239	182	120,024	54,892	45.7	168,588	141,723	71,833	50.7	397,303	192,263	48.4
Heating and cooking apparatus, ex- cept electric.....	31	428	43	53,090	24,599	46.4	65,274	86,736	42,061	48.5	219,082	107,193	48.9
Nails, spikes, etc., not made in wire mills or in plants operated in con- nection with rolling mills.....	62	830	119	89,287	38,017	42.6	111,768	180,105	73,421	40.8	439,285	191,120	43.5
Plumbers' supplies, not including pipe or vitreous-china sanitary ware.	4	42	6	2,432	649	26.7	2,747	5,636	1,585	28.1	11,929	3,299	27.7
Saws.....	21	241	34	25,240	10,622	42.1	30,635	50,116	20,699	41.3	113,920	49,696	43.6
Screw-machine products and wood screws.....	5	80	12	4,384	2,526	57.6	5,576	7,415	3,572	48.2	19,853	9,656	48.6
Springs, steel, except wire, made in plants not operated in connection with rolling mills.....	11	311	17	21,287	5,681	26.7	28,030	42,714	9,011	21.1	102,725	22,855	22.2
Stamped and pressed metal products; enameling, japanning, and lacquer- ing.....	9	57	14	3,902	2,122	54.4	5,804	16,153	11,060	68.5	27,233	16,713	61.4
	52	743	81	61,092	21,534	35.2	73,141	148,148	61,786	41.7	294,039	114,936	39.1

17	58	33	56.9	6,231	4,437	71.2	7,357	5,185	70.5	30,296	20,608	68.0	48,175	33,726	70.0
79	410	233	56.8	479,342	414,144	86.4	779,776	686,039	88.0	1,833,745	1,663,687	90.7	3,330,491	2,985,465	89.6
45	1,132	102	9.0	38,814	16,200	41.7	53,898	24,199	44.9	169,673	76,460	45.1	292,756	128,530	43.9
32	224	128	57.1	33,145	27,988	84.4	37,194	31,507	84.7	245,110	229,018	93.4	358,796	329,772	91.9
23	369	41	11.1	17,612	6,208	35.2	21,132	7,361	34.8	30,959	12,056	38.9	80,046	29,289	36.6
32	93	49	52.7	24,580	19,091	77.7	33,967	26,739	78.7	100,375	74,109	73.8	182,149	131,514	73.8
44	563	101	17.9	33,471	17,120	51.1	39,207	20,857	53.2	78,295	42,263	54.0	164,510	83,867	51.0
11	53	19	35.8	14,125	8,587	60.8	19,436	11,758	60.5	68,629	41,425	60.4	113,769	69,428	61.0
7	78	9	11.5	2,251	374	16.6	2,822	490	17.4	4,525	1,685	15.1	11,143	2,033	18.2
-----	5,303	470	8.9	270,327	132,862	49.1	349,276	182,557	52.3	1,926,526	1,497,672	77.7	2,783,285	1,960,150	70.4
Group 12. Nonferrous metals and their products.-----															
10	75	20	26.7	23,223	6,625	28.5	27,559	7,926	28.8	38,444	20,925	54.4	97,934	38,987	39.8
8	547	15	2.7	8,256	688	8.3	9,828	751	7.6	6,815	1,330	19.5	26,686	3,231	12.1
10	974	12	1.2	20,368	1,235	6.1	23,273	1,371	5.9	43,915	1,243	2.8	96,601	3,455	3.6
11	466	16	3.4	21,743	6,634	30.5	24,918	8,770	35.2	55,593	17,671	31.8	115,096	34,294	29.8
8	52	13	25.0	9,580	6,074	63.4	10,154	6,846	67.4	10,291	5,856	56.9	36,240	23,520	64.9
57	1,103	140	12.7	83,016	49,465	59.6	115,515	70,626	61.1	392,683	272,539	69.4	669,374	446,401	66.7
41	1,392	109	7.8	22,973	5,238	22.8	29,263	6,523	22.3	85,935	31,725	36.9	159,096	52,249	32.8
7	23	20	87.0	14,514	14,238	98.1	20,941	20,568	98.2	645,294	637,424	98.8	715,355	700,178	97.9
Copper.-----															
Nonferrous metals other than gold, silver, and platinum, not from the ore.-----															
14	103	28	27.2	4,973	2,934	59.0	5,972	3,591	60.1	94,052	57,752	61.4	113,067	68,939	61.0
14	25	22	88.0	11,265	9,878	87.7	16,767	15,098	90.0	75,452	69,381	92.0	115,654	106,440	92.0
36	543	75	13.8	50,416	29,853	59.2	65,086	40,487	62.2	478,052	381,826	79.9	638,242	482,456	75.6
Group 13. Machinery, not including transportation equipment.-----															
-----	9,961	1,435	14.4	955,975	520,432	54.4	1,375,506	779,617	56.7	2,424,405	1,408,592	58.1	5,891,599	3,356,170	57.0
20	262	54	20.6	77,512	60,614	78.2	121,861	98,531	80.9	286,514	236,258	82.5	564,778	448,628	79.4
13	87	18	20.7	23,630	7,718	32.8	37,422	11,681	31.2	21,245	8,793	41.4	138,071	32,964	23.9

See footnote at end of table.



	1,942	459	23.6	623,845	497,238	79.7	967,231	789,685	81.6	4,099,756	3,699,693	90.2	5,985,839	5,247,030	87.7
Group 14. Transportation equipment, air, land, and water.	11	17	18.5	24,003	11,789	49.1	33,353	16,564	49.7	4,099,756	3,699,693	90.2	5,985,839	5,247,030	87.7
Aircraft and parts	29	137	89.0	40,466	37,355	92.3	59,276	55,073	92.9	226,505	210,010	92.7	335,322	312,036	93.1
Cars, electric and steam railroad	62	986	161	284,814	241,985	85.0	439,940	384,964	87.5	1,275,073	1,152,526	90.4	2,080,018	1,836,905	88.3
Motor-vehicle bodies and motor-vehicle parts	14	63	48.1	194,627	159,973	82.2	316,141	200,001	82.2	2,394,270	2,213,580	92.5	3,096,219	2,814,509	90.9
Motor vehicles, not including motor-cycles	31	544	69	62,274	36,506	58.6	93,747	57,910	61.8	101,411	62,159	61.3	250,457	154,584	61.7
Ship and boat building, steel and wooden, including repair work	8	85	12	17,761	9,630	54.2	24,774	15,150	61.2	63,692	39,693	62.3	117,305	71,573	61.0
Other industries <sup>1</sup>															
Group 16. Miscellaneous industries.	10,077	853	8.5	355,164	144,145	40.6	366,083	151,006	41.3	1,633,610	1,074,642	65.8	2,712,042	1,612,490	59.5
Brushes, other than rubber	10	243	15	7,915	1,857	23.5	7,250	1,940	26.8	24,110	6,396	26.5	44,536	11,185	25.1
Buttons	21	291	65	12,026	4,697	39.1	9,256	3,201	34.6	13,578	5,149	37.9	31,291	11,320	36.2
Carbon paper and inked ribbons	5	50	5	1,627	503	30.9	1,692	533	32.3	9,178	3,041	33.1	17,859	5,473	30.6
Cigarettes	7	34	19	26,149	23,816	91.1	24,182	21,812	90.2	771,522	698,232	90.5	968,927	875,944	90.4
Cigars	32	693	83	55,879	32,027	57.3	37,522	22,134	59.0	87,342	56,375	64.5	169,237	107,568	63.6
Feathers, plumes, and manufactures therefrom	61			559			437			1,194			2,320		
Foundry supplies	6	51	13	25.5	466	50.4	592	313	52.9	4,739	2,255	47.6	8,626	4,392	50.9
Fur-goods:															
Regular factories	4	1,590	7	12,798	115	.9	21,369	127	.6	106,205	358	.3	154,971	584	.4
Contract factories							154			139			634		
Hair work	35			434			374			942			2,449		
Hand stamps and stencils and brands	6	266	17	2,375	352	14.8	2,929	460	15.7	3,047	434	14.2	10,386	1,507	14.5
Instruments and apparatus, professional, scientific, commercial, and industrial	17	283	32	17,399	5,836	33.5	23,543	8,502	36.1	29,684	11,876	40.0	96,013	36,525	38.0
Lapidary work	51			217			306			3,343			4,391		
Mattresses and bed springs not elsewhere classified	21	839	57	19,165	5,871	30.6	19,811	7,000	35.3	63,190	19,776	31.3	113,120	37,773	33.4
Miscellaneous articles not elsewhere classified	11	595	17	15,854	1,153	7.3	12,905	950	7.4	24,156	2,457	10.2	54,404	4,635	8.5
Musical instruments: Pianos	6	38	8	5,898	2,331	40.9	7,062	3,058	43.3	9,767	4,397	45.0	21,703	10,253	47.2
Optical goods	6	96	14	11,998	4,811	40.1	14,465	5,794	40.1	14,432	5,366	37.2	47,461	18,991	40.0
Paving materials: Blocks (except brick and stone) and mixtures	22	148	91	1,946	1,134	58.3	2,419	1,542	63.7	14,605	10,186	69.7	25,289	17,104	67.6
Pencils, lead (including mechanical), and crayons	6	46	9	5,776	3,022	52.3	5,216	3,061	58.7	9,866	5,217	52.9	22,430	12,645	56.4
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint	17	111	58	7,418	6,378	86.0	9,520	8,336	87.6	62,644	54,866	87.6	102,582	89,504	87.3
Signs and advertising novelties	20	1,001	83	16,042	2,089	13.0	19,181	3,043	15.9	27,754	3,494	12.4	75,723	11,316	14.9
Sporting and athletic goods, not including firearms or ammunition	16	204	25	11,392	4,713	41.4	11,730	5,552	47.3	21,857	10,487	48.0	44,461	19,692	44.3

See footnote at end of table.

## Measures of significance of central-office operations, by industry groups and industries, 1937—Continued

Industry group and industry	Total central-office companies		Manufacturing establishments		Wage earners (average for the year)		Wages paid (thousand dollars)		Cost of materials, etc., and contract work (thousand dollars)		Value of products (thousand dollars)		
	Total	Establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total	In establishments operated by central offices	Total
Steam and other packing, pipe and boiler covering, and gaskets, not elsewhere classified.....	13	25	20.0	2,325	39.2	6,930	2,601	37.5	15,048	6,546	43.5	12,571	38.9
Surgical and orthopedic appliances and related products.....	17	46	14.2	5,019	59.6	8,546	5,078	59.4	45,031	38,184	84.8	56,866	73.8
Tobacco (chewing and smoking) and snuff.....	11	22	17.6	7,372	72.8	8,587	6,534	76.1	88,766	73,789	83.1	110,556	82.2
Toys (not including children's wheel goods or sleds), games, and playground equipment.....	8	344	18	2,486	14.2	15,020	2,114	14.1	28,812	3,345	11.6	6,716	10.5
Window shades (textile and paper) and fixtures.....	12	304	31	1,250	39.5	3,173	1,218	38.4	13,294	4,769	35.9	23,574	34.4
Other industries.....	46	2,078	93	24,753	32.3	91,575	36,113	39.4	139,364	47,707	34.2	361,673	39.1

<sup>3</sup> In order to avoid disclosure of the operations of individual central offices and establishments, the following industries are shown under "Other industries" in the several groups:

- Group 1: Chewing gum; oleomargarine, not made in meat-packing establishments; sausage casings, not made in meat-packing establishments.  
 Group 2: Blouses, women's, misses', and children's—regular factories; carpets and rugs, paper-fiber and grass; carpet yarn, woolen and worsted; clothing, leather and sheep-lined; clothing, women's, misses', and children's, not elsewhere classified—contract factories; curtains, draperies, and bedspreads—contract factories; dresses: House dresses, uniforms, and aprons—contract factories; embroideries—other than Schiffli-machine products—regular factories; regular factories; other than Schiffli-machine products—contract factories; embroideries—other than Schiffli-machine products—regular factories; Schiffli-machine products—contract factories; fish nets and seines; flags, banners, regalia, vestiments, robes, and related products; gloves and mittens, knitted; hat and cap materials, men's; hat bodies, carded wool-felt; hats and caps, except felt and straw, men's; hats, straw, men's; linen goods; linoleum; oilcloth; suspenders, garters and other elastic woven products, made from purchased webbing; trimmings, stamped art goods—contract factories; underwear, men's—contract factories; wool combing—commission, and tops for sale; woolen yarn.  
 Group 3: Cork products; excelsior; laths and related products; mirrors and picture frames.  
 Group 4: Cardboard, not made in paper mills; wall paper.  
 Group 5: Ammunition and related products; bluing; bone black, carbon black, and lampblack; candles; drug grinding; ink, writing; mucilage, paste, and other adhesives, except glue and rubber cement; oils, essential.

- Group 8: Boots and shoes, rubber; rubber goods other than tires, inner tubes, and boots and shoes.
- Group 9: Leather goods—Small articles; leather, tanned, curried, and finished—contract factories; saddlery, harness, and whips.
- Group 10: Graphite, ground and refined; marble, granite, slate, and other stone, cut and shaped; sand-lime brick.
- Group 11: Galvanizing and other coating, done in plants not operated in connection with rolling mills; safes and vaults.
- Group 12: Aluminum products; collapsible tubes; fire extinguishers, chemical; goldleaf and foil; gold, silver, and platinum, refining and alloying; jewelers' findings and materials; silverware and plated ware; smelting and refining, lead; tin and other foils, not including gold foils; watchcases.
- Group 13: Sewing machines and attachments; typewriters and parts.
- Group 14: Carriages, wagons, sleighs, and sleds; locomotives, railroad, mining, and industrial; motorcycles, bicycles, and parts.
- Group 15: Artificial and preserved flowers and plants; artists' materials; beauty-shop equipment, except furniture; brooms; carriages and sleds, children's; dentists' equipment and supplies; furs, dressed and dyed; jewelry and instrument cases; models and patterns, not including paper patterns; musical-instrument parts and materials; Piano and organ, musical-instrument parts and materials, not elsewhere classified; musical instruments: Organs; pens, pen points, gold, steel, and brass; umbrellas, parasols, and canes; wool pulling.
- Group 16: Artificial and preserved flowers and plants; artists' materials; beauty-shop equipment, except furniture; brooms; carriages and sleds, children's; dentists' photographic apparatus and materials and projection apparatus; pipes (tobacco); soda fountains and related products; theatrical scenery and stage equipment; umbrellas, parasols, and canes; wool pulling.

## APPENDIX B

*Industries in which no establishments are controlled by central offices, with number of establishments, average number of wage earners, and value of products, 1937*

Industry	Number of establishments	Wage earners (average for the year)	Value of products (thousand dollars)
Total, all industries.....	166, 794	8, 569, 231	60, 712, 872
Total, industries not controlled by central offices.....	776	14, 090	44, 651
Percent industries not controlled by central offices are of all industries.....	0. 5	0. 2	0. 1
Billiard and pool tables, bowling alleys, and accessories.....	23	530	5, 547
Blouses, women's, misses', and children's—contract factories.....	64	2, 554	2, 435
Carpets and rugs, rag.....	35	429	1, 336
China firing and decorating, not done in potteries.....	16	306	1, 690
Engraving (other than steel, copperplate, or wood), chasing, etching, and diesinking.....	77	2, 152	8, 881
Feathers, plumes, and manufactures thereof.....	61	559	2, 320
Fur goods—contract factories.....	52	154	634
Furnishing goods, men's, n. e. c.—contract factories.....	31	759	854
Hair work.....	35	434	2, 449
Handkerchiefs—contract factories.....	16	932	944
Knitted outerwear—contract factories.....	164	2, 715	4, 592
Lapidary work.....	51	217	4, 391
Millinery—contract factories.....	32	239	697
Statuary and art goods (except concrete), factory production.....	99	858	3, 331
Wool scouring.....	20	1, 252	4, 550

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PART III  
**THE MERGER MOVEMENT**

BY  
**WILLARD L. THORP**



**THE MERGER MOVEMENT**  
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## THE MERGER MOVEMENT <sup>1</sup>

Twice in recent times were there periods when concentration increased with unusual rapidity. Both were periods when mergers and consolidations occurred with unusual frequency. Apparently, there has been a slow and fairly steady development of giant enterprises, but upon this persisting tendency have been superimposed these two periods of feverish amalgamations. The first was at the turn of the century, from about 1897 to 1903. The second was from 1925 to 1929.

In both cases, the enthusiasm for bigger business was closely related to the activities of financial promoters and the willingness of the investment markets to absorb new securities. In both instances, the business community was swept with the belief that size would solve many problems automatically, that "in union there is strength." Both were periods of relative prosperity, with trends rising so that their projection made the future bright indeed. And, finally, both were periods in which the shadow of the anti-trust laws fell only dimly on the business world. As a result, the slower and more tested processes of growth through plowing back earnings gave way to the excited hypotheses of new security prospectuses.

The birth records of the early period include such prominent names as International Silver, International Paper, American Linseed, United Shoe Machinery, Standard Sanitary, American Snuff, International Salt, American Can, Eastman Kodak, International Harvester, Corn Products, International Nickel, and E. I. du Pont de Nemours Powder Co. The early months of 1901 saw the birth of the billion-dollar United States Steel Corporation. Of 318 so-called trusts, listed in Moody's Truth About The Trusts, only 82 were organized before the end of 1897, and the remaining 234 appeared in the years 1898-1903.

The story of this period is beautifully summarized by Seager and Gulick as follows:

The sensational progress of the second (1897-1903) trust movement was possible only because a group of shrewd, plausible, and aggressive promoters was at hand to make fullest use of the favorable business situation.<sup>2</sup>

It was standard procedure for the promoter to negotiate with a number of enterprises in the industry and reach a purchase price for each property. The new enterprise would be formed, with extensive capitalization of the alleged benefits of consolidation. The original owners would be paid in cash or stock, and the promoter and the bankers would obtain the remainder. It was regularly true that the whole was greater than the sum of its parts.

<sup>1</sup> The author was assisted by Miss Frances Goldberg and Miss Helen B. Russell.

<sup>2</sup> Henry R. Seager and Charles A. Gulick, Jr., *Trust and Corporation Problems*, New York, 1929, p. 64.

It was not for 20 years that the same phenomena appeared again. The merger movement once more reached the hysteria stage in the late twenties. A consistent record has been made of mergers and acquisitions in the manufacturing and mining fields covering the last 21 years (see table 1 and chart 1). It is based on the daily reports of the Standard Statistics Co., a clipping service of corporate news items.

This record is neither complete nor accurate. Some consolidations or acquisitions may never have reached the public press or the trade journals, although it is difficult to believe that many important cases could have been kept secret. Moreover, there is no reason to believe

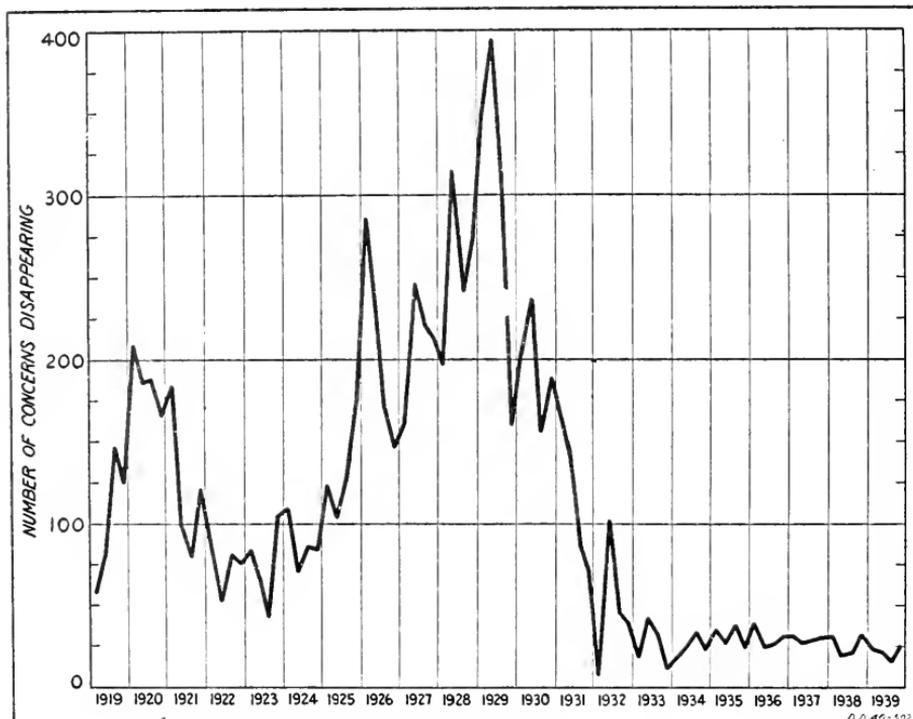


CHART 1.—THE MERGER MOVEMENT, 1919-39.

that journalists were more astute at one time than another, or businessmen more or less secretive. At any rate the records are probably correct as to trend. Mergers of subsidiaries, especially frequent under the goading of recent tax laws, were not included since there was no real change in ownership. Likewise, the formation of a new subsidiary was regarded as expansion rather than acquisition. No attention was paid to the acquisition of foreign enterprises, although in the active foreign trade days of the twenties this was a frequent occurrence.

The record has been compiled on a quarterly basis, although it was often difficult to allocate exactly by time. The original reports often failed to distinguish between agreement, ratification, or actual merging. The record is limited to the manufacturing and mining fields.

TABLE 1.—*Mergers and acquisitions in manufacturing and mining, by quarters, 1919-39*NET NUMBER OF CONCERNS DISAPPEARING<sup>1</sup>

Year	Quarter				Total <sup>2</sup>	Year	Quarter				Total <sup>2</sup>
	I	II	III	IV			I	II	III	IV	
1919.....	57	82	147	125	438	1930.....	204	237	156	189	799
1920.....	209	186	188	166	760	1931.....	163	142	87	71	464
1921.....	<sup>3</sup> 184	99	80	122	487	1932.....	7	102	46	40	203
1922.....	86	53	82	76	309	1933.....	19	43	33	12	120
1923.....	84	67	44	105	311	1934.....	19	25	34	23	101
1924.....	110	71	87	85	368	1935.....	36	27	38	24	130
1925.....	124	104	127	175	554	1936.....	39	25	27	32	126
1926.....	286	236	171	146	856	1937.....	32	27	29	31	124
1927.....	161	247	220	213	870	1938.....	32	20	22	33	110
1928.....	197	315	242	274	1,058	1939.....	24	22	16	25	87
1929.....	349	395	312	160	1,245						

<sup>1</sup> Number of concerns merged less number of mergers plus concerns acquired.

<sup>2</sup> Annual totals are larger than the sum of the quarterly figures, because they include a small number of cases where exact dates were not available.

<sup>3</sup> Includes 1 merger of 60 concerns.

To a considerable extent, the figures tell their own story. The post-war boom in 1920 saw a sudden peak in activity, but the following years were much less active. However, with 1925, momentum began to appear and the merger movement was under way. If the record were based on "merger talk," it would already have reached tremendous heights by 1926. The peak quarter, the spring of 1929, saw more cases of mergers and acquisitions than any of the full years of 1922 to 1924. The movement gradually collapsed, and since 1932 has been at levels far below those even of the early twenties.

The collapse of the movement has been particularly true with respect to the merger procedure. The data for certain selected years shown in table 2 demonstrate this point.

TABLE 2.—*Mergers and acquisitions for selected years*

Year	Number of mergers	Number of concerns merged	Number of concerns acquired
	Annual average		
1921-23.....	74	270	173
1926-28.....	189	654	456
1934-36.....	6	15	111
1937-39.....	8	22	93

Evidently there is an underlying current of acquisition going on all the time (19 cases were reported even in that dismal period, the first quarter of 1933). The merger movement, on the other hand, seems to blossom only under favorable circumstances and to disappear at other times.

There are at least two factors which have considerable influence over the manner of corporate expansion. The first is the character of the anti-trust laws. As has been clearly demonstrated by the Federal Trade Commission (T. N. E. C. hearings, vol. 5-A, pp. 2361 ff.), in cases where there is a tendency "to substantially lessen competition," the result of section VII of the Clayton Act is to force

the action to take the form of a property acquisition. This section has been enforced more vigorously in recent years, and may be largely responsible for the disappearance of mergers as such.

Secondly, there is the matter of tax law. The acquisition of securities, the liquidation of a company, and the acquisition of physical assets may each provide a different tax base. While this may be the determining factor in any individual case, no study has ever been made to indicate whether it provides a general bias in favor of some one method.

The above data relate to manufacturing and mining, although the movement reached into many other fields. The twenties saw the rapid growth of giant public utility systems. Beginning in 1922, there was a rapid increase in "disappearances." In 1926, the amazing number of 1,029 public utility enterprises disappeared through merger or acquisition.<sup>3</sup> Thereafter, the movement subsided, largely due to the increasing scarcity of enterprises which could be acquired or with which one could merge. By 1930, about one-half the industry was in the hands of three controlling groups, and an additional 10 control groups accounted for an additional 30 percent of the total.<sup>4</sup> It is interesting to note that this trend is to be reversed, as a result of section 11 of the Public Utility Holding Company Act.

In still other fields, the same forces were at work. Motion picture producers consolidated and chains of theaters were formed. Chains of hotels began to become a usual phenomenon. And, in retail trade, not only did chains expand but a number of department store groups were formed.

The same basic forces were present in the twenties as in the earlier period of merger activity. Promoters were extremely active, new issues were frequently floated where the sum exceeded the parts. High hopes were entertained that the new enterprises had extraordinary economic strength.

If the above analysis is correct, it indicates that these periods of merger activity were not solely the result of necessary economic evolution, but rather were brought about to a large extent by promotional activity during periods favorable to new security issues. The control therefore lies in considerable degree in control over the money markets. The basic problem shifts from the field of business structure and corporate entities to the financial world. If the Securities and Exchange Commission, by exposing new issues to cold, objective scrutiny, can prevent the run-away excitement of these two earlier periods, then corporate expansion will have to come by plowing back earnings or by making a convincing, positive case. This seems like a more promising path for our economic evolution than the excited products of speculative enthusiasm.

<sup>3</sup> Thorp, Willard L., *Recent Economic Changes*, New York, 1929, vol. I, p. 187.

<sup>4</sup> Tippetts, Charles S., and Shaw Livermore, *Business Organization and Control*, New York, 1932, p. 509.

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PART IV

**THE HISTORY OF CONCENTRATION  
IN SEVEN INDUSTRIES**

BY

**WILLARD L. THORP  
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# THE HISTORY OF CONCENTRATION IN SEVEN INDUSTRIES

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## THE HISTORY OF CONCENTRATION IN SEVEN INDUSTRIES

Industrial evolution never moves in even and steady stages. Furthermore, industries do not follow any single pattern. The present report endeavors to trace the record of concentration in the following seven industries:

- Agricultural implements.
- Automobiles.
- Copper.
- Cotton textiles.
- Iron and steel.
- Petroleum.
- Rayon.

These are sufficiently varied in nature as to suggest various historical patterns which have appeared in the past.

Like any historical study, the reports could be made much more voluminous. However, masses of material have been sifted to find only that which bears directly on the record of concentration. Much of the evidence is fragmentary, and perhaps not perfect statistically, but it does indicate the general nature of the history of concentration in each instance.

## THE AGRICULTURAL IMPLEMENTS INDUSTRY

The agricultural implements industry can trace its history in America back to colonial days. At that time the crude tillage and cultivating tools were made at home largely from imported materials. Small hand tools were all imported. The rapid growth in the demand for implements as new land was cleared and settled encouraged the extension and improvement in American iron manufactures. Most of the early patents in the United States were for farm machinery. During the first years of the young republic nearly every cross-roads country furnace cast plow-irons and made and repaired the neighborhood farm implements. Some of these furnaces ultimately developed into large enterprises, while others disappeared under competitive forces. By 1830, Worcester County, Mass., had three establishments engaged in producing plows, employing 10 workers and manufacturing about 1,000 plows annually.<sup>1</sup> With the introduction of uniform parts, and other economies of centralized production, the village blacksmith and small foundry gradually disappeared as factors in this field.

The emergence of the industry, as it is known today, was coincident with the patent granted in 1834 to Cyrus McCormick on his grain-cutting machine. Between that date and 1845, 15 other machines were patented in the farm implement category. By 1860 this fledgling industry had assumed its position among recognized American manufactures. A farm journal, "The Genesee Farmer," published the following data<sup>2</sup> on the relative importance of leading manufacturers of reaping and mowing machines through the period ending in 1864:

	<i>Number</i>
McCormick Bros. (original International Co.)-----	55, 000
Walter A. Wood-----	30, 000
R. L. Howard-----	28, 500
Buffalo Agriculture Machine Co.-----	27, 000
D. M. Osborne & Co. (later acquired by International)-----	15, 000
C. Aultman & Co. (later acquired by International)-----	9, 100
Warder and Childs-----	9, 000
Seymour, Morgan and Allen-----	7, 200
Bamberger, Wight & Co.-----	4, 306
Adrience, Platt & Co.-----	3, 600
Total made in period by all manufacturers-----	214, 000

The leading four producers accounted for over 65 percent of the total number of mowing and reaping machines produced up to 1864. Aside from the inherent characteristics which induced large-scale production, each of the producers of farm machinery was protected on his own product by patents which further limited the number of competitors. The census of 1860 reports 1,982 establishments in the industry, but this included many small enterprises making implements other than large harvesting machines. After 1870, few new enterprises entered the field. In 1880, there were still 1,943 estab-

<sup>1</sup> History of Manufactures in the U. S., 1607-1860, vol. I, Clark, Victor S., p. 476.

<sup>2</sup> Census of Manufactures, 1860, p. cexii.

lishments, but by 1890 the number had dropped to 910 and by 1900, to 715, despite marked increases in wage earners and value of products.

In 1902 the five largest competitors in the farm machinery field consolidated and formed the International Harvester Co. These companies represented at that time over 90 percent of the total production of grain binders and 80 percent of the mowers built in the United States. Acquisition of other companies by International followed immediately; the D. M. Osborne Company, established in 1856, makers of mowers, the Aultman-Miller Co., established in 1848, reaper producers, and the Minnie Harvester Co., established in the '80's, were purchased by International. By 1912 International Harvester Co. was producing 76 percent of the harvesting machinery, 78 percent of the mowers, and 72 percent of the hay rakes made in this country. It has also increased its line to include plows, harrows, seeding machines, hay presses, manure spreaders, drills, hay loaders, side-delivery rakes, corn machinery, wagons, gasoline engines, tractors, motor trucks, cream separators, and binder twine, establishing itself as a full-line company. Not only did International enhance its competitive position in the production of all farm implements and machinery, but it owned the distributing outlets for its own products.

At the time of the International consolidation (1902) Deere & Co., the next largest producer of farm machinery, unsuccessfully attempted a large merger of plow and tillage implement companies. Later (1910) Deere & Co. successfully undertook an expansion program, acquiring the properties of several previously controlled companies. Addition of new lines, plant expansion, and purchase of competing companies combined to increase materially Deere & Co.'s share in the farm implement business. This company also operated its own distribution outlets.

J. I. Case & Co., established in 1842, steadily developed until by the end of the nineteenth century it had become the largest manufacturer of threshing machines. During the next 30 years it acquired properties which added to its threshing machine line and extended its activities into the distribution field.

The Allis-Chalmers Manufacturing Co., long-established as a maker of industrial machinery and engines, made its bid for a share of the farm machinery business by initiating the production of gasoline engines for farm use in 1903 and tractors in 1915. In the past 10 years it has added to its farm machinery production by acquiring companies engaged in the manufacture of threshers, combines, and clover hullers. Throughout this development it has continued to be prominent in the manufacture of industrial machinery. In 1935, it introduced a 5 foot "all crop" combine which sold for half the price of International's 12 foot combine. International's production of 85 percent of all combines in 1921 had dropped to 32 in 1935. The new competition drove it down to 12 percent.

The Oliver Farm Equipment Co. was established in 1855 as a manufacturer of chilled plows. It gradually, through acquisition and expansion, entered into production of threshers, tractors, seeders and grain drills, and other related lines.

At the present time there are approximately 200 companies engaged in the farm implement and machinery industry. The balance of the

large farm market for implements and machines is shared by numerous so-called short-line companies and two mail order houses each of which retains a small share of the business through production of special-purpose equipment, lower prices, or sale of their products through the large-company stores in order to complete the line required by the farmers in particular areas.

The International Harvester Co. started out with almost a complete monopoly. In 1902, it had an 85 percent control of the output of harvesting machines, which dropped to 80 percent by 1911, and 64 by 1918.<sup>3</sup>

It is possible to put together studies made by the Bureau of Corporations in 1913 and the later investigation by the Federal Trade Commission for certain items. The following represent the percentage of the national output produced by International Harvester Co.:

Year	Binders	Mowers	Year	Binders	Mowers
1903.....	94	88	1929.....	68	65
1911.....	87	77	1935.....	67	60
1921.....	73	62	1936.....	56	53

Of 28 farm implements and machines studied by the Federal Trade Commission, the International Harvester was the leading producer of 23 in 1936. It is even more significant to note that, while it increased its share of the national total in most items from 1921 to 1929, it lost ground severely from 1929 to 1936. The proportion of the national total for each of the products which it produced in 1936 was as follows:

Percent of national total:	Number of products
60 and over.....	1
50 to 59.....	3
40 to 49.....	3
30 to 39.....	6
20 to 29.....	8
10 to 19.....	4
0 to 9.....	3
Total.....	28

Based on data for over 95 percent of the farm implements made and sold in the United States, the Federal Trade Commission calculates that International Harvester's share was 41 percent in 1936, exclusive of motor trucks and binder twine. Deere & Co., ranked second, accounted for an additional 21.5 percent.

Looking at the entire record, it is clear that the industry always has had a high degree of concentration. The maximum was undoubtedly reached in 1902 or shortly thereafter, since when there has been a considerable decline in the degree of the leadership of the International Harvester Co.

<sup>3</sup> Seager, H. R., and Gulick, C. A. *Trust and Corporation Problems*, New York, 1929, p. 267..

## THE AUTOMOBILE INDUSTRY

In 1896 the Duryea Motor Wagon Co. manufactured and sold 13 automobiles, the first commercial production in this country. Cars were built at home and in workshops during the experimental stage by Duryea, Olds, Haynes, Winton, Ford, King, Maxwell, Apperson, Riker, Clarke, Stanley, White, Franklin, and Seldon, all pioneers in the industry. None of the companies which had launched electric-driven vehicles during the 90's survived except that making Columbia Electric automobiles. For a short time in the early 1900's, steam-driven automobiles were favored and the Locomobile Co. and the Mobile Co. produced about 95 percent of the steam carriages built in America.

The pioneer in factory production was the Olds Motor Works at Detroit. In 1904 this company produced about 4,000 cars. Ford ranked second with 1,708 cars; Cadillac produced about 1,200. The three companies accounted for approximately 37 percent of the total number of gasoline-driven cars made at that time.

The automobile industry's history has been marked by shifting popularity for different makes of cars. Dean Ralph Epstein has made an analysis of firms' entrance and exit into the industry between 1903 and 1926.<sup>4</sup> This analysis throws considerable light on the changing personnel of the industry. He found that 181 firms had entered the field from 1899 to 1928. Of these 181 firms, 48, or 28 percent, did not remain in business over 3 years; 40, or 49 percent, lasted 6 years or less, and 26 firms had a life of 7 to 9 years. Only 8 companies remained in business 22 to 24 years and only 5 for more than that length of time. While this mortality is high compared with other industries in the same period, the automobile industry during its infancy had a product which was subject to great changes in design and construction, involving considerable investment.

By 1909 leadership in the industry had shifted to General Motors. This holding company was formed in 1908 to acquire substantial interest in the following companies: Buick, Cadillac, Cartecar, Elmore, Ewing, McLaughlin, Marquette, Oakland, Olds, Randolph, Welch, and the Weston-Mott companies. Other companies engaged in the manufacture of parts were also controlled by this new company. These companies produced 28,550 cars in 1909. By 1915 the rank of producers had again altered. Ford now led, General Motors' production was second, and a newcomer, Willys-Overland, held third place. These same companies were leaders again in 1920. The detail for these companies follow in table 1, showing the increasing share of total production accounted for by the leading three companies. Note particularly that in 1920, Ford had reached nearly one-half the total figure.

With the exception of the General Motors merger in 1908, no successful consolidation of automobile companies was attempted until the Chrysler Corporation was formed in 1925, acquiring the assets of

<sup>4</sup> Clark, Victor, S., *History of Manufactures in the U. S.*, vol. III, p. 160.

the Maxwell and Chalmers Corporations. In 1928 this company purchased the Dodge Brothers assets. From the time of its formation until the present, it has been consistently among the first three in the industry.

Table 2 is based on new car registrations. Registration data, broken down by name of car, first became available in 1925. The proportion of new car registrations by the leaders is shown in the table for 5-year intervals from 1925, with 1938 added.

TABLE 1.—Number of cars produced by leading 3 automobile companies, 1909, 1915, and 1920

	1909	1915	1920
General Motors.....	<sup>1</sup> 28, 550	<sup>1</sup> 120, 161	<sup>1</sup> 393, 075
Studebaker (including E. M. F. cars).....	<sup>2</sup> 14, 500		
Ford Motor Co.....	<sup>1</sup> 10, 660	<sup>1</sup> 283, 161	<sup>1</sup> 1, 074, 336
Willys-Overland.....		<sup>1</sup> 58, 000	<sup>1</sup> 105, 025
Total 3 companies.....	53, 710	461, 161	1, 572, 436
Percent of total.....	42.1	51.2	71.3
Total production <sup>3</sup> .....	127, 731	892, 618	2, 205, 197

<sup>1</sup> Moody's Manuals.

<sup>2</sup> Automotive Industries, Dec. 30, 1909.

<sup>3</sup> Epstein, Ralph C., The Automobile Industry, p. 314.

TABLE 2.—Proportion of new car registrations by 3 leading companies (percent of total) 1925, 1930, 1935, and 1938

	1925	1930	1935	1938
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Ford Motor Co.....	42.8	40.3	30.2	20.5
General Motors.....	20.0	34.5	38.4	44.8
Chrysler Corporation.....	9.1	8.5	22.9	25.0
Total, 3 companies.....	71.9	83.3	91.5	90.3

Source: Automotive Industries, annual statistical numbers.

Throughout its history of more than four decades, the industry has shown steadily increasing concentration among the leading producers. In recent years, what changes there have been are in the proportions held by each of the Big Three, but not in their total. No newcomer seems to be able to break into that 90 percent of the market, although the decline of Ford has been of astonishing proportions.

## THE COPPER INDUSTRY

During the eighteenth century, small shipments of copper ore were made from the Atlantic seaboard to Europe from mines in Connecticut, New Jersey, and Pennsylvania. It was not until 1844, however, that copper mining assumed any size in the United States.

The discovery of new copper mines and the opening of new territories have been an important factor in the rise of the leading companies in the copper refining industry. The Michigan area was the first profitable mining area opened up. Some copper was mined there before the Civil War. The formation of the Allouez Mining Co. in 1859 marked the first successful exploitation of the Michigan mines. This company was acquired by the Calumet & Hecla Consolidated Copper Co. in 1923 as a result of a huge consolidation of Michigan mining companies including the Ahmeek Mining Co. established in 1880, the Calumet & Hecla Mining Co. formed in 1871, the Centennial Copper Mining Co. established in 1896, and the Osceola Consolidated Mining Co. established in 1873. The Calumet & Hecla owns outright or a substantial interest in the following properties: The Cliff Mining Co.; Isle Royale Copper Co.; Eastern Exploration Co.; Goldfield Mining Co.; Ishpenung Gold Mining Co.; Lake Milling, Smelting & Refining Co.; Mutual Water, Light & Power Co.; and the Torch Lake Canal Co. All of these properties are located in Michigan.

Michigan continued to be the leading copper-producing State until 1887, when Montana surged ahead. Copper ore has been known to exist in the Butte district since 1864 when gold was discovered. Ores were treated by 1866, but it was not until the eighties that any extensive operations began there. In 1879 the Colorado & Montana Smelting Co. was formed under the sponsorship of W. A. Clark, owner of the "Original," "Colusa," "Mountain Chief," and "Gambetta" mines around Butte, Mont. This mountainous region has been called the "richest hill on earth" and millions of dollars worth of ore have been taken from the rich copper veins there. These ore fields gave rise to one of the leading companies in the copper industry, Anaconda Copper Corporation, which was incorporated as such in 1895. At the time of formation it purchased the properties of the Anaconda Mining Co. In 1910 it acquired the Boston & Montana Consolidated Copper & Silver Co.; in 1924, the Davis-Daly Copper Co., the International Smelting & Refining Co., and the Utah Consolidated Mining Co.

The history of the mining interests in Montana is colorful and dynamic. The domination of the Montana copper fields by Anaconda came about steadily under the powerful stimulus of Marcus Daly. Daly's entrance into the copper industry was in 1876 when he purchased mining properties in Montana. Backed by George Hearst and others, he purchased the Anaconda Silver Mine which was the

start of the great copper-mining operations that were to make Butte and the Anaconda famous. His many interests included timberlands, railroads, banks, power plants, and irrigation systems. Warfare—political, social, legal, and actual armed encounters—characterized the struggle for supremacy between Clark, Marcus Daly, and Augustus Heinze, the so-called “copper kings” of the nineties and early nineteen hundreds. The Amalgamated Copper Corporation, backed by the Standard Oil, owner of the controlling interests of the Anaconda, of which Marcus Daly was the leader, waged a long war against Heinze, owner of the famous Minnie Healy mine, finally forcing him to sell out. Heinze immediately formed the United Copper Co., which was finally forced to the wall in the panic of 1907, a speculative crash precipitated by the Amalgamated’s fight against Heinze.

Another section of the country is represented in the growth of the Phelps, Dodge Corporation, coincident with the rise of James Douglas, called “the dean of the mining and metallurgical profession.” Dr. Douglas, one-time preacher and doctor, became interested in a struggling copper mine owned by his father and from his experiments there went into the metallurgical field. In 1880 he was hired by a conservative metal-dealing concern, Phelps, Dodge & Co., to investigate reports of a rich copper prospect called the Verde in Northern Arizona. On his way home he stopped in Bisbee and examined some claims which he bought for the Phelps, Dodge & Co. A company was formed in 1885, “The Copper Queen Consolidated Mining Co.,” with Dr. Douglas as its president. It continued to operate under that name until 1917, when its reports were included with those of its owner, the Phelps, Dodge & Co. The mining properties of this company in the United States include the “Burrow Mountain Branch” and the “Stag Canon Branch” in New Mexico, Morenci, the New Cornelia and the Montezuma in Arizona. In 1931 it merged with its subsidiary, Calumet and Arizona, having already purchased the Arizona Copper Co. in 1921. Its latest United States acquisition was the United Verde Copper Co. in 1935.

The development of the copper resources in the Utah-Nevada regions began in the early nineteen hundreds, although ore deposits were discovered there in the last quarter of the nineteenth century. In Nevada, the first extensive development of the copper industry was undertaken by the Nevada Consolidated Copper Co., organized in 1909, and in Utah, the Utah Copper Co., established in 1904, profitably exploited the low-grade ores of the Bingham district under the capable direction of the company’s engineer, Jackling. These two companies later formed the nucleus of the United States activity of the Kennecott Copper Corporation, which owned the well-known “Bonanza” and “Jumbo” mines in Alaska. In 1915 the Kennecott Corporation reorganized under this name, acquiring the properties of the Kennecott Mining Co. and the Bentson Copper Co. In 1932 it purchased outright both the Nevada Consolidated Copper Co. and the Utah Copper Co.

A picture of the shifting controls of the copper mining, smelting, and refining industry in the United States is furnished by data compiled over nearly a century from the records of the Department of the Interior. Table 3 presents data from 1850 to 1937, by decades, until 1938:

This table clearly portrays the development of the copper industry through the leading companies. The beginning of production prior to the Civil War was marked by competition. Only the Michigan fields were under development and these were owned by a number of individual mine owners. By 1890, the copper kings of Butte, Mont., were vying for power. The next decade Arizona with the "Copper Queen" development by Phelps Dodge added its share and by 1910 the Utah and the Nevada Copper Mining Co's. had become leading producers in Utah and Nevada. Control of the industries in the hands of today's leaders (Anaconda, Calumet & Hecla, Kennecott, and Phelps Dodge) was apparent by 1910. The latest figures show these four controlling over three-fourths of the output of the industry with the oldest of these, Calumet & Hecla, a waning power. In order to show more clearly the rise of these companies the data in table 3 are recapitulated for the four leading companies from 1890 to date (1937) in table 4. In 1890 the four companies, Anaconda, Calumet & Hecla, Phelps Dodge, and the Boston & Montana, produced over 75 percent of the total; in 1900, about 65 percent; in 1910 with Anaconda's acquisition of the Boston & Montana, another newcomer, the Utah Copper Mining Co., joined the ranks of the leading four producers, the four companies accounting for only 49.1 percent of the total. This declining degree of concentration was reversed in the boom era of the 20's with the entrance of the Kennecott Corporation in 1915, who had acquired the Utah Co. By 1930 the four leading companies represented 76.6 percent of the total and in 1937 their production represented 82.1 percent of the total. Since decades within themselves may show reversal of trends, the annual production of these four copper giants is given below for 1933-36-37-38.



New Mexico.....						3, 785	52, 160
Chino Copper Co. (later Kennecott)							44, 052
Barro Mountain (later Kennecott)							6, 509
Balance of country.....	175	4, 059	3, 148	10, 798			
Total production.....	1, 456	16, 128	27, 770	60, 480	259, 763	606, 117	1, 209, 061
							1, 394, 389
							1, 669, 322

1 Data taken from "The New International Dictionary," Copper, p. 56.

2 Calumet & Hecla.

3 Anaconda.

4 Phelps Dodge.

5 Kennecott.

Sources: U. S. Geological Survey, Mineral Resources, 1885, 1891, 1901, 1915, 1920, 1930.

TABLE 4.—Leading 4 copper producers by decades, 1890—1937

[Thousands of pounds]

	1890		1900		1910		1920		1930		1937	
	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
Calumet & Hecla.....	59, 868	23. 0	77, 761	12. 8	72, 060	6. 7	131, 552	10. 9	127, 339	9. 1	74, 274	4. 5
Boston & Montana—Daly's	28, 504	11. 0										
Anaconda.....	75, 000	28. 9	235, 000	38. 8	266, 608	24. 7	138, 763	11. 5	304, 922	21. 9	382, 108	22. 9
Utah: Utah Copper Co.					89, 020	8. 2	101, 897	8. 4				
Phelps Dodge.....					76, 429	9. 2	71, 443					
Detroit Copper Mining Co.		12. 7		7. 4								
United Verde (later Phelps Dodge)					23, 046		23, 000	7. 8	821, 041	23. 0	314, 448	18. 8
Kennecott (acquired Utah & Nevada)				6. 6								
Leading four producers	196, 432	75. 6	397, 862	65. 6	527, 163	48. 8	456, 655	43. 6	312, 766	22. 4	598, 734	35. 9
Total production.....	259, 763		606, 117		1, 080, 159		1, 209, 061		1, 066, 088		1, 369, 624	82. 1
									1, 394, 389		1, 669, 322	

1 The Copper Handbook, Stevens, p. 365.

2 The New International Dictionary "Copper", p. 56.

3 No published data—Estimated.

4 Anaconda curtailed production during extensive expansion operations.

TABLE 5.—*Production of copper*

[Thousands of pounds]

	1933		1936		1937		1938	
	Amount	Per- cent of total	Amount	Per- cent of total	Amount	Per- cent of total	Amount	Per- cent of total
Anaconda <sup>1</sup> .....	92,722	20.6	274,578	22.4	382,168	22.8	154,222	13.7
Calumet & Hecla.....	42,818	9.5	73,046	6.0	74,274	4.5	64,884	5.8
Kennecott Copper.....	<sup>2</sup> 136,602	30.2	390,310	32.2	598,734	35.8	339,688	30.2
Phelps Dodge.....	77,592	17.3	252,708	20.8	314,448	18.8	258,044	22.9
<b>Total.....</b>	<b>449,999</b>	<b>77.6</b>	<b>1,222,819</b>	<b>81.4</b>	<b>1,669,362</b>	<b>81.9</b>	<b>1,124,657</b>	<b>72.6</b>

<sup>1</sup> Includes production of "Inspiration" a controlled company.<sup>2</sup> From Minerals Yearbook, 1937. Utah & Nevada Co. combined, p. 64.

Source: The New International Dictionary. Copper, p. 56.

Increasing concentration among the leading producers is noted throughout the period from 1933 to 1937, but a large decrease is shown in the four leaders' proportion in 1938. The Bureau of Mines states that each of the large producers curtailed their operations, shutting down some of their mines. This situation may have been caused by two factors, the decrease in demand in the early part of the year and an unsatisfactory price situation. There is no reason to believe that 1939 will continue the reversed trend, since demand for copper in the markets at home and abroad has been greatly accelerated by armament needs and increased demand at home.

The picture of the copper industry is one of an early stage of scattered individual operation. Gradually through the process of merger and acquisition, certain large companies emerged with three-fourths of the output by 1890. They then lost ground until the early twenties, since which time they (with Kennecott now in the group) have reached new high levels exceeding 80 percent in the hands of four producers.

## THE COTTON TEXTILE INDUSTRY

Although several of the colonial legislatures had encouraged textile manufacture by proclamation of bounties, importation of textile fibers, etc., it was not until the first water frame for spinning was erected in Rhode Island in 1790 by Samuel Slater that the industry gained a foothold in America. Slater, an English counting house clerk, recently arrived in America, persuaded the conservative mercantile partners, Almy & Brown, to set up a mill using machinery closely following the lines of the Arkwright mills in England. Almy & Brown's venture was so successful that before the close of the century numerous small mills had been built making use of similar machinery for water power in Rhode Island, Massachusetts, and Connecticut. By 1810 more than 25 such mills had been started, many of them having been established by former employees of Almy & Brown. Preceding and overlapping the spread of the Arkwright system, many mills employing hand jenny spinning frames had been built. The first of these was started in Philadelphia in 1787, but closed in 1790. In Beverly, Mass., that same year, a mill was opened with horse drawn carding machines and spinning jennies. Exempted from taxation by the State legislature and even subsidized by that body, it still failed to make a profit. Even though larger than Almy & Brown's mill (636 spindles compared with 72) it shut down operations a few years later. Almy & Brown remained the leader in the industry it had launched until after the War of 1812 when a new era was ushered in for the industry.

During the year 1812, 17 new mills were opened, a record number in the industry. During the next 3 years 56 additional ones entered the field.<sup>5</sup> One of these formed the nucleus of a leader in the industry which was to maintain that leadership for many years. This company was the Boston Manufacturing Co. established in 1813 by Francis C. Lowell, a wealthy Boston merchant. This corporation was the first of the modern corporations. It represented the new era of cotton manufacture. The installed capacity of this mill was 3,000 spindles and its paid-in capital \$300,000.<sup>6</sup> This mill, and others following in its wake, performed both the spinning and weaving operations under one roof. Their fabrics were all heavy, plain white cloth, products which came to be called "domestics" to distinguish them from the more favored imported fine goods. The Boston Co. was also the first to employ extensively the distribution system of an agent to dispose of its product. The success of the Boston Co. led its promoters to develop the power on the Merrimac River. This company turned its patents and machinery patterns over to the proprietors of the Locks and Canals at Lowell, a development company which established itself as the first textile machinery company of note, building and financing many mills.

<sup>5</sup> Ware, Caroline F., *The Early New England Cotton Manufacturers*, p. 38.

<sup>6</sup> Kennedy, Stephen J., *Profits and Losses in Textiles*, p. 3.

A study of early corporation records reveals some interesting data on capitalization of cotton textile firms from which it is possible to roughly approximate concentration in the cotton industry for the period ending in 1860. As stated before, the industry was then, as it is today, made up of the large integrated mills and the small single-product mills. In the 1800-60 period, the small mills were, for the most part, engaged in yarn manufacture. A capital of approximately \$1,000 to \$2,000 was required to establish such a spinning mill in 1800.

TABLE 6.—*Relative importance of leading cotton textile producers, 1800-60*

Year	Number of producers	Capital invested	Leading 4 companies <sup>1</sup>	Percent of total
1800 <sup>2</sup> .....	8	\$ 200,000	\$ 180,000	90.0
1810 <sup>2</sup> .....	60	2,361,000	610,000	25.0
1820.....	236	8,892,368	1,201,988	13.5
1830.....	795	40,614,984	6,100,000	15.0
1840.....	1,240	751,102,000	6,850,000	13.2
1850.....	1,074	776,033,006	8,800,000	11.6
1860.....	1,091	798,585,000	9,800,000	10.0

<sup>1</sup> 1800: Slater Mills in Rhode Island, Beverly Mills in Massachusetts, Almy & Brown, and Warwick Mill. 1810: Cambridge, Fitchburg, Norfolk Mills, Slater Mills. 1820: Boston Manufacturing Co., Slater Mills, Ipswich Mills, Devine's Factories. 1830: Cochecho Mills, Merrimac Co., Hamilton Co., and Appleton Mills. 1840: Cochecho Mills, Lawrence Mills, Fulton Mills, Massachusetts Mills. 1850: Amoskeag, Merrimac, Massachusetts, Lawrence. 1860: Amoskeag, Merrimac, Pacific, Massachusetts.

<sup>2</sup> Clark, Victor S., *History of Manufactures in the United States*, p. 635.

<sup>3</sup> Ware, Caroline F. *The Early New England Cotton Manufactures*, "A" balance estimated at \$1,500 per mill.

<sup>4</sup> Estimated.

<sup>5</sup> Census of 1810—*Special Digest of Manufactures*.

<sup>6</sup> Bishop, J. Leander, *History of American Manufactures, 1608-1860*, vol. II, p. 357.

<sup>7</sup> Census of Manufactures, 1840-1850-1860.

The period from 1815 to 1840 represented the "boom era" of expansion in the cotton textile industry. It was then that "the corporations" arose, giving birth to the corporate form as we know it today and also providing a target from that day to this for "anti-monopoly" reforms. The formation in the 1820's of the Merrimac, Hamilton and the Appleton and Lowell companies was hailed as a mark of noteworthy achievement of American industry. They were regarded as gigantic in their day with a capital investment of over \$1,000,000 each. They successfully demonstrated mass production and the mill cities which sprung up around their factories were pointed to with pride by Americans everywhere. Lowell and Lawrence, Mass., and Dover, N. H., represent such towns. The statistics shown above confirm the statements of historians of the period that the formation of these corporations and their share in the industry did not monopolize the progress of the industry. The largest four companies' capitalization increased more than fivefold between 1820 and 1840 but the industry's total capitalization increased more than twentyfold.

The distress to New England manufactures immediately following the War of 1812 drove two or three colonies of spinners to the South where they established mills in South Carolina. Kentucky fostered a few mills utilizing Tennessee and Alabama cotton which the tributaries of the Ohio River carried to their accessible market. Encouraged by the success of their northern competitors, southern merchants financed the southern mills and followed the methods introduced 20 years earlier in New England. One of these in Granitesville, S. C., financed by Charleston merchants, started operation in 1846 with

9,000 spindles and 300 looms and marks the beginning of modern textile manufacture in the South. Even with this forward movement, by 1860 over half the southern cotton manufacture was yarn.

TABLE 7.—4 leading companies in cotton manufactures, 1899<sup>1</sup>

Name of company	Total capitalization	Percent of total
American Thread Co.....	\$12,000,000	2.6
New England Cotton Yarn Co.....	11,500,000	2.2
Mount Vernon-Woodberry Cotton Duck Co.....	9,500,000	2.0
Knight Mills <sup>2</sup> .....	8,500,000	1.9
Total, 4 companies.....	41,500,000	8.7
Total industry.....	467,240,157	-----

<sup>1</sup> Moody's Manual, 1900.

<sup>2</sup> The Knight Mills were a family owned group and no data on capitalization were published. They contained 533,347 spindles which have been estimated at \$16 per spindle, the sale price to the Consolidated Textile Corporation in 1920. (See Kennedy, S. J. "Profit and Loss in Textiles", p. 48.)

The war and reconstruction period from 1860 to 1880 was a serious deterrent to expansion of the southern textile industry. The International Cotton Exposition in Atlanta in 1881 stimulated active promotion of this industry. Coupled with the natural advantages of the South, this focusing of attention upon the possibilities resulted in the increased spindle capacity there from 561,000 in 1880 to 1,570,000 in 1890. The introduction of the Sawyer ring spindle in 1871 and the Rabbett double spinning ring spindle gave decided advantage to the new mills constructed after that date, due to the increased productivity of mills equipped with this type of machinery.

However, by the end of the century competition from the South had not forced any of the northern leaders from their prominence. In 1899, the four leaders in the industry accounted for 7.6 percent of the total capitalization of the cotton manufactures industry. The detail of this is shown below.

A comparison of this and the capitalization data for the 1800-1860 period indicates a continuation of the decline in the proportion of total capitalization contributed by the leading producers.

The cotton manufactures industry did not escape the wave of consolidation which swept over the country in the nineties. The above table reflects this in the three leading corporations' inclusion. The largest, American Thread Co., represented a consolidation in 1898 of the leading spool, crochet, knitting, mending, and other cotton mills of the country. Fourteen mills were included in this consolidation which was financed largely by British interests. Likewise the New England Yarn Co. was a merger of 11 yarn mills in Massachusetts operating about 580,000 spindles.

Over 90 percent of the manufacture of cotton duck was represented in the formation of the Mount Vernon-Woodberry Cotton Duck Co. in 1899. The subsequent failure of these two last named corporations, doubtless, discouraged further mergers in the industry for the next 20 years.

It was not until the post-war period that another movement toward consolidation occurred. The flush condition of the capital markets at the close of the war, together with the later precarious earning situation of old textile manufacturing companies, necessitated reorganization of their financial structure; unsatisfactory conditions in the method of obtaining working capital, that of receiving cash

advances from the commission merchants, influenced many mills to refinance their companies in order to obtain their own working capital. Altogether 43 mergers were effected between 1918 and the present. Some of these mergers are reflected in table 8 showing the leading 4 companies' proportion of total capitalization in 1920.

TABLE 8.—4 leading companies in cotton manufactures, 1920

Name of company	Spindles	Total capitalization	Percent of total
Pacific Mills <sup>1</sup> .....	529,952	\$46,520,734	2.4
Consolidated Textile <sup>2</sup> .....	731,021	43,855,044	2.3
Amoskeag Manufacturing Co. <sup>3</sup> .....	660,000	40,163,531	2.1
Lockwood-Green & Co. <sup>2</sup> .....	362,000	23,243,400	1.2
Total, 4 companies.....		153,782,709	8.0
Total industry <sup>3</sup> .....		1,914,919,506	100.0

<sup>1</sup> Moody's Manual, 1920, p. 1311.

<sup>2</sup> Kennedy, S. J., Profits and Losses in Textiles, p. 53 (Consolidation of 10 textile companies in summer of 1920).

<sup>3</sup> Census of Manufactures, 1920, vol. X, p. 158.

Comparison of the percentage represented by the leading four companies in 1900 and 1920 shows a slight decline in their total share of the industry, from 8.7 to 8 percent of total capitalization. During these two decades, new leaders replaced the old, both in capacity and capitalization. The leader in 1920, Pacific Mills, had purchased the Atlantic Cotton Mills in 1913; in 1915 the print business of the one-time leader, Merrimac Manufacturing Co., was acquired; and in 1916 the four mills of the Hampton Cotton Mills in South Carolina were purchased. Subsequent expansion of the latter mills aided Pacific's rise to first place in the industry. The Consolidated Textile Co. was formed in the fall of 1919 and represented the consolidation of three cotton textile corporations. In 1920 it acquired the Lynchburg Cotton Mills Co., the Pelham mills in Georgia, the Windsor Print Works, Massachusetts, Bosham Cotton Mills, Texas, Henderson Mills, Kentucky, the Union Cotton Mills of Georgia and the Knight Mills of New England, one of the largest cotton manufacturing companies in the country. The Lockwood-Green Co. was a textile engineering enterprise which had carried on the building of most of the new mills in the first decade of the twentieth century. In 1913 it took over the management of the International Cotton Mills, the successor to the Mount Vernon-Woodberry combination. In 1916 it acquired the mills of the Parker Cotton Mills Co., the largest group of southern mills. After the War this company undertook considerable expansion of its mills and through several reorganizations reached the top group of textile manufactures.

TABLE 9.—4 leading companies in cotton manufactures, 1930 <sup>1</sup>

Name of company	Spindles	Percent of total	Total capitalization	Percent of total
Pacific Mills.....	548,060	1.7	\$63,432,768	4.7
Cannon Mills.....	433,960	1.4	34,433,038	2.6
Amoskeag Manufacturing Co.....	800,000	2.6	28,155,494	2.1
Berkshire Fine Spinning Association.....	876,656	2.8	20,885,725	1.6
Total, 4 companies.....	2,658,676	8.5	146,896,015	11.0
Total industry <sup>2</sup> .....	31,255,000	100.0	1,331,000,000	100.0

<sup>1</sup> Moody's Manual, 1930.<sup>2</sup> Kennedy, S. J., Profits and Losses in Textiles, p. 12.

It will be noted that the total spindles of the four leading companies account for a little more than 6 percent of the total installed capacity for the industry, a lower ratio than that for their capitalization. Two factors account for this difference. One is that those companies are all integrated companies, performing the spinning, weaving and finishing processes, while many of the smaller textile companies perform only one of these functions. The second is that the Pacific Mills and Amoskeag engage in worsted manufacture and thus reflect that activity in their capitalization data.

By 1930 the capitalization concentration in the four companies had altered again. Table 9 depicts this change.

These figures reflect the fact that the textile companies took advantage of the 1920's to float security issues through financial houses, to cover fixed assets as well as provide working capital. The years immediately following the war were exceptionally prosperous ones for textile manufactures and capital was readily secured. Two large mergers optimistically undertaken in this period had been liquidated in the latter part of the period when over-expansion took its toll, namely Lockwood-Green and the Consolidated Textile Corporations. This wave of liquidation which set in about 1925 is reflected in the decreased capitalization of the industry between 1920 and 1930 from nearly two billion dollars to one and one-third billion dollars. Aggressive, more conservatively financed corporations either maintained or strengthened their position. Cannon Mills and the Berkshire Fine Spinning Associates appeared as leaders for the first time in 1930.

TABLE 10.—4 leading companies in cotton manufactures, 1937

Name of company	Spindles <sup>1</sup>	Percent of total	Total capitalization <sup>2</sup>	Percent of total
Pacific Mills.....	389,032	1.4	\$44,274,000	4.0
Cannon Mills.....	452,740	1.6	40,131,000	3.6
Pepperell Manufacturing Co.....	227,000	.8	24,012,000	2.2
Bibb Manufacturing.....	313,672	1.1	25,301,471	2.3
Total 4 companies.....	1,816,772	4.9	127,387,000	12.1
Total industry.....	27,676,805	<sup>2</sup> 100.0	<sup>3</sup> 1,107,040,000	100.0

<sup>1</sup> Moody's Manual, 1939.<sup>2</sup> Census of Manufactures, Cotton Manufactures, 1937.<sup>3</sup> Estimated at \$40 per spindle (1930, \$43).

The latest available data showing concentration by spindle capacity and capitalization among leading companies are presented in table 10.

Concentration as shown by the above capitalization figures has increased since 1930 but has declined when measured by spindle capacity (8.5 percent in 1930, 4.9 percent in 1937). These leading companies as measured by capitalization are not the same when spindle capacity is used to measure concentration. The Berkshire Fine Spinning Associates, for example, report 748,000 spindles but only \$16,970,000 capitalization.

The cotton textile industry as defined by the Census Bureau includes over 90 products representing a great diversity in type, use, and fabrication. None of the companies included in the industry engage in the production of all of them. In fact, most companies specialize in a few closely related products. Therefore, all of the figures on concentration greatly understate concentration in the industry when compared with concentration of production by leading 4 companies for individual products. For example, there are 1,237 establishments classified in the industry. The product showing the greatest value for 1937, as reported in the Census of Manufactures, was "plain print cloth, 36 inches and wider." There were 93 companies with 113 establishments producing this item. Of these, the 4 leading companies accounted for 22.3 percent of the total value produced (\$117,955,528). The next product of largest value was sheetings produced by 93 companies with 120 establishments of which 19.1 percent of the total value was produced by the 4 leading companies. This latter percentage represents the lowest degree of concentration among the leading 4 companies of any of the ninety-odd products included in the industry.

The record of over a century shows no period of considerable concentration. Changes have taken place among the leaders, but the leading four have seldom exceeded 10 percent of the industry's total.

## THE IRON AND STEEL INDUSTRY

The first iron-works known to exist in America were located along the James River in Virginia in the early days of that colony. Indians demolished these works in 1622 and iron manufactures were not attempted there again for many years. A charter for iron-works was given by the colonial government of Massachusetts in 1646. This company was capitalized at about \$5,000 (later increased to about \$10,000) and granted a monopoly in iron manufacture for a period of 21 years. The company established works at Lynn and Braintree which had a total capacity of 8 tons per week. These works continued in operation for over a hundred years.<sup>7</sup> Records of the colony indicate the operation of 5 iron-works in 1673.

In 1731, according to returns made to the Board of Trade, there were 19 forges or bloomeries for bar-iron, 1 slitting mill and 1 nail factory in New England. In 1750 Parliament prohibited the erection of any slitting and rolling mills. All of the colonial governments subsidized iron manufactures either by bounty or tax exemption. At the close of the Revolution iron bloomeries, forges and furnaces existed in all the colonies, supplying the local population with material for tools, nails, agricultural implements, household utensils, etc. Meanwhile factories for the manufacture of munitions, carriages, textile machinery and other iron manufactures had established various branches of iron and steel production in this country. By 1830 there were 202 iron furnaces in the United States which produced 137,075 tons of pig iron and 18,273 tons of castings.<sup>8</sup>

Technical changes in iron manufactures introduced in the 1830's and the growth of railroads permitted the iron and steel industry to change from a small unit, local industry into a large-scale activity. The use of coal as fuel, instead of charcoal and puddling operations, greatly increased productivity. The Great Western Iron Co. later known as Brady's Bend Works typified this new type of large-scale operation. Its capital was \$1,000,000 and it produced annually between 10,000 and 15,000 tons of rails. The Phoenix Iron Works, the Cambria Iron Works, the Thomas Iron Works and the Lackawanna Iron & Coal Co. all competed on fairly equal terms in the pre-Civil War period. In 1860 the production of iron exceeded 1,000,000 tons, a twentyfold increase in 50 years compared with a fourfold increase in population. Rolling mills which utilized part of the product of the bloomeries (now called blast furnaces) numbered 256 in 1860, producing 500,000 tons in that year.

<sup>7</sup> Other important colonial iron works were the Principio Co. in Maryland, Baron Steigel's in Pennsylvania and Hasenclever's in New York. (Clark, V. S. History of Manufactures in United States, vol. I, p. 147.)

<sup>8</sup> Bishop, J. L. History of Manufactures, p. 346.

TABLE 11.—*Lading producers in the iron and steel industry, 1880-1938*

Name of company	BLAST FURNACE CAPACITY				ROLLING MILL CAPACITY			
	1880		1892		1901		1908	
	Tons	Percent of total	Tons	Percent of total	Tons	Percent of total	Tons	Percent of total
Cambria Iron Co.	179,000	3.3	380,000	2.3	650,000	2.6	1,300,000	3.7
Lackawanna Iron & Steel Co.	150,000	2.8						
Edgar Thomson Steel Co. <sup>2</sup>	120,000	2.2						
Bethlehem.	95,000	1.7	1,350,000	8.3				
Illinois Steel <sup>3</sup>			850,000	6.2				
Carnegie Bros. <sup>3</sup>			400,000	2.5				
Maryland Steel					8,210,000	33.1	15,069,000	43.3
United States Steel.					1,250,000	3.0	3,110,000	3.3
Tennessee Coal & Iron.					890,000	3.6	1,055,000	3.0
Jones & Laughlin.								
Total, 4 companies.	544,000	10.0	2,980,000	18.3	11,000,000	44.3	18,610,000	53.3
Total industry.	5,439,230	100.0	16,296,793	100.0	24,812,037	100.0	34,833,900	100.0

Name of company	1880		1892		1901		1908		1920		1930		1938	
	Tons of ingots	Percent of total	Tons of ingots	Percent of total	Tons of ingots	Percent of total	Tons of ingots	Percent of total	Tons of ingots	Percent of total	Tons of ingots	Percent of total	Tons of ingots	Percent of total
	Lackawanna Iron & Steel.	298,500	7.1	1,065,000	9.0	1,335,000	6.3	1,345,000	4.0					
Albana & Rensselaer Iron & Steel Co.	285,000	6.8												
Edgar Thomson Steel Co. <sup>2</sup>	247,500	5.9												
Joliet Steel Co. <sup>4</sup>	210,000	5.0												
Carnegie Bros. <sup>3</sup>	1,195,000	10.1							3,409,100	6.3	9,430,000	14.2	10,042,000	14.4
Bethlehem.	560,000	4.7												
Carnegie Phipps Co. <sup>3</sup>	515,000	4.4												
United States Steel.					10,020,000	47.2	17,134,000	50.9	21,535,100	40.1	26,778,000	40.5	25,790,000	35.5
Republic.					825,000	3.9	1,245,000	3.7			4,806,000	7.3	6,500,000	9.0
Cambria.					757,000	3.6	1,425,000	4.2						
Jones & Laughlin.									2,840,000	5.3	3,420,000	5.2	3,671,000	5.1
Youngstown.									1,500,000	2.8				
Total, 4 companies.	1,041,000	24.8	3,335,000	28.2	12,937,000	61.0	21,149,000	62.8	29,284,200	54.5	44,434,000	67.2	46,003,000	64.0
Total industry.	4,189,760	100.0	11,831,294	100.0	21,227,750	100.0	33,642,000	100.0	53,735,180	100.0	66,195,270	100.0	72,533,969	100.0

<sup>1</sup> Later Bethlehem.<sup>2</sup> Later Carnegie.<sup>3</sup> Later United States Steel.<sup>4</sup> Later Illinois Steel (sub. of United States Steel).

Source: Iron and Steel Directory 1880, 1892, 1901, 1908, 1938; Fraser &amp; Dornier Analyzing Our Industries, p. 263, 1920 and 1930.

The introduction of the Bessemer process for making steel occurred in 1863. The next 10 years witnessed the rise of the following companies as important steel producers: The Pennsylvania Steel Co., the Cambria Iron Works (reorganized in 1862 with \$1,500,000 capital and 60,000 to 70,000 ton capacity), Bethlehem Steel Co., the Carnegie Steel Co. and the Thomson Steel Co.

The concentration trend since 1880 in the iron and steel industry is shown by the data in table 11 on capacity of blast furnaces and rolling mills compiled from records of the American Iron & Steel Institute.

This table shows the jump in concentration; due to the dominant position held by the United States Steel Corporation from the date of its formation in 1901. At that time it owned practically all the capital stock of the following companies: Federal Steel Co. (Illinois Steel), National Tube Co., American Steel & Wire Co., National Steel Co., American Tin Plate Co., American Steel Hoop Co., American Sheet Steel Co., American Bridge Co., Lake Superior Consolidated Mines Co., Shelby Steel Tube Co. and the Carnegie Co. In 1902 it purchased the Union Steel Co. and in 1904, the Clairton Steel Co. In 1906 another subsidiary, the Indiana Steel Co., was formed to construct the large plant at Gary, Ind. The next year the Tennessee Coal Iron & Railroad Co. was purchased. Through these holdings, the United States Steel became a fully integrated company, owning the mines to furnish coal and iron, the railroads to transport materials, blast furnaces, rolling mills, and steel construction companies to fabricate the finished products.

Later mergers by other members of the industry failed to approach the vastness of the United States Steel's domain. In 1903 the present Bethlehem Steel Corporation was founded. Its purchase of another large company, the Lackawanna Steel Co., brought Bethlehem to second rank in the industry. In 1930 another merger of four companies under the name of Republic, changed the personnel of the leading four companies.

United States Steel's proportion of steel ingot capacity reached its peak in 1908, when it included more than half the industry's capacity. It dropped to 40.1 in 1920, held at that level for the next decade and has further declined to 35.5 in 1938. In the meantime, the next three companies, who totaled only 11.9 percent in 1908, increased to 14.4 percent in 1920, 26.7 percent in 1930 and 28.5 in 1938.

## THE PETROLEUM INDUSTRY

In 1857 the first operations were begun to drill for oil at Titusville, Pa. The Pennsylvania Rock Oil Co. began to produce oil in 1859 after having sunk a well 71 feet deep. Its success drew others into oil prospecting and by 1860 the census reports 78 establishments refining crude petroleum.<sup>9</sup> Nearly one-half billion barrels of oil were produced in 1861. The rush of prospectors to the Pennsylvania area and the drilling of wells there soon led to chaotic conditions. Barrels could not be manufactured fast enough to meet the demand. Many small enterprises were forced to cease operations. The "boom" led to overproduction and a sharp drop in prices to 15 cents a barrel—a price way under the cost of production. With the elimination of many small competitors, prices rose fantastically—to \$9.59 a barrel in 1860. Again a glutted market and in 1862 prices dropped to 49 cents a barrel.

The small refining company of Rockefeller, Andrews & Flagler, of Cleveland, Ohio, saw that such chaotic conditions could only bring losses to all oil enterprises. In 1870 the Standard Oil Co. was formed with a capitalization of \$1,000,000. This company represented the consolidation of numerous small refining companies around Cleveland. By 1879 through acquisition of competitor companies, the Standard interests were refining 90 percent of the crude oil produced, controlled 80 percent of the pipe line transportation service and dominated the marketing of petroleum products.<sup>10</sup> Its capitalization had been increased to \$3,000,000. Many of the refineries acquired by Standard which were poorly located or equipped were dismantled. This reduction in number of producing units is reflected in the census figures for 1870 and 1880. Establishments in the latter year numbered 86 compared with 170 in 1870. Production of crude petroleum during the same period increased from 19,914,146 barrels to 35,163,513 barrels.<sup>11</sup> Value of products increased from nearly \$27,000,000 to nearly \$44,000,000.

TABLE 12.—*Total assets of oil companies*

[Millions]

Name of company	1919	1938
Standard, New Jersey.....	\$853	\$2,045
Standard, New York (later Socony).....	299	919
Texas Corporation.....	261	605
Gulf Oil.....	218	.....
Standard of Indiana.....	.....	724
Largest 4 companies.....	1,631	4,293
Percent of total.....	31.6	34.2
Total assets.....	\$5,179	\$12,500

<sup>1</sup> Aggregate of total assets of all oil companies listed in Moody's manual for 1920; largest 4 selected from this.

<sup>2</sup> Temporary National Economic Committee hearings of Sept. 30, 1939, p. 345.

<sup>9</sup> Census of Manufactures, 1860.

<sup>10</sup> Encyclopedia of Social Sciences—Oil, p. 446.

<sup>11</sup> U. S. Geological Survey, Mineral Resources, 1882.

In 1882 the Standard Trust was created representing a virtual monopoly in the purchase, transportation, refining and marketing of oil and its products. This monopoly was maintained principally through secret rebates granted on Standard products by the railroads. Competitors' activities were closely watched, price-cutting was resorted to, and even bogus independent companies were set up. The United Pipe Lines, a Standard subsidiary, had been formed in 1877 and controlled practically all the oil transportation facilities of the United States. In 1892 the capitalization of the Standard Oil Co. amounted to \$10,000,000 and 8 years later had been increased to \$110,000,000. The Census of Manufactures for the year 1899 reports capital investment of \$95,327,892 in the petroleum refining industry. Standard's holdings represented investment in pipe lines as well as refineries.

Standard's monopolistic position in the industry was challenged in 1906 after an exhaustive investigation by the Bureau of Corporations. The company was indicted under the anti-trust laws but, because of time consumed in appeals through the lower courts, it was not until 1911 that the Standard company was ordered dissolved by the Supreme Court. Each of the constituent companies was to continue operations without unified control. This dissolution did not immediately affect the competitive situation since there still existed a community of interest through stock-ownership in the old Standard companies. An analyst of the industry stated "Subsequent to the dissolution, the integration (of ownership) was maintained for more than a decade by an undisturbed community of interest, the dissolved companies continuing to perform their former specialized functions."<sup>12</sup> The court order, however, did provide a frame by which competition could develop, and gradually new capital flowed into the independent concerns. In the 1896-1906 period the Standard Oil Co. controlled 85 to 90 percent of the total refined products, but in 1926 eleven of the old Standard companies and their affiliates marketed 44.8 percent of the total production.<sup>13</sup>

TABLE 13.—Activity of leading companies, 1926-38

	Crude runs to stills <sup>1</sup>		Production of gasoline <sup>2</sup>	
	4 companies	20 companies	4 companies	20 companies
1926		71.2		71.3
1929	37.1		38.0	
1931	36.1	81.4	34.8	82.6
1933	37.1		34.2	
1935	36.4	82.3	33.3	84.1
1936	36.7	82.6	32.6	83.4
1937	36.2	82.6	32.2	83.8
1938	35.5		34.0	

<sup>1</sup> Includes imported crude oil.

<sup>2</sup> Includes blended natural gasoline.

Source: Derived from data in Temporary National Economic Committee Hearings, XIV-A, pp. 7735, 7800, 7803.

<sup>12</sup> Encyclopedia of Social Sciences, p. 448.

<sup>13</sup> Ibid.

TABLE 14.—*Gasoline production of leading companies, 1929, 1932, and 1938*

	Percent of total		
	3 largest	5 largest	10 largest
1929.....	26.8	40.7	59.2
1932.....	24.8	39.5	58.7
1938.....	23.7	35.8	55.2

A comparison of concentration at the beginning of the post-war period (1919) and the present (1938) is afforded by data on total assets of the four leading companies and the total assets of the industry shown in table 12.

The oil industry is composed of large companies whose activities cover the production of crude petroleum, the transportation by pipe line of the crude oil to the refinery, the refining of the oil and manufacture into various products, and the marketing of the refined products. Smaller non-integrated companies may engage in any one of these activities. Thus measurements of concentration are deceiving for the "oil industry" which embraces in its scope such a vast scale of operations from the crude oil well to the automobile driver's gas-station service.

The situation in recent years is shown by the data concerning crude runs to stills and gasoline production. The leading four companies have shown a decline in their position presented in tables 13 and 14. The major gains have been made by the companies below the leaders.

The same picture is painted by a leader of the industry, Robert E. Wilson, president of the Pan American Petroleum & Transport Co., in material presented to the T. N. E. C. (See Hearings XV, p. 8665).

It will be noted that the five largest have lost position, while the second five have gained slightly, and the rest of the industry has gained even more. All these measures fall far below the dominance obtained by the Standard Oil Co. prior to 1911.

## THE RAYON YARN INDUSTRY

The rayon yarn industry was introduced in America in 1910 with the establishment of the Viscose Co. of America, today's largest rayon producer in the world. Production in 1911, which was entirely that of the Viscose Co., was 300,000 pounds; by 1937 the annual production was 322,000,000 pounds—an increase of a thousand-fold in little more than a quarter of a century. The sharpest increase in production came in the 1920's when it increased from 8,000,000 pounds in 1920 to 123,000,000 pounds in 1929. This is the era when seven of today's leaders entered the field of rayon yarn production.

With such a rapid and profitable growth it is no wonder that aggressive competitors entered the field each year. With demand outstripping production and fast-moving technology, such fertile markets would ordinarily encourage new enterprises. In the first years, however, the process by which this synthetic fiber was made was zealously guarded by the Viscose Co. Until 1918 its supremacy went unchallenged. At that time the Celanese Corporation entered the arena with a competing fiber made by a different process. Meanwhile the leader in the chemical industries, the E. I. du Pont de Nemours Corporation had been investing money in research to produce an artificial fiber from cotton linters. In 1920, with demand for one of its principal products, munitions, at low ebb, it converted its Hopewell, Va., plant into a rayon yarn establishment, since the same raw material and some of its equipment there could be utilized in rayon yarn production. The du Pont Rayon Corporation, now a department of the parent corporation, was soon producing rayon yarn in such quantities as to take second place in that production. Also, in 1920, the French-owned enterprise Tubize Artificial Silk Co. entered the field. In 1930 it merged with the American Chatillon Corporation to form the Tubize Chatillon Corporation. In 1920, also, the Eastman Kodak Co. began production of rayon yarns in their Tennessee methyl alcohol and acetose plant.

TABLE 15.—Installed capacity of rayon yarn producers, 1933, 1935, and 1938  
[Millions of pounds]

Name of company	1933		1935		1938	
	Amount	Percent of total	Amount	Percent of total	Amount	Percent of total
American Viscose.....	77.0	32.8	95.0	34.8	126.7	33.8
Dupont Rayon.....	37.2	15.9	47.4	17.6	147.4	12.4
Celanese Corporation.....	22.0	9.5	35.0	12.8	37.0	9.7
North American.....	17.3	7.4	20.0	7.3	24.5	6.4
Industrial Rayon.....	16.7	7.2	16.7	6.1	32.0	8.3
American Enka.....	15.0	6.4	12.5	4.6	29.6	7.7
Tubize-Chatells.....	16.3	7.0	10.0	3.7	20.0	5.2
Tennessee-Eastman.....	5.5	2.4	10.0	3.7	24.0	6.3
American Bemberg.....	7.9	3.4	7.9	2.9	10.0	2.6
Balance of industry.....	18.5	-----	18.8	-----	30.8	7.6
<b>Total.....</b>	<b>233.4</b>	<b>100.0</b>	<b>273.3</b>	<b>100.0</b>	<b>382.0</b>	<b>100.0</b>

<sup>1</sup> Estimated. Trade papers showed no new capacity installed; Celanese now enlarging plants.

Source: Rayon and Synthetic Yarn Handbook, 1934 to 1938.

In 1925 two more corporations entered the field, the Industrial Rayon Corporation, which took over Industrial Fiber Co. (1920) and the American Bemberg Corporation, a German-owned company with exclusive right to use the Bemberg process. In 1927 another foreign-owned corporation began operations, the American Glantzstoff

Corporation, since 1934 known as the North American Rayon Corporation. In 1928 a Dutch company, American Enka Corporation, was established near Asheville, N. C. In 1938 those companies employed about 78 percent of the total employees of the industry and operated 21 of the 33 plants producing yarn, according to trade reports. The last year for which concentration can be adequately measured is 1935, when Dupont still operated the Dupont Rayon Corporation as a separate entity. After that it became one of the departments of the parent corporation with its operating data merged with the Dupont Corporation reports. Table 15 shows installed capacity for 1933, 1935, and 1937, for the 9 largest rayon yarn producers.

These figures, of course, represent what each company could handle in the way of production, not the actual production. Rayon yarn production in 1938 approximated that of 1935 (1938 was 257.6 million pounds and 1935, 257.5 million pounds), while installed capacity increased by 110 million pounds or 40.2 percent between 1935 and 1938. Some of those companies which increased their capacity during this period may have failed to utilize their capacity in the same proportion as their competitors. According to these figures, the leading four companies accounted for 65.6 percent of capacity in 1933, 72.5 percent in 1935, and only 59.3 percent in 1938. That capacity and production were equally indicative of the relative importance of leading companies in 1935, is substantiated by a compilation of the National Resources Committee from 1935 Census of Manufactures data showing concentration in manufacturing industries. The largest four producers accounted for \$137,520,000 or 74.3 percent of the total value of products for the rayon yarn industry and the largest eight producers accounted for \$167,006,000 or 90.2 percent of the total.<sup>14</sup> In value of products, the leading four producers accounted for 74.3 percent of the total, according to the National Resources Committee study, and 72.5 percent of installed capacity, according to the Rayon and Synthetic Yarn Handbook, 1936. The largest 8 producers represented 90.6 percent of capacity and 90.2 percent of the value of the product, according to the same sources.

If this industry responds in the same fashion as similarly rapid-growing industries have done, whose history in America is older than this recent one, the leaders will continue to receive a smaller share of the market as new competitors are brought into the field by promise of profits now being enjoyed by a popular-product industry.

The data herein presented on concentration fail to measure the competitive advantages enjoyed by those manufacturers who have integrated their operations into the fabrication field. Tubize Chatillon and Industrial Rayon operate their own knitting mills and thus extend their operations over two levels of production. Thus, they enhance their competitive position in that they supply their own raw materials for their weaving mills as well as compete with other rayon yarn producers for other mills' business. Both of these companies entered the knitting field in order to insure a market for their products, demonstrate the best way to utilize them, and detect flaws in them with a view to improvement. The Celanese Corporation weaves and knits some of its own yarn and makes some finished consumer goods such as men's bathing suits and underwear. The two leaders in the industry, Viscose and Dupont, have retained their position by seniority and a successful brand-promotion campaign among their consumers' customers.

<sup>14</sup> National Resources Committee, *Structure of the American Economy, 1939*, pp. 240-241.

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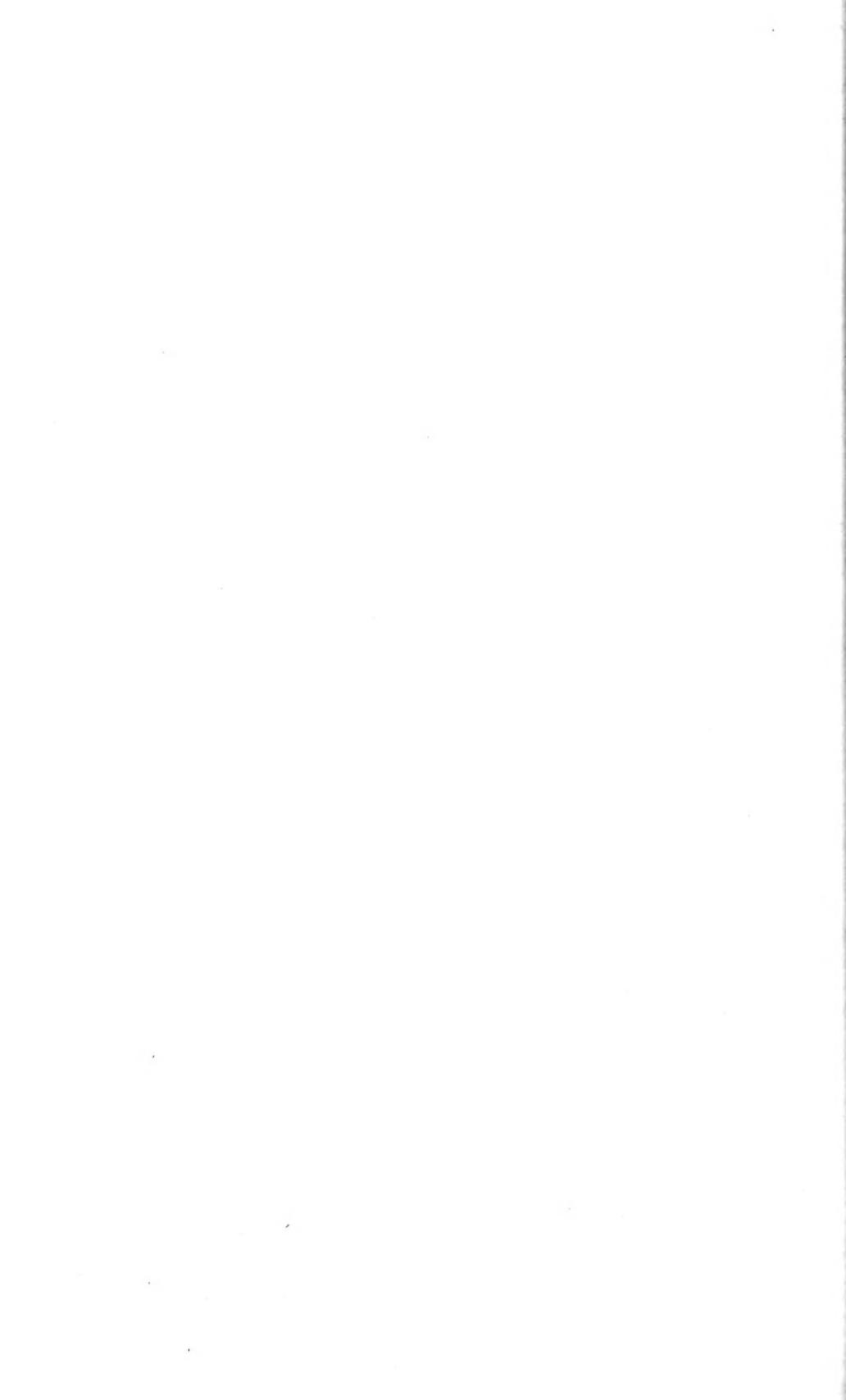
PART V

**THE CONCENTRATION OF PRODUCTION  
IN MANUFACTURING**

BY

**WALTER F. CROWDER**

**ASSISTED BY GENEVIEVE BECKWITH WIMSATT**



# THE CONCENTRATION OF PRODUCTION IN MANUFACTURING

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# THE CONCENTRATION OF PRODUCTION IN MANUFACTURING <sup>1</sup>

## CHAPTER I

### EXTENT AND AREAS OF CONCENTRATION

The investigation of the concentration of economic power may be approached from many angles. It is the purpose of the present study to supply information bearing on the following questions relative to the concentration of economic power in the production of manufactured commodities, and to point out some of the possible economic implications which may be drawn from the material that has been brought together.

To what extent do a few firms control the supply of various manufactured products? How common is the situation in which a single concern is a leader in the production of a number of separate products? In what lines of activity is the control of output most concentrated? What is the effect of high or low concentration on output and prices of manufactured products in periods of recession and recovery? With what factors in the production and distribution, or with what factors in the intrinsic nature of the product itself, may concentration be related? What is the effect of concentration in the production of manufactured products on various consuming groups and on the functioning of the economy?

The subject materials of this study are *products*, as distinguished in the Census of Manufactures for 1937. Earlier studies have analyzed the concentration of production for census industries, but, in an investigation of the workings of a price economy, data on concentration in terms of products obviously afford a more significant framework for analysis. The product concept approaches more closely that of the economic commodity as employed in the usual type of economic analysis. It is important, however, to realize that there are certain differences between census products and economic commodities.

The thousands of physical commodities produced by our industries and listed separately in the Census of Manufactures as products differ among themselves with respect to physical characteristics, although frequently the differences are very slight. Physical differences between two census products are in some cases, indeed, so slight as to make it doubtful that the products are significantly different in an economic sense, one being so easily substituted for the other as to render them functionally homogeneous for all important valuation decisions. Just when a gap in substitutability exists sufficient to

<sup>1</sup> Acknowledgment is due Mrs. Esther W. Staudt, who supervised the editing of the appendixes, and Miss K. Celeste Stokes, who reviewed the manuscript. Mrs. Martha H. Porter and Mr. Arnold S. Skinner classified the products on the basis of their various economic characteristics. At the preliminary planning stage of the study, Prof. Paul O'Leary and Grace W. Knott made many helpful suggestions. Acknowledgment is also due the Division of Manufactures, Bureau of the Census, for the cooperation given in making the data for this report available. Appreciation is especially due Mr. John F. Daly, Assistant Chief of the Division of Manufactures, for many suggestions and for his generous assistance in checking the basic data to avoid disclosures.

warrant saying that two different physical things are economically different products it is impossible to say. In general, however, one is warranted in assuming that census product differentiations do reflect in-varying degrees significant economic functional differences, since they represent largely the cumulative result of suggestions and requests made through the years by manufacturers and their trade associations. (For further discussion of a census product, see appendix A, p. 413.)

A cross-section sample consisting of 1,807 products was analyzed. This sample was selected in such a manner that it presents a comprehensive over-all picture of the situation existing in the entire manufacturing segment of the economy. The products analyzed account for slightly less than one-half of the total number of census products and cover more than one-half of the total value of all manufactured products. Furthermore, the sample covers all the products listed in 117 census industries (with only minor omissions) and these industries were selected from all industry groups, except the printing and publishing group. Thus the sample is made up of products representing different types of manufacturing processes, different degrees of fabrication, different raw materials, different degrees of durability, and different types of buyers. The list includes products which are sold under different marketing conditions, and products which are destined for different uses. It covers consumers' as well as producers' goods, and such diverse items as food, clothing, structural steel, cigarettes, electric motors, heavy duty lathes, construction materials, and writing paper—to list only a few of the products. The products are thus so diverse and the sample so comprehensive that the generalizations which are made on the basis of these analyzed products may logically be assumed to obtain within very narrow limits for all manufactured products.<sup>2</sup>

The concentration in the production of each of these products is expressed as a proportion (percentage) of the United States total value of each product accounted for by the output of the leading four producers of that product. This measure of the concentration in the production of census products is called herein the concentration ratio for the individual product. For some products the actual ratio could not be shown as it would disclose confidential census data, but for the purpose of this study this limitation on the publication of the data is not particularly serious. It is sufficient here to know that the production of the commodity was concentrated in so few hands that publication of the data would violate the law which prohibits the Bureau of the Census from publishing any statistics that might disclose data reported by individual establishments or companies.<sup>3</sup>

<sup>2</sup> A complete description of the nature of the sample and of its coverage and representativeness in terms of various measures is given in appendix A. Similar concentration data for products of mines are presented in appendix F.

<sup>3</sup> For the purposes of this study, the Bureau of the Census set forth the following rules to prevent disclosures in the publication of data taken from confidential sources:

(1) No data could be shown for less than four companies;

(2) No aggregate value of product figure could be shown or used if the value of product of one of the companies making up the aggregate constituted 75 percent of the total or if the value of product of two of the companies taken together made up 90 percent of the aggregate. Since concentration ratios cannot be assigned to products falling in these categories, they are listed throughout this study under footnote 1 and are indicated in charts and tables by a footnote symbol, as "(b)". This rule also applies to any figure which could be obtained by subtraction or addition to any published figure. Disclosure of this second type appears under footnote 2, in all tables and charts in the study.

It should be pointed out that the Bureau of the Census does not publish data for a product when that product is produced by only one manufacturer. In such cases, the data which relate to the product are combined with those of another product of like nature or included with products in an "other" product classification. It is thus obvious that instances of monopoly, duopoly, and many cases of oligopoly cannot be ascertained from the data as recorded in this study. The operation and production statistics for these concerns, however, are included in the industry totals.

In addition to the value ratios, concentration ratios have also been computed showing the proportion of the United States total quantity output of the individual product accounted for by the production of the largest four producers of that product. In subsequent sections of the study, other pertinent material bearing on the concentration in the production of the individual products of the sample will be presented and analyzed.

It should be noted that the concentration ratio for each product was computed on a company basis. In the meaning employed in this study, a company represents a combination of all establishments under common control. Thus, all establishments operated from a central administrative office were considered as a single producing unit or company. A number of companies were multiplant firms; on the other hand, many concerns were composed of but a single establishment. (For a distribution of the leading companies according to central-office companies and independents, see ch. II, table 5.)

#### DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS BY CONCENTRATION CLASSES

In order that some general over-all view of the data assembled here may be available, the 1,807 products were grouped on the basis of concentration ratios into 5 percent intervals and the frequency of appearances of products and the total value of the products falling in each concentration class are shown in table 1 and chart 1. Approximately three-fourths of the total number of products had concentration ratios above 50 percent, about one-half of all the products analyzed had concentration ratios above 75 percent, and nearly one-third had concentration ratios above 85 percent.

TABLE 1.—*Distribution of number and value of products by concentration ratio classes, 1937*

Concentration ratio class	Number of products			Value of products		
	Number	Percent	Cumulative percent	Amount (thousands of dollars)	Percent	Cumulative percent
0.1 to 5.0	1	0.1	0.1	353,432	1.2	1.2
5.1 to 10.0	7	.4	.5	357,663	1.2	2.4
10.1 to 15.0	10	.6	1.1	477,592	1.6	4.0
15.1 to 20.0	28	1.5	2.6	792,708	2.7	6.7
20.1 to 25.0	44	2.4	5.0	1,454,942	5.0	11.7
25.1 to 30.0	46	2.6	7.6	1,304,025	4.4	16.1
30.1 to 35.0	54	3.0	10.6	1,421,494	4.8	20.9
35.1 to 40.0	69	3.8	14.4	2,892,890	9.8	30.7
40.1 to 45.0	91	5.0	19.4	1,461,146	4.9	35.6
45.1 to 50.0	75	4.1	23.5	2,060,290	7.0	42.6
50.1 to 55.0	85	4.7	28.2	893,227	3.0	45.6
55.1 to 60.0	98	5.4	33.6	1,761,698	6.0	51.6
60.1 to 65.0	100	5.5	39.1	1,287,529	4.4	56.0
65.1 to 70.0	130	7.2	46.3	1,445,246	4.9	60.9
70.1 to 75.0	124	6.9	53.2	1,689,270	5.7	66.6
75.1 to 80.0	135	7.5	60.7	2,224,582	7.5	74.1
80.1 to 85.0	117	6.5	67.2	1,449,834	4.9	79.0
85.1 to 90.0	101	5.6	72.8	648,389	2.2	81.2
90.1 to 95.0	75	4.1	76.9	2,796,032	9.5	90.7
95.1 to 100.0	89	4.9	81.8	319,819	1.1	91.8
(1)	153	8.5	90.3	1,827,858	6.2	98.0
(2)	175	9.7	100.0	586,027	2.0	100.0
Total	1,807	100.0		29,505,693	100.0	

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

At the lower end of the distribution, there was only one product with a concentration ratio less than 5 percent. In other words there was only one product for which the production of the leading four producers taken together made up less than 5 percent of the United States total. At the other extreme, there were 89 products which had concentration ratios falling between 95 and 100 percent of the United States value of product. Furthermore, there were 328 products in which production was concentrated in the hands of so few producers that the actual figures could not be published because they would reveal the operations of individual companies. An examination of

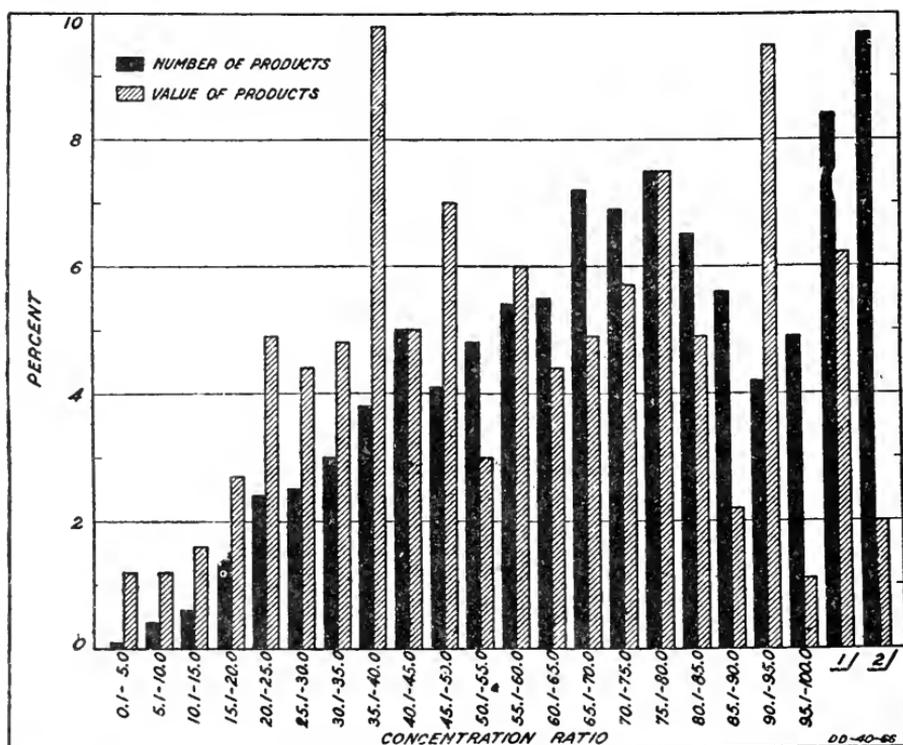


CHART I.—DISTRIBUTION OF NUMBER OF PRODUCTS AND VALUE OF PRODUCTS BY CONCENTRATION OF RATIO CLASSES, ALL INDUSTRY GROUPS COMBINED, 1937.

the unpublished concentration ratios for those products listed under “(1)” and “(2)” indicates that by far the largest number had concentration ratios above 90 percent. That is, the production of the leading four producers of each of these products made up over 90 percent of the United States total value of the product.

In contrast with the preponderant number of products occurring in the upper concentration classes, a much higher percentage of the aggregate value of the products was accounted for by products in the middle concentration ratio classes. One-fifth of the total value of all products analyzed was accounted for by products with concentration ratios below 35 percent while only one-tenth of the number of products had concentration ratios below 35 percent. Or again, the value of products with concentration ratios less than 60 percent made

up more than one-half the total value of products analyzed, while only about one-third of the total *number* of products had concentration ratios less than 60 percent. Viewed from the high-concentration end of the distribution, almost 20 percent of the total *value* of the products analyzed may be accounted for by those items which had concentration ratios higher than 90 percent. The products in these classes accounted for 27 percent by *number* of all products analyzed. The outstanding characteristic of the distribution of number of products as contrasted with that of value of products is, thus, the larger proportion of the number of products falling in the upper concentration classes and the larger proportion of value of products appearing in the middle-concentration groups.

#### DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS BY INDUSTRY GROUPS <sup>4</sup>

The over-all picture of the distribution of the number and value of products by concentration classes as shown above conceals a wide divergence in the behavior of the distributions among the various industry groups. As shown in table 2 and charts 2a and 2b, 41.9 percent of the total number of products in the food group and approximately 38 percent of the number of items in the forest products, in the paper products, and in the petroleum products groups had concentration ratios below 50 percent. On the other hand, only 5 percent of the total number of the products analyzed in the rubber and in the machinery groups had concentration ratios below 50 percent.<sup>5</sup>

<sup>4</sup> The Bureau of the Census has combined the various industries differentiated by it into 15 industrial groups. These groups are: Food and kindred products; textiles and their products; forest products; paper and allied products; printing, publishing, and allied industries; chemicals and allied products; products of petroleum and coal; rubber products; leather and its manufactures; stone, clay, and glass products; iron and steel and their products, not including machinery; nonferrous metals and their products; machinery, not including transportation equipment; transportation equipment, air, land, and water; and miscellaneous industries.

<sup>5</sup> The two consolidated products analyzed in the transportation equipment group had concentration ratios of more than 75 percent and under normal conditions this group would have been included along with the groups mentioned above. Particular circumstances which surrounded the data available to us, however, made analysis of the products of this group a procedure of questionable value.

The value of products of the motor vehicles and the motor vehicle bodies and parts industries accounted for almost 90 percent of the total value of products of the transportation group and thus would be the obvious industries to select for our sample. Data, however, for only two consolidated products from one of these two industries were released by the Bureau of the Census for the purposes of this study. These two "consolidated" products comprise closed two-and-four-door and open two-and-four-door passenger cars and passenger-car chassis; and commercial vehicles, which include motor busses, trucks, hearses, undertakers' wagons, ambulances, truck tractors, taxicabs, fire-department apparatus, street-cleaning apparatus, and commercial-car and bus chassis.

TABLE 2.—Distribution of number and value of products by concentration ratio classes for 14 industry groups, 1937.

Concentration ratio class	Cumulative percent													
	Food and kindred products	Textiles and their products	Forest products	Paper and allied products	Chemicals and allied products	Products of petroleum and coal	Rubber products	Leather and its manufactures	Stone, clay, and glass products	Iron and steel and their products, not including machinery	Nonferrous metals and their products	Machinery, not including transportation equipment	Transportation equipment, air, land, and water	Miscellaneous industries
Total number of products	136	290	99	63	212	18	39	112	182	177	55	305	2	57
0.1 to 5.0	0.7	0.3	1.0						1.7	1.1				
5.1 to 10.0	2.9	1.0	2.0					0.9	3.9	2.2	1.8			1.8
10.1 to 15.0	5.1	4.8	9.1					4.5	7.3	3.9	7.3			1.8
15.1 to 20.0	8.8	8.2	20.1		0.5			5.4	11.8	6.7	12.8			1.8
20.1 to 25.0	13.9	12.3	27.2	1.6	1.9			9.0	17.8	10.7	14.6			7.1
25.1 to 30.0	16.8	17.8	32.3	3.2	8.0	16.6		14.4	24.2	14.7	18.2			12.4
30.1 to 35.0	24.2	23.3	38.1	27.0	17.4	22.1	5.1	18.0	31.0	19.8	20.0			17.7
35.1 to 40.0	31.6	28.8	36.3	38.1	19.8	33.7	12.8	22.5	37.7	23.8	23.5			24.7
40.1 to 45.0	41.9	33.3	44.4	41.3	21.7	49.8	23.1	27.8	43.3	29.4	32.8			24.7
45.1 to 50.0	52.9	38.8	44.4	47.0	26.4	60.9	28.2	29.6	51.3	35.0	36.4			31.7
50.1 to 55.0	60.3	46.1	46.4	55.5	32.5	66.5	38.5	38.5	61.3	43.5	41.9			35.2
55.1 to 60.0	66.2	50.9	49.4	66.6	39.1	72.1	38.5	44.7	70.6	49.7	47.4			45.7
60.1 to 65.0	72.8	57.8	55.5	72.9	48.1	77.7	41.1	50.0	83.8	55.9	54.7			49.2
65.1 to 70.0	78.7	65.4	59.5	80.8	53.8	83.3	48.8	61.6	91.7	64.4	65.6			56.2
70.1 to 75.0	82.4	71.6	61.5	85.6	58.0	88.9	59.1	67.8	97.4	71.2	69.2			66.7
75.1 to 80.0	85.3	76.8	67.6	89.4	64.1	88.9	61.7	71.9	100.0	74.6	78.5			72.0
80.1 to 85.0	89.0	80.2	72.7	93.6	67.9	88.9	67.7	75.0	100.0	78.7	85.0			73.7
85.1 to 90.0	89.7	82.3	77.8	96.2	73.0	88.9	71.9	80.4	100.0	82.9	88.5			79.0
90.1 to 95.0	90.4	86.8	83.9	99.2	82.1	100.0	77.0	88.4	100.0	96.0	100.0			83.0
95.1 to 100.0	95.3	92.0	90.0	100.0	82.1	100.0	100.0	94.5	100.0	100.0	100.0			98.0
(1).....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0			100.0

Aggregate value of products (thousands of dollars).....	5, 119, 482	4, 050, 032	663, 078	835, 369	1, 941, 180	2, 482, 267	729, 046	1, 14 <sup>2</sup> 622	1, 075, 885	3, 017, 572	832, 833	3, 168, 945	2, 848, 786	1, 597, 646
0.1 to 5.0.....	8.7	1.1												
5.1 to 10.0.....	14.4	12.1							7.9	0.6				
10.1 to 15.0.....	23.7	35.4			0.2			10.1	11.4	0.8				
15.1 to 20.0.....	30.8	53.4		5.0	8.4			21.7	15.8	5.0	2.0			0.9
20.1 to 25.0.....	2.6	59.2		9.9	19.0			22.6	33.3	12.2	11.0	2.2		0.9
25.1 to 30.0.....	5.8	63.1		15.5	25.7			37.9	36.9	15.7	13.3	3.7		0.9
30.1 to 35.0.....	13.7	56.5		37.1	26.5			37.9	39.2	20.0	13.7	4.2		2.2
35.1 to 40.0.....	25.1	72.4		57.9	37.4	70.3		67.2	46.2	22.4	14.3	8.2		13.8
40.1 to 45.0.....	31.1	71.7		75.3	37.4	75.7		61.1	46.2	22.4	14.7	10.9		16.3
45.1 to 50.0.....	49.3	75.3		59.0	38.6	89.6		70.8	48.4	24.1	20.9	13.0		18.6
50.1 to 55.0.....	52.0	79.1		70.8	39.7	91.0		70.8	49.5	28.5	30.7	18.7		18.6
55.1 to 60.0.....	69.0	80.1		63.2	41.7	96.5		77.5	52.1	38.4	32.4	21.7		19.8
60.1 to 65.0.....	78.9	84.8		70.7	44.7	97.8		84.5	64.7	44.3	37.7	24.7		20.2
65.1 to 70.0.....	85.0	87.0		87.0	51.6	98.0		87.0	68.0	48.1	45.6	38.8		21.2
70.1 to 75.0.....	92.9	85.5		89.7	55.9	98.2		89.2	73.0	67.9	60.3	43.4		21.4
75.1 to 80.0.....	96.4	86.4		92.9	62.9	99.8		92.0	80.5	74.6	65.3	54.5		29.3
80.1 to 85.0.....	95.8	91.1		94.2	68.2	99.8		93.2	80.5	76.5	69.9	59.3		85.5
85.1 to 90.0.....	96.4	94.3		96.1	69.7	99.9		93.6	82.4	79.5	75.6	68.0		87.5
90.1 to 95.0.....	97.0	96.4		96.9	73.3	99.9		95.6	85.2	79.6	81.7	75.6		89.5
95.1 to 100.0.....	97.1	94.7		98.8	81.8	99.9		96.4	87.2	80.0	100.0	100.0		100.0
(1).....	99.5	98.4		100.0	90.0	100.0		98.8	97.3	99.4	100.0	100.0		99.7
(2).....	100.0	100.0		100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0		100.0

Cumulative percent

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.  
<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

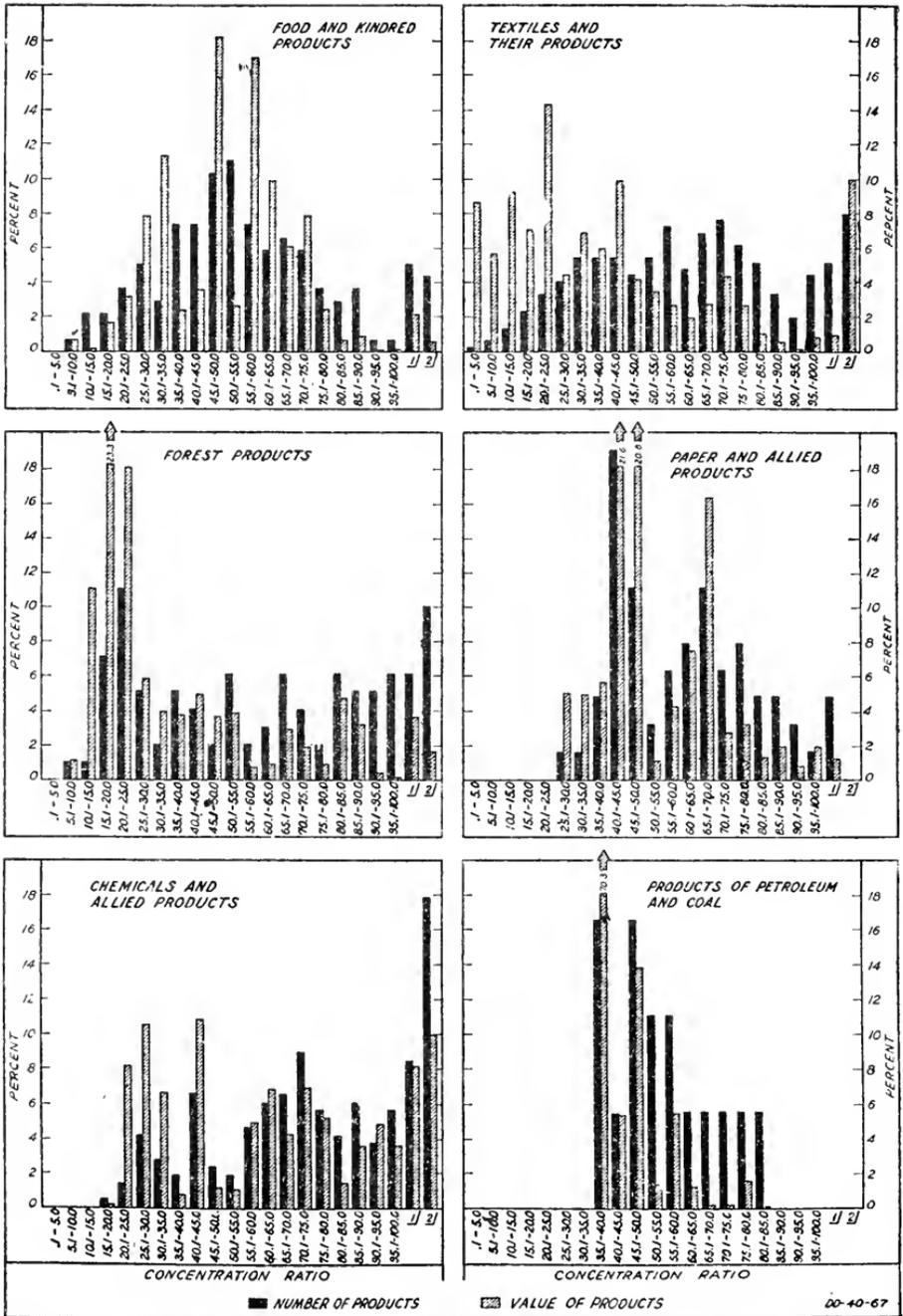


CHART 2a.—DISTRIBUTION OF NUMBER OF PRODUCTS AND VALUE OF PRODUCTS BY CONCENTRATION RATIO CLASSES, BY INDUSTRY GROUPS, 1937

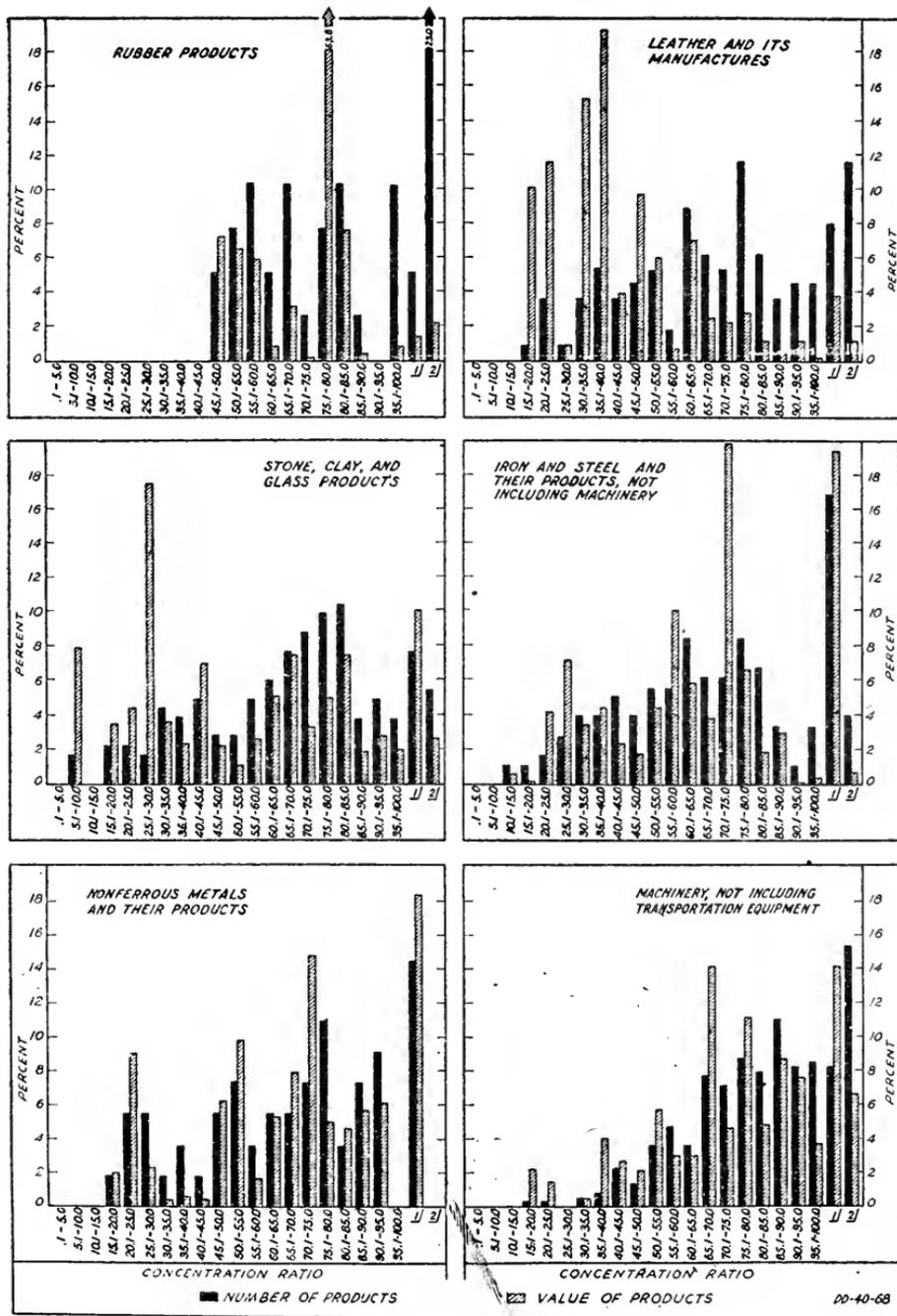
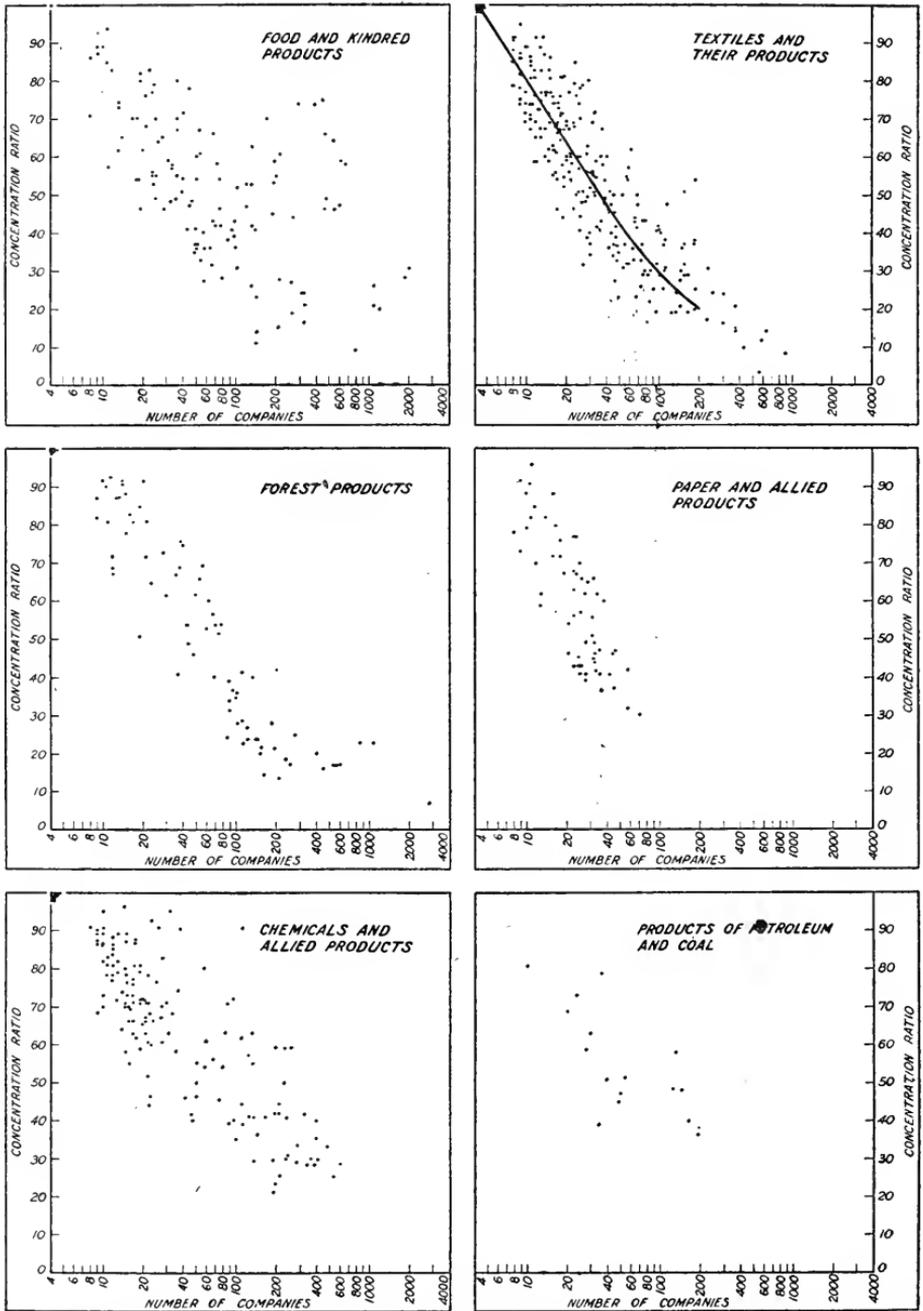
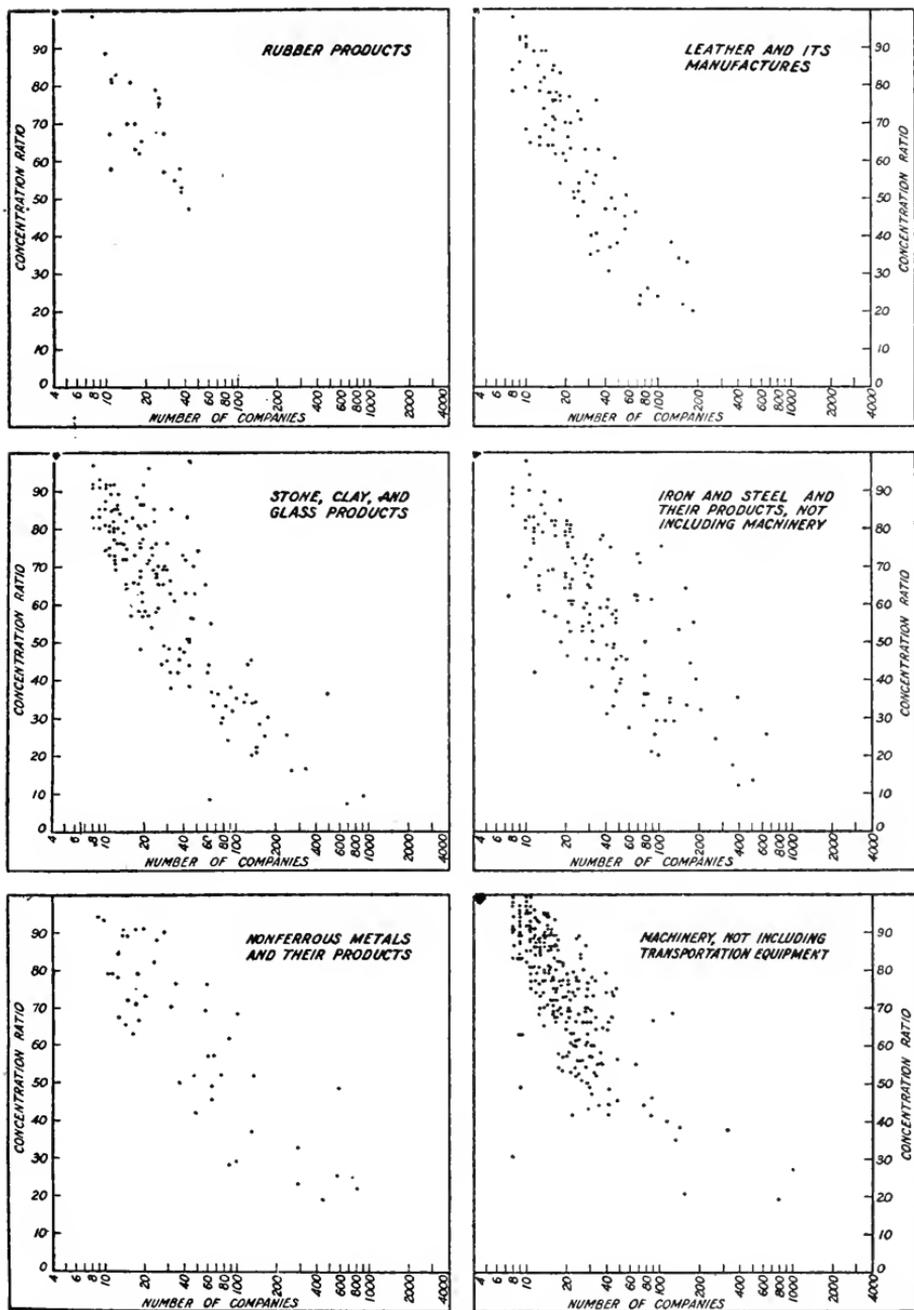


CHART 2b.—DISTRIBUTION OF NUMBER OF PRODUCTS AND VALUE OF PRODUCTS BY CONCENTRATION RATIO CLASSES, BY INDUSTRY GROUPS, 1937.



D O 40-69

CHART 3a.—RELATION BETWEEN NUMBER OF PRODUCING COMPANIES AND CONCENTRATION RATIO FOR EACH PRODUCT, BY INDUSTRY GROUPS, 1937.



D.D. 40-10

CHART 3b.—RELATION BETWEEN NUMBER OF PRODUCING COMPANIES AND CONCENTRATION RATIO FOR EACH PRODUCT, BY INDUSTRY GROUPS, 1937.

In the upper concentration classes, 40 percent of the total number of products analyzed in the machinery group, 38 percent in the rubber group, and 36 percent in the chemical group had concentration ratios above 90 percent, while only 10 percent of the total number of products in the paper industries group and 11 percent in the food products group had concentration ratios above 90 percent.

The distribution patterns of the various industry groups were almost as widely divergent in the case of the *value* of products as in that of the *number* of products. Although a careful inspection of the table and charts will reveal these variations, as an aid to the interpretation of the material some of the extremes are worthy of citation. Approximately 90 percent of the total value of products analyzed in the petroleum and coal group, 77 percent in the textiles group, and 75 percent in the forest products group represented the value of products having concentration ratios below 50 percent, but only 7 percent of the value of products in the rubber group and 13 percent in the machinery group were in these lower concentration classes. Conversely, the concentration ratio classes above 90 percent included 32 percent of the value of products analyzed in the machinery group and 27 percent in the chemical group, whereas corresponding percentages in the food, textiles, paper, and rubber groups were as low as 3 or 4 percent.

These differences in the distribution of number and value of products among the various industry groups are particularly striking in the case of those groups whose products include, for the most part, commodities going directly into the hands of consumers, as contrasted with the so-called producers' capital goods industries. (This point will be covered more extensively in chapter III.)

#### RELATION OF CONCENTRATION TO NUMBER OF COMPANIES

It might generally be assumed that in cases where products were manufactured by a large number of companies the proportion of the total contributed by any one company would be smaller than in cases where only a few companies produced the product. Thus, one might expect commodities which are produced by a large number of companies to have low concentration ratios and those produced by only a few companies to have high concentration ratios. From the material presented in the accompanying scatter diagrams (charts 3a-3b), this assumption appears to be well founded. The relationship between the number of companies manufacturing a product and its concentration ratio is generally, though by no means perfectly, inverse in character.

In order that the data may be shown in charts of reasonable size, the number of companies producing the products as measured along the horizontal axis has been plotted on a logarithmic scale. It appears that a generally straight line sloping downward, with a tendency to curve slightly as the line progresses through the upper company range, expresses the prevailing tendency of the relationship as it exists among the various industry groups. If these data had been plotted on an arithmetic scale, a curve that drops off sharply in the left-hand segment and then slopes off gently to the right would reflect the inverse nature of the relationship. The general shape of such a curve plotted on an arithmetic scale from the data of the textiles

group is shown in chart 4. The curve shown on this chart using the arithmetic scale is the same as that drawn on a logarithmic scale in the scatter diagram in chart 3a and was fitted by approximate methods. A scatter chart combining the data for all industrial groups is not shown here as it is believed the data for the industry groups are more revealing.

The closeness of this inverse relationship varies rather widely from one industry group to another. In the textiles group; the forest products group; the paper group; the leather group; and the stone, clay, and glass products group the vertical spread of the items from a regression line which might be drawn through the points to reflect the central tendency of the relation appears to be much less than that in the other groups. In all groups, however, the vertical spread at any point on the horizontal axis is rather wide. For example, even in the textile group where the relation is quite obvious, there was one

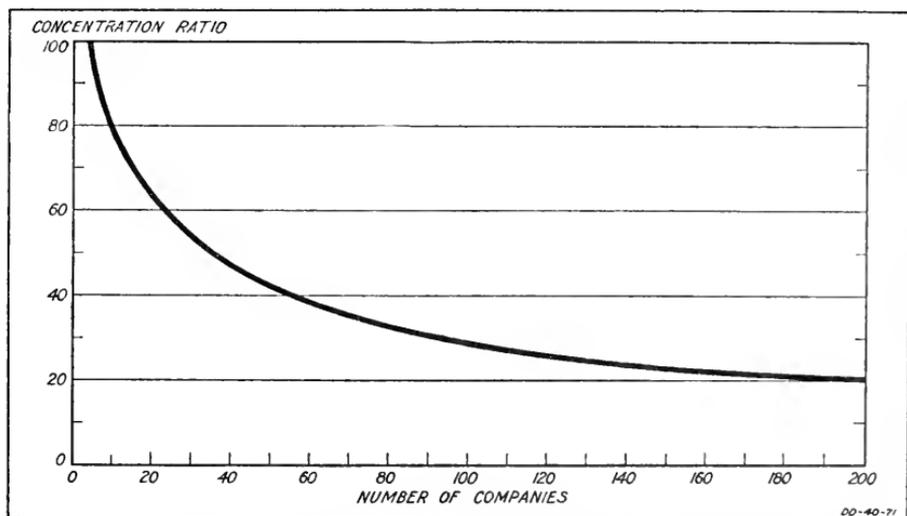


CHART 4.—RELATION BETWEEN THE NUMBER OF PRODUCING COMPANIES AND CONCENTRATION RATIO FOR EACH PRODUCT, TEXTILE GROUP, 1937.

product produced by 23 companies which had a concentration ratio of 46 percent while a second product also produced by 23 companies had a concentration ratio of 85 percent. Again, in the machinery group, there were 12 products with concentration ratios ranging from 31 to 99 percent and each of these products was produced by 8 companies.

Further inspection reveals the apparent lack of relation between the number of companies and the concentration ratios for the products when the number of companies exceeds 100. This lack of relationship beyond the 100-company line is most obvious in the case of the food group, the chemicals group, the iron and steel group, and the non-ferrous metals group.

It should be noted that no product points are located on the 5-, 6-, and 7-company ordinates in the various charts. This hiatus in the diagrams is not due to any peculiar characteristic of the basic data but is due to the disclosure rules set forth by the Bureau of the Census. All products that are listed under "(2)" and some of those listed under

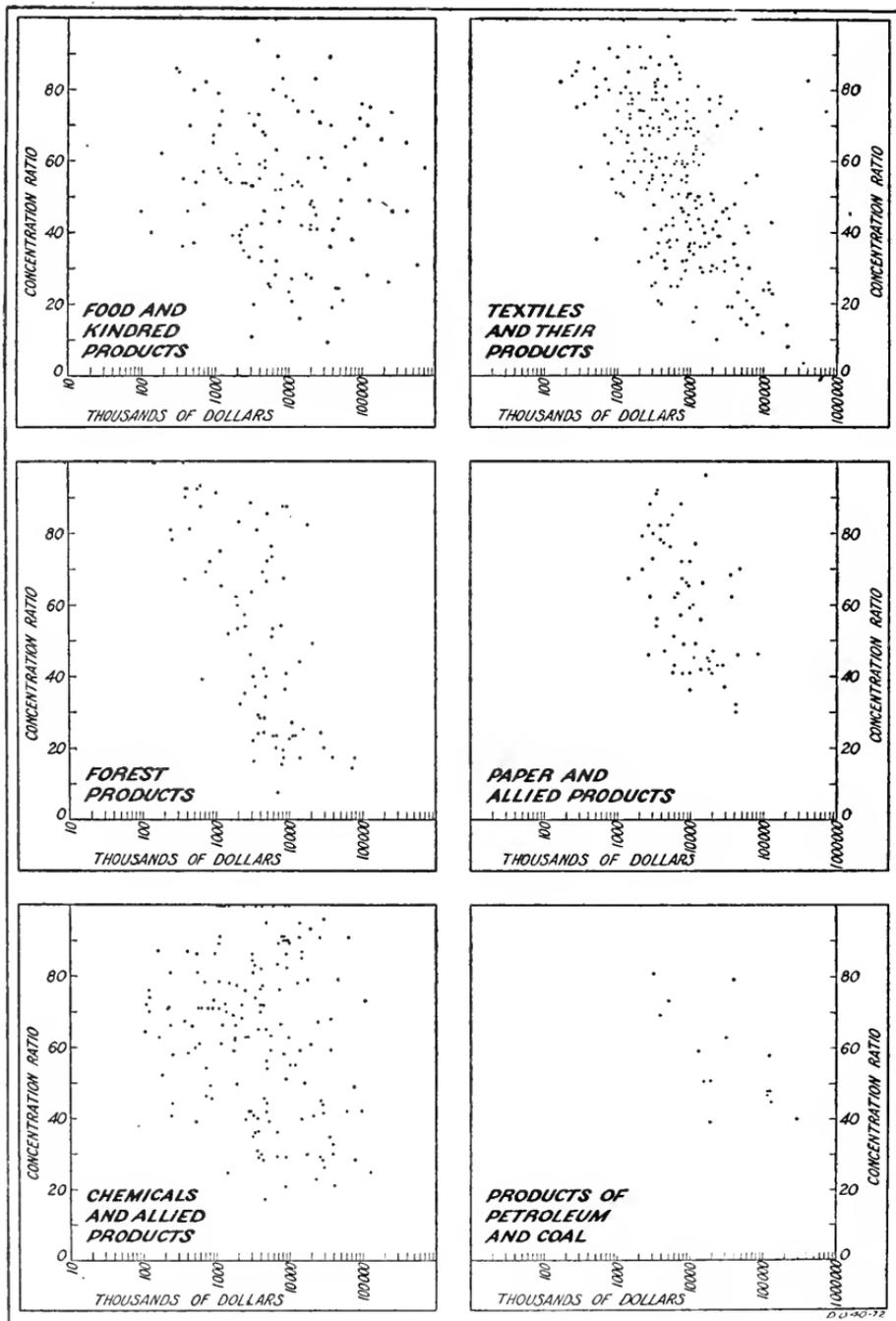


CHART 5a.—RELATION BETWEEN VALUE AND CONCENTRATION RATIO OF EACH PRODUCT, BY INDUSTRY GROUPS, 1937.

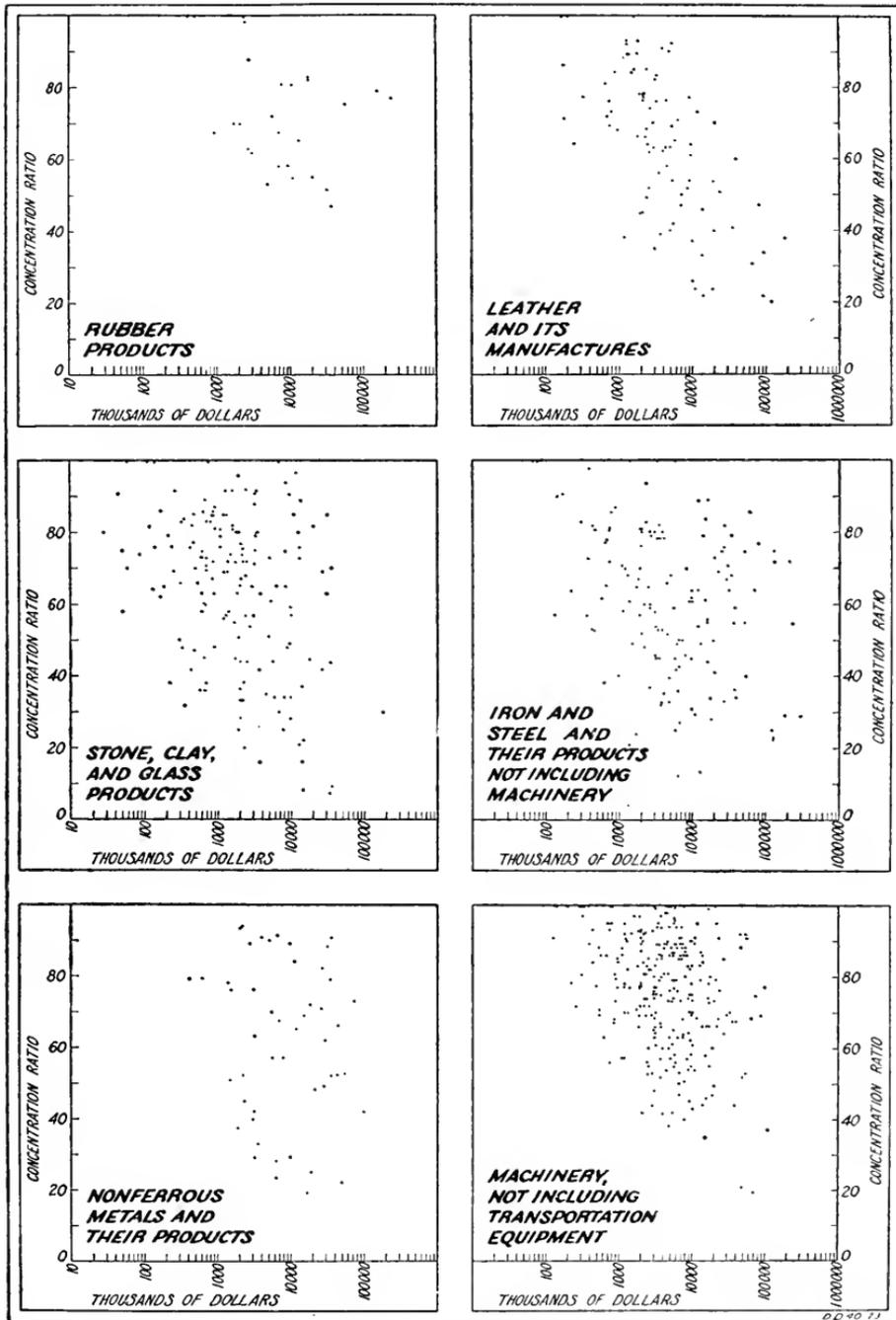


CHART 5b.—RELATION BETWEEN VALUE AND CONCENTRATION RATIO OF EACH PRODUCT, BY INDUSTRY GROUPS, 1937.

“(1)” fall in this area. If the concentration ratios for the products were published it would be possible by subtraction to approximate the activities of the remaining companies. As was pointed out earlier in the discussion, the concentration ratios of those products which have been listed under “(1)” and “(2)” would fall in most cases between 90 and 100 percent. The hiatus in the diagrams may be bridged by visualizing an extension of the tendencies evident in the scatter diagram on either side of the gap.

#### RELATION OF CONCENTRATION TO VALUE OF PRODUCT

There appears to be only a slight inverse relation between the concentration ratio of a commodity and the total United States value of that product. An inspection of the accompanying scatter diagrams (charts 5a and 5b) reveals within rather broad limits an inverse relation in the textiles; forest products; petroleum; leather; and stone, clay, and glass products groups, but even in these groups the scatter is so great as to indicate that total value is by no means a dominant factor. In the textiles group, for example, the concentration ratios of the commodities with value ranging between \$5,000,000 and \$10,000,000 extend from 25 to 100 percent and commodities with concentration ratios falling between 50 and 60 percent are products whose value ranges from \$300,000 to almost \$80,000,000.

The discovery that there is no close relation between the total value of a product and its concentration, although a negative conclusion, is of interest here. In general terms, this means that products with high value and with low value may have either a high concentration or a low concentration. It should be noted that in several industry groups where there are products with total United States values less than \$100,000, the concentration ratios of these products are 100 percent. It is to be expected, however, that production of products where the total value is low would be concentrated in a few hands. The vast majority of products have total values higher than \$100,000 and for these more important products, both as to number and value, the scatter of product points opposite any range on either the horizontal or the vertical axis is so great that only within the broadest limits can it be said that products with high values have low concentration ratios or vice versa.

#### RELATION OF PRODUCTION OF LEADER TO THE CONCENTRATION RATIO

The statement that the concentration ratio of product A is 80 percent means that the leading four producers of product A accounted for 80 percent of the total United States value of that product. There is another question that immediately arises: How is the production of the four leaders distributed? Does one producer account for 23 percent of the total and the other three producers 19 percent each, does one account for 50 percent and the other three producers 10 percent each, or does one account for 77 percent and the other three producers 1 percent each? Of course, those products for which the value-output of one producer represents 75 percent of the four-company total and those products for which two producers account for 90 percent of the total involve disclosures of the first type, “(1)”, and

specific data on these products are withheld to avoid revealing operations of individual companies.

As may be seen in charts 6a and 6b, there is a tendency for the percent which the output of their leader bears to the total United States value to increase as the concentration ratio increases. Thus, in the cases of those products with high concentration ratios, it usually occurs that the leading producer accounts for a high proportion of the total value of production of those products.

A line has been drawn on each chart to show the distribution of production at various concentration ratios if each of the four producers contributed equally to the total production, i. e., if each producer, including the leader, accounted for 25 percent of the total for the four companies. The plotted product-points fall closer to this line, representing a theoretically equal distribution, in the lower range of concentration ratios, and tend to diverge from the line in the higher ranges. Furthermore, this divergence appears to be more than proportional.

Interindustry-group comparisons do not reveal any particular differences in relation between the percentage contribution of the leader and the concentration ratio that cannot be accounted for by the differences in the distribution of products with high and low concentration ratios. The dominant and general feature throughout the industry groups is the tendency for the leader to be more important in the total value of products with high concentration and less important in the case of products with low concentration ratios. Within almost every industry group, an occasional product may be noted in the low concentration ranges for which the leader contributes a relatively high percentage of the total value of that product. The fact that these products fall outside the clusters on the scatter diagrams may be accounted for by a number of different circumstances:

One possible explanation of the sporadic behavior of a few of the product-points in the scatter diagrams, other than the fact of dominance by some one concern in the usual sense, lies in the regional nature of the markets for the products coupled with the presence among the companies manufacturing the products of a national producer. It may happen that the major portion of the product was manufactured and distributed regionally. Thus the output of one concern, even though it be the predominant producer in the area, was but a small proportion of the total national output, and, since this situation may be duplicated in many regions the concentration ratio of that particular product (which is based on national data) will be low. Where this situation is coupled with the presence of a national producer selling his product under a nationally advertised name and otherwise operating on a national scale, the value of the product manufactured by the national producer will stand out much above the other three producers of the product who are essentially operating on a more restricted scale. This does not necessarily mean that the national producer will dominate the local market where the regional producer is operating. Quite the contrary, the value of the product manufactured and sold by the regional producer may greatly exceed that which the national producer is able to sell in that particular locality.

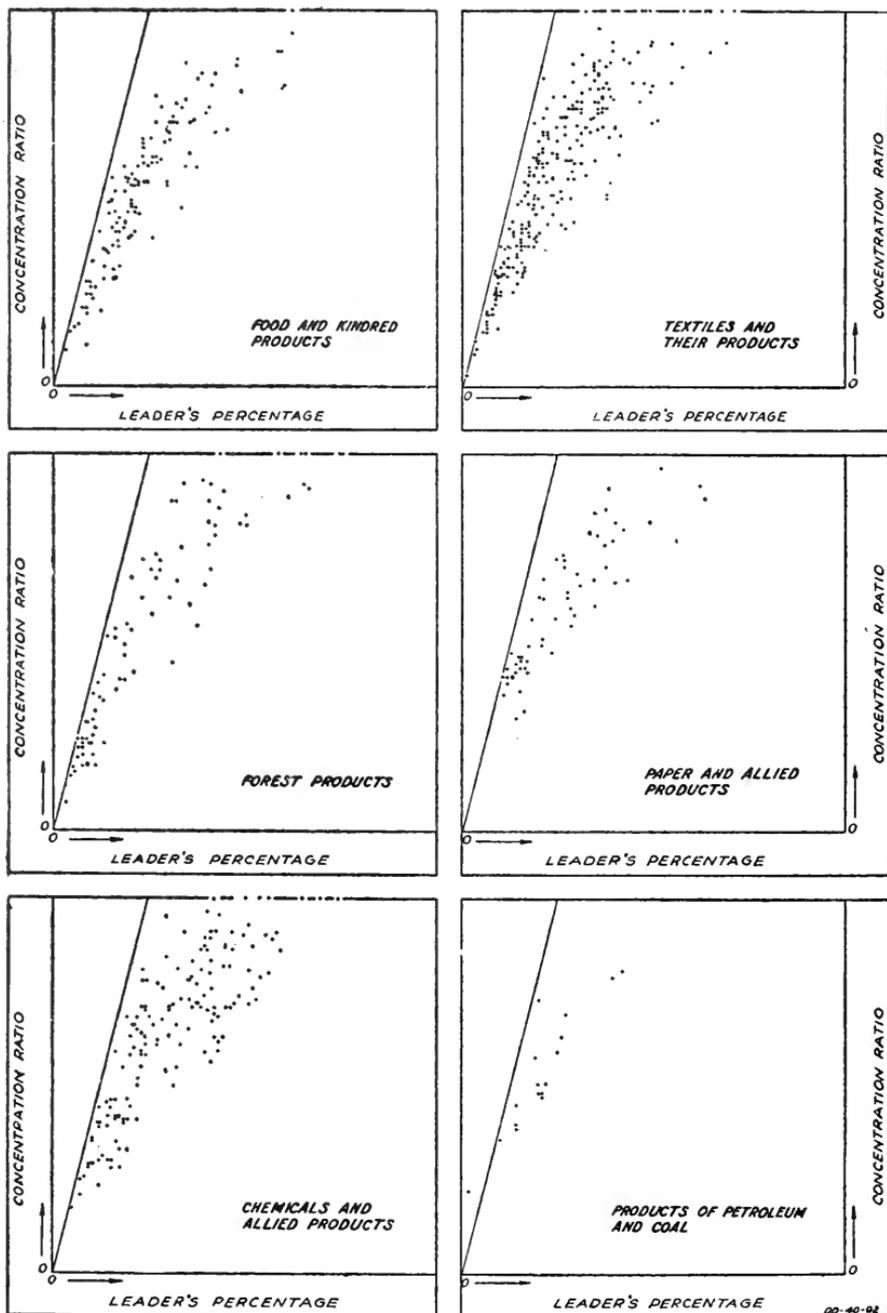


CHART 6a.—RELATION BETWEEN PERCENTAGE OF TOTAL VALUE OF PRODUCTS ACCOUNTED FOR BY LEADING PRODUCER AND CONCENTRATION RATIO FOR EACH PRODUCT, BY INDUSTRY GROUPS, 1937.

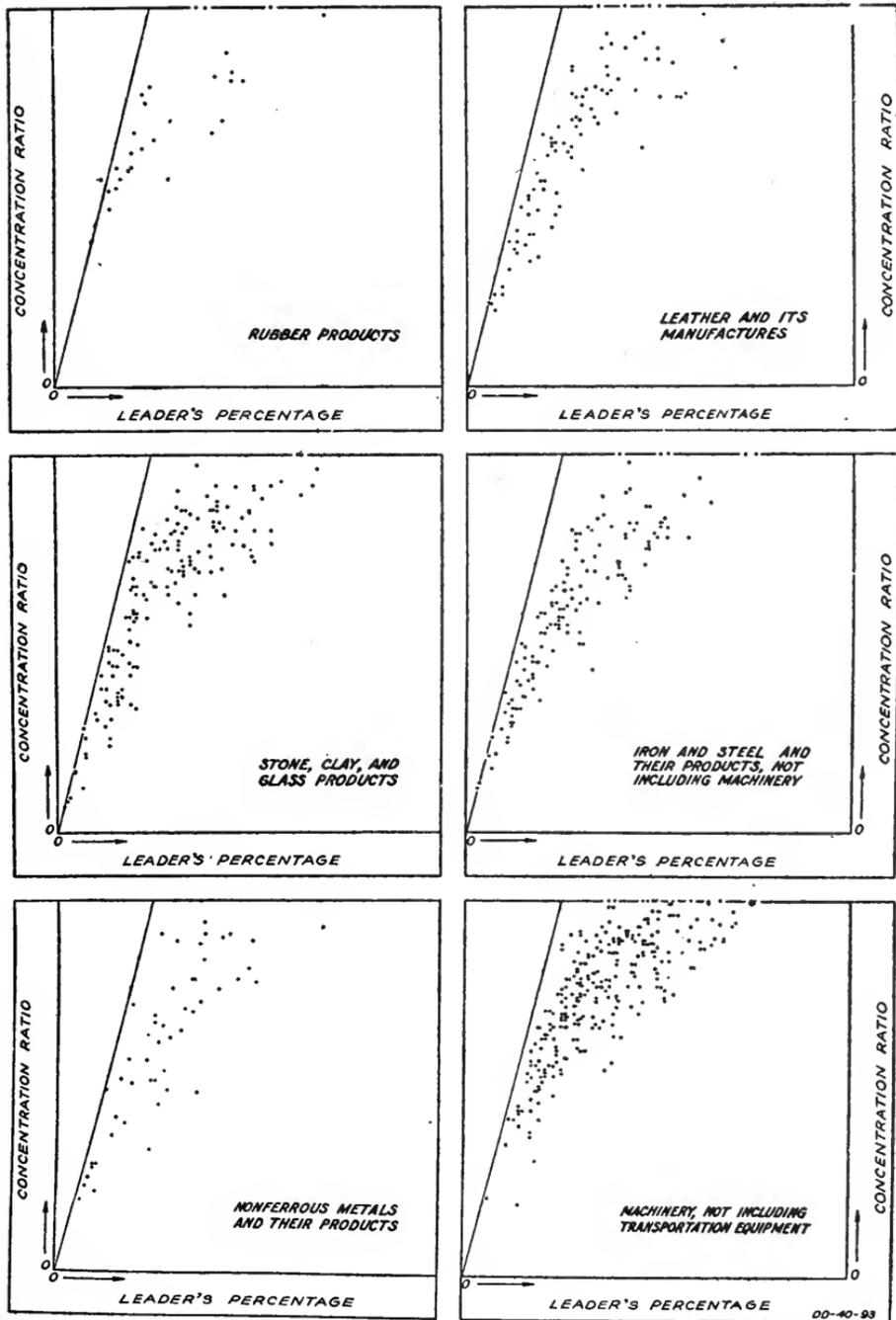


CHART 6b.—RELATION BETWEEN PERCENTAGE OF TOTAL VALUE OF PRODUCTS ACCOUNTED FOR BY LEADING PRODUCER AND CONCENTRATION RATIO FOR EACH PRODUCT, BY INDUSTRY GROUPS, 1937.

## DISTRIBUTION BY PERCENTAGE CLASSES OF NUMBER AND VALUE OF PRODUCTS ACCOUNTED FOR BY THE LEADING PRODUCER

The control over production exercised by the leading producer of each of the 1,807 census products analyzed in this study is shown in table 3 and chart 7. There were 20 products in which the leading producer accounted for no more than 5 percent of the United States total value of each of the products and the total value of these 20 products amounted to \$1,146,998,000 in 1937, or 3.9 percent of the total value of all products analyzed. Forty-eight percent of the total number of products were those in which the leading producer accounted for 30 percent or less of the total value, while 63.5 percent of

TABLE 3.—*Distribution of number and value of products by percentage of total value of product accounted for by leading producer, 1937*

Percentage classes of leader's production to United States total	Products			Value of products		
	Number	Percent	Cumulative percent	Amount (thousands of dollars)	Percent	Cumulative percent
0.1 to 5.0.....	20	1.1	1.1	1,146,998	3.9	3.9
5.1 to 10.0.....	90	5.0	6.1	2,104,144	7.1	11.0
10.1 to 15.0.....	159	8.8	14.9	5,657,878	19.2	30.2
15.1 to 20.0.....	213	11.8	26.7	3,113,290	10.6	40.8
20.1 to 25.0.....	188	10.5	37.2	3,885,292	13.2	54.0
25.1 to 30.0.....	196	10.8	48.0	2,826,780	9.6	63.6
30.1 to 35.0.....	183	10.1	58.1	2,725,863	8.2	72.8
35.1 to 40.0.....	167	9.2	67.3	1,427,612	4.8	77.6
40.1 to 45.0.....	159	8.8	76.1	3,401,081	11.5	89.1
45.1 to 50.0.....	141	7.8	83.9	1,253,537	4.2	93.3
50.1 to 55.0.....	87	4.8	88.7	627,741	2.1	95.4
55.1 to 60.0.....	57	3.2	91.9	371,604	1.3	96.7
60.1 to 65.0.....	50	2.8	94.7	236,361	1.0	97.7
65.1 to 70.0.....	33	1.8	96.5	220,547	0.7	98.4
70.1 to 75.0.....	64	3.5	100.0	457,065	1.6	100.0
Total.....	1,807	100.0		29,505,693	100.0	

the value of all products analyzed was accounted for by products in which the output of the leader made up 30 percent or less of the total value of each product. At the upper end of the distribution, there were 64 products in which the leader accounted for 70 to 75 percent of the total value of those products. The 64 products, however, were relatively less important, in value terms, than other products analyzed, as they accounted for only 1.4 percent of the value of the 1,807 products. The bunching of products in this 70 to 75 percent class would seem to require some explanation in a distribution which is as smooth as the present one. This grouping is not due to any particular behavior characteristic of the concentration data themselves but is due to the form in which the data were released by the Bureau of the Census.

As was noted in the discussion of table 1, there is a tendency for products with low concentration ratios to have high aggregate values. This same feature also characterizes the present distribution and may be seen in chart 7. Products in which the leader had a relatively low percentage of total production were the products which had high aggregate values. The largest number of products fell in

the 15 to 20 percent class; that is, those products in which the production of the leader was 15 to 20 percent of the total value of the product made up the modal group. On the other hand, the greatest value of product was contributed by those products which fell in the 10 to 15 percent class.

DISTRIBUTION BY PERCENTAGE CLASSES OF NUMBER AND VALUE OF PRODUCTS ACCOUNTED FOR BY THE LEADING PRODUCER, BY INDUSTRY GROUPS

The importance of the role of the leading producer in the manufacture of a particular item varies widely among the products classified in the different industrial groups. In table 4 it may be seen, for example, that 26.5 percent of the total number of products

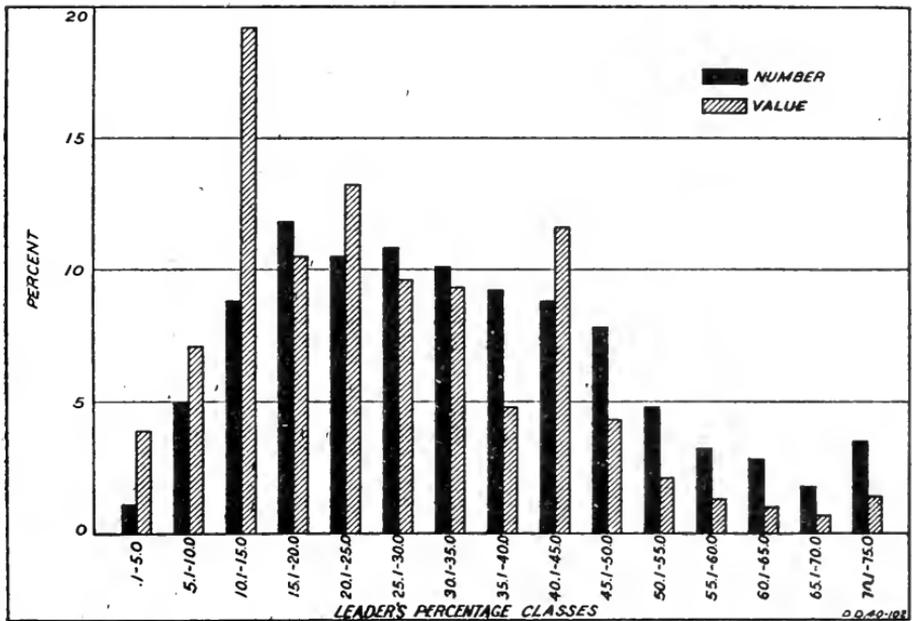


CHART 7.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS BY PERCENTAGE OF TOTAL VALUE OF PRODUCT ACCOUNTED FOR BY LEADING PRODUCER, ALL INDUSTRY GROUPS, 1937.

analyzed in the food group are those in which the production of the leader amounted to 15 percent or less of the total value of those products, while for those products in the machinery group only 2.8 percent of the total number of products are items in which the output of the leader was 15 percent or less of the total value of those products. As the cumulative percentage figures indicate, approximately one-half or more of the total number of products classified in the food group, the textiles group, the paper group, and the petroleum and coal group were those products in which the leader accounted for no more than 25 percent of the total value of each. For the products in the other groups, it is necessary to go to the higher concentration ranges before the 50 percent level is reached.



Aggregate value of products (thousands of dollars)	5, 119, 482	4, 050, 022	663, 078	835, 369	1, 941, 180	2, 482, 267	729, 046	1, 142, 622	1, 075, 835	3, 017, 572	832, 833	3, 168, 945	1, 597, 646
0.1 to 5.0	0.8	22.1	12.5	8.7	21.7	15.5	9.5	13.3	1.5	13.3	6.4	2.2	
5.1 to 10.0	5.6	45.9	42.1	19.6	51.8	37.6	15.6	13.9	15.6	13.9	6.4	17.5	
10.1 to 15.0	25.9	59.6	67.3	36.3	69.9	51.8	23.3	17.6	23.3	17.6	19.7	18.1	
15.1 to 20.0	39.1	72.3	74.8	59.9	82.9	69.9	48.6	30.1	48.6	30.1	24.9	19.4	
20.1 to 25.0	73.4	79.1	77.3	68.2	82.9	74.7	55.4	44.7	55.4	44.7	42.2	36.2	
25.1 to 30.0	77.1	86.1	80.1	78.0	85.1	86.4	67.4	55.4	67.4	55.4	42.2	36.2	
30.1 to 35.0	94.1	90.5	85.1	83.0	87.7	87.7	80.7	69.0	80.7	69.0	51.8	38.3	
35.1 to 40.0	94.9	94.8	90.6	91.8	88.1	88.1	82.2	72.7	82.2	72.7	61.4	48.6	
40.1 to 45.0	96.1	96.1	93.3	94.6	92.0	92.0	86.2	79.8	86.2	79.8	66.9	51.8	
45.1 to 50.0	96.6	98.1	97.7	95.5	98.8	98.8	90.7	83.6	90.7	83.6	78.8	66.9	
50.1 to 55.0	96.7	98.4	98.0	97.4	99.0	99.0	91.4	84.4	91.4	84.4	81.7	78.8	
55.1 to 60.0	96.7	98.5	98.1	98.8	99.1	99.1	91.7	84.4	91.7	84.4	86.2	81.7	
60.1 to 65.0	98.2	99.5	98.6	99.6	99.5	99.5	93.7	90.2	93.7	90.2	90.7	86.2	
65.1 to 70.0	98.5	99.8	98.8	99.6	100.0	100.0	99.9	99.2	99.9	99.2	93.8	89.5	
70.1 to 75.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Cumulative percent

1 Transportation group omitted to avoid disclosing, exactly or approximately, the operations of individual companies.

2 Percentage combined with "5.1 to 10.0 percentage" class to avoid disclosing, exactly or approximately, the operations of individual companies.

3 Percentage combined with "10.1 to 15.0 percentage" class to avoid disclosing, exactly or approximately, the operations of individual companies.

4 Values of products appearing in the "45.1 to 50.0 percentage" class and in the "70.1 to 75.0 percentage" class each amount to less than one-tenth of 1 percent.

In the lower part of table 4 the cumulative percentage distribution of the aggregate values of the products attributable to those products in which the leader accounted for varying percentages of the total value of the products is presented. By referring to the table, it is apparent that 73.4 percent of the aggregate value of the products analyzed in the food group represented the value of products in which the leading producer accounted for 25 percent or less of the total value of the individual products. At the other extreme only about one-quarter of the aggregate value of the products analyzed in the machinery group related to products in which the leader accounted for 25 percent or less of the total value of the individual products.

To summarize briefly the material presented in table 4, there was a tendency for the majority of the number and the value of products in the food group, in the textiles group, in the forest products group, in the paper group, and in the petroleum and coal group to be products in which the leading producer contributed a relatively small percent of the United States total value. On the other hand, in the machinery group and in the chemicals group there were large numbers of products and a relatively high proportion of the total value of product bunched in the classes in which the leading producer accounted for a high percentage of the total value of the individual products. For many products in these last two groups, some one producer occupied a relatively important place as a manufacturer of the products while in the former groups the leader was relatively less important in the control of the production of each commodity.

RELATION BETWEEN NUMBER OF COMPANIES PRODUCING AND PERCENTAGE OF TOTAL VALUE OF PRODUCT ACCOUNTED FOR BY LEADING PRODUCER, BY INDUSTRY GROUPS

In charts 3a and 3b it was possible to show the relation between the number of companies producing a product and its concentration ratio by industry groups. This same sort of comparison cannot be made to show the relation between the number of producers and the production of the leader, since it would tend in many cases to disclose the operations of individual concerns. It may be said, however, that some inverse sort of relation does exist. That is, there is a tendency for the leading producer to account for a high percentage of the total output of those products for which there are only a few producers. And further, in the case of those products made by a large number of concerns the leading producer assumes a less important role. The scatter within each industry group is somewhat wider than was the case in charts 3a and 3b.

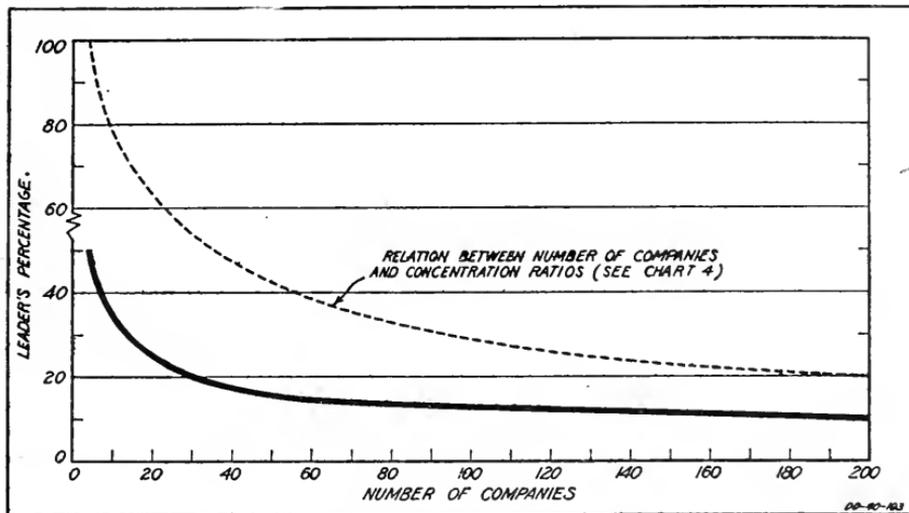


CHART 8.—RELATION BETWEEN THE NUMBER OF PRODUCING COMPANIES AND PERCENTAGE OF TOTAL VALUE OF PRODUCT ACCOUNTED FOR BY LEADING PRODUCER OF EACH PRODUCT, TEXTILE GROUP, 1937.

In order that some general graphic comparisons may be made, a regression line has been fitted by approximate methods to the material showing the relation between the percent of the total value accounted for by the leader and the number of companies producing the individual products of the textiles group. The regression line has been reproduced in chart 8. The curve in this chart is drawn on an arithmetic scale and is comparable in nature to the curve in chart 4. (For facility in comparison the earlier curve has been reproduced in chart 8 as a dotted line.) It should be noticed, however, that the curve is much more sharply concave downward and is lower on the scale. This, of course, is to be expected, since the concentration ratios used in the earlier chart represented the aggregate product output of four companies and the lower line in the present chart relates to the output of only one company—the leader.

RELATION BETWEEN VALUE AND PERCENTAGE OF TOTAL VALUE OF PRODUCTS ACCOUNTED FOR BY THE LEADER, BY INDUSTRY GROUPS

As was the case in the preceding section, and for the same reason, it is not possible to show the relation between the value of a product and the percentage of that value accounted for by the leading producer. Although the material may not be reproduced, it should be pointed out that there is no clear-cut relationship between these variables. If the data could be published they would show about the same lack of relation that was revealed in charts 5a and 5b, where the value was plotted against the concentration ratio of each product.

## CHAPTER II

### LEADING PRODUCERS: NUMBER, TYPE, AND FREQUENCY OF APPEARANCE

The analysis of the extent to which the output of individual manufactured products was concentrated in the hands of four companies in 1937, as presented in chapter I, leads to the question: Were these leaders different for each product analyzed or did some companies appear as leading producers of many commodities? The degree to which the same concerns dominated the output of a number of different products throws further light on actual concentration in production as it existed in 1937. Did a company which was one of the leading four manufacturers of a number of products tend to be the largest producer of each of these products or was it more likely to be first in some, second in others, and possibly the third or fourth ranking producer of still other products? Did "central-office companies," i. e., multi-plant concerns, appear more frequently as leaders than "independent establishments," i. e., single-plant concerns? <sup>1</sup>

A total of 3,752 individual companies appeared as one of the leading 4 producers of at least 1 of the 1,807 products included in this study. These companies represented only 2.6 percent of the total number of concerns reporting in the Census of Manufactures in 1937. About three-fifths of 3,752 leading companies were classified by the Bureau of the Census as independents or single-plant companies while the remaining companies were central-office companies or multi-plant concerns. Although central-office companies made up only 3.8 percent of all concerns reporting in the Census of Manufactures, they accounted for 38 percent of the total number of companies appearing as leading manufacturers of the products covered in this study.

These figures, as well as all of the data for the analyses in this chapter, were derived on the basis of the sample. Had all of the products covered in the Census of Manufactures been included in this study the number of companies, the number of appearances, etc., would have been increased, although it is doubtful if the increase would have been proportionate. Leaders for many of the products, which would be included, would be the same central-office companies as those already enumerated in the present study.<sup>2</sup> To the extent that the sample is representative of all products in manufacturing, the relationships revealed in the following paragraphs may be taken as indicative of the situation existing in all manufacturing.

#### FREQUENCY OF APPEARANCE OF SAME COMPANY

Since the number of times a single company appeared as one of the largest 4 producers varied from 1 to 99, a distribution of the companies according to the number of their appearances affords a better pic-

<sup>1</sup> For an extended discussion of the meaning, extent, and significance of central-office companies, see the study of "The Integration of Manufacturing Operations," pt. II, of this study.

<sup>2</sup> For a discussion of the total number of products manufactured by the largest 50 companies, and the number of products not covered by the present sample of which they were leaders, see "The Product Structures of Large Corporations," pt. VI, of this study.

ture of concentration in 1937 than that supplied by totals.<sup>3</sup> The distribution of the number of companies making 1 appearance, 2 appearances, etc., is presented in table 5.

There were 2,656 companies which manufactured a sufficient value of an individual product to place them among the leading 4 producers of that item. Approximately a fifth of the leading producers made 2 or 3 appearances, there being 547 companies and 222 companies at these levels, respectively.<sup>4</sup> Beyond the 4-appearance level, the number of companies which occurred at each level was progressively less until there were but 8 companies making 10 appearances and 9 companies making 11. At the highest appearance levels, one company<sup>5</sup> was among the first 4 producers of 99 products, a second company made 82 appearances, and a third made 72.

TABLE 5.—Frequency of appearance of central-office companies and of independent companies among 4 leading producers, 1937

Appearance level <sup>1</sup>	Number of companies			Appearance level	Number of companies		
	Total	Central offices	Independents		Total	Central offices	Independents
1.....	2,656	755	1,901	19.....	8	8	0
2.....	547	260	287	21.....	2	2	0
3.....	222	138	84	22.....	1	1	0
4.....	98	74	24	25.....	2	2	0
5.....	70	56	14	26.....	1	1	0
6.....	37	32	5	28.....	1	1	0
7.....	22	20	2	30.....	1	1	0
8.....	16	14	2	31.....	1	1	0
9.....	13	12	1	33.....	1	1	0
10.....	8	7	1	34.....	1	1	0
11.....	9	8	1	41.....	1	1	0
12.....	4	4	0	52.....	1	1	0
13.....	6	6	0	72.....	1	1	0
14.....	3	3	0	82.....	1	1	0
15.....	4	4	0	99.....	1	1	0
16.....	5	5	0				
17.....	3	3	0	Total.....	3,752	1,430	2,322
18.....	5	5	0				

<sup>1</sup> Total number of appearances of each company.

#### TYPES OF LEADING COMPANIES

As noted above, 38 percent of the 3,752 companies which appeared as leaders of the products analyzed were central-office companies. In terms of appearances, however, multiplant concerns assumed a more important role, accounting for 59 percent of the total possible appearances.<sup>6</sup>

<sup>3</sup> For purposes of this study a company was said to make as many appearances as there were products of which it was 1 of the largest 4 producers. If it appeared as 1 of these 4 it was said to be a leader. In general, there were 4 appearances for each product. Thus, for the 1,807 products combined it was possible to have 7,228 appearances. Actually there were only 7,201 appearances, owing to the presence in the sample of 27 products for each of which there were only 3 manufacturers in the United States.

<sup>4</sup> For ease of reference to tables 5, 6, and 7, companies which were making one appearance were said to occur at the one-appearance level; those companies making two appearances, at the two-appearance level, etc.

<sup>5</sup> This company actually manufactured 302 census products, but only 142 of them were included in the 1,807 items analyzed in this study.

<sup>6</sup> The total number of appearances of the 1,430 central-office companies was 4,218, while the 2,322 independents appeared 2,983 times. These numbers of appearances were calculated from table 5 by summing the number of central-office companies making 1 appearance multiplied by 1, the number of central-office companies making 2 appearances multiplied by 2, and so on through the 1 central-office company making 99 appearances. The same procedure may be followed for computing the total number of appearances made by independents. In this case, the figures are (1,901×1) (287×2) (84×3) \* \* \* (1×11), which equals 2,983.

Central-office companies outnumbered the independents as leaders, except at the 1- and 2-appearance levels; at the 1-appearance level, single plant concerns outnumbered central-office concerns more than 2 to 1. At the 3-appearance level there were about one and one-half times as many central-office companies as independents, while at the 4-appearance level there were three times as many central-office companies as independents. No independent concern was a leader in more than 11 products.

#### APPEARANCE IN FIRST, SECOND, THIRD, AND FOURTH PLACES

The analysis thus far has been in terms of the leading four companies without regard to their position as first, second, third, or fourth largest producer. The relation between the distribution of appearances by position and the total number of appearances may be examined for the appearance levels through 11 in table 6. This table merely gives the number of companies appearing at least once in each place and gives no indication of the relation between a company's appearance level and the number of times it appears as first, second, third, or fourth largest producer.

TABLE 6.—Number of companies in each place of appearance, at selected appearance levels, 1937

Appearance level	Number of companies at each level	Number of companies <sup>1</sup> appearing at least once to—			
		First place	Second place	Third place	Fourth place
1.....	2,656	488	616	745	807
2.....	547	203	234	249	254
3.....	222	99	134	126	130
4.....	98	69	65	61	61
5.....	70	55	44	53	51
6.....	37	26	33	29	25
7.....	22	19	20	16	13
8.....	16	13	16	14	12
9.....	13	9	12	12	11
10.....	8	7	6	8	7
11.....	9	9	9	9	9

<sup>1</sup> Above the 1-appearance level the same company usually appears in more than one place; thus, the totals for each place at a given appearance level may include the same companies.

It must also be borne in mind that above the 1-appearance level the same company usually appears in several positions. From table 6, for example, 203 of the 547 companies which made 2 appearances made at least 1 of them in first place. Undoubtedly some of these companies made both appearances in first place, but others may have made 1 appearance in first place and another in either the second, third, or fourth place. Thus all the 203 companies in first place may be included in the count of 234 companies in second place or they may be scattered in the counts for third or fourth place.

Of the companies which were leaders in the manufacture of but 1 product, by far the largest number of companies were in third and fourth places. Obviously, the greater the number of products in which a company appeared as a leader the less likely was the company to make those appearances in only 1 place. Thus above the 1-appear-

ance level the companies were more evenly distributed among all 4 places. All of the companies at the 11-appearance level made at least 1 appearance in each place.

A tabulation showing the number of company-appearances of both central-office companies and independents distributed on the basis of appearance place and of appearance level of the companies is presented in table 7. The outstanding feature of this table is the large proportion of appearances in third or fourth place of companies at the low appearance levels and the tendency of companies which made a large number of appearances to have a higher proportion of their appearances in first or second place. A detailed examination of the various appearance levels on the table will, however, reveal some exceptions to this general tendency.

Of the 2,656 companies which appeared as one of the leading producers of a single product, 488 were in first place and 807 in fourth place. At the opposite extreme, the 1 company appearing as a leader in the manufacture of 99 products made 65 of its appearances in first place, and only 5 in fourth place. Companies which were leaders in the production of 2 or 3 products followed the pattern of those making but 1 appearance; that is, they tended to have a higher proportion of their appearances in third or fourth place than in first or second. Specifically, from table 7 it may be seen that at the 2-appearance level there were 245 company-appearances in first place, 274 in second place, 282 in third place, and 293 in fourth place.<sup>7</sup> Above the 3-appearance level, there is a marked tendency for the number of company-appearances to be the largest in first place and to be progressively less in second, third, and fourth place.

Since central offices tended to be the largest producers,<sup>8</sup> a considerably larger number of first-place appearances were made by them than by independent concerns at each appearance level with the exception of the 1-appearance level. At the 1-appearance level, 35 percent of the total number of company-appearances were made by central-office companies and 65 percent by independents; at the 11-appearance level, however, the comparable ratios were 86 percent and 14 percent, respectively.

Examination of the basic data for the 1,807 products reveals that there was a slight tendency for companies having a larger number of appearances to have more of those appearances in products classified in a large number of different industries. There are, however, a number of exceptions to the general trend. For example, the company making 99 appearances made those appearances in products classified in 8 different industries, while 1 concern having 6 appearances was a leader in the manufacture of products belonging in 5 different industries.

<sup>7</sup> It should be noted that the sum of these company-appearances is 1,094 or twice the number of companies (547) listed at the 2-appearance level in table 5. This is due to the fact that each company at this level had 2 appearances and was tallied in each of the places in which it made an appearance. Hence, the term "company-appearance" is used in this table rather than "company" alone. At the 3-appearance level the sum of the company-appearances in the 4 places is 3 times the number of companies at the 3-appearance level in table 5, and similarly for each appearance level.

<sup>8</sup> While central-office companies represented 3.8 percent of the number of manufacturing concerns in 1937, they accounted for 61.1 percent of the value of all manufactured products. For further data on the activities of central-office companies see "The Integration of Manufacturing Operations," pt. II of this study.

TABLE 7.—Frequency of appearance of central-office companies and of independent companies as first, second, third, or fourth largest producer, according to total number of appearances of each company, 1937

Appearance level	First place appearance			Second place appearance			Third place appearance			Fourth place appearance		
	Number of company-appearances			Number of company-appearances			Number of company-appearances			Number of company-appearances		
	Total	Central offices	Independents									
1.....	488	170	318	616	168	448	745	205	540	807	212	595
2.....	245	130	115	274	136	138	282	138	144	283	116	177
3.....	141	90	51	174	106	68	167	99	68	184	119	65
4.....	114	93	21	94	72	19	90	62	28	94	66	28
5.....	97	79	18	87	75	15	82	64	18	84	65	19
6.....	53	39	14	61	55	6	60	54	6	48	44	4
7.....	55	50	5	44	40	4	30	20	1	25	21	4
8.....	44	38	6	30	34	5	27	24	3	18	16	2
9.....	23	23	0	38	32	6	31	29	2	25	24	1
10.....	21	17	4	15	12	3	21	18	3	23	23	0
11.....	29	25	4	20	17	3	24	21	3	26	25	1
12.....	12	12	0	10	10	0	16	16	0	10	10	0
13.....	16	16	0	23	23	0	22	22	0	17	17	0
14.....	18	18	0	9	9	0	10	10	0	5	5	0
15.....	23	23	0	10	10	0	10	10	0	10	10	0
16.....	24	24	0	14	14	0	20	20	0	22	22	0
17.....	17	17	0	17	17	0	8	8	0	9	9	0
18.....	39	19	0	19	19	0	20	20	0	12	12	0
19.....	65	65	0	40	40	0	29	29	0	18	18	0
20.....	17	17	0	8	8	0	14	14	0	3	3	0
21.....	1	1	0	17	17	0	4	4	0	0	0	0
22.....	1	1	0	12	12	0	10	10	0	2	2	0
23.....	9	9	0	12	12	0	2	2	0	3	3	0
24.....	17	17	0	6	6	0	4	4	0	1	1	0
25.....	21	21	0	3	3	0	2	2	0	4	4	0
26.....	23	23	0	4	4	0	1	1	0	3	3	0
27.....	14	14	0	11	11	0	6	6	0	2	2	0
28.....	12	12	0	14	14	0	4	4	0	4	4	0
29.....	8	8	0	27	27	0	3	3	0	3	3	0
30.....	26	26	0	13	13	0	10	10	0	3	3	0
31.....	9	9	0	40	40	0	16	16	0	7	7	0
32.....	35	35	0	21	21	0	16	16	0	10	10	0
33.....	65	65	0	15	15	0	14	14	0	5	5	0

## CHAPTER III

### RELATION OF CONCENTRATION TO VARIOUS PRODUCT CHARACTERISTICS

In order that the possible relations between the concentration ratios and various economic attributes of commodities might be examined, the 1,807 products analyzed in this study were classified on the basis of (1) type of immediate purchaser, (2) type of ultimate user, (3) degree of durability, (4) degree of fabrication, (5) type of market, (6) source of raw materials, (7) construction materials, and (8) producers' supplies. An extended discussion of the nature of these various classifications and of the extent to which they are overlapping may be found in appendix D.

Other interesting and significant economic variables bearing on the production structure or marketing conditions for the products suggested themselves but difficulties in measurement precluded their development and use in this study. Thus, the relation between the concentration ratio of a product and the amount of capital equipment employed in its production might have proved quite revealing. It was impossible as a practical consideration, however, to segregate or allocate the portion of a plant used in the production of item "A" when 50 other items were produced in the same establishment. A separate study is being conducted for the Temporary National Economic Committee in which the relation between the concentration ratios of the products as developed here and the tariff barriers relative to each product is the subject of extended analysis.

In this and succeeding chapters an attempt is made to present in terms of comprehensive measures an over-all view of the economic characteristics of manufactured products. The picture presented relates to the varying characteristics and behavior patterns of all products taken together. As such it affords a general background against which the marketing, production, and price policies of individual firms may be measured. Owing to the paucity of data of a comprehensive nature, sweeping inferences and conclusions on matters of price and production policy have in the past been drawn largely from the few scattered cases for which information was available. The information in a considerable number of these cases was developed in connection with actions of the Federal Trade Commission or of the Antitrust Division of the Department of Justice and thus relates to particular situations where these agencies enter the picture. To overcome this deficiency of general information and to throw some light on the economic factors with which price and production policies of firms producing manufactured goods are associated are the objects of the ensuing analysis.

#### TYPE OF IMMEDIATE PURCHASER

On the basis of the type of immediate purchaser, the 1,807 manufactured products analyzed in this study have been classified as (1) purchased by immediate consumer and (2) purchased by immediate

producer. Of the total products, 511, or 28 percent, were included in the former group and 1,296 in the latter group.

Products whose immediate purchasers were consumers included all finished consumers' goods (only private household units were recognized as consumers). Products whose purchasers were producers included products purchased by those engaged in income producing activities for further processing or fabrication or for materials and equipment to be used in their operations. To be sure, the products were seldom purchased directly from the factory. Rather, the great bulk of products (more especially consumers' goods, since large producers do purchase from manufacturers) undoubtedly went through regular wholesale and retail channels. These distributors, however, who are merely intermediaries, were not taken into consideration in the classification of products.

We are interested here in ascertaining and possibly in measuring the variation in concentration which may have been present in the manufacture of products purchased immediately by consumers and of those purchased by industrial producers. Is the relatively weak bargaining position of consumers in contrast with the stronger position of large producers a conditioning factor in the price and production policies of manufacturers?

#### *Distribution by Concentration Ratio Classes.*

In chart 9 the distributions of number and value of products whose immediate purchasers were consumers or producers are shown for each concentration ratio class. The median of the number of products purchased by consumers fell in the 60 to 70 percent concentration class, whereas the median of the number of products purchased by producers was in the 70 to 80 percent concentration class. Half of the value of products purchased by consumers was accounted for by those products which had concentration ratios below 50 percent, but half of the value of items purchased by producers was accounted for by products with concentration ratios less than 60 percent. An examination of the distributions of the number and value of items purchased by consumers indicates that the number of products was bunched somewhat more heavily in the higher concentration classes. Among products purchased by producers the distribution of number and value was more strikingly different. Nineteen percent of the number of the items purchased by producers had concentration ratios below 50 percent, whereas the value of these products accounted for 38 percent of the total value. The distribution of the number of products purchased by producers was skewed to the left, while the value of these products was more evenly distributed between the high and low concentration ratios. (See table 2D, page 554 for basic data.)

Generally, then, a larger proportion of the number of products purchased by producers was produced under conditions of considerably higher concentration than goods purchased by consumers. The distributions of the value of products purchased by producers and by consumers, however, had the same general conformation and in both cases the more important products valuwisewise had relatively lower concentration ratios.

The high value bars in the 30 to 40 and in the 90 to 100 percent concentration classes in the upper section of the chart are to be accounted for by the inclusion in the first class of all gasoline and in the second of passenger automobiles. As single products, both of these

items had relatively high values and thus tended to break up or give a lumpiness to the distribution. The value of truck and bus tires, steel bars and plates, and tin cans fell in the 70 to 80 percent class in

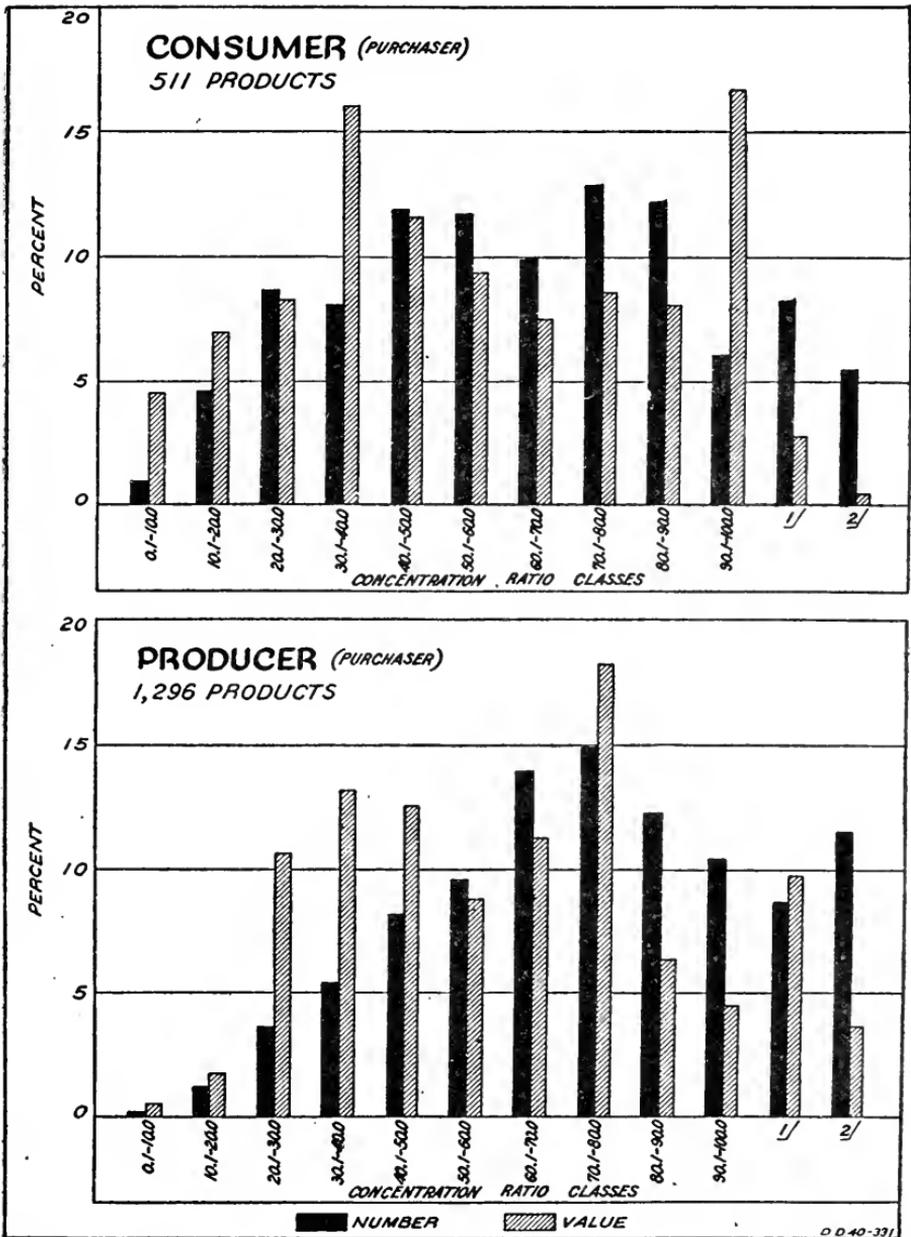


CHART 9.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS ACCORDING TO TYPE OF IMMEDIATE PURCHASER BY CONCENTRATION RATIO CLASSES, 1937.

the lower half of the chart and were responsible for the height of the bar in that class. These products with high relative values appear in subsequent charts of similar nature and tend to make the value distribution uneven.

TABLE 8.—Percentage distribution of number and value of products according to type of immediate purchaser, by industry groups, 1937

Industry group and group number	Products whose immediate purchasers are—													
	Consumers						Producers							
	Total	Food	Clothing and personal items	Household operation	Furniture and furnishings	Recreation	Drugs and medicines	Miscellaneous items	Total	Agricultural	Industrial			
Number	Per-cent													
Number of products.....	1,807	511	83	154	5	147	68	36	18	1,296	23	31	947	295
<b>All industries.....</b>	<b>1,807</b>	<b>100.0</b>	<b>28.3</b>	<b>4.6</b>	<b>8.5</b>	<b>0.3</b>	<b>8.1</b>	<b>2.0</b>	<b>1.0</b>	<b>71.7</b>	<b>1.3</b>	<b>1.7</b>	<b>52.4</b>	<b>16.3</b>
1. Food and kindred products.....	136	100.0	61.0							39.0	5.9		33.1	
2. Textiles and their products.....	290	100.0	39.0	31.4		6.9			.4	61.0		.3	58.6	2.1
3. Forest products.....	99	100.0	54.5		2.0	51.5		1.0		45.5			15.2	30.3
4. Paper and allied products.....	63	100.0								100.0			100.0	
5. Chemicals and allied products.....	212	100.0	17.5					.5	0.5	82.5	6.1		76.4	
6. Products of petroleum and coal.....	18	100.0	27.8			16.7		5.6	2.6	72.2			72.2	
7. Rubber products.....	39	100.0	35.9		17.9			15.4		64.1			41.0	18.0
8. Leather and its manufactures.....	112	100.0	50.0		50.0					50.0			50.0	
9. Stone, clay, and glass products.....	182	100.0	13.2				8.8		4.4	86.8	1.1		75.8	9.9
10. Iron and steel and their products, not including machinery.....	177	100.0	18.1				13.6		1.7	81.9		1.7	76.8	3.4
11. Nonferrous metals and their products.....	55	100.0	10.9				9.1		1.8	89.1			80.0	9.1
12. Machinery, not including transportation equipment.....	365	100.0	14.5				7.1		.8	85.5		6.8	18.1	60.6
13. Transportation equipment, air, land, and water.....	2	100.0	50.0					50.0		50.0				50.0
14. Miscellaneous industries.....	57	100.0	57.9				8.8			42.1			40.3	1.8

Percentage distribution

Products whose immediate purchasers are—

Industry group and group number	All products		Consumers						Producers						
	Value (thousands of dollars)	Per-cent	Total	Food	Clothing and personal items	Household operation	Furniture and furnishings	Recreation	Drugs and medicinal items	Miscellaneous items	Agricultural		Industrial		
											Materials and supplies	Capital equipment	Materials and supplies	Capital equipment	
Value of products (thousands of dollars).....	20,505,683	100.0	14,818,142	4,002,629	2,848,057	377,983	1,409,199	5,767,507	313,835	98,932	14,687,551	368,206	291,760	11,430,229	2,597,356
Percentage distribution															
All industries.....	20,505,683	100.0	50.3	13.6	9.6	1.3	4.8	19.6	1.1	0.3	49.7	1.2	1.0	38.7	8.8
1. Food and kindred products.....	5,119,482	100.0	78.2	78.2	50.0		3.9	(1)			21.8	3.5		18.3	
2. Textiles and their products.....	4,050,032	100.0	54.1				60.0				45.9		( )	45.4	
3. Forest products.....	663,078	100.0	64.7			3.3		1.4			35.3			13.5	
4. Paper and allied products.....	835,369	100.0									100.0			100.0	
5. Chemicals and allied products.....	1,941,180	100.0	17.8					1.5	16.0	.3	82.2	9.5		72.7	
6. Products of petroleum and coal.....	2,482,267	100.0	72.8			14.3		58.3	.2		27.2			27.2	
7. Rubber products.....	729,046	100.0	52.1		8.5			43.2		.4	47.9		.4	20.0	27.5
8. Leather and its manufactures.....	1,143,622	100.0	66.7		66.7						33.3			33.3	
9. Stone, clay, and glass products.....	1,075,835	100.0	14.2				9.9			4.3	85.8	0.2		81.7	3.9
10. Iron and steel and their products, not including machinery.....	3,017,572	100.0	6*9				6.1	.5		.3	93.1		.4	89.9	2.8
11. Nonferrous metals and their products.....	832,833	100.0	5.2				5.1			.1	94.8			89.5	5.3
12. Machinery, not including transportation equipment.....	3,168,945	100.0	24.5				14.1	9.6		.8	75.5		8.7	18.8	47.9
13. Transportation equipment, air, land, and water.....	2,848,786	100.0	81.1					81.1			18.9				18.9
14. Miscellaneous industries.....	1,997,046	100.0	88.1				4.4	83.7			11.9			11.8	.1

\* Less than one-tenth of 1 percent.

*Variations Among Industry Groups.*

In table 8 products purchased by consumers have been broken down by type of use to which the goods was put, i. e., foods, clothing and personal items, household operation items, household furnishings, recreation, drugs and medicines, and miscellaneous items. Products purchased by producers have been subclassified on the basis of whether the buyer was an industrial purchaser or an agricultural purchaser. These latter subclassifications are further subdivided to segregate products purchased for materials and supplies and products that enter the capital equipment of the producer. Both the number and value of products are distributed in each of these classes and subclasses by industry groups.

Of the 1,807 products analyzed in this study more than two-thirds were items normally purchased by industrial buyers and more than half of all products were subclassified as industrial materials and supplies. Listed in this latter classification are all semimanufactured producers' and consumers' goods and construction materials, as well as all producers' supplies.<sup>1</sup>

Although a number of the products analyzed in the paper group were undoubtedly used immediately by consumers, all of the products in this group were classified as industrial materials and supplies purchased by producers. This is attributable to the fact that each product was classified on the basis of its predominant purchaser. The same sort of forced classification probably distorted the distribution of products in other industrial groups, but for the purposes of this study, does not impose any serious limitation on the data.

The chief value of the material presented in table 8 lies in the measure of the extent and distribution of the sample which it affords. A careful scrutiny of variations among industry groups evident from the table will prove of more value than the reading of a descriptive review of the particular grouping of the material in certain classes.

## TYPE OF ULTIMATE USER

When the products are classified on the basis of ultimate user, the composition of the consumer and producer classes differs considerably from the composition of these classes when the products are grouped on the basis of immediate purchaser.

In the first place, the products classified as producers' supplies and construction materials were not differentiated according to producers' and consumers' goods on the basis of ultimate user. Owing to the extreme difficulty of accurately determining the ultimate user (consumer or producer) of these products, they were grouped in the two separate categories listed above. While it could be said with a fair degree of precision that the immediate purchaser of a product was a consumer or a producer, it could not be said with the same degree of accuracy that the ultimate user of the product was a consumer or producer. For example, it was possible to say that the great majority of containers, such as cotton bags and burlap bags, etc., were items whose immediate purchasers were producers, but it was impossible to determine with any degree of accuracy the proportions of containers, lubricants, fuels, etc., that would be used in connection with goods ultimately to be used by consumers or by producers. This same difficulty in classification necessitated the omissions of products in

<sup>1</sup> For a discussion of the composition of the various classifications see appendix D.

these two groups from classification on the basis of degree of durability, while the items listed as producers' supplies were not classified as to degree of fabrication. The exclusion here of products listed as producers' supplies and construction materials reduces the number of products analyzed in this and the subsequent section from 1,807 to 1,328.<sup>2</sup> On the basis of ultimate user, 892 of these products were consumers' and 436 were producers' goods. (See table 9.)

TABLE 9.—Percentage distribution of number and value of products according to type of ultimate user, by industry groups, 1937

Industry group and group number	All products		Products whose ultimate users are	
	Number	Percent	Consumers	Producers
Number of products.....	1,328		892	436
			Percentage distribution	
All industries.....	1,328	100.0	67.2	32.8
1. Food and kindred products.....	126	100.0	100.0	.....
2. Textiles and their products.....	283	100.0	94.7	5.3
3. Forest products.....	87	100.0	65.5	34.5
4. Paper and allied products.....	18	100.0	100.0	.....
6. Chemicals and allied products.....	104	100.0	98.1	1.9
7. Products of petroleum and coal.....	5	100.0	100.0	.....
8. Rubber products.....	36	100.0	66.7	33.3
9. Leather and its manufactures.....	110	100.0	90.0	10.0
10. Stone, clay, and glass products.....	49	100.0	63.2	36.8
11. Iron and steel and their products, not including machinery.....	78	100.0	48.7	51.3
12. Nonferrous metals and their products.....	42	100.0	16.7	83.3
13. Machinery, not including transportation equipment.....	350	100.0	22.6	77.4
14. Transportation equipment, air, land, and water.....	2	100.0	50.0	50.0
16. Miscellaneous industries.....	38	100.0	97.4	2.6

Industry group and group number	All products		Products whose ultimate users are	
	Value (thousands of dollars)	Percent	Consumers	Producers
Value of products (thousands of dollars).....	24,583,211		19,260,403	5,322,808
			Percentage distribution	
All industries.....	24,583,211	100.0	78.3	21.7
1. Food and kindred products.....	4,935,645	100.0	100.0	.....
2. Textiles and their products.....	3,896,820	100.0	98.8	1.2
3. Forest products.....	608,226	100.0	76.3	23.7
4. Paper and allied products.....	253,323	100.0	100.0	.....
6. Chemicals and allied products.....	996,135	100.0	95.0	5.0
7. Products of petroleum and coal.....	1,807,916	100.0	100.0	.....
8. Rubber products.....	723,730	100.0	65.2	34.8
9. Leather and its manufactures.....	1,137,147	100.0	96.9	3.1
10. Stone, clay, and glass products.....	275,196	100.0	84.7	15.3
11. Iron and steel and their products, not including machinery.....	1,893,811	100.0	17.4	82.6
12. Nonferrous metals and their products.....	715,671	100.0	8.6	91.4
13. Machinery, not including transportation equipment.....	3,057,531	100.0	34.9	65.1
14. Transportation equipment, air, land, and water.....	2,848,786	100.0	81.1	18.9
16. Miscellaneous industries.....	1,433,274	100.0	99.9	.1

<sup>2</sup> See appendix D for a further explanation of the criteria used in distinguishing consumers' and producers' goods in this section, in the next section on the degree of durability, and in the section on the degree of fabrication. It should be noted that the products in these three sections were classified with respect to the ultimate product. The characteristics of the final end product were imputed to the intermediate.

In the second place, the composition of the consumer and producer classes differs when products are grouped on the basis of ultimate user as contrasted with the grouping on the basis of immediate purchaser owing to the shifting of a considerable number of products from the producers' to the consumers' category. For example, 90 percent of the pack of canned apples was put up in No. 10 cans and this product was thus included in the list of products whose immediate purchasers were producers. (Bakers, restaurants, hotels, and other producers would be the immediate purchasers for further processing of apples packed in these large-size cans.) The user of this product in its ultimate form, however, would be a consumer and the item was classified as such in this section. There were 511 products whose immediate purchasers were classified as consumers, while 892 products were classified as consumer items on the basis of ultimate user.

#### *Distribution by Concentration Ratio Classes.*

Products destined ultimately for consumer use were produced under conditions of considerably lower concentration than products ultimately to be used by producers. The median of the number of products ultimately used by consumers fell in the 60 to 70 percent concentration class; the median of the number of products ultimately used by producers, however, fell in the 80 to 90 percent concentration class (see chart 10). Furthermore, only 35 percent of the value of products classified as consumer goods was accounted for by products with concentration ratios more than 70 percent, whereas slightly more than 66 percent of the value of producers' goods was accounted for by products with concentration ratios more than 70 percent.

The relatively high value bar in the 70 to 80 percent concentration class for producers' goods—almost one-third of the value of all producers' goods fell in this class—may be accounted for by the presence in that group of all motor trucks and truck tires as well as steel sheets, bars, sheared plates, castings, and several other important iron and steel products. The relatively high value bars in the 30 to 40 and 90 to 100 percent concentration class of the upper chart are again to be accounted for by the presence in those classes of gasoline and of passenger automobiles, respectively.

#### *Variations Among Industry Groups.*

All of the analyzed products of the food, paper, and petroleum and coal groups were classified as consumers' goods on the basis of ultimate user (see table 9). In contrast, the products of the non-ferrous metals, machinery, and iron and steel groups were used predominantly by producers. Such a distribution of products among the industry groups is to be expected, since products made from raw materials of the like nature are usually classified in the same industry group by the Bureau of the Census. Thus, products classified in the iron and steel group had a common raw material which was predominantly used in the manufacture of products ultimately to be used by producers. The distribution of value of products among the industry groups followed the same general pattern as that of the number of products.

Owing to the fact that producers' supplies and construction materials were excluded from the classification in this section, the number of products analyzed in a few of the industries was greatly reduced. The number of products in the petroleum group, for example, dropped

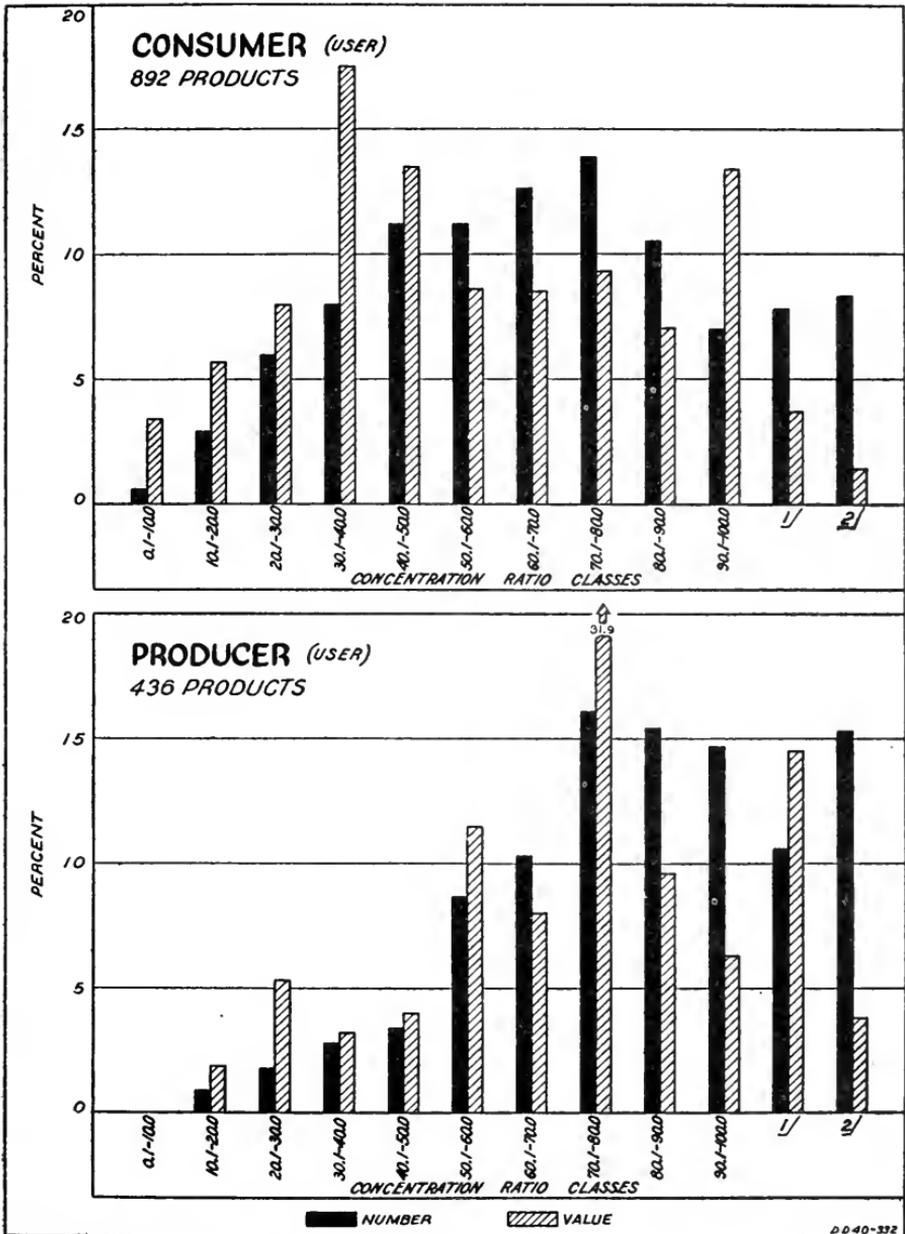


CHART 10.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS ACCORDING TO TYPE OF ULTIMATE USER BY CONCENTRATION RATIO CLASSES, 1937.

from 18 to 5 (9 of the products were listed as producers' supplies and 4 as construction materials).

#### DEGREE OF DURABILITY

The concentration patterns of goods whose use extends over a number of years as contrasted with those which are consumed in a single use are significantly different. The 1,328 products discussed in the preceding section were classified on the basis of their length of service into nondurable, semidurable, and durable goods.<sup>3</sup> In chart 11 the products falling in each category are distributed according to their concentration ratios. Of the 1,328 products, 49 percent were classified as durable, 37 percent as semidurable, and 14 percent as nondurable items.

#### *Distribution by Concentration Ratio Classes.*

Both in terms of number and value of products the proportion of the 650 durable goods tended to increase rather consistently at successively higher concentration levels. In contrast, the proportion of the 190 nondurable goods, both as to number and value, was greatest at the 30 to 50 percent level and tapered off, in general, at the higher levels. Reference to the chart shows that while the distributions in the case of both durable and nondurable goods were not smooth, there was a tendency for the proportion of number and of value of products to move together from concentration level to concentration level.

On the other hand, the 488 semidurable products exhibited different tendencies with respect to the proportions of the number and value of products falling in different concentration classes. The bulk of the value of semidurable products fell below the 50 percent concentration level, while the majority of the number of semidurable products were above the 50 percent concentration level. That is, those products of a semidurable nature having the greater importance in terms of value tended to have lower concentration ratios than products of less importance.

Each of the bars in chart 11 is divided to indicate the proportion of products which may be considered consumers' goods or producers' goods on the basis of the ultimate user of the product. In the durable goods classification, a larger number of items were listed as producers' goods, but the value of these items was slightly less than that for consumers' durable goods. This latter category included the value of all passenger cars. It is the inclusion of the value of passenger cars that accounts for the height of the 90 to 100 percent value bar in the durable goods section of the chart. Owing to the small number of producers' goods in the semidurable goods class and the absence of producers' goods in the nondurable class, the patterns for each of these groups were essentially the same as those for the consumer goods falling in the groups. It should be noted that the consumers' products in each of the three classes, when combined, yield the same group of consumers' goods as was discussed in the preceding section. This is also true of the producers' goods.

<sup>3</sup> The reasons for excluding producers' supplies and construction materials from classification on the basis of the degree of durability were discussed in the preceding section. For further explanation of the criteria of classification, reference is again made to appendix D.

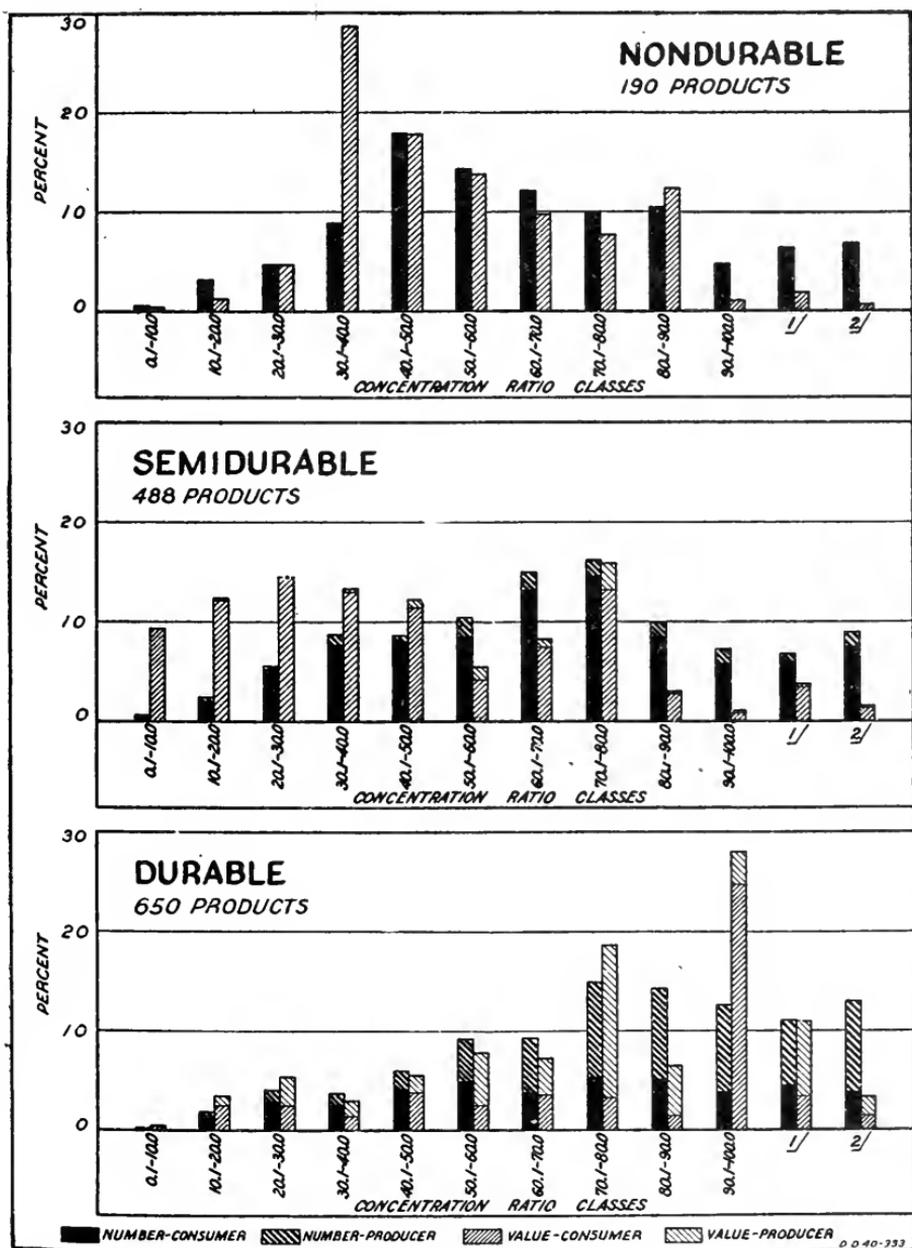


CHART 11.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS ACCORDING TO DEGREE OF DURABILITY BY CONCENTRATION RATIO CLASSES, 1937.

TABLE 10.—Percentage distribution of number and value of products according to degree of durability, by industry groups, 1937

Industry group and group number	All products		Nondurable			Semidurable			Durable		
	Number	Percent	Total	Consumers	Producers	Total	Consumers	Producers	Total	Consumers	Producers
Number of products.....	1,328		190	190		488	425	63	650	277	373
Percentage distribution											
All industries.....	1,328	100.0	14.3	14.3		36.7	32.0	4.7	49.0	20.9	28.1
1. Food and kindred products.....	126	100.0	94.4	94.4		4.8	4.8		8.8	8.1	7.7
2. Textiles and their products.....	283	100.0				91.2	86.6	4.6	96.6	62.1	34.5
3. Forest products.....	87	100.0	3.4	3.4					50.0	50.0	
4. Paper and allied products.....	18	100.0	44.4	44.4		5.6	5.6		17.3	15.4	1.9
5. Chemicals and allied products.....	104	100.0	44.2	44.2		38.5	38.5				
6. Petroleum and coal.....	5	100.0	100.0	100.0							
7. Products of petroleum and coal.....	36	100.0	2.8	2.8		86.0	58.3	27.7	11.2	5.6	5.6
8. Rubber products.....	110	100.0				90.9	83.6	7.3	9.1	6.4	2.7
9. Leather and its manufactures.....	49	100.0				10.4	8.2	8.2	83.6	55.0	28.6
10. Stone, clay, and glass products.....	78	100.0				1.3	1.3		98.7	47.4	51.3
11. Iron and steel and their products, not including machinery.....	42	100.0							100.0	16.7	83.3
12. Nonferrous metals and their products.....	350	100.0								20.0	68.4
13. Machinery, not including transportation equipment.....	2	100.0				10.6	2.6	8.0			
14. Transportation equipment, air, land, and water.....	38	100.0	21.1	21.1		15.8	15.8		100.0	50.0	50.0
15. Miscellaneous industries.....									63.1	60.5	2.6

Industry group and group number	All products		Nondurable			Semidurable			Durable		
	Value (thousands of dollars)	Percent	Total	Consumers	Producers	Total	Consumers	Producers	Total	Consumers	Producers
Value of products (thousands of dollars).....	24, 583, 211	-----	8, 374, 722	8, 374, 722	-----	6, 263, 327	5, 823, 645	439, 082	9, 945, 162	5, 062, 036	4, 883, 126
Percentage distribution											
All industries.....	24, 583, 211	100.0	34.1	34.1	-----	25.5	23.7	1.8	40.4	20.5	19.9
1. Food and kindred products.....	4, 935, 645	100.0	97.0	97.0	-----	1.5	1.5	-----	1.5	1.5	-----
2. Textiles and their products.....	3, 896, 820	100.0	-----	-----	-----	94.2	93.0	1.2	5.8	5.8	-----
3. Forest products.....	698, 226	100.0	5.1	5.1	-----	-----	-----	-----	94.9	71.2	(1) 23.7
4. Paper and allied products.....	253, 323	100.0	38.8	38.8	-----	9	9	-----	60.3	60.3	-----
5. Chemicals and allied products.....	996, 135	100.0	37.6	37.6	-----	35.9	35.9	-----	26.5	21.5	5.0
6. Products of petroleum and coal.....	1, 807, 916	100.0	100.0	100.0	-----	-----	-----	-----	-----	-----	-----
7. Rubber products.....	723, 730	100.0	1.2	1.2	-----	96.6	62.1	34.5	2.2	1.9	3
8. Leather and its manufactures.....	1, 137, 147	100.0	-----	-----	-----	98.1	95.5	2.6	1.9	1.4	5.6
9. Stone, clay, and glass products.....	1, 583, 811	100.0	-----	-----	-----	7.2	6.3	0.9	92.8	78.4	14.4
10. Iron and steel and their products, not including machinery.....	715, 671	100.0	-----	-----	-----	1.0	1.0	-----	99.0	16.4	82.6
11. Nonferrous metals and their products.....	3, 057, 531	100.0	-----	-----	-----	-----	-----	-----	100.0	8.6	91.4
12. Machinery, not including transportation equipment.....	2, 848, 786	100.0	-----	-----	-----	9.6	6.0	3.6	100.4	28.9	61.5
13. Transportation equipment, air, land, and water.....	1, 433, 274	100.0	88.6	88.6	-----	-----	-----	-----	100.0	81.1	18.9
14. Miscellaneous industries.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
15. -----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
16. -----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 Less than one-tenth 1 of percent.

*Variations Among Industry Groups.*

The distribution of the products among the three classes of durability according to industry groups reveals the nature of the products upon which these concentration patterns are based (see table 10). As would be expected, the food group is composed almost entirely of non-durable products, while sizable portions of the products in the paper, the chemical, the petroleum, and the miscellaneous groups were also listed as nondurable. The final users of the five petroleum products included in this category were ascertainable and hence were classified here. The balance of the products of the petroleum group were considered producers' supplies or construction materials and as such were not included. Since one of the leading criteria used in the establishment of the various census industry groups is the nature of the raw material which enters into the product, it is to be expected that this fact would be reflected in the distribution of products in table 10.

The petroleum group was the only group which did not contain items of a durable nature. Products classified in the forest products; the stone, clay, and glass; the iron and steel; the nonferrous metals; the machinery; and the transportation equipment groups were preponderantly durable in nature. Although most of the industry groups contained semidurable products, there were no products classified as semidurable in the forest products, the petroleum, the nonferrous metals, and the transportation equipment groups. The largest proportions of the products in the textiles, the rubber, and the leather groups were classified as semidurable.

In accordance with usual preconceptions, the bulk of the non-durable and semidurable items were as consumers' goods. Among the durable goods, approximately three-fifths of the products were producers' goods. There were, however, wide differences among industry groups in the proportion of products ultimately used by producers or consumers.

## DEGREE OF FABRICATION

A comparison of the distribution of semimanufactured and of finished goods by concentration ratio classes, as presented in chart 12, reveals little difference between the concentration patterns of the two groups. It should be kept in mind in making this comparison that only products which have undergone one or more manufacturing processes are included in this study. If concentration data for raw materials were available, striking differences in concentration patterns would undoubtedly appear.

The sample upon which chart 12 is based includes all types of manufactured products covered in the study with the exception of producers' supplies. These 1,611 products were classified as semimanufactured if the product was not in final form for its ultimate user and as a finished good if the product was in the form in which, without significant alteration, it was employed in its final use.

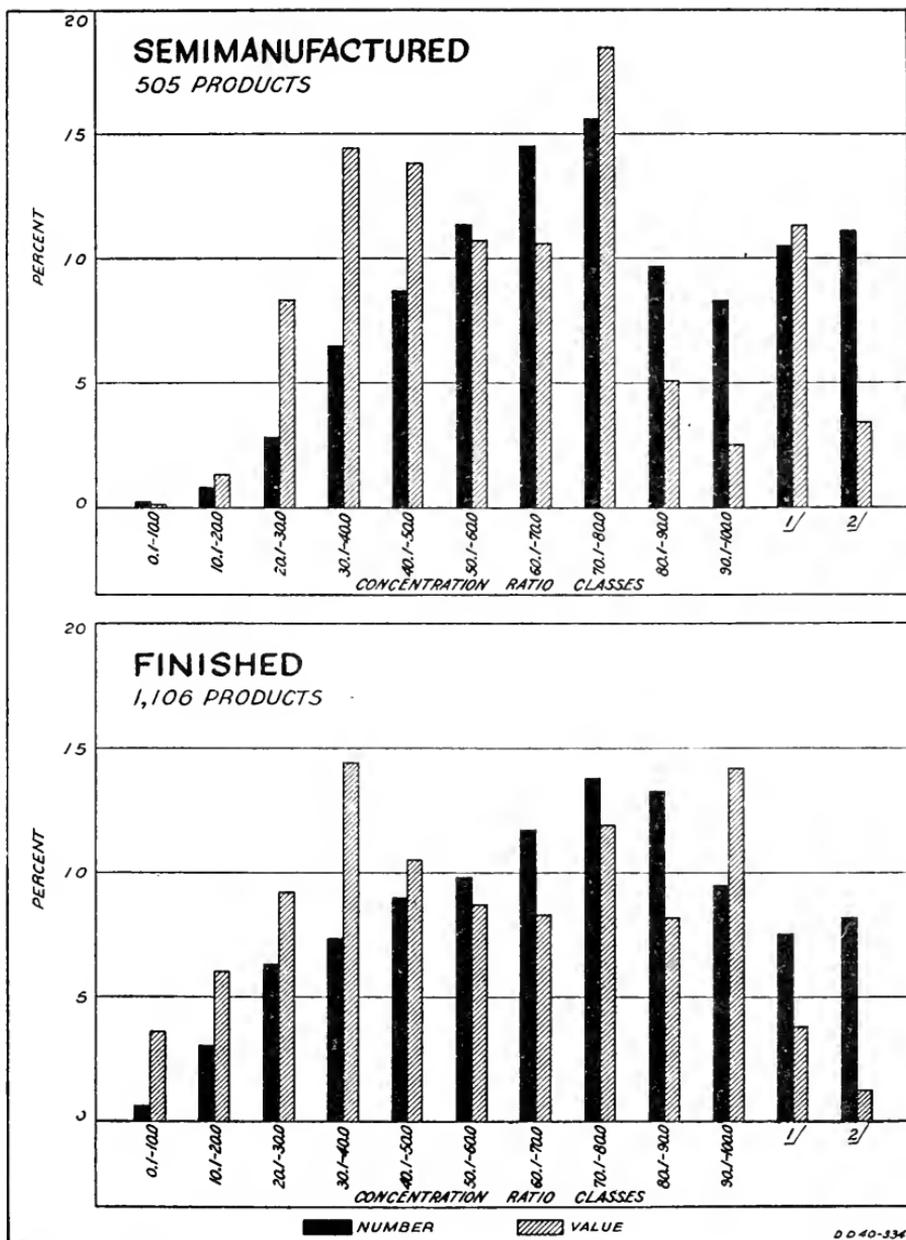


CHART 12.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS ACCORDING TO DEGREE OF FABRICATION BY CONCENTRATION RATIO CLASSES, 1937.



Industry group and group number	All products		Semimanufactured					Finished		
	Value (thous- sands of dollars)	Percent	Total	Con- sumer	Producer	Construction materials	Total	Con- sumer	Producer	Construction materials
Value of products (thousands of dollars).....	26,720,806	.....	6,977,272	4,442,261	2,433,692	101,319	19,743,634	14,818,142	2,889,116	2,036,276
Percentage distribution										
All industries.....	26,720,806	100.0	26.1	16.6	9.1	0.4	73.9	55.5	10.8	7.6
1. Food and kindred products.....	4,936,145	100.0	18.9	18.9	.....	.....	81.1	81.1	.....	.....
2. Textiles and their products.....	3,896,820	100.0	43.2	42.5	.7	(*)	56.8	56.2	.6	.....
3. Forest products.....	642,972	100.0	8.0	5.4	.....	2.6	92.0	66.7	22.5	2.8
4. Paper and allied products.....	291,801	100.0	100.0	86.8	.....	13.2	47.4	26.4	.....	21.0
5. Chemicals and allied products.....	1,306,740	100.0	52.6	46.0	3.8	.....	100.0	97.2	.....	2.8
6. Products of petroleum and coal.....	1,859,643	100.0	19.4	12.7	6.7	.....	80.6	52.2	.....	2.8
7. Rubber products.....	726,395	100.0	32.9	29.8	3.1	.....	67.1	67.1	.....	.4
8. Leather and its manufactures.....	1,437,147	100.0	9.2	8.9	.....	.....	90.8	16.7	.....	69.4
9. Stone, clay, and glass products.....	906,916	100.0	69.5	4.5	55.0	.3	40.5	7.8	3.6	29.1
10. Iron and steel and their products, not including machinery.....	2,671,592	100.0	78.8	2.2	73.9	.....	21.2	5.4	5.5	10.3
11. Nonferrous metals and their products.....	804,211	100.0	15.3	9.2	6.1	.7	84.7	24.5	56.7	3.5
12. Machinery, not including transportation equipment.....	3,168,645	100.0	15.3	.....	.....	.....	100.0	81.1	18.9	.....
13. Machinery, not including transportation equipment.....	2,648,786	100.0	.....	.....	.....	.....	.....	.....	.....	.....
14. Transportation equipment, air, land, and water.....	1,522,693	100.0	1.6	.....	.....	.....	98.4	92.4	.1	5.9
15. Miscellaneous industries.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16. Miscellaneous industries.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

\* Less than one-tenth of 1 percent.

*Distribution by Concentration Ratio Classes.*

Thirty-one percent, or 505 products, fell into the semimanufactured group and 69 percent, or 1,106 items, in the finished group. Slightly more than half of the number of products in each group had concentration ratios above 70 percent. Approximately half of the value of products in each group was accounted for by products having concentration ratios greater than 60 percent. Thus the degree of concentration found in each of the groups, i. e., semimanufactured and finished goods, parallels that for the 1,807 products (see ch. I).

Not only was there a similarity between semimanufactured and finished goods with respect to the concentration class in which the median fell, but the proportion of products at successive concentration levels followed the same pattern. The proportions of the number of semimanufactured and finished goods increased at each concentration level, reaching a maximum at the 70 to 80 percent class, and decreased unevenly thereafter. The proportion of total value of the respective groups increased at each of the concentration levels through the 30 to 40 percent class then fluctuated irregularly over the remaining levels.

*Variations Among Industry Groups.*

Although over twice as many products were included in the finished goods class as in the semimanufactured goods class, it is apparent that both classes included products from nearly all of the industry groups. (see table 11). Regardless of industry group, there must obviously be products in each class at the various stages of manufacture. It will be recalled, however, that this study includes only a portion of the products in each industry group. For this reason, there were no semimanufactured products in the petroleum and coal and in the transportation groups and no finished products in the paper group. The similarity of the concentration patterns of the two types of products may be largely explained by the representation of products from nearly every industry group in each type. In the preceding section rather striking differences in the concentration patterns of nondurable and durable goods were noted. There it was also pointed out that nondurable products did not come from the same industry groups as did durable products.

The distribution of semimanufactured producers' goods and finished producers' goods among concentration ratio classes were quite similar, as were those of semimanufactured and finished construction materials. In the consumer goods subdivisions, however, the distribution of the number of semimanufactured products was skewed further to the left than the distribution of finished goods. Specifically, 22 percent of the semimanufacture and 34 percent of the finished consumer goods had concentration ratios below 50 percent. Table 11 presents the distribution of products in the subclasses by industry groups. As in the preceding section, consumers' and producers' goods were classified on the basis of the ultimate user of the product. All types of construction materials are discussed in a later section of this chapter.

## TYPE OF MARKET

The concentration ratios obtained in this study were computed on a Nation-wide basis. That is, the values of specific products manufactured by the largest four producers of such products were expressed as ratios of the entire United States values of these products. It is important to realize that various factors, such as the perishability or the difficulties of transporting certain products, may cause a small number of producers to dominate the market in the area in which the items are usually sold. Since the number of such areas throughout the United States is large, the proportion of the United States total accounted for by the leading four producers will be small. Thus, as expressed here, the concentration ratios for products such as bread or common brick understate the true concentration situation within the market area.<sup>4</sup> The concentration pattern for the 1,576 products in this study with national markets and for the 231 products with regional markets is reflected in chart 13.

In terms of the number of products, the proportions of the total distributed nationally increased at each successive concentration level through the 70 to 80 percent ratio class. The proportions of those with regional markets increased at each level only through the 30 to 40 percent class and then tended to decline irregularly at each of the successively higher concentration classes. Likewise, the bulk of the value of nationally marketed products tended to be at the higher concentration levels, while that of the regionally distributed products tended to be at the lower concentration levels. Gasoline, paraffin wax, and heavy fuel oils accounted for the high value bar at the 30 to 40 percent class for the nationally distributed products; while complete fertilizers, portland cement, and direct steel castings accounted in large measure for the high proportion of value of regionally distributed products in the 20 to 30 percent concentration class. It is interesting to observe that, notwithstanding the understatement of actual market concentration, well over a third of the 231 regional products, which represented about the same proportion of the total value, had national concentration ratios greater than 60 percent.

In each of the industry groups except paper, rubber, and transportation equipment, there were some products distributed in a regional market. From table 12, the outstanding regionality of iron and steel products among the industry groups is evident. In the forest products; chemicals; stone, clay, and glass; and iron and steel groups the more important products in terms of value were distributed in a regional market. That is, 9.1 percent of the number of products in the forest products group were marketed in a regional area, whereas these same products accounted for 33 percent of the total value of products in this group. Conversely, 91 percent of the number of forest products were distributed in a national market, but the value of these items represented only 67 percent of the total value of forest products.

<sup>4</sup> Experimental work with regional concentration ratios for common brick revealed that for the Los Angeles and the New York City industrial areas the number of companies producing in each of those areas was so small that publication of the concentration ratios was prohibited under the rules of disclosure prescribed by the Bureau of the Census for this study. For the Philadelphia area the ratio was 63 percent. In contrast, the ratio based on all companies in the United States was 7 percent.

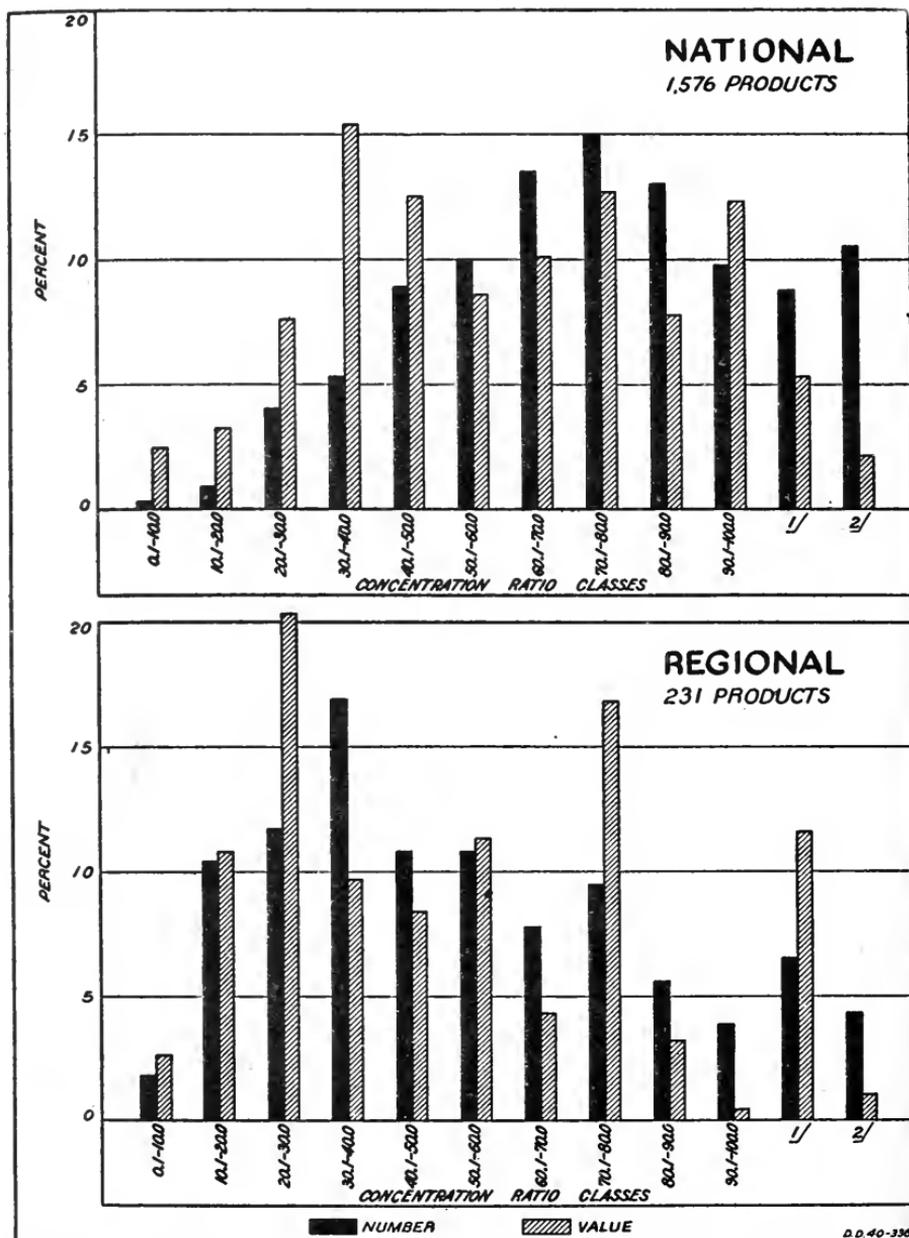


CHART 13.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS ACCORDING TO TYPE OF MARKET BY CONCENTRATION RATIO CLASSES, 1937.

TABLE 12.—Percentage distribution of number and value of products according to type of market, by industry groups, 1937

Industry group and group number	All products		National market	Regional market
	Number	Percent		
Number of products.....	1,807	-----	1,576	
			Percentage distribution	
All industries.....	1,807	100.0	87.2	12.8
1. Food and kindred products.....	136	100.0	79.4	20.6
2. Textiles and their products.....	290	100.0	91.7	8.3
3. Forest products.....	99	100.0	90.9	9.1
4. Paper and allied products.....	63	100.0	100.0	-----
6. Chemicals and allied products.....	212	100.0	96.2	3.8
7. Products of petroleum and coal.....	18	100.0	83.3	16.7
8. Rubber products.....	39	100.0	100.0	-----
9. Leather and its manufactures.....	112	100.0	68.8	31.2
10. Stone, clay, and glass products.....	182	100.0	77.5	22.5
11. Iron and steel and their products, not including machinery.....	177	100.0	58.8	41.2
12. Nonferrous metals and their products.....	55	100.0	89.1	10.9
13. Machinery, not including transportation equipment.....	365	100.0	99.5	.5
14. Transportation equipment, air, land, and water.....	2	100.0	100.0	-----
16. Miscellaneous industries.....	57	100.0	96.5	3.5

Industry group and group number	All products		National market	Regional market
	Value (thousands of dollars)	Percent		
Value of products (thousands of dollars).....	29,505,693	-----	25,327,844	4,177,849
			Percentage distribution	
All industries.....	29,505,693	100.0	85.9	14.1
1. Food and kindred products.....	5,119,482	100.0	91.0	9.0
2. Textiles and their products.....	4,050,032	100.0	91.1	8.9
3. Forest products.....	663,078	100.0	67.0	33.0
4. Paper and allied products.....	835,369	100.0	100.0	-----
6. Chemicals and allied products.....	1,941,180	100.0	91.1	8.9
7. Products of petroleum and coal.....	2,482,267	100.0	98.2	1.8
8. Rubber products.....	729,046	100.0	100.0	-----
9. Leather and its manufactures.....	1,143,622	100.0	70.4	29.6
10. Stone, clay, and glass products.....	1,075,835	100.0	63.8	36.2
11. Iron and steel and their products, not including machinery.....	3,017,572	100.0	30.8	69.2
12. Nonferrous metals and their products.....	832,833	100.0	92.3	7.7
13. Machinery, not including transportation equipment.....	3,168,945	100.0	99.3	.7
14. Transportation equipment, air, land, and water.....	2,848,786	100.0	100.0	-----
16. Miscellaneous industries.....	1,597,646	100.0	99.0	1.0

SOURCE OF RAW MATERIAL

The wide variety of raw materials which are used in manufacturing the products analyzed in this study suggests another approach to the investigation of the relationship between the concentration in the output of products and various product characteristics. Is there any relationship between the source of basic materials and the concentration ratios of the products?

For the purposes of this study four major sources of the basic materials were recognized: (1) agricultural materials, including all materials originating on farms, ranches, etc.; (2) mineral products, including all materials from mines, quarries, etc.; (3) forest products; and (4) miscellaneous materials, including all materials from the sea, air, and other sources. In those cases where a product was composed of materials from more than one source it was classified according to its principal source.

Of the 1,807 products analyzed in the study, the basic raw material for 31 percent of the items came from agricultural sources and these products accounted for 40 percent of the total value of all products analyzed; 56 percent of the products were made from materials which came from mines and these items accounted for 51 percent of the total value of product; while 13 percent were produced from forest materials and these provided 9 percent of the total value of product. (A small percentage of the products were made from the materials derived from the sea, air, and other miscellaneous sources.)

#### *Distribution by Concentration Ratio Classes.*

The concentration patterns of the products derived from agricultural and mineral sources showed marked differences as may be seen in chart 14. Thirty-five percent of the number of products manufactured from agricultural materials had concentration ratios of less than 50 percent, while only 16 percent of the products from mineral sources fell within these lower concentration classes. On the basis of value this difference is equally evident. Fifty-seven percent of the value of products from agricultural sources and only 31 percent of the products derived from minerals had concentration ratios of less than 50 percent. The proportion of the number of products derived from forest materials was fairly constant in each concentration class while the proportion of value tended to be quite small above the 70 to 80 percent concentration class.

These comparisons suggest certain general inferences which may be drawn with respect to the relationship between the source of the basic material for a product and its concentration ratio. On the basis of both number and value of product, products fabricated from agricultural materials tended to have relatively low concentration ratios while products fabricated from minerals tended to have high concentration ratios. In contrast to the tendency of products derived from agricultural and mineral sources to bunch more heavily in the low and high concentration classes, respectively, those products which were predominantly manufactured from forest materials tended to be rather evenly distributed among the concentration classes.

#### *Variations Among Industry Groups.*

The Bureau of the Census industry groupings are based in most cases on similarity in the character of the principal materials used in the fabrication of the products within the industries. Thus, it is to be expected that in each industry group a predominant portion of the basic materials going into the products classified in the group would come from one source. In table 13 it can be seen that practically all products classified in 9 of the 14 industry groups analyzed in this study were made from a basic material derived from only one specified source; products of 1 group were fabricated from raw materials from

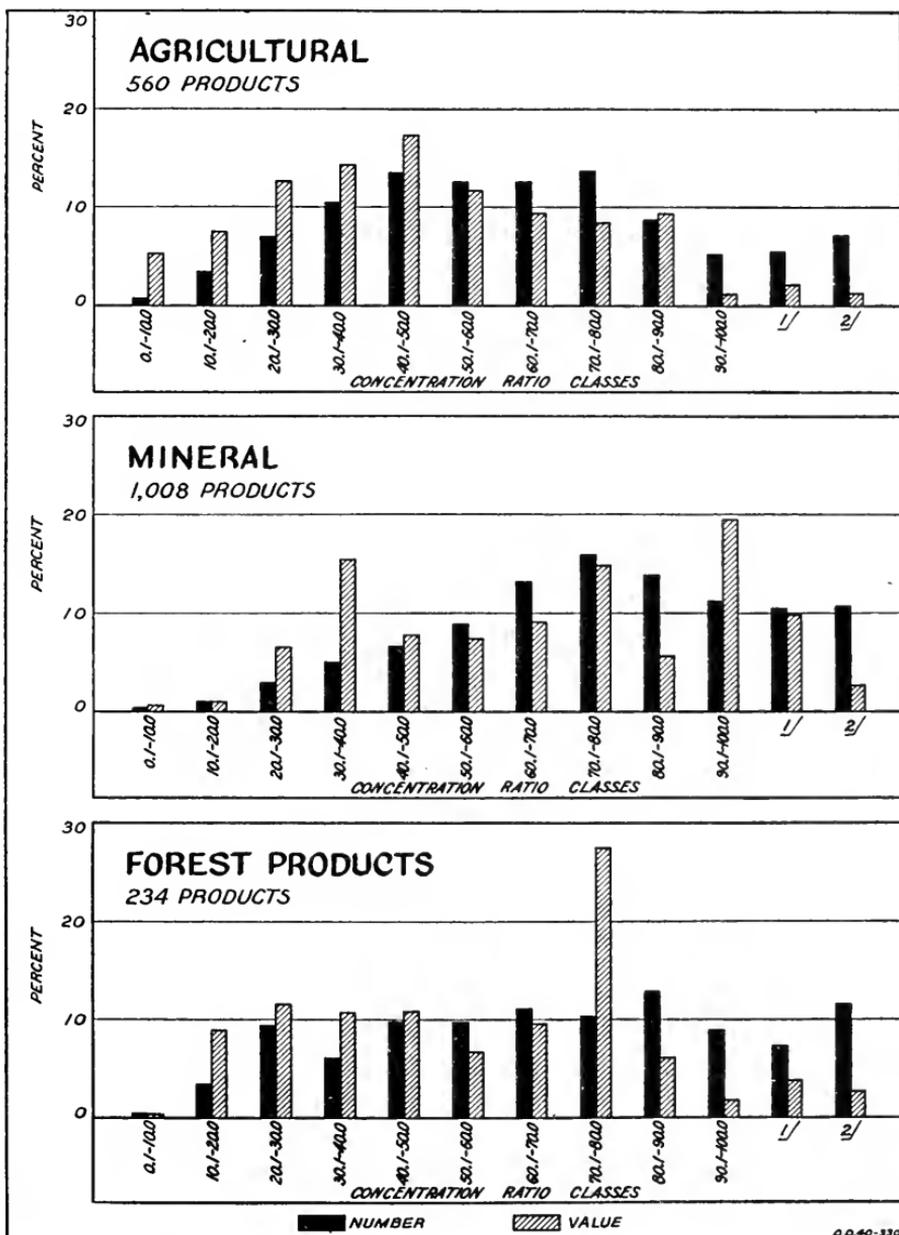


CHART 14.—DISTRIBUTION OF NUMBER AND VALUE OF PRODUCTS ACCORDING TO SOURCE OF RAW MATERIALS BY CONCENTRATION RATIO CLASSES, 1937.

2 of the basic sources; 3 groups used materials from 3 sources; while the chemicals group secured its materials from all 4 of the sources.

TABLE 13.—Percentage distribution of number and value of products according to source of raw material, by industry groups, 1937

Industry group and group number	All products		Agricultural	Mineral	Forest	Other
	Number	Percent				
Number of products.....	1, 807	-----	560	1, 008	234	5
			Percentage distribution			
All industries.....	1, 807	100. 0	31. 0	55. 8	13. 0	0. 2
1. Food and kindred products.....	136	100. 0	100. 0	-----	-----	-----
2. Textiles and their products.....	290	100. 0	81. 4	3. 1	15. 5	-----
3. Forest products.....	99	100. 0	1. 0	31. 3	67. 7	-----
4. Paper and allied products.....	63	100. 0	11. 1	-----	88. 9	-----
6. Chemicals and allied products.....	212	100. 0	23. 1	66. 5	8. 0	2. 4
7. Products of petroleum and coal.....	18	100. 0	-----	100. 0	-----	-----
8. Rubber products.....	39	100. 0	-----	-----	100. 0	-----
9. Leather and its manufactures.....	112	100. 0	100. 0	-----	-----	-----
10. Stone, clay, and glass products.....	182	100. 0	-----	100. 0	-----	-----
11. Iron and steel and their products, not including machinery.....	177	100. 0	-----	99. 4	. 6	-----
12. Nonferrous metals and their products.....	55	100. 0	-----	100. 0	-----	-----
13. Machinery, not including trans- portation equipment.....	365	100. 0	-----	99. 7	. 3	-----
14. Transportation equipment, air, land, and water.....	2	100. 0	-----	100. 0	-----	-----
16. Miscellaneous industries.....	57	100. 0	33. 3	52. 6	14. 1	-----

Industry group and group number	All products		Agricultural	Mineral	Forest	Other
	Value (thou- sand of dollars)	Per- cent				
Value of products (thousands of dollars).....	29, 505, 693	-----	11, 828, 881	15, 063, 494	2, 556, 294	57, 024
			Percentage distribution			
All industries.....	29, 505, 693	100. 0	40. 1	51. 0	8. 7	0. 2
1. Food and kindred products.....	5, 119, 482	100. 0	100. 0	-----	-----	-----
2. Textiles and their products.....	4, 050, 032	100. 0	91. 4	1. 6	7. 0	-----
3. Forest products.....	663, 078	100. 0	. 1	17. 2	82. 8	-----
4. Paper and allied products.....	835, 369	100. 0	25. 5	-----	74. 5	-----
6. Chemicals and allied products.....	1, 941, 180	100. 0	15. 1	66. 7	15. 3	2. 9
7. Products of petroleum and coal.....	2, 482, 267	100. 0	-----	100. 0	-----	-----
8. Rubber products.....	729, 046	100. 0	-----	-----	100. 0	-----
9. Leather and its manufactures.....	1, 143, 622	100. 0	100. 0	-----	-----	-----
10. Stone, clay, and glass products.....	1, 075, 835	100. 0	-----	100. 0	-----	-----
11. Iron and steel and their products, not including machinery.....	3, 017, 572	100. 0	-----	99. 9	. 1	-----
12. Nonferrous metals and their products.....	832, 833	100. 0	-----	100. 0	-----	-----
13. Machinery, not including trans- portation equipment.....	3, 168, 945	100. 0	-----	99. 9	. 1	-----
14. Transportation equipment, air, land, and water.....	2, 848, 786	100. 0	-----	100. 0	-----	-----
16. Miscellaneous industries.....	1, 597, 646	100. 0	84. 5	11. 2	4. 3	-----

Three variations should be noted in connection with the foregoing findings. The materials used in the manufacture of one product in the machinery group and one in the iron and steel group were obtained from a non-mineral source. The portion of the total number and value

of product accounted for by these products, however, was so small that these two industry groups may be said to have obtained all their materials from one source. The third and most significant variation to be noted is associated with products classified in the forest products group where both metal furniture and furniture constructed of wood are included. The inclusion of metal and wood furniture in the same group may be explained by the fact that the Bureau of the Census makes some industry classifications on the basis of similarity of use of the product instead of the materials used. Thus it is necessary in some cases to include in a particular group certain products which are made from materials other than those treated as basic for the group.

#### CONSTRUCTION MATERIALS AND PRODUCERS' SUPPLIES

Almost 16 percent of the 1,807 products analyzed in this study were classified as construction materials and 11 percent as producers' supplies. The construction materials represented 7 and the producers' supplies 9 percent of the total value of the 1,807 products.

##### *Construction Materials.*

A comparison of the concentration patterns of construction materials in terms of number of product with that in terms of value of product reveals that the more important construction items value-wise were produced under conditions of lower concentration. (See chart 15.) Approximately three-fifths of the 283 construction items representing one-third of the value of these items, was accounted for by products with concentration ratios greater than 60 percent. The proportion of the number of construction materials reached the highest level at the 60 to 70 percent class and then tended to decrease. In contrast with this pattern, the percentages of the value in each class rose sharply in the 20 to 30 percent class and then showed successive decreases, with one exception, at each of the subsequent concentration classes. The very high value bar in the 20 to 30 percent concentration class was caused largely by the bunching there of products from the chemicals; the stone, clay, and glass; and the iron and steel industry groups.

In interpreting these patterns for purposes of price and other types of economic analysis it should be kept in mind that many of the products included as construction materials were distributed largely in regional markets. Hence the same limitations mentioned in the preceding section with respect to the meaning of the concentration ratios for regional products apply. In table 14, it can be seen that the major portion of the construction materials were classified by the Bureau of the Census in the stone, clay, and glass and in the iron and steel groups. With the exception of the chemical group, only a small proportion of the total number of construction materials was classified in any one of the other industry groups. In terms of the total number of products analyzed in each group, the proportion classified as construction materials was also highest in the stone, clay, and glass and in the iron and steel groups.

##### *Producers' Supplies.*

The products classified as producers' supplies exhibited concentration patterns, both in terms of number and of value, somewhat similar to those for construction materials. From chart 15 it is evident that

the proportion of the number of producers' supplies tended to be greater at each of the concentration levels, with one exception, through the 60 to 70 percent class. The highest value bar, however, occurred

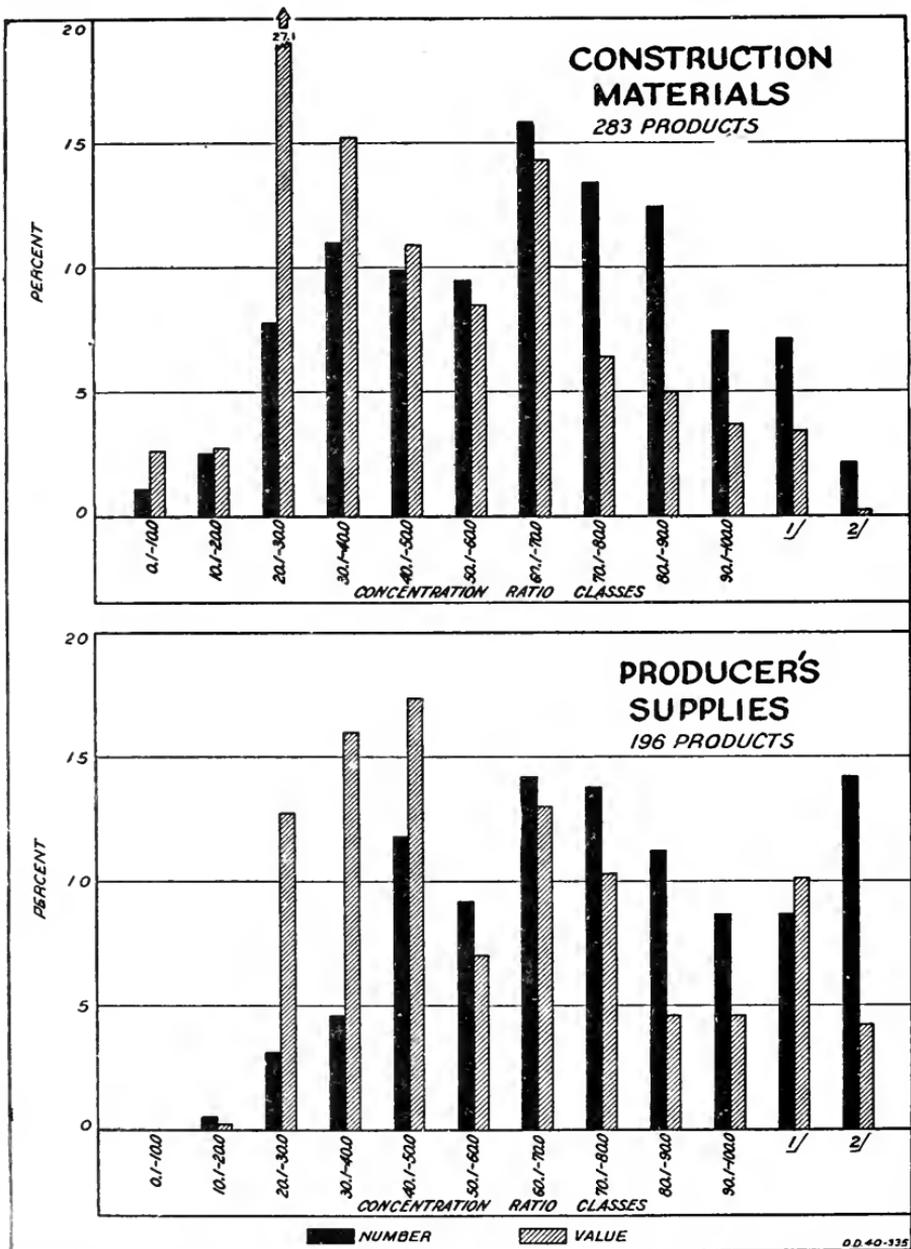


CHART 15.—DISTRIBUTION OF NUMBER AND VALUE OF CONSTRUCTION MATERIALS AND PRODUCERS' SUPPLIES BY CONCENTRATION RATIO CLASSES, 1937.

at the 40 to 50 percent class. Twenty percent of the number of producers' supplies had concentration ratios below 50 percent but these products accounted for 46 percent of the value

As would be expected, the largest proportions of products classified as producers' supplies came from the paper and chemicals groups. (See table 14.) It is these two groups which include the bulk of the containers and auxiliary purpose chemicals for numerous manufacturing processes. Products of the petroleum group, such as fuels and lubricants, represented only 4.6 percent of the total number of producers' supplies. This low percentage may be accounted for by the fact that only a small number of products in the petroleum group were included in the total number of products analyzed. Half of the total number of petroleum products analyzed, however, were classified as producers' supplies; the corresponding ratios for the paper and chemicals groups were 67 percent and 39 percent, respectively.

TABLE 14.—Percentage distribution of number and value of construction materials and of producers' supplies, by industry groups, 1937

Industry group and group number	Construction materials		Producers' supplies	
	Number	Percent	Number	Percent
All industries.....	283	100.0	196	100.0
1. Food and kindred products.....	1	0.4	9	4.6
2. Textiles and their products.....			7	3.6
3. Forest products.....	8	2.8	4	2.1
4. Paper and allied products.....	3	1.1	42	21.4
6. Chemicals and allied products.....	25	8.8	83	42.3
7. Products of petroleum and coal.....	4	1.4	9	4.6
8. Rubber products.....	1	.4	2	1.0
9. Leather and its manufactures.....			2	1.0
10. Stone, clay, and glass products.....	110	38.8	23	11.7
11. Iron and steel and their products, not including machinery.....	91	32.2	8	4.1
12. Nonferrous metals and their products.....	12	4.2	1	.5
13. Machinery, not including transportation equipment.....	15	5.3		
14. Transportation equipment, air, land, and water.....				
16. Miscellaneous industries.....	13	4.6	6	3.1

Industry group and group number	Construction materials		Producers' supplies	
	Value (thousands of dollars)	Percent	Value (thousands of dollars)	Percent
All industries.....	2,137,595	100.0	2,784,887	100.0
1. Food and kindred products.....	500	( <sup>1</sup> )	183,337	6.6
2. Textiles and their products.....			153,212	5.5
3. Forest products.....	34,746	1.6	20,106	.7
4. Paper and allied products.....	38,478	1.8	543,568	19.5
6. Chemicals and allied products.....	310,605	14.5	634,440	22.8
7. Products of petroleum and coal.....	51,727	2.4	622,624	22.4
8. Rubber products.....	2,665	.1	2,651	.1
9. Leather and its manufactures.....			6,475	.2
10. Stone, clay, and glass products.....	631,720	29.6	168,919	6.1
11. Iron and steel and their products, not including machinery.....	777,781	36.5	345,980	12.4
12. Nonferrous metals and their products.....	88,540	4.1	28,622	1.0
13. Machinery, not including transportation equipment.....	111,414	5.2		
14. Transportation equipment, air, land, and water.....				
16. Miscellaneous industries.....	89,419	4.2	74,953	2.7

<sup>1</sup> Less than one-tenth of 1 percent.

#### SUMMARY

By way of a recapitulation, the distribution of products among the various major bases of classification and the break-down by type within each major group are brought together in table 15. The products in this table are distributed by industry groups and the same sort of distribution by concentration ratio classes is presented in table 2D through 9D in appendix D.

TABLE 15.—Distribution of the 1,807 products by product characteristics and by industry groups, 1937

Industry group and group number	Type of immediate purchaser		Type of ultimate user*		Degree of durability*			Degree of fabrication*		Type of market			Source of raw material			Construction materials	Producers' supplies
	Consumer	Producer	Consumer	Producer	Non-durable	Semi-durable	Durable	Semi-manufactured	Finished	Regional	National	Agricultural	Mineral	Forest	Other		
All industries.....	1,807	511	1,296	436	190	488	650	505	1,106	231	1,576	560	1,008	234	5	283	196
1. Food and kindred products.....	136	83	53	126	119	6	1	44	83	28	108	136	9	45	---	1	9
2. Textiles and their products.....	280	113	177	268	---	258	25	163	120	24	266	236	9	4	---	---	7
3. Forest products.....	99	54	45	57	3	---	84	6	89	9	90	1	31	67	---	8	4
4. Paper and allied products.....	63	37	26	18	8	1	9	21	63	---	63	7	---	56	---	3	42
5. Chemicals and allied products.....	212	37	175	102	2	46	18	70	59	8	204	49	141	17	5	25	83
6. Products of petroleum and coal.....	18	5	13	5	5	---	---	---	9	3	15	---	18	---	---	4	9
7. Rubber products.....	39	14	25	24	1	31	4	13	24	---	39	---	---	39	---	1	2
8. Leather and its manufactures.....	112	56	56	99	11	100	10	54	56	35	77	112	---	---	---	---	2
9. Stone, clay, and glass products.....	182	24	158	31	18	8	41	9	150	41	141	---	182	---	---	110	23
10. Iron and steel, and their products, not including machinery.....	177	32	145	38	40	---	77	37	132	73	104	---	---	1	---	91	8
11. Nonferrous metals and their products.....	55	6	49	7	35	---	42	33	21	6	49	---	---	---	---	12	1
12. Machinery, not including transportation equipment.....	365	53	312	79	271	37	313	51	314	2	363	---	---	1	---	15	---
13. Transportation equipment, air, land, and water.....	2	1	1	1	1	---	2	---	2	---	---	---	---	---	---	---	---
14. Miscellaneous industries.....	57	33	24	37	8	6	24	4	47	2	55	19	30	8	---	13	6

\* Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

## CHAPTER IV

### CHANGES IN CONCENTRATION, IN QUANTITY PRODUCED AND IN AVERAGE REALIZED PRICE FROM 1935 TO 1937

In the preceding chapters the extent of concentration, as measured by the proportion of the total value of a product accounted for by the largest four producers, gives a cross-section picture of the product structure in manufacturing for the year 1937. To what extent does the concentration picture change from one biennial census to another? If shifts in the concentration ratios of products occurred, were the increases or decreases in certain types of products more pronounced than in others or, again, were the changes in certain lines of activity more pronounced than in others? Were changes in concentration paralleled by variations in quantity produced and by changes in average realized price?

A study of the changes in the concentration ratios for 392 products which were identical in 1935 and 1937 offers tentative answers to these questions. Such a study also throws light on the actual course of concentration in the 2-year period. To appraise the reliability of the trends indicated by an analysis of these census products, the methods of their selection and their relation to the sample of 1,807 products analyzed for 1937 are set forth in some detail.

#### COMPOSITION OF THE 1935-37 SAMPLE

In order to develop the methods and techniques to be used in this study of the "Concentration of Production in Manufacturing," a number of products were analyzed using data from the 1935 Census of Manufactures. At the time the plans for the study were being made the 1937 data had not yet become available. The items to be analyzed in this preliminary work were chosen not so much for the purpose of obtaining a representative sample which would reflect the situation in all manufacturing as to indicate the various types of problems which would be met in the extensive study of the 1937 data. Altogether the 1935 data were analyzed for 392 products. These products were also included among the larger sample of 1,807 commodities. For 225 of the 392 products, quantity as well as value data were available for analysis and for these products it was possible to compute average realized prices.

Although the method of selection of the 1935-37 sample would not necessarily assure a representative sample, the products are, nevertheless, reasonably typical of all manufactured products. The representativeness of the 392 products may be checked against the comprehensive sample. Two measures suggest themselves: Are the distributions of the 1937 concentration ratios similar for the 392 and for the 1807 products? Are the products in these two samples distributed in a similar fashion among the industry groups?

The distribution in table 16 indicates that the 392 products offer a fairly representative cross-section of the concentration picture of the larger group. Therefore, the general tendencies noted in the following analyses are probably indicative of the situation respecting all manufacturing.

A further indication of the dependableness of the sample of 392 products is the closeness with which the relative number of products classified in each industry group in it follows that of the sample of 1807 products. In table 17 the distributions of the two samples may be examined. The most marked discrepancies occur in the textile and machinery groups, there being underrepresentation in the former and overrepresentation in the latter. There is no evidence available, however, to indicate that the shifts in concentration in these two groups were radically different from those in other groups. There were no products from the forest products, the rubber products, the leather, the nonferrous metals, and the transportation equipment groups included in the smaller sample. The number of analyzed products in each of these groups, however, constituted a relatively small proportion of the total 1807 products.

TABLE 16.—*Relation between the distributions of number and value of products for the 1937 sample and the 1935-37 sample, by concentration ratio classes*

Concentration ratio class	1937 sample		1935-37 sample*	
	Products	Percentage	Products	Percentage
	Number			
Total .....	1, 807	100.0	392	100.0
0.1 to 10.0 .....	8	.4	1	.3
10.1 to 20.0 .....	38	2.1	2	.5
20.1 to 30.0 .....	90	5.0	18	4.6
30.1 to 40.0 .....	123	6.8	25	6.4
40.1 to 50.0 .....	166	9.2	48	12.2
50.1 to 60.0 .....	183	10.1	53	13.5
60.1 to 70.0 .....	230	12.7	64	16.3
70.1 to 80.0 .....	259	14.3	56	14.3
80.1 to 90.0 .....	218	12.1	39	9.9
90.1 to 100.0 .....	164	9.1	38	9.7
(1) .....	153	8.5	36	9.2
(2) .....	175	9.7	12	3.1
	Value (thousands of dollars)			
Total .....	29, 505, 693	100.0	8, 626, 459	100.0
0.1 to 10.0 .....	711, 095	2.4	34, 010	.4
10.1 to 20.0 .....	1, 270, 300	4.3	19, 599	.2
20.1 to 30.0 .....	2, 758, 967	9.4	326, 529	3.8
30.1 to 40.0 .....	4, 314, 384	14.6	2, 111, 546	24.5
40.1 to 50.0 .....	3, 521, 436	11.9	1, 799, 305	20.9
50.1 to 60.0 .....	2, 654, 925	9.0	1, 451, 143	16.8
60.1 to 70.0 .....	2, 732, 775	9.3	833, 322	9.7
70.1 to 80.0 .....	3, 913, 852	13.2	854, 603	9.9
80.1 to 90.0 .....	2, 098, 223	7.1	213, 927	2.5
90.1 to 100.0 .....	3, 115, 851	10.6	208, 588	2.4
(1) .....	1, 827, 858	6.2	695, 215	8.0
(2) .....	586, 027	2.0	78, 672	9.0

\*This distribution is based on the 1937 concentration ratios of the products.

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 17.—*Relation between the distributions of number of products in the 1937 sample and the 1935-37 sample, by industry groups*

Industry group and group number	1937 sample		1935-37 sam., 'e	
	Number of products	Percentage	Number of products	Percentage
Total.....	1,807	100.0	392	100.0
1. Food and kindred products.....	136	7.5	28	7.2
2. Textiles and their products.....	290	16.0	9	2.3
3. Forest products.....	99	5.5	0	0
4. Paper and allied products.....	63	3.5	13	3.3
6. Chemicals and allied products.....	212	11.7	53	13.5
7. Products of petroleum and coal.....	18	1.0	17	4.3
8. Rubber products.....	39	2.2	0	0
9. Leather and its manufactures.....	112	6.2	0	0
10. Stone, clay, and glass products.....	182	10.1	53	13.5
11. Iron and steel and their products, not including machinery.....	177	9.8	70	17.9
12. Nonferrous metals and their products.....	55	3.0	0	0
13. Machinery, not including transportation equipment.....	365	20.2	136	34.7
14. Transportation equipment, air, land, and water.....	2	0.1	0	0
16. Miscellaneous industries.....	57	3.2	13	3.3

## RELATION OF CONCENTRATION RATIOS IN 1935 AND 1937

The over-all picture of the shifts in concentration experienced by the 392 census products between 1935 and 1937 indicates no "wholesale" movement toward an increase or decrease in concentration ratios. In chart 16<sup>1</sup> the great majority of the product points fall very close to the heavy diagonal line which represents "no change" in concentration ratios at the various levels in the two-year period. It should also be noted that there is no tendency for greater percentage changes to occur at the higher concentration levels than at the lower levels. The few products which exhibited marked changes are scattered along the entire concentration ratio range.

By way of explanation of the material presented in chart 16, it is pointed out that if the concentration ratio for a product in 1937 were the same as in 1935 the product point would fall on the heavy, solid diagonal line. If the concentration in 1937 were more than in 1935 the point would fall to the right of this diagonal line at a point opposite the 1935 concentration ratio and above the 1937 ratio. The distance in each case measured horizontally between the diagonal line and the actual location of the point gives the change in percentage *points*. For convenience in comparison, the calculated percentage changes are shown on the chart by the light dash and light solid lines (the measurement in this case must also be along a horizontal line).

The distribution of products in terms of the percentage changes in their concentration ratios is presented in table 18. Almost two-thirds of the products showed "no change" or an increase or decrease of less than 10 percent in their concentration ratios. Approximately 8 percent of the products underwent more than a 20 percent increase and about 7 percent experienced a decrease of more than 20 percent.

The levels of economic activity in the 2 years under study differed greatly. In the field of manufacturing, the quantity of goods produced in 1937 was 30 percent more than that in 1935, as measured by the Bureau of the Census index. It might be expected that so great an increase in manufacturing activity would be accompanied by

<sup>1</sup>The points on the chart which are indicated by solid dots represent products for which quantity data are available, and which serve as a basis for the later analyses in this chapter. See appendix C for the basic data for 1935.

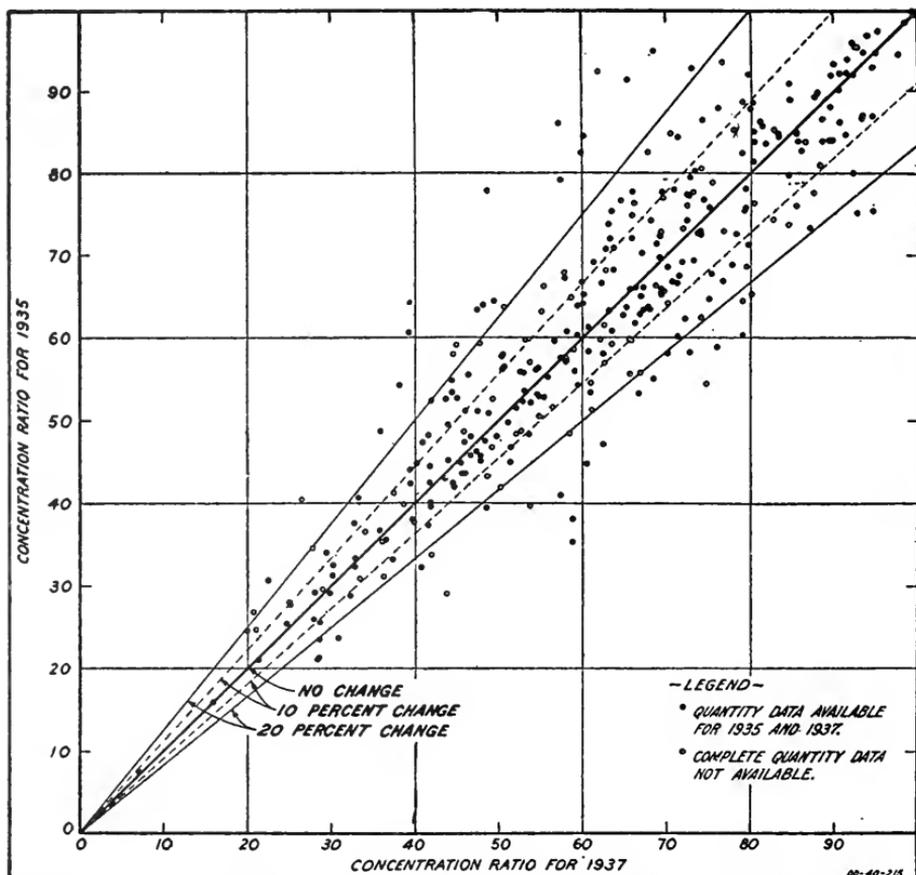


CHART 16.—RELATION BETWEEN CONCENTRATION RATIOS IN 1935 AND 1937.

marked changes in concentration ratios. The changes which actually took place, however, were not only relatively small but were symmetrically distributed as to increases and decreases. The balance of products tending toward higher concentration against those tending toward lower concentration in the entire manufacturing economy should not lead one to overlook important movements among individual products.

TABLE 18.—*Distribution of products by the percentage change in concentration ratios between 1935 and 1937*

Percentage change in concentration ratios, 1935-37	Products	
	Number <sup>1</sup>	Percent
Total.....	325	100.0
Over 20 percent increase.....	25	7.7
10.1 to 20.0 percent increase.....	29	8.9
0.1 to 10.0 percent increase.....	103	31.7
No change.....	6	1.8
0.1 to 10.0 percent decrease.....	94	28.9
10.1 to 20.0 percent decrease.....	46	14.2
Over 20 percent decrease.....	22	6.8

<sup>1</sup> The number of products included in this distribution is less than 392 owing to the impracticability of computing a percentage change for those products with concentration ratios indicated by "(1)" or "(2)" in either or both years.

It is the contention here that the changes in concentration ratios are essentially random in nature, not only for the particular interval under study but also for longer periods of time. The reasons underlying this position center in the fact that each product appears to have its own peculiar set of distinct and separate factors which determine its behavior. Many of these factors may be formulated in general terms and may be applied to all sections of the manufacturing process. Nevertheless, they affect each product at different times in varying degrees, so that for a given period they form a unique set of conditions for each product or for a group of closely related products.

## RELATION OF TYPE OF PRODUCT TO CHANGE IN CONCENTRATION

Products of like nature did not exhibit a similar degree or direction of change in their concentration ratios between 1935 and 1937. An examination of the products listed in appendix C reveals a wide variety of changes among products in the same industry, among competing products, among products fulfilling the same types of wants, among products purchased by the same group of users, etc. Furthermore, products which increased in concentration did not show materially different characteristics from those products which decreased in concentration. The products listed in appendix C were classified according to various criteria and summarized in table 19. In each classification about as many products showed increases as decreases with the exception of semidurable and durable goods and producers' supplies.

TABLE 19.—*Distribution of products by product characteristics and by changes in concentration ratios between 1935 and 1937*

Product characteristics <sup>1</sup>	Total number of products	Number of products showing—		
		Increases	No change	Decreases
All products.....	325	157	6	162
Type of immediate purchaser:				
Consumer.....	67	27	1	39
Producer.....	258	130	5	123
Type of ultimate user: <sup>2</sup>				
Consumer.....	120	52	1	67
Producer.....	57	27	2	28
Degree of durability: <sup>3</sup>				
Nondurable.....	24	10	0	14
Semidurable.....	29	20	0	9
Durable.....	124	49	3	72
Degree of fabrication: <sup>2</sup>				
Semimanufactured.....	67	33	0	34
Finished.....	235	108	6	121
Type of market:				
Regional.....	49	19	1	29
National.....	276	138	5	133
Source of raw material:				
Agricultural.....	41	16	0	25
Mineral.....	266	130	6	130
Forest.....	17	10	0	7
Other.....	1	1	0	0
Construction materials.....	125	62	3	60
Producers' supplies.....	23	16	0	7

<sup>1</sup> Definitions of the various product characteristics and the methods of classification of products are presented in appendix D.

<sup>2</sup> Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.



Number of industry group, in which product is classified	Product	Percentage change from 1935 to 1937			Concentration ratio, 1935	Value of product (thousands of dollars)		Number of companies producing	
		Concentration ratio	Quantity produced	Average realized price		1935	1937	1935	1937
DECREASES									
13	Electric toasters, non-antomatic.....	-20.0	+19.7	+8.3	52.4	1,574	2,052	22	22
13	Radio-phonograph combinations.....	-21.1	+147.4	-25.0	92.8	2,461	4,567	14	14
11	Parts for coal and wood stoves, ranges, and heaters.....	-22.8			26.8	2,375	2,371	93	89
11	Gas water heaters without storage tanks.....	-23.3			58.0	1,631	3,059	30	35
4	Miscellaneous folding boxboards (bending).....	-23.3	+31.3	+15.3	64.4	7,661	11,598	29	28
11	Regulators for cooking and heating apparatus.....	-24.0			59.1	2,373	5,667	36	57
10	Enameled tile and glazed ceramic mosaic.....	-24.6	+127.7	+6.9	63.4	3,551	8,470	15	19
16	Rye whiskey.....	-25.1	-34.1	-10.0	63.4	33,190	19,777	31	32
6	Asphalt grit roll roofing.....	-26.3	+2.8	+3.6	48.7	11,058	11,801	25	26
10	Clear lacquers.....	-26.4	+56.8	+11.6	30.6	12,862	22,587	205	200
2	Hollow brick.....	-27.3	+3.3	-46.9	79.1	.89	50	14	20
10	Shirtings, all-wool woolen, all-wool worsted, and all other.....	-27.4	-50.6	+146.3	82.5	8,810	10,810	19	40
10	Vitreous china stails.....	-27.8	+79.8	+6.3	94.9	466	890	8	10
16	Tar-saturated felt.....	-28.4	+82.4	-13.0	91.3	1,816	2,880	12	20
11	Fuel oil furnace-burner units.....	-28.6	+221.2	-19.8	84.3	1,004	2,600	8	23
11	Corn and bourbon whiskey.....	-29.5	-12.4	-19.4	54.3	100,688	70,927	61	85
11	Steel boilers, steam and hot-water heating.....	-33.0			92.4	2,496	9,477	12	10
16	Asphalt brick siding.....	-33.4			86.0	1,243	1,933	10	15
11	Gas room heaters.....	-34.2			40.4	3,212	6,714	36	57
6	Dry or paste water paints and calcimines.....	-37.8	+20.5	+25.0	77.0	5,298	7,622	77	89
11	Laundry and orchard stoves.....	-37.6			60.5	5,789	1,504	24	46
7	Paraffin wax.....	-38.7	+18.5	+10.5	64.3	14,447	19,213	34	34

<sup>1</sup> As used by the Division of Manufactures, Bureau of the Census.

A study of the characteristics of products which experienced changes in concentration of 20 percent or more between 1935 and 1937 points up the material of table 19 and lends support to the contention that changes are random in nature. Data on these products, 25 of which experienced significant increases in concentration and 22 of which experienced decreases of 20 percent or more, are presented in table 20. Examination of these materials seems to indicate the lack of any general aspect which is common to the products in each group.

When the products are classified according to various criteria used in table 19, the same type appears among both increases and decreases. Thus, it cannot be said, for example, that consumers' goods tended to increase in concentration while producers' goods tended to decrease or vice versa. Nor did products, which in many cases were manufactured by the same companies, show consistent changes in their concentration ratios. Products which were important in value terms exhibited no greater likelihood to increase than did unimportant products. Further, there appeared to be no association between the magnitude of change in the concentration ratios of products between 1935 and 1937 and the highness of their ratios in 1935. It may be said, however, that products which had decreases in concentration tended more frequently to have higher concentration ratios than did products with increases.

Since there is an inverse relationship between the number of companies producing a product and the degree of concentration of that product,<sup>2</sup> a decrease in the number of companies between 1935 and 1937 might be expected to result in an increase in concentration ratios. It is apparent from table 20, however, that among products having increases in concentration about an equal number of products showed increases and decreases in the number of producing companies. Among products having decreases in concentration, there were several instances in which the number of companies decreased, but by far the greater proportion of the products showed an increase in the number of producers.

Since these and other general factors tend to be equally characteristic of products showing either increases or decreases in concentration, the key to the explanation of changes in concentration thus appears to be associated with the unique conditions which surrounded the production of each product during this period.

#### RELATION BETWEEN DEGREE OF CONCENTRATION AND CHANGES IN QUANTITY PRODUCED AND IN AVERAGE REALIZED PRICE

Since the average realized price of a census product is used in this and subsequent chapters, it is well at this point to investigate the nature and limitations of this measure. It was derived by dividing the total value of a census product in 1935 and in 1937 by the quantity of that product manufactured in those years. Thus "price" and quantity data became available for the same product. Although the price measure as here employed should be considered a price only in a special sense, for the purposes of this study, it is more desirable than existing price indexes proper. Its several limitations will be discussed in detail later, but certain advantages should also be pointed out.

<sup>2</sup> See ch. I, charts 3a and 3b.

It is a net realized price. It reflects the actual per unit return on a manufactured product and avoids the fiction which surrounds nominal or quoted prices as used in the typical indexes. Frequently a commodity will be quoted at an unchanged price over a number of years and thus to the extent that indexes include this type of quotation they will remain relatively unchanged. Actually, the manufacturers of the product may have shaved or cut the price of the item drastically in periods when business was slow and boosted it as economic conditions improved without the change being recorded in the quoted price.

The average realized price figures go a long way toward overcoming this difficulty. The manufacturer reports to the Bureau of the Census the total dollar volume of his production for the particular year and the number of units of products involved; thus the actual amount received per unit by the manufacturer is reflected in the average realized price.<sup>3</sup> All sorts of rebates, special allowances, quantity discounts, cash discounts, freight absorption, and extras would tend, therefore, to be reflected in the realized figures reported to the Bureau of the Census by manufacturers. If one is interested in studying the relation between changes in price and changes in quantity in any particular period, it would seem advisable to use some measure of price that reflects these "concealed" price changes rather than to use a price quotation that is purely nominal.<sup>4</sup>

The use of average realized prices for census products should be accompanied by a full understanding of the nature of prices in this form. Furthermore, the users of these data should be familiar with the area within which the figures have meaning.

In the first place, it should be stressed that a census product is not a unique and homogeneous commodity over a period of time, nor does it always have precise specifications. Rather, a product as defined by the Bureau of the Census frequently covers a number of separate, but closely related, items. Under one census product classification there may be included several different and differentiated economic commodities. For example, the census product, "men's dress shoes, welted, including Silhouwelt" covers all men's welted dress shoes regardless of price class, brand name, marketing channels, material, color, and other elements of physical make-up. This classification includes all dress shoes regardless of whether they are made of calf or kid, whether they are for formal or informal wear, whether they sell at retail for \$3 or \$15, etc. Obviously, under these conditions the average realized price is not to be interpreted as the market price of a unique commodity.

In the second place, a further difficulty growing out of the lack of homogeneity is encountered when comparisons are made over a period of time during which general economic conditions may have experi-

<sup>3</sup> The limitation of census data on price arising out of the differences between the values received from interplant transfer and sales to outsiders is minimized in this study since interplant transfers were not included in the "quantity produced" nor in the "value of product" figures.

<sup>4</sup> The difficulties which confront the statistician in the construction of a price index which accurately reflects changes in terms of sale, special group prices, and changes in the quality of the product are discussed at some length by Dr. Willard L. Thorp in an article entitled "Price Theories and Market Realities," American Economic Review Supplement, March 1936, pp. 15-22. For an extended discussion of the validity of the Bureau of Labor Statistics price indexes (which may be considered as typical of good price indexes) and a comparison of these indexes with average realized prices computed from the census data, see an article by Saul Nelson appearing as appendix 1 in *The Structure of the American Economy*, pp. 173-85, National Resources Committee, U. S. Government Printing Office; also an article "Producers' Goods Prices in Expansion and Decline," by Lloyd G. Reynolds, *Journal of the American Statistical Association*, March 1939, p. 32. It is interesting to note that in these studies the validity of individual price quotations as used in the typical price index is checked against the average realized prices computed from census data.

enced marked change. Individuals who bought \$6 shoes in 1935 may have shifted their purchases to \$12 shoes in 1937. Thus, it would be possible for average realized prices to show a marked increase between 1935 and 1937 without there having been a change in either the total number of shoes produced or in the price of a particular brand of shoes. Brand A, the \$6 shoe in 1935, may still have been sold at an unchanged price in 1937 and brand B, the \$12 shoe, may likewise have experienced no change in price, yet if relatively more of brand B were purchased in 1937 than brand A, the average realized price would have been higher. In this instance, the usual price index would show no change in price. This shift in consumer purchases imposes an even more serious limitation over longer periods when consumer income is changing rapidly, i. e., over the 1929-33 recession period or over the 1933-37 recovery period.

A third difficulty arises in connection with the custom in some lines of changing the quality of a product, rather than its price, with changes in economic conditions. Thus in the case above, brand A shoe which sold at \$6 in 1935 and at \$6 in 1937 may have been inferior in quality in the latter year as compared with the former. This change in the quality of a product over a period of time is a particularly elusive and almost immeasurable element which it is extremely difficult to express in price terms in an index. Although this difficulty should constantly be kept in mind, it is not peculiar to the average realized price derived from the census data. Rather, this limitation is common to all types of price indexes.

Notwithstanding these restrictions on the use to which the data may be applied it is believed that they serve as an appropriate basis for an investigation of changes in price and quantity. Their very differences from the usual types of price indexes afford another approach to the problems of interest here.

If the concentration ratios for 1935 were known, could valid approximations of the changes in quantity and average realized price of a product be estimated? From chart 17 it is apparent that there is little, if any, relation between the extent of concentration in 1935 and either the change in quantity produced or in the average realized price between 1935 and 1937. The scatter of the product points at each concentration level makes any statement of general tendency impossible. This lack of co-variation is not confined to the period 1935-37, but is also apparent in the other and longer periods studied in chapter V.

#### RELATION OF PERCENTAGE CHANGE IN CONCENTRATION RATIOS AND CHANGE IN QUANTITY PRODUCED AND IN AVERAGE REALIZED PRICE

The scatter of the products plotted in chart 18 reflects the general increases in quantity produced and in average realized price that would be expected in the 1935-37 period of rising industrial activity.

An inspection of the right and left hand segment of each section of the chart reveals about an equal division of the product points on either side of the line showing "no change" in concentration ratio. That is, about an equal number of products showed increases in concentration as showed decreases. This is to be expected, from the nature of the distribution given in table 18. It is interesting to note,

moreover, that products in which the quantity produced decreased or increased were equally likely to have been products in which the production of the largest four companies either diminished or increased. Likewise the increases and decreases in realized price over the two-year period were evenly divided between products with positive and with negative changes in concentration.

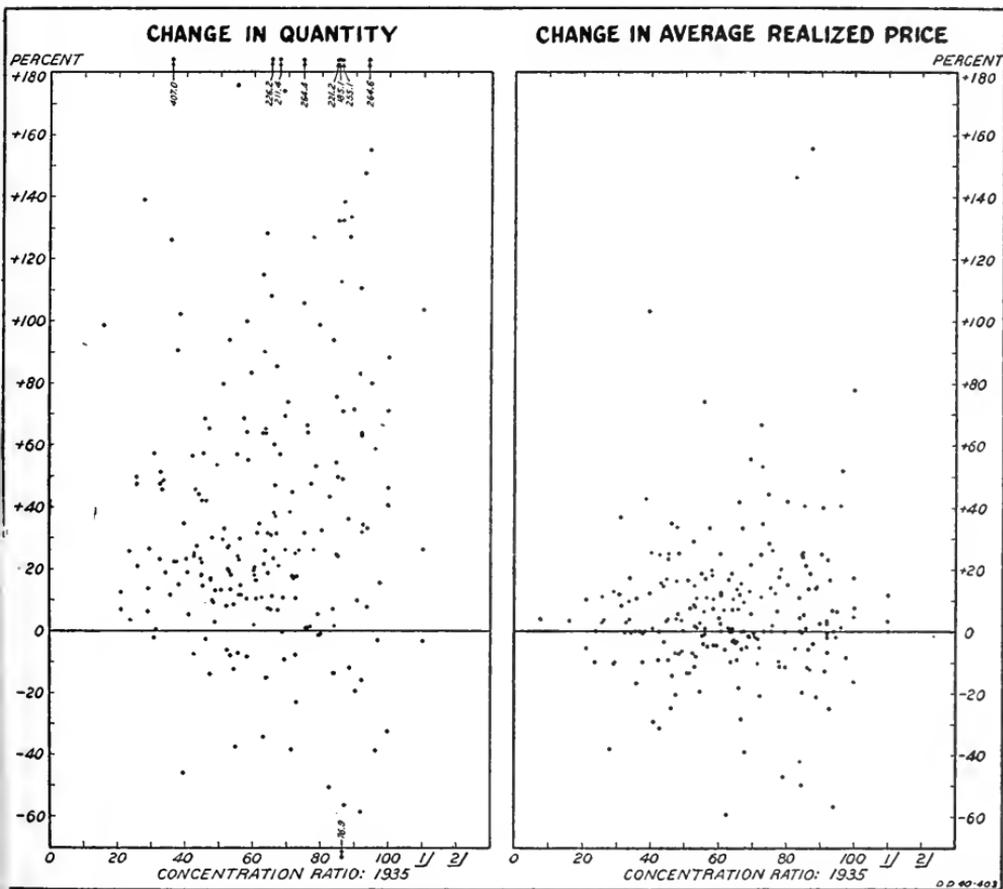


CHART 17.—RELATION BETWEEN CONCENTRATION RATIO IN 1935 AND CHANGE IN QUANTITY PRODUCED AND IN AVERAGE REALIZED PRICE, 1935 TO 1937.

The data in chart 17 did not support the hypothesis that in a period of increasing industrial activity the products having high concentration ratios experienced smaller price increases and larger increases in quantity produced than was true for products with low concentration ratios. The distribution of product points in chart 18 reveals further that there is no particular or distinct pattern of change in quantity output or in price associated with large or small increases in concentration. The randomness of these distributions may be due to the shortness of the period under study, but it is more probably due to the fact that the degree of concentration is not the dominating factor in determining changes in quantity output and in realized price.

## CONTINUITY OF LEADERSHIP IN 1935 AND 1937

Not only did the period 1935-37 fail to show striking "wholesale" shifts of concentration ratios, but further analysis of the data reveals that the same companies tended to be leaders in 1937 that were among the first four producers in 1935. For 256<sup>5</sup> of the 392 products it was possible to enumerate the cases in which the four leaders in 1937 were also the largest producers in 1935. For 19 percent of these prod-

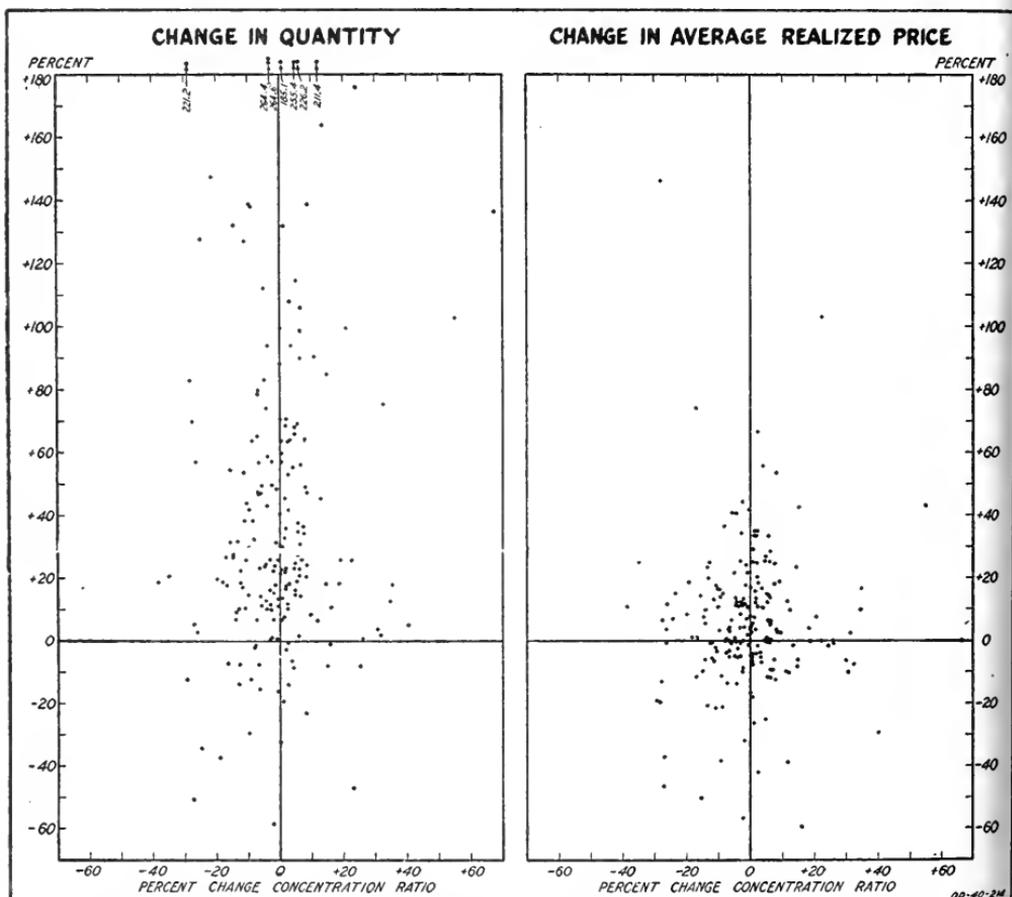


CHART 18.—RELATION BETWEEN CHANGE IN CONCENTRATION RATIO AND CHANGE IN QUANTITY PRODUCED AND IN AVERAGE REALIZED PRICE, 1935 TO 1937.

ucts the same four companies appeared as leaders in both years; for 41 percent of the products three companies were among the first four in both years; for 7 percent two companies remained leaders, and for 11 percent one company was the same for both years. In only 2 percent of the cases (four products) were all four of the largest companies in 1937 different from those in 1935.

Although there were not sufficient products available for analysis to warrant publishing separate percentage figures for each industry,

<sup>5</sup> Due to differences in coding by the Bureau of the Census in 1935 and in 1937 it was impossible in the case of many industries to determine the identity of the leadership in the two years. Moreover, consolidation of companies by various methods made comparison impractical for a number of products. It was decided to omit all such cases rather than to make comparisons where the data were of questionable validity.

it may be stated that for over two-thirds of the products in the meat packing industry and for about a third of those in the petroleum refining and gypsum products industries the same four companies were leaders in both years. The same three companies were leaders in 1935 and 1937 for approximately one-fourth to two-thirds of the products in the clay products, paint and varnish, gypsum products, electrical machinery, and petroleum refining industries. In each of these industries there was a tendency for the same three or four companies to be leaders in the output of several different products.

In such industries as those involving the manufacture of plumbing fixtures, tin cans, radios, refrigerators, and asphalt roofing there were no products for which all four leaders were identical in 1935 and 1937. Insofar as the 256 products may be considered representative, it may be said that products for which the same four companies were leaders from year to year were manufactured in industries which were relatively well established and which were not subject to "style" or "model" changes.

The location of the product points above each number on the horizontal axis in chart 19a is determined by the concentration ratio and the extent of the continuity of leadership for each product. This means that for the four products distributed among the concentration ratios above the "0", there was no continuity of leadership; the leading four producers of these four products in 1937 were different from the four leaders in 1935. For each product point above "1," it means that only one company that appeared as one of the leading four producers of that product in 1935 also appeared in 1937, etc.

Evidence afforded by chart 19a indicates that products which had a larger number of leaders that were identical in 1935 and 1937 tended to have somewhat higher concentration ratios. There is, however, a wide range of concentration at each of the company ordinates, so that any general statement is subject to considerable limitation.

The sample of 256 products for which data on the continuity of leadership are available parallels the 1935 sample of 392 products in having a fairly equal distribution of increases and decreases in concentration ratios between 1935 and 1937 (see chart 19b)<sup>6</sup>. In both samples, however, the proportion of products having decreases in concentration was somewhat greater than the proportion having increases.

<sup>6</sup> The product points in chart 19b are somewhat less than 256 because actual concentration ratios could not be computed for some products. To have done so would have violated the rules regarding disclosures set forth by the Bureau of the Census for this study.

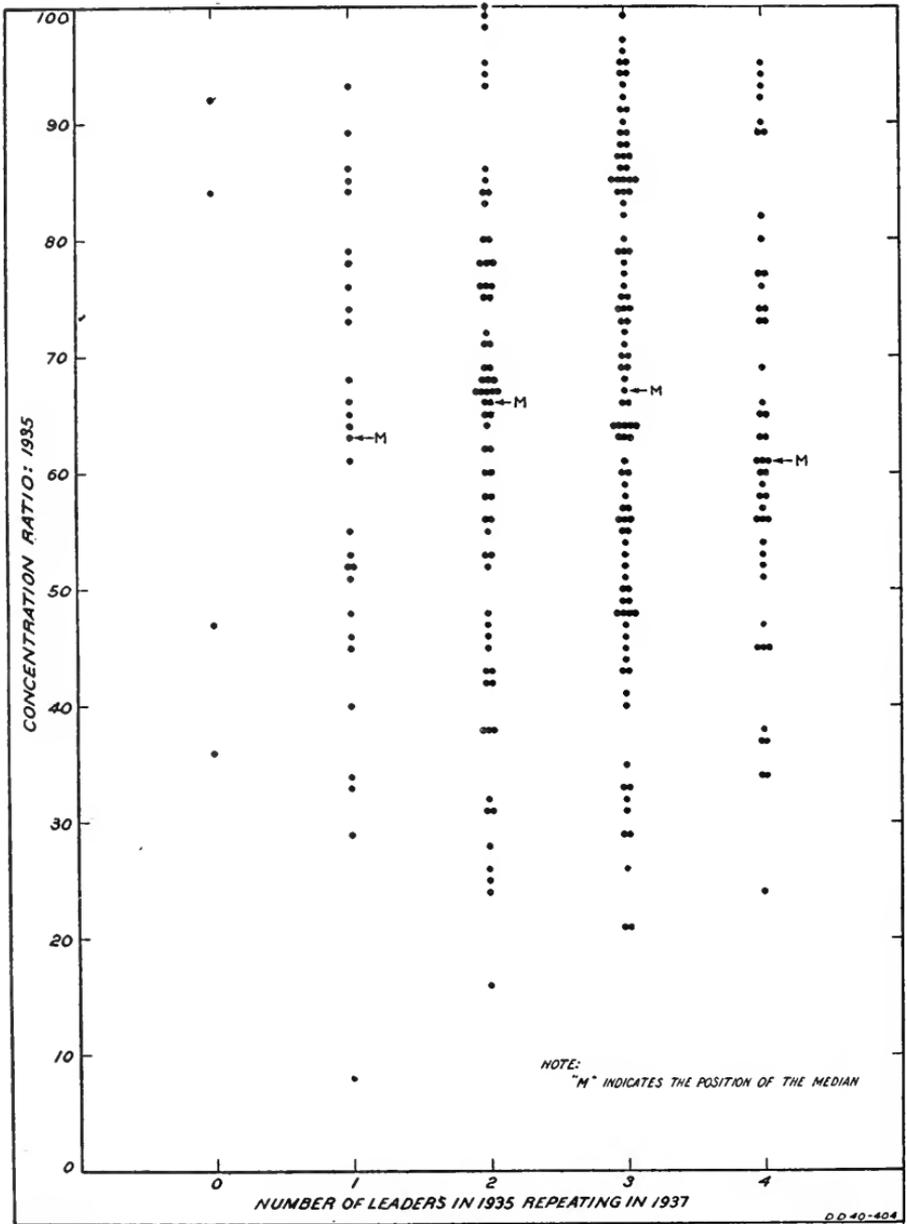


CHART 19a.—RELATION BETWEEN NUMBER OF COMPANIES WHICH WERE LEADERS IN 1935 AND 1937 AND CONCENTRATION RATIO.

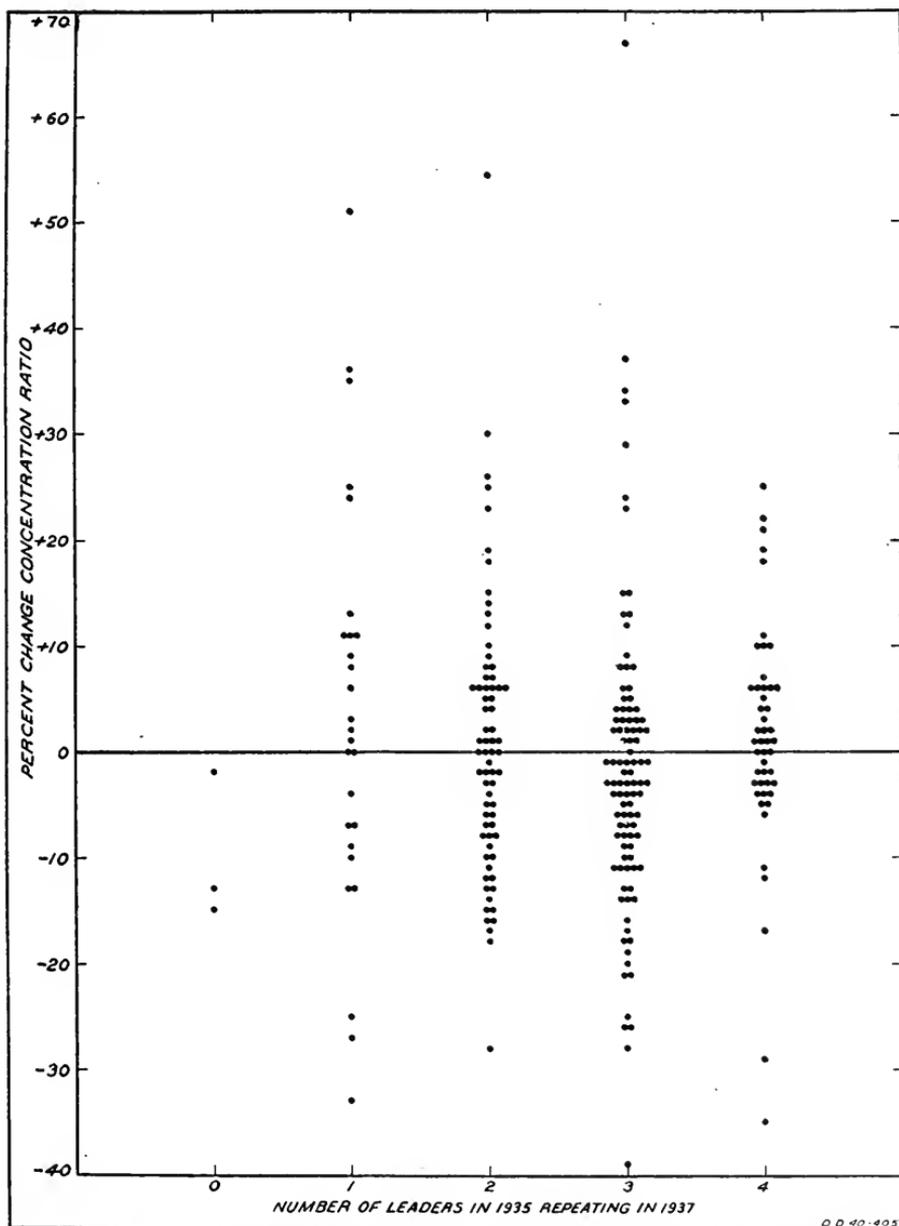


CHART 19b.—RELATION BETWEEN NUMBER OF COMPANIES WHICH WERE LEADERS IN 1935 AND 1937 AND CHANGE IN CONCENTRATION RATIO.

## CHAPTER V

### BEHAVIOR CHARACTERISTICS OF PRODUCTS IN PERIODS OF RECESSION AND RECOVERY

The sharp contraction in economic activity between 1929 and 1933 was featured in the manufacturing field by a drop of almost 40 percent in the quantity output of manufactured products and by a 25 to 30 percent decrease in the prices of these products. Did manufactured items with high concentration ratios experience significantly different changes in quantity output and in price from those products with low concentration ratios? Conversely, in the upswing in business from 1933 to 1937, did manufactured products with high and with low concentration ratios exhibit significantly different magnitudes of change in quantity output and price? Were variations between high and low control of output among manufactured products in these two periods directly related to great or small contraction or expansion of output? With what product characteristics were specific price and production policies associated?

To answer these questions, each of the products among the 1,807 for which comparable data were available from the Censuses of Manufactures for 1929, 1933, and 1937 was segregated for further analysis. If the analysis was to run in terms of quantity changes and in terms of changes in average realized prices, it was necessary that only those products for which quantity data were available in the census records be included in the list. Furthermore, only those products which were identically classified throughout the period could be used. The imposition of these two limitations resulted in a reduction of the sample from 1,807 to 407 products. The products which were eliminated from the sample for these two reasons were proportionately distributed throughout the concentration ratio classes. Thus, the percentage distribution of number and value of products among the concentration ratio classes conforms closely to the distribution of the 1,807 products (see table 21 and appendix E, table 2E). Since the sample of 1,807 products presents a comprehensive cross-section picture of the product structure in all manufacturing, this smaller sample (407 products) drawn from the original list and conforming to the concentration pattern of the larger sample may also be considered adequate to insure significant results.

In the subsequent analysis in this chapter the interest centers in the relationship between various characteristics of the products. If an attempt were made to measure a characteristic of the products in the entire population from a sample, the representativeness of the sample would be of prime significance. Here, however, the relationship between various factors characterizing the products is the subject of inquiry, and it is only necessary that the attributes of the products in the sample cover adequately the range over which each characteristic may be distributed. The distribution of products among the

concentration ratio classes and among the various industry groups is sufficiently wide to insure an adequate picture of the relationships between the product characteristics under consideration.

TABLE 21.—*Relation between the distributions of number and value of the 1,807 products and of the 407 products among the concentration ratio classes*

Concentration ratio class	Total products analyzed		407 products analyzed *	
	Products	Percent	Products	Percent
	Number			
Total.....	1,807	100.0	407	100.0
0.1 to 10.0.....	8	.4	4	1.0
10.1 to 20.0.....	38	2.1	12	2.9
20.1 to 30.0.....	90	5.0	26	6.4
30.1 to 40.0.....	123	6.8	32	7.9
40.1 to 50.0.....	166	9.2	42	10.3
50.1 to 60.0.....	183	10.1	48	11.8
60.1 to 70.0.....	230	12.7	56	13.8
70.1 to 80.0.....	259	14.3	50	12.2
80.1 to 90.0.....	218	12.1	43	10.6
90.1 to 100.0.....	164	9.1	36	8.8
(1).....	153	8.5	34	8.4
(2).....	175	9.7	24	5.9
	Value (thousands of dollars)			
Total.....	29,505,693	100.0	14,909,124	100.0
0.1 to 10.0.....	711,095	2.4	291,831	2.0
10.1 to 20.0.....	1,270,300	4.3	589,078	4.0
20.1 to 30.0.....	2,758,967	9.4	1,232,297	8.3
30.1 to 40.0.....	4,314,384	14.6	2,628,875	17.6
40.1 to 50.0.....	3,521,436	11.9	1,787,948	12.0
50.1 to 60.0.....	2,654,925	9.0	1,715,229	11.5
60.1 to 70.0.....	2,732,775	9.3	1,208,007	8.1
70.1 to 80.0.....	3,913,852	13.2	1,676,750	11.2
80.1 to 90.0.....	2,098,223	7.1	388,206	2.6
90.1 to 100.0.....	3,115,851	10.6	2,569,126	17.2
(1).....	1,827,858	6.2	692,646	4.6
(2).....	586,027	2.0	129,131	0.9

\* This distribution is based on concentration ratios in 1937.

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix 4 for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the four leading companies.

#### RELATION BETWEEN CONCENTRATION RATIOS OF SELECTED PRODUCTS AND CHANGES IN THEIR TOTAL QUANTITY PRODUCED

The percentage change between 1929 and 1933 in the United States total quantity output of the 407 individual products was plotted against the concentration ratios of the products in chart 20a. For the purpose of sharper analysis, the chart was divided into three segments, each of which contains approximately one-third of the product points. In the ensuing discussion, those products with concentration ratios above 80 percent (including those products listed under "(1)" and "(2)") are said to be in the "high" concentration group, while those products with concentration ratios less than 50 percent are referred to as the "low" concentration group.

For the charts used in the analysis that follows, the points on the vertical axis are plotted on a logarithmic scale. In those charts in

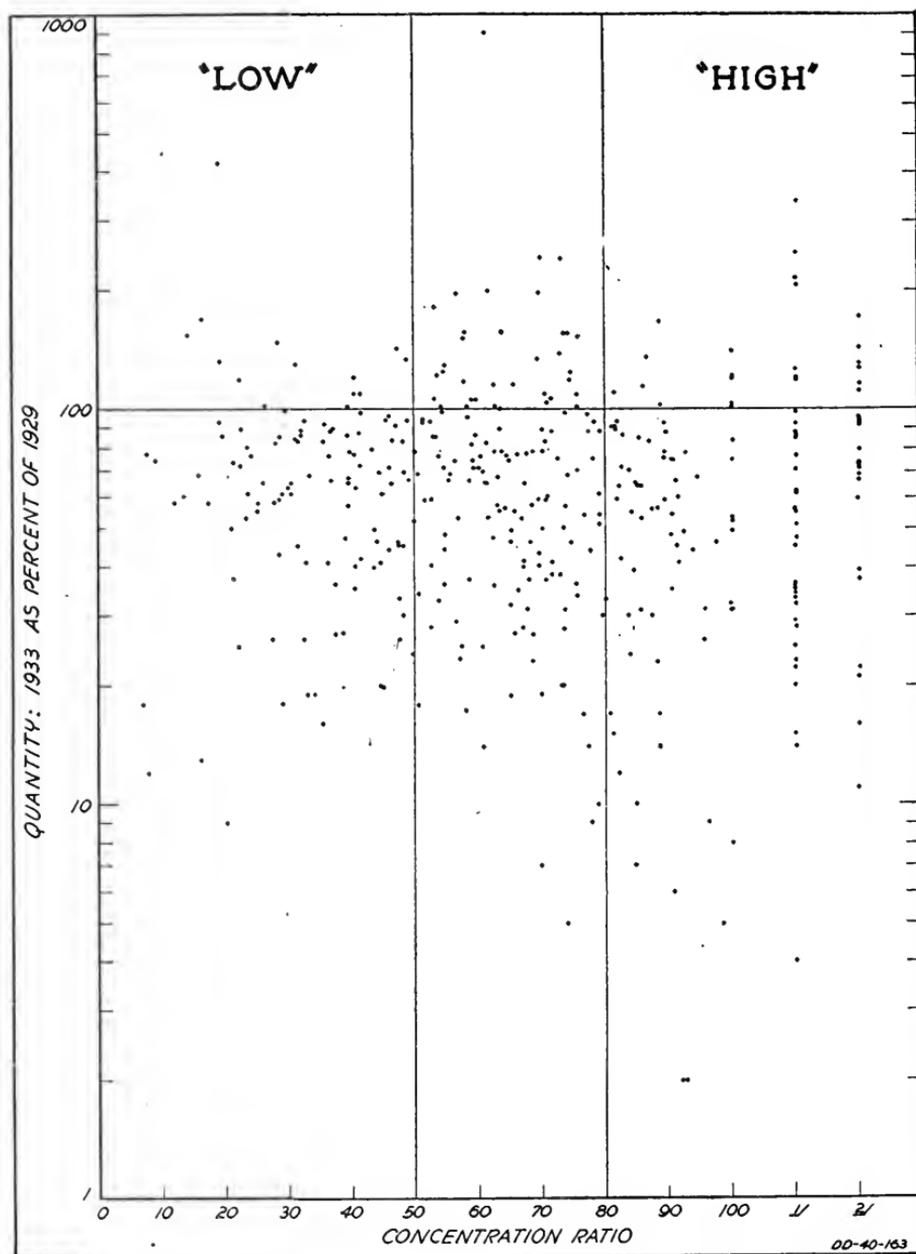


CHART 20a.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED, 1929-33.

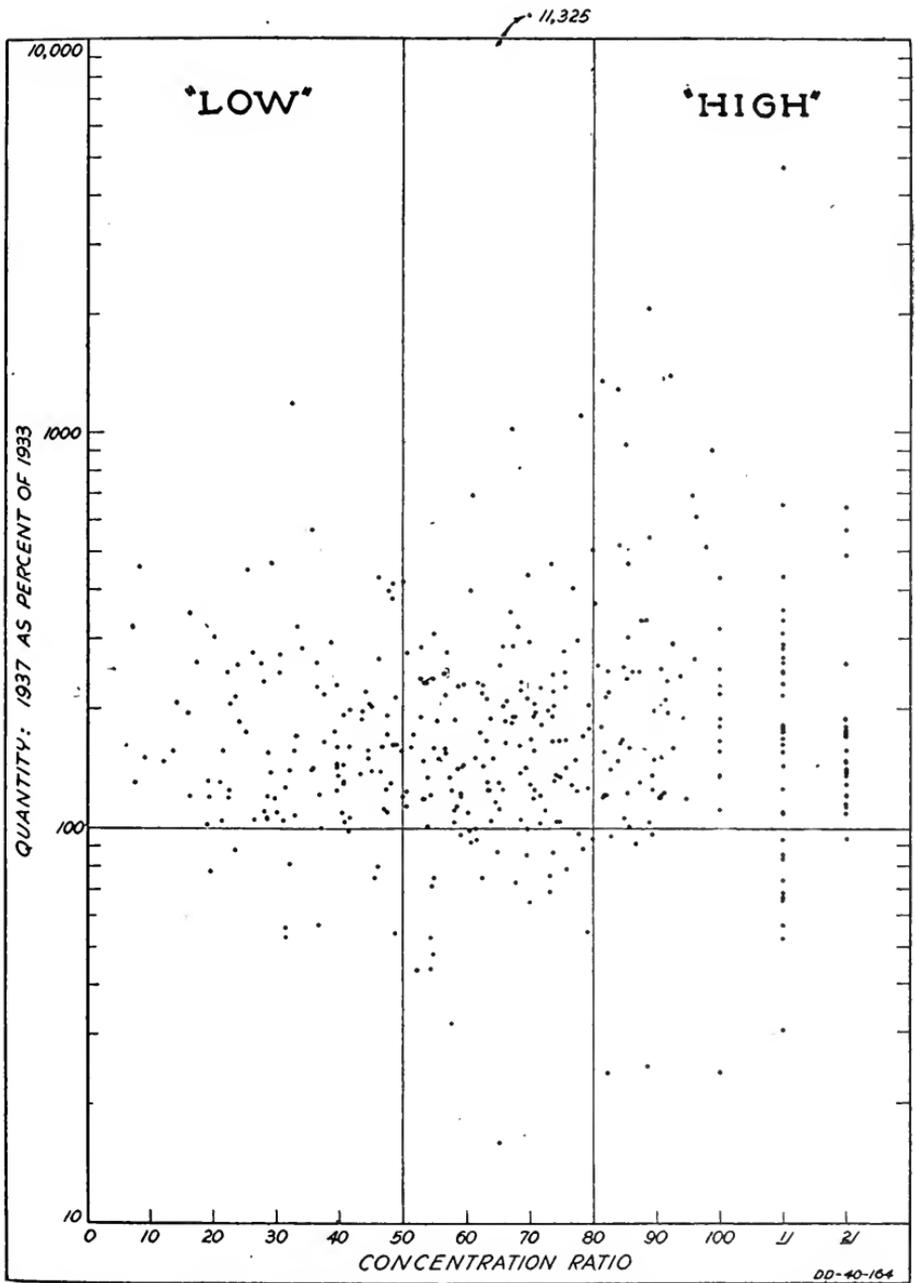


CHART 20b.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED, 1933-37.

which changes in average realized price are plotted against changes in quantity, the logarithmic scale is used on both the vertical and horizontal axes. By way of further explanation of the chart material, in certain charts the quantity produced and the average realized price in 1933 are expressed as a percent of the quantity and average realized price in 1929.

This means that the output in 1929 may be taken as 100 percent and the quantity produced in 1933 as a relative of that. For example, if 50,000 units of a particular product were produced in 1929 and only 10,000 units in 1933 the output in 1933 would be 20 percent of that in 1929 and as such it would be plotted on the chart. Stated in another way, this means there was a drop of 80 percent in the quantity output of this particular product between 1929 and 1933. By using the logarithmic scale, equal distances on the vertical scale represent equal ratios. Thus, a drop in quantity of 80 percent would occupy a distance on the vertical scale equal to an increase of 400 percent—the relatives as plotted on the charts would be 20 and 500 percent, respectively. In order that output might attain the earlier level in the case above, it would be necessary for quantities to increase 400 percent.

The concentration ratios used throughout this section are based on 1937 materials. There is thus an implied assumption that products with high concentration ratios in 1937 also had high ratios in 1929 and 1933. It would have been more satisfactory if the concentration ratios for the products analyzed here had been available for these earlier census years, but such was not the case.

In the preceding chapter, the changes in the concentration ratios for individual products between 1935 and 1937 were studied, and the conclusions from those data, while indicating change, show the changes to be confined in most cases within rather narrow limits and to be random in nature. On the basis of this observation, there seems little reason to suppose that products in general which had concentration ratios above 80 percent in 1937 would have been produced under such strikingly different conditions in 1929 that their concentration ratios would have been below 50 percent, thus placing them in the "low" concentration group. Isolated instances of such a change may have occurred, but it is believed that the structural pattern in the manufacture of individual products did not change enough in this 8-year period to impose any very serious limitation on the findings of this part of the study.

An inspection of the scatter diagram (chart 20a) reveals very little observable difference in the behavior of products with "low" concentration ratios as shown in the left-hand segment of the chart and the behavior of those products with "high" concentration ratios shown in the right-hand portion of the chart. Throughout the distribution, the scatter is of approximately the same nature and in each group the output of some products increased but by far the larger number showed decreases in quantity, the drop in some instances exceeding 90 percent. Very broadly, the conformation of product points seems to have a somewhat greater spread in the "high" concentration range than in the "low" range, but the scatter is so great within each group that only the most restricted sort of relationship may be said to exist. If the eight or ten products which decreased more than 90

percent are not given undue weight, the logical inference would seem to be that the changes in quantity output of the great mass of manufactured products between 1929 and 1933 were not related to the concentration ratios of the products. In other words, restriction in output between 1929 and 1933 was almost equally common and equally severe for products with "high" and with "low" concentration ratios. It should be remembered that one-half of the products had concentration ratios between 50 and 90 percent (see chart 1); thus the product points in the scatter diagrams also tend to bunch more heavily in that range.

The 407 products were drawn from many different industry groups, but there was a tendency for the majority of the number of products falling in the "high" group to be from the industry groups characterized by products with high concentration and for the industry groups characterized by products with low concentration ratios to be more heavily represented in the "low" concentration group. Thus, in general, the products in each group are different in nature. In the analysis which follows this aspect of the data should be kept in mind. The various industries in which these products were classified by the census, together with the basic data for the charts in this chapter, are available in appendix E.

A careful examination of the nature of the products which experienced large decreases in quantity output between 1929 and 1933 will perhaps throw light on the product characteristics with which this type of quantity behavior is associated. In table 22 the names of all products showing decreases in quantity of 70 percent<sup>1</sup> or more are listed together with their percentage changes in quantity and average realized prices. In order that the economic significance of these products may be appraised, the value of each product in 1933 is also shown. There were 72 products in the sample of 407 which experienced decreases in quantity of 70 percent or more and the total value of these products was \$180,288,012. In other words, these products were relatively less important valuwisewise than other products in the 407 sample and consequently were not particularly important in the whole economy—they accounted for 17.7 percent of the total number of products in the sample but for only 2.4 percent of the total value of the 407 products in 1933.

The product characteristics of the 72 products with decreases in quantity of over 70 percent are set forth in table 23. From this table it may be seen that 67 of the 72 items were products whose immediate purchasers were producers and only 5 items were in the consumer category. In terms of the ultimate user, 37 of the 43 items were producers' goods. The difference between the total number of items when classified on the basis of immediate purchaser and ultimate user is due to the inclusion of 29 products listed as construction materials in the former major category and their exclusion from the latter. These same construction materials were not classified or grouped on the basis of the degree of durability of the products. On the basis of the degree of durability, 41 of the 43 products were in the durable category. The distribution of the 72 products in the other

<sup>1</sup> No particular significance need be attached to this 70 percent change, it afforded only a convenient break-point that would provide an adequate number of products for analysis but not so extensive a list as to be unwieldy. The same observation is pertinent to the subsequent analysis in which products showing extreme changes are listed.

major classifications is about as one would expect, except in the group in which the products are classified on the basis of the source of raw material. There, 70 of the 72 products were manufactured from materials of mineral origin.

TABLE 22.—Percentage change in quantity and in average realized price of products which experienced contractions in output of 70 percent or more between 1929 and 1933

Products	Percent change, 1929 to 1933		Value, 1933 (in dollars).
	Quantity	Average realized price	
<b>FOOD AND KINDRED PRODUCTS GROUP</b>			
Canned fruits and vegetables; canned and bottled juices:			
Canned fruits—strawberries.....	-76	-42	350,616
Canned vegetables—succotash.....	-70	-26	172,135
<b>STONE, CLAY, GLASS PRODUCTS GROUP</b>			
Clay products, other than pottery:			
Brick:			
Common.....	-82	-19	8,816,000
Face.....	-87	-17	3,807,000
Hollow.....	-83	+38	79,607
Chimney pipe and tops.....	-73	-31	57,151
Flue lining.....	-91	+1	471,155
Sewer pipe.....	-73	-15	4,911,104
Terra cotta.....	-81	-31	1,830,999
Tile:			
Ceramic mosaic (vitreous and semivitreous, unglazed).....	-77	-20	698,945
Hollow building tile:			
Conduit tile.....	-98	-27	141,336
Floor-arch, silo, and corner tile; radial chimney blocks; fire-proofing tile.....	-80	-32	290,793
Roofing tile.....	-72	-17	910,647
Vitrified brick and plates—for paving.....	-80	-6	1,106,043
Wall coping.....	-82	-13	80,442
Concrete products:			
Brick.....	-74	+2	27,955
Circular structures.....	-88	+45	384,700
Cast stone.....	-91	-29	847,365
Laundry trays.....	-73	-7	281,309
Paving materials.....	-86	-14	84,555
Pipe:			
Irrigation.....	-74	-12	691,481
Pressure.....	-96	+28	114,959
Sewer.....	-81	-10	2,091,668
Poles and posts.....	-81	-27	196,880
Tile:			
Building block and tile, except roofing.....	-88	-17	3,024,548
Drain tile.....	-84	+17	137,991
Roofing tile.....	-91	+35	338,809
Pottery, including porcelain ware:			
Plumbing fixtures (exclusive of fittings), vitreous china:			
Lavatories.....	-77	-31	760,398
Reverse traps.....	-70	-6	277,566
Siphon jets.....	-83	-11	310,670
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>			
Cast-iron pipe and fittings:			
Pipe:			
Bell and spigot.....	-72	-13	10,851,841
Culvert.....	-78	-41	142,510
Steel works and rolling-mill products:			
Finished hot-rolled products and forgings:			
Bars, merchant, etc.—iron.....	-76	+4	3,348,380
Rails.....	-85	-10	15,157,302
Rail joints and fastenings, tie plates, etc.....	-77	-14	9,316,031
Rods, bolt and nut, and spike and chain.....	-72	-15	1,360,886
Structural shapes (not assembled or fabricated): Heavy (leg or web 3 inches and over).....	-80	-16	27,000,722
Semifinished rolled products:			
Bars, muck and scrap.....	-86	-21	423,381
Blooms and billets for forging.....	-76	-18	2,008,338
Unrolled steel:			
Direct steel castings.....	-82	-8	30,857,582
Ingots.....	-86	+22	1,058,095

TABLE 22.—Percentage change in quantity and in average realized price of products which experienced contractions in output of 70 percent or more between 1929 and 1933—Continued

Products	Percent change, 1929 to 1933		Value, 1933 (in dollars)
	Quantity	Average realized price	
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>			
<b>Nonferrous-metal alloys; nonferrous-metal products, except aluminum, n. e. c.:</b>			
Castings, rough			
Brass and bronze	-75	-32	16, 575, 341
Copper	-72	-12	663, 536
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>			
<b>Agricultural implements:</b>			
Combines (harvester-thresher), all widths of cut	-90	-33	328, 000
Cultivators, horse-drawn, 1-row, riding (2-horse)	-86	-13	524, 980
Disk harrows, horse- or tractor-drawn, (single or double action)	-91	-40	459, 000
Drills, grain, horse- or tractor-drawn	-94	-60	236, 192
Manure spreaders, horse- or tractor-drawn	-91	-23	586, 000
Mowers (haying machinery), horse- or tractor-drawn	-70	-14	1, 803, 000
Plows, moldboard, horse-drawn, walking, 2-horse and larger	-73	-14	609, 246
Cash registers, adding and calculating machines and other business machines except typewriters: Calculating machines	-84	+14	2, 143, 004
<b>Electrical machinery, apparatus, and supplies:</b>			
Household apparatus and appliances: Ranges, electric household, 2½ kilowatts and over	-77	+11	3, 898, 000
Transformers, instrument and meter	-75	-29	891, 000
<b>Engines, turbines, water wheels, and windmills:</b>			
<b>Engines, internal-combustion:</b>			
Carburetor engines:			
Aircraft	-71	+19	8, 719, 122
Marine, inboard	-75	-44	948, 965
<b>Machine tools:</b>			
Boring machines, vertical (not vertical boring mills)	-92	-26	79, 000
<b>Drilling machines, vertical:</b>			
Multiple-spindle, other than sensitive	-95	-17	164, 000
Multiple-spindle, sensitive	-98	+9	62, 000
Single-spindle, sensitive	-93	-45	37, 000
Standard	-93	-26	105, 000
Drills, electric, portable	-83	+1	775, 000
Drills, pneumatic, portable	-74	-2	633, 000
Grinders, electric, portable	-83	-35	260, 566
Grinders, pneumatic, portable	-78	-20	206, 000
<b>Hammers (chipping, riveting, calking, etc.):</b>			
Electric, portable	-89	-18	61, 000
Pneumatic, portable	-79	-7	568, 000
<b>Milling machines:</b>			
Power-feed, universal	-95	-5	295, 000
Power-feed, vertical	-85	-9	191, 000
Presses (except forging): Forming and stamping	-80	-13	1, 432, 000
Radio apparatus and phonographs: Radio-phonograph combinations	-80	-68	1, 407, 650
<b>MISCELLANEOUS INDUSTRIES GROUP</b>			
<b>Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:</b>			
Roof cements (solid), asphalt	-70	+3	255, 471
Roof cement, fibrous plastic	-74	+7	661, 044

The distribution of the 72 products among the various concentration ratio classes closely approximates the distribution which would be expected if the products were drawn at random from the 1,807 sample—in this distribution the calculated median is 74.5, while in the distribution of the sample of 1,807 products the median is 72.6. Expressed in other terms, this means that these 72 products were produced under only slightly higher conditions of concentration than manufactured products of the large sample. The applicability of the earlier contention, namely, that there is no apparent relation between

the concentration ratios of the products and their quantity behavior, is thus extended even to those products which experienced severe contractions in the 1929-33 period.

TABLE 23.—Distribution of products which experienced contraction in output of 70 percent or more between 1929 and 1933, by concentration ratio classes and by product characteristics

Concentration ratio class	Total	Type of immediate purchaser		Type of ultimate user*		Degree of durability*			Degree of fabrication*		Type of market		Source of raw material			Construction materials	Producers' supplies	
		Consumer	Producer	Consumer	Producer	Nondurable	Semidurable	Durable	Semimanufactured	Finished	Regional	National	Agricultural	Mineral	Forest			Other
Total.....	72	5	67	6	37	2	0	41	11	61	23	49	2	70	0	0	29	0
0.1 to 10.0.....	2		2							2	2			2			2	
10.1 to 20.0.....	2		2							2	2			2			2	
20.1 to 30.0.....	3		3		3				3	2	1	2	1	3				
30.1 to 40.0.....	6	1	5	1					1	6	5	1		6			5	
40.1 to 50.0.....	5	1	4	1	1	1			1	4	4	1	1	4			3	3
50.1 to 60.0.....	5	1	4	1	1	1			1	4	2	3	1	4			3	3
60.1 to 70.0.....	9		9	1	5				6	2	7	4		5			3	3
70.1 to 80.0.....	9	1	8	1	6				7	9		9		9			3	3
80.1 to 90.0.....	11		11		6				6	1	10	1	10	11			5	5
90.1 to 100.0.....	7		7		5				5	7	1	6		7			2	2
(1).....	9	1	8	1	6				7	4	5	3		9			2	
(2).....	4		4		4					4		4		4				

\* Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

The changes between 1933 and 1937 in the quantities of the products manufactured in both the "low" and "high" concentration groups are shown in chart 20b. Here, again, the percentage changes vary so widely within each group and the conformation of the product points within each group is so similar, it cannot be said that manufactured products in the "low" concentration group exhibit any outstandingly different behavior pattern from that of the products in the "high" concentration group. In each group there was a marked tendency for the output of the products to increase, but, at the same time, there were products in both groups which experienced contractions in quantity output.

There were several products in the "high" and "middle" groups in which output was stepped up tremendously, while only a very few products in the "low" group experienced such outstanding gains. This situation is to be explained more in terms of other attributes of the products than in terms of their high concentration ratios alone. The items which experienced large gains were chiefly agricultural and industrial producers' capital goods. In 1933 only 2 or 3 such units might have been produced while 50 might have been produced in 1937; thus the huge percentage gains.

If these few extreme items are not given undue consideration and if attention is centered within the range where the great majority of

product points are located, there appears to be no observable relation during a period of greatly expanding economic activity between the changes in output experienced by products and their concentration ratios.

TABLE 24.—Percentage change in quantity and in average realized price of products which experienced expansion in output of 200 percent or more between 1933 and 1937

Products	Percent change, 1933 to 1937		Value, 1937 (in dollars)
	Quantity	Average realized price	
<b>FOOD AND KINDRED PRODUCTS GROUP</b>			
Canned fruits and vegetables; canned and bottled juices:			
Canned vegetables:			
Succotash.....	+312	-4	680, 621
Sweet potatoes.....	+335	-19	1, 017, 840
Vegetables, mixed.....	+326	+31	4, 529, 680
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>			
Cotton woven goods over 12 inches in width: Specialties—rugs, cotton braided except bath mats.....	+369	-41	477, 076
Hosiery: Women's seamless: Pure-thread-silk with lisle or cotton tops, heels, and toes.....	+249	-23	11, 475, 518
<b>PAPER AND ALLIED PRODUCTS GROUP</b>			
Paper and paperboard: Book paper—lithograph.....	+202	+40	5, 683, 482
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>			
Chemicals, n. e. c.: Acids, citric.....	+218	-28	4, 118, 513
Fertilizers: Bone meal.....	+314	-3	1, 919, 503
Paints, pigments, and varnishes: Varnishes, other.....	+346	-38	13, 711, 567
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>			
Asbestos products, steam and other packing, pipe and boiler covering and gaskets: Shingles.....	+415	+23	11, 519, 411
Clay products, other than pottery:			
Brick, common.....	+219	+21	34, 009, 775
Brick, face.....	+247	+9	14, 357, 181
Flue lining.....	+221	+34	2, 032, 005
Tile, enameled tile and glazed ceramic mosaic.....	+279	+9	8, 470, 479
Concrete products:			
Brick.....	+1, 083	+5	347, 900
Cast stone.....	+203	-12	2, 260, 744
Paving materials.....	+1, 966	-62	672, 935
Pipe, pressure.....	+4, 591	-20	4, 323, 603
Tile:			
Building block and tile, except roofing.....	+356	+8	14, 862, 739
Drain tile.....	+469	-19	639, 477
Roofing tile.....	+519	-7	1, 948, 727
Glass: Lenses, Motor-vehicle.....	+271	-1	1, 755, 645
Pottery, including porcelain ware: Plumbing fixtures (exclusive of fittings), vitreous china:			
Lavatories.....	+235	+23	3, 128, 462
Reverse traps.....	+408	+32	1, 861, 894
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>			
Steel-works and rolling-mill products: Finished hot-rolled products and forgings:			
Bars, merchant—steel, electric and crucible.....	+210	+2	51, 081, 185
Rails.....	+258	-1	53, 716, 019
Structural shapes (not assembled or fabricated):			
Heavy (leg or web 3 inches and over).....	+212	+32	110, 873, 129
Light (leg or web less than 3 inches).....	+222	+43	34, 130, 777
Semifinished rolled products: Blooms and billets for forging.....	+427	+46	15, 304, 185
Unrolled steel:			
Direct steel castings.....	+364	+23	176, 129, 935
Ingots.....	+599	+18	8, 734, 116

TABLE 24.—Percentage change in quantity and in average realized price of products which experienced expansion in output of 200 percent or more between 1933 and 1937—Continued

Products	Percent change, 1933 to 1937		Value, 1937 (in dollars)
	Quantity	Average realized price	
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>			
<b>Agricultural implements:</b>			
Combines (harvester-threshers), all widths of cut.....	+8,206	-22	21,283,817
Disk harrows, horse- or tractor-drawn, (single or double action).....	+1,008	+92	9,745,008
Drills, grain, horse- or tractor-drawn.....	+1,269	+118	7,044,974
Manure spreaders, horse- or tractor-drawn.....	+836	+32	7,216,792
Mowers (haymaking machinery), horse- or tractor-drawn.....	+236	+32	8,015,105
Cash registers, adding and calculating machines and other business machines except typewriters: Calculating machines.....	+472	+10	13,506,101
<b>Electrical machinery, apparatus, and supplies:</b>			
<b>Household apparatus and appliances: Ranges, electric household, 2½ kilowatts and over.....</b>			
Transformers, instrument and meter.....	+568	-9	23,742,816
Engines, turbines, water wheels, and windmills: Engines, internal-combustion: Carburetor engines:	+334	+35	5,217,745
Aircraft.....	+238	-3	28,576,971
Marine, inboard.....	+298	-15	3,203,663
Marine, outboard.....	+332	-19	4,359,822
<b>Machine tools:</b>			
<b>Drilling machines—vertical:</b>			
Multiple-spindle (other than sensitive).....	+1,624	-10	2,255,415
Multiple-spindle, sensitive.....	+1,291	+74	1,497,584
Single-spindle, sensitive.....	+11,325	-72	1,172,956
Drills, electric, portable.....	+445	-2	4,152,509
Drills, pneumatic, portable.....	+597	+27	5,601,252
Grinders, electric, portable.....	+304	+30	1,374,959
Grinders, pneumatic, portable.....	+394	-2	1,001,585
Hammers (chipping, riveting, caulking, etc.), electric, portable.....	+555	-19	324,585
<b>Milling machines:</b>			
Power-feed, universal.....	+813	+62	4,376,275
Power-feed, vertical.....	+1,249	+61	4,141,625
Presses (except forging): Forming and stamping.....	+365	+57	10,468,167
<b>MISCELLANEOUS INDUSTRIES GROUP</b>			
<b>Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:</b>			
Roof cements (solid), asphalt.....	+1,183	-32	2,237,140
Roof cement, fibrous plastic.....	+299	-34	1,728,092
Roof coating, nonfibrous liquid.....	+921	+30	2,200,695

A list of the products which experienced increases in quantity between 1933 and 1937 of 200 percent or more is presented in table 24. The product characteristics and concentration ratios of these products are indicated in table 25. An inspection of these tables and of the preceding two tables reveals the nature of the products which are subject to violent fluctuations in production in periods of recession and recovery. It is interesting to note that many of the products are the same. Of the 56 products showing increases of 200 percent or more, there were 42 which appeared in the list of products with decreases of 70 percent or more in the 1929-33 period. (It would actually have been necessary for the products which decreased 70 percent in the downswing to increase 233 percent in the upswing to attain the earlier level of output.) Furthermore, all of the 72 products which decreased more than 70 percent in the 1929-33 period showed increases in quantity in the recovery period.

TABLE 25.—*Distribution of products which experienced expansion in output of 200 percent or more between 1933 and 1937, by concentration ratio classes and by product characteristics*

Concentration ratio class	Total	Type of immediate purchaser		Type of ultimate user*		Degree of durability*			Degree of fabrication*		Type of market		Source of raw material			Construction materials	Producers' supplies		
		Consumer	Producer	Consumer	Producer	Nondurable	Semidurable	Durable	Semimanufactured	Finished	Regional	National	Agricultural	Mineral	Forest			Other	
Total.....	56	7	49	11	26	4	1	32	11	44	14	42	7	47	2	0	18	1	
0.1 to 10.0.....	2		2							2	2			2				2	
10.1 to 20.0.....	2		2							2	2			2				2	
20.1 to 30.0.....	2		2		1			1	1	1	1	1		1	1			1	
30.1 to 40.0.....	3		3							3	2	1		3				3	
40.1 to 50.0.....	5	2	3	2		2				4	1	4	3	2				2	1
50.1 to 60.0.....	1		1		1			1	1	1	1			1					
60.1 to 70.0.....	7	2	5	3	3	1	1	4	3	4	2	5	2	5				1	
70.1 to 80.0.....	6		6		5			5	6	6		6		6				1	
80.1 to 90.0.....	11	1	10	3	5			8	3	8	2	9	1	9	1			3	
90.1 to 100.0.....	8	1	7	2	4	1		5	1	7		8	1	7				2	
(1).....	6	1	5	1	4			5	2	4	1	5		6				1	
(2).....	3		3		3			3		3		3		3					

\* Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

RELATION BETWEEN THE CONCENTRATION RATIOS OF SELECTED PRODUCTS AND CHANGES IN THEIR AVERAGE REALIZED PRICES

The average realized price which is used in the following analysis was derived by dividing the total value of a census product in 1929, 1933, and 1937 by the quantity of that product manufactured in these years. The advantages and disadvantages associated with the use of average realized price data to measure price changes were discussed at some length in chapter IV.

The relation between the changes in average realized prices of the 407 products from 1929 to 1933 and their concentration ratios is shown in chart 21a. The coordinates of each product point are the percent which the average realized price in 1933 was of that in 1929 and the product's concentration ratio. As in the chart in the preceding section, the diagrams here have been divided into three sections. The distributions of product points in the "low," "middle," and the "high" groups are strikingly similar. The highness or the lowness of the concentration ratios of products does not appear to have any measurable relation to the decreases in average realized price experienced between 1929 and 1933.

A general feature of charts 21a and 21b as contrasted with charts 20a and 20b is the much narrower spread of product points in the scatter diagrams showing changes in price than in those showing changes in quantity. Thus, for all the manufactured products analyzed there appears to be a quite definite tendency for prices to decline less than quantity output in a period of general business contraction and, on the upswing, for prices to increase less when quantity

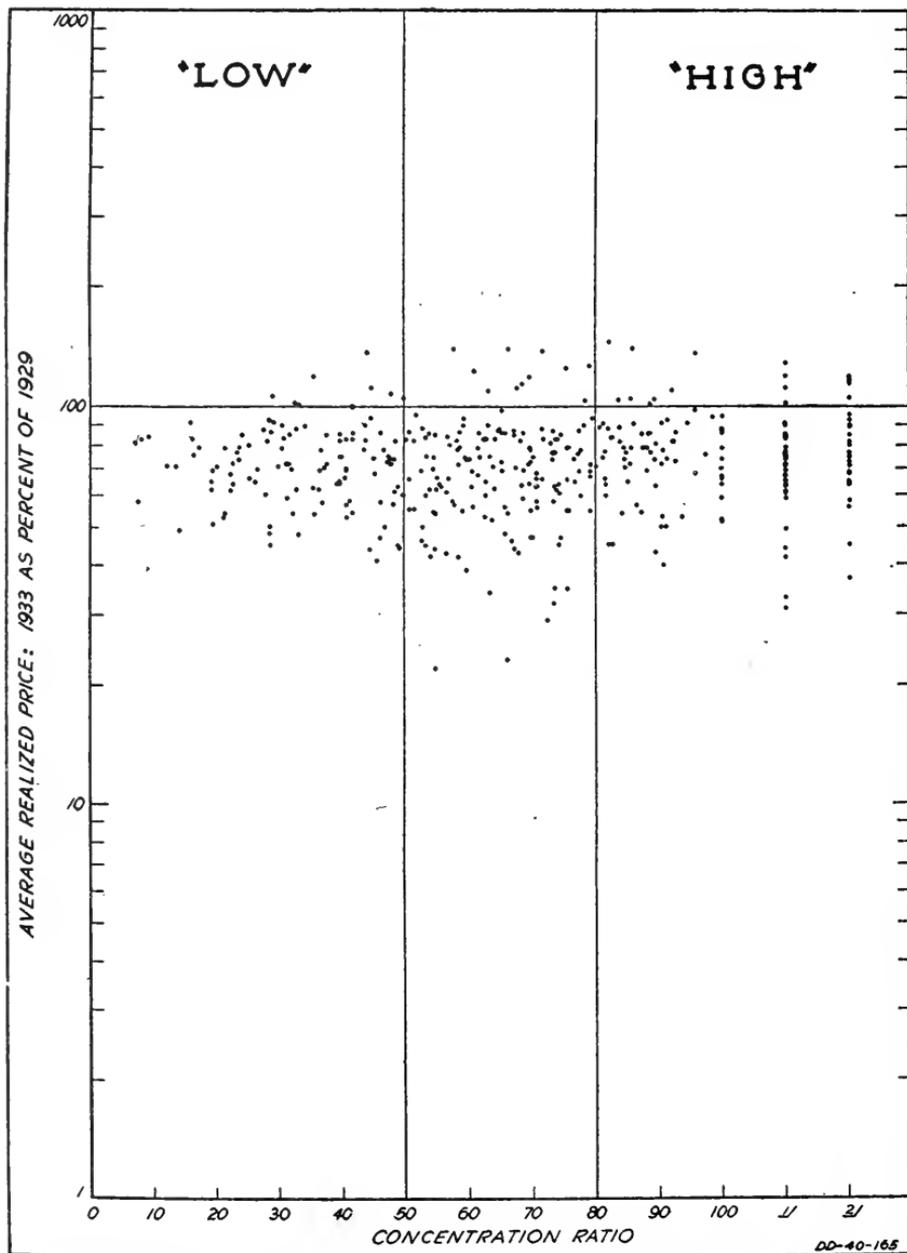


CHART 21a.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE, 1929-33.

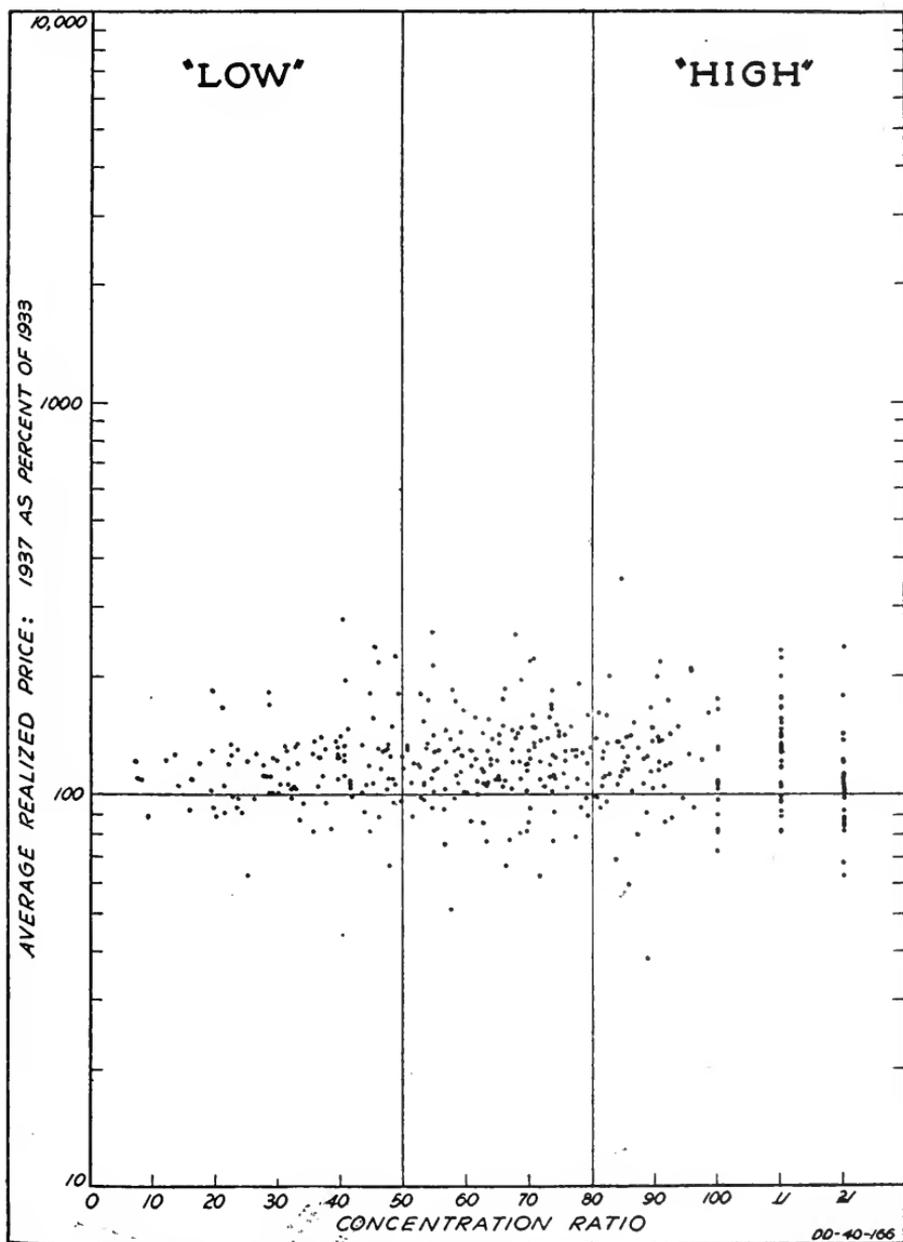


CHART 21b.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE, 1933-37.

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output is expanded. This behavior is not associated with any particular condition of concentration but is apparently a price and production characteristic of all manufactured products.

The percentage changes in the average realized prices of products between 1933 and 1937 and their concentration ratios are plotted in the form of a scatter diagram in chart 21b. During this period there were a number of products which experienced decreases in average realized price, but by far the larger number showed material increases. As in the period of declining economic conditions, the behavior pattern of products with "low" concentration ratios in the 1933-37 period was quite similar to that of the products in the "high" group. The central tendency of the points reflecting the percentage changes in the products within each group appears to be of about the same positive magnitude. The divergent behavior of the prices of the products in these groups is not sufficient to support any general contention that wide or narrow changes in the average realized price of products are associated with the highness or lowness of their concentration ratios.

The data presented in charts 21a and 21b seem only to support the general observation that in periods of both increasing and decreasing business activity the changes in average realized prices experienced by products with "high" concentration ratios and by those with "low" concentration ratios were quite similar in nature and extent. The changes in the average realized prices of products with high concentration ratios were neither significantly more nor less than the changes of products with low concentration.

If the validity and relevance of the material presented up to this point is granted, the obvious conclusion seems to be that the various changes in average realized prices experienced by the products in each group are to be accounted for by factors or characteristics of the products other than the concentration or relative lack of concentration in their production. The analysis in chapter III would seem to indicate that such factors as the durability of the products, the stage of their fabrication, the nature of their markets, or the types of buyers for the products are perhaps more pertinent in an explanation of the price and quantity behavior of the products than the condition or degree of concentration under which they are produced.

In order that the nature and significance of products which varied widely in price may be examined, those products which experienced decreases of 50 percent or more in average realized price between 1929 and 1933 have been listed in table 26. Of the 407 products in the sample, there were 47 products, or 11.5 percent, which dropped 50 percent or more in price between 1929 and 1933. In terms of total value, these products were of more than average importance in the economy, accounting for 18.9 percent of the total value of all products in the 407 sample in 1933. This is in sharp contrast with the products showing large quantity decreases; products experiencing large quantity decreases were of relatively slight importance valuelwise, while the products which experienced broad decreases in price were relatively more important valuelwise than the average.

The economic characteristics of these 47 products and their concentration ratios are shown in table 27. The computed median of concentration ratios is 65.1 percent, while the computed median for the 407 sample is 67.2 percent. The products are distributed somewhat

lower on the concentration ratio scale, however, than those of the 1,807 product sample—the computed median for the entire sample is 72.6 percent. This situation is to be accounted for by the large proportion of consumers' goods in the distribution, coupled with the fact that consumers' goods were generally produced under conditions of relatively low concentration. Thirty-five products were classified on the basis of ultimate user (5 products were classified as construction materials and 7 as producers' supplies and as such were not classified on the basis of ultimate user), and of this total 31 were ultimately used by consumers and only 4 by producers. Of the 35 products classified on the basis of durability, there were only 9 in the durable category. Further, two-thirds of all the products which experienced decreases of 50 percent or more in price were fabricated or processed from materials derived from agricultural sources. Generally, then, these products were nondurable consumers' goods which were processed predominantly from agricultural materials. Here, again, there is a strong contrast with products which experienced large quantity decreases in the 1929-33 period.

TABLE 26.—Percentage change in average realized price and in quantity of products which experienced price decreases of 50 percent or more between 1929 and 1933

Products	Percent change, 1929 to 1933		Value, 1933 (in dollars)
	Average realized price	Quantity	
<b>FOOD AND KINDRED PRODUCTS GROUP</b>			
Corn sirup, corn sugar, corn oil and starch:			
Corn oil, crude.....	-57	-23	2,363,972
Corn-oil cake and meal.....	-63	-28	389,628
Flour and other grain-mill products: Bran and middlings.....	-50	-15	60,700,000
Meat packing, wholesale:			
Hides, skins, and pelts:			
Cattle hides, cured.....	-52	+14	34,625,000
Cattle hides, uncured.....	-52	-57	3,546,000
Sheep and lamb pelts, cured.....	-55	+54	9,599,000
Sheep and lamb pelts, uncured.....	-51	+18	2,724,000
Sheepskins and lambskins, pickled.....	-69	+113	2,663,000
Lard.....	-55	-6	104,908,000
Meat:			
Cured:			
Beef, pickled and other cured.....	-55	-15	8,340,000
Pork, dry-salted, not smoked.....	-56	-29	35,185,000
Pork, pickled and dry-cured, smoked.....	-53	-4	136,855,000
Pork, pickled and dry-cured, not smoked.....	-53	-22	83,906,000
Fresh:			
Beef.....	-58	+1	362,734,000
Mutton and lamb.....	-53	+23	84,903,000
Pork.....	-59	-6	235,206,000
Veal.....	-61	+5	44,386,000
Oleomargarine (margarine) made in the oleomargarine, in the meat-packing, and in other industries: Oleomargarine, all.....	-56	-34	17,357,683
Sugar, beet:			
Molasses, sold or transferred for desugarization.....	-65	+54	732,433
Pulp, molasses.....	-55	+71	1,516,432
Sugar, cane, not including products of refineries: Bagasse, for sale as such.....	-67	+103	453,306
Sugar refining, cane: Refiners' blackstrap and monedible sirup.....	-52	-32	1,348,888
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>			
Coats, suits, and separate skirts, women's, misses', and juniors'—regular and contract factories: Suits.....	-51	+53	26,101,000
Corsets and allied garments: Brassieres and bandeaux-brassieres.....	-55	+47	12,126,000
Hosiery:			
Boys', misses', and children's—seamless—rayon with cotton tops, heels, and toes, and all-rayon.....	-55	-36	715,000
Women's:			
Seamless:			
All-pure-thread-silk.....	-57	-26	1,342,264
Pure-thread-silk with hisle or cotton tops, heels, and toes.....	-54	-47	4,260,240

TABLE 26.—Percentage change in average realized price and in quantity of products which experienced price decreases of 50 percent or more between 1929 and 1933—Continued

Products	Percent change, 1929 to 1933		Value, 1933 (in dollars)
	Average realized price	Quantity	
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>			
Chemicals, n. e. c.:			
Acetates—amyl.....	-58	+236	441,592
Sulphates—copper (blue vitriol).....	-55	-29	1,407,631
Compressed and liquefied gases: Hydrogen.....	-77	+183	914,532
Paints, pigments, and varnishes: Shellac, bleached.....	-66	0	1,878,000
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>			
Petroleum refining: Lubricating oils, black, cylinder, red, neutral, pale, and paraffin.....	-56	-31	74,178,000
<b>LEATHER AND ITS MANUFACTURES GROUP</b>			
Leather, tanned, curried, and finished:			
Glove and garment leather:			
Horse, colt, ass, and mule: Half and whole fronts (equivalent fronts).....	-50	-34	2,281,000
Sheep and lamb, except shearlings (skins).....	-53	+139	8,345,000
Shearlings (skins).....	-50	-25	2,062,000
Sole and belting leather: Oak and union sole (backs, bends, and sides).....	-50	-17	39,061,000
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>			
Clay products, other than pottery:			
Tile:			
Faience tile (including hand-decorated tile).....	-65	-66	325,980
Wall tile, including trim.....	-58	-67	1,551,734
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>			
Heating and cooking apparatus, except electric: Portable ovens.....	-71	-25	616,333
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>			
Nonferrous-metal alloys; nonferrous-metal products, except aluminum, n. e. c.:			
Ingots and pigs:			
Brass and bronze.....	-54	-60	8,018,270
Copper (secondary).....	-57	-42	4,179,767
Rods, copper.....	-56	-65	12,587,786
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT, GROUP</b>			
Agricultural implements: Drills, grain, horse- or tractor-drawn.....	-60	-94	236,192
Electrical machinery, apparatus, and supplies:			
Fans (direct motor-driven): Desk fans.....	-78	+23	2,134,917
Household apparatus and appliances: Waffle irons and griddles.....	-50	-41	1,289,524
Radio apparatus and phonographs: Radio-phonograph combinations.....	-68	-80	1,407,650
<b>MISCELLANEOUS INDUSTRIES GROUP</b>			
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint: Roof coating, nonfibrous liquid.....	-56	-59	183,729

Extending the analysis to the 1933-37 upswing, there were 61 products which experienced price increases of 50 percent or more. (See table 28.) An inspection of the products on this list indicates a considerable amount of overlapping with those products on the list showing large price decreases between 1929 and 1933. In fact, 28 of the 47 products appearing on the earlier list also appear on this list. As in the earlier list, these products have greater than average value—they made up 15 percent of the 407 products but they accounted for 20 percent of the aggregate value of the products in 1937.

TABLE 27.—Distribution of products which experienced price decreases of 50 percent or more between 1929 and 1933, by concentration ratio classes and by product characteristics

Concentration ratio class	Total	Type of immediate purchaser		Type of ultimate user*		Degree of durability*			Degree of fabrication*		Type of market		Source of raw material				Construction materials	Producers' supplies
		Consumer	Producer	Consumer	Producer	Nondurable	Semidurable	Durable	Semimanufactured	Finished	Regional	National	Agricultural	Mineral	Forest	Other		
Total.....	47	19	28	31	4	13	13	9	16	24	9	38	31	13	2	1	5	7
0.1 to 10.0.....	0			1						1			1	1				
10.1 to 20.0.....	1	1		1						1			1	1				
20.1 to 30.0.....	3	1	2	2			2			1	1	1	2	3				1
30.1 to 40.0.....	1		1	1		1							1	1				
40.1 to 50.0.....	6	4	2	5		4	1		1	4	1	1	5	5	1			1
50.1 to 60.0.....	9	7	2	7	1	4	1	3	1	8	1	8	5	4	1		1	
60.1 to 70.0.....	7	1	6	4		1	2	1	3	3	1	6	4	1	1	1	2	1
70.1 to 80.0.....	7	4	3	6		3	1	2	2	5	1	6	4	3			1	
80.1 to 90.0.....	3	1	2	1	1		1	1	1	1		3	2		1			1
90.1 to 100.0.....	4		4	3	1		3	1	3	1	2	2	3	1				
(1).....	4		4	1	1		1	1	3			4	3	1			1	1
(2).....	2		2								2		2					2

\* Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 28.—Percentage change in average realized price and in quantity of products which experienced price increases of 50 percent or more between 1933 and 1937

Products	Percent change, 1933 to 1937		Value, 1937 (in dollars)
	Average realized price	Quantity	
<b>FOOD AND KINDRED PRODUCTS GROUP</b>			
Corn sirup, corn sugar, corn oil, and starch:			
Corn oil, crude.....	+153	-27	4,340,527
Corn-oil cake and meal.....	+78	+37	952,680
Corn sirup, mixed with other sirups.....	+52	-31	10,392,615
Corn sirup, unmixed.....	+58	+18	26,605,776
Corn sugar.....	+55	-43	15,692,490
Flour and other grain-mill products:			
Bran and middlings.....	+82	+6	116,434,273
Corn meal.....	+83	-22	32,642,130
Feed, screenings, etc.....	+66	+30	52,930,697
Flour, wheat, semolina.....	+57	0	17,529,631
Meat packing, wholesale:			
Hides, skins, and pelts:			
Cattle hides, cured.....	+75	+25	75,509,529
Cattle hides, uncured.....	+69	+5	6,267,685
Sheep and lamb pelts, cured.....	+109	+4	20,754,760
Sheep and lamb pelts, uncured.....	+132	-16	5,318,838
Sheepskins and lambskins, pickled.....	+122	+11	6,569,709
Lard.....	+122	-46	126,331,478
Meat, cured:			
Beef, pickled and other cured.....	+53	+17	15,018,947
Pork, dry-salted, smoked.....	+95	+3	24,268,086
Pork, dry-salted, not smoked.....	+157	-29	64,072,256
Pork, pickled and dry-cured, smoked.....	+115	-20	235,530,519
Pork, pickled and dry-cured, not smoked.....	+118	-35	118,556,833

TABLE 28.—Percentage change in average realized price and in quantity of products which experienced price increases of 50 percent or more between 1933 and 1937—Continued.

Products	Percent change, 1933 to 1937		Value, 1937 (in dollars)
	Average realized price	Quantity	
<b>FOOD AND KINDRED PRODUCTS GROUP—continued</b>			
Meat packing, wholesale—Continued.			
Meat, fresh.			
Beef.....	+73	+13	710, 531, 368
Pork.....	+136	-25	415, 525, 668
Veal.....	+64	+44	105, 086, 001
Edible organs, tripe, etc.....	+55	+25	57, 989, 923
Oleomargarine (margarine) made in the oleomargarine, in the meat-packing, and in other industries: Oleomargarine, all.....	+80	+62	50, 876, 734
Shortenings (other than lard), vegetable cooking oils, and salad oils: Shortenings.....	+86	+64	184, 505, 604
Sugar, beet:			
Molasses, sold or transferred for desugarization.....	+83	-13	1, 161, 272
Pulp, dried, exclusive of molasses.....	+84	-68	1, 055, 746
Pulp, moist, exclusive of molasses.....	+52	-8	1, 226, 100
Sugar, cane, not including products of refineries: Bagasse, for sale as such.....	+67	-34	499, 895
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>			
Chemicals, n. e. c.:			
Glycerine:			
Crude.....	+178	+9	3, 592, 537
Dynamite grade and chemically pure.....	+138	+13	21, 282, 521
Sulphates:			
Copper (blue vitriol).....	+100	+41	3, 883, 409
Zinc.....	+76	+26	1, 143, 284
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>			
Petroleum refining:			
Acid oil.....	+67	-33	1, 015, 991
Lubricating oils, black, cylinder, red, neutral, pale, and paraffin.....	+81	+49	133, 955, 561
Residuum or tar.....	+100	-69	853, 393
<b>LEATHER AND ITS MANUFACTURES GROUP</b>			
Leather, tanned, curried, and finished:			
Glove and garment leather: Shearlings (skins).....	+99	+20	4, 878, 255
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>			
Clay products, other than pottery:			
Chimney pipe and tops.....	+96	+122	248, 796
Tile:			
Hollow building tile: Floor-arch, silo, and corner tile; radial chimney blocks; fire-proofing tile.....	+56	+38	625, 049
Wall tile, including trim.....	+73	+1	2, 689, 227
Concrete products: Circular structures.....	+58	+150	1, 519, 563
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>			
Steel-works and rolling-mill products:			
Finished hot-rolled products and forgings:			
Armor plate and ordnance.....	+55	+163	8, 460, 893
Axles, rolled and forged.....	+77	+132	11, 424, 076
Ties, cotton.....	+65	+36	3, 329, 293
Scrap iron and steel.....	+121	+92	29, 591, 859
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>			
Nonferrous-metal alloys; nonferrous-metal products, except aluminum, n. e. c.:			
Ingots and pigs:			
Brass and bronze.....	+81	+137	34, 347, 841
Copper (secondary).....	+67	+36	9, 499, 136
Plates and sheets: Brass and bronze.....	+66	+66	72, 389, 569
Tubing (seamless) and pipe: Brass and bronze.....	+59	+104	34, 869, 555

TABLE 28.—Percentage change in average realized price and in quantity of products which experienced price increases of 50 percent or more between 1933 and 1937—Continued.

Products	Percent change, 1933 to 1937		Value, 1937 (in dollars)
	Average realized price	Quantity	
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT, GROUP</b>			
<b>Agricultural implements:</b>			
Disk harrows, horse- or tractor-drawn (single or double action).....	+92	+1,006	9,745,008
Drills, grain, horse- or tractor-drawn.....	+118	+1,269	7,004,974
Electrical machinery, apparatus and supplies: Fans (direct motor-driven): Desk fans.....	+113	+136	10,698,020
<b>Machine tools:</b>			
Boring machines—vertical (not vertical boring mills).....	+76	+120	306,498
<b>Drilling machines—vertical:</b>			
Multiple spindle, sensitive.....	+74	+1,291	1,497,584
Standard.....	+253	+155	943,077
Honing and lapping machines.....	+107	+167	692,299
<b>Milling machines:</b>			
Power-feed, universal.....	+62	+813	4,376,275
Power-feed, vertical.....	+61	+1,249	4,141,625
Presses (except forging): Forming and stamping.....	+57	+365	10,468,167
Radio apparatus and phonographs: Radio-phonograph combinations.....	+69	+92	4,567,342

One might assume from the number of duplications in the two lists that, on the basis of their economic characteristics, the distribution of the products which experienced broad increases in prices in the 1933-37 recovery period would be more or less similar to those showing large price decreases in the downswing. The distributions on the basis of product characteristics, however, are not particularly close. Of the 44 products classified on the basis of ultimate user (6 products listed as construction materials and 11 as producers' supplies were not classified on the basis of ultimate user), 28 products were consumers' goods, and 16 producers' goods (see table 29). The products classified on the basis of durability were about evenly distributed between nondurable and durable goods and, on the basis of the source of raw material, the distribution between agricultural and mineral sources was fairly even. Generally, the products which experienced large increases in prices were consumers' goods, but their distribution, on the basis of other economic characteristics, indicates no predominant attribute. As was seen in table 25, those products experiencing large quantity increases in this same period were predominantly durable producers' goods fabricated from mineral materials.

The distribution of products by concentration ratio classes shows the products experiencing large price increases to be clustered considerably higher on the range than was the case of products with large price decreases on the downswing. The computed median of these 61 products is 74.6 percent, while the computed median of the 47 products is 65.1 percent. The central tendency of the distribution, however, closely approximates the distribution of the 1807 products for which the computed median is 72.6 percent.

TABLE 29.—Distribution of products which experienced price increases of 50 percent or more between 1933 and 1937, by concentration ratio classes and by product characteristics

Concentration ratio class	Total		Type of immediate purchaser		Type of ultimate user *		Degree of durability *			Degree of fabrication *		Type of market		Source of raw material			Construction materials	Producers' supplies	
	Total	61	Consumer	Producer	Consumer	Producer	Non-durable	Semi-durable	Durable	Semi-manufactured	Finished	Regional	National	Agricultural	Mineral	Forest			Other
Total.....	61	16	45	28	16	16	20	5	19	20	30	14	47	33	28	0	0	11	
0.1 to 10.0.....	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
10.1 to 20.0.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
20.1 to 30.0.....	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
30.1 to 40.0.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
40.1 to 50.0.....	8	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
50.1 to 60.0.....	8	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
60.1 to 70.0.....	6	2	4	5	5	5	4	4	4	3	3	3	3	3	3	3	3	3	
70.1 to 80.0.....	10	2	8	5	5	5	3	1	6	4	4	2	8	4	6	1	1	1	
80.1 to 90.0.....	6	6	6	6	6	6	3	2	3	1	3	1	5	1	5	1	1	2	
90.1 to 100.0.....	8	1	8	3	3	3	2	2	5	2	2	2	7	2	6	1	1	2	
(1).....	9	2	8	3	2	2	1	1	2	5	2	2	7	4	5	2	2	1	
(2).....	2	1	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	

\* These products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

1 Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study

2 Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading four companies.

## RELATION BETWEEN CHANGES IN QUANTITY OUTPUT AND CHANGES IN AVERAGE REALIZED PRICES

In chart 22a, the percentage changes between 1929 and 1933 in the average realized prices of products with "high" and with "low" concentration ratios are plotted against their percentage changes in quantity during this same period. To facilitate the comparison, separate charts for each group have been prepared. The scatter diagram of the "low" concentration group is shown in the upper half of the chart and that of the "high" group in the lower half of the chart.

In an appraisal of the significance of the data presented in this type of chart, the behavior patterns into which the product points fall indicate distinct relational forms and each form has a particular significance in price analysis. In the first place and within each scatter diagram the product points may be (1) scattered or (2) clustered into some particular conformation. When the points are scattered it means that both large and small changes in price are associated in random fashion with both large and small changes in quantity, or conversely both large and small changes in quantity are associated with both large and small changes in price. In this situation, the changes in price and the changes in quantity concur as if by chance. Thus, products A, B, C, D, and E may all have experienced a 50 percent decrease in quantity but A experienced no change in price, B a 10 percent decrease, C a 20 percent decrease, D a 30 percent decrease, while the price of E dropped 40 percent. Likewise, products F, G, H, I, and J may have experienced 50 percent decreases in price but F experienced no change in quantity, G a 10 percent decrease, H a 20 percent decrease, I a 30 percent decrease and J a 40 percent decrease.

In those cases where a definite pattern is evident, it may take the form of a cluster of points which string out and slope downward toward the right. This type of behavior is evident, within broad limits, in both sections of chart 22a; it is more pronounced, however, in the upper diagram. There, small changes in price are associated with relatively large decreases in quantity and appear in the upper left-hand area of the range. From this upper range the product points string out down to the right through the intermediate behavior types to the lower right-hand portion of the scatter. In this latter area small changes in quantity are associated with relatively large decreases in price. When viewed in one way, the points tend to cluster along or around a diagonal line sloping downward to the right. The closeness of the relation between changes in price and changes in quantity is suggested by the closeness with which the product points conform to this line.

This inverse relation between price change and quantity change appears to characterize the behavior of certain types of products, while for other types of products no relation between price and quantity changes is evident. The nature of the divergent behavior patterns for the various groups of products is set forth in the latter portion of this chapter. The fact that large price changes are associated with small quantity changes and vice versa does not mean that the large price changes resulted in or caused small quantity changes. Actually the causal relationship may have run in the opposite direction, or it may be that the relation is to be accounted for by the operation of a third or fourth variable on the price and quantity of the particular

products. The meaning of the relation must be supplied by an understanding of common causes or of other variables affecting the association.

In the second place and in a comparison of the behavior patterns of various types of products as reflected in different scatter diagrams, it is necessary to observe the location on the horizontal and vertical axes of the range and the center of the conformation of product points. The center of the product points for one type of commodity may be in one area of the scatter diagram, while the center of the cluster for another type of product may be in another area. Products of one type may be characterized by small price changes associated with large quantity changes; thus, the product points will cluster in one area of the diagram. Products of another type may be characterized by large price changes associated with small quantity changes and will cluster in another area. The typical behavior of still other groups of products may assume an intermediate relationship. Furthermore, the points on the diagram for products of one type may be scattered and thus tend to show a more restricted sort of inverse relation between their price and output characteristics (lower diagram, chart 22a).

A few of the product points in both diagrams of chart 22a fall in the second and fourth quadrants, but by far the largest number of points fall in the third quadrant where decreases in quantity are associated with decreases in price. The points falling in the second quadrant represent products which experienced an increase in average realized price accompanied by a decrease in quantity, while those points in the fourth quadrant represent products for which there was an increase in quantity accompanied by a decrease in average realized price.

As already pointed out, in the lower half of chart 22a, where the percentage changes between 1929 and 1933 in the average realized prices of products with "high" concentration ratios are plotted against their changes in quantity, the pattern of inverse relationship is not so strongly marked as that for products with "low" concentration. In some instances products that had small price decreases also experienced sharp curtailment in output but there were an equal number of instances in which small price declines were associated with small contractions in output (in some cases the production actually increased). And further, there were a sizable number of products for which the contraction in output was accompanied by an equal or proportionate decrease in price. Undoubtedly, the inclusion in the list of commodities with different characteristics was responsible for the lack of uniformity in the conformation of the product points. An outstanding feature of the lower diagram as contrasted with the upper section of the chart is the greater magnitude of change in quantity output among products in the "high" group than among those in the "low" concentration group, while price changes in both cases were approximately equal in magnitude. Thus, if regression lines were fitted to the data of the upper and lower sections of the chart, the slope would be greater in the former than in the latter.

It has been argued that concentration in production manifests itself in price and output policies which result in distinctly different behavior patterns from those which would result in the absence of such control. According to this hypothesis, the prices of products produced under conditions of high concentration are maintained in a period of business recession and the depression adjustment takes the

form of a contraction in output. In a period of recovery, on the other hand, the immediate effects may be increases in output at the old price as demand expands. Although there might be a tightening of credit terms, lowering of cash and quantity discounts, etc., actual price increases would probably not occur until near capacity operations were reached. It has also been contended, and in some cases demonstrated, that the prices of some products were not reduced in the 1929-33 downswing and in the ensuing upswing were pushed still higher. In contrast, the adjustments to cyclical changes for products with low concentration tend to take the form of relatively wide price reductions in the downswing and wide advances in price in the upswing, while the fluctuations in production are relatively narrow in both movements.

In an evaluation of the above hypothesis it is essential to observe the predominant location of the product points in the upper and lower diagrams of charts 22a and 22b. If the hypothesis were tenable, one would expect the cluster for the "high" and "low" concentration groups to fall in distinctly different areas on the charts. For example, the cluster of points representing products with low concentration should fall in the general area indicated by the circle in the upper diagram, while the cluster of points representing products with high concentration should fall in the area indicated by the circle in the lower diagram. Actually, however, the product points for both groups tend to string out through the general areas of both circles and to occupy the same general positions on the diagrams. The heaviest clusters in both cases are in almost identical areas on the diagrams. This means that products with both "high" and "low" concentration ratios had approximately the same price-quantity behavior patterns during the 1929-33 period. From this empirical evidence, it may be said that the degree of concentration in production is not of paramount consideration in explaining the price-production behavior of individual commodities.

The wide scatter of points in the lower diagram of chart 22a, reflecting the divergent behavior of products in the "high" concentration group, points to the conclusion that in actual practice the control over the supply of the products analyzed was not exercised in any uniform fashion. Obviously, the price and production policies for some products did result in rigid prices, but the contention that such price and production policies were more widely characteristic of products manufactured under conditions of high concentration is definitely not tenable. The determination by a concern of a price and production policy which manifests itself in rigid prices accompanied by curtailed output would appear from this material to be conditioned by some circumstance other than the potential or actual control over the supply of the product. Even though control (as measured here) existed, the formulation of price and production policies was strongly influenced by these other factors.

Chart 22b shows in the form of scatter diagrams the relation between changes in average realized prices and changes in quantity output of products with "low" (upper diagram) and "high" concentration ratios during the cyclical upswing from 1933 to 1937. The data presented lend further support to the hypothesis suggested in the preceding paragraph. As shown in this chart, the great majority of products with both "high" and "low" concentration ratios experienced increases

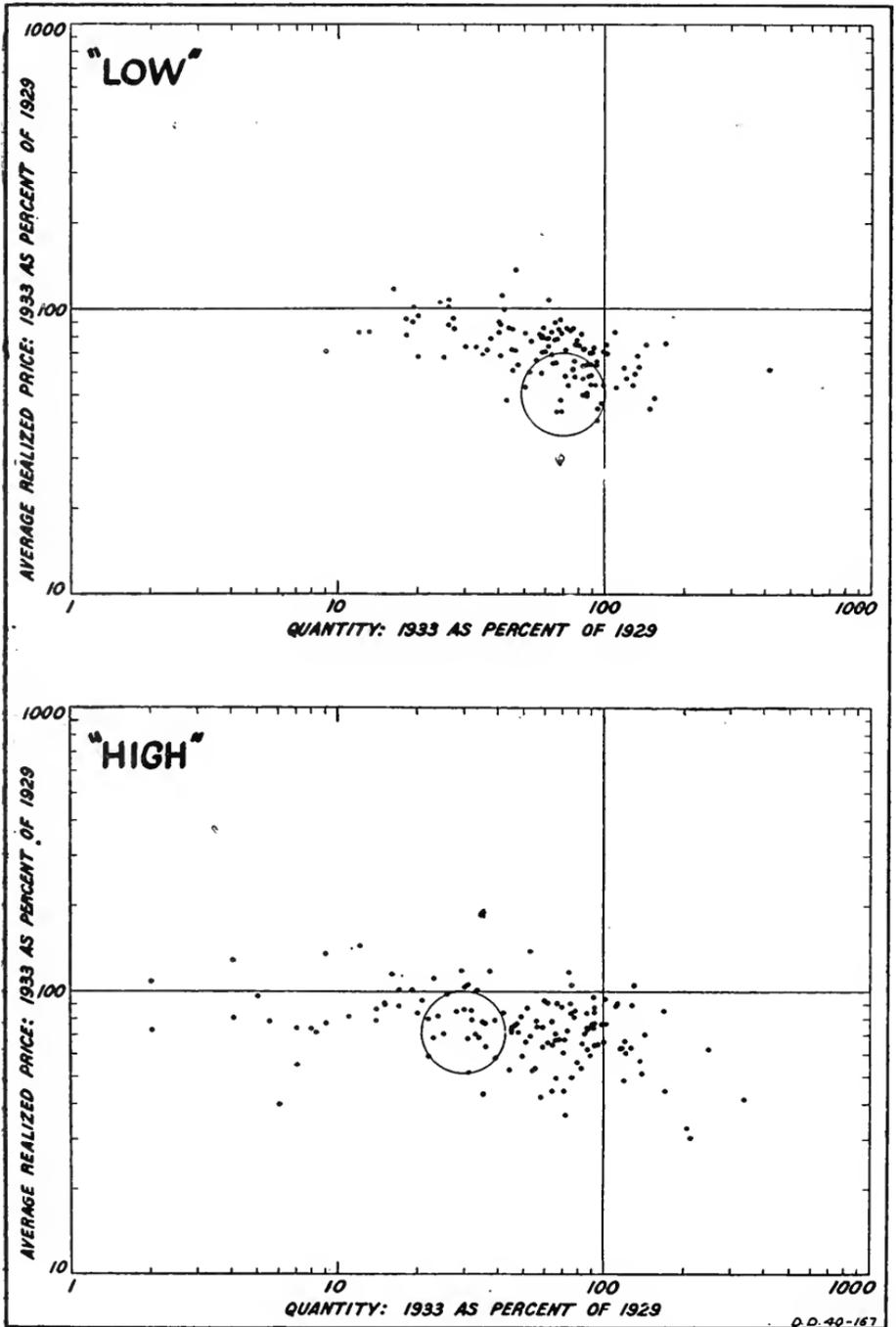


CHART 22a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE, 1929-33.

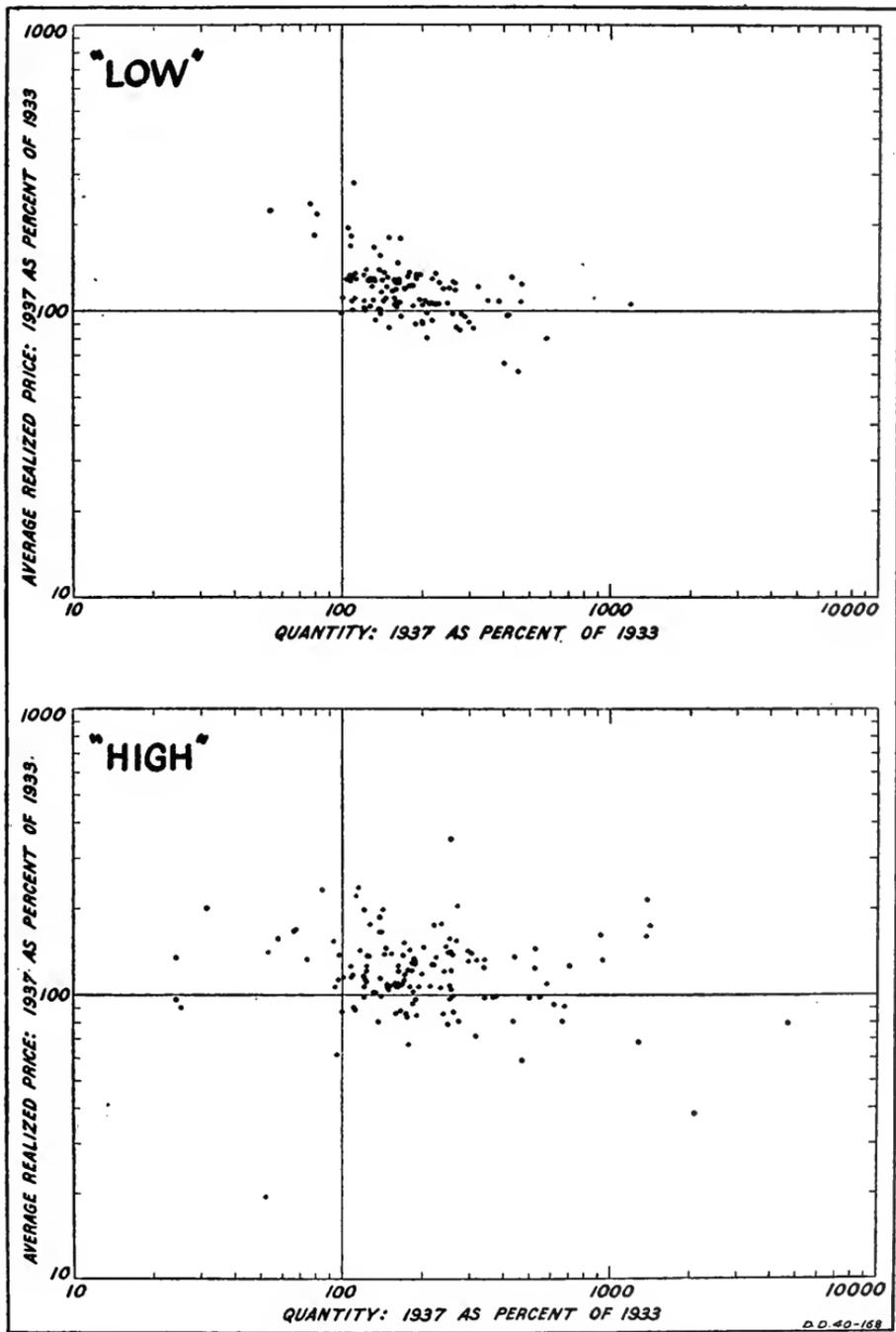


CHART 22b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE, 1933-37.

in quantity output and in average realized price in the period 1933-37 and thus appear in the first quadrant of each diagram. The conformation of product points in the "low" group appears to fit more closely a regression line sloping downward from left to right, while a similar tendency, although likewise apparent in the "high" concentration group, is not so pronounced. The product points in both groups, however, tend to cluster in the same general area in the diagrams. Thus, the obvious conclusion here, too, is the negative one, namely, that the conditions of concentration under which the manufactured products analyzed in this study were produced did not account for their varying quantity and price behavior.

#### BEHAVIOR CHARACTERISTICS OF PRODUCTS IN THE VARIOUS GROUPINGS SET FORTH IN CHAPTER III

In chapter III the products analyzed in this study were classified on the basis of six major criteria, namely, type of immediate purchaser, type of ultimate user, degree of durability, degree of fabrication, type of market, and source of raw material. Two additional subgroups included products not readily classifiable in the above, i. e., construction materials and producers' supplies.<sup>2</sup> In the earlier chapter, the extent of concentration in the production of the products was measured against these various product characteristics. The products classified in certain of the groups were found to be produced more generally under conditions of "high" than of "low" concentration and vice versa. That is, there appeared to be some association between the highness or lowness of the concentration ratios of the products and certain product characteristics.

In this chapter, the behavior characteristics of products in the various major groupings over the 1929-33 and the 1933-37 periods are the subjects of investigation. As was indicated earlier, there were only 407 of the 1,807 products for which comparable data over the period were available. For these 407 products, however, the divergent behavior patterns of items in the six groups are carefully examined.

The analysis as developed centers around a series of charts. For each of the six major product classifications scatter diagrams are presented showing (1) percentage changes in quantity between 1929 and 1933 and between 1933 and 1937 against the concentration ratios of the products, (2) percentage changes in average realized price between 1929 and 1933 and between 1933 and 1937 against the concentration ratios of the products and (3) percentage changes in average realized prices against percentage changes in quantity output between 1929 and 1933 and between 1933 and 1937. Each of the major groups was broken down into subgroups of products with divergent characteristics. Thus, the major grouping of products classified on the basis of immediate purchaser was broken down into two subgroups made up of products the immediate purchasers of which were consumers and the immediate purchasers of which were producers. Similarly, on the basis of the degree of fabrication products were grouped according to finished and semimanufactured goods, etc. While the charts themselves must carry the main burden of presentation, it may be well to point out a few of the outstanding behavior characteristics of the products in each major group.

<sup>2</sup> See appendix D for an extended discussion of the basis of classification.

*Type of Immediate Purchaser.*

In the upper left-hand diagram of chart 23a, the percentage changes between 1929 and 1933 in quantity output of products whose immediate purchasers were consumers were plotted against their concentration ratios; in the lower left-hand diagram, the percentage changes in quantity output of products whose immediate purchasers were producers were plotted against their concentration ratios. Likewise, in the upper and lower diagrams on the right-hand side of the chart, the percentage changes between 1929 and 1933 in the average realized prices of products whose immediate purchasers were consumers (above) and producers (below) were plotted against their concentration ratios.

Those products whose immediate purchasers were *consumers* apparently experienced contractions in quantity output between 1929 and 1933 that were considerably less severe than those experienced by the products purchased by *producers*. In contrast, the changes in average realized prices over this same period were of almost equal magnitude. Thus, while the pricing policies of the concerns producing both consumers' and producers' goods, in the meaning used here, were quite similar, those products normally purchased immediately by producers experienced much more severe contractions in output than those products in the consumer category.

There were only 5 products in the consumer category which experienced quantity decreases of more than 70 percent between 1929 and 1933 (see table 23), while there were 67 products in the producers' group which dropped 70 percent or more in this same period. While the products listed here as "producers'" contain semifinished items ultimately to be used by consumers, it is interesting to note that 37 of the products which experienced decreases of more than 70 percent were producers' capital items and 29 were construction materials, a considerable portion of which would also eventuate in producers' capital goods.

Chart 23b supplies the same sort of information as chart 23a except that the data relate to the percentage changes in quantity and in price between 1933 and 1937. In chart 23a by far the greater portion of the changes are negative while in chart 23b the majority of the changes are on the plus side. Here again, however, the percentage changes in average realized prices of consumer and producer items are of approximately the same magnitude and the percentage changes in quantity output are considerably greater for those products whose immediate purchasers are producers than for those purchased immediately by consumers. As was suggested in the analysis of the preceding paragraph, the wide swings in quantity output may be accounted for in large measure by the behavior of the producers' capital items and construction materials which are included in the "producers'" group. Of the 49 producers' items which experienced increases of 200 percent or more between 1933 and 1937 (see table 25), there were 26 items in the producers' capital goods classification and 18 in the construction materials category.

The greater number of items classified in the producers' than in the consumers' category in both these charts creates the illusion of a denser cluster of points in the lower halves of both charts than in the upper portions. In terms of ranges and of averages, however, the foregoing conclusions are obvious. It will also be observed that the

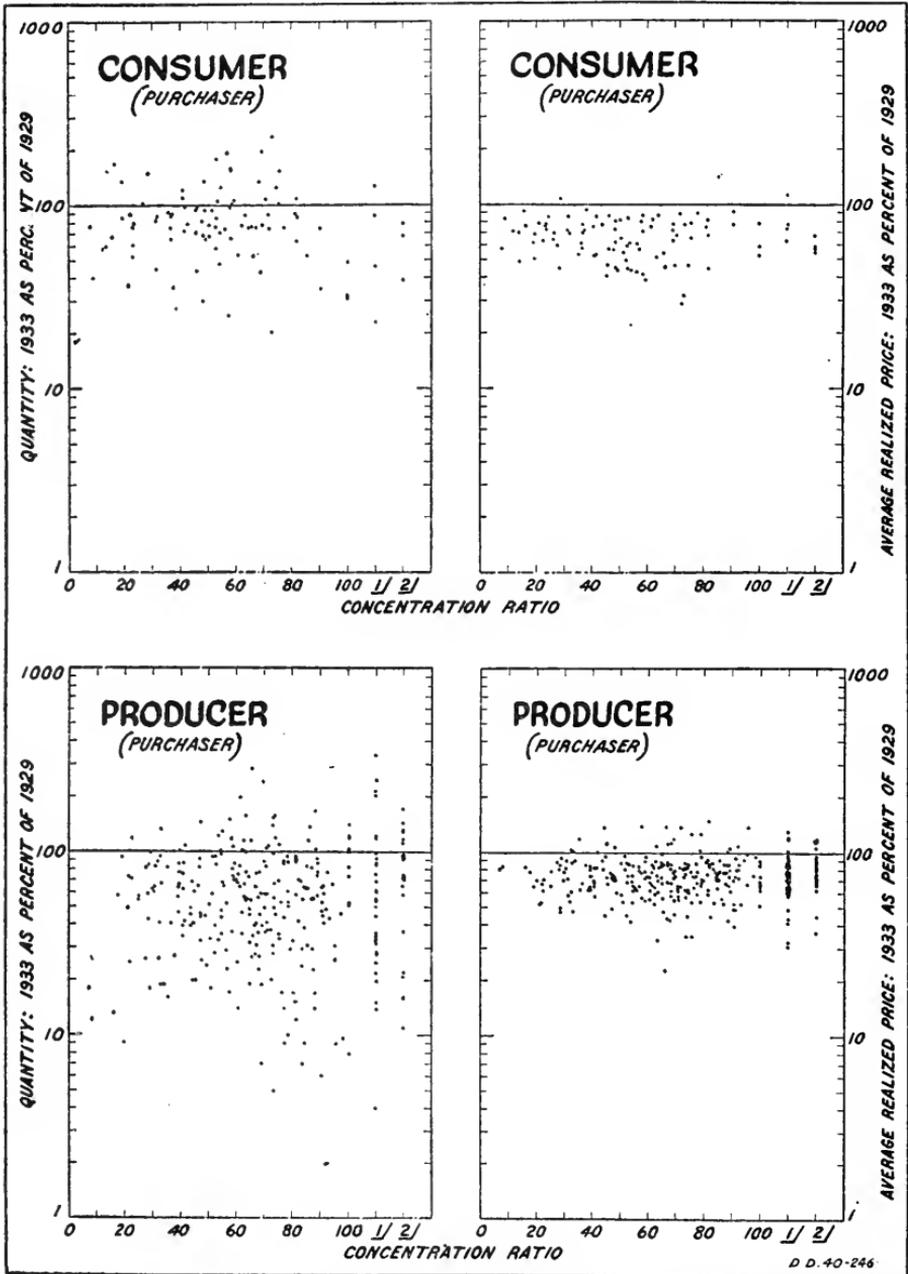


CHART 23a.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF IMMEDIATE PURCHASER, 1929-33.

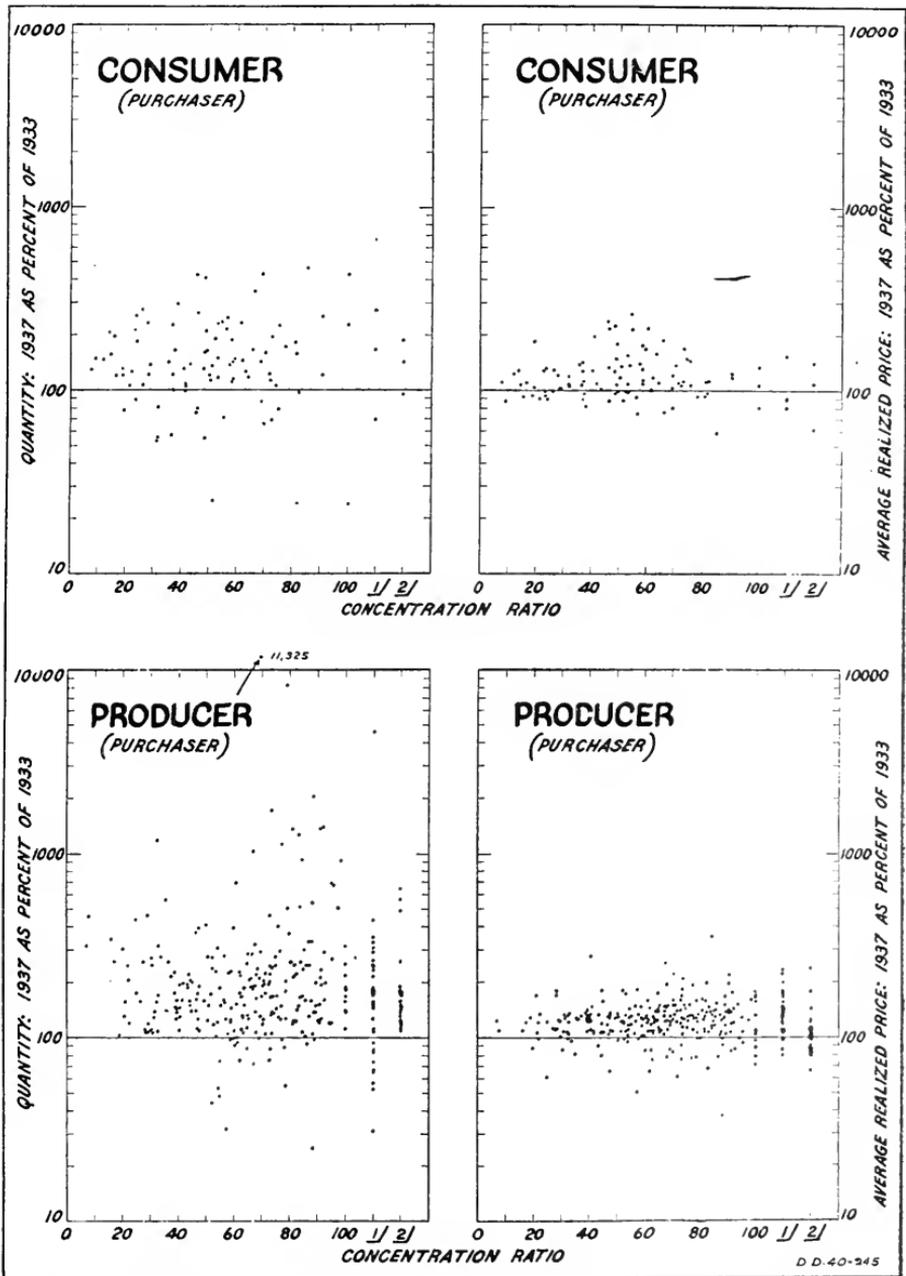


CHART 23b.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF IMMEDIATE PURCHASER, 1933-37.

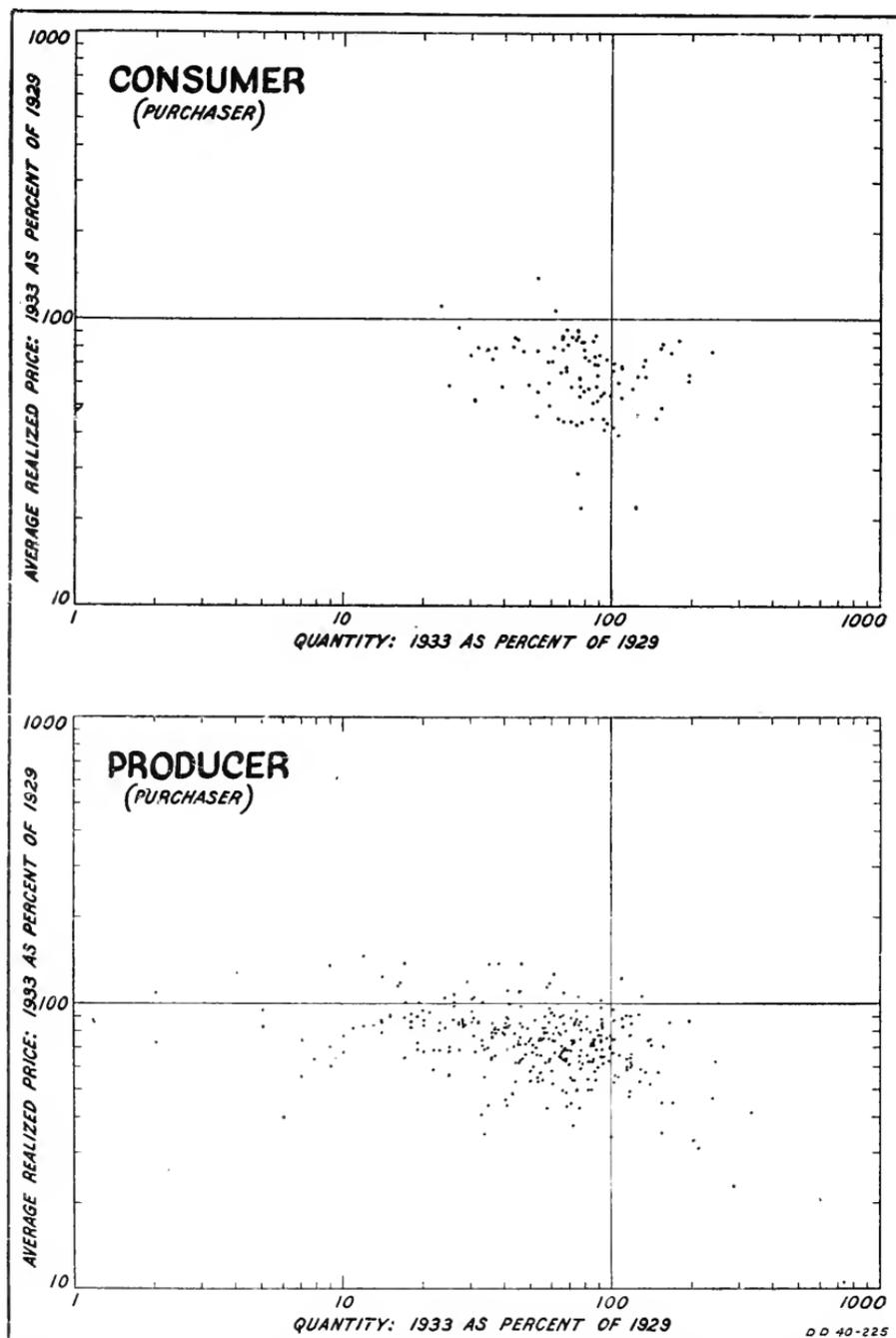


CHART 21a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF IMMEDIATE PURCHASER, 1929-33.

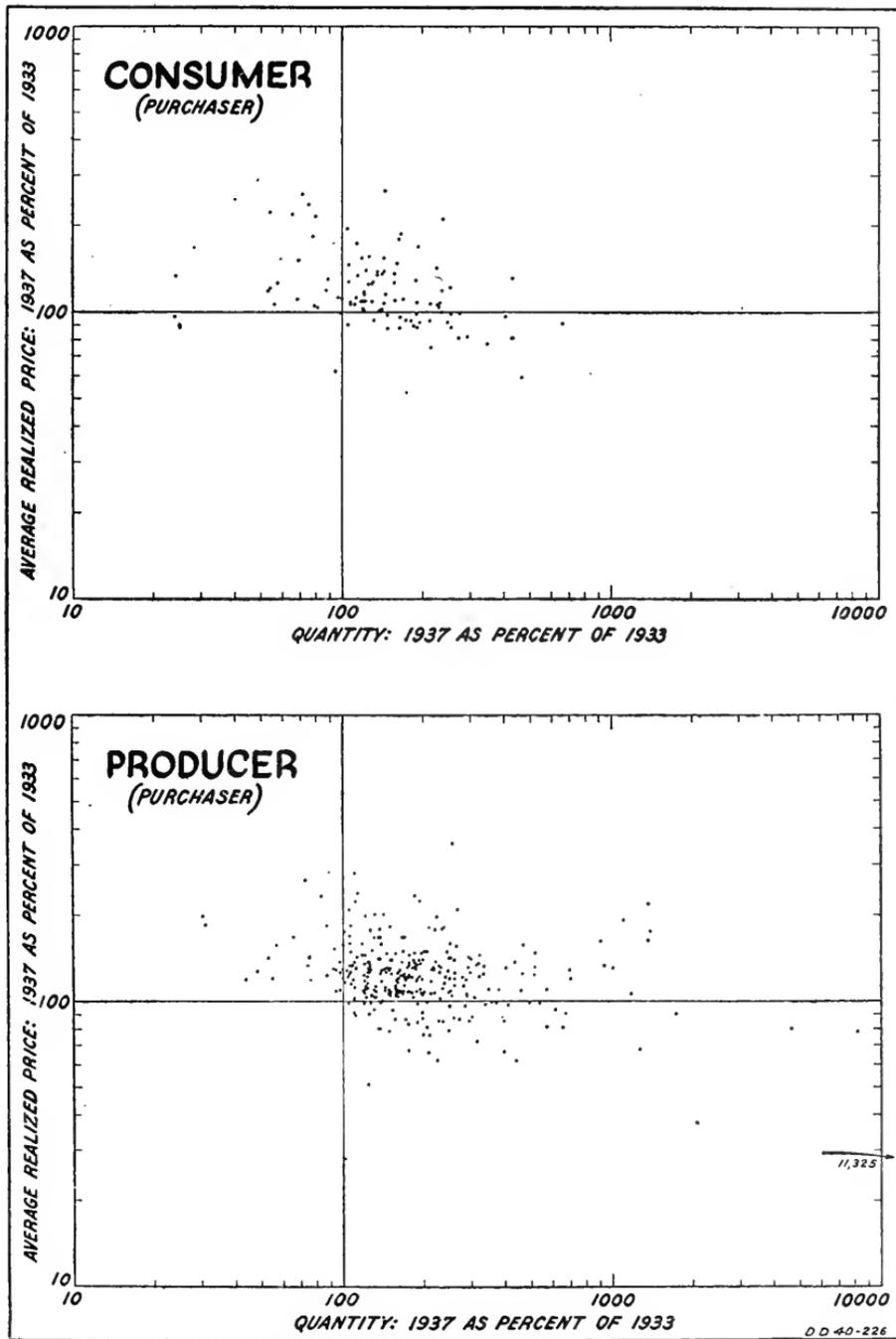


CHART 24b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF IMMEDIATE PURCHASER, 1933-37.

product points in the consumer sections of the charts tend to be in the lower concentration ranges while the centers of the cluster in the producer sections are in appreciably higher concentration ratio classes. This tendency, of course, is to be expected in light of the distributions presented in chapter III. The cluster of product points showing changes in quantity of "producers" items in both the recession and recovery periods appears to string out downward to the right in the former period and upward to the right in the latter period. This tendency is evident, however, only within very broad limits. Within these limits this means that there appears to be some very general, broad sort of relation between the height of the concentration ratios and the extent of change in quantity output of products purchased immediately by producers.

In charts 24a and 24b the percentage changes in average realized prices between 1929 and 1933 and between 1933 and 1937, respectively, were plotted against percentage changes in quantity output of products purchased immediately by consumers (upper) and by producers (lower). As will be noted, the logarithmic scale has been used on both the vertical and horizontal axes. Thus, while the product points appear to cluster, in reality the actual changes in both quantity and price are in some cases quite large. From the preceding charts (charts 23a and 23b) it was seen that the price changes in the 1929-33 period and again in the 1933-37 period for both producers' and consumers' goods were of approximately the same magnitude while the quantity changes were greater for the producer items. A possible regression line would thus tend to be somewhat flatter if fitted to the product points representing producers' goods than if fitted to the product points of consumers' goods.

It is also interesting to note that the conformation of product points in the 1933-37 upswing would indicate a regression line with a considerably steeper slope for both consumers' and producers' items than that which would be indicated by the conformation of product points in the 1929-33 downswing. Since these data are plotted on a logarithmic scale this means that percentage decreases in quantity during the downswing of the 1929-33 period were not matched by percentage increases of equal ratio in the upswing of the 1933-37 period. There is an assumption here that percentage price changes were of equal magnitude for products of both types. In more general terms, larger changes in quantity for equal changes in price tend to be associated with products whose immediate purchasers were producers than with those whose immediate purchasers were consumers. It should be noted, however, that neither producers' nor consumers' goods were characterized by distinct types of price and production policies. Rather, there were products in both categories which experienced small decreases in price and large quantity contractions in the downswing, for example, while there were other products which experienced sizable decreases in price and relatively small contractions in output. In some cases there were actual increases in output.

#### *Type of Ultimate User.*

Charts 25a and 25b cover the same general type of information that was covered by charts 23a and 23b except that in this particular set of charts the products are classified on the basis of their ultimate users into consumer and producer categories. Although the items

in the two sections of both of the charts are loosely referred to as consumers' and producers' products, the product composition of the two groups is considerably different.<sup>3</sup> Under the classification on the basis of ultimate user, a considerably larger number of products are in the consumer than in the producer category.

Products ultimately used by consumers experienced somewhat narrower contractions in quantity between 1929 and 1933 than products whose ultimate users were producers. Only two products in the producer section of the chart showed increases in quantity while 45 products in the consumer category experienced increases in quantity. In the upswing from 1933-37, the quantity output of the producers' items expanded, on the average, considerably more than that of consumers' products. As in the preceding section, no appreciable difference in the price behavior of consumers' goods and producers' goods is evident either in the 1929-33 period or in the 1933-37 period.

Since price changes tend to be quite similar for both consumers' and producers' goods, changes in quantity output for equal changes in price must be accounted for in terms of the variation in the nature of economic characteristics of the goods themselves as reflected in the demand schedules for the products and not in terms of price policies.

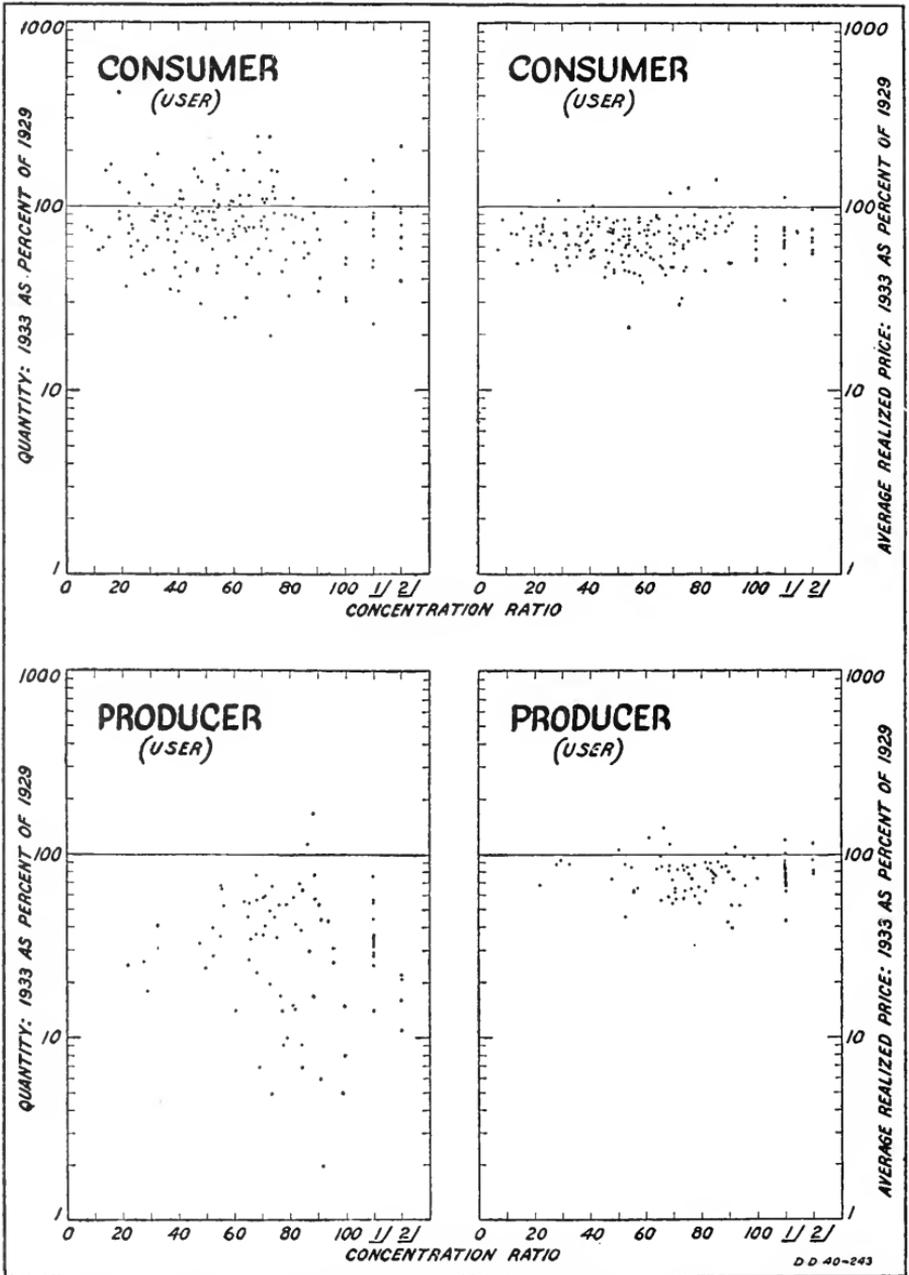
These differences in the behavior of consumer and producer products are more strongly pointed up in charts 26a and 26b. For those products ultimately used by consumers (upper half chart 26a), there is a fairly well marked tendency, as reflected in the conformation of the product points, for small price decreases to be associated with relatively large contractions in output and for sizable price decreases to be associated with relatively small contractions in quantity produced. In contrast with this tendency, decreases in price of producers' items (lower half chart 26a) do not appear to be associated with any strongly marked quantity behavior. Small and large decreases in price appear indiscriminately with large or small contractions in quantity produced.

This same tendency is apparent in chart 26b, but here, of course, there is a reflection of the price and production characteristics of products in a period of increasing business. The relation between the changes in price and in quantity of consumer items during this period follows a quite evident pattern and may be represented by a regression line extending through the product points downward toward the right. For producers' items the scatter of the product points would indicate no such obvious inverse relationship. Rather, price changes do not appear to be associated with any particular or characteristic quantity behavior.

#### *Degree of Durability.*

In charts 27a and 27b and in 28a and 28b materials similar to those shown in the preceding charts are presented for products classified on the basis of the degree of their durability into nondurable and durable goods. The diagram showing the behavior of semidurable products is not reproduced since the conformation of product points in this classification exhibits a tendency which is intermediate between that of the nondurable and the durable items.

<sup>3</sup> Reference is again made to the discussion of the basis of classification in ch. III and appendix D.



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CHART 25a.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF ULTIMATE USER, 1929-33.

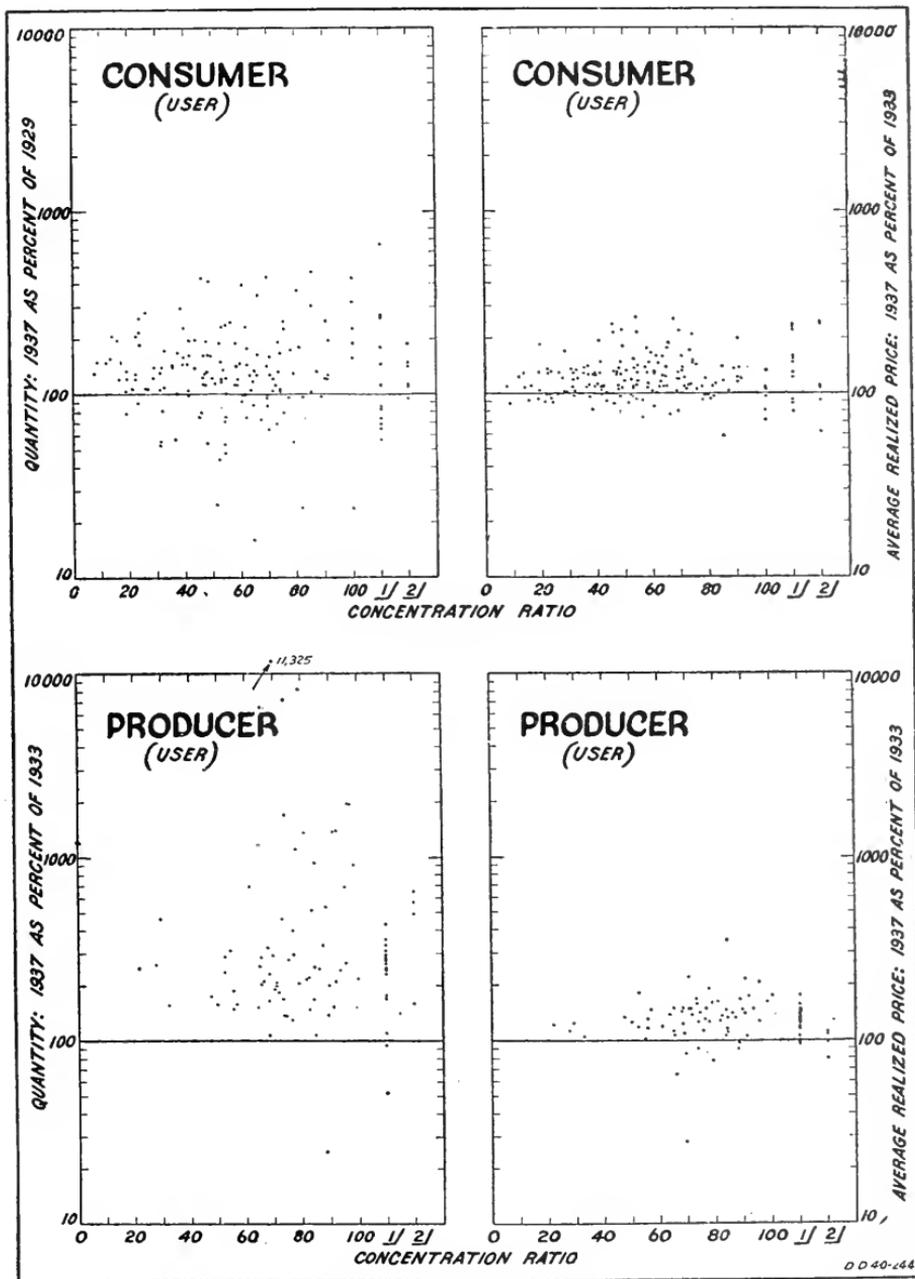


CHART 25b.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF ULTIMATE USER, 1933-37.

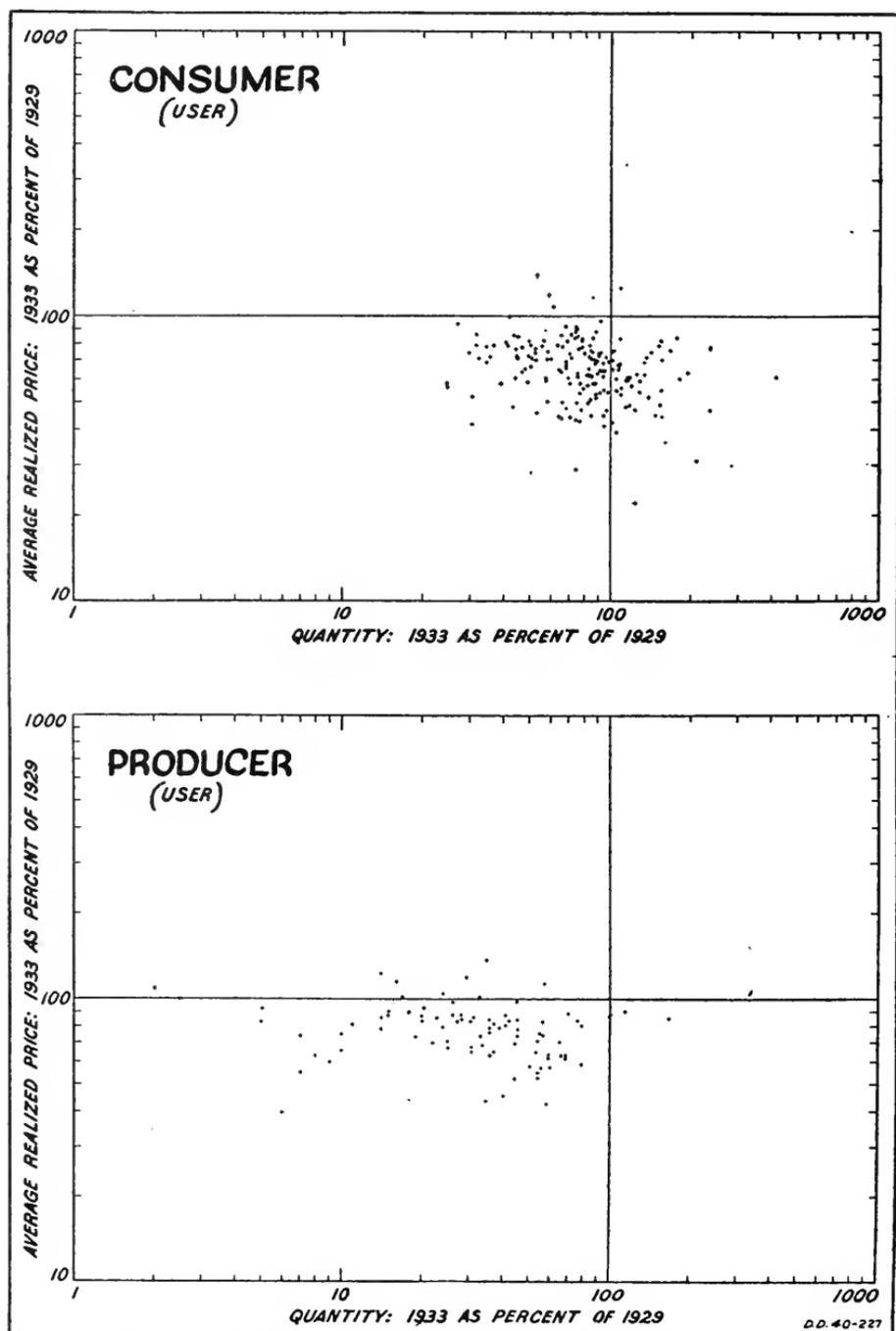


CHART 26a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF ULTIMATE USER, 1929-33.

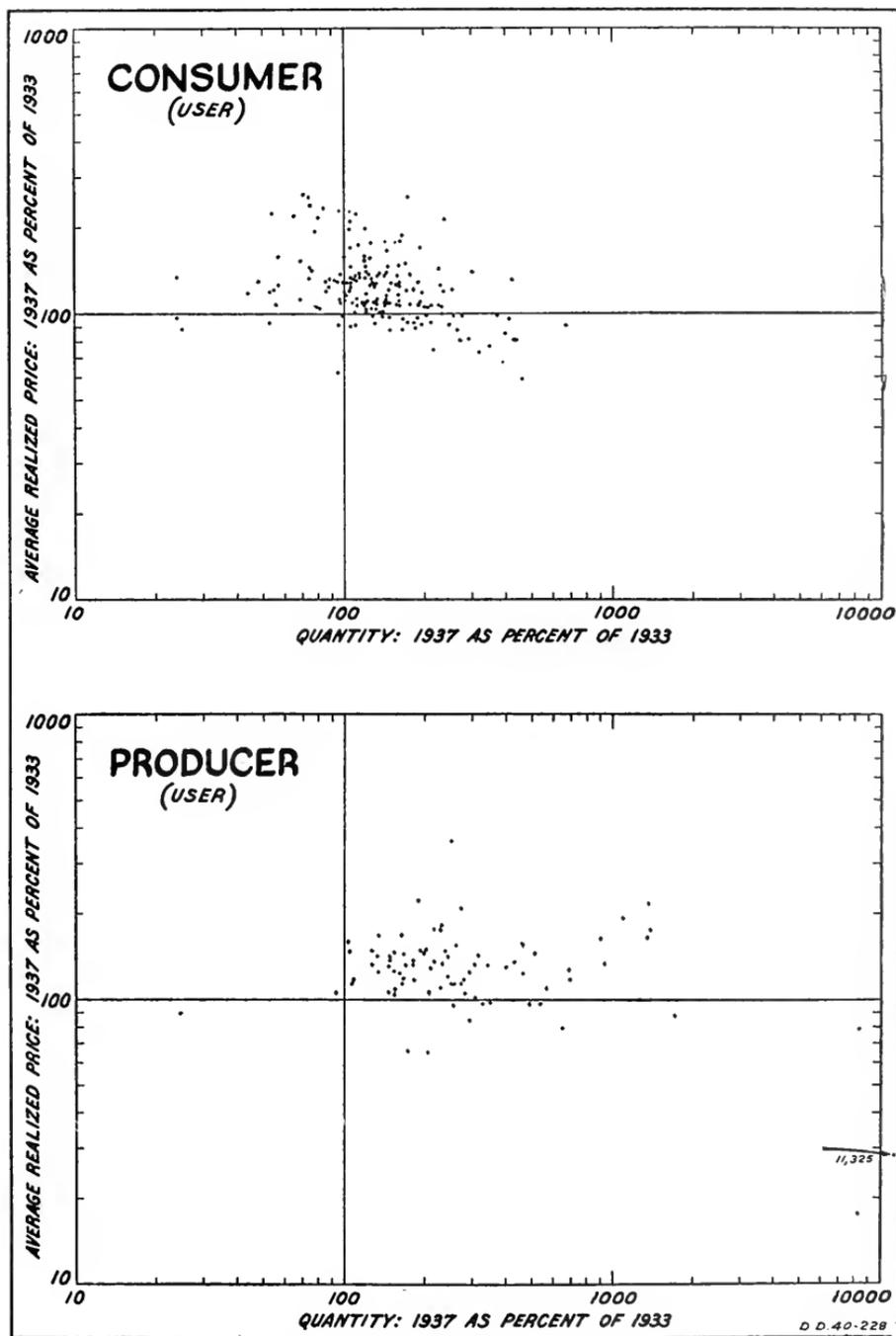


CHART 26b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF ULTIMATE USER, 1933-37.

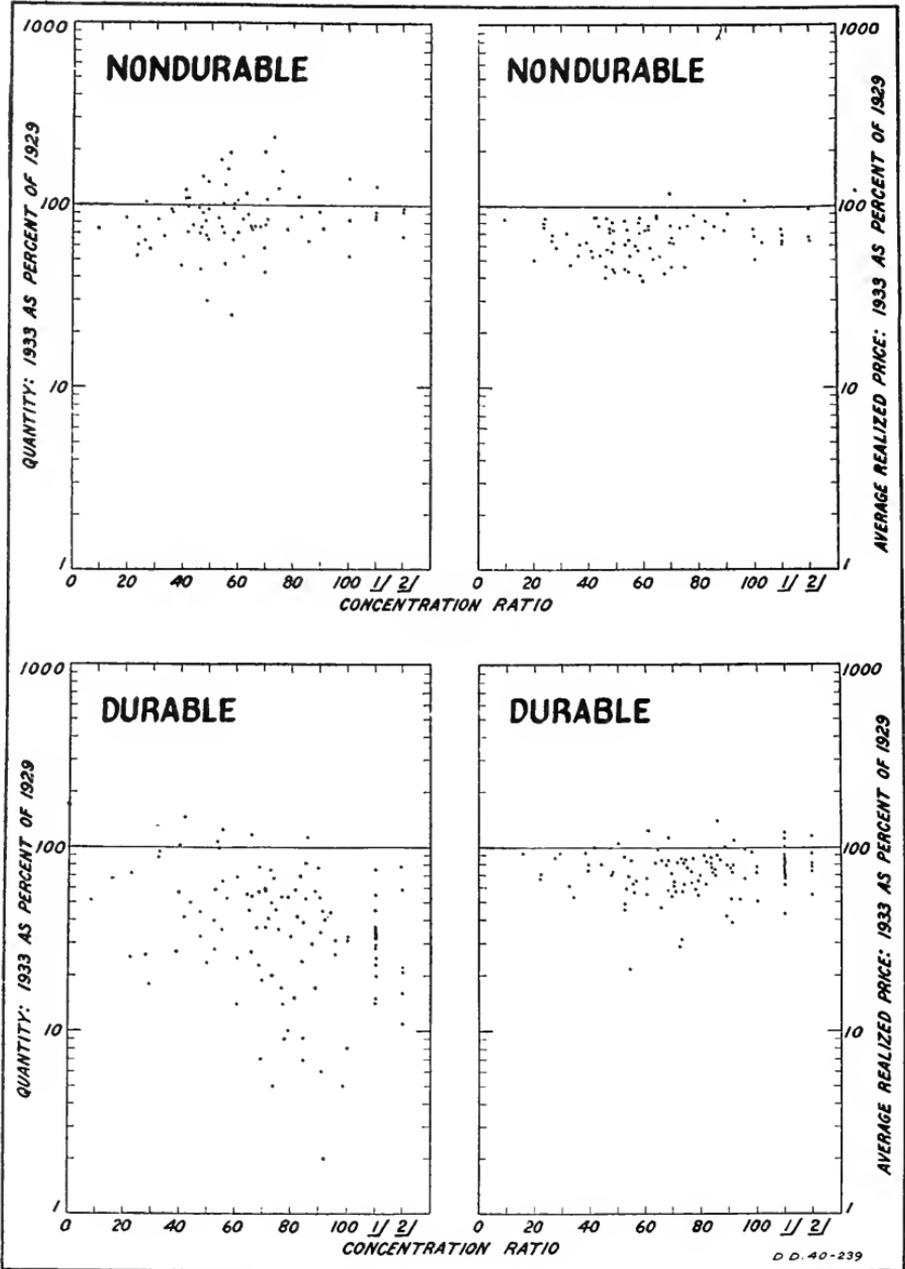


CHART 27a.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF DURABILITY, 1929-33.

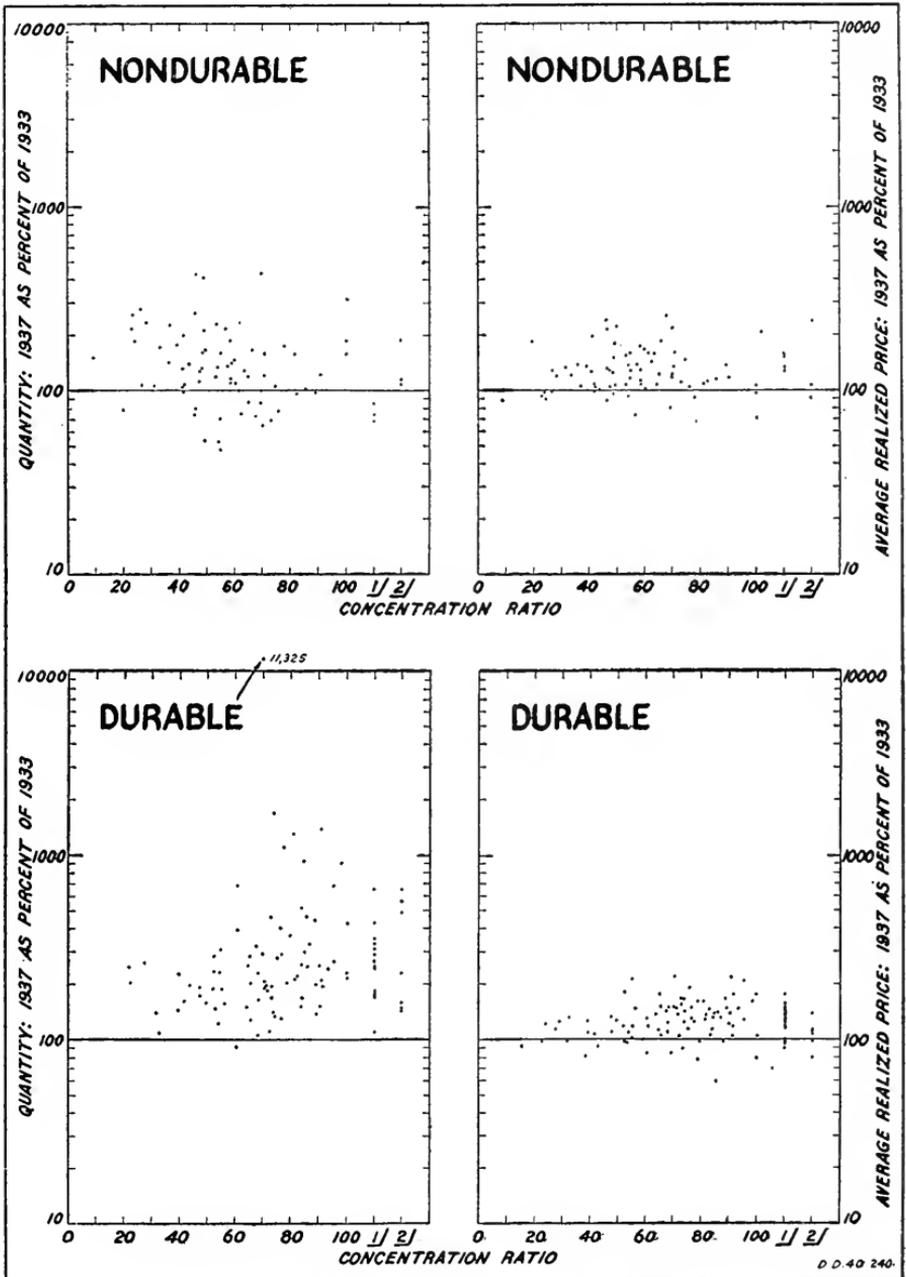


CHART 27b.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF DURABILITY, 1933-37.

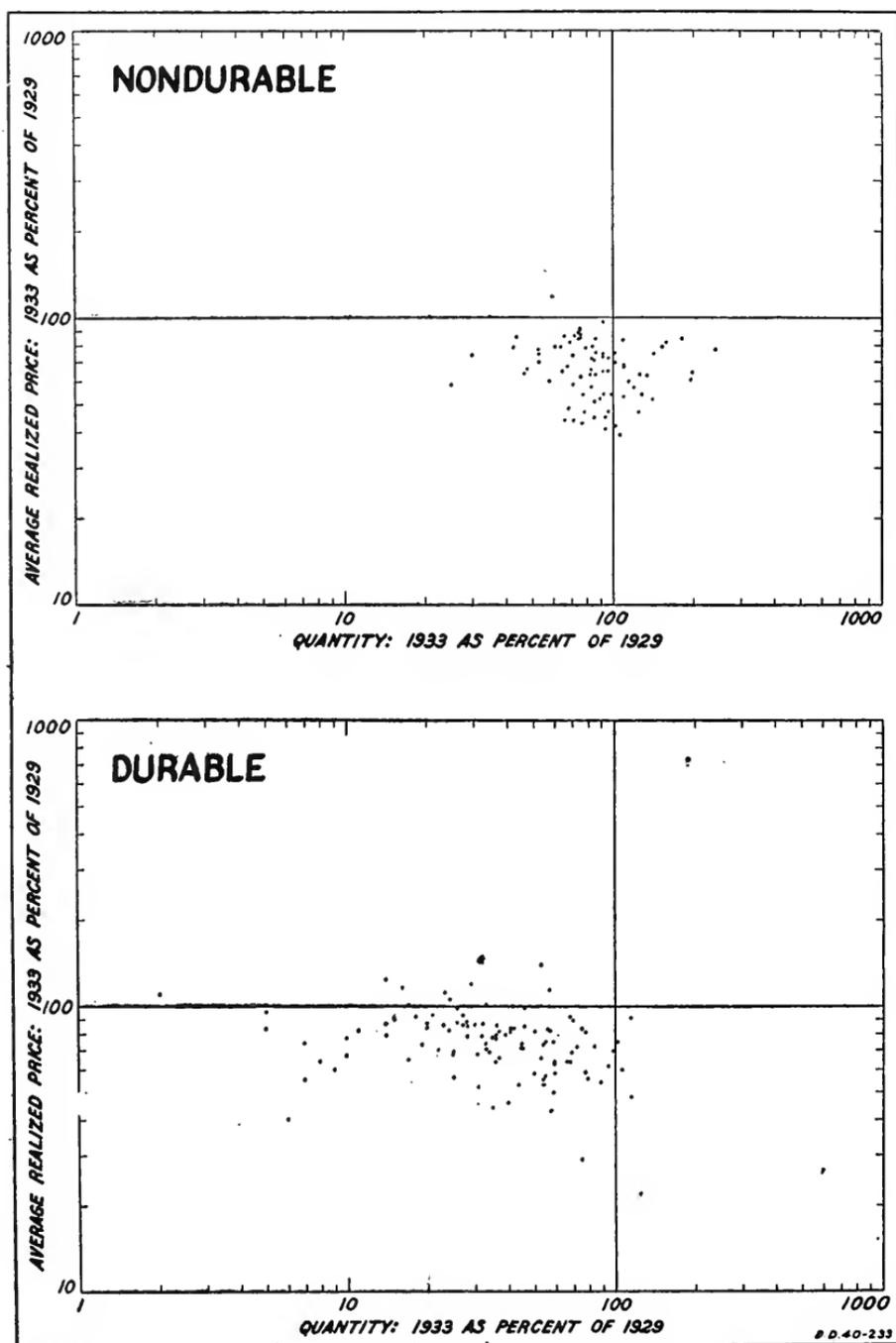


CHART 28a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF DURABILITY, 1929-33

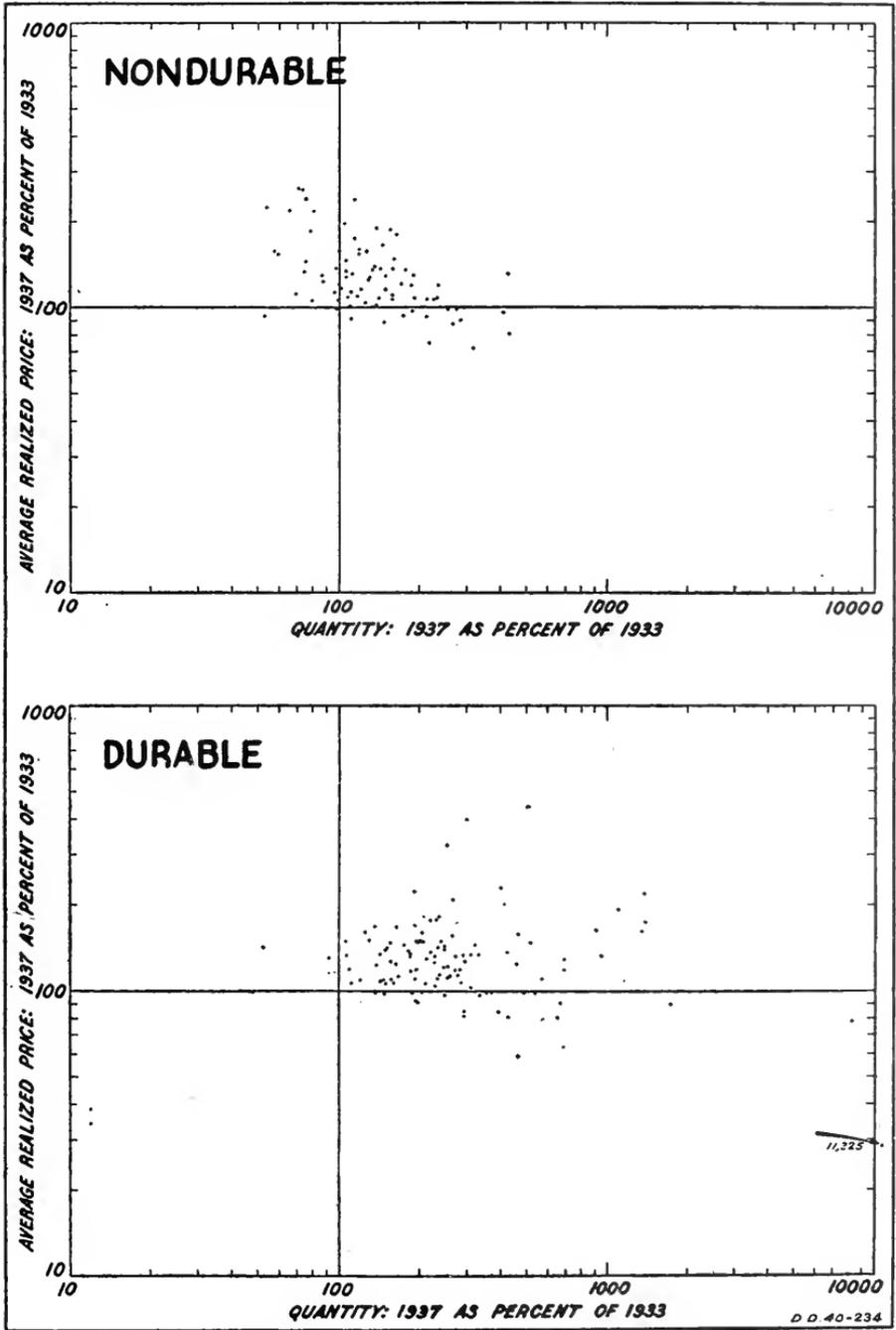


CHART 28b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF DURABILITY, 1933-37.

The nondurable products experienced much less severe contractions in quantity output between 1929 and 1933 than were experienced by the durable items. An inspection of the list of products in these two categories reveals the divergent natures of the items in these two groups. The nondurable products are largely items for which the demand is steady and continuous within rather narrow limits, i. e., products whose expansion or contraction tendencies are associated more with the number of consumers than with other variables. The durable items, on the contrary, are products for which the demand may be deferred or is postponable. The conditioning factors in the demand for these products are extremely varying and are more directly related to the anticipations of businessmen as to the future economic prospects. Furthermore, since the replacement demand of durable consumers' goods is easily postponed in periods of declining income, the income diverted through this postponement may be used to bolster the purchase of nondurable goods. Thus, it may be possible with a product having a normal service life of 5 years to "get along" with the item beyond the period when it would normally be discarded, while nondurable items, since they are consumed in a single use, must be regularly purchased if consumption is to continue. By consulting the chart it may be seen that the durable products experienced severe decreases in output in the downswing from 1929 to 1933 but, conversely, they showed large increases in quantity output in the 1933-37 period when business generally was expanding. The behavior of prices of nondurable and of durable goods was quite similar in the downswing, 1929-33, and again in the general advance in production from 1933-37 (charts 27a and 27b). Since the price changes cover about the same range and, further, are of approximately the same average height on the diagrams, any observable variations in the quantity behavior of the durable and nondurable items must be ascribed largely to the differences in durability or to factors associated with durability. That is, since price behavior may be viewed as a constant factor in both groups, the much wider contraction in the quantity output of the durable than the nondurable products must be associated with these characteristics of the products themselves.

The quantity changes of durable goods in both the downswing (chart 27a) and the upswing (chart 27b) appear to be positively related, within very broad limits, to the concentration ratios of the products. Stated more generally, there is a rather broad tendency for products with high concentration ratios to experience large contractions in output in the downswing and to show wide expansion in production in the upswing. This general tendency is not evident among the products in the nondurable category.

The relation between the changes in quantity and the changes in price of durable and nondurable products is shown in charts 28a and 28b. The pattern of product points in the "nondurable" sections of the charts is markedly different from that in the "durable" sections. Since price changes for products in both categories are quite similar, the relatively narrow changes experienced by nondurable goods gives the cluster effect of the points in the upper sections of the charts. Furthermore, the conformation of product points in the "nondurable" sections reflects a rather obvious inverse relation between changes

in price and changes in quantity for products in that category. In contrast, the product points in the "durable" sections cover a much wider range and are scattered so widely that the relation between price and quantity changes is much less strongly marked.

*Degree of Fabrication.*

The relations between the concentration ratios and the change in quantity and price between 1929 and 1933 and between 1933 and 1937 for semifinished and finished manufactured products are shown in the scatter diagrams of charts 29a and 29b. The percentage changes in the prices of semifinished and finished goods were of approximately equal magnitude and range during both the downswing and the upswing, but the changes in quantity output of semifinished goods were appreciably less severe than those experienced by finished products. Of a total of 197 finished products included in this sample, there were 61 which experienced quantity decreases between 1929 and 1933 of 70 percent or more. These products were almost evenly divided between construction materials and producers' capital items. There were only 11 products from the total of 134 semifinished items which experienced decreases of 70 percent or more and in each case the item was a producers' capital good or at least would tend to eventuate in such a good. (See table 23.) Thus it appears that the products which experienced extreme contractions were largely finished producers' capital goods and construction materials. While extreme contractions were not so common among semifinished goods, those cases for which there were large drops were goods that would eventuate as producers' capital goods.

In the recovery from 1933 to 1937, 44 of the total of 197 finished products showed increases of more than 200 percent while only 11 of the 134 semifinished products increased 200 percent or more. (See table 25.) Thus, while the output of finished producers' capital goods tended to be greatly curtailed in the 1929-33 decline, there was a tendency for them to experience sharp increases in output in the recovery period.

In charts 30a and 30b, the comparative analysis of the relationship between changes in price and changes in quantity is extended to semifinished and finished products. The conformation of the product points reflecting the behavior of both semimanufactured and finished goods and covering both the recession and recovery periods indicates a rather clearly marked inverse relation between changes in price and changes in quantity for the products in these categories. The scatter in the case of finished goods is somewhat wider owing to the larger changes in quantity experienced by these items, but the evidence of relationship is unmistakable.

The similarity in the behavior patterns of products in these categories may be accounted for in large measure by the fact that all other product characteristics are present in both semimanufactured and finished goods. Products which are durable have their semifinished and finished stages; products ultimately to be used by consumers or by producers have their semimanufactured and finished stages; products from all industry groups pass through these stages of manufacture, and similarly for other product attributes.

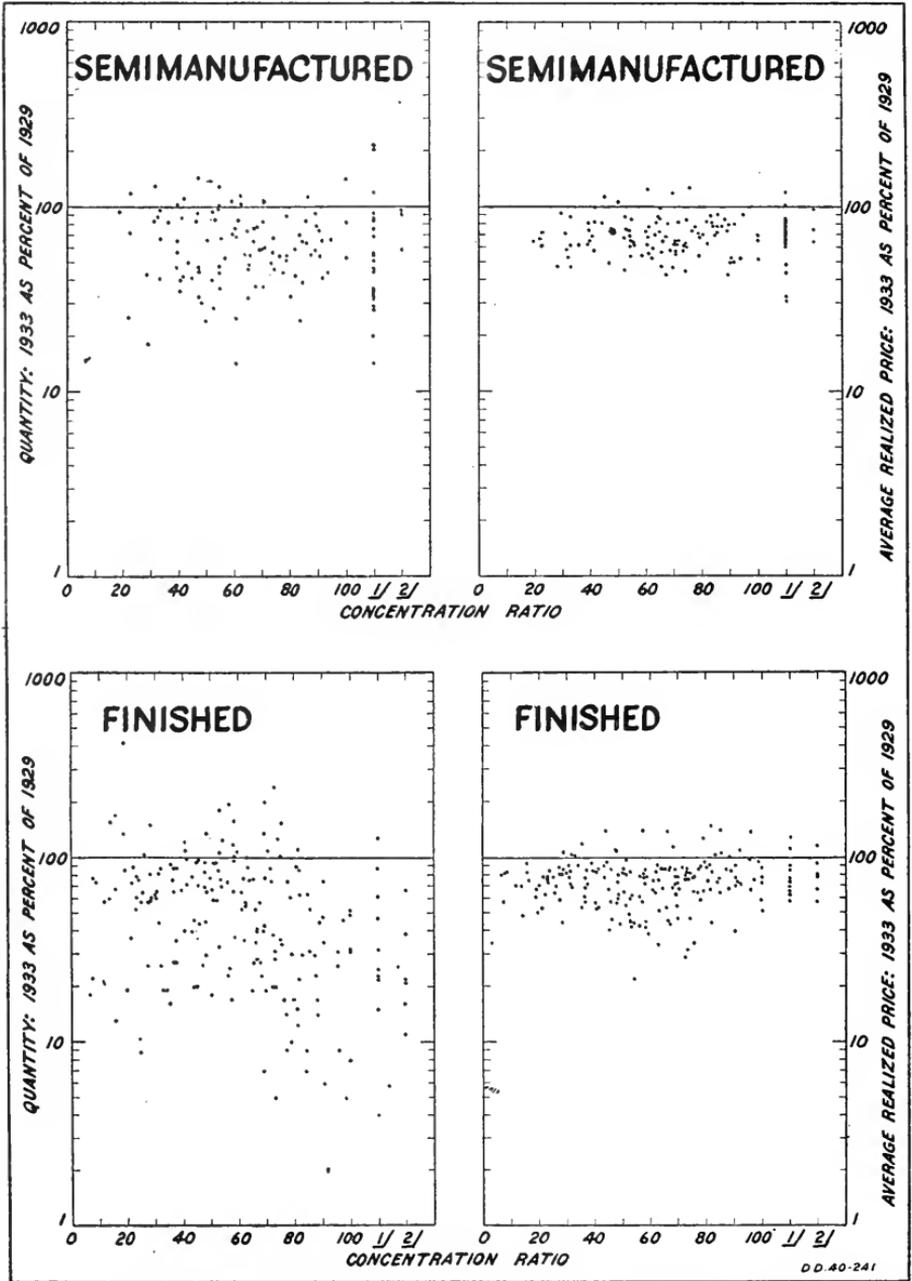


CHART 29a.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF FABRICATION, 1929-33.

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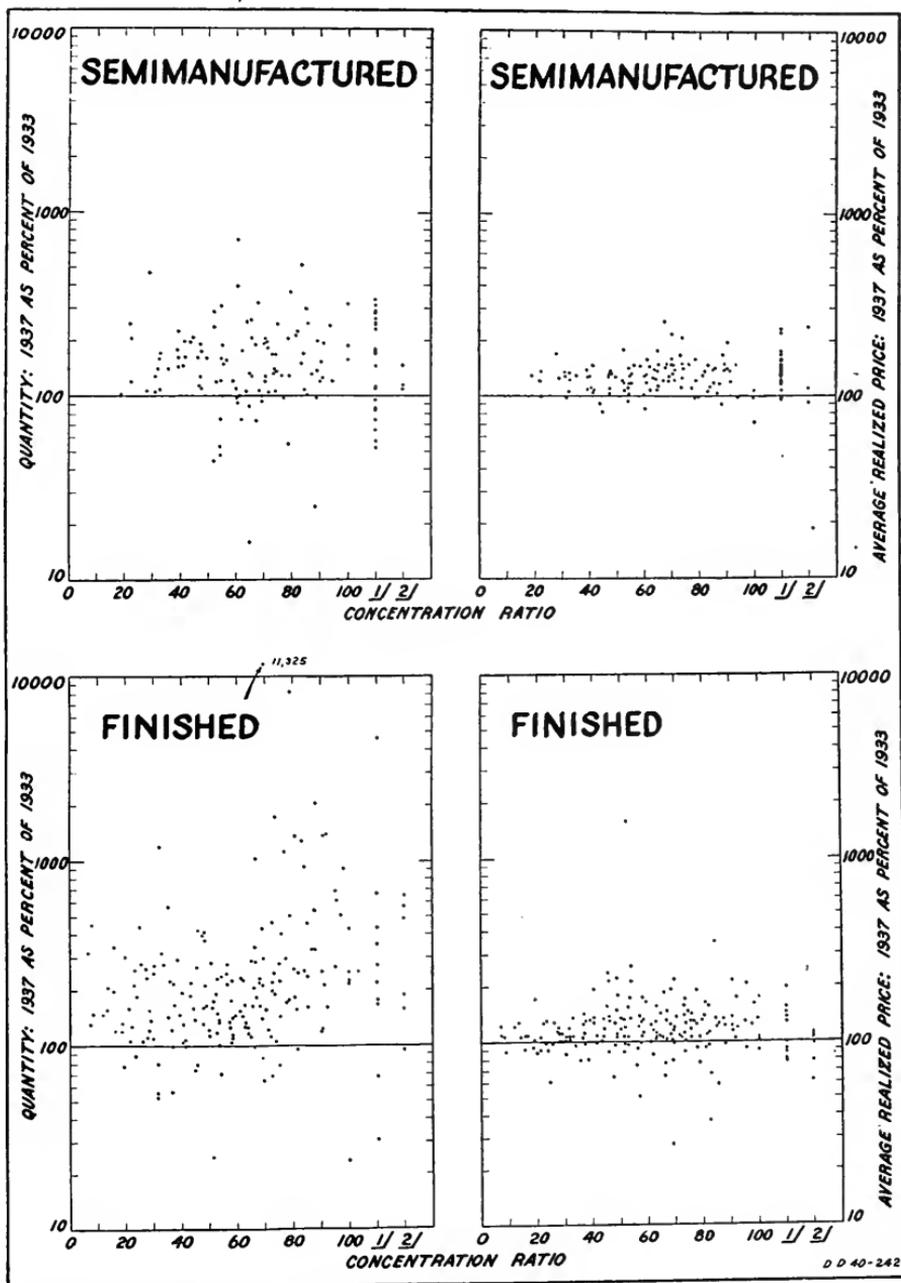


CHART 29b.—RELATION BETWEEN CONCENTRATION RATIO AND PERCENTAGE CHANGE IN QUANTITY PRODUCED AND AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF FABRICATION, 1933-37.

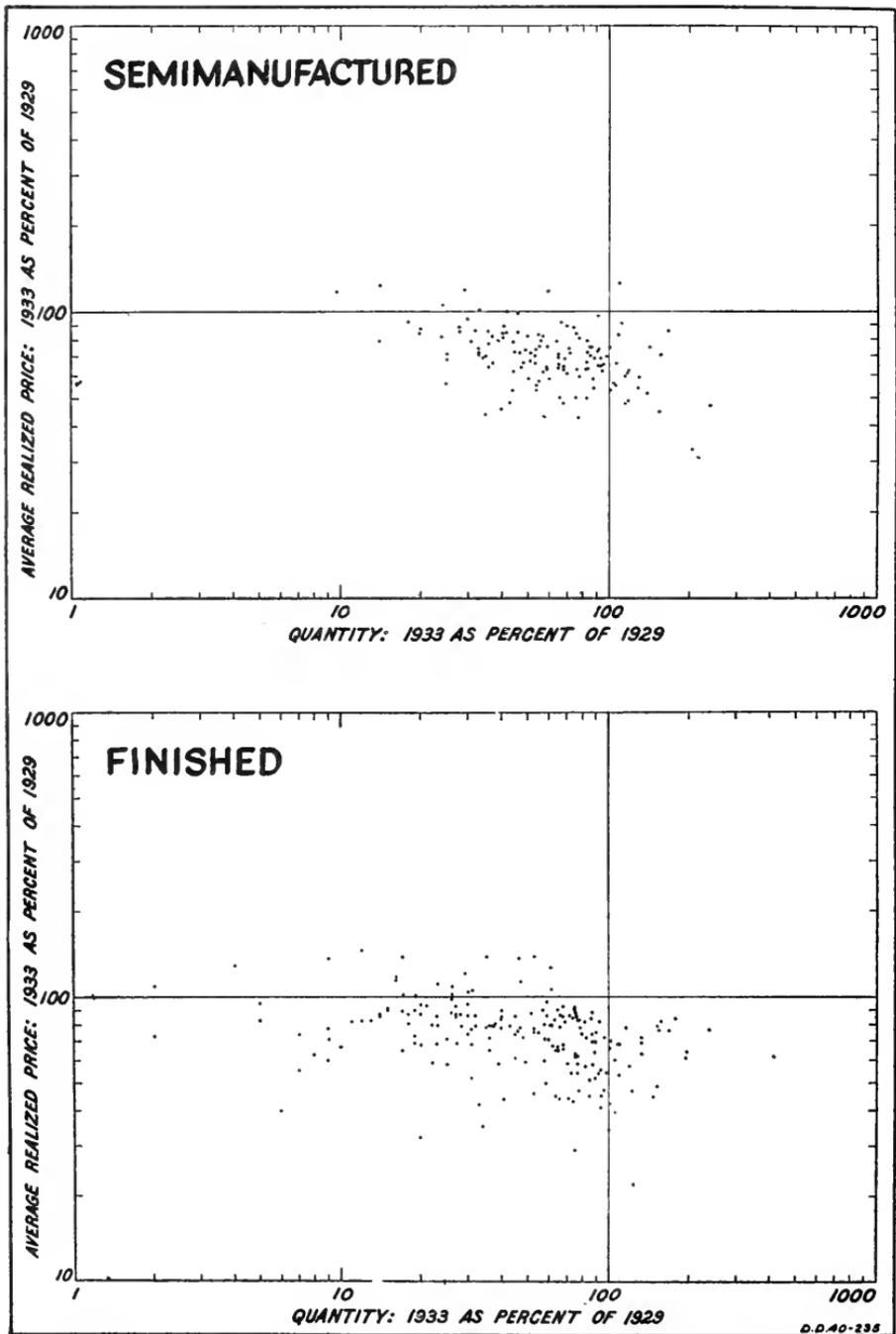


CHART 30a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF FABRICATION, 1929-33.

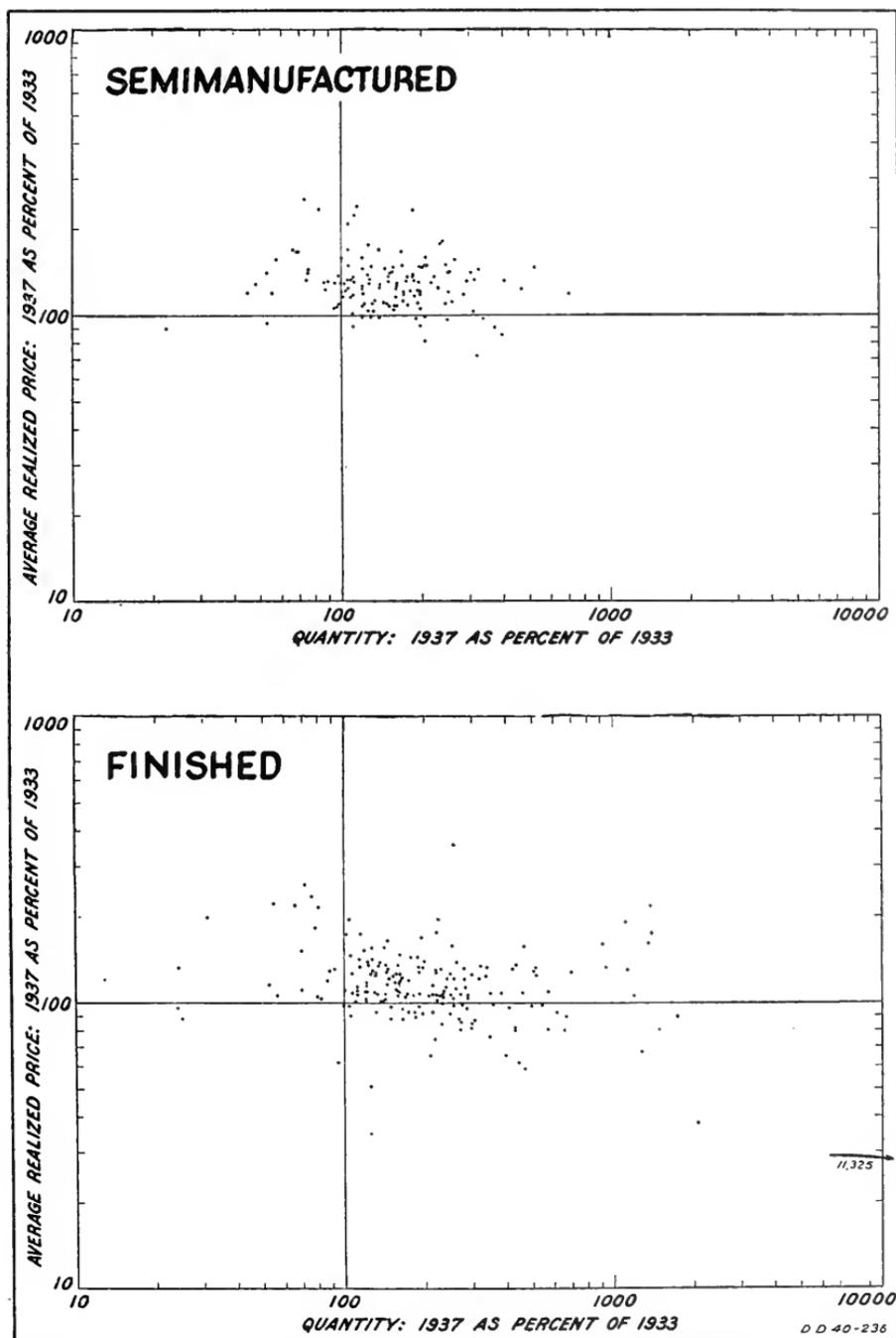


CHART 30b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY DEGREE OF FABRICATION, 1933-37.

*Type of Market.*

In charts 31a and 31b scatter diagrams depict the relation between changes in price and changes in quantity for products sold in a national market and products sold in a regional market. (The charts showing the relation between changes in quantity and in price and the concentration ratios of the products classified in this and the succeeding groupings have been omitted from the presentation. The pattern of the relationship between concentration and price and quantity for these omitted charts was quite similar to that which characterized all the charts of this type used in connection with the foregoing discussions of product attributes.) Although there is a considerable variation in the number of products classified in these two groupings, there is no particular difference in their behavior patterns as reflected in the scatter of product points in the upper and lower diagrams. Furthermore, for products in both categories the usual inverse relationship between changes in quantity and price is apparent. It is somewhat closer, however, for those products in the regional than for those in the national category.

*Source of Raw Materials.*

The relations between changes in price and changes in quantity for products whose chief material is derived from agricultural and mineral sources are shown in charts 32a and 32b. (Since the pattern of product points for items manufactured from forest materials is more or less intermediate between the forms taken by the scatter of product points in the agricultural and mineral diagram, it has not been reproduced here.) An inspection of the upper and lower sections of chart 32a reveals a rather striking difference in the patterns of product points in the two diagrams.

It has frequently been contended that the price and production characteristics of raw materials are reflected in the price and production characteristics of products manufactured from these materials. Thus, agricultural raw materials, since they are characterized by relatively steady production (output is more a function of the weather than the rate at which business is operating) and wide price change, as they enter manufacturing establishments tend to leave the imprint of their own behavior on the products manufactured from them. Large and small crops of wheat are milled and large and small crops of cotton are spun into yarn. This tendency is reflected in the scatter diagrams of the accompanying charts.

Since elements other than the prices of raw materials enter the costs of the various products and since a wide and divergent range of factors condition their production, the difference may not be accounted for entirely by the source of the raw material. Withal, the divergent patterns are clearly evident. In the matter of price change, there were only four products whose materials came from agriculture which experienced increases in price between 1929 and 1933, while 33 products for which the basic material was mineral increased in price during this period. The mean price decrease of agricultural products was considerably greater than the mean price decrease of mineral items even though there were a few scattered changes which were larger in the latter diagram. The whole conformation of product points in the "agriculture" section appears definitely lower than that of products from mines. In general terms, this means that products embodying

agricultural materials tended to experience larger price drops in the recession period than products made from mineral items.

In terms of quantity changes, the difference in the behavior of products made from mineral and agricultural materials is equally striking. The output of approximately one-fourth of the products shown in the upper diagram was greater in 1933 than in 1929, while this situation was true of only 20 products in the lower diagram. The mean quantity decrease from the upper chart is about 20 percent while the mean decrease experienced by products represented in the lower chart is near 60 percent. The whole conformation in the upper chart is definitely more to the right (smaller decreases). This means that the production of products manufactured from agricultural materials in 1933 was not down as much from the 1929 level as that of products manufactured from mineral goods. This same general situation prevailed in the upswing from 1933 to 1937 except, of course, increases in price and quantity replaced the decreases of the earlier period.

Among agricultural products there appears to be a marked tendency for relatively large price changes to be associated with small quantity changes (many of the products actually experienced increases in quantity output in the downswing and decreases in the upswing) and small price changes to be associated with large quantity changes as represented by the usual regression line sloping downward to the right. This inverse relationship does not appear to characterize the behavior of those products embodying raw materials from mineral sources.

#### *Construction Materials and Producers' Supplies.*

In order that the picture may be complete, the scatter diagrams showing the relation between changes in price and changes in quantity for construction materials and producers' supplies are presented in charts 33a and 33b. The behavior patterns of products of these two types are quite different. Construction materials experienced relatively narrow price decreases and wide decreases in quantity in the 1929-33 period. In the upswing from 1933 to 1937 the price increases were about average and the quantity increases were somewhat less than average. This situation may be accounted for, in part at least, by the less than proportional increase in construction activity generally.

The percentage changes in the quantity output of products classified as producers' supplies were confined to a relatively narrow range and the decrease in output in the 1929-33 period and the increase in the 1933-37 upswing were somewhat less than average. In the case of construction materials there is no apparent or strongly marked relation between high and low price changes and high and low quantity changes while the usual inverse relationship between changes in price and quantity is quite evident among those products classified as producers' supplies.

#### SUMMARY

A recapitulation of the material presented in this chapter may well begin with a brief résumé of the results of previous investigations in this area of economic analysis and an attempt to integrate the findings here with those of earlier studies.

Over the past few years there has been considerable interest in the effect of relatively high or low price flexibility on production during the recession and recovery phases of the business cycle. One group

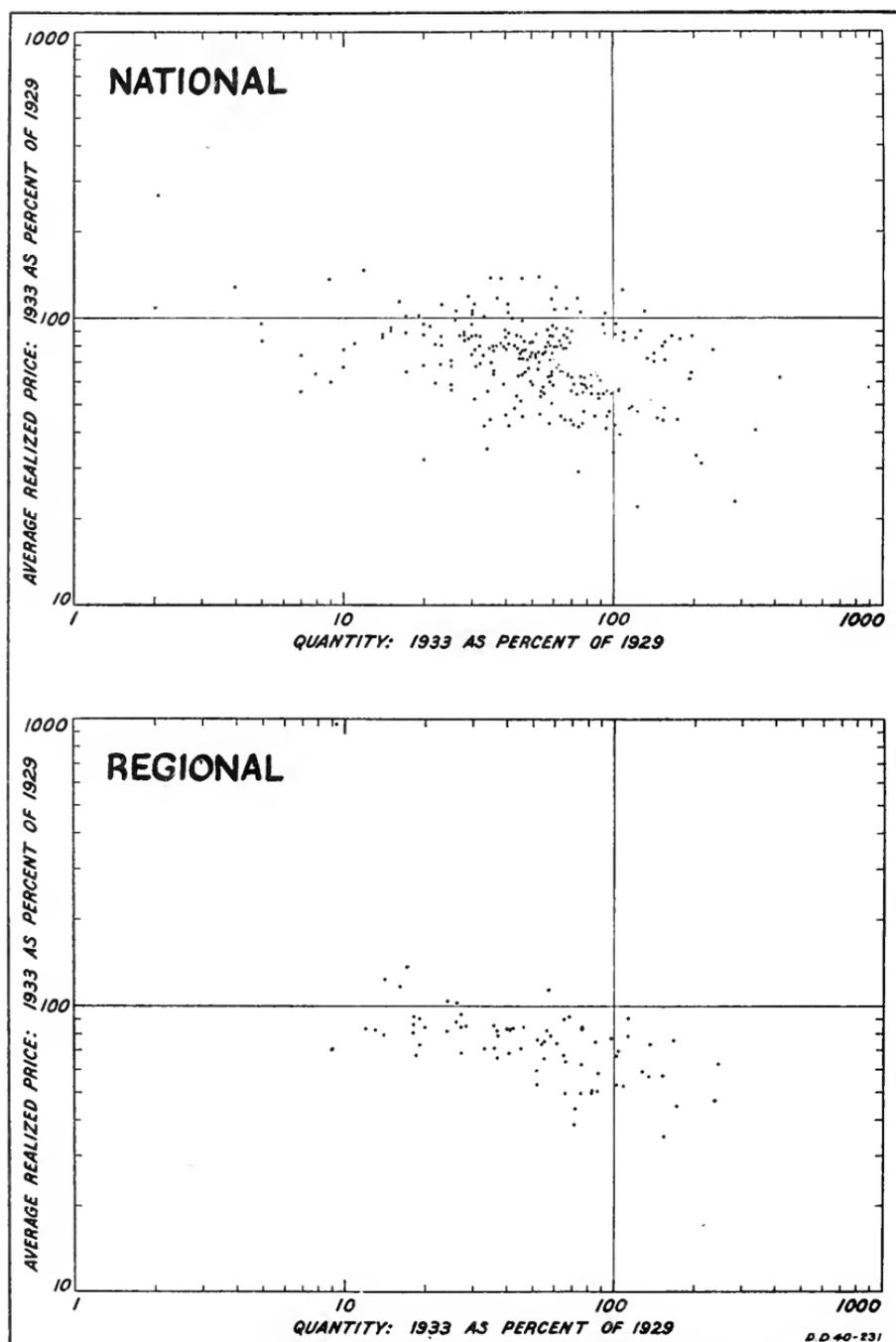


CHART 31a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF MARKET, 1929-33.

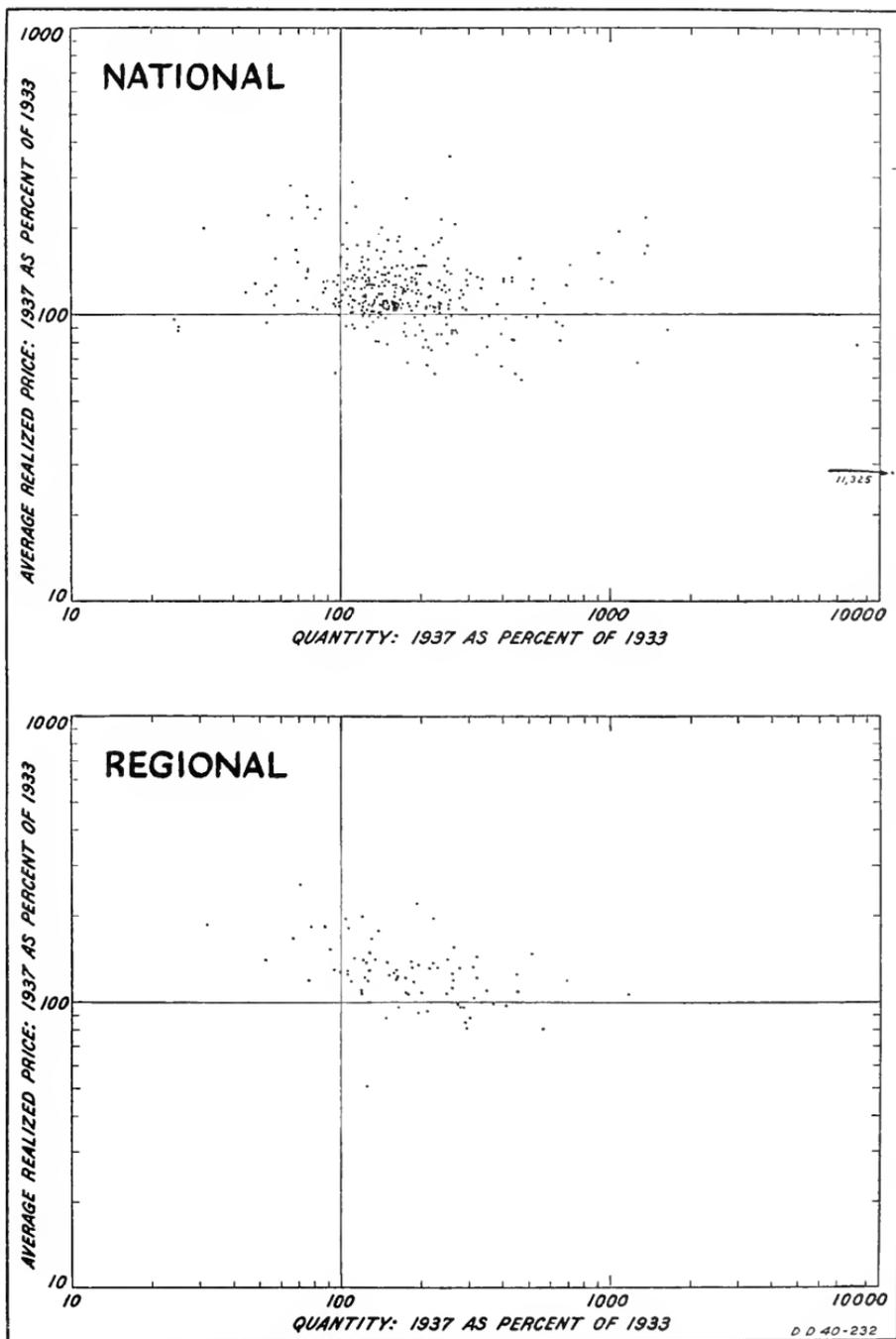


CHART 31b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY TYPE OF MARKET, 1933-37.

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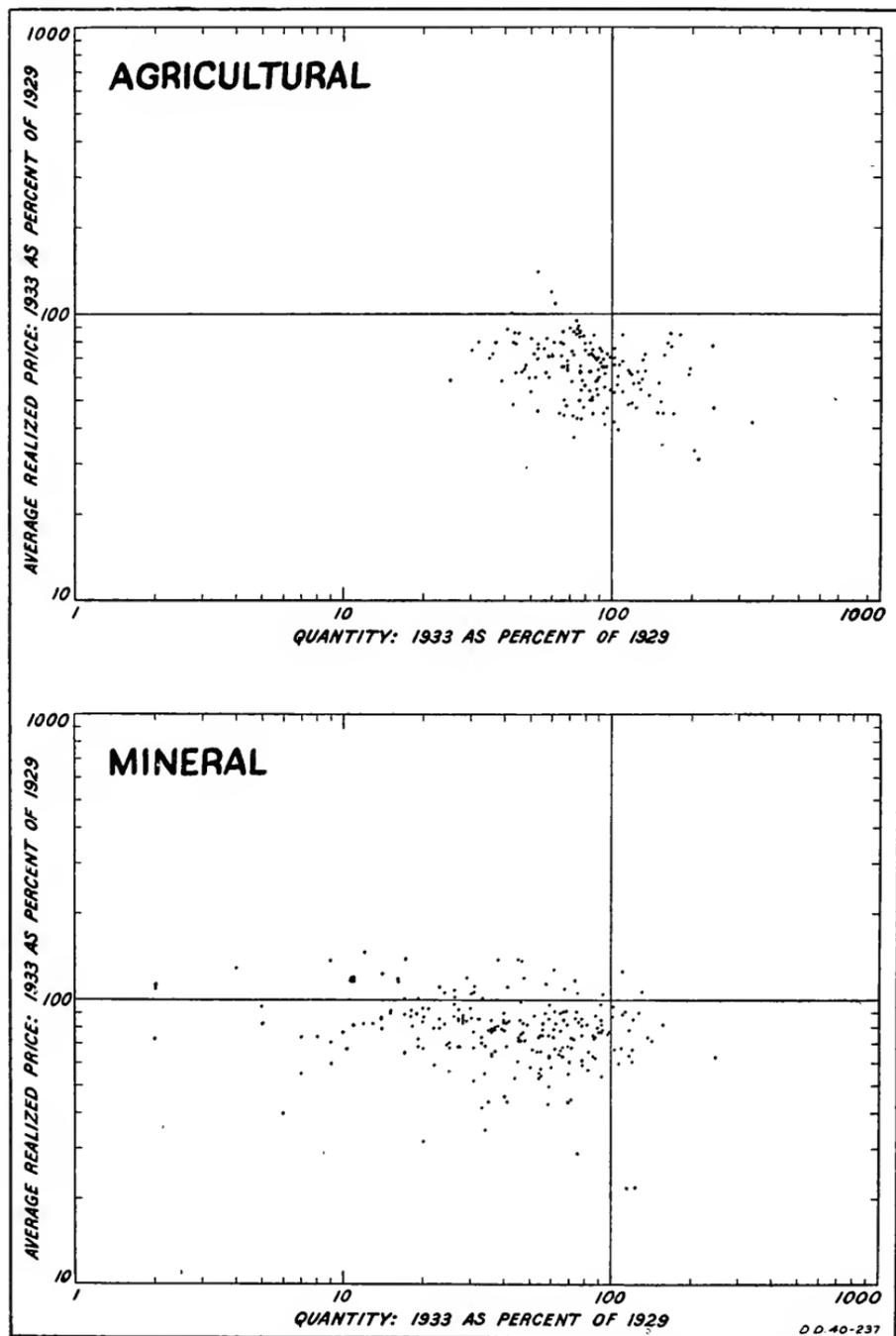


CHART 32a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY SOURCE OF RAW MATERIALS, 1929-33.

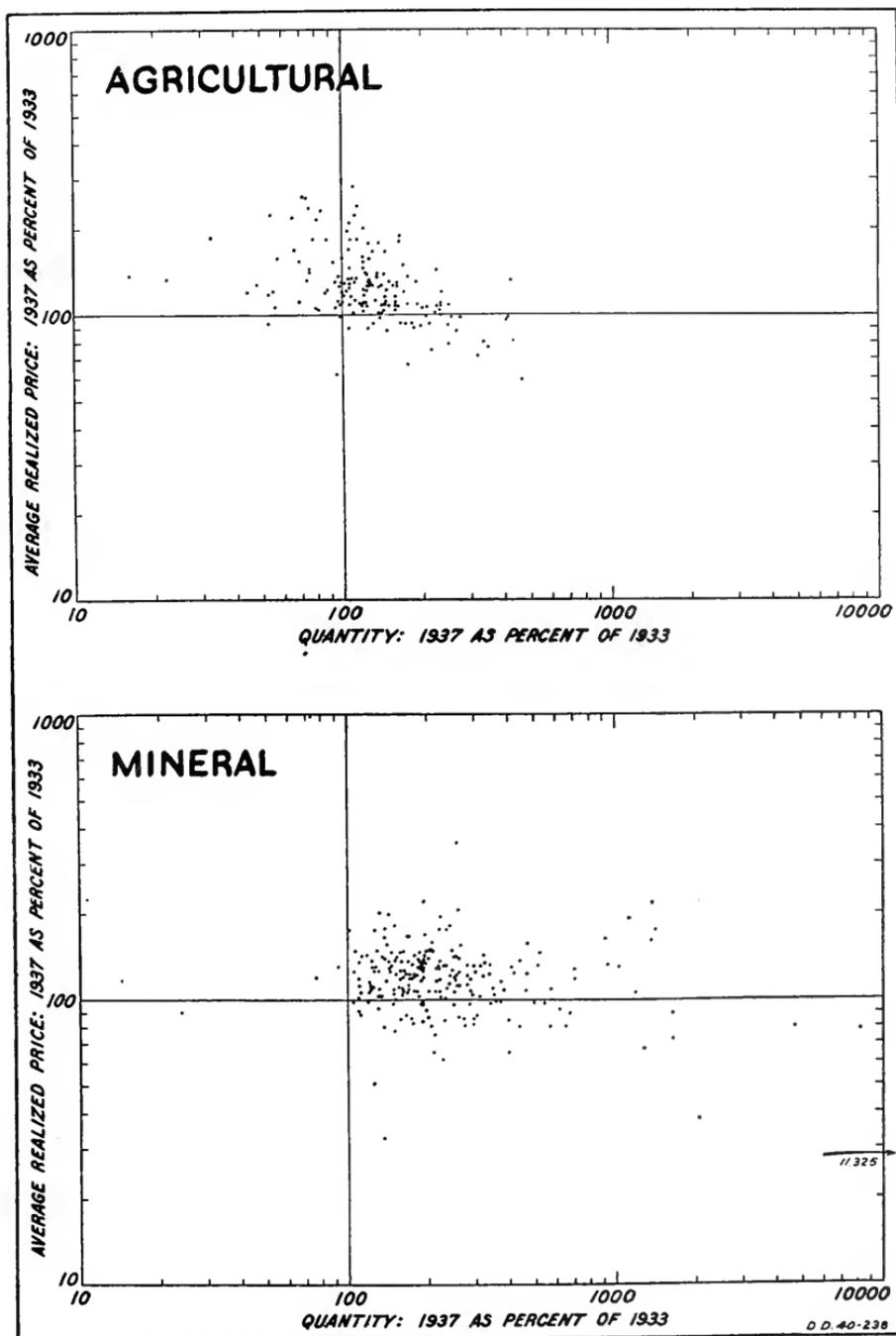


CHART 32b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED BY SOURCE OF RAW MATERIALS, 1933-37.

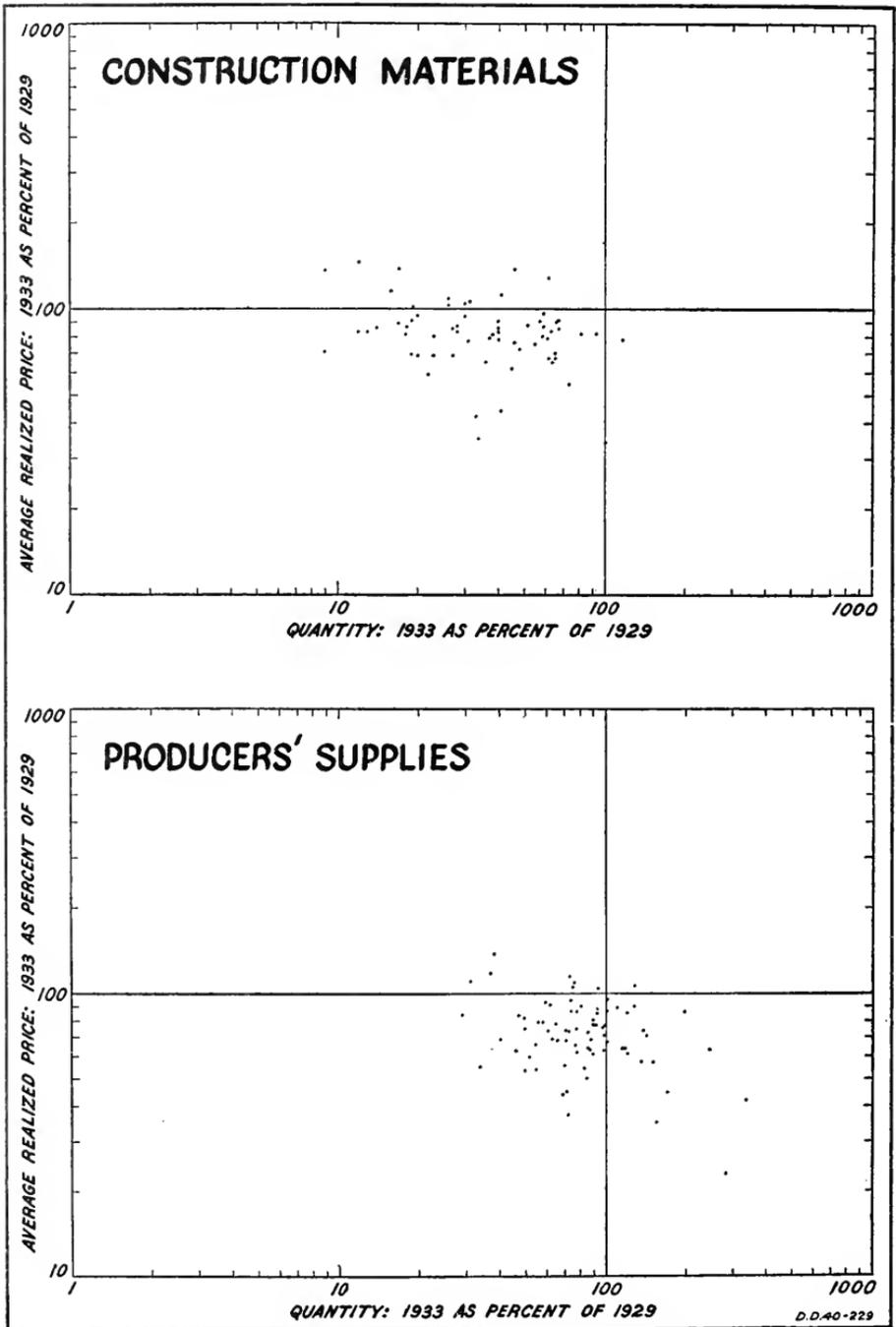


CHART 33a.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED SEPARATELY AS CONSTRUCTION MATERIALS AND AS PRODUCERS' SUPPLIES, 1929-33.

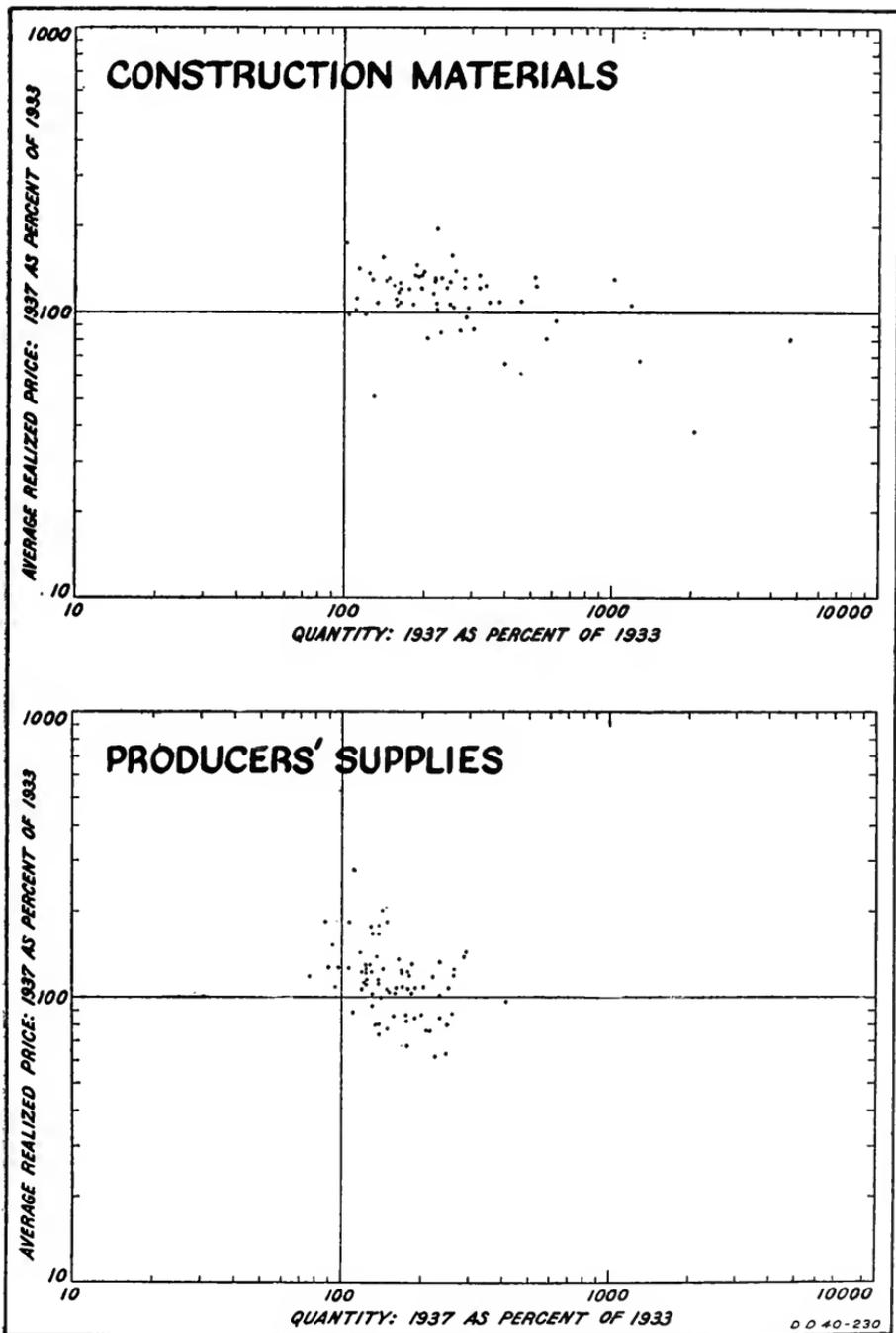


CHART 33b.—RELATION BETWEEN PERCENTAGE CHANGE IN QUANTITY PRODUCED AND PERCENTAGE CHANGE IN AVERAGE REALIZED PRICE FOR PRODUCTS GROUPED SEPARATELY AS CONSTRUCTION MATERIALS AND AS PRODUCERS' SUPPLIES, 1933-37

of writers has maintained that there are two essentially different types of markets in operation—the traditional market in which supply and demand are equated by a flexible price and the administered market in which production and demand are equated at an inflexible, administered price. In the traditional free market no individual buyer or seller alone has any significant power over either price or total volume of production for the industry, while in the administered market the number of competing concerns is so small that the individual concern has a significant power to choose within limits between changing its prices and changing its volume of production or sales. This does not necessarily imply monopoly but rather fewness of sellers (oligopoly). For these products with inflexible, administered prices the full force of the adjustments in the depression period has fallen upon production. At the other end of the scale there are products produced by many sellers where the prices are flexible. For these products with flexible prices the depression adjustments take the form of lower prices and relatively well maintained output and, of course, employment.

The second group of writers, while not minimizing the importance of price flexibility in cyclical movements, contends that price behavior and pricing policies are in general to be associated with the economic characteristics of the products rather than arbitrary business policies. Since writers in both schools emphasize the difficulties of adjustment to cyclical movements when some products have flexible prices and others have inflexible prices, the heart of the controversy centers in the diverse reasons advanced in explaining the causes of price inflexibility.

In the first group, one of the primary causes of inflexibility or rigidity of prices is seen to be the concentration of control over the supply of products.<sup>4</sup> By this control it is held that a few sellers by agreement, "understanding," or through some form of "leadership" are able to maintain prices in a period of recession by curtailing output. In the second group, the price system is seen as a composite of many different kinds of prices, the relative flexibility or inflexibility of which is conditioned by a multiplicity of factors associated with the economic characteristics of the products themselves as well as the cost conditions under which they are produced and distributed.<sup>5</sup> Obviously, a different public policy is indicated when the causes of rigidity are those advanced by the first group from that which is indicated when the causes are those advanced by the second.

From the material presented in this chapter and over the complete list of products, there appeared to be no strongly marked relation between the conditions of concentration under which products were produced and their quantity and price behavior; high and low concentration and large and small changes in price and quantity appeared together almost as if by chance. And further, different quantity behavior tended to be associated more directly with some particular economic characteristic of the product than with the amplitude of price changes.

The material as developed in this study differs in several important respects from that used in the earlier studies. It is within the frame-

<sup>4</sup> Gardiner Means, "Industrial Prices and their Relative Inflexibility," S. Doc. No. 13, 74th Cong., 1st sess., and "Notes on Inflexible Prices," American Economic Review, Supplement March 1936; also Ralph C. Wood, "Tucker's 'Reasons' for Price Rigidity," American Economic Review, December 1938.

<sup>5</sup> Rufus Tucker, "Reasons for Price Rigidity," American Economic Review, March 1938; Backman, "Price Flexibility and Changes in Production," National Industrial Conference Board Bulletin, February 20, 1939, and "The Causes of Price Flexibility," Quarterly Journal of Economics, May 1940.

work of these different conditions that the conclusions must be interpreted:

1. The analysis here has been in terms of individual census products and the data relate to the quantities and the average realized prices of these products. While the data for some of the other studies relate to the prices of commodities as reported by the Bureau of Labor Statistics, in other studies the data relate to industries, not commodities, and the prices are in the form of averages for groups of products. Averages necessarily obscure the relationships; the use of product data, therefore, yields more realistic results than industry data. (The pertinency of census product data was appraised at some length in chapter IV.)

2. Price changes over the 1929-33 and over the 1933-37 periods are measured in terms of the amplitude of change and not in terms of the frequency of change or some other measure. Both amplitude and frequency of change have been employed in the measurement of price flexibility. The measurement of the amplitude of change as used here is only recognized as one of several acceptable methods. Under the different methods, different things are measured, thus measurement by either method has something to contribute to a more complete understanding of the influence of price behavior in cyclical movements. While the use of this measure excludes an appraisal of the effect of the timing of price changes, it should certainly not be inferred that the significance of the influence of the timing of price changes is underestimated.

3. This study is confined to an analysis of manufactured products. As such it covers only a segment of the pricing system. The price behavior in other areas, while equally important, lies outside the scope of this study. A complete picture of the effect of rigidities in depression adjustments would necessarily include an analysis of the relative flexibility or inflexibility of wage rates, interest charges, service charges, fees, rents, etc. In contrast with other studies, the present investigation does not include within its purview the price behavior of raw materials. For the price behavior of manufactured products, however, the material presented here makes possible a new approach to the problem and, furthermore, within the area which it covers, presents a more complete picture than has been available heretofore. The statement has frequently been made that depression adjustment in the case of agricultural products has been mostly in price, and the adjustment in the case of manufactured products mainly in quantity output. This position appears to oversimplify the situation, since within the field of manufacturing itself there were extremely wide differences in the price and production behavior of products.

4. The analysis as developed here presents an over-all view and as such the price and production policies of the manufacturers of individual products are obscured. Monopoly or near monopoly control over the supply of a product may be exercised in such a manner that prices are maintained and output reduced, but such a situation does not appear to be general. If control over this type of behavior is deemed in the public interest, the policy adopted to promote this end should be formulated in terms of the particular rather than the universal.

5. By way of general limitations which apply to the data of this chapter, it should be noted that there is an implicit assumption throughout that the concentration ratios of products did not change significantly between 1929 and 1937. That is, products which by actual measurement had high concentration ratios in 1937 were assumed to have had high concentration ratios in 1929 and in 1933 or were assumed to have had their changes restricted to rather narrow limits over this period. This is not to deny the fact that the concentration ratios of a few particular products changed materially, but over the whole list of products the changes were random in direction and small in magnitude. Furthermore, from the analysis in chapter IV, changes in concentration were not associated with any particular product characteristics.

The concentration ratios are computed in terms of national totals; thus, the extent of control of products produced and sold in local markets is understated. Hence, caution should be exercised in applying the concentration data to any particular product which is marketed locally. Since all the products analyzed in this study have gone through at least one stage of fabrication this limitation is not particularly serious. Actually, only about one-eighth of the total number of products were produced and sold in predominant proportions in regional areas. It should also be remembered that the Bureau of the Census publishes no data on a product if that product is manufactured by only one concern. In those instances where this situation prevailed, the product in question, in compliance with the laws governing disclosure, was combined with another product of like nature.

And finally, the measure of concentration of control developed herein is in terms of the proportion of the total output of a product accounted for by the leading four producers. No account is taken of those instances in which control is actually established or enhanced by agreements, collusions, conspiracies or "understandings" among the producers. Thus, a product might have a low concentration as measured here, yet owing to collusions or agreements among producers actual monopoly control might exist. Such situations are undoubtedly present in this long list of products. Again, the limitation is not particularly serious since there are plenty of cases of high concentration of the direct sort to establish the relations which are being measured.

Over the area within which the data of this chapter are relevant and within the limitations set forth here, certain conclusions as to the relation of concentration to the behavior of the price and quantities of manufactured products in periods of recession and recovery are indicated.

It appears from the analysis as developed in this chapter that concentration of control over the production of manufactured products was not associated with any consistent or predictable patterns of price and output behavior. Some of the analyzed products in which almost the entire output was controlled by four producers experienced severe contractions in production between 1929 and 1933, while their prices were maintained. But for such situations, there were others in which products manufactured under like conditions of concentration were characterized by greatly reduced output and greatly reduced prices. In fact, over the entire gamut of concentration of control, price and quantity changes occurred almost as if by chance.

When the products are analyzed in terms of particular characteristics, however, it appears that different types of behavior were associated with the varying characteristics of the products. Durable goods, the replacement for which is postponable, tended to experience much more severe contractions in production in the 1929-33 period than nondurable goods. These durable products were largely producers' capital goods and equipment. In periods of business recession when the profit outlook is uncertain the demand for these items evidently becomes extremely inelastic and even large price concessions would not be a sufficient inducement to retard the drop in buying. The contractions in the prices of durable and of nondurable goods were of approximately the same magnitude, but the quantity behavior of products in each of these groups was significantly different. This points to the conclusion that the different quantity behavior was associated with some element in the situation other than the price changes of the products.

If this behavior is taken as truly characteristic of manufactured products in a period of recession, then these products should be characterized by a complementary type of behavior in a period of increasing economic activity. Such was the case. The quantity output of the durable producers' capital goods was increased greatly while the price changes experienced by these goods were about in line with the price changes of other goods. Although the data as developed here are not available on a monthly or quarterly basis, information available from other sources would indicate that as the recovery progressed and demand was strengthened, average realized prices increased owing to the fact that quoted prices were adhered to more stringently (assuming there had previously been price concessions in the way of special discounts, etc.). The timing of actual increases in quoted prices would probably coincide with the attainment of capacity or near-capacity operations.

The different nature of the demand for goods ultimately to be used by consumers from that for goods ultimately to be used by producers accounts in large measure for the different behavior patterns of these two types of products. Producers' goods are usually desired when profits are increasing and the demand for them becomes greatly restricted or nonexistent in a period of decline. On the other hand, the demand for consumers' goods is relatively steady. The desire for food and clothing persists in periods of decline and is not greatly increased in periods of expanded business activity. Price reductions on consumers' goods may result in the transfer of purchase from one type of good to another, but the aggregate quantity is not greatly affected by such transfers. Price reductions on producers' goods, on the contrary, would probably not induce purchases if profit prospects were hazy. Closely connected with the type of user is, of course, the degree to which the purchase may be postponed. Producers' and consumers' durable goods experienced much wider declines in quantity, price being more or less constant, than the large number of nondurable consumers' goods.

The nature of the raw materials entering the manufactured products also appears to be a determining factor in their quantity and price behavior. Those products whose chief material comes from agricultural sources experienced more violent price fluctuations in periods of both recession and recovery, while quantity fluctuations were less

severe than for those items manufactured from mineral products. This situation may be accounted for in large part by the different production and marketing structures of these two types of raw materials.

A logical explanation of price and quantity behavior of manufactured products would thus of necessity appear to run in terms of the product characteristics such as durability, use to which the products are put, and the nature of the raw materials from which they are fabricated. For some products, the concentration in the control of their production is undoubtedly an important factor, but for manufactured products in general there is no close relationship between control and any particular price and quantity behavior.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

Since the advent of the factory system, the relative importance of the manufacturing segment of our economic life has increased with each passing decade. At the present time, approximately 30 percent of all gainful workers are employed in tens of thousands of manufacturing establishments which in the aggregate turn out a multitude of different products. The institutional conditions which surround the production and distribution of these products vary widely from product to product. Some products are produced by many firms, while others are produced by only a few; some products are sold under brand or trade names, while others are undifferentiated; some products are destined for immediate consumption, while others are capital items for use in income producing activities; the use of some products extends over a number of years, while other products are consumed at a single use; some of the products are produced under conditions requiring immense outlay of capital, while others are produced under conditions but little advanced from the handicraft stage.

As the economy has become more complex and more extended the task of coordinating the parts has become exceedingly involved. Traditionally, the more or less automatic operation of the pricing system has tended to play the central role in this coordination. The pricing system as an organizing force is dependent on the competitive struggle between buyers and sellers. If competition, at least "workable" competition, does not exist, the effectiveness of the pricing system as an organizing influence is directly cut down. Government, therefore, has the positive function of insuring a framework within which competition may effectively operate. The forces and factors which enter the determination of prices are brought to focus under many different market conditions. It has been the purpose of the preceding chapters to trace the framework of the market within which the prices of manufactured products are set. The more immediate task was the description of the effect of concentration of control in the pricing of manufactured goods.

No one denies that the theoretical conditions of perfect competition are present in the pricing of only a very few products. Such conditions require that the share of the market of each seller be so small that he alone is unable to influence the price. For the individual seller, this situation means that the demand is, for practical purposes, infinitely elastic. In other words, any attempt by a producer to charge more for his product than the going market price for that product will result in none of his product being purchased. Perhaps in the pricing of homogeneous and specified products, such as particular grades and qualities of wheat, a perfect competitive market is more closely approximated.

In these situations where the demand is elastic, the amount of the product which any one producer may put on the market is so small that the addition of that portion has only an infinitesimal effect on the total supply and on the price.

For the thousands of fabricated products, however, these perfect conditions are never realized. These products tend to be manufactured by so few producers that each producer is in a position to influence price by adding to or withholding his supply of the product from the market. And, of course, it is to the advantage of each manufacturer if he can by advertising, by quality differences, by service adjustments, and by other non-price competitive measures differentiate his product in the public mind from other similar products and thereby make the demand for it somewhat more inelastic and his control over supply more effective.

The extent to which manufactured products are produced by a few sellers and the manner in which this control may be exercised lies close to the heart of the problem of the concentration of economic power. The number of producers and the amount of products which each is able to put on the market thus become an integral part of any description of the structure of the market. It is the investigation of the extent to which the production of manufactured products is concentrated in a few hands which is the object of this study. The results may be summarized briefly.

The subject material of the study is a comprehensive cross-section sample of 1,807 products, as distinguished in the Census of Manufactures for 1937. This sample embraces almost one-half of all census products and covers somewhat more than one-half of the value of production in manufacturing. The concentration of production, as measured in this study, is expressed as the proportion (percentage) of the total value of each product accounted for by the leading 4 producers of that product. This measure of the concentration in the production of each product is called its concentration ratio.

Approximately one-half of all analyzed products were produced under such conditions of control that the concentration ratios of the products were over 75 percent. Stated in another way, this means that for about one-half of the analyzed products, the leading 4 producers accounted for 75 percent or more of the value output of each of these products. These products with concentration ratios over 75 percent accounted for one-third of the value of all analyzed products. This points to the observation that the more important products valuewise had relatively low concentration ratios, while the products in the higher concentration ranges were less important in value terms. To the extent the sample is representative, the description of the concentration of production presented here may be said to be characteristic of the concentration picture in all manufacturing.

The degrees to which a few business enterprises dominate any particular area of production varies among the census industry groups. For example, approximately 42 percent of the total number of products classified in the food group had concentration ratios below 50 percent, and approximately 38 percent of the number of items in the forest products group, in the paper products group, and in the petroleum products group had concentration ratios below 50 percent, while slightly more than 5 percent of the total number of products

analyzed in the rubber and in the machinery groups had concentration ratios below 50 percent. In certain industry groups the bunching of products in the upper concentration range was outstanding. Thus, 40 percent of the total number of products analyzed in the machinery group, 38 percent in the rubber group, and 36 percent in the chemical group had concentration ratios above 90 percent, while by contrast, only 10 percent of the total number of products in the paper group and 11 percent in the food group had concentration ratios above 90 percent.

The relation between the number of companies producing a product and the concentration ratios of the products is generally inverse in nature. For those products produced by 100 or more companies, however, there is no apparent relationship between the number of companies producing a product and its concentration ratio.

Only within broad limits does there appear to be a relationship between the concentration ratio of a product and the total United States value of that product. Thus, in general terms, products with high concentration ratios and with low concentration ratios are found in almost equal numbers among products with high and with low aggregate values. For the products listed in the textiles; forest products; petroleum; leather; and stone, clay, and glass products groups some slight inverse relation is evident, but even in these groups there are so many cases in which products diverge from this tendency that only the most general sort of inference may be drawn.

The concentration in the production of each product analyzed is stated in terms of the proportion of the total value output of the product accounted for by the leading 4 producers of that product. The extent to which 1 company appears as a leading producer of more than 1 product gives further indication of concentration of production in manufacturing. There were 3,752 individual companies which appeared as one of the leading 4 producers of at least 1 of the 1,807 products included in this study. One company appeared as one of the 4 leaders of 99 different products, while 2,656 companies appeared only once. There were 547 companies which appeared as one of the leading producers of 2 products and 222 companies made 3 appearances. Central-office companies (multi-unit concerns) outnumbered independents as leaders except in those cases where the company appeared only once or twice; at the one-appearance level, single-plant concerns outnumbered multi-plant concerns 2 to 1. No independent concern was a leader in more than 11 products. There was a slight tendency for companies having a large number of appearances to make those appearances in products classified in a large number of different industries. Generally, the concentration which might have arisen through the appearance of a few companies as leaders in the production of many products was not realized to any very great extent. True, a few companies appeared as leaders in many products, but by far the largest number of companies appeared as leaders in the production of only one product.

Each analyzed product was classified according to certain product characteristics. On the basis of this classification, the products in each group showed rather wide variations in their distribution among the concentration ratio classes. Products whose immediate purchasers were producers tended to be produced under conditions of higher

concentration than those goods purchased immediately by consumers. Products to be used ultimately by producers were likewise produced under conditions of considerably higher concentration than goods ultimately to be used by consumers.

When the products were classified on the basis of the degree of durability, it was observed that the durable products were produced under conditions of relatively high concentration, the semidurable products under conditions of intermediate concentration, while the nondurable goods were produced under conditions of least concentration. The largest portion of the durable goods in the high concentration ranges were items which would ultimately be purchased by producers. Since the number of producers' goods included in the semidurable category was comparatively small and since there were no producers' goods among the nondurable items, the patterns for each of these groups were essentially the same as the distribution of consumers' goods among the concentration ratio classes.

The distributions by concentration ratio classes of products classified as semifinished and finished are strikingly similar and approximate closely the distribution of the entire 1,807 products. Whereas the particular characteristics of products distributed on the basis of other criteria account for the bunching at certain concentration levels, the distributions on the basis of degree of fabrication reflect the pattern of the large sample since any particular degree of fabrication is not limited to any one type of product but represents stages through which all products pass.

On the basis of the source of raw material entering the manufactured product, those products processed from agricultural materials showed a significantly different distribution pattern from that of products fabricated from minerals. In terms of both number and value of products, products fabricated from agricultural materials tended to have relatively low concentration ratios while products fabricated from minerals tended to have high concentration ratios. The different production and market structures which characterize agriculture and mining industries have conditioned, in part at least, the concentration picture of products manufactured from these two types of materials. The conditions of concentration under which products were produced did not change significantly between 1935 and 1937. In this period when the quantity output in manufacturing increased 30 percent, almost two-thirds of the products in an extensive sample showed changes in concentration of less than 10 percent; furthermore, the changes in concentration ratios were nearly evenly distributed between increases and decreases. Both plus and minus changes and large and small changes in concentration were distributed proportionately among the concentration ratio classes. A particular type of change, therefore, did not appear to be associated with any special condition of concentration.

It should also be pointed out that a particular type of change was not associated with any particular product characteristic. Thus, it cannot be said, for example, that there tended to be an increase in the concentration of consumers' goods and a decrease in the concentration of producers' goods or vice versa. Nor did products manufactured by the same companies show consistent changes in their concentration ratios. All these factors point to the fact that over the 1935-37 period, during which there was a marked increase in output of

manufactured products, the distribution of the changes in concentration was symmetrical. Thus, there is an indicated conclusion that changes in the product structure of manufacturing were not subject to violent shifts over the short run and, further, that the changes which did occur were random in nature.

In order that the possible relationship between the extent of concentration in the control of the production of manufactured products and their price and production behavior in periods of recession and recovery might be studied, all products in the 1,807 sample for which comparable classification existed at the time of the Census of Manufactures for 1929, 1933, and 1937 and for which quantity data were available were subjected to further intensive analysis. There were 407 products which met these requirements. The distribution of the concentration ratios of these products followed very closely the pattern of the 1,807 sample.

An investigation of the behavior of the products in this representative sample over the 1929-33 period and over the 1933-37 period reveals several interesting relationships:

1. Concentration in the control of production of the products does not appear to be associated with any particular and unique price or quantity behavior in either the cyclical downswing from 1929 to 1933 or in the upswing from 1933 to 1937. Products with high concentration ratios and products with low concentration ratios experienced strikingly similar changes in price and quantity.

2. For products manufactured under conditions of low concentration there tended to be an inverse relation between changes in price and changes in quantity; that is, relatively large decreases in quantity in the recession period, for example, tended to be associated with relatively small changes in price, while relatively small changes in quantity output tended to be associated with relatively large changes in price. The association was by no means close, however, and lends support to only the most general sort of inference. The association is not nearly so apparent among products with high concentration ratios. There, large and small changes in quantity appear with large and small changes in price as if by chance.

3. These two observations concerning the behavior of products in the sample point to a third conclusion, namely, product characteristics such as the degree of durability, the type of ultimate user (consumer or producer), the degree of fabrication, and the source of raw material appear to be factors of greater significance in any explanation of particular price and quantity behavior than the extent of the concentration of control under which they were produced. Thus, the production of durable producers' goods experienced a sharp contraction in the downswing in business activity from 1929 to 1933 and conversely experienced a large expansion in output in the ensuing upswing. On the other hand, nondurable goods experienced much more moderate declines in the downswing and more moderate advances in the upswing. The explanation of this divergent quantity behavior lies in the postponable nature of the demand for durable goods. The behavior of the prices of durable and nondurable goods was quite similar in magnitude of change; thus price change may be viewed as one of the constants in the analysis. Another factor whose influence is inextricably interwoven in the chain of causation which gives rise to distinct behavior patterns is the nature of the ultimate user. No

appraisal of the relative influence of any particular factor on the behavior of products may be made. In fact, the influences of all these factors on the demand for the various products are so intermingled that no single factor can stand alone. Furthermore, one factor may be of more importance in determining the behavior of one group of products and another may be more significant in another group. This mingling of the influences of the various factors makes the relationships less close than would be desirable if the association could be fully accounted for on the basis of a single factor.

4. When the products are grouped on the basis of the degree of durability into durable and nondurable goods, on the basis of their ultimate user into producers' and consumers' goods, on the basis of the degree of their fabrication into semifinished and finished, etc., it is apparent that for certain of the groupings there was an inverse relation between price and quantity changes in the 1929-33 period and again in the 1933-37 period. But here, too, the relation, while observable in many cases, was not always strongly marked. For the products in a few groups, however, the changes in price and changes in quantity of products appear as if by chance.

In conclusion, certain findings of this study bear repeating. The evidence presented here leaves no doubt that the great majority of manufactured products are produced under conditions of relatively high concentration—conditions under which a few producers account for the major portion of the output of a product. This concentration, however, does not appear to result in any particular, strongly marked or unique behavior pattern. Products produced under conditions of high concentration show about the same changes in quantity and in price over periods of recovery and recession that are shown by products with low concentration. When the behavior patterns of products are analyzed in terms of their various product characteristics, changes in price are quite similar regardless of the product characteristic, but the changes in quantity vary widely. This divergent quantity behavior, however, appears to be more closely associated with the varying economic characteristics of the products themselves than with the different conditions of competition under which they were produced.

## APPENDIX A

### STATEMENT OF DEFINITIONS AND METHODS

#### DEFINITIONS OF TERMS

The basic data presented in this study were compiled from unpublished records of the Division of Manufactures of the Bureau of the Census. In general, the terminology of the Bureau of the Census was employed. The concepts of product, of value of product, and of the producing unit, however, were delimited as follows:

#### *Product.*

More than 95 percent of the 1,807 products analyzed in this study are identical with the corresponding product appearing in the published report of the Census of Manufactures, 1937. In the remaining instances the following types of combinations of census products have been made:

(1) Identical products which were reported separately in the Census of Manufactures according to the industry classification of the establishment in which they were produced were combined and appear as one product in this study. For example, fresh sausage is listed herein as one product regardless of the fact it represents a combination of fresh sausage made in the meat packing industry, fresh sausage made in the sausage industry and fresh sausage made in other industries. Similarly, no differentiation is made between identical textile products manufactured in "regular" or "contract" factories.

(2) In several cases, products which were identical but which were reported separately in the Census of Manufactures because a different technology was employed in their manufacture were combined in this study. For example, no distinction was made between rayon made by the acetate process and rayon made by the viscose process.

(3) In several industries the conditions of manufacture were so involved that an accurate analysis of the various types of products included in each industry was very difficult to achieve. In these cases the Bureau of the Census suggested that for purposes of this study the separate types be combined into one product. The most conspicuous case of such a combination was that of products in the motor vehicle industry where 22 parts and types of an automobile were consolidated into two products. The difficulty in this particular situation arises from the following combination of factors: (a) No distinction is made between bodies and parts manufactured for sale and for interplant transfer since the census reports are made on an establishment basis; (b) some vehicles assembled abroad from parts made in the United States are not included in census reports due to the fact that these vehicles are assembled from parts shipped from two or more United States plants and cannot be assigned to any individual plant; and (c) a large but indeterminable number of units reported as "chassis only"

are combined at distribution points of the operating company with bodies made by the same company.

Although some combinations have been considered desirable in order to align census products more closely with economic commodities, the more usual discrepancy between the two results from the inclusion of several economic commodities within one census product. The "area" included in a census product does not conform to the economist's concept of a commodity and thus to the "area" within which prices are determined for several reasons. To begin with, the census classification of product may not reflect commodity differences based on different price classes. Electric fans, for example, are classified as "air circulators, 18 inches and over," and "desk fans," but within each of these classifications there is a considerable range in price. Radios, on the other hand, are reported by six price classes; refrigerators are reported according to capacity and these classifications represent approximately the different price classes also. Furthermore, the census classification of products does not reflect the commodity difference created by brands, trademarks, advertising, etc. A branded and an unbranded article of the same goods may be considered by the buying public as different commodities. The several brands of gasoline, for example, may be considered as different economic commodities though for census purposes they are treated as one product. In addition, an economic commodity must be defined by defining its market area and the extent of the market depends on the costs of transportation of the commodity and the difficulties of communication between buyers and sellers. While some of the products analyzed here are produced and sold in local or regional markets, the great majority of them are sold on a national market. Thus, the measure of concentration developed in this study, while giving an approximation of extent to which the supply of the analyzed products is concentrated in a few hands, is in the main coextensive with the market area measured in this study. For those products marketed regionally the data may be considered a first approximation. Finally, a number of census products represent deliberate combinations of similar economic commodities. Such combinations may be made because of (1) the possibility of disclosures, (2) the relative unimportance of some of the items, or (3) such similarity that additional detail is unnecessary. For example, separate data were collected for portable and stationary industrial engines and other types of surface-ignition engines, but it was necessary to combine them under one product classification, "Surface-ignition engines, all types," in order to avoid disclosing data relative to the operation of individual establishments. A number of products of small total value are usually combined under the product designation of "other," as in "Other products of the varnish groups." An example of the third type of combination is "Living-room and library metal upholstered davenports, sofas, daybeds, studio couches, etc."

These facts all suggest limitations on the significance of the data on concentration in the production of census products for the problems of price analysis. The census classifications of products, however, have been developed in cooperation with manufacturers and on the whole represent the most measurable unit which is consonant with the comprehensive nature of the job and the resources available.

TABLE 1A.—Comparison of value of products for Census of Manufactures industry groups, computed on an establishment and on a product basis, 1937

Industry group and group number	Value of product of—	
	Establishments classified in each group	Products classified in each group
1. Food and kindred products.....	\$11,265,610,228	\$10,660,449,973
2. Textiles and their products.....	7,061,609,047	6,463,733,886
3. Forest products.....	2,439,530,184	2,445,357,609
4. Paper and allied products.....	2,060,848,757	2,128,444,889
5. Printing, publishing, and allied industries.....	2,585,698,812	2,587,712,010
6. Chemicals and allied products.....	3,721,531,322	3,714,849,810
7. Products of petroleum and coal.....	2,954,464,803	2,937,850,849
8. Rubber products.....	883,032,546	878,625,645
9. Leather and its manufactures.....	1,491,512,631	1,452,710,983
10. Stone, clay, and glass products.....	1,395,857,580	1,389,924,837
11. Iron and steel and their products, not including machinery.....	7,480,360,230	7,780,604,554
12. Nonferrous metals and their products.....	2,783,284,791	1,510,508,829
13. Machinery, not including transportation equipment.....	5,891,599,369	5,634,307,146
14. Transportation equipment—air, land, and water.....	5,985,889,399	5,804,048,967
16. Miscellaneous industries.....	2,712,042,038	2,633,656,056
Total.....	60,712,871,737	58,022,786,082

*Value of Product.*

The census definition of value of product was used in this study. The United States total value of individual products is published in the biennial report of the Census of Manufactures in each industry table under the title "Products by kind, quantity, and value." This United States total is the aggregate dollar value of each product irrespective of the industry classification of the establishments in which it was produced.

The value of products for an industry is computed by the Bureau of the Census on two bases: First, on an establishment basis and, second, on a strictly product basis. The value of products computed on an establishment basis represents the aggregate value of products of all establishments classified in a given industry irrespective of the industry classification of the products manufactured by them. The second method of computation gives the total value of products classified in the industry irrespective of the industry classification of the establishments in which they were produced. A comparison of the total value of products computed on these two bases and a breakdown by industry groups is given in table 1A. For example, the value of products of all establishments classified in the food group is \$11,265,610,228, while the value of all products classified in the food group is \$10,660,449,973. The difference between these totals is to be accounted for by the following combination of factors: (1) The value of the byproducts transferred from plants classified in this industry group to other industry groups may not have been offset by additions to it through transfer of the value of byproducts of plants classified in other industry groups, and (2) the count on a product basis does not include receipts for custom work, contract work, and electric energy sold. For the United States totals the interindustry group transfers cancel out, of course, and the difference is to be accounted for by the exclusion from the total when the count is on a product basis of receipts for custom work, contract work, and electric energy.

*Producing unit.*

Published figures of the Census of Manufactures are based upon the establishment as the producing unit. As a rule the term establishment signifies a single plant or factory. Data computed for this study are on a company or concern basis. That is, reports of all establishments under a common ownership were combined and treated as belonging to a single company. Under this procedure all establishments classified by the Bureau of the Census as belonging to the same "central-office" organization were considered as one company. Each establishment classified by the Bureau of the Census as an "independent" is a company with but one plant.

The figures in this report on the number of companies and the number of establishments manufacturing a given product were computed without regard to the industry in which the establishments were classified by the Bureau of the Census. This procedure is in direct contrast to that followed by the Bureau of the Census in deriving the number of establishments in its published reports. There, data are published on an industry basis rather than a product basis; and the number of establishments reported for each industry represents the number of establishments actually classified in the industry.

## SELECTION OF THE SAMPLE

The sample of 1,807 products analyzed in this study represents approximately one-half of all products reported in the Census of Manufactures of 1937. The sample was selected in such a manner that it yields a comprehensive cross-section picture of the product structure of manufacturing. All industry groups (except publishing and printing), all types and conditions of manufacturing, all types of users, degrees of durability, etc., are represented by products in the sample.

All of the products, with a few minor omissions,<sup>1</sup> from one-third of all census industries (117 of 351) were selected for analysis. Two criteria were applied in the selection of the industries: (1) The number of establishments per industry, and (2) the total value of products per industry. That is, the sample was selected in such a way that the distribution in the sample of industries according to number of establishments per industry and according to value of products per industry closely approximates the distributions of all manufacturing industries on these two bases. In order that the various industry groups might be proportionately represented, these criteria were applied to each group separately. Since the industries selected included within their classifications somewhat more than the average number of products, the total number of products analyzed accounts for almost one-half of all products listed in the Census of Manufactures, 1937.

A comparison of the distribution of all industries and of the industries included in the sample according to the number of establishments per industry is given in table 2A. For example, 11.4 percent of all industries had fewer than 25 establishments while 12.1 percent of the sample industries had less than 25 establishments; 75.5 percent of all industries had fewer than 400 establishments, while 69.9 percent

<sup>1</sup> A small number of products listed in the selected industries are excluded from the sample because of their heterogeneous nature. Such a "product" is "Other miscellaneous electrical machinery and apparatus, and such machinery and apparatus not specifically reported as belonging to any of the classes covered by the preceding tables." Receipts for custom work, contract work, and electric energy sold are also omitted from the analyzed products.

of the sample industries had fewer than 400 establishments. While the two distributions are very similar, the sample industries are somewhat more heavily weighted with industries having a large number of establishments. Since the measure of concentration is based upon a constant number of companies, i. e., four, a disproportionate number of industries with a large number of producers would tend to yield a bias toward too low concentration ratios.<sup>2</sup>

TABLE 2A.—Relation between all manufacturing industries and the industries included in the sample of 1,807 products, distributed according to the number of establishments per industry, 1937

Number of establishments per industry	Cumulative percentage of Census of Manufactures industries		Number of establishments per industry	Cumulative percentage of Census of Manufactures industries	
	Total <sup>1</sup>	Included in concentration study sample <sup>2</sup>		Total <sup>1</sup>	Included in concentration study sample <sup>2</sup>
Under 25.....	11.4	12.1	500 to 599.....	82.3	73.3
25 to 49.....	23.9	23.3	600 to 699.....	85.1	77.6
50 to 99.....	41.7	34.5	700 to 799.....	87.1	80.2
100 to 149.....	52.2	44.8	800 to 899.....	88.0	83.6
150 to 199.....	59.9	52.6	900 to 999.....	89.4	84.5
200 to 249.....	65.3	59.5	1,000 to 1,999.....	95.7	96.6
250 to 299.....	69.2	62.9	2,000 to 2,999.....	97.7	97.5
300 to 349.....	72.9	67.2	3,000 to 3,999.....	98.8	99.1
350 to 399.....	75.5	69.8	7,000 to 8,999.....	99.1	100.0
400 to 449.....	77.5	72.4	9,000 to 9,999.....	99.4	100.0
450 to 499.....	78.9	73.3	10,000 and over.....	100.0	100.0

<sup>1</sup> Total number of industries is 351.

<sup>2</sup> Number of industries included in sample is 117.

TABLE 3A.—Relation between all manufacturing industries and the industries included in the sample of 1,807 products, distributed according to the value of product for each industry, 1937

Value of product per industry (thousands of dollars)	Cumulative percentage of Census of Manufactures industries		Value of product per industry (thousands of dollars)	Cumulative percentage of Census of Manufactures industries	
	Total <sup>1</sup>	Included in concentration study sample <sup>2</sup>		Total <sup>1</sup>	Included in concentration study sample <sup>2</sup>
0 to 4,999.....	10.0	-----	40,000 to 59,999.....	53.5	34.1
5,000 to 9,999.....	17.7	6.8	60,000 to 99,999.....	66.0	44.4
10,000 to 19,999.....	28.5	12.8	100,000 to 199,999.....	80.0	64.0
20,000 to 29,999.....	37.0	19.6	200,000 to 399,999.....	90.0	80.3
30,000 to 39,999.....	44.4	24.7	400,000 and over.....	100.0	100.0

<sup>1</sup> Total number of industries is 351.

<sup>2</sup> Number of industries included in sample is 117.

A comparison of the distribution of all industries and of the industries included in the sample according to the value of products per industry is given in table 3A. For example, 17.7 percent of all industries had a total value of products of less than \$10,000,000, while 6.8

<sup>2</sup> An examination of unpublished data indicates that the distribution of the number of concerns per industry for the sample more closely approximates a comparable distribution for all manufacturing than when the distributions are on an establishment basis. Since the concentration ratios are computed in terms of the total output of concerns or companies this is an even more pertinent measure of the adequacy of the sample.

percent of the industries in the sample had a total value of products of less than \$10,000,000. At the other extreme, 90 percent of all industries had total values of less than \$400,000,000, while 80.3 percent of the sample industries had total values less than \$400,000,000. A preliminary investigation indicated that there is a slight inverse relationship between the value of products of an industry and the degree of concentration. Since the industries included in the sample have a somewhat higher value of product per industry than do all industries, the bias again is toward an understatement of concentration.

The industries selected on these bases afford a sample of approximately one-half of the number of all products and account for more than one-half of the total value of all products reported in the Census of Manufactures in 1937. A comparison of the total value of all products and the value of analyzed products in each industry group is given in table 4A. With one exception (forest products), the analyzed products account for at least one-third of the value of all products in each industry group and in only three industry groups is the value representation of the sample less than half the total value of the production in the industry group.

TABLE 4A.—Comparison of the value of all products and of the 1,807 products, by industry groups, 1937

Industry group and group number	All products (in dollars)	Analyzed products	
		Value (in dollars)	Percent of total
1. Food and kindred products.....	10,660,449,973	5,119,481,836	48.0
2. Textiles and their products.....	6,463,733,885	4,050,032,350	62.7
3. Forest products.....	2,445,357,609	663,078,060	27.1
4. Paper and allied products.....	2,128,444,889	835,368,504	39.2
5. Printing, publishing, and allied industries.....	2,587,712,010	( <sup>1</sup> )	-----
6. Chemicals and allied products.....	3,714,849,850	1,941,180,443	52.3
7. Products of petroleum and coal.....	2,937,850,849	2,482,267,379	84.5
8. Rubber products.....	878,625,645	729,046,043	83.0
9. Leather and its manufactures.....	1,452,710,983	1,143,621,591	78.7
10. Stone, clay, and glass products.....	1,389,924,837	1,075,834,599	77.4
11. Iron and steel and their products, not including machinery.....	7,780,604,554	3,017,572,276	38.8
12. Nonferrous metals and their products.....	1,510,508,829	832,833,263	55.1
13. Machinery, not including transportation equipment.....	5,634,307,146	3,168,944,449	56.2
14. Transportation equipment, air, land, and water.....	5,804,048,967	2,848,786,150	49.1
16. Miscellaneous industries.....	2,633,656,056	1,597,646,200	60.7
Total.....	58,022,786,082	29,505,693,145	50.9

<sup>1</sup> Not analyzed.

#### COMPUTATION OF THE CONCENTRATION RATIO

The measure of concentration used in this study is the proportion of the United States production of a product accounted for by the leading four producers of that product, expressed as a percent and called herein the concentration ratio.

For example, all companies manufacturing canned apples were arrayed according to the value of their production of that product. The first four companies in such an array, then, were the leading four companies in the production of canned apples. The concentration ratio, as used in this study, is the percent of the total United States value of canned apples accounted for by the combined production of

the four leading producers. It should be understood that the word "leading" does not necessarily imply domination of the market.

Where quantity data were available, the same type of ratio was computed on the basis of quantity produced. The total number of companies manufacturing each product, and the number of establishments operated by them as well as the number of establishments operated by the leading four producers were also computed in order to throw light on the general structure of production of each product.

Four companies were selected as the unit of measurement of concentration of production in manufacturing since that number represents the minimum for which such detailed statistics can be released by the Bureau of the Census. The Bureau is forbidden by law to release any data which may disclose exactly or approximately the operations of individual companies. The following rules were therefore adopted in this study to prevent such disclosures:

(1) No data are shown for less than four companies.

(2) No value of product is shown if one company accounts for 75 percent or more of the total value of a product, or if two companies together account for 90 percent or more of the total value. This rule also applies to any figure which could be obtained by subtraction or addition to any published total. For those situations where publication of concentration ratios based on value data would constitute a disclosure of the operations of any one of the leading four companies, the products are listed under footnote 1, "(1)", throughout the study. For those situations where publication of concentration ratios for the leading four companies would, by subtraction from other published data, constitute a disclosure of the operations of any one of the remaining companies, the products are listed under footnote 2, "(2)".

## APPENDIX B

## BASIC DATA FOR EACH OF THE 1,807 PRODUCTS ANALYZED FOR 1937

[NOTE.—The concentration ratios listed opposite each product are the proportion of the total value of that product and of the quantity manufactured by the 4 leading producers]

Product	Concentration ratio		Total value of product* (in dollars)				Total quantity product*		Number of com- panies in United States*	Number of establishments*		
	Value (1)	Quantity (2)	4 leading companies (3)		4 smallest companies (4)		4 leading companies (5)			4 smallest companies (6)		All com- panies (8)
<b>FOOD AND KINDRED PRODUCTS GROUP</b>												
Canned fruits and vegetables; canned and bottled juices:												
Canned fruit:												
Apples.....	60.0	56.3	2,734,720	1,129	1,561,711	795	50	56	7			
Applesauce.....	66.5	61.6	3,109,991	2,957	2,063,307	1,861	36	38	6			
Apricots.....	27.8	24.6	4,644,874	3,353	1,430,063	1,237	77	89	11			
Blackberries.....	39.0	32.0	674,873	(1)	222,395	(1)	66	72	4			
Blueberries.....	54.7	52.2	798,089	3,389	240,172	1,353	24	28	6			
Cherries:												
R. S. P.....	32.2	34.5	2,169,126	476	827,935	142	101	116	8			
Sweet.....	40.6	39.2	943,217	1,370	173,482	350	49	55	6			
Cranberries and sauce.....	94.4	92.6	3,513,728	(1)	1,135,171	(1)	11	13	6			
Figs.....	53.5	51.7	1,228,598	4,918	1,345,386	1,546	18	21	7			
Fruit salad and fruit cocktail.....	48.8	48.2	10,137,830	22,782	2,301,735	11,383	35	37	4			
Grapefruit sections.....	56.4	62.2	4,430,282	71,649	3,094,047	33,023	24	25	4			
Loganberries.....	54.8	61.9	1,141,260	(1)	51,085	(1)	25	26	5			
Olive,ripe.....	46.0	35.0	1,884,224	25,152	403,286	5,845	29	29	4			
Peaches.....	40.6	38.3	16,263,648	404	5,207,873	120	91	115	16			
Pears.....	41.6	37.3	6,252,665	2,324	1,927,329	1,225	70	84	11			
Plums.....	81.5	78.3	580,696	1,570	229,259	816	19	23	6			
Prunes.....	36.3	32.9	1,306,295	1,262	600,522	163	53	58	6			
Raspberries:												
Black.....	66.9	71.6	607,606	342	234,021	109	52	58	9			
Red.....	39.9	34.4	509,986	493	110,217	146	52	55	4			
Strawberries.....	57.2	57.1	371,123	1,090	76,987	259	33	35	6			
Canned and bottled fruit juices:												
Grape.....	80.4	70.0	4,026,832	(1)	1,169,381	(1)	19	23	8			
Grapefruit.....	26.6	22.3	2,819,285	13,404	1,518,298	9,842	57	60	5			
Orange.....	54.8	52.9	2,133,330	3,686	1,870,825	1,895	36	37	4			
Canned soups.....	(1)	(1)	(1)	(1)	(1)	(1)	44	59	10			

	53.8	46.7	7,026,637	2,128	1,284,723	708	75	78
Canned vegetables:								
Asparagus.....	58.2	58.1	17,865,962	1,491	10,671,538	971	72	79
Beans:	15.7	13.2	2,259,398	1,100	1,102,651	320	359	8
Baked.....	42.9	40.9	1,808,775	1,100	1,045,814	709	66	5
Green-pod.....	36.4	36.9	1,515,537	507	823,394	577	116	9
Kidney.....	14.0	14.0	359,975	507	197,569	327	142	8
Lima.....	26.0	26.2	1,346,080	465	888,172	289	128	8
Wax-pod.....	39.3	38.3	836,988	724	575,905	708	95	8
Carrots.....	23.6	21.9	10,431,999	526	5,712,779	358	313	447
Corn.....	43.3	58.9	1,257,224	3,940	968,904	4,013	31	35
Hominy.....	24.0	41.6	3,143,438	1,576	1,906,220	309	96	10
Kraut.....	61.7	20.0	11,361,217	1,019	4,893,565	476	313	31
Pintos.....	41.6	67.2	1,144,367	(1)	420,782	(1)	13	14
Pumpkin and squash.....	46.2	41.0	1,068,803	2,726	718,158	1,741	75	8
Rhubarb.....	78.0	47.3	43,834	1,284	26,101	987	19	19
Spaghetti.....	23.2	47.0	6,990,931	3,548	3,980,955	1,744	44	4
Spinach.....	48.3	17.3	2,291,843	1,710	939,791	1,970	140	6
Succotash.....	69.5	49.5	238,418	1,218	177,729	1,048	46	7
Sweetpotatoes.....	8.9	75.0	707,235	8,896	519,093	5,248	25	4
Tomatoes.....	45.4	8.0	3,061,519	238	1,878,803	151	787	24
Tomato juice and cocktail.....	46.6	40.4	10,526,179	323	5,574,162	268	184	29
Tomato ketchup.....	51.5	39.7	10,258,895	1,068	3,897,068	499	115	19
Tomato paste.....	60.5	60.4	3,311,471	9,820	1,438,066	5,356	39	4
Tomato pulp and puree.....	69.5	19.1	795,493	721	748,830	461	211	10
Tomato sauce.....	88.0	69.2	2,294,599	2,883	1,063,634	36	41	9
Vegetable puree for infants.....	46.0	91.1	6,153,689	(1)	4,156,203	(1)	12	7
Vegetables, mixed.....	67.8	43.7	2,053,501	2,739	1,089,292	1,784	74	7
Corn sirup, corn sugar, corn oil, and starch:								
Corn oil:								
Crude.....	67.8	68.1	2,944,641	350,268	34,244,633	4,186,523	21	24
Refined.....	(1)	(1)	(1)	(1)	(1)	(1)	6	7
Corn-oil cake and meal.....	(1)	(1)	(1)	(1)	(1)	(1)	7	8
Corn sirup:								
Mixed with other sirups.....	(1)	(1)	18,745,192	7,860,947	603,493,858	73,880,317	6	8
Unmixed.....	(1)	(1)	(1)	(1)	(1)	(1)	8	11
Corn sugar.....	(1)	(1)	(1)	(1)	(1)	(1)	7	10
Dextrine.....	(1)	(1)	(1)	(1)	(1)	(1)	5	5
Starch:								
Corn.....	89.2	89.7	31,818,442	(1)	839,455,353	(1)	10	12
Potato.....	85.5	81.7	246,123	41,904	7,968,000	1,712,472	8	9
Flour and other grain-mill products:								
Bran and middlings.....	28.4	28.8	33,103,922	342	1,204,379	16	1,941	2,089
Corn meal.....	19.5	16.1	6,377,606	93	1,118,307	19	1,256	6
Feed, screenings, etc.....	20.9	21.7	11,073,777		347,142		1,087	21

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of com- panies in United States	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com- panies (8)	4 leading com- panies (9)
FOOD AND KINDRED PRODUCTS GROUP—continued									
Flour and other grain-mill products—Continued.									
Flour:									
Buckwheat.....	(1)	(1)			(1)		199	200	6
Corn.....	53.8	51.0	846,403		158,525		40	69	4
Gluten, rice, wheat-malt, barley-malt, and other.....	78.9	53.6	860,665		7,034,214		24	26	4
Rye.....	62.6	63.9	4,196,476	122	910,651	28	131	133	6
Wheat:									
Graham and whole-wheat.....	47.1	46.6	3,829,512	27	642,497	6	590	660	23
Prepared.....	26.5	24.2	5,245,604	58	766,037	7	259	290	28
Semolina.....	61.3	59.8	10,752,852	125	1,483,017	18	62	57	4
White.....	31.1	30.2	177,994,740	473	29,710,935	82	2,037	2,069	36
Liquors, distilled:									
Brandy:									
Commercial.....	11.4	18.6	699,076	17,244		14,968	136	140	6
Fortifying.....	32.1	33.4	1,320,145		2,844,519		65	69	4
Distillers' grains.....	57.9	58.1	2,590,305	5,211	206,090,850	592,161	33	45	14
Gin.....	41.7	39.5	8,296,549		7,101,123		133	140	8
Whisky:									
Corn and bourbon.....	38.3	39.1	27,199,757	54,872	47,908,290	116,638	85	96	14
Rye.....	47.5	48.6	9,387,372	63,951	15,176,790	105,447	32	37	8
Macaroni, spaghetti, vermicelli, and noodles:									
Egg noodles and other egg products.....	20.7	17.3	2,310,018	606	17,509,423	7,675	329	339	6
Macaroni, spaghetti, and vermicelli.....	18.7	15.1	7,297,583	6,735	84,153,741	67,240	263	269	6
Ravioli.....	62.2	58.9	111,773	12,840	612,970	64,200	20	20	4
Meat packing, wholesale:									
Dog and cat food, canned.....	82.6	80.8	6,574,147	4,489	113,529,816	70,436	22	28	10
Hides, skins, and pelts:									
Calfskins, cured.....	74.2	69.3	9,995,573	27	48,222,310	346	393	471	71
Cattle hides:									
Cured.....	65.7	61.8	49,580,984	418	351,768,684	6,351	466	549	73
Uncured.....	28.4	28.3	1,779,536	370	15,074,229	6,607	214	228	11
Sheep and lamb pelts:									
Cured.....	74.1	71.2	15,379,069	9	8,557,682	16	288	360	59
Uncured.....	(1)	(1)					151	169	19
Sheepskins and lambskins, pickled.....	100.0	100.0	6,569,709		31,126,811		4	12	12

	48.8	48.3	61,639,035	217	499,923,852	2,300	474	583	70
Lard.....									
Meat, canned, except sausage:									
Vacuum-cooked.....	70.0	70.7	25,880,323	34,057	125,141,632	169,443	18	24	8
Other than vacuum-cooked.....	76.5	74.6	8,718,912	7,870	47,543,769	43,738	24	33	11
Meat, cured.....									
Beer, pickled and other cured.....	53.1	49.0	7,968,840	194	34,990,973	1,632	117	167	38
Hams, cooked.....	44.4	44.2	20,610,334	975	59,362,165	3,100	270	356	70
Pork, dry-salted:									
Smoked.....	40.7	41.2	9,874,949	983	47,302,025	5,718	137	183	33
Not smoked.....	54.6	54.6	34,984,546	462	235,255,815	3,475	202	271	56
Fork, pickled and dry-cured:									
Smoked.....	45.9	44.1	108,184,627	696	439,157,218	2,820	338	448	68
Not smoked.....	70.1	69.6	83,111,452	457	446,355,022	2,774	165	238	60
Meat, fresh:									
Beef.....	58.2	58.5	413,826,802	2,740	3,063,423,775	24,318	647	740	82
Mutton and lamb.....	74.5	73.9	95,964,316	53	581,924,604	431	431	523	81
Pork.....	48.5	45.1	188,868,351	1,291	1,137,346,567	11,111	525	612	75
Veal.....	59.4	62.4	62,423,883	297	1,485,602,262	2,017	599	699	87
Edible organs, tripe, etc.....	63.5	65.2	36,851,118	347	411,667,438	5,010	527	633	93
Oleo oil.....	( <sup>2</sup> )	8	35	29					
Tannage materials dry-rendered.....	52.8	47.1	1,581,229	1,242	37,453	27	128	155	25
Wool.....	( <sup>1</sup> )	18	27	13					
Oleomargarine (margarine) made in the oleomargarine, the meat-packing, and in other industries: Oleomargarine, all.....	48.9	46.2	24,885,905		183,735,200		25	43	9
Rice cleaning and polishing:									
Bran.....	37.0	35.5	807,702	8,388	64,244,000	5,630,400	49	59	13
Clean rice:									
Brewers'.....	54.4	49.7	1,410,838	1,857	5,467,962	108,500	50	60	8
Whole-grain heads:									
Brown.....	85.4	85.6	261,980	( <sup>2</sup> )	7,927,345	( <sup>2</sup> )	11	13	6
Polished.....	35.5	33.0	12,332,680	201,235	333,447,011	6,282,500	50	60	14
Screenings.....	35.1	31.6	843,997	8,673	418,519	31,862,244	49	59	14
Second-head.....	47.0	43.3	931,370	5,319	32,832,596	235,052	45	54	13
Polish.....	37.0	34.7	184,691	1,010	11,406,442	74,100	50	60	14
Sausage casings made in the sausage, in the meat-packing, and in other industries:									
Beef casings.....	58.7		2,312,879	78			194	264	74
Hog casings.....	62.7		5,651,625	94			191	273	73
Sheep and lamb casings.....	51.5		3,940,710	135			103	168	38
Sausage, meat puddings, headcheese, etc., made in the sausage, in the meat-packing, and in other industries:									
Canned sausage.....	79.8	75.8	4,785,190		21,291,306		37	41	7
Dry sausage.....	61.2	61.7	16,525,762	515	70,586,529	2,075	208	260	63
Fresh sausage and sausage products.....	25.5	26.7	58,741,635	1,429	383,290,219	7,152	1,128	1,301	145
Shortenings (other than lard), vegetable cooking oils, and salad oils:									
Shortenings.....	65.9	65.0	121,624,416		1,024,053,166		66	128	32
Vegetable cooking oils, and other edible oils.....	73.1	73.2	65,467,338		661,256,868		40	80	34

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>FOOD AND KINDRED PRODUCTS GROUP—continued</b>									
Sugar, beet:									
Molasses, sold or transferred for desugarization.....	73.5	83.8	853,902		129,113		13	48	35
Pulp, dried, exclusive of molasses.....	57.8	58.7	627,805	( <sup>1</sup> )	25,118	( <sup>1</sup> )	11	25	12
Pulp, moist, exclusive of molasses.....	86.5	74.4	1,061,485	( <sup>1</sup> )	1,206,092	( <sup>1</sup> )	9	52	41
Sugar:	( <sup>1</sup> )	( <sup>1</sup> )					6	22	19
Granulated.....	75.8	75.9	75,478,187	1,340,808	976,312	15,021	21	87	51
Unfinished.....	69.5	77.8	301,966	5,157	8,197	104	17	82	54
Sugar, cane, not including products of refineries:									
Bagasse, for sale as such.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )		( <sup>1</sup> )		7	9	6
Molasses, other than blackstrap.....	64.2	47.6	289,119		2,043,279		18	18	4
Sirup.....	64.8	58.6	590,087		1,729,885	3	14	14	4
Sugar:									
Clarified.....	53.0	51.6	1,034,701	32,318	22,443	558	24	24	4
Granulated.....	73.0	73.9	2,691,446	132,782	33,463	1,504	13	15	6
Raw.....	41.4	41.5	7,854,672	107,274	126,084	1,707	43	50	7
Sugar, refining, cane:									
Refiners' blackstrap and nondible sirup.....	33.1	31.5	912,180	19,005	15,704,178	486,314	53	70	13
Refiners' sirup, edible.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )		( <sup>1</sup> )				
Refined sugar:									
Hard.....	64.6	64.0	255,110,508	9,010,611	2,720,101	88,248	28	40	10
Soft or brown.....	82.6	82.5	18,472,688		216,853		12	18	10
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>									
Asphalted-felt-base floor covering:									
Piece goods:									
12/4 and wider.....	66.5	63.5	3,939,521	( <sup>1</sup> )	17,461,119	( <sup>1</sup> )	11	12	5
8/4.....	69.2	71.1	7,022,075	( <sup>1</sup> )	33,108,423	( <sup>1</sup> )	10	13	6
Narrower than 8/4.....	79.1	80.9	849,371	225,769	4,294,199	993,284	8	9	5
Rugs.....	73.5	70.4	13,466,843	( <sup>1</sup> )	54,128,085	( <sup>1</sup> )	9	12	7
Awnings, tents, sails, and canvas covers:									
Awnings.....	14.5		1,622,605	1,335			365	375	7
Canopies.....	36.6		188,931	644			105	110	4
Canvas covers.....	32.4		608,115	142			149	156	8

CONCENTRATION OF ECONOMIC POWER

Sails.....	57.0	711,366	105	58	63	4
Tarpaulins.....	19.9	776,054	367	178	189	9
Tents.....	25.2	756,791	243	181	187	5
Bags, other than paper:						
Burlap.....	39.6	23,649,698		101	141	35
Cotton.....	53.6	30,083,951	281	179	225	33
Clothing, men's, youths', and boys', n. e. c.—regular and contract factories:						
Separate garments, boys':						
Coats.....	58.4	32,701	6,935	1,688	19	4
Overcoats.....	24.8	1,632,842	3,592	59	4	4
Pants and knickers, cotton.....	32.9	939,242	1,334	1,242	60	6
Pants and knickers, wholly or partly of wool.....	40.7	1,591,420	189	1,08	96	4
Separate garments, men's and youths':						
Coats.....	21.2	760,853	169	15	143	6
Overcoats and topcoats.....	11.9	11,470,732	(1)	(1)	587	6
Trousers and knickers, cotton.....	41.7	2,424,053	1,045	817	95	8
Trousers and knickers, mohair, silk, linen, etc.....	79.8	2,595,477	1,387	92	29	8
Trousers and knickers, wholly or partly of wool.....	9.7	2,244,180	274	98	415	8
Vests.....	55.4	458,130	70	31	56	4
Suits, boys':						
Cotton.....	84.7	229,197	41,183	54,456	8	5
Mohair, silk, linen, etc.....	100.0	304,106			3	3
1-pants (knickers).....	68.4	2,454,051	2,223	244	20	4
1-pants (not knickers).....	56.7	1,171,007	15,183	2,832	25	4
2-pants (knickers).....	36.7	1,338,611	5,932	924	45	4
2-pants (not knickers).....	45.1	4,078,262	4,513	1,864	45	4
2-pants (1 long pants, 1 knickers).....	63.1	1,487,792	6,869	1,277	29	4
Suits, men's and youths':						
Cotton.....	73.9	3,250,644	1,334	114	25	10
Mohair, silk, linen, etc.....	(1)				39	8
3-piece.....	13.5	28,371,484	3,622	183	675	6
3-piece with extra trousers.....	23.6	23,419,100	3,120	91	261	5
Tuxedo and dress suits.....	35.6	1,841,520	320	23	139	4
2-piece.....	30.1	4,333,369	1,168	47	160	15
2-piece with extra knickers.....	76.3	1,047,487	5,587	149	16	4
2-piece with extra trousers.....	50.0	6,301,765	807	24	67	12
Uniforms, military, naval, and cadet.....	54.3	1,458,410	(1)	(1)	39	5
Waterproofed, not including oiled outer garments.....	50.4	4,412,155	1,120	330	52	4
Clothing, work (including work shirts) and sport garments except leather:						
Coats, blanket-lined.....	(1)				71	4
Coats and vests, hunting.....	71.6	1,091,166	2,632	102	32	4
Coats and jackets, leathersette.....	51.2	550,362	2,982	94	25	4
Industrial garments.....	50.2	594,943	(1)	(1)	45	5
Machinaws:						
Boys'.....	62.3	1,832,052	1,561	52	61	4
Men's and youths'.....	47.2	3,154,847	2,151	32	109	4
Melton jackets.....		3,594,256	1,296	46	110	6

See footnotes at end of table.

## Basic data for each of the 1,507 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com-panies (8)	4 leading com-panies (9)
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>									
Clothing, work (including work shirts) and sport garments except leather—Continued.									
Overalls:									
Children's.....	50.6	54.6	3,484,616	768	632,609	156	168	16	
Except children's.....	31.3	32.2	13,824,605	1,488	1,324,183	131	247	16	
Overall jackets.....	38.0	38.4	1,989,955	810	176,347	86	178	12	
Overall 1-piece suits, including industrial.....	37.3	36.8	1,769,310	646	104,106	31	154	8	
Pants and breeches, work.....	16.3	19.5	7,823,551	1,228	813,217	94	304	6	
Play suits, children's.....	37.5	29.6	2,443,275	(1) 432	396,820	68	119	6	
Riding and camp clothing.....	78.6	52.5	1,475,080	(1) 680	43,753	(1)	28	4	
Shirts, work (including dannel).....	36.8	43.9	14,640,724	1,367	2,659,654	181	231	23	
Ski suits and snow suits.....	23.9	18.0	844,578	1,377	14,649	30	73	4	
Windbreakers and lumber jacks.....	86.9	87.0	3,191,746	27,400	127,538	1,610	15	5	
Boys.....	54.4	41.2	940,738	2,406	27,806	83	62	5	
Men's and youths'.....	29.8	29.8	1,377,076	2,388	53,186	73	111	4	
Coats, suits, and separate skirts, women's, misses', and juniors'—regular and contract factories:									
Coats.....	7.6	5.9	15,927,869	2,230	965,148	449	885	4	
Ensembles (suits).....	40.7	25.6	4,048,893	(1) 283	175,714	(1)	97	4	
Skirts.....	19.0	20.5	2,245,006	(1) 283	1,370,700	107	129	4	
Suits.....	14.0	1.5	7,857,774	(1)	808,631	(1)	368	4	
Corsets and allied garments:									
Brassieres and bandeaux-brassieres.....	28.5	28.3	4,191,951	(1)	1,027,628	(1)	151	5	
Combination or 1-piece garments.....	29.0	20.6	5,600,098	1,394	152,195	82	91	6	
Corsets, girdles, and garter belts.....	19.3	9.7	6,939,286	3,573	228,982	166	167	6	
Corset accessories (clasps, stays, etc.).....	66.8	.....	6,931,272	10,388	.....	.....	19	4	
Cotton woven goods over 12 inches in width:									
Blankets, part-wool.....	72.0	71.6	7,587,689	226,064	18,150,923	524,288	15	4	
Colored cotton goods and related fabrics:									
Bed tickings.....	54.2	58.7	4,641,815	47,908	13,824,323	159,005	22	8	
Chambrays and chevilles.....	63.0	78.0	10,166,744	55,650	27,076,956	150,853	19	6	
Cottonades and other covers (except shirting covers).....	81.8	64.3	7,642,292	118,879	19,790,861	304,920	18	6	
Covers, shirting.....	62.4	65.0	9,058,461	.....	24,862,854	.....	15	6	
Dealmis.....	71.5	72.4	25,726,393	295,838	97,403,916	645,240	22	5	
Gingham.....	66.0	69.0	910,642	152,098	1,666,849	317,655	13	4	

Pin stripes, pin checks, and hickory stripes.....	56.2	1,309,039	103,882	4,421,967	269,739	19
Plaids.....	(1)	(1)	(1)	(1)	(1)	7
Seersuckers for men's, women's, and children's wear.....	90.9	695,143	62,714	790,071	78,743	8
Other suitings woven with colored yarn.....	42.0	5,510,469	76,778	12,898,030	154,867	26
Cotton duck:						
Numbered duck:						
Naught duck.....	87.8	258,077	33,967	877,911	122,093	9
Paper felts.....	77.1	1,176,143	321,301	2,618,590	777,454	8
Sail duck 24-inch and under.....	(1)	(1)	(1)	(1)	(1)	10
Wide duck, wider than 24 inches.....	86.6	4,140,688	29,846	14,082,573	84,177	19
Ounce duck:						
Army duck.....	54.5	4,920,103	30,643	16,627,977	88,662	21
Filter cloth.....	89.2	1,028,937	(1)	3,282,813	(1)	11
Fiat duck, plied filling.....	60.8	4,557,446	123,230	395,842	22	
Fiat duck, single filling.....	36.5	3,809,194	81,631	15,944,838	299,696	30
Hose and belting duck.....	83.5	6,015,360	(1)	21,226,679	(1)	11
Other ounce duck.....	(1)	(1)	(1)	(1)	(1)	6
Fine cotton goods, combed or part-combed:						
Broadcloths.....	51.3	9,865,926	31,855	20,925,220	55,209	32
Cotton mixtures.....	60.7	2,743,568	45,444	3,712,316	50,103	22
Dimities.....	(1)	(1)	(1)	(1)	(1)	11
Lawn.....	70.0	15,767,901	18,007	21,614,286	28,142	26
Marquissettes:						
Beat-up-spot.....	(1)	(1)	(1)	(1)	(1)	6
Clipped-spot.....	62.5	7,241,684	133,250	8,807,782	170,221	16
Plain.....	65.1	3,503,971	43,899	6,725,720	64,668	20
Organdies.....	(1)	(1)	(1)	(1)	(1)	6
Oxfords.....	64.0	1,379,958	121,298	2,192,035	162,782	13
Piques.....	59.8	431,594	15,186	511,384	16,696	15
Pongees.....	(1)	(1)	(1)	(1)	(1)	7
Poplins.....	70.0	1,059,463	48,146	1,774,710	79,667	13
Sateens.....	76.7	1,274,394	(1)	2,242,526	(1)	13
Shirtings, not elsewhere reported.....	66.8	8,034,746	56,044	11,757,027	68,745	23
Twill.....	(1)	(1)	(1)	(1)	(1)	15
Voiles.....	81.3	2,882,909	13,889	4,102,476	21,197	23
Other (including cotton crepes).....	32.5	3,175,696	67,254	3,263,746	58,742	30
Fine carded goods:						
Carded colored-yarn shirtings.....	100.0	230,809	85,011	450,533	162,735	4
Other fine carded goods.....	68.7	4,391,481	(1)	9,399,704	(1)	17
Napped fabrics:						
Blankets (except crib):						
Jacquard.....	100.0	7,217,755	(1)	15,287,234	(1)	4
Not Jacquard.....	76.7	6,904,804	(1)	18,342,904	(1)	10
Blankets, crib.....	(1)	(1)	(1)	(1)	(1)	8
Blanketings.....	(1)	(1)	(1)	(1)	(1)	6
Flannels:						
Canton.....	68.9	5,245,938	1,193,106	19,787,813	3,826,396	12
Interlining.....	66.0	3,161,913	114,399	9,331,670	331,465	17
Outing.....	41.2	10,031,847	165,922	23,764,268	421,338	25

See footnotes at end of table.

## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States	Number of establishments		
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		(7)	All companies (8)	4 leading companies (9)
							(1)			
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>										
Cotton woven goods over 12 inches in width—Continued.										
Napped fabric—Continued.										
Moleskin.....	( <sup>1</sup> )	74.0	4, 185, 032	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	6	7	6	5
Other napped fabrics.....							16	17	16	4
Print-cloth-yarn fabrics:										
Carded broadcloth.....	( <sup>1</sup> )	39.2	9, 610, 176	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	29	32	29	6
Pajama checks.....	( <sup>1</sup> )	41.1	( <sup>2</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	6	7	6	5
Print cloth, narrower than 36 inches, plain.....		46.0	3, 699, 987	14, 046			11, 101, 328	31	11, 101, 328	7
Print cloth, 36 inches and wider, plain.....		22.3	26, 328, 052	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	23	23	23	7
Print cloth, fancy.....		74.2	5, 287, 521	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	83	113	83	15
3-leaf twills, 40 inches and narrower, (except jeans).....		62.0	4, 276, 738	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	10	10	10	4
Tobacco and cheesecloth and gauze.....		77.2	13, 780, 108	115, 562			11, 507, 787	19	11, 507, 787	7
Sheetings, narrow, and allied coarse medium-yarn fabrics:										
Birdseye diaper cloth.....		84.6	1, 754, 484	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	9	10	9	5
Drills, 40 inches and narrower.....		39.4	9, 641, 082	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	47	60	47	11
4-leaf twills, 40 inches and narrower.....		66.9	5, 701, 055	100, 514			21	21	21	12
Jeans.....		44.0	2, 543, 319	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	19	25	19	7
Osnaburgs, all widths.....		35.5	5, 759, 214	20, 862			23, 045, 473	49	23, 045, 473	7
Sateens, heavy-warp 40 inches and narrower, and carded filling sateens.....		72.8	4, 496, 042	68, 657			13, 455, 451	22	13, 455, 451	6
Sheetings, 40 inches and narrower.....		19.1	13, 884, 025	50, 109			49, 979, 027	120	184, 699	6
Specialties:										
Bedspreads:										
All-cotton:										
Jacquard-figured.....		72.7	2, 960, 899	102, 880			6, 548, 941	13	269, 462	4
Seamless-woven.....		74.4	1, 680, 209	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	3, 726, 792	11	( <sup>1</sup> )	5
Cotton-warp, rayon, etc.....		72.3	2, 040, 148	7, 239			3, 467, 048	10	( <sup>1</sup> )	4
Drapery and upholstery fabrics.....		32.1	9, 645, 417	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	18, 882, 884	109	9, 886	5
Pile fabrics and cotton damask:										
Cordurys.....		70.8	6, 302, 954	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	12, 330, 747	11	( <sup>1</sup> )	4
Cotton table damask.....		77.4	2, 307, 587	65, 786			3, 567, 662	14	154, 988	4
Plushes, velvets, and velveteens.....		40.4	6, 562, 611	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	8, 338, 503	30	( <sup>1</sup> )	9
Rugs, cotton braided, except bath mats.....		86.7	403, 626	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	1, 173, 799	9	( <sup>1</sup> )	4
Other woven fabrics over 12 inches wide:										
All-cotton.....		25.9	3, 662, 924	22, 153			8, 571, 201	71	24, 148	4
Cotton-warp, rayon, or silk filling.....		71.9	3, 633, 037	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	3, 202, 381	19	( <sup>1</sup> )	5



Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments		
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com-panies (8)	4 leading com-panies (9)	
		28.7	---	2, 375, 658	360	---	---	163	165	5
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>										
Flags, banners, regalia, vestments, robes, and related products: Flags, banners, regalia, vestments, robes, badges, and similar emblems.....										
Hosiery: Boys', misses', and children's: Anklets and slack socks: All-cotton..... All- rayon and rayon with cotton tops, heels, and toes..... Rayon-and-cotton.....	30.6 (1)	26.3 70.2	2, 988, 592 (1) 1, 370, 029	3, 799 9, 319	2, 353, 522 (1) 1, 576, 885	2, 791 8, 172	52 9 15	55 9 22	4 4 4	
Seamless: All-cotton..... All-wool..... Rayon with cotton tops, heels, and toes and all- rayon. Rayon-and-cotton.....	32.0 100.0 81.9 51.3	33.5 100.0 84.1 50.8	2, 725, 578 15, 795 137, 880 478, 032	3, 981 9, 091 1, 598	2, 285, 821 4, 553 134, 089 423, 365	2, 542 8, 044 1, 078	57 4 8 26	62 4 11 26	9 4 5 4	
Infants': Anklets and slack socks: All-cotton, all- rayon, and rayon with cotton tops, heels, and toes..... Rayon-and-cotton.....	75.7 75.7	72.5 71.1	1, 200, 175 261, 313	11, 692 15, 877	1, 098, 289 235, 907	10, 841 16, 802	18 12	22 12	4 4	
Seamless: All-cotton..... All-pure-thread-silk..... Rayon with cotton tops, heels, and toes, all- rayon, and rayon-and-cotton.....	69.3 (2)	71.3 (2)	2, 470, 743 (2)	6, 685	2, 380, 122 (2)	6, 347	31 6	32 6	5 4	
Men's: Anklets and slack socks, all types..... Athletic and golf hose, all types..... Full-fashioned, all types..... Seamless, all types.....	81.3 41.5 66.5 69.1 21.2	83.1 36.9 70.4 68.9 13.2	411, 260 1, 902, 276 431, 713 680, 761 12, 526, 308	8, 612 7, 660 10, 031 5, 617 3, 633	411, 960 1, 283, 457 2, 757, 974 153, 324 5, 230, 717	9, 505 2, 910 2, 757 951 3, 227	18 67 14 12 366	19 96 19 34 481	4 4 5 4 10	
Women's: Anklets and slack socks: All-cotton..... All- rayon and rayon with cotton tops, heels, and toes, and rayon-and-cotton.....	82.6 83.8	83.4 86.5	562, 748 213, 643	705 (2)	648, 909 288, 037	651 (2)	15 11	15 11	4 4	



Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>									
Rayon broad woven goods (18 inches wide and over)—Continued.									
Filament-rayon and spun-rayon fabrics—Continued.									
Tapestries and draperies.....	(2)	(1)	8,340,486	7,200	7,458,097	8,123	36	10	8
Twills and serges.....	(1)	(2)	(1)	(2)	(2)	(1)	36	37	4
Velvets.....	(1)	(2)	5,721,952	26,249	6,718,084	16,475	7	7	5
Other filament-rayon and spun-rayon fabrics.....									
Rayon mixtures (warp primarily rayon by weight):									
Dress goods:									
Silk filling.....	83.3	82.5	2,867,667	94,207	1,087,841	20,496	13	17	8
Other filling.....	(1)	(2)	(1)	(2)	(2)	(1)	15	17	4
Novelties (other than dress goods).....	92.1	94.0	1,819,005	23,837	1,088,778	15,556	12	12	4
Pushes, cotton filling.....	(1)	(2)	(1)	(2)	(2)	(1)	7	7	4
Upholsteries, tapestries, and draperies (except velvets and plushes).....	59.5	62.7	1,707,157	(1)	1,735,291	(1)	25	25	4
Velvets.....	(2)	(1)	(2)	(1)	(1)	(2)	7	8	5
Shirts (except work shirts), collars, and nightwear—regular and contract factories:									
Blouses and shirts, boys'.....	37.0	34.5	4,416,522	5,782	767,306	762	47	71	13
Pajamas and nightshirts:									
Boys'.....	60.8	61.7	2,239,108		306,371		26	30	5
Men's and youths'.....	29.5	31.2	6,806,205	1,040	585,607	38	85	99	9
Shirts (except work), men's and youths'.....	22.5	18.5	28,975,767	2,806	2,236,085	255	303	364	28
Shirts, polo or sport or purchased knitted fabrics.....	34.1	28.4	1,200,562	3,907	203,072	1,485	44	48	5
Silk broad woven goods (18 inches wide and over):									
Silk:									
Flat crepes.....	59.6	53.5	3,725,193	6,830	1,047,325	2,288	36	39	5
French crepes.....	91.9		1,295,613	22,316			13	15	6
Georgettes.....	47.6		1,454,975	17,889			28	33	6
Lingerie satins.....	76.8		3,186,669	(1)			15	16	5
Necktie fabrics.....	60.1	55.5	1,388,024	51,291	276,763	6,634	30	22	5
Satin crepes.....	52.2		2,116,221	19,678			30	37	6
Triple sheers.....	68.5	73.1	2,065,613	12,880	786,706	3,147	23	25	6
Velvets and plushes.....	100.0	100.0	30,514		4,029		3	3	3
Other silk fabrics.....	37.1		4,493,579	7,519			63	61	6

	88.7	92.9	871,717	( <sup>1</sup> )	504,787	( <sup>1</sup> )	10	4
	49.8	72.8	2,799,045	30,518	978,295	6,377	24	6
	( <sup>1</sup> )	16	4					
	( <sup>2</sup> )	72.0	208,510	( <sup>1</sup> )	99,666	( <sup>1</sup> )	6	6
	( <sup>2</sup> )	( <sup>1</sup> )	13	6				
Silk shirtings:								
Linings, including taffetas and twills								
Necktie fabrics								
Upholsteries, tapestries, and draperies (except velvets and plushes)								
Velvets								
Other silk mixed fabrics								
Woolen woven goods, including woven felts, and worsted woven goods:								
Auto cloths, woven wholly or in part of woolen or worsted spun yarns:								
With pile								
Without pile								
Bathrobe flannels, all-wool woolen, all-wool woolen worsted, and all other								
Billiard cloths								
Blankets, bed and camp, except crib:								
25 to 98 percent wool or similar animal fibers								
98 percent or more wool or similar animal fibers								
Coatings, women's wear:								
All-wool woolen								
All-wool woolen worsted								
Woolen or worsted filled								
Other woolen (except all-wool)								
Interlinings, with and without horsehair								
Necktie and other linings								
Overcoatings and topcoatings, men's wear:								
All-wool woolen								
All-wool worsted								
Woolen or worsted filled								
Other woolen (except all-wool)								
Shirtings, all-wool woolen, all-wool worsted, and all other								
Snow and ski suit cloths, all-wool woolen, other woolen, and all other								
Suits and dress fabrics, women's wear:								
All-wool woolen								
All-wool worsted								
All-wool woolen worsted								
Woolen or worsted filled, other woolen and worsted (except all-wool)								
Suits and pantings, men's wear:								
All-wool woolen								
All-wool worsted								
Woolen or worsted filled								
Other woolen (except all-wool)								
Woolen or worsted filled								
Other woolen (except all-wool)								
Other worsted (except all-wool)								

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>									
Woolen woven goods, including woven felts, and worsted woven goods—Continued.									
Undercollar cloths, all-wool woolen, other woolen, and all other	74.5	55.6	1,518,790	(1)	1,069,575	(1)	9	9	4
Woolen felts, papermakers	59.0	47.1	7,462,846	1,883,483	1,973,931	738,903	12	12	4
Woolen and worsted yarn:									
Spun on Bradford system:									
Hand-knitting yarns	70.9	74.4	4,320,807	109,177	3,708,514	98,001	18	18	4
Machine-knitting yarns	42.5	44.6	11,505,210	83,542	9,901,919	87,740	36	38	6
Spun on French system: Machine-knitting yarns	54.2	55.4	6,715,422	376,352	4,465,971	277,387	17	18	5
Mill waste	28.6		1,178,363	439			106	150	6
<b>FOREST PRODUCTS GROUP</b>									
Cork products:									
Gaskets, disks, washers, and washers	(1)		(1)				7	7	4
Insulation products, blocks, slabs, pipe coverings, etc.	87.4		7,238,308				9	10	5
Stoppers, all kinds	80.5		2,963,099				17	17	4
All other, including life, life-preservers, finished articles of natural and artificial cork, and ground and granulated cork and cork waste	84.7		5,150,604				19	22	7
Furniture, including store and office fixtures:									
Household:									
Fiber, rattan, reed, and willow:									
Bedroom	(1)		(1)				6	6	4
Juvenile	81.0		200,708	(1)			11	11	4
Living-room and library:									
Chairs and rockers, upholstered:									
Full-up or occasional	92.0		362,228	(1)			10	10	4
Other	100.0		59,125				3	3	3
Chairs and rockers, not upholstered:	(1)		(1)				6	6	4
Davenport, sofas, day beds, etc.	87.2		528,810	7,481			13	14	6
Desks	100.0		2,317				4	4	4
Suites, upholstered	67.3		257,944	16,296			12	12	4
Tables	(1)		(1)				5	6	5



Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of com- panies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com- panies (8)	4 leading com- panies (9)
<b>FOREST PRODUCTS GROUP—continued</b>									
Furniture, including store and office fixtures—Continued.									
Household—Continued.									
Wood—Continued.									
Living room and library—Continued.									
Cabinets:									
Radio and phonograph.....	31.9		6,710,658	166			59	91	4
Sewing machine.....	(1)						13	13	4
Other and not specified.....	57.1		1,441,371	807			66	66	4
Chairs and rockers, upholstered:									
Pull-up or occasional.....	16.9		2,323,407	329			251	255	7
Other than pull-up or occasional.....	23.1		1,383,838	831			137	137	4
Chairs and rockers, not upholstered.....	23.2		1,046,865	392			70	71	4
Davenport, sofas, day beds, studio couches, etc., upholstered.....	16.9		6,366,752	365			561	572	8
Desks.....	28.2		1,258,169	375			176	183	6
Furniture frames.....	15.2		1,192,148	(1)			158	158	4
Suites, Upholstered.....	17.0		12,988,214	21,172			523	635	13
Suites, davenport, sofas, day beds, etc., not upholstered.....	60.0		1,184,891	605			61	61	4
Tables.....	25.4		3,960,181	230			281	284	5
Lockers:									
Metal.....	71.6		3,553,081	71,222			21	21	4
Wood.....	(1)						5	5	4
Office furniture:									
Metal:									
Chairs.....	87.7		2,505,657	26,577			15	15	4
Desks.....	72.7		4,120,421	8,289			29	30	5
Filing cabinets and cases.....	49.4		10,252,718	29,790			44	46	6
Wood:									
Chairs.....	39.0		2,497,224	341			88	90	4
Desks and tables.....	27.3		2,875,830	175			118	119	4
Filing cabinets and cases.....	74.6		904,793	90			40	40	4
Professional furniture and equipment:									
Barber shop:									
Metal chairs, hydraulic.....	100.0		145,741				3	4	4
Wood and fiber cabinets and cases.....	78.4		207,279	1,505			15	16	5



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)				Total quantity product		Number of companies in United States (7)	Number of establishments		
	Value (1)	Quantity (2)	4 leading companies (3)		4 smallest companies (4)		4 leading companies (5)			4 smallest companies (6)		
			(8)	(9)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PAPER AND ALLIED PRODUCTS GROUP												
Paper and paperboard:												
Absorbent paper:												
Blotting.....	70.1	69.6	1,532,629	132,850	8,214	834		12	14			
For vulcanized fiber.....	(1)	(1)	(1)		(1)			7	9			
Other (including paper for parchmentizing).....	65.7	65.0	9,758,090	48,815	57,047	306		32	36			
Boards:												
Binders' board.....	91.6	91.0	3,300,337	(*)	47,262	(*)		9	13			
Bristol board.....												
Index.....	45.6	42.1	1,181,410	84,494	8,602	622		21	22			
MHI (including specialties).....	75.8	74.2	3,971,700	54,999	34,356	444		18	19			
Container boards:												
CL-9 (plain and test).....	41.8	39.8	7,706,531	9,720	201,365	180		57	73			
Liners:												
Jute.....	46.0	44.0	19,868,835	206,000	448,642	3,820		33	53			
Kraft.....	69.5	70.3	31,744,998	132,672	2,011	2,011		25	33			
Other.....	62.5	67.9	4,209,581	20,862	99,795	423		23	29			
Straw (for corrugated-container use).....	45.0	44.5	7,594,733	345,779	196,426	8,421		25	36			
Other.....	90.9	92.4	3,113,218	(1)	68,915	(1)		11	12			
Folding boxboards (bending):												
Manile-lined (all lined boards).....	32.2	32.1	13,240,534	35,363	256,004	613		57	77			
Patent-coated.....	41.8	40.3	6,054,706	52,381	98,540	801		33	47			
Other.....	49.4	44.7	5,730,064	20,069	110,005	381		28	40			
Leatherboard.....	79.1	75.0	1,770,958	(*)	20,386	(*)		10	10			
Set-up boxboards (nonbending):												
Chip and straw.....	55.5	54.7	7,732,686	64,263	181,584	1,584		31	46			
Newsboard.....	36.4	35.8	3,692,698	28,388	90,045	566		30	54			
Other (including tube, egg-case, etc.).....	50.6	51.0	3,011,929	44,234	69,756	1,013		31	49			
Book paper:												
Converting:												
Body stock for coated paper, free from ground wood.....	42.9	43.5	10,415,088	108,167	121,870	1,139		26	31			
Other.....	81.9	79.5	3,951,019	(*)	41,543	(*)		11	15			
Lithograph.....	85.2	84.9	4,840,717	97,838	42,953	834		12	15			
Machine-finished, sized and super-calendered:												
Containing ground wood.....	96.4	98.9	15,015,796	(*)	187,700	(*)		11	14			
Free from ground wood.....	46.4	46.5	38,350,219	83,687	387,892	594		44	60			

Offset.....	39.4	35.8	3,242,404	65,623	21,652	506	28
Other.....	54.3	61.8	1,852,752	50,768	14,106	402	25
Building paper:							
Felts.....	43.2	41.4	12,021,666	113,663	217,038	2,757	41
Other than felts and sheathing.....	88.2	81.9	2,502,411	( <sup>1</sup> )	29,627	( <sup>1</sup> )	10
Cover paper.....	47.4	42.9	2,100,271	11,693	10,487	110	38
Ground-wood printing and specialty papers:							
Catalog.....	87.9	88.2	6,507,436	8,304	89,068	104	18
Hanging.....	67.3	69.0	6,238,831	45,051	87,504	477	20
Novel-news and news-tablet.....	80.3	81.3	2,408,064	53,901	52,323	1,053	17
Printing.....	(1)	(1)	(1)	(1)	(1)	1,053	19
Other.....	65.7	66.8	5,750,943	44,769	96,426	494	33
Newsprint, standard in rolls.....	68.1	69.0	23,908,456	23,657	640,838	603	26
Tissue paper:							
High-grade (cigarette, condenser, carbon, etc.).....	71.6	69.4	7,179,091	58,579	26,103	494	20
Napkin stock.....	40.9	33.5	2,349,285	99,119	21,401	1,427	30
Towel tissue.....	47.2	47.5	9,783,867	14,803	120,642	164	61
Toweling.....	61.9	62.7	3,956,257	21,721	58,458	244	28
Waxing (up to 18 pounds).....	55.5	60.4	1,922,631	26,381	16,183	192	23
Wrapping (up to 18 pounds).....	40.9	36.0	3,184,065	32,010	21,799	250	37
Wrapping paper:							
Bleached sulphite and bleached sulphate:							
Machine-glazed wrapping.....	78.0	78.3	2,950,220	832,422	27,922	7,735	10
Waxing (18 pounds and up).....	67.2	67.5	9,636,977	87,643	83,655	773	24
Other grades.....	65.1	67.0	5,988,653	33,148	62,631	341	29
Glassine.....	59.0	53.1	5,857,404	1,033,010	24,881	6,450	13
Greaseproof.....	61.6	57.4	1,724,388	76,926	8,583	424	13
Kraft:							
Machine-finished:							
Converting:							
Bag.....	61.6	63.4	21,921,750	137,633	318,263	1,331	34
Other.....	43.8	43.2	7,761,427	12,020	87,672	168	32
Wrapping.....	37.3	40.9	10,783,462	21,458	153,969	243	46
Machine-glazed, wrapping.....	(1)	(1)	(1)	(1)	(1)	641	6
Manila, wrapping and envelope.....	81.8	88.8	2,156,084	52,100	32,754	641	14
Rope and jute.....	72.7	71.3	2,277,492	( <sup>1</sup> )	12,103	( <sup>1</sup> )	9
Tagboard, light manila board and pattern.....	43.2	41.7	2,645,362	54,630	24,929	570	23
Unbleached sulphite and semi-bleached sulphate:							
Bag.....	71.7	73.4	5,456,084	80,330	76,099	905	16
Butchers and grocers paper.....	44.0	49.4	5,091,748	24,170	72,697	253	37
Other grades.....	76.7	76.8	3,257,690	2,123	33,445	28	30
Other wrapping paper.....	76.9	77.8	8,896,957	1,976	86,267	66	23
Writing paper (fine):							
100 percent rag.....	57.4	52.6	4,253,717	39,399	6,165	67	30
50 to 100 percent rag.....	40.8	43.1	4,222,724	123,487	13,382	391	26
Less than 50 percent rag.....	49.0	52.4	3,923,830	56,781	18,673	864	34
Sulphite bond.....	26.8	27.3	12,470,746	21,837	90,761	271	69
Other chemical wood-pulp.....	60.3	44.7	8,014,291	64,802	74,960	510	10
Other paper.....		61.4	6,893,773	28,061	40,108	619	4

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com- panies (8)	4 leading com- panies (9)
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>									
Ammunition and related products:									
Blasting and detonating caps.....	85.6		7,377,869	(1)			10	10	4
Cartridges (rifle, revolver, pistol), loaded paper shells, blanks, and other ammunition and parts.....	(1)		(1)						
Chemicals, n. e. c.:									
Acetates:									
Amyl.....	(1)	(1)	(1)		(1)		9	9	4
Butyl.....	86.9	88.2	4,420,324	(1)	8,212,194		9	9	4
Ethyl.....	68.2	67.1	1,989,812	(1)	4,673,374		9	10	5
Acetone.....	(2)	(2)	(2)		(2)		7	9	5
Acids:									
Acetic.....	73.4	68.1	4,853,029	132,644	89,603,512	3,714,604	15	22	9
Boric (boracic).....	100.0	100.0	1,545,304		40,524,000		3	3	3
Chromic.....	100.0	100.0	1,260,447		8,997,337		4	4	4
Citric.....	100.0	100.0	4,118,513		18,138,263		4	4	4
Hydrochloric.....					46,185	(1)	9	19	12
Made from chlorine, salt, and other.....	86.3	87.1	2,629,453	(1)	14,555	(1)	10	11	6
Mixed (sulphuric-nitric).....	85.5	80.2	803,965	(1)			9	20	14
Nitric.....	(2)	(2)	(2)		(2)		9	25	15
Oleic.....	81.3	88.1	2,483,871	137,289	31,187	841	12	25	15
Oxalic.....	68.1	67.2	2,455,664	(1)	25,592,431	(1)	12	12	4
Stearic.....	100.0	100.0	2,986,878		10,197,632		4	4	4
Stearic.....	64.9	66.4	2,372,218	(1)	21,176,459	(1)	12	12	4
Sulphuric:									
Chamber process.....	60.6	60.9	11,239,471	91,601	1,654,987	13,848	28	69	12
Contact process.....	66.7	65.7	15,775,601	35,762	1,972,144	3,586	28	66	26
Tartaric.....	100.0	100.0	2,484,625		10,642,838		4	4	4
Alcohols:									
Butyl.....	(1)	(1)	(1)		(1)		7	8	4
Methyl, synthetic.....	100.0	100.0	8,619,238		31,606,320		4	4	4
Ammonia:									
Anhydrous.....	89.5	87.8	7,937,930	(1)	195,966,638	(1)	9	13	7
Aqua and liquor.....	71.5	62.5	936,979	23,505	15,950,488	1,250,236	21	34	10
Bicarbonates and carbonates:									
Calcium carbonate (precipitated chalk).....	(2)	(2)	(2)		(2)		7	8	5



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
	<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>								
Chemicals, n. e. c.—Continued.									
Sodium silicate:									
Liquid.....	(3)	(3)	(3)	-----	(3)	-----	8	25	20
Solid.....	(3)	(3)	(3)	-----	(3)	-----	8	13	9
Sodium sulphide.....	78.2	80.6	1,196,809	(1)	21,979	(1)	11	11	4
Sodium sulphite, formaldehyde and zinc-hydro.	(3)	(3)	(3)	-----	(3)	-----	6	7	4
Sulphates:									
Aluminum (concentrated alum).....	81.8	82.5	7,333,015	(1)	324,503	(1)	10	22	14
Ammonium.....	75.9	77.4	1,835,233	54,150	78,098	2,237	17	18	4
Copper (blue vitriol).....	82.4	81.1	3,201,943	36,852	63,985,538	610,753	13	15	5
Magnesium (Epsom salt).....	100.0	100.0	1,216,748	-----	41,369	-----	4	4	4
Sodium hyposulphite (thiosulphate).....	(3)	(3)	(3)	-----	(3)	-----	5	9	8
Sodium salt cake (crude).....	63.0	63.4	1,492,937	55,958	153,071	6,027	17	27	12
Zinc.....	(3)	(3)	(3)	-----	(3)	-----	10	10	4
Sulfur, refined.....	(3)	(3)	(3)	-----	(3)	-----	11	17	9
Vitreous enamels (grit).....	88.7	91.8	6,054,179	(1)	101,773,106	(1)	13	13	4
Compressed and liquified gases:									
Ammonia, anhydrous.....	89.5	87.8	7,937,930	(3)	195,966,638	(3)	9	12	7
Carbon dioxide (not including "dry ice").....	(1)	(1)	(1)	-----	(1)	-----	21	61	33
Carbon dioxide, solidified ("dry ice").....	65.1	55.6	3,009,136	36,049	174,052,514	1,859,632	20	42	25
Chlorine.....	59.4	64.9	6,188,450	257,885	185,594	6,107	16	22	7
Hydrogen.....	66.1	30.8	1,221,618	16,691	339,828	87,007	16	41	17
Hydrocarbon gases:									
Acetylene.....	92.7	95.5	17,762,865	56,501	1,443,082	1,845	23	130	101
Liquefied petroleum gases.....	70.0	68.2	2,730,789	47,494	70,133	1,696	16	24	6
Methyl chloride.....	100.0	100.0	1,043,195	-----	3,389,125	-----	4	4	4
Nitrogen oxide.....	90.5	87.3	1,008,445	105,068	12,369	-----	8	11	7
Oxygen.....	91.4	89.0	23,838,930	138,073	3,955,369	15,232	26	170	144
Sulfur dioxide.....	(3)	(3)	(3)	-----	(3)	-----	6	6	4
Drugs and medicines:									
Medicinal products sold direct to or prescribed by physicians:									
Alkaloids and derivatives:	(3)	(3)	(3)	-----	(3)	-----	5	6	5
Caffeine.....	(3)	(3)	(3)	-----	(3)	-----	5	6	5
Strychnine.....	(3)	(3)	(3)	-----	(3)	-----	5	6	5



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value	Quantity	4 leading companies	4 smallest companies	4 leading companies	4 smallest companies		All com-panies	4 leading com-panies
	(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>									
Drugs and medicines—Continued.									
Medicines in specially prepared packages made for sale to the general public—Continued.									
Liquid preparations (tinctures, fluid extracts, slrups, elixirs, solutions, etc.):									
U. S. P. and N. F.	55.4		7,430,236	(1)			127	136	9
Not U. S. P. and N. F.	34.5		21,399,407	227			399	428	17
Ointments, cerates, suppositories, globules, etc.:									
U. S. P. and N. F.	61.6		1,125,043	177			107	109	4
Not U. S. P. and N. F.	40.9		8,553,344	458			231	273	9
Pharmaceutical metals and their salts:									
U. S. P. and N. F.	(1)		(1)				7	7	4
Not U. S. P. and N. F.	(1)		(1)				25	27	4
Synthetic chemical medicinals, including U. S. P. and N. F. and other.	(1)		(1)				12	12	4
Vitamin products:									
U. S. P. and N. F.	74.0		2,529,184	2,998			36	38	5
Not U. S. P. and N. F.	55.2		6,793,923	882			51	58	6
	28.5		2,457,408	166			129	133	6
Poultry and animal remedies (except biological products):									
Fertilizers:									
Bone meal.	49.9	53.1	958,431	441	45,062	19	50	68	9
Complete fertilizers (mixtures containing nitrogen, phosphoric acid, and potash)	25.0	28.2	32,150,393	430	1,599,423	18	531	802	102
Fish scrap.	17.2	16.6	793,277	1,723	21,156	42	97	103	6
Superphosphates:									
Ammoniated (including urea and ammonium-nitrate solu-tions)	71.4	70.5	521,509	925	33,153	30	30	46	17
Not ammoniated (including concentrated phosphates)	45.0	41.3	12,534,041	4,711	1,284,964	341	73	175	66
Superphosphate, potash (mixtures)	36.3	33.3	1,617,773	273	75,127	16	140	261	51
Other ammoniated fertilizers (nonpotash)	57.7	58.3	146,724	260	7,692	9	35	37	4
Tankage.	44.0	42.3	2,124,323	541	75,976	15	107	118	5
Paints, pigments, and varnishes:									
Dry colors and pigments:									
Chemical pigments:									
Chrome greens, C. P.	62.3	62.8	1,105,774	9,993	4,864,467	44,952	18	20	4
Chrome yellows and oranges, C. P.	72.0	71.1	2,831,744	22,803	20,246,043	156,646	20	21	4

Iron blues (Prussian), C. P.	67.1	1,486,798	4,595	4,139,135	14,189	23	4
Lead oxides:							
Litharge	(1)	(1)		(1)		5	4
Red lead, minium, and other	(1)	(1)		(1)		6	4
Lithopone	52.9	13,020,184	(2)	171,865,572	(2)	10	7
Zinc oxides (Chinese white, zinc white)	84.3	13,372,910	(1)	271,497,310	(1)	18	8
Other oxides	(1)	(1)		(1)		11	8
Lakes:							
Coal-tar color lakes:							
Alizarine	71.7	76,022	7,166	48,476	15,129	13	4
Azo bordeaux	60.5	71,966	3,461	208,266	13,945	14	4
Lithiorubine	86.4	89,750	8,232	364,930	8,232	15	4
Peacock blue	60.8	294,691	4,387	537,680	7,342	23	4
Persian orange	61.7	100,313	251,149	251,149	2,180	21	4
Pigment scarlet	88.3	141,202	2,656	244,336	3,913	15	4
Scarlet 2r	67.3	149,277	2,565	521,772	7,431	17	4
Phosphotungstic-acid lakes, all	72.4	432,398	2,515	375,349	3,646	22	4
Toners, full strength:							
Eosine and phloxine	88.7	453,900	(1)	405,918	(1)	12	4
Lake-red C	66.0	234,607	34,521	266,886	28,026	15	4
Lithol. C. P.	72.3	1,144,058	21,553	1,586,936	28,109	16	4
Lithol-rubine	79.2	860,206	3,322	86,452	2,300	14	4
Methyl-violet	53.6	147,638	(1)	114,865	883	15	4
Para, C. P.	71.5	606,345	15,053	809,232	20,011	19	4
Phosphotungstic acid:							
Blue	61.1	351,879	11,137	105,577	4,125	22	4
Green	58.5	230,327	9,113	82,863	4,420	21	4
Purple	49.3	92,507	2,391	49,751	1,539	22	4
Other	79.6	154,778	1,582	118,055	802	17	4
Red, all other	63.1	291,083	6,357	248,578	5,476	21	4
Toluidine, C. P.	62.3	77,810	15,147	578,224	11,823	24	4
Other	(1)	(1)		(1)		13	4
Toners, reduced:							
All reduced organic reds	43.5	108,330	5,114	305,961	27,250	22	4
All other reduced organic toners	80.5	184,856	(1)	412,884	(1)	11	4
Whiting	73.0	632,097	(1)	93,952,980	(1)	10	4
Fillers:							
Dry	71.4	132,074	272	12,648,494	5,716	24	4
Liquid	41.0	96,926	51	55,556	52	129	6
Paste	59.0	995,901	28	8,300,520	328	229	10
Paints:							
Paste paints:							
Colors in oil	26.7	1,179,709	42	6,056,065	465	355	18
Colors in Japan	39.4	202,714	19	788,086	87	113	10
Combination or graded whites	59.0	5,107,031	315	38,478,337	4,106	200	12
Red lead in oil	66.5	379,867	117	2,996,078	93	85	9
White lead in oil, pure	89.8	12,824,208	102	123,323,383	1,031	109	12
Zinc oxide in oil	(1)	(1)		(1)		131	12
Other	30.8	1,085,008	165	9,733,352	1,541	148	21

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smaller companies (6)		All companies (8)	4 leading companies (9)
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>									
Paints, pigments, and varnishes—Continued.									
Plastic paints.									
Ready-mixed and semipaste paints:	60.5	56.3	668,125	125	8,756,009	1,346	59	89	5
Paints in oil, ready-mixed:	28.0	26.5	22,209,783	170	12,673,657	130	598	661	28
Stains (not varnish stains):	28.1	28.3	1,169,024	105	1,097,819	125	331	379	17
Undercoatings and primers:	40.2	40.0	5,961,073	476	6,021,284	287	404	462	14
Wall paints and mill whites, flat or gloss:	32.8	30.0	12,505,004	281	7,910,908	202	483	539	23
Other:	28.4	26.7	7,715,716	362	5,349,908	282	384	440	21
Water paints and calciums, dry or paste:	30.4	46.5	3,001,192	104	70,167,262	9,876	89	101	11
Putty:	28.7	23.8	1,056,892	174	27,033,548	2,216	189	223	7
Shellac, bleached:	63.3	63.8	1,686,833	1	9,347,121	12,833	31	31	4
Varnishes, lacquers (including enamels), and japans:									
Enamels:									
Oil, ester-gum, and natural-resin, varnish base:	29.5	35.0	11,626,579	591	8,568,307	328	412	468	30
Synthetic-resin (oil, straight or modified):	59.4	58.4	21,626,695	418	10,628,383	430	250	283	26
Japans:									
Baking:	39.5	37.6	991,634	285	1,228,693	445	94	113	10
Drying japans and driers:	41.5	40.0	1,222,529	117	1,402,738	159	210	240	20
Nitrocellulose (pyroxylin) products:									
Lacquers, clear:	22.5	28.4	5,063,678	655	3,864,174	407	290	220	10
Lacquers, pigmented:	43.7	39.1	12,458,480	407	5,842,830	290	212	230	14
Lacquer bases and dopes:	56.0	53.6	2,663,265	97	2,174,677	82	67	74	6
Thinners:	49.8	55.7	7,780,405	717	13,444,076	1,461	229	257	17
Varnishes:									
Spirit, not turpentine:	21.3	20.6	1,862,500	468	1,738,639	437	189	220	12
Synthetic-oleoresinous, straight or modified (100% synthetic resin):	28.6	24.3	7,302,101	506	5,619,634	317	313	313	23
Other resinous except synthetic (100% natural resin):	30.2	23.6	5,039,336	887	3,762,462	826	276	260	15
Other varnishes:	25.1	18.2	3,445,890	124	3,995,058	205	215	240	8
Varnish stains:	32.8	28.4	1,169,060	75	613,302	84	285	328	17
Other products of the varnish group:	53.6		2,524,074	1,062			80	93	9
Rayon and allied products:									
Rayon staple fiber:	70.9	75.6	782,817	19,878	8,455,419	182,473	7	9	4
Rayon waste:							15	20	9

Rayon yarns, by denier:	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)	(77)	(78)	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)	(89)	(90)	(91)	(92)	(93)	(94)	(95)	(96)	(97)	(98)	(99)	(100)																																																																																																																																																																																																																																																												
75 and finer (87 and less)	78.4	79.1	35,710,903	203,985	46,347,687	239,365	13	13	11	12,863,642	19	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																												
100 (88-112)	86.2	88.5	8,768,193	(1)	1,671,107,835	(1)	6	6	1,671,107,835	9,455	6	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																												
125 (113-137)	72.9	71.4	77,574,359	1,113,331	1,366,128,654	(1)	10	10	1,366,128,654	77,599	13	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																																		
150 (138-162)	83.4	82.7	5,385,373	(1)	8,124,518,789	(1)	11	11	8,124,518,789	17,503	136	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500																																																																													
200 (163-249)	78.4	77.6	10,426,852	(1)	1,157,295,909	(1)	15	15	1,157,295,909	45,951	120	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500																																																												
300 (250-374)	78.4	77.6	10,426,852	(1)	7,860,373	3,300	15	15	7,860,373	26,487	28	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																																																							
450 and coarser (375 and over)	78.4	77.6	10,426,852	(1)	459,295,338	32,344	17	17	459,295,338	548,302	48	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	4

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>RUBBER PRODUCTS GROUP—continued</b>									
Rubber tires and inner tubes—continued.									
Tires and casings, pneumatic:									
Airplane.....	(?)	(?)	(?)	(?)	(?)	(?)	5	5	4
Motorcycle and bicycle:									
Casings.....	(?)	(?)	(?)	(?)	(?)	(?)	6	9	5
Single-tube tires.....	(?)	(?)	(?)	(?)	(?)	(?)	7	8	5
Passenger-car.....	76.5	76.9	193,869,568	725,259	35,097,494	102,296	26	36	14
Truck and bus.....	78.8	80.0	123,282,108	295,701	6,161,261	10,008	23	34	13
Other.....	97.3	82.5	2,307,589	59,961	585,529	124,171	8	9	4
Tires, solid and cushion:									
Industrial, truck, tractor, and trailer.....	(?)	(?)	(?)	(?)	(?)	(?)	7	7	4
Truck and bus for highway transportation.....	(?)	(?)	(?)	(?)	(?)	(?)	7	7	4
Rubber products other than boots and shoes and tires and tubes:									
Bands.....	70.2		1,227,638				15	15	4
Battery jars, boxes, etc.....	57.7		4,064,113				11	14	7
Belting, all types.....	52.4		16,798,797				38	38	4
Camelback.....	57.0		4,117,751				28	33	0
Cement.....			(1)				17	20	6
Combs.....	100.0		2,261,676				4	4	4
Erasers, except pencil plugs.....	67.4		698,525				11	11	4
Flooring (tile or sheet).....	62.6		1,668,267				17	17	4
Gloves, all types.....	62.2		1,894,347				18	21	5
Gutta-percha products.....	(?)		(?)				7	7	4
Heels.....	45.3		7,372,602				84	40	6
Hose, all types.....	47.0		16,874,893				43	45	5
Molded articles for motor vehicles.....	65.3		8,634,286				19	19	4
Mouthpieces for pipes and cigar and cigarette holders.....	100.0		(1)				4	4	4
Nipples and pacifiers.....	(1)		(1)				18	18	4
Miscellaneous hard-rubber goods.....	66.8		4,682,579				48	29	5
Reclaimed rubber.....	55.4		10,926,080				23	23	5
Rolls, rubber-covered (all sizes).....	52.9		2,570,484				26	25	6
Soles, including composition or fiber.....	54.8		5,888,812				33	35	4
Selling strips and top-lift sheets.....	69.9		1,451,288				17	19	5
Sponge-rubber products, n. e. c.....	38.1		5,399,483				37	40	6
Thread.....	(?)		(?)				7	7	4



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
LEATHER AND ITS MANUFACTURES GROUP—continued									
Boots and shoes—Continued									
Part-leather and part-fabric uppers with leather soles:									
Cemented.....	23.9	22.2	4,555,221	10,066	2,003,196	5,558	103	111	6
McKay.....	37.3	29.4	3,814,650	63,246	1,289,306	32,915	43	50	10
Turned.....	72.3	65.4	494,716	8,844	68,062	1,853	16	16	4
Welled.....	56.6	41.3	2,543,452	(1)	474,667	(1)	29	31	4
Slippers and moccasins for house wear, all-leather:									
Cemented.....	36.0	25.3	1,396,306	(1)	804,099	(1)	35	35	4
McKay.....	49.2	47.9	1,197,308	7,459	983,686	6,944	27	27	4
Stitchdown.....	45.0	49.1	852,353	18,489	1,167,027	21,576	25	25	4
Turned.....	63.3	56.7	2,746,502	13,097	2,391,623	20,480	28	28	4
Welled.....	65.6	57.3	1,186,221	1,706	1,184,301	1,002	21	21	4
Slippers and moccasins for house wear, other than all-leather:									
Cemented.....	39.6	43.5	1,994,029	60,574	4,173,878	49,042	31	32	4
McKay.....	82.7	81.3	2,065,969	14,000	4,190,315	19,960	18	19	5
Stitchdown.....	61.7	57.4	1,470,511	47,489	3,104,485	77,893	19	19	4
Turned.....	50.0	48.9	3,526,883	100,686	2,752,990	272,758	23	24	5
Welled.....	88.6	92.7	1,630,839	8,905	2,608,828	9,283	13	13	4
Women's:									
Cemented.....	19.8	15.0	22,808,573	20,732	8,703,358	10,749	175	198	14
McKay.....	34.0	27.3	32,080,364	9,570	13,181,002	7,323	139	167	21
Stitchdown.....	76.8	72.5	6,924,118	15,304	4,890,916	16,808	22	32	11
Turned.....	26.4	22.9	2,762,536	19,694	706,384	8,903	84	84	4
Welled.....	22.0	19.0	19,722,689	8,723	6,452,520	1,601	150	170	14
Wood-or-metal-fastened.....	(1)	(1)	(1)	(1)	(1)	(1)	10	10	4
Youths and boys:									
McKay.....	62.5	64.9	3,116,315	41,346	2,311,154	35,335	22	24	5
Stitchdown.....	76.0	72.4	2,475,042	21,353	2,139,286	21,883	18	24	8
Welled.....	45.8	42.8	6,365,497	1,666	3,162,109	683	66	76	10
Wood-or-metal-fastened.....	(1)	(1)	(1)	(1)	(1)	(1)	16	18	6
Leather, tanned, curried, and finished:									
Bag, case, and strap leather, finished grains (sides or equivalent sides).....	54.0	54.6	2,867,986	(1)	11,750,744	(1)	18	18	4
Collar leather (sides).....	83.7	89.9	1,264,059	9,018	4,360,201	26,642	16	16	4



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
							(1)		
<b>LEATHER AND ITS MANUFACTURES GROUP—continued</b>									
Leather, tanned, curried, and finished—Continued:									
Splits, other than wax and finished upper and upholstery:									
Splits for gloves.....	52.1	42.4	1,347,428	10,282	12,167,788	127,727	25	26	5
Splits for innersoles.....	63.6	70.1	1,573,200	121,853	17,357,120	589,394	13	14	5
Splits for linings.....	66.0	55.9	1,525,230	(1)	11,112,758	(1)	13	14	4
Other splits.....	63.0	49.1	1,801,738	7,735	10,590,016	171,558	35	35	4
Upholstery leather, finished:									
Splits (main and second pieces).....	78.4	76.2	1,497,608	18,011	10,568,949	112,699	15	15	4
Whole-hide grains and machine-buffed (hides).....	68.6	66.2	3,585,398	33,272	13,811,789	205,910	14	14	4
Upper leather:									
Calf and whole kip, excluding kip sides (whole skins).....	41.1	42.8	14,663,499	(1)	51,313,411	(1)	34	35	4
Cattle, including kip sides (sides).....	31.3	32.0	20,209,448	(1)	103,226,215	(1)	42	44	6
Goat and kid (skins).....	60.3	60.2	23,617,760	(1)	104,325,130	(1)	20	25	8
Horse, colt, ass, and mule (butts and shanks).....	93.4		1,255,361	(2)			9	10	5
Kangaroo and wallaby (skins).....	100.0	100.0	1,633,756		5,137,815		3	4	6
Wax and finished splits (pieces).....	52.3	51.0	4,462,261	21,649	29,434,638	241,739	23	26	0
Other.....	77.5	64.9	1,730,189	10,787	5,459,784	158,004	13	17	5
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>									
Asbestos products, steam and other packing, pipe and boiler covering, and gaskets:									
Blocks, molded.....	84.6	86.4	689,857	(2)	2,751,639	(2)	11	13	6
Brake lining:									
Molded.....	75.2	78.2	6,182,506	123,957	46,885,362	1,646,988	15	18	7
Not molded.....	64.9	64.8	4,097,440	97,618	30,113,243	560,026	26	31	6
Cement, insulating.....	68.9		469,461				19	21	6
Cloth.....	75.6	80.7	1,655,006	22,838	6,299,124	69,655	14	16	5
Clutch facings:									
Molded.....	90.7	96.3	2,924,911	(2)	38,714,046	(2)	9	10	5
Not molded.....	92.2	92.4	3,182,718	(2)	13,945,619	(2)	11	11	4
Gaskets.....	47.5	48.8	407,566	9,641	752,835	17,563	37	46	8
Mlinboard.....	72.0	68.0	609,196		11,667,441		12	13	5
Miscellaneous textiles.....	67.2		550,364	11,687			19	20	5



Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com-panies (8)	4 leading com-panies (9)
STONE, CLAY, AND GLASS PRODUCTS GROUP—continued									
Clay products, other than pottery—Continued.									
Tile—Continued.									
Hollow building tile:									
Conduit tile.....	92.4	80.5	249,383	1,770	15,378	227	12	14	4
Floor-arch, sill, and corner tile; radial chimney blocks; fire-proofing tile.....	45.0	46.4	281,589	2,077	43,880	151	30	33	4
Partition, load-bearing, furring:									
Glazed.....	71.5	45.5	1,581,257	762	85,119	285	41	45	6
Roofing tile.....	24.9	22.5	1,904,296	426	304,432	110	241	276	13
Wall tile, including trim.....	73.4	55.3	1,507,304	1,032	126,204	65	38	44	9
Vitrified brick and plates:	53.8	56.4	1,446,711	11,257	5,672,354	22,269	23	25	4
For paving.....	44.4	36.6	909,307	2,439	30,956	144	44	56	8
Sewer liners.....	(1)	(1)	(1)	(1)	(1)	(1)	6	8	5
Wall coping.....	50.4	46.8	148,438	215	9,833	13	44	54	13
Concrete products:									
Brick.....	32.4	29.7	112,879	59	14,669	11	93	95	4
Circular structures.....	82.0	76.5	1,245,612	928	48,750	107	24	29	9
Cast stone.....	19.9	14.9	450,287	120	13,716	4	129	129	4
Concrete, premixed.....	20.9	(1)	4,902,997	101	(1)	(1)	141	160	8
Conduits, electric.....	(2)	(1)	(1)	(1)	(1)	(1)	5	5	4
Laundry trays.....	38.4	37.3	261,841	2,388	10,923	103	32	37	7
Paving materials.....	88.7	79.8	596,961	3,500	125,669	457	13	15	6
Filling.....	(1)	(1)	(1)	(1)	(1)	(1)	10	15	9
Pipe:									
Culvert.....	30.3	25.9	2,032,368	864	148,527	84	169	251	30
Irrigation.....	27.5	25.4	550,612	2,292	43,445	167	76	89	9
Pressure.....	(1)	(1)	(1)	(1)	(1)	(1)	23	33	11
Sewer.....	34.0	33.9	1,944,124	600	181,347	36	126	186	22
Poles and posts.....	69.8	36.8	344,421	128	5,883	9	48	54	5
Squares for walls, ceilings, etc.....	(2)	(1)	(1)	(1)	(1)	(1)	8	8	4
Septic tanks.....	37.9	25.6	81,624	146	2,314	6	90	96	5
Tile:									
Art marble and Spanish floor tile.....	79.4	87.2	167,957	(1)	19,070	(1)	11	11	4
Building block and tile, except roofing.....	7.9	7.0	1,175,893	324	163,387	27	625	636	8

Drain tile.....	35.6	29.4	227,514	137	20,876	14	124
Roofing tile.....	93.9	93.3	1,808,457	718	69,121	23	24
Vaults.....	15.8	16.1	352,684	120	17,008	5	262
Glass:							
Containers for beverages:							
Beer bottles.....	(1)	(1)	19,234,589	17,797	(1)	5,432	11
Liquor ware (including wines and cordials).....	63.1	59.2			4,919,086		31
Containers for food-products:							
Fruit jars (herme-pack).....	(2)	(2)	12,736,431	130,604	(2)	26,071	6
Milk bottles.....	80.2	86.1	9,545,391	136,567	2,304,020		14
Narrow-neck (packers' ware).....	76.3	71.2	18,054,230	29,693	2,786,859	29,769	12
Wide-mouth bottles and jars (packers' ware).....	68.8	69.4	25,300,435	34,782	6,459,470	15,027	25
Containers for medicinal and toilet preparations.....	70.0	71.4			13,107,848	14,652	26
Flat glass:							
Obscured.....	(3)	(3)	26,070,587	(2)	(2)	(2)	7
Window.....	85.0	80.6			497,037,800	(2)	14
Other (including glass block or brick).....	(1)	(1)					33
Insulators.....	(2)	(2)					9
Lamp chimneys.....	58.3	57.3	805,276	9,584	1,264,896	15,054	5
Lantern globes.....	85.0	77.8	393,012	652	214,307	1,765	19
Lenses, motor-vehicle.....	80.1	81.3	1,405,777	(2)	2,300,706	(2)	12
Lighting glassware, miscellaneous including electric-light bulbs.....	(1)	(1)					14
Pressed and blown glassware not elsewhere specified (including glass cooking ware or ovenware).....	59.2		5,684,566				16
Shades, globes, reflectors, etc.....	49.4		4,526,152	8,305			31
Tableware:							28
Plates, dishes, and cups and saucers:							
Hand-made, pressed.....	69.1	59.8	986,260	10,559	68,150	1,107	13
Machine-made, pressed and blown.....	(2)	(2)			(2)		7
Tumblers, goblets, and barware:							
Hand-made:							
Blown.....	43.7	42.1	2,784,386	33,725	1,899,821	48,794	4
Pressed.....	71.7	57.2	1,017,499	9,713	528,305	6,811	4
Machine-made, pressed and blown.....	80.0	84.3	10,046,102	(2)	33,443,816	(2)	15
Tubing.....	(2)	(2)					8
Keene's cement.....	(1)	(1)					11
Plaster:							6
Calcined.....	72.4	(1)					5
Industrial.....	92.3	61.4	1,894,171		165,485		7
Molding and gaging.....	92.2	88.5	1,212,842	(2)	106,289	(2)	5
Neat.....	84.7	91.5	1,479,975				29
Prepared finish.....	69.4	83.4	9,111,724		993,776		39
Sanded.....	69.4	85.7	527,150		26,425		22
Other.....	70.5	81.8	818,055		118,478		31
Plaster board and lath.....	90.7	71.3	470,510				19
See footnotes at end of table.....		91.4	8,487,073	864,736	449,143	42,023	43
							24

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity, product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
	STONE, CLAY, AND GLASS PRODUCTS GROUP—continued								
Gypsum—Continued.									
Rock:									
Agricultural gypsum	85.8	84.5	148,309	-----	31,008	-----	13	35	19
For Portland cement	81.5	81.2	943,306	-----	375,291	-----	12	31	20
Other gypsum rock	(1)	-----	(1)	-----	-----	-----	8	11	7
Tile, partition and wall	84.7	82.9	706,768	-----	87,353	-----	13	26	15
Wallboard	93.4	92.8	7,809,601	(†)	242,631	(†)	9	30	24
Lime:									
Agricultural	33.2	22.6	729,226	-----	90,015	-----	83	105	8
Hydrated	34.3	30.5	3,324,785	-----	341,660	-----	119	146	14
Quicklime	22.1	22.2	3,284,316	-----	477,746	-----	144	167	9
Marble, granite, slate, and other stone, cut and shaped:									
Building stone:									
Granite, exterior use	34.7	-----	1,491,857	-----	-----	-----	104	105	4
Limestone:	-----	-----	-----	-----	-----	-----	-----	-----	-----
Exterior use	27.5	-----	2,587,201	-----	421	-----	152	159	8
Interior use	81.4	-----	351,300	-----	1,735	-----	20	21	4
Marble:									
Exterior use	64.7	-----	1,286,427	-----	455	-----	57	60	7
Interior use	33.7	-----	2,653,979	-----	129	-----	141	149	12
Slate:									
For roofing	38.0	-----	819,063	-----	-----	-----	44	44	4
Structural and sanitary	41.8	-----	173,338	-----	3,860	-----	30	36	4
Other:									
Exterior use	56.8	-----	711,784	-----	762	-----	46	49	5
Interior use	82.5	-----	257,307	-----	2,693	-----	17	18	5
Monumental stones:									
Granite	8.6	-----	3,071,042	-----	624	-----	905	914	7
Limestone	79.3	-----	30,747	-----	126	-----	28	28	4
Marble	36.0	-----	1,908,950	-----	153	-----	481	488	8
Other	91.3	-----	40,234	(†)	-----	-----	10	11	4
Ornamental stones and stones for miscellaneous uses:									
Granite:									
Curbing	63.0	-----	547,435	-----	513	-----	41	41	4
Paving blocks	85.5	-----	709,770	-----	658	-----	19	19	4
Rubble	74.1	-----	62,686	-----	493	-----	15	15	4



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
STONE, CLAY, AND GLASS PRODUCTS GROUP—continued									
Pottery, including porcelain ware—Continued									
Stoneware (except chemical) and yellow and Rockingham ware	50.7		958,283	9,677			43	44	4
White ware, including cream color, white granite, semiporcelain and semivitreous porcelain ware	42.2		10,844,703	125,308			32	35	4
Wallboard and plaster (except gypsum), building insulation, and floor composition	75.7	65.4	310,377		3,516		13	14	4
Floor tile, asphalt	( <sup>1</sup> )		( <sup>1</sup> )				6	6	4
Insulation board or rigid form of fiber composition and cellular fiber	82.1	80.5	17,611,067		642,502,222		15	16	4
Insulating mineral wool:									
Rock wool	73.3	77.8	3,659,867		196,977,255		23	27	8
Slag wool	91.6	88.8	2,266,991	208,304	96,030,428	12,111,018	8	11	6
Plaster:									
Magnesite stucco and Portland-cement stucco	48.0	30.7	154,898		6,248		31	36	8
Other non gypsum plasters	56.1		654,317				45	49	7
Wallboard (fiber board made of wood or other vegetable pulp; laminated lumber with paper liners)	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )		( <sup>1</sup> )		25	25	4
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP									
Cast-iron pipe and fittings:									
Fittings:									
Gas and water pipe fittings	53.1		2,034,870	47,456			22	31	10
Soil and plumbers' pipe fittings	43.2		2,837,755	31,315			45	56	13
Other cast-iron pipe fittings and those not reported separately by kind	56.2		8,887,874	6,339			47	61	8
Pipe:									
Ball and spigot	66.9	69.7	19,571,702	1,316,940	437,989	24,270	13	23	11
Culvert	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )		( <sup>1</sup> )		5	5	4
Flanged	85.6	83.7	651,359	109,383	9,353	1,819	8	13	9
Soil and plumbers'	45.0	47.2	4,312,420	297,701	115,605	7,326	29	40	13



Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com-panies (8)	4 leading com-panies (9)
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP—continued									
Heating and cooking apparatus, except electric:									
Boilers, steam and hot-water heating:									
Cast-iron.....	54.9		8,770,080	2,214			48	52	6
Steel.....	62.0		5,875,458	22,825			69	71	5
Boiler-burner units:									
Fuel oil.....	93.7	76.8	2,179,425	(1)	7,218	(1)	11	11	4
Gas.....	(1)		(1)				9	9	4
Brooders.....	57.5		1,749,429	789			47	47	4
Burners:									
Distillate-oil, for cooking and heating stoves.....	66.9	59.0	1,194,188	2,495	109,608	115	32	33	5
Gas:									
Commercial and industrial.....	69.8		811,084	1,421			29	30	5
Domestic (residence) type.....	72.3		1,408,701	6,663			23	23	4
Oil, commercial, mechanical and forced draft.....	79.5	64.5	531,584	3,174	2,872	114	20	20	4
Oil, domestic (for central heating systems and water heating):									
Atmospheric (natural) draft.....	89.6	82.1	122,319	(2)	2,937	(2)	11	11	4
Mechanical or forced draft.....	34.1	34.4	5,721,407	5,431	61,059	623	122	122	4
Oil, industrial.....	56.5		1,089,282	485			45	45	4
Cooking stoves and ranges:									
Coal and wood:									
Porcelain-enameled.....	27.9		4,971,821	1,296			114	115	4
Other than porcelain-enameled.....	25.1		1,465,902	346			94	94	4
Combination (coal, wood, and gas):									
Porcelain-enameled.....	45.6	43.2	3,672,120	1,291	41,915	23	53	53	4
Other than porcelain-enameled.....	(1)		(1)		(1)		13	13	4
Distillate and fuel oil.....	82.3	97.7	598,271	8,315	93,237		16	16	4
Gas:									
Porcelain-enameled, with ovens.....	36.1	35.6	20,841,857	963	405,941	31	82	85	6
Porcelain-enameled, without ovens.....	(2)	(2)	(2)		(2)		5	5	4
Other than porcelain-enameled, with and without ovens.....	80.5	72.1	1,626,750	3,726	19,134	46	22	23	5

Gasoline (except camp stoves), porcelain-enameled and other.....	79.9	71.7	2,436,434	57,483	75,300	2,128	12
Kerosene.....	78.8	68.2	10,770,162	37,273	810,464	6,851	13
Fittings, valves, and faucets.....	63.5		44,570,007	1,883			200
Furnaces, warm-air.....							
Assembled from purchased parts.....	65.0		1,072,899	4,162			30
Manufactured.....	33.4		8,965,484	526			166
Parts and registers.....	61.1		5,913,766	1,588			89
Furnace-burner units.....							90
Fuel oil.....	60.2	43.7	1,564,829	21,063	5,202	204	23
Gas.....	76.0		1,545,906	5,238			21
Heating stoves, coal and wood: Cast-iron and cast-steel.....							
Porcelain-enameled.....	29.1		3,066,495	1,273			96
Other than porcelain-enameled.....	20.0		1,050,650	260			100
Sheet-metal.....	71.0		773,986	1,674	488,525		24
Hot plates, gas.....	81.3		202,160	(1)	75,716	64	34
Inchometers.....	37.4	60.0					10
Incubators.....	97.9		1,380,404	(1)			10
Laundry, orchard, etc., stoves.....	64.6		1,644,245	22,982			22
Leubards.....	48.6		730,874	983			46
Parts for burners, oil and gas.....	47.8		1,039,990	712			46
Parts for heating boilers.....	68.0		891,736	9,407			20
Parts for stoves, ranges, and heaters: Coal and wood.....	20.7		491,489	1,968			89
Gas.....	37.4		984,784	806			58
Kerosene, distillate, and fuel oil.....	78.3		2,611,861	522			20
Portable ovens.....	72.3	71.5	525,320	(1)	438,264	(1)	20
Radiators: Cast-iron.....	61.0		9,003,088	207,166			22
Copper.....	83.4		1,898,388	(1)			11
Gas and oil-fired.....	100.0		67,316				3
Regulators.....	44.9		2,545,782	1,723			57
Room heaters: Gas.....	26.6		1,786,540	632			61
Kerosene and distillate: Pot-type, space heater.....	53.7	53.4	6,576,898	763	198,682	21	37
Sleeve-type.....	(1)	(1)			(1)		13
Wick-type, portable fuelless.....	(2)	(3)			(2)		14
Wickless type, portable fuelless.....	(1)	(1)			(1)		9
Steam tables.....	53.2		230,373	1,675			6
Thermostats.....	73.1		18,524,514	2,810			27
Traps.....	58.5		3,226,941	595			54
Unit heaters: Water heaters.....	50.2		3,611,799	9,465			51
Coal and wood, with storage tanks attached.....	77.0		494,743	13,083			32
Coal and wood, without storage tanks.....	61.0	60.0	862,702	192	111,636		12
Distillate-burning, pot-type and sleeve-type.....	82.0	90.4	355,677	1,327	12,225	32	42
Gas: With storage tanks attached.....	49.3	53.7	6,301,336	3,717	234,461	212	17
Without storage tanks.....	44.5		1,363,129	4,666			17

See footnotes at end of table.





Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
	<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP—continued</b>								
Structural and ornamental metal work, made in plants not operated in connection with rolling mills—Continued.									
Fire escapes.....	17.0		342,258	281			354	368	4
Gratings, treads, and flooring, steel.....	31.5		1,137,770	82			215	217	4
Grilles and railings.....	35.4		1,468,420	279			393	395	4
Lath, expanded metal.....	64.2		7,579,531	290			31	35	6
Ornamental bronze work.....	(1)		(1)	275			186	188	4
Ornamental iron and steel.....	12.8		1,650,745	250			508	511	4
Stairs and staircases.....	12.2		779,705				398	400	4
Structural steel, fabricated:									
For bridges.....	55.0		19,713,736	435			176	205	17
For buildings.....	24.9		30,236,394	650			634	668	21
Tin cans and other tinware, n. e. c.:									
Beer cans.....	(1)	(1)	(1)	93,073	(1)		5	17	16
Dairy milk cans.....	68.3	64.2	3,445,149		1,011,676		20	20	4
Sanitary cans including sweetened-condensed-milk cans.....	(1)	(1)	(1)		(1)		18	140	43
Venthole-top cans.....	88.8	90.3	14,319,409		1,624,871,856		8	19	13
Other cans and packages.....	74.8		97,571,806	53,779			108	182	51
Finished tinware other than cans.....	49.7		9,221,013	10,595			80	86	9
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>									
<b>Aluminum products:</b>									
Aluminum ware (except electrical appliances):									
Cast.....	90.5		5,740,641	42,325			14	14	4
Spun.....	78.7		473,992	(1)			11	11	4
Stamped.....	87.8		26,799,646	22,060			25	27	4
Castings, die.....	(1)		(1)				27	28	5
Castings, rough (not included with aluminum ware or motor-vehicle accessories).....	47.6	47.0	10,001,815	64	21,924,239	141	686	690	4
Ingot produced for sale (from pig and scrap).....	81.7	79.8	22,310,835	24,183	120,763,866	111,013	24	33	4
Motor-vehicle accessories and parts, and pistons for internal-combustion engines.....	71.5		12,881,721	201,248			15	15	4
Other aluminum products made for sale.....	(1)		(1)				61	67	4

Lighting equipment:	39.7	1, 177, 693	2, 404	73	73
Commercial fixtures:	28.3	1, 754, 963	4, 523	88	88
Auditorium, church, and theater	93.3	1, 884, 223	( <sup>1</sup> )	10	10
Public building, bank, store, office-building, school, etc. (other than window and showcase)	28.6	2, 754, 510	693	129	129
Industrial fixtures for factories, porcelain-enameled (including reflectors and shades)	29.0	914, 495	1, 994	104	104
Residence fixtures:	88.8	2, 353, 017	4, 421	14	14
Ceiling or chandelier type, except kitchen units	22.1	10, 888, 388		806	806
Wall or bracket type, except kitchen units	52.4	1, 160, 120		144	144
Heat-corrosion-resistant alloys (not including ferro-alloys)	75.5	2, 281, 261		34	34
Nickel alloys, other than heat-corrosion-resistant	76.0	1, 117, 793		60	60
Finished products:	52.0	22, 478, 630		101	101
Bearings and bushings (including antifriction linings)	79.1	322, 094	( <sup>1</sup> )	12	12
Bells	48.9	13, 730, 473		65	65
Castings:	41.5	1, 268, 656	5, 042	50	50
Die	66.9	4, 577, 497	435, 785	13	13
Finished, other than cooking utensils	45.3	1, 051, 041	( <sup>1</sup> )	65	65
Forged and hot-pressed parts	56.5	4, 408, 102		83	83
Spun ware	90.6	3, 507, 211		20	20
Ingots and pigs:	50.4	17, 893, 181		28	28
Antifriction-bearing metal:	89.5	8, 477, 601		47	47
White base	63.2	10, 580, 193		17	17
Other	58.7	17, 844, 474		16	16
Brass and bronze	83.1	4, 462, 202		25	25
Copper (secondary)	89.6	3, 548, 907		31	31
Lead (secondary)	56.7	4, 377, 848		5	5
Solders, all kinds	70.4	53, 033, 995		20	20
Tin (secondary)	73.3	32, 894, 442		81	81
Type metal	90.5	9, 067, 517		37	37
Zinc (secondary)	71.6	8, 012, 826		9	9
Zinc	92.6	28, 473, 440		32	32
Plates and sheets:	( <sup>1</sup> )	( <sup>1</sup> )		15	15
Brass and bronze	84.3	8, 012, 826		14	14
Copper	64.9	88, 119	( <sup>1</sup> )	17	17
Lead	65.8			28	28
Nickel alloys	( <sup>1</sup> )			10	10
Zinc	70.2			17	17
Rods:	66.3			13	13
Brass and bronze	63.1			14	14
Copper	( <sup>1</sup> )			14	14
Nickel alloys and other nonferrous-metals and alloys	( <sup>1</sup> )			18	18
Brass and bronze	( <sup>1</sup> )			8	8
Other metals	( <sup>1</sup> )			19	19
Shapes, extruded:	( <sup>1</sup> )			16	16
Brass and bronze	( <sup>1</sup> )			22	22
Other metals	63.1	2, 025, 843	( <sup>1</sup> )	5	5
Other metals				7	7

See footnotes at end of table.

Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP—continued</b>									
Nonferrous-metal alloys, nonferrous-metal products, except aluminum, n. e.—Continued:									
Tubing (seamless) and pipe:									
Copper	78.9	79.9	27,521,914		63,051		18	25	11
Lead	70.8	71.3	18,611,836		41,340		17	23	10
Nickel alloys	(1)	(1)	(1)		(1)		18	34	19
Other metals	93.7	91.9	2,029,029	(1)	1,762	(1)	9	12	7
Sheet-metal work, not specifically classified:									
Buildings, portable steel	78.1		1,005,359	36,066			13	22	13
Culverts, flumes, irrigation pipe, etc.	50.9		755,452				37	41	8
Gutters, downspouts, cornices, ventilators, etc.:	(1)		(1)				105	145	40
Copper and other nonferrous-metal	33.2		1,178,390				286	298	4
Galvanized-iron	24.8		4,826,524				577	577	5
Pans, vats, and stills	36.5		694,331				130	131	4
Pipe and flue (stove and furnace), and air ducts.	18.9		3,198,389				443	449	5
Tanks and bins.	22.7		1,410,488				287	298	9
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>									
<b>Agricultural implements:</b>									
Binders, grain, horse- or tractor-drawn.	(1)	(2)	(1)		(1)		6	6	4
Combines (harvester-threshers), all widths of cut.	79.1	82.4	16,831,054	391,328	24,227	434	12	12	4
Corn pickers	87.5	87.5	5,401,229	(1)	11,886		9	9	4
Cream separators.	86.0	90.6	3,279,875	532,293	76,351	7,895	8	8	4
Cultivators, horse-drawn, 1-row riding (2-horse).	77.2	76.0	1,503,168	5,451	36,913	156	21	21	6
Cultivators, tractor-drawn or mounted, 2- to 6-row.	88.5	90.0	9,686,325	141,521	114,413	1,608	14	14	4
Disk harrows, horse- or tractor-drawn, (single or double action).	77.7	73.0	7,568,825	(1)	98,961	(1)	31	33	6
Drills, grain, horse- or tractor-drawn.	90.8	86.7	6,400,229	(1)	49,405	(1)	16	16	4
Ensilage cutters (silo fillers), all types.	73.8	78.5	1,610,687	(1)	8,902	(1)	21	21	4
Forks, hoes, and rakes	(1)		(1)				31	36	9
Lawn mowers, hand	56.1		3,334,252	(1)	678,546	(1)	26	26	4
Manure spreaders, horse- or tractor-drawn.	84.8		6,117,546	80,930	51,047	725	13	13	4
Milk machines (complete units)	77.7		6,944,902	(1)	17,956	(1)	24	24	4
Mowers (haymaking machinery), horse- or tractor-drawn.	87.2	88.1	6,956,377	333,076	110,858	4,147	24	24	4

Plows, moldboard, horse-drawn, walking, 2-horse and larger.....	65.7	62.7	1, 209, 449	482	98, 009	50	41	42	5
Plows, moldboard, tractor-drawn, 2-bottom.....	86.7	83.7	7, 223, 995	28, 202	92, 109	324	14	14	4
Shovels, spades, and scoops.....	88.1		6, 411, 369	(1)			13	13	4
Tractors, wheel type, "all-purpose": Belt horsepower under 30:									
Rubber tires.....	90.6	92.2	49, 948, 962	(2)	75, 735	(2)	11	11	4
Steel tires.....	92.0	90.2	49, 035, 704	(1)	84, 522	(1)	10	10	4
Belt horsepower 30 and over, steel and rubber tires.....	100.0	100.0	7, 818, 799		9, 898		3	3	3
Tractors, wheel type, other than "all-purpose": Belt horsepower under 25, steel and rubber tires.....	82.9	79.3	8, 044, 312	(2)	12, 359	(2)	9	9	4
Rubber tires.....	(2)	(2)			(2)		6	6	4
Steel tires.....	85.4	87.1	22, 018, 821	(2)	26, 461	(2)	11	11	4
Belt horsepower 25-29, steel and rubber tires.....	61.7	53.8	1, 890, 672	(1)	30, 945	(1)	33	33	4
Wagons, farm.....									
Cash registers, adding and calculating machines and other business machines except typewriters.....									
Adding machines.....	83.1	73.2	10, 948, 641	(2)	116, 170	(2)	9	10	5
Addressing and mailing machines.....	(1)		(1)				16	16	4
Calculating machines.....	(2)	(2)	(2)		(2)		5	5	4
Cash registers, card punching, sorting, and tabulating machines; change-making machines and coin counters; fare registers and boxes; ticket-counting machines; postal meters.....	(1)		(1)						
Check-writing, canceling, and perforating machines.....	76.8		1, 576, 836	(1)			27	28	4
Duplicating machines.....	87.7		4, 470, 770	(1)	44, 994		11	11	4
Listing-adding-bookkeeping machines and typewriter-book-keeping-billing machines.....	(2)	(2)	(2)		(2)		5	6	5
Numbering machines.....	(2)		(2)				7	7	4
Other adding, calculating, and computing devices.....	(1)		(1)				8	9	5
Electrical machinery, apparatus, and supplies: Batteries and battery parts:									
Dry, 6-inch, 1.5-volt.....	91.3	89.3	2, 383, 277	(2)	14, 315, 226	(2)	10	11	5
Dry, all other.....	80.0		14, 462, 729	60, 365			14	17	6
Storage, motor-vehicle, 9- to 31-plate size.....	68.0		42, 628, 409	9, 683			126	151	16
Storage, other than motor-vehicle and radio.....	(1)		(1)				28	35	7
Storage, parts and supplies.....	73.8		1, 678, 941	3, 610			40	44	5
Wet primary.....	98.6		3, 058, 930	43, 388			8	8	4
Carbons: Brushes and contacts (carbon, graphite, and metal-graphite) and parts for making brushes.....	50.4		3, 280, 154	20, 812			29	31	6
Other, including packing rings, electrodes, and miscellaneous carbon, graphite, and metal-graphite specialties.....	(1)		(1)				13	17	8
Conduits and conduit fittings, interior: Conduits:									
Flexible steel.....	92.8		1, 745, 101	(2)			9	9	4
Rigid steel.....	49.1		9, 881, 212	(2)			9	21	6
Fittings, including elbows and couplings.....	65.7		3, 591, 574	(1)			18	18	4
Fittings, cast-metal outlet, hazardous-location and other.....	73.1		3, 767, 588	61, 627			19	19	4
Switch boxes, outlet boxes, and covers.....	62.6		2, 920, 964	626			29	31	4

See footnotes at end of table.

## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>									
Electrical machinery, apparatus, and supplies—Continued.									
Cooking apparatus, commercial.	52.8		1,460,982	11,591			25	25	4
Control apparatus (except railway and vehicle controllers, all types):									
Industrial magnetic control:									
For a. c. motors.....	73.3		12,271,988	19,895			20	26	7
For d. c. motors.....	94.7		5,509,186	14,167			14	16	6
Industrial manual control: For a. c. motors.....	84.9		3,197,282	16,407			18	21	7
Other control apparatus.....	72.5		14,596,399	1,277			45	63	20
Electrotherapeutic and electromedical apparatus:									
Physical-therapy equipment.....	87.0		1,735,043	(1)			13	13	4
X-ray apparatus (exclusive of tubes) for general medical use.....	88.4		7,109,692	109,916			12	12	4
Fans (direct motor-driven):									
Air circulators, 18" and larger.....	59.5		2,309,150	20,064			28	28	4
Desk fans.....	84.4	46.2	5,818,990	(2)	883,981	(3)	28	28	4
Flashlight cases.....	(2)		2,311,806	38,255			8	8	4
Furnaces (industrial), resistance.....	76.3						21	21	4
Fuses (except high-voltage and power types):									
Enclosed renewable, 250 and 600 volts.....	78.4	73.8	1,588,264	33,213	3,044,129	184,632	14	14	4
Nonrenewable plug fuses, 125 volts.....	71.6	70.6	1,344,859	42,316	56,451,588		16	16	4
Generators:									
Alternating-current.....	81.2	37.0	1,867,612	8,916	(1)	49	19	20	5
Direct-current, not including arc welding sets.....	(1)	(1)					21	24	6
Other generators, except railway and vehicle power generators.....	76.1		54,122,216	(2)			47	51	6
Parts and supplies for generating apparatus.....	88.7		5,103,179	8,314			17	20	6
Generator-sets (motor), and dynamotors (not including arc welding sets):									
1-150 kilowatts, inclusive.....	61.1	12.7	3,242,505	11,451	2,592	311	29	31	6
Over 150 kilowatts.....	(2)		(2)	(1)			8	9	5
Heating units (industrial), strip, space, and ring heaters.....	92.7		1,704,297	(1)			13	13	4

Household apparatus and appliances:	81.0	84.8	1,820,527	20,124	805,601	9,999	16	4
Coffee makers, pots, and urns, 660 watts or less, glass							16	4
Flatirons, standard:								
Automatic:								
Under 5 pounds.....	81.7	83.5	2,775,548	21,225	719,038	5,175	16	4
5 pounds and over.....	73.8	73.9	2,201,186	11,673	744,290	5,212	17	4
Nonautomatic, all sizes.....	59.5	61.7	1,498,943	15,002	1,323,783		24	5
Heaters, storage water (complete).....	78.9	79.7	4,251,692	42,852	91,663	824	15	6
M'ers and whippers.....	85.9	85.7	6,331,043	7,095	885,099	3,076	16	4
Ranges, electric household, 2½ kilowatts and over.....	(1)	(1)	(1)		(1)		8	4
Toasters:								
Automatic.....	(1)	(1)	(1)		(1)		14	4
Nonautomatic.....	41.9	53.9	859,527	20,056	842,577		22	4
Vacuum cleaners:								
Floor cleaners.....	69.6		22,986,563	103,716			29	4
Hand dusters.....	65.3	62.3	1,965,883	(1)	244,253	(1)	14	4
Waffle irons and griddles.....	52.6	53.9	1,261,866	6,683	506,828	2,156	22	4
Miscellaneous domestic cooking and heating equipment and appliances.....	56.4		4,812,800	9,457			50	4
Ignition apparatus for internal combustion engines:								
Colls.....	79.5		6,339,613	13,178			27	5
Distributors.....	(1)		(1)				7	4
Magnets.....	(1)		(1)				12	4
Spark plugs.....	(1)		(1)				30	4
All other, including magnetic generators.....	42.7		4,446,038	52,728			29	4
Insulated wire and cable and armored conductor:								
Appliance and extension cords with attachments complete.....	88.5		3,791,113	(1)			17	5
Armored cable or conductor.....	53.8		4,797,423	262,283			18	7
Asbestos-insulated.....	84.8		5,534,480	(1)			13	7
Cotton-insulated.....	68.2		15,465,099	(1)			16	12
Ignition-cable sets or wire assemblies for internal-combustion.....	(1)		(1)				9	4
Magnet:								
Cotton, silk, and rayon covered.....	65.9		10,228,777	88,761			24	13
Enameled.....	65.6		9,372,505	(1)			20	11
Paper-insulated.....	81.3		27,168,815	(1)			12	9
Rubber-insulated:								
Lighting and power circuit, braided.....	52.1		24,468,416	486,245			24	10
Lighting and power circuit, leaded.....	58.1		8,627,100	439,150			18	7
Telephone.....	89.7		8,576,632	211,169			16	5
Flexible cords (cotton, silk, and rayon covered).....	48.6		9,257,817	216,063			30	6
Varnished-cambric-insulated.....	70.2		6,420,466	(1)			14	10
Other insulated wire and cable.....	63.7		17,042,350	25,000			41	8
Lamps, incandescent-filament:								
Large tungsten.....	(1)	(1)	(1)		(1)		15	13
Miniature tungsten:								
Christmas-tree and flashlight.....	93.8		5,589,922	20,983			15	7
Motor-vehicle.....	(1)	(1)	(1)		(1)		12	7

See footnotes at end of table.

## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>									
Electrical machinery, apparatus, and supplies—Continued									
Lamps, other, including vapor lamps, photoflash, and photo-flood	(1)		(1)	(2)			13	15	6
Lightning arresters and choke coils, except radio and telephone	98.7		5,847,648	(2)			10	12	6
Meters, miniature, 3½ inches and under (not including meters for motor vehicles)	(1)	(1)	(2)		(1)		8	8	4
Meters, watt-hour, a. c.	100.0		21,249,268				4	5	5
Motors (except railway), stationary:									
Under ½ horsepower (toy motors, etc.)	74.8		7,210,881	5,898			29	29	4
½ horsepower and over but under 1 horsepower:									
Capacitor type	84.1	87.8	12,234,375	(1)	1,467,905	(1)	25	27	4
Direct-current	70.7	70.7	2,172,618	2,470	154,751	75	28	30	6
Polyphase	76.7	68.7	4,174,802	3,446	163,342	94	33	35	6
Repulsion-induction	60.6	61.1	6,076,933	4,280	435,319	165	24	25	4
Split-phase	75.5		18,101,507	(1)			29	32	7
Universal	91.6	97.1	4,103,309	3,939	1,828,890	370	13	16	5
Other	87.7		3,555,350	49,302			13	15	5
1 horsepower and over:									
Alternating-current:									
Polyphase-induction:									
1-200 horsepower, inclusive	67.3	56.2	27,141,792	6,821	239,683	90	44	47	7
Over 200 horsepower	92.8		2,729,685	(1)			11	11	4
Repulsion-induction	67.2	65.8	2,391,818	(1)	55,282	(1)	21	21	4
Synchronous motors, over 200 horsepower	(1)		(2)				7	8	5
Direct-current:									
1-200 horsepower, inclusive	79.4	48.2	10,504,074	1,635	24,283	15	40	43	7
200 horsepower and over	(1)		(1)				5	6	4
Motors, automotive starter-motors (not including vehicle motors or control switches)	(1)		(2)				6	7	5
Motor parts and supplies	57.8		5,605,128	6,194			36	42	10
Radio parts (coils, condensers, etc.)	21.0		9,949,748	9,148			151	154	5
Rectifying apparatus, electronic-tube apparatus, and other	55.5		1,310,913	10,668			23	27	5
Relays (excluding industrial motor-control and telephone)	(1)		(1)				9	9	6
Signaling apparatus, all types	65.8		14,503,841	4,196			89	93	6



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—</b>									
continued									
Engines, turbines, water wheels, and windmills:									
Engines, internal-combustion:									
Carburetor engines:									
Aircraft:									
Industrial:	(1)	(1)	(1)		(1)		19	19	4
Portable:	75.5	49.6	4,639,609	154,327	27,403	504	13	13	4
Stationary:	(1)	(1)	(1)		(1)		16	17	5
Marine:	60.5	55.3	1,938,645	9,361	5,724	25	22	23	4
Inboard:	100.0	100.0	4,359,822		77,549		3	3	3
Outboard:									
Motor-vehicle:									
Automobile (including taxicab) and light truck and bus:	(2)	(2)	(2)		(2)		7	7	4
Heavy truck and bus:	(2)	(2)	(2)		(2)		5	5	4
Railway-car:	100.0	100.0	767,198		2,719		4	4	4
Tractor, made for sale separately:	100.0	100.0	5,047,511		34,149		4	4	4
Other and not specified types:	86.0	89.8	11,991,086	(1)	229,464	(1)	16	16	4
Injection type:									
Compression-ignition (Diesel):									
Marine:	58.4	49.7	3,237,271	88,226	348	213	21	22	5
For direct connection to propeller shaft:	94.6	80.8	3,134,941	(2)	173	(2)	9	9	4
For electric drive and auxiliary use:									
For connection to propeller shaft by reduction gearing:	(2)	(2)	(2)		(2)		7	7	4
Stationary:	54.6	59.8	9,453,849	(1)	3,555	(1)	36	37	5
Surface-ignition (hot-spot, hot-bulb, etc.), all types:	(2)	(2)	(2)		(2)		6	6	4
With spark ignition:	100.0	100.0	130,118		252		3	3	3
Mixing-valve engines:	93.8	92.9	4,523,559	(1)	19,054	(2)	9	9	4
Parts for all types of internal-combustion engines:	43.8		16,225,289	14,373			77	80	6
Engines, steam, marine (reciprocating):	100.0	100.0	193,117		14		3	3	3
Turbines, steam:									
Marine:	(2)	(2)	(2)		(2)		5	7	4
Other than marine:	87.0	49.4	11,185,360	(1)	1,221	(1)	9	10	5
Parts for steam turbines and engines:	70.3		912,466	(1)			13	13	4



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of com- panies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com- panies (8)	4 leading com- panies (9)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>									
Machine-tool accessories and machinists' precision tools—Con.									
Threading tools, not pipe-threading—Continued.									
Dies:									
Carbon.....	82.1	-----	1,043,160	(1)	-----	-----	19	20	5
High-speed.....	88.9	-----	353,866	4,076	-----	-----	12	12	4
Self-opening.....	(2)	-----	(2)	-----	-----	-----	6	6	4
Taps:									
(Except collapsible), carbon.....	68.6	-----	1,864,386	1,817	-----	-----	21	23	6
(Except collapsible), high-speed.....	56.6	-----	2,856,699	16,974	-----	-----	10	21	6
Collapsible.....	(2)	-----	(2)	-----	-----	-----	7	7	4
Tools for screw and automatic machines.....	64.0	-----	1,984,834	(1)	-----	-----	37	37	4
Vises (machines).....	77.7	-----	181,623	2,862	-----	-----	16	16	4
Machine tools:									
Bending machines:									
L-beam, pipe, plate, etc.....	80.5	69.9	249,153	(2)	190	(2)	11	11	4
Sheet-metal brakes.....	95.4	95.8	1,112,874	(2)	2,354	(2)	11	11	4
Boring machines:									
Horizontal:									
Boring, drilling, and milling combined.....	78.6	77.4	2,740,903	109,019	230	19	14	14	4
General utility.....	100.0	100.0	311,403	-----	29	-----	4	4	4
Special types:									
Jig borers.....	100.0	100.0	772,190	-----	127	-----	4	4	4
Precision boring machines.....	(2)	(2)	(2)	-----	(2)	-----	6	6	4
Vertical (not vertical boring mills).....	100.0	100.0	306,498	-----	44	-----	3	3	3
Boring mills (vertical—work revolving):									
General utility (50-inch table and under):									
With side head.....	100.0	100.0	2,962,759	-----	447	-----	4	4	4
Without side head.....	100.0	100.0	198,160	-----	21	-----	3	3	3
Heavy duty (above 50-inch table) with or without side head.....	(2)	(2)	(2)	-----	(2)	-----	6	6	4
Broaching machines (other than keyseaters):									
Cutting-off machines:									
Bandsaw.....	(2)	(2)	(2)	-----	(2)	-----	7	7	4
Hacksaw.....	(2)	(2)	(2)	-----	(2)	-----	7	7	4
Die-casting machines.....	(2)	(2)	(2)	-----	(2)	-----	7	7	4
	(2)	(2)	(2)	-----	(2)	-----	5	5	4
	(2)	(2)	(2)	-----	(2)	-----	4	4	4



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>									
Machine tools—Continued.									
Lathes—Continued.									
Engine, general-utility:									
16-inch swing and under.....	63.7	69.7	4,618,922	29,007	4,028	38	20	20	4
Over 16-inch swing and including 22-inch	74.8	74.8	2,304,020	38,862	854	17	16	16	4
Over 22-inch swing and including 36-inch	71.4	66.9	1,228,385	45,367	186	18	15	15	4
Heavy-duty, over 36-inch swing.....	100.0	100.0	376,851	27	27	4	4	4	4
Gap.....	100.0	100.0	141,907	—	32	4	4	4	4
Turret, horizontal hand-operated:									
Ram type.....	88.5	86.9	5,890,742	( <sup>1</sup> )	1,833	( <sup>1</sup> )	9	9	4
Saddle type (standard and heavy-duty).....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	6	6	4
Milling machines:									
Hand-feed.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	7	7	4
Power-feed, automatic.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	7	7	4
Power-feed, plain (including Lincoln type).....	98.4	92.1	4,440,637	( <sup>1</sup> )	1,263	( <sup>1</sup> )	10	10	4
Power-feed:									
Planer-type.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	7	7	4
Universal.....	98.4	97.6	4,305,402	70,573	1,070	26	8	8	4
Vertical.....	80.9	73.9	3,348,764	( <sup>1</sup> )	688	( <sup>1</sup> )	11	11	4
Planers:									
Open-side.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	6	6	4
Standard, over 36 inches.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	6	6	4
Presses (except forging):									
Forming and stamping.....									
Punch.....	73.0	26.5	7,644,569	15,707	1,204	6	23	23	4
Punching machines (not portable).....	75.2	76.1	2,756,979	12,630	2,812	( <sup>1</sup> )	17	17	4
Punching machines (not portable).....	90.6	73.3	122,043	18,269	647,588	—	8	8	4
Shapers, horizontal:									
20-inch stroke and under.....	79.2	67.3	689,589	( <sup>1</sup> )	345	( <sup>1</sup> )	11	11	4
Over 20-inch stroke and including 28-inch	63.2	77.9	390,926	128,077	197	56	8	8	4
Over 28-inch stroke.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	7	7	4
Shapers, vertical, and slotters.....	31.4	48.3	208,982	( <sup>1</sup> )	115	( <sup>1</sup> )	9	9	4
Shears (power):									
Alligator, rotary, and combination punch and shear.....	94.6	93.3	734,503	( <sup>1</sup> )	434	( <sup>1</sup> )	10	10	4
Straight.....	91.8	90.9	1,129,365	( <sup>1</sup> )	540	( <sup>1</sup> )	9	9	4



## Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of companies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All companies (8)	4 leading companies (9)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>									
Refrigerators and refrigerating and ice-making apparatus: Cabinets, etc., for mechanical refrigerators, made for sale separately:									
Commercial:									
Display, storage, etc., cases.....	45.8		7,478,577	11,490			88	88	4
Refrigerator cabinets.....	39.9		2,998,790	1,510			118	119	4
Remote fountains or water coolers (low sides) and other commercial cabinets.....	82.8		2,579,861	18,708			25	25	4
Domestic (household).....	98.6	98.0	16,932,386	(?)	509,930	(?)	11	11	4
Condensing units (high sides) for air conditioning.....	86.0	78.8	5,177,070	40,893	5,951	50	14	16	6
Ice refrigerators and ice boxes.....									
Commercial (milk and water coolers, etc.).....	42.0		2,246,001	484			86	87	4
Domestic (household).....	68.5		6,933,563	51,262			21	21	4
Mechanical refrigerators, compression type, electric:									
Commercial:									
Beverage coolers (bottled beverage).....	79.4	80.4	4,324,721	3,010	51,156	32	20	20	4
Ice-cream cabinets, self-contained.....	83.0		7,035,448	39,243			16	16	4
Water coolers, self-contained.....	81.3		3,692,555	43,437			13	13	4
Other, self-contained.....	55.1		1,376,156	3,343			34	34	4
Domestic (household):									
Capacity under 6 cubic feet.....	68.2	68.0	58,464,364	90,760	754,130	1,033	21	22	5
6 to 10 cubic feet.....	76.8	73.5	73,739,375	72,484	728,660	914	25	25	4
10 cubic feet and over.....	76.9		2,406,123	45,258			14	14	4
Refrigerating and ice-making machines, commercial and industrial:									
Complete machine:									
Capacity less than 10 tons per 24 hours.....	74.2		4,045,203	57,946			22	24	4
10 or more but under 100 tons.....	89.4		3,145,611	33,842			14	16	4
Compressors made for sale separately.....	(1)	(1)			(1)		16	16	4
Systems for mechanical refrigerators (commercial and domestic):									
Evaporators made for sale separately.....	90.0		4,050,702	14,181			14	17	6
High sides made for sale separately.....	87.9		4,878,863	35,326			18	19	4
Low sides made for sale separately.....	86.7	77.2	4,515,804	14,444	110,092	682	17	19	4
Systems complete without cabinets.....	95.4	96.0	11,154,712	30,758	288,549	254	15	15	6



Basic data for each of the 1,807 products analyzed for 1937—Continued

Product	Concentration ratio		Total value of product (in dollars)		Total quantity product		Number of com-panies in United States (7)	Number of establishments	
	Value (1)	Quantity (2)	4 leading companies (3)	4 smallest companies (4)	4 leading companies (5)	4 smallest companies (6)		All com-panies (8)	4 leading com-panies (9)
MISCELLANEOUS, INDUSTRIES GROUP—continued									
Photographic and projection apparatus:									
Cameras, including motion-picture:	(1)		(1)				13	19	4
Films:							10	19	4
Exclusive of X-ray:	(1)		(1)				7	7	4
X-ray:									
Paper:									
Photo-copying:									
Blueprint:	70.2		2,166,638	69,824			16	23	10
Brown or black and white:	(1)		(1)				9	12	7
Sensitized photographic:	(1)		(1)				11	11	4
Plates and slides, sensitized:	(2)		(2)				8	8	4
Projectors:									
Motion-picture:	(1)		(1)				7	7	4
Standard gage:	82.1		3,998,827	(2)			9	9	4
Substandard gage:									
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:									
Fabrics, waterproofing:	68.7		332,113	19,068			11	14	6
Felt:									
Asphalt-saturated:	47.4	30.6	4,591,266	37,193	100,155	6,368	27	59	22
Tar-saturated:	65.4	50.2	1,884,535	6,458	36,046	138	20	32	11
Roof cements (solid), asphalt:	83.5	88.4	1,869,894	15,074	117,710	8,193	19	32	13
Roof cement, fibrous plastic:	47.8	52.4	827,752	1,945	29,239,400	48,998	49	72	11
Roof coating:									
Fibrous liquid:	30.3	26.4	712,799	4,552	2,148,850	83,490	58	91	6
Nonfibrous liquid:	66.9	55.3	1,471,710	1,333	4,514,744	4,557	51	73	12
Roofing:									
Asphalt grit roll:	35.9	38.5	4,239,064	169,464	3,146,925	117,016	26	62	16
Asphalt smooth roll:	33.3	33.6	5,833,705	134,076	5,838,799	183,000	30	66	20
Roofing pitch, coal-tar:	(1)	(1)	(1)		(1)		11	24	17
Shingles:									
Asphalt individual:	46.6	43.6	2,997,235	19,926	714,505	8,450	23	57	14
Asphalt strip:	41.6	37.5	11,880,573	176,119	2,798,454	124,963	23	61	20
Siding, asphalt brick:	57.3		1,108,983	34,071			15	25	10

Sporting and athletic goods:										
Baseballs.....	75.7								10	4
Baseball bats.....	95.6					46,890			8	4
Basketballs.....	83.1								16	5
Fishing rods:										
Bamboo.....	66.2								19	4
Steel.....	83.8					188,513			8	4
Football.....	60.6								15	5
Golf balls.....	80.0								14	4
Golf club shafts.....	69.6								19	4
Tennis balls.....	(1)								7	4
Tennis rackets.....	100.0								3	3
Tobacco (chewing and smoking) and snuff:										
Chewing tobacco:										
Plug.....	91.7	92.3	29,096,694			(1)	53,178,179	(1)	18	4
Scrap.....	87.3	89.9	18,698,895			1,108	40,424,875	64	64	4
Twist.....	57.7	52.9	2,618,914			18,338	3,636,787	25	26	4
Chewing and smoking tobacco, fine-cut.....	88.0	82.5	8,634,467			(1)	13,205,424	(1)	18	6
Smoking tobacco.....	77.5	77.9	91,194,047			(1)	138,258,719	(1)	119	11
Snuff.....	90.2	99.2	28,965,099			(2)	36,834,597	(2)	11	5

\* Due to various technical reasons, data were not available for certain products as indicated by blanks in the table.  
 1 Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures.  
 2 Withheld to avoid disclosing the operations of the remaining companies. There is not necessarily a disclosure among the leading four companies.

See footnotes at end of table.

## APPENDIX C

### BASIC DATA FOR THE 392 PRODUCTS ANALYZED FOR 1935 AND 1937

TABLE 1C.—*Basic data for each of the 392 products analyzed for 1935*

[NOTE.—The concentration ratios listed opposite each product are the proportion of the total value of that product and of the quantity manufactured by the leading four producers]

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(5)	(6)
<b>FOOD AND KINDRED PRODUCTS GROUP</b>							
Liquors, distilled:							
Distillers' grains.....	67.8		1,922,440		26	35	13
Gin.....	42.5	38.1	9,979,968	5,508,643	155	162	9
Whisky:							
Corn and bourbon.....	54.3	48.3	54,693,438	67,539,916	61	67	10
Rye.....	63.4	54.4	21,043,586	25,739,867	31	38	9
Meat packing, wholesale:							
Hides, skins, and pelts:							
Calfskins, cured.....	72.8	69.2	6,191,064	40,876,934	359	425	61
Cattle hides:							
Cured.....	65.8	63.1	31,622,270	323,665,492	417	489	64
Uncured.....	30.9	29.1	1,445,510	17,727,387	254	260	8
Sheep and lamb pelts:							
Cured.....	72.5	75.0	8,196,428	8,179,070	265	322	49
Uncured.....	(1)		(1)		182	193	(2)
Sheepskins and lambskins, pickled.....	(1)		(1)		5	12	(2)
Lard.....	50.9	50.2	65,669,972	460,050,366	450	531	62
Meat, cured:							
Beef, pickled and other cured.....	53.5	48.8	6,362,858	30,773,750	115	161	35
Hams, cooked.....	54.9	58.5	34,266,262	125,176,812	258	608	278
Pork:							
Dry-salted, smoked.....	32.3	32.4	5,567,127	26,333,779	138	168	23
Dry-salted, not smoked.....	56.4	56.2	34,324,696	217,133,183	183	242	48
Pickled and dry-cured, smoked.....	47.4	47.3	92,164,029	405,878,395	366	455	66
Pickled and dry-cured, not smoked.....	68.6	69.2	84,140,487	444,971,817	145	215	55
Meat, fresh:							
Beef.....	60.7	60.7	348,968,097	2,882,343,906	624	707	71
Edible organs, tripe, etc.....	60.8	63.7	29,710,253	346,482,186	494	577	77
Mutton and lamb.....	76.6	77.7	86,583,430	595,715,405	457	532	70
Pork.....	44.9	47.7	147,560,589	984,892,473	515	594	67
Veal.....	60.3	64.9	48,363,089	429,337,646	603	684	74
Oleo oil.....	93.7	93.6	6,199,375	58,980,378	9	35	28
Wool.....	96.7	96.2	15,398,755	40,141,040	19	30	15
Sausage casings made in the sausage, the meat-packing, and in other industries:							
Beef casings.....	64.9	72.8	2,785,538	34,338,860	222	292	67
Hog casings.....	48.8	43.5	4,710,707	22,533,412	242	309	57
Sheep and lamb casings.....	46.8	28.2	2,869,649	5,991,660	134	201	49
Sausage, m.at puddings, head-cheese, etc., made in the sausage, the meat-packing, and in other industries:							
Canned sausage.....	71.2	67.4	3,286,120	13,081,302	31	36	6

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>							
<b>Linoleum:</b>							
Cork carpet.....	100.0	100.0	189,459	215,318	4	4	4
Inlaid.....	100.0	100.0	13,193,369	17,674,682	4	4	4
Printed.....	(1)	-----	(1)	-----	5	5	4
<b>Woolen woven goods, including woven felts, and worsted woven goods:</b>							
Auto cloths, woven wholly or in part of woolen or worsted spun yarns:							
With pile.....	(1)	-----	(1)	-----	7	7	4
Without pile.....	55.5	57.5	9,657,158	10,857,402	20	21	4
Billiard cloths.....	(1)	-----	(1)	-----	5	5	4
Blankets, bed and camp, except crib, 98 percent or more wool or similar animal fibers.	35.9	55.9	5,251,770	10,927,152	47	50	5
Shirtings, all-wool woolen, all-wool worsted, and all other.....	82.5	75.2	7,263,789	9,959,567	19	20	5
Woven felts, papermakers'.....	58.6	-----	6,207,968	-----	12	12	4
<b>PAPER AND ALLIED PRODUCTS GROUP</b>							
<b>Paper and paperboard:</b>							
Boards:							
Binders' board.....	92.1	90.8	4,008,080	55,938	8	11	7
Container boards:							
Chip (plain and test) ..	40.1	39.6	4,795,013	162,581	55	68	13
Liners:							
Jute.....	43.6	45.1	12,918,663	361,649	30	48	11
Kraft.....	65.9	64.7	20,457,518	459,574	29	36	9
Other.....	58.1	61.9	2,027,837	55,592	19	21	4
Straw (for corrugated-container use).....	52.7	49.4	6,501,027	171,169	24	32	11
Folding boxboards (bending):							
Manila-lined (all lined boards).....	28.9	29.2	9,950,234	219,846	60	77	5
Patent-coated.....	39.7	40.4	3,802,143	73,253	28	43	15
Other.....	64.4	56.5	4,932,608	105,908	29	43	15
Leatherboard.....	60.3	63.5	1,300,668	16,990	8	8	4
Set-up boxboards (non-bending):							
Chip and straw.....	52.8	52.7	5,394,841	147,059	36	50	8
Newsboard.....	35.6	34.7	2,850,695	78,136	37	52	6
Other (including tube, egg-case, etc.).....	56.3	57.6	2,644,035	68,851	25	39	10
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>							
<b>Paints, pigments, and varnishes:</b>							
Dry colors and pigments:							
Chemical pigments:							
Chrome greens, C. P.....	66.6	67.3	795,728	3,560,270	17	19	4
Chrome yellows and oranges, C. P.....	69.2	77.7	2,048,310	24,342,958	22	24	5
Iron blues (Prussian). C. P.....	63.6	62.8	1,108,498	3,075,203	20	23	4
Lead oxides:							
Litharge.....	90.8	91.0	7,018,301	137,328,247	8	15	10
Red lead, minium, and other.....	(2)	(2)	(2)	(2)	7	14	10
Lithopone.....	75.4	73.1	10,778,588	235,846,737	8	12	7
Zinc oxides (Chinese white, zinc white).....	73.4	72.7	9,599,882	185,911,723	16	19	7
Lakes:							
Coal-tar color lakes:							
Peacock blue.....	65.2	67.2	308,740	556,923	21	21	4
Persian orange.....	63.3	63.7	83,297	213,377	19	19	4
Scarlet 2r.....	77.6	78.5	85,874	268,689	14	14	4

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>							
Paints, pigments, and varnishes—Con.							
Dry colors and pigments—Con.							
Toners, full strength:							
Lithol, C. P. ....	65.3	72.3	728, 107	1, 365, 100	18	18	4
Para, C. P. ....	60.1	57.3	408, 516	544, 824	23	24	4
Phosphotungstic acid:							
Blue .....	58.4	57.8	226, 740	64, 362	22	22	4
Green .....	62.8	60.1	104, 252	39, 746	21	21	4
Purple .....	51.5	53.6	64, 337	40, 765	20	20	4
Other .....	66.6	64.6	147, 172	70, 133	12	12	4
Red, all other .....	72.1	71.7	653, 926	456, 236	24	24	4
Toluidine, C. P. ....	61.7	61.5	571, 456	424, 696	24	24	4
Other .....	100.0	100.0	232, 443	233, 976	3	3	3
Whiting .....	79.4	80.5	661, 385	101, 202, 751	11	14	6
Fillers:							
Dry .....	84.3	71.8	167, 936	6, 445, 041	21	26	7
Liquid .....	47.4	41.5	162, 618	121, 461	117	142	5
Paste .....	38.1	40.3	235, 849	3, 301, 729	188	222	13
Paints:							
Paste paints:							
Colors in oil .....	29.1	27.3	1, 080, 305	5, 477, 228	335	375	20
Colors in japan .....	44.1	32.3	165, 753	418, 053	128	153	9
Combination or graded whites .....	35.4	34.6	833, 635	8, 821, 633	194	219	15
Red lead in oil .....	66.8	69.8	204, 450	2, 394, 417	82	90	8
White lead in oil, pure .....	90.1	91.4	11, 657, 737	154, 996, 168	97	107	10
Zinc oxide in oil .....	35.6	36.7	51, 279	458, 024	121	136	7
Other .....	23.6	23.7	811, 894	8, 452, 833	233	276	17
Plastic paints .....	44.8	45.7	349, 819	6, 035, 540	75	78	4
Ready-mixed and semi-paste paints:							
Paints in oil, ready-mixed .....	25.0	26.2	16, 430, 311	10, 393, 242	584	647	24
Stains (not varnish stains) .....	29.1	29.8	961, 486	915, 920	285	335	17
Undercoatings and primers .....	44.7	51.4	4, 546, 352	4, 452, 422	343	399	23
Wall paints and mill whites, flat or gloss .....	32.3	30.9	9, 792, 594	6, 628, 749	343	488	20
Other .....	21.1	19.8	4, 635, 582	3, 525, 574	408	468	22
Water paints and calcimines, dry or paste .....	60.5	61.4	3, 204, 923	76, 839, 588	77	90	14
Putty .....	23.5	23.6	676, 363	16, 961, 382	172	206	7
Shellac, bleached .....	72.0	73.8	1, 747, 921	9, 253, 729	12	12	4
Varnishes, lacquers (including enamels), and japans:							
Enamels:							
Oil, ester-gum, and natural-resin, varnish base .....	34.1	38.2	11, 296, 586	7, 821, 461	317	364	26
Synthetic-resin (oil, straight or modified) .....	63.9	61.2	14, 073, 280	6, 758, 654	182	207	16
Japans:							
Baking .....	42.4	47.9	913, 461	1, 690, 646	71	90	5
Drying japans and driers .....	37.4	26.9	638, 239	498, 144	192	227	17
Nitrocellulose (pyroxylin) products:							
Lacquers, clear .....	30.6	38.0	3, 941, 634	3, 541, 398	205	227	10
Lacquers, pigmented .....	52.6	50.9	13, 359, 465	5, 989, 350	192	221	14
Lacquer bases and dopes .....	55.2	58.4	1, 738, 233	1, 512, 177	71	75	6
Thinners .....	48.1	53.4	6, 190, 922	10, 018, 247	227	253	13
Varnishes:							
Spirit, not turpentine .....	21.1	19.3	1, 826, 112	1, 529, 801	206	236	13
Synthetic-oleoresinous, straight or modified (100 percent synthetic resin) .....	25.5	26.0	4, 289, 462	3, 781, 123	211	248	15

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>							
Paints, pigments, and varnishes—Con.							
Varnishes, lacquers (including enamels), and japans—Con.							
Varnishes—Continued.							
Other resinous except synthetic (100 percent natural resin).....	31.2	26.7	4,796,396	4,226,107	199	232	26
Other varnishes.....	27.7	20.7	2,556,767	1,909,246	218	247	8
Varnish stains.....	37.6	33.6	1,103,351	592,898	250	286	21
Other products of the varnish group.....	48.3		1,623,142		69	78	4
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>							
<b>Petroleum refining:</b>							
Acid oil.....	96.1	94.7	1,171,797	89,295,495	11	25	17
Asphalt, other than liquid asphalt.....	70.7	68.4	16,432,833	1,472,764	23	46	22
Distillates.....	57.0	54.4	34,737,763	969,011,557	151	225	33
Gas oils.....	47.5	42.9	40,668,847	1,161,279,161	160	245	31
Gasoline.....	36.7	35.4	375,270,563	6,542,236,577	259	374	56
Illuminating oils.....	45.1	43.2	42,472,607	947,227,619	153	255	36
Lubricating greases, including axle grease.....	55.9	51.7	5,666,349	16,340,493	32	49	15
Lubricating oils:							
Black, cylinder, red, neutral, pale, and paraffin....	42.5	41.4	44,671,083	321,438,846	52	86	17
Other, including compounded and unclassified.....	48.1	37.4	39,236,632	185,999,102	49	77	13
Naphtha.....	56.2	50.1	7,431,252	108,606,504	54	83	17
Paraffin wax.....	64.3	56.6	9,292,594	43,322,471	34	63	15
Partially refined oils, sold for rerunning.....	64.4	57.0	20,377,130	594,181,517	51	72	22
Petrolatum, mineral jelly, etc.....	69.7	52.6	1,818,170	9,049,245	27	32	6
Petroleum coke.....	58.4	48.5	3,364,997	700,233	26	85	24
Residual fuel oils.....	38.1	36.2	81,215,945	4,126,811,022	175	310	54
Residuum or tar.....	85.7	91.0	1,454,868	81,087,996	13	15	4
Road oils, liquid asphaltic.....	49.8	47.7	6,650,987	194,000,929	37	73	21
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>							
<b>Clay products, other than pottery:</b>							
Brick:							
Common.....	7.5	6.1	1,359,222	110,728	642	(3)	(3)
Face.....	15.9	14.1	1,112,230	66,772	277	(3)	(3)
Hollow.....	79.1	72.3	70,546	3,659	14	(3)	(3)
Chimney pipe and tops.....	55.0	38.4	50,557	1,631	28	(3)	(3)
Clay sold, raw or prepared, including fire-clay dust.....	42.0	42.6	499,892	107,761	124	(3)	(3)
Fire-clay products:							
Brick, block, or tile, except high-alumina (9-in. equivalent).....	43.0	37.5	8,384,387	180,404	127	(3)	(3)
Brick, high-alumina.....	65.0	43.5	696,624	5,751	18	(3)	(3)
Special shapes.....	44.9	50.1	1,466,399	78,279	49	(3)	(3)
Flue lining.....	33.4	35.8	390,082	35,280	60	(3)	(3)
Glass-house tank blocks, melting pots, stoppers, floaters, and rings.....	82.4	77.8	2,011,093	21,426	13	(3)	(3)
Refractory cement (clay).....	45.1	47.8	782,687	17,655	52	(3)	(3)
Segment blocks.....	100.0	100.0	105,540	9,169	4	(3)	(3)
Sewer pipe.....	33.2	33.5	2,862,664	224,683	66	(3)	(3)
Stove lining.....	66.1	54.5	156,276	4,150	15	(3)	(3)
Terra cotta.....	62.8	57.7	958,759	10,126	15	(3)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP—continued</b>							
Clay products, other than pottery—Continued:							
Tile:							
Ceramic mosaic (vitreous and semivitreous, unglazed).....	59.6	59.9	785,593	3,841,160	19	(3)	(3)
Drain tile, vitrified (under drain).....	52.9	53.2	468,224	58,208	66	(3)	(3)
Drain tile, unvitrified.....	25.4	25.1	283,548	38,778	147	(3)	(3)
Enameled tile and glazed ceramic mosaic.....	63.9	63.3	2,226,473	7,656,332	15	(3)	(3)
Faience tile (including hand-decorated tile).....	67.7	68.7	210,693	360,430	19	(3)	(3)
Floor tile.....	47.1	37.6	510,521	2,841,760	43	(3)	(3)
Hollow building tile:							
Conduit tile.....	80.0	80.0	153,445	15,541	10	(3)	(3)
Roofing tile.....	69.4	55.7	794,661	75,198	26	(3)	(3)
Wall tile, including trim.....	52.1	41.1	1,611,769	4,394,527	24	(3)	(3)
Vitrified brick and plates:							
For paving.....	53.3	45.2	918,936	32,476	40	(3)	(3)
Sewer liners.....	64.5	54.2	48,472	2,784	8	(3)	(3)
Wall coping.....	57.9	59.1	129,015	11,292	40	(3)	(3)
Gypsum:							
Keene's cement.....	89.8	92.0	311,177	21,091	11	(3)	(3)
Plaster:							
Calcined.....	74.3	78.9	479,300	73,933	12	(3)	(3)
Industrial.....	96.0	96.7	617,090	75,923	10	(3)	(3)
Molding and gaging.....	92.1	90.4	1,051,807	75,700	33	(3)	(3)
Neat.....	79.7	78.0	6,238,099	600,715	21	(3)	(3)
Prepared finish.....	84.8	82.0	221,653	13,946	15	(3)	(3)
Sanded.....	65.2	68.3	387,467	50,952	19	(3)	(3)
Other.....	84.8	(1)	793,268	(1)	19	(3)	(3)
Plasterboard and lath.....	86.1	85.1	2,944,213	138,199	9	(3)	(3)
Rock:							
Agricultural gypsum.....	83.9	79.1	350,954	42,543	21	(3)	(3)
For Portland cement.....	85.7	81.7	451,415	218,021	16	(3)	(3)
Other gypsum rock.....	(1)	-----	(1)	-----	6	(3)	(3)
Tile, partition and wall.....	73.9	-----	471,859	-----	16	(3)	(3)
Wallboard.....	86.6	85.4	6,418,419	175,388	12	(3)	(3)
Nonclay refractories:							
Graphite and other carbon:							
Crucibles and retorts.....	72.7	-----	752,312	-----	10	(3)	(3)
Other carbon refractories.....	(1)	-----	(1)	-----	6	(3)	(3)
Magnesite and chrome brick.....	100.0	100.0	3,424,726	12,112	3	(3)	(3)
Silica brick.....	77.2	75.5	6,317,205	113,071	17	(3)	(3)
Pottery, including porcelainware:							
Plumbing fixtures (exclusive of fittings), vitreous china:							
Lavatories.....	89.8	86.5	1,448,030	136,364	13	(3)	(3)
Lowdown flush tanks.....	69.1	69.1	2,927,083	741,576	18	(3)	(3)
Reverse-traps.....	78.0	74.9	550,802	113,291	14	(3)	(3)
Siphon jets.....	81.6	78.7	495,229	70,396	15	(3)	(3)
Stalls.....	94.9	94.9	442,050	16,537	8	(3)	(3)
Washdowns.....	73.7	72.4	2,391,370	737,646	18	(3)	(3)
Other vitreous-china fixtures.....	76.2	-----	454,589	-----	14	(3)	(3)
Plumbing fixtures (exclusive of fittings), semivitreous or porcelain.....	(1)	-----	(1)	-----	6	(3)	(3)
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>							
Heating and cooking apparatus, except electric:							
Boilers, steam and hot-water heating:							
Cast-iron.....	50.4	-----	6,863,560	-----	33	(3)	(3)
Steel.....	92.4	94.7	2,306,783	7,361	12	(3)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(5)	(6)
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP—continued							
Heating and cooking apparatus, except electric—Continued.							
Boiler-burner units:							
Fuel oil.....	87.0	-----	2,413,702	-----	16	(3)	(3)
Gas.....	74.2	-----	867,309	-----	17	(3)	(3)
Brooders.....	57.7	-----	927,963	-----	29	(3)	(3)
Burners:							
Distillate-oil, for cooking and heating stoves.....	55.8	-----	794,944	-----	42	(3)	(3)
Oil, commercial, mechanical and forced draft.....	(1)	-----	(1)	-----	13	(3)	(3)
Oil, domestic (for central heating systems and water heating):							
Atmospheric (natural) draft.....	88.0	50.9	91,442	1,339	8	(3)	(4)
Mechanical or forced draft.....	36.5	-----	5,119,625	-----	113	(3)	(3)
Cooking stoves and ranges:							
Coal and wood:							
Porcelain-enameled.....	34.6	-----	6,494,939	-----	119	(3)	(3)
Other than porcelain-enameled.....	28.0	-----	1,230,782	-----	93	(3)	(3)
Combination (coal, wood, and gas), porcelain-enameled.....	43.6	-----	2,583,595	-----	48	(3)	(3)
Combination (coal, wood, and gas), other than porcelain-enameled.....	91.8	93.4	285,272	3,170	15	(3)	(5)
Gas, porcelain-enameled, with ovens.....	35.3	-----	14,363,627	-----	97	(3)	(3)
Gas, porcelain-enameled, without ovens.....	(2)	-----	(2)	-----	6	(3)	(3)
Gas, other than porcelain-enameled, with and without ovens.....	85.1	55.5	829,111	9,864	24	(3)	(3)
Gasoline (except camp stoves), porcelain-enameled and other.....	92.0	94.4	1,728,955	75,251	9	(3)	(3)
Fittings, valves, and faucets.....	59.2	-----	26,677,097	-----	72	(3)	(3)
Furnaces, warm-air:							
Manufactured.....	30.9	-----	5,091,045	-----	60	(3)	(3)
Parts and registers.....	51.3	-----	3,245,758	-----	94	(3)	(3)
Furnace-burner units: Fuel oil.....	84.3	78.3	846,021	2,908	8	(3)	(3)
Heating stoves, coal and wood:							
Cast-iron and cast-steel:							
Porcelain-enameled.....	29.5	-----	2,720,033	-----	98	(3)	(3)
Other than porcelain-enameled.....	24.6	-----	967,229	-----	100	(3)	(3)
Sheet-metal.....	77.9	85.6	582,556	314,578	18	(3)	(3)
Hot plates, gas.....	41.0	33.8	139,055	40,634	39	(3)	(3)
Incinerators.....	94.6	-----	139,268	-----	9	(3)	(3)
Incubators.....	76.7	-----	2,568,606	-----	16	(3)	(3)
Laundry, orchard, etc., stoves.....	77.9	-----	614,155	-----	24	(3)	(3)
Parts for burners, oil and gas.....	59.3	-----	1,016,587	-----	34	(3)	(3)
Parts for heating boilers.....	(1)	-----	(1)	-----	28	(3)	(3)
Parts for stoves, ranges, and heaters:							
Coal and wood.....	26.8	-----	635,867	-----	93	(3)	(3)
Gas.....	41.2	-----	737,733	-----	54	(3)	(3)
Kerosene, distillate, and fuel oil.....	85.2	-----	2,033,866	-----	21	(3)	(3)
Portable ovens.....	62.3	59.0	500,235	327,053	17	(3)	(3)
Radiators:							
Cast-iron.....	54.5	-----	6,558,111	-----	23	(3)	(3)
Copper.....	84.8	-----	842,974	-----	9	(3)	(3)
Gas- and oil-fired.....	(1)	-----	(1)	-----	6	(3)	(3)
Regulators.....	59.1	-----	1,404,786	-----	36	(3)	(3)
Room heaters: Gas.....	40.4	-----	1,298,587	-----	49	(3)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP—continued							
Heating and cooking apparatus, except electric—Continued.							
Steam tables .....	59.8	-----	112, 125	-----	23	(3)	(3)
Thermostats .....	64.7	-----	10, 219, 959	-----	48	(2)	(3)
Traps .....	48.5	-----	1, 039, 670	-----	45	(3)	(3)
Unit heaters .....	42.0	-----	1, 899, 714	-----	36	(3)	(3)
Water heaters:							
Coal and wood:							
With storage tanks attached .....	72.9	-----	806, 351	-----	17	(3)	(3)
Without storage tanks .....	53.2	50.7	822, 717	102, 783	52	(3)	(3)
Gas:							
With storage tanks attached .....	52.5	-----	3, 901, 202	-----	38	(3)	(3)
Without storage tanks .....	58.0	68.8	946, 715	203, 080	30	(3)	(3)
Gasoline, including parts for gasoline stoves, ranges, and heaters .....	(2)	-----	(2)	-----	7	(3)	(3)
Miscellaneous cafeteria, hotel, and kitchen apparatus .....	39.9	-----	1, 412, 523	-----	60	(3)	(3)
Miscellaneous specialties .....	31.1	-----	1, 123, 552	-----	69	(3)	(3)
Equipment not reported by kind .....	68.6	-----	2, 000, 239	-----	36	(2)	(3)
Plumbers' supplies, not including pipe or vitreous-china sanitary ware:							
Bathtubs, enameled-iron .....	80.2	77.3	8, 289, 977	415, 196	12	(3)	(3)
Drinking fountains:							
Enameled-iron .....	93.1	-----	68, 119	-----	8	(3)	(3)
Other than enameled-iron and vitreous-china .....	(1)	-----	(1)	-----	6	(3)	(3)
Flush tanks, enameled-iron .....	84.6	85.3	95, 159	14, 607	9	(3)	(3)
Laundry tubs, enameled-iron .....	83.7	82.9	182, 413	23, 733	11	(3)	(3)
Lavatories, enameled-iron .....	77.7	75.4	3, 183, 753	565, 576	12	(3)	(3)
Range boilers, copper and non-ferrous-alloy, 25- to 180-gallon-capacity .....	67.3	72.0	640, 962	26, 695	14	(3)	(3)
Range boilers, galvanized iron, 180- to 192-gallon capacity .....	48.2	50.7	2, 496, 946	431, 789	27	(3)	(3)
Sinks, enameled iron .....	75.3	70.3	4, 803, 547	566, 625	13	(3)	(3)
Sink and laundry tray combinations, enameled-iron .....	88.6	86.3	2, 295, 129	145, 498	9	(3)	(3)
Tanks and shell for water heaters .....	(2)	-----	(2)	-----	7	(3)	(3)
Toilet seats:							
Wood .....	51.1	47.6	1, 013, 588	648, 167	20	(3)	(3)
Other than wood .....	92.0	94.2	1, 543, 722	559, 436	10	(3)	(3)
Steel-works and rolling-mill products:							
Finished hot-rolled products and forgings:							
Rails .....	(1)	(1)	(1)	(1)	5	(3)	(3)
Structural shapes (not assembled or fabricated):							
Heavy (leg or web 3 inches and over) .....	88.9	88.7	37, 022, 615	910, 426	12	(3)	(3)
Tin cans and other tinware, n. e. c.:							
Dairy milk cans .....	74.2	-----	2, 655, 221	853, 638	17	(3)	(3)
Sanitary cans including sweetened-condensed-milk cans .....	(1)	-----	(1)	-----	17	(3)	(3)
Venthole-top cans .....	83.9	84.3	14, 444, 438	1, 496, 126, 328	8	(3)	(3)
Other cans and packages .....	(1)	-----	(1)	-----	108	(2)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>							
<b>Electrical machinery, apparatus, and supplies:</b>							
<b>Batteries and battery parts:</b>							
Dry, 6-inch, 1.5-volt.....	(2)	-----	(2)	-----	7	(2)	(2)
Dry, all other.....	87.7	89.6	10,974,470	396,688,668	14	(2)	(2)
Storage, motor-vehicle, 9- to 31-plate size.....	63.4	-----	34,060,891	-----	154	(2)	(2)
Storage, other than motor-vehicle and radio.....	(1)	-----	(1)	-----	38	(2)	(2)
Storage, parts and supplies.....	(1)	-----	(1)	-----	(2)	(2)	(2)
Wet primary.....	(1)	-----	(1)	-----	6	(2)	(2)
<b>Carbons:</b>							
Brushes and contacts (carbon, graphite, and metal-graphite) and parts for making brushes.....	57.7	-----	2,392,650	-----	28	(2)	(2)
Other, including packing rings, electrodes, and miscellaneous carbon, graphite, and metal-graphite specialties.....	97.2	-----	8,088,348	-----	13	(2)	(2)
<b>Conduits and conduit fittings, interior:</b>							
<b>Conduits:</b>							
Flexible steel.....	75.1	-----	186,980	-----	11	(2)	(2)
Rigid steel.....	46.8	-----	5,935,077	-----	19	(2)	(2)
Fittings, including elbows and couplings.....	55.6	-----	1,756,021	-----	26	(2)	(2)
Switch boxes, outlet boxes, and covers.....	61.4	-----	1,451,859	-----	28	(2)	(2)
<b>Control apparatus (except railway and vehicle controllers, all types):</b>							
<b>Industrial magnetic control:</b>							
For a. c. motors.....	77.6	-----	5,987,423	-----	16	(2)	(2)
For d. c. motors.....	92.9	-----	2,923,811	-----	12	(2)	(2)
<b>Industrial manual control:</b>							
For a. c. motors.....	88.9	-----	1,859,676	-----	15	(2)	(2)
Other control apparatus.....	75.9	-----	9,694,404	-----	36	(2)	(2)
<b>Electrotherapeutic and electro-medical apparatus; X-ray apparatus (exclusive of tubes) for general medical use.....</b>							
	80.9	-----	3,315,283	-----	14	(2)	(2)
<b>Fans (direct motor-driven):</b>							
Desk fans.....	56.1	-----	3,265,596	-----	27	(2)	(2)
Flashlight cases.....	79.0	-----	2,819,255	-----	8	(2)	(2)
<b>Furnaces (industrial), resistance.</b>							
Fuses (except high-voltage and power types):	87.9	-----	1,954,470	-----	10	(2)	(2)
Enclosed, renewable, 250 and 600 volts.....	72.6	78.2	1,241,693	4,197,873	15	(2)	(2)
Nonrenewable plug fuses, 125 volts.....	67.5	64.0	964,364	42,426,782	20	(2)	(2)
<b>Generators: Parts and supplies for generating apparatus.....</b>							
	86.6	-----	5,528,881	-----	15	(2)	(2)
<b>Heating units (industrial); strip, space, and ring heaters.</b>							
	95.4	-----	800,638	-----	11	(2)	(2)
<b>Household apparatus and appliances:</b>							
Flatirons, standard: Non-automatic, all sizes.....	54.3	49.5	1,235,323	977,402	24	(2)	(2)
Mixers and whippers.....	(1)	-----	(1)	-----	(2)	(2)	(2)
Ranges, electric household, 2½ kw. and over.....	84.5	81.2	11,509,157	157,884	12	(2)	(2)
<b>Toasters:</b>							
Automatic.....	(1)	-----	(1)	-----	10	(2)	(2)
Nonautomatic.....	52.4	54.0	825,315	704,593	22	(2)	(2)
<b>Vacuum cleaners:</b>							
Floor cleaners.....	76.9	66.5	17,400,557	579,972	19	(2)	(2)
Hand dusters.....	63.7	63.1	990,922	151,206	12	(2)	(2)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued.							
Electrical machinery, apparatus, and supplies—Continued.							
Household apparatus and appliances—Continued.							
Waffle irons and griddles.....	55.9	51.7	1,211,284	435,929	22	(3)	(3)
Miscellaneous domestic cooking and heating equipment and appliances.....	51.6	-----	1,757,972	-----	42	(3)	(3)
Ignition apparatus for internal-combustion engines:							
Coils.....	75.4	-----	3,621,368	-----	24	(3)	(3)
Magnetos.....	(2)	(2)	(2)	(2)	7	(3)	(3)
Spark plugs.....	(1)	-----	(1)	-----	29	(3)	(3)
Insulated wire and cable and armored conductor:							
Armored cable or conductor.....	39.7	-----	2,718,531	-----	21	(3)	(3)
Asbestos-insulated.....	90.8	-----	2,760,163	-----	10	(3)	(3)
Magnets:							
Cotton, silk, and rayon covered.....	59.7	-----	5,029,312	-----	20	(3)	(3)
Enameled.....	59.9	-----	5,076,769	-----	18	(3)	(3)
Rubber-insulated—							
Lighting and power circuit, braided.....	48.4	-----	12,340,375	-----	22	(3)	(3)
Lighting and power circuit, leaded.....	57.5	-----	2,681,055	-----	16	(3)	(3)
Telephone.....	(1)	-----	(1)	-----	(3)	(3)	(3)
Flexible cords (cotton, silk, and rayon covered).....	43.2	-----	4,962,076	-----	32	(3)	(3)
Varnished-cambric-insulated.....	64.2	-----	2,644,025	-----	16	(3)	(3)
Other insulated wire and cable.....	70.8	-----	17,412,922	-----	42	(3)	(3)
Lamps, incandescent-filament:							
Large tungsten.....	(1)	-----	(1)	-----	21	(3)	(3)
Miniature tungsten:							
Christmas-tree and flashlight.....	(1)	-----	(1)	-----	6	(3)	(3)
Motor-vehicle.....	93.9	92.1	6,365,699	121,965,810	10	(3)	(3)
Lamps, other, including vapor lamps, photoflash, and photoflood.....	(1)	-----	(1)	-----	10	(3)	(3)
Lightning arresters and choke coils except radio and telephone.....	98.7	97.7	2,832,774	1,115,860	10	(3)	(3)
Meters, miniature, 3½ inches and under (not including meters for motor vehicles).....	87.0	87.4	1,523,853	672,948	8	(3)	(3)
Meters, watt-hour, a. c.....	(1)	-----	(1)	-----	5	(3)	(3)
Motors (except railway), stationary:							
Under ½ hp. (toy motors, etc.).....	54.5	70.7	2,666,180	2,319,367	30	(3)	(3)
½ hp. and over but under 1 hp.:							
Direct-current.....	53.1	60.6	839,699	66,450	27	(3)	(3)
Repulsion-induction.....	61.3	53.7	4,384,365	291,216	24	(3)	(3)
Split-phase.....	78.8	81.6	12,461,624	2,093,721	27	(3)	(3)
Universal.....	94.0	95.0	2,682,866	490,724	14	(3)	(3)
Other.....	77.6	-----	4,219,954	-----	30	(2)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued.							
Electrical machinery, apparatus, and supplies—Continued.							
Motors (except railway), stationary—Continued.							
1 hp. and over:							
Alternating-current:							
Polyphase-induction:							
1 to 200 hp., inclusive.....	63.3	56.9	12,784,498	127,528	44	(3)	(3)
Over 200 hp.....	95.5		1,374,953		11	(3)	(3)
Repulsion-induction.....	66.1	57.2	1,705,254	38,959	22	(3)	(3)
Synchronous motors, over 200 hp.....	89.4		1,654,494		12	(3)	(3)
Direct-current, 1 to 200 hp., inclusive.....	75.7	50.4	4,775,166	15,318	32	(3)	(3)
Motors, automotive starter-motors (not including vehicle motors or control switches).....	73.8		18,681,595		36	(3)	(3)
Radio parts (coils, condensers, etc.).....	24.7		6,529,100		84	(2)	(3)
Relays (excluding industrial motor-control and telephone).....	91.0		604,505		10	(2)	(3)
Switchboard apparatus:							
Circuit breakers:							
Air circuit breakers, 1,200 volts and under.....	(1)		(1)		6	(3)	(3)
Indoor oil circuit breakers, all voltages and air circuit breakers over 1,200 volts.....	99.0		2,135,965		7	(3)	(3)
Outdoor oil circuit breakers, 34,500 volts and below.....	93.8		878,945		9	(3)	(3)
Outdoor oil circuit breakers, over 34,500 volts.....	(1)		(1)		5	(3)	(3)
Fuse cut-outs and fuse links, 2,300 to 15,000 volts, a. c., service.....	83.8		2,271,805		14	(3)	(3)
Panelboards including enclosing cabinets.....	53.1		1,575,436		62	(3)	(3)
Switches:							
Knife.....	62.4		2,656,041		46	(3)	(3)
Time.....	92.1		1,037,335		8	(3)	(3)
Switchboards and equipment, power—relays, regulators, etc.....	96.9		1,804,008		10	(3)	(3)
Switchboards, distribution.....	29.0		349,102		38	(3)	(3)
Switching equipment, power:							
Indoor.....	73.1		629,006		15	(3)	(3)
Outdoor.....	57.0		1,148,763		24	(3)	(3)
Telephone and telegraph apparatus.....	(1)		(1)		37	(3)	(3)
Transformers:							
Natural-draft air-cooled:							
Ignition and luminous tube.....	66.6		1,960,026		20	(3)	(3)
Radio for receiving sets.....	63.7		3,105,977		24	(3)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued.							
Electrical machinery, apparatus, and supplies—Continued.							
Transformers—Continued.							
Employing oil or other insulating liquid, and airblast:							
Distribution, ½-500 kv.-a.	89.2	88.1	13,846,687	94,889	24	(3)	(3)
Power, 501 kv.-a. and over	94.9		6,047,700		11	(3)	(3)
Other transformers, current-limiting reactors, and induction stepfeeder voltage regulators and boosters	(1)		(1)		23	(3)	(3)
Instrument and meter	94.4	93.7	1,972,904	55,413	14	(3)	(3)
Vacuum tubes, X-ray, other than rectifying-valve	(1)		(1)		7	(3)	(3)
Welding apparatus:							
Direct-current arc welding apparatus, motor-driven	88.6	89.3	2,930,006	5,131	12	(3)	(3)
Resistance welding apparatus and accessories, butt, spot, and line	68.1		2,216,410		19	(3)	(3)
Wiring devices:							
Attachment plugs and caps	74.9		1,653,253		24	(3)	(3)
Brass shell sockets (standard size)	59.0		909,394		12	(3)	(3)
All other lamp sockets and receptacles (all bases)	57.1		1,357,159		17	(3)	(3)
Convenience outlets	72.9		754,934		15	(3)	(3)
Miscellaneous wiring devices, n. e. c.	66.3		7,114,713		42	(3)	(3)
Wiring supplies, pole-line hardware	76.3		6,342,040		22	(3)	(3)
Radio apparatus and phonographs:							
Loud speakers made for sale separately	59.8		3,359,026		33	(3)	(3)
Phonographs for mechanical reproduction of records including cabinets	94.8		1,997,568		8	(3)	(3)
Public-address and music-distribution apparatus	65.3		1,817,959		31	(3)	(3)
Radio-phonograph combinations	92.8	87.2	2,284,005	20,366	14	(3)	(3)
Receiving sets for automobiles, general use:							
Factory price not over \$25	70.2	67.0	14,612,263	697,396	35	(3)	(3)
Over \$25	91.9	93.4	4,158,194	165,822	14	(3)	(3)
Receiving sets for home and general use, complete, standard broadcast:							
Socket-power-operated:							
Factory price not over \$11	46.2	44.1	2,555,825	285,415	35	(3)	(3)
Over \$11 but not over \$18	68.2	65.6	4,071,621	279,407	32	(3)	(3)
Over \$18 but not over \$30	84.8	85.1	1,885,201	87,933	18	(3)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued.							
Radio apparatus and phonographs—Continued.							
Receiving sets for home and general use, complete, extending beyond standard broadcast band:							
Socket-power-operated:							
Factory price not over \$18.....	49.5	52.4	4,858,672	407,576	26	(3)	(3)
Over \$18 but not over \$30.....	64.1	64.2	14,579,066	619,985	32	(3)	(3)
Over \$30 but not over \$45.....	71.4	71.4	18,743,562	503,291	26	(3)	(3)
Over \$45 but not over \$65.....	68.8	68.4	4,380,679	79,743	20	(3)	(3)
Over \$65 but not over \$100.....	83.6	83.0	6,859,602	88,707	18	(3)	(3)
Over \$100.....	91.6	93.6	3,097,076	27,587	8	(3)	(3)
Tubes, receiving:							
Initial equipment:							
Alternating-current:							
Glass.....	86.5	87.8	6,851,885	20,352,095	12	(3)	(3)
Metal.....	(1)		(1)		7	(3)	(3)
Replacement—Rectifiers.....	86.9	89.3	1,045,573	3,361,918	10	(3)	(3)
Refrigerators and refrigerating and ice-making apparatus:							
Cabinets, etc., for mechanical refrigerators, made for sale separately:							
Commercial:							
Display, storage, etc., cases.....	48.6		3,522,873		60	(3)	(3)
Refrigerator cabinets.....	37.8		1,414,983		94	(3)	(3)
Remote fountains or water coolers (low sides) and other commercial cabinets.....	74.4		964,587		16	(3)	(3)
Ice refrigerators and ice boxes:							
Commercial (milk and water coolers, etc.).....	33.8		1,090,093		97	(3)	(3)
Domestic (household).....	65.5		4,514,795		29	(3)	(3)
Mechanical refrigerators, compression type, electric:							
Commercial:							
Ice-cream cabinets, self-contained.....	85.2		2,276,947		14	(3)	(3)
Water coolers, self-contained.....	86.3		1,748,127		17	(3)	(3)
Other, self-contained.....	63.1		2,301,353		22	(3)	(3)
Domestic (household):							
Capacity under 6 cubic feet.....	72.4	70.5	44,115,690	617,037	24	(3)	(3)
6 to 10 cubic feet.....	66.9	65.0	36,904,509	348,762	31	(3)	(3)
10 cubic feet and over.....	93.6	94.7	2,273,002	11,068	9	(3)	(3)
Refrigerating and ice-making machines, commercial and industrial:							
Complete machine:							
Capacity less than 10 tons per 24 hours.....	80.4		2,130,622		19	(3)	(3)
10 or more but under 100 tons.....	84.0		2,684,278		13	(3)	(3)
Compressors made for sale separately.....	(1)		(1)		14	(3)	(3)

See footnotes at end of table.

TABLE 1C.—Basic data for each of the 392 products analyzed for 1935—Continued

Products	Concentration ratio		Production of 4 leading companies		Number of companies in United States	Number of establishments	
	Value	Quantity	Value	Quantity		All companies	4 leading companies
	(1)	(2)	(3)	(4)		(6)	(7)
MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued.							
Refrigerators and refrigerating and ice-making apparatus—Con.							
Systems for mechanical refrigerators (commercial and domestic):							
Evaporators made for sale separately.....	93.4		1,992,347		13	( <sup>1</sup> )	( <sup>1</sup> )
High sides made for sale separately.....	82.5	83.6	4,769,159	47,989	14	( <sup>2</sup> )	( <sup>2</sup> )
Low sides made for sale separately.....	76.0		1,085,256		16	( <sup>1</sup> )	( <sup>1</sup> )
Systems complete without cabinets.....	97.5	98.4	10,766,628	238,397	15	( <sup>2</sup> )	( <sup>1</sup> )
Washing machines, wringers, driers, and ironing machines for household use:							
Ironing machines, electric.....	52.3	51.1	2,412,521	75,414	16	( <sup>1</sup> )	( <sup>2</sup> )
Washing machines:							
Electric, standard size.....	55.7	50.6	23,985,295	603,313	24	( <sup>2</sup> )	( <sup>2</sup> )
Gas or gasoline-engine-driven, standard size.....	75.9	74.8	6,823,087	124,869	22	( <sup>2</sup> )	( <sup>2</sup> )
Wringers, driers, and extractors.....	98.1		2,435,020		9	( <sup>2</sup> )	( <sup>2</sup> )
Parts and accessories.....	82.6		2,590,546		19	( <sup>2</sup> )	( <sup>2</sup> )
MISCELLANEOUS INDUSTRIES GROUP							
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:							
Fabrics, waterproofing.....	66.3		300,444		13	( <sup>2</sup> )	( <sup>2</sup> )
Felt:							
Asphalt-saturated.....	51.1	36.5	3,187,327	67,970	24	( <sup>2</sup> )	( <sup>2</sup> )
Tar-saturated.....	91.3	90.3	1,658,606	35,491	12	( <sup>2</sup> )	( <sup>2</sup> )
Roof cements (solid), asphalt.....	84.4	67.6	1,227,473	72,386	19	( <sup>2</sup> )	( <sup>2</sup> )
Roof cement, fibrous plastic.....	45.8	44.4	602,699	14,749,288	48	( <sup>2</sup> )	( <sup>2</sup> )
Roof coating:							
Fibrous liquid.....	32.5	36.4	497,705	2,008,580	46	( <sup>2</sup> )	( <sup>2</sup> )
Nonfibrous liquid.....	53.3		1,336,068		54	( <sup>2</sup> )	( <sup>2</sup> )
Roofing:							
Asphalt grit roll.....	48.7	51.0	5,384,867	4,060,447	25	( <sup>2</sup> )	( <sup>2</sup> )
Asphalt smooth roll.....	40.6	39.2	5,962,495	5,759,476	28	( <sup>2</sup> )	( <sup>2</sup> )
Roofing pitch, coal-tar.....	( <sup>1</sup> )		( <sup>1</sup> )		7	( <sup>2</sup> )	( <sup>2</sup> )
Shingles:							
Asphalt individual.....	45.9	40.5	2,255,223	687,792	23	( <sup>2</sup> )	( <sup>2</sup> )
Asphalt strip.....	44.5	40.1	9,747,171	2,429,668	24	( <sup>2</sup> )	( <sup>2</sup> )
Siding, asphalt brick.....	86.0	89.1	1,069,159	247,050	10	( <sup>2</sup> )	( <sup>2</sup> )

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

<sup>3</sup> Data not computed.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-37, for the sample of 392 products

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>FOOD AND KINDRED PRODUCTS GROUP</b>						
Liquors, distilled:						
Distillers' grains.....	67.8	57.9	-14.6			2
Gin.....	42.5	41.7	-1.9	+24.1	-31.5	2
Whisky:						
Corn and bourbon.....	54.3	38.3	-29.5	-12.4	-19.4	4
Rye.....	63.4	47.5	-25.1	-34.1	-10.0	3
Meat packing, wholesale:						
Hides, skins, and pelts:						
Calfskins, cured.....	72.8	74.2	+1.9	+17.7	+34.7	4
Cattle hides:						
Cured.....	65.8	65.7	-.2	+11.1	+41.5	4
Uncured.....	30.9	28.4	-8.1	-2.1	+36.4	2
Sheep and lamb pelts:						
Cured.....	72.5	74.1	+2.2	+10.3	+66.3	3
Uncured.....	(1)	(1)				
Sheepskins and lambskins, pickled.....	(1)	100.0				4
Lard.....	50.9	48.8	-4.1	+13.0	-13.5	4
Meat, cured:						
Beef, pickled and other cured.....	53.5	53.1	-.7	+13.3	+10.5	3
Hams, cooked.....	54.9	44.4	-19.1	-37.3	+18.5	3
Pork:						
Dry-salted, smoked.....	32.3	40.7	+26.0	+41.3	-.5	2
Dry-salted, not smoked.....	56.4	54.6	-3.2	+11.4	-5.1	4
Pickled and dry-cured, smoked.....	47.4	45.9	-3.2	+16.2	+4.0	4
Pickled and dry-cured, not smoked.....	68.6	70.1	+2.2	-.2	-1.6	4
Meat, fresh:						
Beef.....	60.7	58.2	-4.1	+10.3	+12.4	4
Edible organs, tripe, etc.....	60.8	68.5	+4.4	+16.1	0	4
Mutton and lamb.....	76.6	74.5	-2.7	+1.1	+12.2	4
Pork.....	44.9	45.5	+1.3	+22.0	+3.8	4
Veal.....	60.3	59.4	-1.5	+17.7	+11.6	4
Oleo oil.....	93.7	(2)		+7.5	+6.7	
Wool.....	96.7	(1)		-3.2	+51.6	
Sausage casings made in the sausage, the meat-packing, and in other industries:						
Beef casings.....	64.9	58.7	-9.6			
Hog casings.....	48.8	52.7	+8.0			
Sheep and lamb casings.....	46.8	51.5	+10.0			
Sausage, meat puddings, headcheese, etc., made in the sausage, the meat-packing, and in other industries: Canned sausage.....	71.2	79.8	+12.1	+44.7	-10.1	
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>						
Linoleum:						
Cork carpet.....	100.0	100.0	0	+70.5	+17.0	
Inlaid.....	100.0	100.0	0	+40.5	+7.7	
Printed.....	(1)	100.0				
Woolen woven goods, including woven felts, and worsted woven goods:						
Auto cloths, woven wholly or in part of woolen or worsted spun yarns:						
With pile.....	(1)	(2)				
Without pile.....	55.5	46.4	-16.4	-7.1	+73.9	2
Billiard cloths.....	(1)	(1)				
Blankets, bed and camp, except crib: 98 percent or more wool or similar animal fibers.....	39.5	48.4	+22.5	-46.4	+102.9	3
Shirtings, all-wool woolen, all-wool worsted, and all other.....	82.5	59.9	-27.4	-50.6	+146.3	
Woven felts, papermakers'.....	58.6	59.0	+7			4

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-37, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>PAPER AND ALLIED PRODUCTS GROUP</b>						
Paper and paperboard:						
Boards:						
Binders' board.....	92.1	91.6	- .5	-15.7	-1.3	-----
Container boards:						
Chip (plain and test).....	40.1	41.8	+4.2	+23.3	+25.3	-----
Liners:						
Jute.....	43.6	46.0	+5.5	+27.3	+14.5	-----
Kraft.....	65.9	69.5	+5.5	+37.6	+6.9	-----
Other.....	58.1	62.5	+7.6	+63.7	+18.0	-----
Straw (for corrugated-container use).....	52.7	45.0	-14.6	+27.4	+7.6	-----
Folding boxboards (bending):						
Manila-lined (all lined boards).....	28.9	32.2	+11.4	+6.2	+12.4	-----
Patent-coated.....	39.7	41.8	+5.3	+34.9	+12.1	-----
Other.....	64.4	49.4	-23.3	+31.3	+15.3	-----
Leatherboard.....	60.3	79.1	+31.2	+1.6	+2.2	-----
Set-up boxboards (nonbending):						
Chip and straw.....	52.8	55.5	+5.1	+19.0	+14.7	-----
Newsboard.....	35.6	36.4	+2.2	+11.6	+10.5	-----
Other (including tube, egg-case, etc.).....	56.3	50.6	-10.1	+14.6	+10.6	-----
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>						
Paints, pigments, and varnishes:						
Dry colors and pigments:						
Chemical pigments:						
Chrome greens, C. P.....	66.6	62.3	-6.5	+46.6	0	2
Chrome yellows and oranges, c. p.....	69.2	72.0	+4.0	-9.3	+55.6	3
Iron blues (Prussian), C. P.....	63.6	67.9	+6.8	+25.9	0	-----
Lead oxides:						
Litharge.....	90.8	(1)	-----	+9.8	+40.0	-----
Red lead, minium, and other.....	92.6	(1)	-----	+34.2	+16.7	-----
Lithopone.....	75.4	94.6	+25.5	+8	0	-----
Zinc oxides (Chinese white, zinc white).....	73.4	87.3	+18.9	+25.9	0	4
Lakes:						
Coal-tar color lakes:						
Peacock blue.....	65.2	60.1	-7.8	+6.7	-3.5	2
Persian orange.....	63.3	63.2	-0.2	+21.5	-2	-----
Scarlet 2r.....	77.6	66.1	-14.8	+126.7	-9.4	2
Toners, full strength:						
Lithol, C. P.....	65.3	69.3	+6.1	+30.9	+13.6	-----
Para, C. P.....	60.1	71.4	+18.8	+19.2	+4.2	2
Phosphotungstic acid:						
Blue.....	58.4	60.8	+4.1	+55.2	+10.2	-----
Green.....	62.8	66.9	+6.5	+114.4	+8	-----
Purple.....	51.5	52.1	+1.2	+32.7	+7.3	2
Other.....	66.6	71.4	+7.2	+36.6	-28.1	2
Red, all other.....	72.1	65.9	-8.6	-38.1	-21.1	-----
Toluidine, C. P.....	61.7	66.3	+7.5	+34.4	-6.0	2
Other.....	100.0	(1)	-----	+46.3	+77.8	-----
Whiting.....	79.4	73.0	-8.1	-1.3	0	3
Fillers:						
Dry.....	84.3	71.4	-15.3	+54.5	-50.0	0
Liquid.....	47.4	41.0	-13.5	-13.9	-20.5	0
Paste.....	38.1	59.0	+54.9	+102.3	+42.9	2
Paints:						
Paste paints:						
Colors in oil.....	29.1	29.9	+2.7	+13.8	-10.5	3
Colors in japan.....	44.1	39.4	-10.7	+44.0	-3.5	3
Combination or graded whites.....	35.4	59.0	+66.7	+136.0	0	3
Red lead in oil.....	66.8	70.6	+5.7	+31.4	+33.3	2
White lead in oil, pure.....	90.1	90.6	+0.6	-19.1	+25.0	4
Zinc oxide in oil.....	35.6	(1)	-----	+407.0	-16.7	0
Other.....	23.6	30.8	+30.5	+3.8	-10.0	2

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-1937, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued.</b>						
<b>Paints, pigments, and varnishes—Con. Paints—Continued.</b>						
Plastic paints.....	44.8	60.5	+35.0	+17.7	+16.7	1
Ready-mixed and semipaste paints:						
Paints in oil, ready-mixed....	25.9	28.0	+8.1	+20.8	+3.8	3
Stains (not varnish stains)....	29.1	28.1	-3.4	+26.0	-9	3
Undercoatings and primers....	44.7	40.2	-10.1	+41.6	+3.4	3
Wall paints and mill whites, flat or gloss.....	32.3	32.8	+1.5	+22.7	+2.8	3
Other.....	21.1	28.4	+34.6	+12.5	+9.8	3
Water paints and calcimines, dry or paste.....	60.5	39.4	-34.9	+20.5	+25.0	4
Putty.....	23.5	28.7	+22.1	+26.0	0	4
Shellac, bleached.....	72.0	63.3	-12.1	+16.9	-5.3	2
Varnishes, lacquers (including enamels), and japans:						
Enamels:						
Oil, ester-gum, and natural resin, varnish base.....	34.1	29.5	-13.5	+18.5	-0.6	4
Synthetic-resin (oil, straight or modified).....	63.9	59.4	-7.0	+64.8	+0.5	3
Japans:						
Baking.....	42.4	39.5	-6.8	-7.3	+24.6	2
Drying japans and driers.....	37.4	41.5	+11.0	+90.3	-9.8	4
Nitrocellulose (pyroxylin) products:						
Lacquers:						
Clear.....	30.6	22.5	-26.5	+56.8	+11.6	3
Pigmented.....	52.6	43.7	-16.9	+26.8	-11.6	4
Lacquer bases and dopes.....	55.2	56.0	+1.4	+56.8	-4.1	1
Thinners.....	48.1	49.8	+3.5	+29.9	-7.3	2
Varnishes:						
Spirit, not turpentine.....	21.1	21.3	+9	+6.7	-5.5	3
Synthetic-oleoresinous, straight or modified (100 percent synthetic resin).....	25.5	28.6	+12.2	+47.2	+2.6	2
Other resinous except synthetic (100 percent natural resin).....	31.2	30.2	-3.2	+5	+8.3	2
Other varnishes.....	27.7	25.1	-9.4	+138.9	-38.0	2
Varnish stains.....	37.6	32.8	-12.8	+22.5	-6	2
Other products of the varnish group.....	48.3	53.6	+11.0			1
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>						
<b>Petroleum refining:</b>						
Acid oil.....	96.1	(1)		-38.9	+1.0	
Asphalt, other than liquid asphalt.....	70.7	62.9	-11.0	+38.0	-2.2	3
Distillates.....	57.0	58.1	+1.9	+68.2	+33.3	3
Gas oils.....	47.5	48.3	+1.7	+16.4	+33.3	3
Gasoline.....	36.7	35.8	-2.5	+22.3	0	4
Illuminating oils.....	45.1	47.9	+6.2	+14.3	+25.0	4
Lubricating greases, including axle grease.....	55.9	59.2	+5.9	+23.0	3	4
Lubricating oils:						
Black, cylinder, red, neutral, pale, and paraffin.....	42.5	44.5	+4.7	+24.9	0	3
Other, including compounded and unclassified.....	48.1	46.6	-3.1	+9.9	+25.0	3
Naphtha.....	56.2	50.5	-10.1	+29.7	+16.7	3
Paraffin wax.....	64.3	39.4	-38.7	+18.5	+10.5	3
Partially refined oils, sold for re-running.....	64.4	79.2	+23.0			3

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-37, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>PRODUCTS OF PETROLEUM AND COAL GROUP—continued</b>						
<b>Petroleum refining—Continued.</b>						
Petrolatum, mineral jelly, etc.....	69.7	69.2	-.7	+26.0	+21.4	3
Petroleum coke.....	58.4	72.9	+24.8	-8.1	-4.8	4
Residual fuel oils.....	38.1	39.8	+4.5	+14.7	0	4
Residuum or tar.....	85.7	(1)		-76.9	+1.0	
Road oils, liquid asphaltic.....	49.8	51.2	+2.8	+18.2	0	3
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>						
<b>Clay products, other than pottery:</b>						
<b>Brick:</b>						
Common.....	7.5	7.0	-6.7	+79.6	+3.9	1
Face.....	15.9	15.9	0	+98.4	+3.2	2
Hollow.....	79.1	57.5	-27.3	+5.3	-46.9	1
Chimney pipe and tops.....	55.0	68.5	+24.5	+175.9	-1.6	2
Clay sold, raw or prepared, including fire-clay dust.....	42.0	44.7	+6.4	+56.0	-9.3	2
<b>Fire-clay products:</b>						
Brick, block, or tile, except high-alumina (9-inch equivalent).....	43.0	43.6	+1.4	+45.5	+15.6	2
Brick, high-alumina.....	65.0	67.0	+3.1	+107.7	-4.1	4
Special shapes.....	44.9	51.4	+14.5	+18.0	+23.3	2
Flue lining.....	33.4	33.0	-1.2	+48.3	+17.3	3
Glass-house tank blocks, melting pots, stoppers, floaters, and rings.....	82.4	79.1	-4.0	+43.1	-5.3	4
Refractory cement (clay).....	45.1	44.0	-2.4	+57.0	-9.4	4
Segment blocks.....	100.0	100.0	0	-32.2	-16.3	2
Sewer pipe.....	33.2	37.4	+12.7	+45.2	+9.6	3
Stove lining.....	66.1	66.2	+2	+59.9	-17.9	3
Terra cotta.....	62.8	64.9	+3.3	+63.8	+16.5	3
<b>Tile:</b>						
Ceramic mosaic (vitreous and semivitreous, unglazed).....	59.6	56.8	-4.7	+82.9	-4.8	3
<b>Drain tile:</b>						
Vitrified (under drain).....	52.9	54.9	+3.8	+93.8	+1.4	2
Unvitrified.....	25.4	24.8	-2.4	+49.7	+11.0	2
Enameled tile and glazed ceramic mosaic.....	63.9	48.2	-24.6	+127.7	+6.9	1
Falence tile (including hand-decorated tile).....	67.7	75.4	+11.4	+211.4	-39.0	1
Floor tile.....	47.1	62.5	+32.7	+75.3	-7.1	3
Hollow building tile: Conduit tile.....	80.0	92.4	+15.5	-1.0	+42.1	2
Roofing tile.....	69.4	73.4	+5.8	+69.2	+5.9	3
Wall tile, including trim.....	52.1	53.8	+3.3	-6.1	-6.9	1
<b>Vitrified brick and plates:</b>						
For paving.....	53.3	44.4	-16.7	+17.9	+8	2
Sewer liners.....	64.5	(2)		+7.4	-2.7	1
Wall coping.....	57.9	50.4	-13.0	+10.1	+10.9	2
<b>Gypsum:</b>						
Keene's cement.....	89.8	(1)		+71.1	+2.7	
<b>Plaster:</b>						
Calcined.....	74.3	72.4	-2.6	+264.4	+44.1	4
Industrial.....	96.0	92.3	-3.9	+58.5	+40.2	3
Molding and gaging.....	92.1	92.2	+1	+63.4	-6.8	4
Neat.....	79.7	84.7	+6.3	+98.4	-11.7	4
Prepared finish.....	84.8	85.7	+1.1	+131.9	+25.6	3
Sanded.....	65.2	69.4	+6.4	+226.2	-9.2	4
Other.....	84.8	70.5	-16.9			3
Plaster board and lath.....	86.1	90.7	+5.3	+255.4	-11.6	3
<b>Rock:</b>						
Agricultural gypsum.....	83.9	85.8	+2.3	-13.7	-42.1	2
For portland cement.....	85.7	81.5	-4.9	+112.1	+21.3	2
Other gypsum rock.....	(1)	(1)		-3.3	+11.2	2
Tile, partition and wall.....	73.9	84.7	+14.6			3
Wallboard.....	86.6	93.4	+7.9	+49.0	-12.1	3
<b>Nonclay refractories:</b>						
<b>Graphite and other carbon:</b>						
Crucibles and retorts.....	72.7	74.1	+1.9			
Other carbon refractories.....	(1)	100.0				

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-37, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP—continued</b>						
Nonclay refractories—Continued.						
Magnesite and chrome brick.....	100.0	100.0	0	+87.9	+4.5	-----
Silica brick.....	77.2	72.7	-5.8	+47.1	+6.4	4
Pottery, including porcelain ware:						
Plumbing fixtures (exclusive of fittings), vitreous china:						
Lavatories.....	89.8	88.1	-1.9	+70.8	+13.5	3
Lowdown flush tanks.....	69.1	61.3	-11.3	+10.3	+12.7	2
Reverse traps.....	78.0	79.6	+2.1	+105.7	+28.3	2
Siphon jets.....	81.6	80.5	-1.3	+52.7	+20.1	3
Stalls.....	94.9	86.5	-8.9	+79.8	+6.3	2
Washdowns.....	73.7	63.2	-14.2	-7.7	+24.8	3
Other vitreous-china fixtures.....	76.2	80.5	+5.6	-----	-----	2
Plumbing fixtures (exclusive of fittings), semivitreous or porcelain.....	(2)	82.7	-----	-----	-----	-----
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP</b>						
Heating and cooking apparatus, except electric:						
Boilers, steam and hot-water heating:						
Cast-iron.....	50.4	54.9	+8.9	-----	-----	-----
Steel.....	92.4	62.0	-32.9	-----	-----	-----
Boiler-burner units:						
Fuel oil.....	87.0	93.7	+7.7	-----	-----	-----
Gas.....	74.2	(1)	-----	-----	-----	-----
Brooders.....	57.7	57.5	-.3	-----	-----	-----
Burners:						
Distillate-oil, for cooking and heating stoves.....						
Oil:	55.8	66.9	+20.0	-----	-----	-----
Commercial, mechanical, and forced draft.....	(1)	79.4	-----	-----	-----	-----
Domestic (for central heating systems and water heating):	-----	-----	-----	-----	-----	-----
Atmospheric (natural) draft.....	88.0	89.6	+1.8	+36.1	-3.9	-----
Mechanical or forced draft.....	36.5	34.1	-6.6	-----	-----	-----
Cooking stoves and ranges:						
Coal and wood, porcelain-enameled.....						
Coal and wood, other than porcelain-enameled.....	34.6	27.9	-19.4	-----	-----	-----
Combination (coal, wood, and gas):	28.0	25.1	-10.4	-----	-----	-----
Porcelain-enameled.....	43.6	45.6	+4.6	-----	-----	-----
Other than porcelain-enameled.....	91.8	(1)	-----	+110.3	+2.7	-----
Gas:						
Porcelain-enameled, with ovens.....	35.3	36.1	+2.3	-----	-----	-----
Porcelain-enameled, without ovens.....	(2)	(2)	-----	-----	-----	-----
Other than porcelain-enameled, with and without ovens.....	85.1	80.5	-5.4	+49.5	+40.5	-----
Gasoline (except camp stoves), porcelain-enameled and other.....	92.0	79.9	-13.2	+31.8	+23.1	-----
Fittings, valves, and faucets.....	59.2	63.5	+7.3	-----	-----	-----
Furnaces, warm-air:						
Manufactured.....	30.9	33.4	+8.1	-----	-----	-----
Parts and registers.....	51.3	61.1	+19.1	-----	-----	-----
Furnace-burner units: Fuel oil.....	84.3	60.2	-28.6	+221.2	-19.8	-----
Heating stoves, coal and wood:						
Cast-steel:						
Porcelain-enameled.....	29.5	29.1	-1.4	-----	-----	-----
Other than porcelain-enameled.....	24.6	20.0	-18.7	-----	-----	-----
Sheet-metal.....	77.9	71.0	-8.9	+63.5	-11.3	-----

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-1937, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP—CON.</b>						
<b>Heating and cooking apparatus, except electric.—Continued.</b>						
Hot plates, gas.....	41.0	57.4	+40.0	+4.9	-29.1	-----
Incinerators.....	94.6	97.9	+3.5	-----	-----	-----
Incubators.....	76.7	64.6	-15.8	-----	-----	-----
Laundry, orchard, etc., stoves.....	77.9	48.6	-37.6	-----	-----	-----
Parts for burners, oil and gas.....	59.3	47.8	-19.4	-----	-----	-----
Parts for heating boilers.....	(1)	68.0	-----	-----	-----	-----
Parts for stoves, ranges, and heaters:						
Coal and wood.....	26.8	20.7	-22.8	-----	-----	-----
Gas.....	41.2	37.4	-9.2	-----	-----	-----
Kerosene, distillate, and fuel oil.....	85.2	78.3	-8.1	-----	-----	-----
Portable ovens.....	62.3	72.3	+16.1	+10.6	-59.4	-----
Radiators:						
Cast-iron.....	54.5	61.0	+11.9	-----	-----	-----
Copper.....	84.8	83.4	-1.7	-----	-----	-----
Gas- and oil-fired.....	(1)	100.0	-----	-----	-----	-----
Regulators.....	59.1	44.9	-24.0	-----	-----	-----
Room heaters: Gas.....	40.4	26.6	-34.2	-----	-----	-----
Steam tables.....	59.8	53.2	-11.0	-----	-----	-----
Thermostats.....	64.7	75.1	+16.1	-----	-----	-----
Traps.....	48.5	58.5	+20.6	-----	-----	-----
Unit heaters.....	42.0	50.2	+19.5	-----	-----	-----
Water heaters:						
Coal and wood:						
With storage tanks attached.....	72.9	77.0	+5.6	-----	-----	-----
Without storage tanks.....	53.2	61.0	+14.7	-7.8	-8.3	-----
Gas:						
With storage tanks attached.....	52.5	49.3	-6.1	-----	-----	-----
Without storage tanks.....	58.0	44.5	-23.3	-----	-----	-----
Gasoline, including parts for gasoline stoves, ranges, and heaters.....	99.9	(1)	-----	-----	-----	-----
Miscellaneous cafeteria, hotel, and kitchen apparatus.....	39.9	38.7	-3.0	-----	-----	-----
Miscellaneous specialties.....	31.1	36.2	+16.4	-----	-----	-----
Equipment not reported by kind.....	68.6	79.6	+16.0	-----	-----	-----
<b>Plumbers' supplies, not including pipe or vitreous-china sanitary ware:</b>						
Bathtubs, enameled-iron.....	80.2	73.4	-8.5	+32.5	+14.9	3
Drinking fountains:						
Enameled-iron.....	93.1	(2)	-----	-----	-----	2
Other than enameled-iron and vitreous-china.....	(1)	(1)	-----	-----	-----	-----
Flush tanks, enameled-iron.....	84.6	91.4	+8.0	+24.1	+24.4	2
Laundry tubs, enameled-iron.....	83.7	80.5	-3.8	+93.4	+10.9	-----
Lavatories, enameled-iron.....	77.7	69.4	-10.7	+25.9	+17.6	3
Range boilers:						
Copper and nonferrous-alloy, 25- to 180-gallon capacity.....	67.3	57.9	-14.0	+6.8	+9.5	2
Galvanized iron, 180- to 192-gallon capacity.....	48.2	41.5	-13.9	+9.0	+5.4	3
Sinks, enameled-iron.....	75.3	63.5	-15.7	+31.3	+14.1	3
Sink and laundry tray combinations, enameled-iron.....	88.6	80.3	-9.4	-12.0	+13.9	1
Tanks and shell for water heaters.....	(2)	(2)	-----	-----	-----	2
Toilet seats:						
Wood.....	51.1	46.0	-10.0	+29.3	+16.4	1
Other than wood.....	92.0	(1)	-----	+62.8	-0.4	-----
<b>Steel-works and rolling-mill products:</b>						
Finished hot-rolled products and forgings:						
Rails.....	(1)	(1)	-----	+103.5	+3.3	-----
Structural shapes (not assembled or fabricated: Heavy (leg or web 3 inches and over).....	88.9	(1)	-----	+133.2	+14.2	-----
<b>Tin cans and other tinware, n. e. c.:</b>						
Dairy milk cans.....	74.2	68.3	-8.0	-----	-----	3
Sanitary cans including sweetened-condensed-milk cans.....	(1)	(1)	-----	+26.1	0	-----
Venthole-top cans.....	83.9	88.8	+5.8	+1.4	0	3
Other cans and packages.....	(1)	74.8	-----	-----	-----	3

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-1937, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>						
<b>Electrical machinery, apparatus, and supplies:</b>						
<b>Batteries and battery parts:</b>						
Dry, 6-inch, 1.5-volt	(2)	91.3				1
Dry, all other	87.7	80.0	-8.8			3
Storage, motor-vehicle, 9- to 31-plate size	63.4	68.0	+7.3			4
Storage, other than motor-vehicle and radio	(1)	(1)				
Storage, parts and supplies	(1)	73.8				
Wet primary	(1)	98.6				
<b>Carbons:</b>						
Brushes and contacts (carbon, graphite, and metal-graphite) and parts for making brushes	57.7	50.4	-12.7			3
Other, including packing rings, electrodes, and miscellaneous carbon, graphite, and metal-graphite specialties	97.2	(1)				
<b>Conduits and conduit fittings, interior:</b>						
Conduits, flexible steel	75.1	92.8	+23.6			3
Conduits, rigid steel	46.8	49.1	+4.9			2
Fittings, including elbows and couplings	55.6	65.7	+18.2			4
Switch boxes, outlet boxes, and covers	61.4	62.6	+2.0			1
<b>Control apparatus (except railway and vehicle controllers, all types):</b>						
<b>Industrial magnetic control:</b>						
For alternating current motors	77.6	73.3	-5.6			2
For direct current motors	92.9	94.7	+1.9			4
Industrial manual control: For alternating current motors	88.9	84.9	-4.5			4
Other control apparatus	75.9	72.5	-4.5			3
<b>Electrotherapeutic and electromedical apparatus: X-ray apparatus (exclusive of tubes) for general medical use</b>						
	80.9	88.4	+9.3			
<b>Fans (direct motor-driven): Desk fans</b>						
	56.1	54.4	-3.0			3
Flashlight cases	79.0	(2)				3
Furnaces (industrial), resistance	87.9	76.3	-13.2			3
<b>Fuses (except high-voltage and power types):</b>						
Enclosed renewable, 250 and 600 volts	72.6	78.4	+8.0	-23.2	+53.1	1
Nonrenewable plug fuses, 125 volts	67.5	71.6	+6.1	+20.7	0	2
<b>Generators: Parts and supplies for generating apparatus</b>						
	86.6	88.7	+2.4			
<b>Heating units (industrial): strip, space, and ring heaters</b>						
	95.4	92.7	-2.8			3
<b>Household apparatus and appliances:</b>						
Flatirons, standard: Nonautomatic, all sizes	51.3	59.5	+9.6	+8.5	+2.6	4
Mixers and whippers	(1)	85.9				
Ranges, electric household, 2½-kilowatts and over	84.5	(1)		+75.2	-0.6	3
Toasters, automatic	(1)	(1)				
Toasters, nonautomatic	52.4	41.9	-20.0	+19.7	+8.3	3
<b>Vacuum cleaners:</b>						
Floor cleaners	76.9	69.6	-9.5			3
Hand dusters	63.7	65.3	+2.5	+63.5	+18.3	3
Waffle irons and griddles	55.9	52.6	-5.9	+11.4	- .8	2
Miscellaneous domestic cooking and heating equipment and appliances	51.6	56.4	+9.3			1

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-37, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>						
<b>Electrical machinery, apparatus, and supplies—Continued</b>						
Ignition apparatus for internal-combustion engines:						
Coils.....	75.4	79.5	+5.4			2
Magnetos.....	80.8	(1)				
Spark plugs.....	(1)	(1)				
Insulated wire and cable and armored conductor:						
Armored cable or conductor.....	39.7	53.8	+35.5			1
Asbestos-insulated.....	90.8	84.8	-6.6			3
Magnet:						
Cotton, silk, and rayon covered.....	59.7	65.9	+10.4			4
Enameled.....	59.9	65.6	+9.5			2
Rubber-insulated:						
Lighting and power circuit, braided.....	48.4	52.1	+7.6			3
Lighting and power circuit, leaded.....	57.5	58.1	+1.0			2
Telephone.....	(1)	89.7				
Flexible cords (cotton, silk, and rayon covered).....	43.2	48.6	+12.5			3
Varnished-cambric-insulated.....	64.2	70.2	+9.3			2
Other insulated wire and cable.....	70.8	63.7	-10.0			2
Lamps, incandescent-filament:						
Large tungsten.....	(1)	(1)				
Miniature tungsten:						
Christmas-tree and flashlight.....	(1)	93.8				
Motor-vehicle.....	93.9	(1)		+33.2	0	3
Lamps, other, including vapor lamps, photoflash, and photoflood.....	(1)	(1)				
Lightning arresters and choke coils except radio and telephone.....	98.7	98.7	0			2
Meters, miniature, 3½ inches and under (not including meters for motor vehicles).....	87.0	(2)		-56.1	+155.1	3
Meters, watt-hour, a. c.....	(1)	100.0				
Motors (except railway), stationary:						
Under 1/20 hp. (toy motors, etc.).....	54.5	74.8	+37.2			3
1/20 hp. and over but under 1 hp:						
Direct-current.....	58.1	70.1	+20.7	+99.6	+7.4	4
Repulsion-induction.....	61.3	60.6	-1.1	+31.3	+6.8	3
Split-phase.....	78.8	75.5	-4.2			3
Universal.....	94.0	91.6	-2.6	+264.6	-56.9	2
Other.....	77.6	87.7	+13.0			1
1 hp. and over:						
Alternating-current:						
Polyphase-induction:						
1-200 hp., inclusive.....	63.3	67.3	+6.3	+90.0	+5.0	4
Over 200 hp.....	95.5	92.8	-2.8			3
Repulsion-induction.....	66.1	67.2	+1.7	+23.3	+11.8	3
Synchronous motors, over 200 hp.....	89.4	(2)				
Direct-current, 1-200 hp., inclusive.....	75.7	79.4	+4.9	+65.8	+26.5	4
Motors, automotive starter-motors (not including vehicle motors or control switches).....	73.8	(2)				
Radio parts (coils, condensers, etc.).....	24.7	21.0	-15.0			
Relays (excluding industrial motor-control and telephone).....	91.0	(1)				
Switchboard apparatus:						
Circuit breakers:						
Air circuit breakers, 1,200 volts and under.....	(1)	97.0				3
Indoor oil circuit breakers, all voltages and air circuit breakers over 1,200 volts.....	99.0	(1)				3

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-37, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued						
Electrical machinery, apparatus, and supplies—Continued						
Switchboard apparatus—Continued.						
Circuit breakers—Continued.						
Outdoor oil circuit breakers, 34,500 volts and below	93.8	(1)	-----	-----	-----	4
Outdoor oil circuit breakers, over 34,500 volts	(1)	(2)	-----	-----	-----	-----
Fuse cut-outs and fuse links, 2,300 to 15,000 volts, a. c., service	83.8	86.6	+3.3	-----	-----	3
Panelboards including enclosing cabinets	53.1	54.7	+3.0	-----	-----	3
Switches:						
Knife	62.4	74.2	+18.9	-----	-----	2
Time	92.1	90.6	-1.6	-----	-----	3
Switchboards and equipment, power:						
Relays, regulators, etc.	96.9	94.0	-3.0	-----	-----	3
Switchboards, distribution	29.0	43.8	+51.0	-----	-----	1
Switching equipment, power:						
Indoor	73.1	72.1	-1.4	-----	-----	3
Outdoor	57.0	62.6	+9.8	-----	-----	4
Telephone and telegraph apparatus	(1)	(1)	-----	-----	-----	-----
Transformers:						
Natural-draft air-cooled:						
Ignition and luminous tube	66.6	59.9	-10.1	-----	-----	2
Radio for receiving sets	63.7	50.6	-20.6	-----	-----	3
Employing oil or other insulating liquid, and air-blast:						
Distribution, ½-500 kv.-a.	89.2	87.8	-1.6	-----	-----	4
Power, 501 kv.-a. and over	94.9	95.0	+ .1	-----	-----	4
Other transformers, current-limiting reactors, and induction stepfeeder voltage regulators and boosters	(1)	95.6	-----	-----	-----	-----
Transformers, instrument and meter	94.4	(1)	+155.0	-2.1	-----	-----
Vacuum tubes, X-ray, other than rectifying-valve	(1)	84.4	-----	-----	-----	-----
Welding apparatus:						
Direct-current arc welding apparatus, motor-driven	88.6	79.2	-10.6	+126.9	-21.4	3
Resistance welding apparatus and accessories, butt, spot, and line	68.1	62.8	-7.8	-----	-----	3
Wiring devices:						
Attachment plugs and caps	74.9	66.0	-11.9	-----	-----	2
Brass shell sockets (standard size)	59.0	76.1	+29.0	-----	-----	3
All other lamp sockets and receptacles (all bases)	57.1	53.8	-5.8	-----	-----	3
Convenience outlets	72.9	69.4	-4.8	-----	-----	4
Miscellaneous wiring devices, n. e. c.	66.3	55.4	-16.4	-----	-----	2
Wiring supplies, pole-line hardware	76.3	66.2	-13.2	-----	-----	1
Radio apparatus and phonographs:						
Loud speakers made for sale separately	59.8	62.1	+3.9	-----	-----	3
Phonographs for mechanical reproduction of records, including cabinets	94.8	93.7	-1.2	-----	-----	3
Public-address and music-distribution apparatus	65.3	80.1	+22.7	-----	-----	2
Radio-phonograph combinations	92.8	73.2	-21.1	+147.4	-25.0	3
Receiving sets for automobiles, general use:						
Factory price not over \$25	70.2	67.1	-4.4	+73.9	- .1	3
Over \$25	91.9	89.7	-2.4	-58.3	+13.5	0
Receiving sets for home and general use, complete, standard broadcast:						
Socket-power-operated:						
Factory price not over \$11	46.2	47.3	+2.4	+41.7	-14.5	1
Over \$11 but not over \$18	68.2	63.7	-6.6	+56.6	-5.1	2
Over \$18 but not over \$30	84.8	85.5	+ .8	+185.1	+5.0	1

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-1937, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>MACHINERY NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>						
Radio apparatus and phonographs—Con.:						
Receiving sets for home and general use, complete, extending beyond standard broadcast band:						
Socket-power-operated:						
Factory price not over \$18.....	49.5	43.9	-11.3	+53.4	-6.4	3
Over \$18 but not over \$30.....	64.1	60.0	-6.4	-15.1	-3.2	3
Over \$30 but not over \$45.....	71.4	68.7	-3.8	+17.5	-2.5	2
Over \$45 but not over \$65.....	68.8	78.0	+13.4	+173.7	-1.6	2
Over \$65 but not over \$100.....	83.6	81.9	-2.0	+6.7	+4.5	2
Over \$100.....	91.6	(2)				
Tubes, receiving:						
Initial equipment:						
Alternating-current:						
Glass.....	86.5	74.3	-14.1	+132.0	-5.9	3
Metal.....	(1)	96.7				
Replacement: Rectifiers.....	86.9	94.7	+9.0	+138.1	+18.8	3
Refrigerators and refrigerating and ice-making apparatus:						
Cabinets, etc., for mechanical refrigerators made for sale separately:						
Commercial:						
Display, storage, etc., cases.....	48.6	45.8	-5.8			3
Refrigerator cabinets.....	37.8	39.9	+5.6			2
Remote fountains or water coolers (low sides) and other commercial cabinets.....	74.4	82.8	+11.3			1
Ice refrigerators and ice boxes:						
Commercial (milk and water coolers, etc.).....	33.8	42.0	+24.3			1
Domestic (household).....	65.5	69.5	+6.1			2
Mechanical refrigerators, compression type, electric:						
Commercial:						
Ice-cream cabinets, self-contained.....	85.2	83.0	-2.6			3
Water coolers, self-contained.....	86.3	81.3	-5.8			3
Other, self-contained.....	63.1	55.1	-12.7			1
Domestic (household):						
Capacity under 6 cubic feet.....	72.4	69.2	-4.4	+24.9	+11.1	3
6 to 10 cubic feet.....	66.9	76.8	+14.8	+84.8	-5.9	3
10 cubic feet and over.....	93.6	76.9	-17.8			3
Refrigerating and ice-making machines, commercial and industrial:						
Complete machine:						
Capacity less than 10 tons per 24 hours.....	80.4	74.2	-7.7			2
10 or more but under 100 tons.....	84.0	89.4	+6.4			1
Compressors made for sale separately.....		(1)				
Systems for mechanical refrigerators, (commercial and domestic):						
Evaporators made for sale separately.....	93.4	90.0	-3.6			1
High sides made for sale separately.....	82.5	67.9	-17.7			2
Low sides made for sale separately.....	76.0	85.7	+12.8			2
Systems complete without cabinets.....	97.5	95.4	-2.2	+15.4	-8.4	2
Washing machines, wringers, driers, and ironing machines for household use:						
Ironing machines, electric.....	52.3	52.8	+1.0	+7.7	+28.8	4
Washing machines:						
Electric, standard size.....	85.7	53.0	-4.8	+24.0	+7.7	3
Gas or gasoline-engine-driven, standard size.....	75.9	75.2	-.9	+9.9	+1.7	2
Wringers, driers, and extractors.....	98.1	(1)				
Parts and accessories.....	82.6	86.1	+4.4			3

See footnotes at end of table.

TABLE 2C.—Percentage change in concentration ratio, quantity, and price between 1935-1937, for the sample of 392 products—Continued

Product	Concentration ratio 1935	Concentration ratio 1937	Percentage change between 1935 and 1937 in—			Number of leaders in 1935 repeating in 1937
			Concentration ratio	Quantity	Average realized price	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>MISCELLANEOUS INDUSTRIES GROUP</b>						
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:						
Fabrics, waterproofing.....	66.3	68.7	+3.6	-----	-----	1
Felt:						
Asphalt-saturated.....	51.1	47.4	-7.2	+79.2	-13.5	3
Tar-saturated.....	91.3	65.4	-28.4	+82.4	-13.0	3
Roof cements (solid), asphalt.....	84.4	83.5	-1.1	+24.2	+24.0	3
Roof cement, fibrous plastic.....	45.8	47.8	+4.4	+68.0	-25.0	3
Roof coating:						
Fibrous liquid.....	32.5	30.3	-6.8	+47.3	+3.6	1
Nonfibrous liquid.....	53.3	66.9	+25.5	-----	-----	1
Roofing:						
Asphalt grit roll.....	48.7	35.9	-26.3	+2.8	+3.6	3
Asphalt smooth roll.....	40.6	33.3	-18.0	+18.7	+1.0	3
Roofing pitch, coal-tar.....	( <sup>1</sup> )	( <sup>1</sup> )	-----	-----	-----	-----
Shingles:						
Asphalt individual.....	45.9	46.6	+1.5	-2.6	+34.7	2
Asphalt strip.....	44.5	41.6	-6.5	+23.3	+5.8	-----
Siding, asphalt brick.....	86.0	57.3	-33.4	-----	-----	1

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

## APPENDIX D

### CLASSIFICATION OF THE 1,807 PRODUCTS BY PRODUCT CHARACTERISTICS

#### CRITERIA AND METHODS OF CLASSIFICATION OF PRODUCTS

The 1,807 products, for which 1937 Census of Manufactures data were analyzed, were classified according to each of the following criteria:

- I. Type of immediate purchaser:
  - A. Consumer:
    1. Food.
    2. Clothing and personal items.
    3. Household operation.
    4. Furniture and furnishings.
    5. Recreation.
    6. Drugs and medicines.
    7. Miscellaneous items.
  - B. Producer:
    1. Agricultural:
      - (a) Materials and supplies.
      - (b) Capital equipment.
    2. Industrial:
      - (a) Materials and supplies.
      - (b) Capital equipment.
- II. Type of ultimate user (for products other than producers' supplies and construction materials):
  - A. Consumer.
  - B. Producer.
- III. Degree of durability (for products other than producers' supplies and construction materials):
  - A. Nondurable:
    1. Consumer (ultimate user).
    2. Producer (ultimate user)—capital equipment.
  - B. Semidurable:
    1. Consumer (ultimate user).
    2. Producer (ultimate user)—capital equipment.
  - C. Durable:
    1. Consumer (ultimate user).
    2. Producer (ultimate user)—capital equipment.
- IV. Degree of fabrication (for products other than producers' supplies):
  - A. Semimanufactured:
    1. Consumer (ultimate user).
    2. Producer (ultimate user)—capital equipment.
    3. Construction materials.
  - B. Finished:
    1. Consumer (ultimate user).
    2. Producer (ultimate user)—capital equipment.
    3. Construction materials.
- V. Type of market:
  - A. Regional.
  - B. National.
- VI. Source of raw materials:
  - A. Agricultural.
  - B. Mineral.
  - C. Forest.
  - D. Other.
- VII. Construction materials.
- VIII. Producers' supplies.

Inspection of the above outline reveals that certain of the classes are identical and that others, when added together, contain the same products listed in another classification. Outstanding examples of these identities are—

Consumer as immediate purchaser (all types of products combined).	= Finished goods (consumer as ultimate user).
Consumer as ultimate user	= Nondurable consumer plus semidurable plus durable consumer goods; or Finished consumer plus semimanufactured consumer goods.
Producer as ultimate user	= Nondurable producer plus semidurable producer plus durable producer goods; or Finished producer plus semimanufactured producer goods.
Nondurable consumer plus semidurable consumer plus durable consumer goods.	= Finished plus semimanufactured consumers' goods.
Nondurable producer plus semidurable producer plus durable producer goods.	= Finished plus semimanufactured producers' goods.

The criteria of grouping were selected with a view to demonstrating the relation of concentration to particular characteristics of products. None of the various systems of classification devised in recent years exactly met the needs of the present study since they were developed with the intention of testing different sets of hypotheses. Some of the criteria used here do accord with those applied in various other studies, but the structure developed here varies in several respects from these other systems of classification.

The general principle was followed throughout the present classifications of assigning the value of a product entirely to one group on the basis of its major use. This procedure is directly contrary to that applied in numerous studies, in which a product was apportioned between two or more groups in accordance with the percentages of the product put to different uses. Thus no "mixed" classes were recognized here. While this procedure may lead to some apparent distortion or forced groupings it was believed that available data for apportioning were too scanty and unreliable to yield accurate results in regard to many of the criteria.

It is true, moreover, that there were a few miscellaneous products belonging to the semimanufactures class, the use of which could not be determined. Such products were assigned to the "producers' supplies" group. This class is the only one which partakes of the nature of a mixed group. However, the vast majority of products classified as producers' supplies are homogeneous in that the function of each is to service a large number of other products. For a more detailed definition of producers' supplies see category VIII on page 512 of this appendix.

Practical difficulties in determining the predominant use of the products, as well as the appropriate classes in which they belonged, were numerous. Commodity experts in Government departments and agencies and published data were consulted to aid in solving these problems. Illustrations of the manner in which such information was applied will be given in connection with the discussion of individual categories.

## I. TYPE OF IMMEDIATE PURCHASER

Two types of immediate purchasers were recognized, namely, consumers and producers. Actually wholesalers, retailers, and other renderers of services make the bulk of the purchases direct from the manufacturers. (Some large industrial producers do, of course, purchase directly from manufacturers.) The wholesalers, etc., however, purchase for resale and whatever effects there may be of concentration are passed along to the next group of buyers. This latter group purchases for use, either in the immediate satisfaction of wants or in further processing to produce income. By eliminating the distributors, who act merely as intermediaries, from consideration in the classification of products in this category the incidence of concentration on producers as purchasers as contrasted with that on consumers can be measured.

All 1,807 products were classified with respect to type of immediate purchaser, since it was possible with a fair degree of accuracy to designate the persons next in line to the manufacturer who changed the form of each product either by consumption or by further processing or fabrication.

Consumers included only private household units. Semipublic institutions, hotels, restaurants, hospitals, governmental bodies, and the like are not included in this definition because of the difference between their buying and bargaining power and that of individual housekeepers. In this respect the nonhouseholders are more analogous to producers. The products purchased immediately by consumers were finished goods ready for use. Seven different groups of these products entering into the family budget were recognized: Food; clothing and personal items, including work and sport apparel; household operation items as fuel, matches, etc.; household furniture and furnishings; recreation items including passenger automobiles, tobacco, radios, athletic and sporting equipment except clothing; drugs and medicines; and all other items not classified in any of the above classes.

Producers included all types of persons, both natural and legal, engaged in income producing activity who purchased commodities for further processing or fabrication or as equipment to be used in carrying on business activities. Two main classes of producers were distinguished, agricultural and industrial. It was believed that the individual units within the former possessed a somewhat different bargaining power from those in the latter. Within each of these classes, products were classified either as materials and supplies or as capital equipment. Whether or not a product was usually carried as a capital item in the accounts of concerns was one of the criteria used in determining to which class a product should be assigned.

By way of illustration, it may be pointed out that feeds and fertilizers were designated as materials and supplies for agricultural producers; harvesters as capital equipment for agricultural producers; raw wool, cotton yard goods, leather, etc., as materials and supplies for industrial producers; and machine tools as capital equipment for industrial producers. All building materials were considered as materials and supplies for industrial producers. Although some of these materials were purchased by household consumers or by producers as

capital equipment, the largest proportion of them was purchased by building contractors.

An illustration of the fine distinctions which had to be drawn in determining the immediate purchaser is to be found in the methods used in classifying canned goods. Such products are frequently classified as consumer goods. A tabulation by the Bureau of the Census gives the amount of each type of canned goods by the size of can in which it was packed. A large number of canned products were packed, for the most part, in cans of a size ordinarily purchased by households. They were designated consumer goods in the food class. However, 98 percent of canned apples were packed in No. 10 cans, the largest size, indicating their use by bakeries, restaurants, etc., for further fabrication into pies and other articles. Hence canned apples were classified as materials and supplies for industrial producers.

## II. TYPE OF ULTIMATE USER (FOR PRODUCTS OTHER THAN CONSTRUCTION MATERIALS AND PRODUCERS' SUPPLIES)

As in the previous category, products were divided here into consumers' and producers' goods. The criterion, however, is the ultimate user of the product and not the immediate purchaser. Construction materials and producers' supplies were not assigned to consumers' and producers' goods classes on the basis of the ultimate user. The wide variety of uses to which each type of building material and producers' supplies is put prevents their being definitely distinguished as either a consumer's or a producer's goods. Exclusion of these products from this category reduces the size of the sample somewhat, but conclusions regarding the relation of concentration of a product to the type of ultimate user are still valid. The smaller sample gives a more reliable picture since the products in each class are homogeneous in nature.

Consumers' goods were those products which at their final stage would be used by consumers. The character of the user of the end product was imputed to the intermediate products. Many of the products analyzed in this study were not in the final form which they took after complete processing. For example, tire cord fabrics were classified as consumers' goods because they were materials for the production of items that would be ultimately used by consumers. Tire cord fabrics were thus placed in the same classification as tires.

Producers' goods were here considered as those products which in their final form were used by producers for income producing purposes.

For example, naught duck in its final form becomes belting as used in bakeries and hence was classified as a producers' goods on the basis of its ultimate use.

## III. DEGREE OF DURABILITY (FOR PRODUCTS OTHER THAN CONSTRUCTION MATERIALS AND PRODUCERS' SUPPLIES)

In order that the relation between concentration in the production of a product and the frequency with which it is purchased might be studied, products were classified on the basis of their length of use. Construction materials and producers' supplies were excluded from classification in this category, since the use of the products in these

groups was so diffused throughout all manufacturing it was impossible to determine the degree of durability of the products into which they eventually went. The same number of products were actually classified here as were included in the category on the ultimate user of the product.

Three degrees of durability were distinguished based on the length of use of products—nondurable, semidurable, and durable. The length of service of the final end product was the determining factor; the degree of durability of the final end product was imputed to the intermediate.

A Nondurable goods were those goods which in their final form were consumed at a single use.

B Semidurable goods were those goods which in their final form were not consumed at a single use, but which were consumed within less than 3 years.

C Durable goods were those goods which in their final form, and which without essential change in their physical identities were used for a period of 3 or more years.

The products in each of these three classes were grouped into producers' and consumers' goods on the basis of the ultimate user of the product. That is, products which were designated as producers' goods in category II were also designated as producers' goods here. If the producers' goods in the nondurable class are added to those in the semidurable and the durable classes, the sum will equal the products classified as producers' goods in category II. The same is true of consumers' goods.

#### IV. DEGREE OF FABRICATION (FOR PRODUCTS OTHER THAN PRODUCERS' SUPPLIES)

A The degree of fabrication of a product, for purposes of classification in this study, was denoted as finished if the product was in the form in which without significant alteration it was employed in its ultimate use; and as semimanufactured if the product

B was one which had undergone one or more degrees of processing or fabrication but which was not in final form for ultimate use. Producers' supplies were not included in either the finished or the semimanufactures group because of the lack of data whereby the degree of fabrication of the end product could be imputed to these supplies. The number of products classified in this category is larger than that in the previous two categories since it includes construction materials.

The standard of judging the degree of fabrication of a product with respect to its ultimate use rather than with respect to its present form resulted in classifying some products, popularly thought of as finished, in the semimanufactures group. For example, flour in the present study was grouped with the semimanufactures since it had to go through one or more further stages of fabrication before it eventuated in its ultimate consumer form. It is true that some flour was purchased directly by households for a variety of purposes and as such it might have been considered a finished food. Available data, however, indicated that the bulk of flour was purchased by bakeries and other producers for further processing before sale to the ultimate consumers. In accordance with the principle followed in these classifications, the

product was assigned on the basis of its predominant characteristic—flour was therefore considered as a semimanufacture.

Likewise products which were used as a part of another product but which were also on the market for replacement purposes received somewhat different treatment in this study from that given them in other studies. Tires for automobiles are a good case in point. In the present classification they were considered finished goods since the major portion of them was used for replacement purposes. Had the largest part of their production been used for equipping new cars, tires would have been classified as semimanufactures.

Each of the groups of finished and semimanufactured products was further subdivided into consumers' goods, producers' goods, and construction materials. As in the category relating to the 1-2 degree of durability, products were assigned to these subgroups on the basis of their ultimate use. Thus, the sum of the producers' goods in the finished and the semimanufactures classes is equal to the sum of the producers' goods in the nondurable, semi-durable, and durable classes. The same equality holds true for consumers' goods. For a definition of construction materials see category VII below. The sum of the finished and the semimanufactured construction materials in this category equals the number of products in category VII.

Using the illustrations given above, flour was considered as an unfinished consumer good; automobile tires for passenger cars as finished consumer goods and tires for buses, trucks, etc., as finished producers' goods.

#### V. TYPE OF MARKET

The 1,807 products analyzed were classified according to the extent of the market customarily supplied by an individual producer. Two types of areas were distinguished, regional and national. Markets as thus defined are not to be confused with a concept of areas in which products may be used. Most products are ordinarily employed in all parts of the country, but only a small region may have been the usual area in which the products of a manufacturer were distributed.

A regional market was defined as an area varying in extent from a single community to a number of States; a national market encompassed the entire country. Many products were classifiable in either group, being distributed in a national market by some manufacturers and in a regional market by other producers. Such commodities were assigned to the market in which their major proportion was distributed. Typical products grouped in the regional market classification were common clay brick, cement, ice cream; those with a national market were canned peaches, men's shirts, shoes, automobiles, etc.

Several factors were studied in connection with classifying products according to the nature of their markets. Were the plants distributed throughout the country, or were they concentrated largely in a single area? Were the products, regardless of the plant distribution, nationally advertised and distributed? Was there a relatively uniform national price structure, or was the price structure largely regional or local in character? Did the seller look to the entire country for his market? Or conversely, did the buyer look to the entire country as a source of supply?

## VI. SOURCE OF RAW MATERIAL

Very few of the 1,807 products were composed entirely of one raw material. All of them could, however, be classified on the basis of their predominant element. Following this method they were grouped into three classes:

1. Agricultural, which included those products originating on the farm, ranch, etc., both animal and other.
2. Mineral, which included products from mines, quarries, wells, etc., both metallic and nonmetallic.
3. Forest, which included lumber and other products from trees.
4. Miscellaneous, a few of the products analyzed in this study were from the sea or air.

## VII. CONSTRUCTION MATERIALS

Construction materials are those goods used in building plants, homes, or in other construction activities. Outstanding examples are brick, cement, and lumber. Products of these types were considered in a separate category for several reasons. As a group, they are of current economic interest, especially to students of construction economics.

Each type of construction material was employed in a multiplicity of uses. Information on the proportions devoted to each type of use was meager, owing largely to the fact that each product served a number of different uses and was frequently put to all of its uses by each type of purchaser. It therefore became impracticable, if not impossible, to arbitrarily determine the end product or ultimate use of these materials. Since in the categories relating to the type of ultimate user and the degree of durability, intermediate products were classified on the basis of the end product, no attempt was made to include construction materials in them.

## VIII. PRODUCERS' SUPPLIES

Producers' supplies are those products which do not become an integral part of the final product in most instances, but rather are largely used in the servicing of a wide variety of final products. Examples are fuel, containers, certain types of chemicals, etc. The products in this group are characterized by the diffusion of their uses. Fuels are employed in the fabrication of practically every product, including both consumers' and producers' goods. Furthermore, there was no accurate way of ascertaining the predominant ultimate user for each type of fuel. It was impossible to determine the proportion of the products expended in the production of durable and non-durable goods. Neither could a satisfactory allocation be made of the proportion used in the manufacture of products classified as finished or unfinished goods. Nor could the same problems be solved for all those items which were used up in the manufacturing process without becoming a part of the final product or which served as a medium for aiding in the distribution of a product. Producers' supplies, therefore, were omitted from the categories relating to the type of ultimate user, the degree of durability, and the degree of fabrication.

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937\*

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>FOOD AND KINDRED PRODUCTS GROUP</b>																	
<b>Canned fruits and vegetables; canned and bottled juices:</b>																	
<b>Canned fruit:</b>																	
Apples.....		x	x		x			x			x	x					
Applesauce.....	x		x		x			x			x	x					
Apricots.....	x		x		x			x			x	x					
Blackberries.....		x	x		x			x			x	x					
Blueberries.....		x	x		x			x			x	x					
Cherries, R. S. P.....		x	x		x			x			x	x					
Cherries, sweet.....	x		x		x			x			x	x					
Cranberries and sauce.....	x		x		x			x			x	x					
Figs.....	x		x		x			x			x	x					
Fruit salad and fruit cocktail.....	x		x		x			x			x	x					
Grapefruit sections.....	x		x		x			x			x	x					
Loganberries.....		x	x		x			x			x	x					
Olives, ripe.....	x		x		x			x			x	x					
Peaches.....	x		x		x			x			x	x					
Pears.....	x		x		x			x			x	x					
Plums.....	x		x		x			x			x	x					
Prunes.....	x		x		x			x			x	x					
Raspberries, black.....		x	x		x			x			x	x					
Raspberries, red.....	x		x		x			x			x	x					
Strawberries.....	x		x		x			x			x	x					
<b>Canned and bottled fruit juices:</b>																	
Grape.....	x		x		x			x			x	x					
Grapefruit.....	x		x		x			x			x	x					
Orange.....	x		x		x			x			x	x					
<b>Canned soups</b>																	
<b>Canned vegetables:</b>																	
Asparagus.....	x		x		x			x			x	x					
<b>Beans:</b>																	
Baked.....	x		x		x			x			x	x					
Green-pod.....	x		x		x			x			x	x					
Kidney.....	x		x		x			x			x	x					
Lima.....	x		x		x			x			x	x					
Wax-pod.....	x		x		x			x			x	x					
<b>Beets</b>																	
Carrots.....	x		x		x			x			x	x					
Corn.....	x		x		x			x			x	x					
Hominy.....	x		x		x			x			x	x					
Kraut.....	x		x		x			x			x	x					
Peas.....	x		x		x			x			x	x					
Pimentos.....	x		x		x			x			x	x					
Pumpkin and squash.....	x		x		x			x			x	x					
Rhubarb.....		x	x		x			x			x	x					
Spaghetti.....	x		x		x			x			x	x					
Spinach.....	x		x		x			x			x	x					
Succotash.....	x		x		x			x			x	x					
Sweetpotatoes.....	x		x		x			x			x	x					
Tomatoes.....	x		x		x			x			x	x					
Tomato juice and cocktail.....	x		x		x			x			x	x					
Tomato ketchup.....	x		x		x			x			x	x					
Tomato paste.....	x		x		x			x			x	x					
Tomato pulp and puree.....		x	x		x			x			x	x					
Tomato sauce.....	x		x		x			x			x	x					
Vegetable puree for infants.....	x		x		x			x			x	x					
Vegetables, mixed.....	x		x		x			x			x	x					
<b>Corn sirup, corn sugar, corn oil, and starch:</b>																	
Corn oil, crude.....		x	x		x			x			x	x					
Corn oil, refined.....	x		x		x			x			x	x					
Corn-oil cake and meal.....		x	x		x			x			x	x				x	
Corn sirup, mixed with other sirups.....	x		x		x			x			x	x					
Corn sirup, unmixed.....		x	x		x			x			x	x					
Corn sugar.....		x	x		x			x			x	x					
Dextrine.....		x	x		x			x			x	x					
<b>Starch:</b>																	
Corn.....		x	x		x			x			x	x					
Potato.....		x	x		x			x			x	x					
<b>Flour and other grain-mill products:</b>																	
Bran and middlings.....		x	x		x			x			x	x				x	
Corn meal.....	x		x		x			x			x	x					
Feed, screenings, etc.....		x	x		x			x			x	x				x	
<b>Flour:</b>																	
Buckwheat.....		x	x		x			x			x	x					
Corn.....		x	x		x			x			x	x					
Gluten, rice, wheat-malt, barley-malt, and other.....		x	x		x			x			x	x					
Rye.....		x	x		x			x			x	x					

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
FOOD AND KINDRED PRODUCTS GROUP—continued																	
Flour and other grain-mill products—Con.																	
Flour—Continued.																	
Wheat:																	
Graham and whole-wheat		X	X		X			X		X	X						
Prepared	X		X		X			X	X		X						
Semolina		X	X		X			X		X	X						
White	X	X	X		X			X		X	X						
Liquors, distilled:																	
Brandy, commercial	X		X		X			X		X	X						
Brandy, fortifying		X	X		X			X		X	X						
Distillers' grains	X		X		X					X	X					X	
Gin	X		X		X			X		X	X						
Whisky, corn and bourbon	X		X		X			X		X	X						
Whisky, rye	X		X		X			X		X	X						
Macaroni, spaghetti, vermicelli, and noodles:																	
Egg noodles and other egg products	X		X		X			X	X		X						
Macaroni, spaghetti, and vermicelli	X		X		X			X	X		X						
Ravioli	X		X		X			X		X	X						
Meat packing, wholesale:																	
Dog and cat food, canned																	
	X		X		X			X		X	X						
Hides, skins, and pelts:																	
Calfskins, cured																	
		X	X		X			X		X	X						
Cattle hides, cured																	
		X	X		X		X	X		X	X						
Cattle hides, uncured																	
		X	X		X		X	X		X	X						
Sheep and lamb pelts, cured																	
		X	X		X		X	X		X	X						
Sheep and lamb pelts, uncured																	
		X	X		X		X	X		X	X						
Sheepskins and lambskins, pickled																	
		X	X		X		X	X		X	X						
Lard	X		X		X			X		X	X						
Meat, canned, except sausage:																	
Vacuum-cooked																	
	X		X		X			X		X	X						
Other than vacuum-cooked																	
	X		X		X			X		X	X						
Meat, cured:																	
Beef, pickled and other cured																	
	X		X		X			X		X	X						
Hams, cooked																	
	X		X		X			X		X	X						
Pork, dry-salted, smoked																	
	X		X		X			X	X	X	X						
Pork, dry-salted, not smoked																	
	X		X		X			X	X	X	X						
Pork, pickled and dry-cured, smoked																	
	X		X		X			X		X	X						
Pork, pickled and dry-cured, not smoked																	
	X		X		X			X		X	X						
Meat, fresh:																	
Beef																	
	X		X		X			X		X	X						
Mutton and lamb																	
	X		X		X			X		X	X						
Pork																	
	X		X		X			X		X	X						
Veal																	
	X		X		X			X		X	X						
Edible, organs, tripe, etc.																	
	X		X		X			X		X	X						
Oleo oil																	
		X	X		X			X		X	X						
Tankage materials dry-rendered																	
	X		X		X			X		X	X					X	
Wool		X	X		X			X		X	X						
Oleomargarine (margarine) made in the oleomargarine, the meat-packing, and in other industries: Oleomargarine, all																	
	X		X		X			X		X	X						
Rice cleaning and polishing:																	
Bran																	
		X	X		X			X		X	X						
Clean rice:																	
Brewers'																	
		X	X		X			X		X	X						
Whole-grain heads, brown																	
	X		X		X			X		X	X						
Whole-grain heads, polished																	
	X		X		X			X		X	X						
Screenings																	
		X	X		X			X		X	X						
Second-head																	
	X		X		X			X		X	X						
Polish		X							X		X					X	
Sausage casings made in the sausage, the meat-packing, and in other industries:																	
Beef casings																	
		X	X		X			X		X	X						
Hog casings																	
		X	X		X			X		X	X						
Sheep and lamb casings																	
		X	X		X			X		X	X						
Sausage, meat puddings, headcheese, etc., made in the sausage, the meat-packing, and in other industries:																	
Canned sausage																	
	X		X		X			X		X	X						
Dry sausage																	
	X		X		X			X		X	X						
Fresh sausage and sausage products																	
	X		X		X			X		X	X						

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>FOOD AND KINDRED PRODUCTS GROUP—continued</b>																	
Shortenings (other than lard), vegetable cooking oils, and salad oils:																	
Shortenings.....	x		x		x				x		x	x					
Vegetable cooking oils, vegetable salad oils, and other edible oils.....	x		x		x				x		x	x					
Sugar, beet:																	
Molasses, sold or transferred for desugarization.....		x	x		x			x		x		x					
Pulp, dried, exclusive of molasses.....		x							x		x					x	
Pulp, moist, exclusive of molasses.....		x							x		x					x	
Pulp, molasses.....		x							x		x					x	
Sugar, granulated.....	x		x		x			x		x		x					
Sugar, unfinished.....		x	x		x			x		x		x					
Sugar, cane, not including products of refineries:																	
Bagasse, for sale as such.....		x						x			x	x				x	
Molasses, other than blackstrap.....		x	x		x						x	x					
Sirup.....		x	x		x			x			x	x					
Sugar, clarified.....	x		x		x				x		x	x					
Sugar, granulated.....	x		x		x				x		x	x					
Sugar, raw.....		x	x		x			x			x	x					
Sugar refining, cane:																	
Refiners' blackstrap and nonedible sirup.....		x	x		x			x			x	x					
Refiners' sirup, edible.....		x	x		x			x			x	x					
Refined sugar, hard.....	x		x		x				x		x	x					
Refined sugar, soft or brown.....	x		x		x				x		x	x					
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>																	
Asphalted-felt-base floor covering:																	
Piece goods:																	
12/4 and wider.....	x		x				x		x		x		x				
8/4.....	x		x				x		x		x		x				
Narrower than 8/4.....	x		x				x		x		x		x				
Rugs.....	x		x				x		x		x		x				
Awnings, tents, sails, and canvas covers:																	
Awnings.....		x		x		x			x	x		x					
Canopies.....		x		x		x			x	x		x					
Canvas covers.....		x		x		x			x	x		x					
Sails.....	x		x						x	x		x					
Tarpaulins.....		x		x		x			x	x		x					
Tents.....		x		x		x			x	x		x					
Bags, other than paper:																	
Burlap.....		x									x			x		x	
Cotton.....		x									x	x				x	
Clothing, men's, youths', and boys', n. e. c.—regular and contract factories:																	
Separate garments, boys':																	
Coats.....	x		x			x			x		x	x					
Overcoats.....	x		x			x			x		x	x					
Pants and knickers:																	
Cotton.....	x		x			x			x		x	x					
Wholly or partly of wool.....	x		x			x			x		x	x					
Separate garments, men's and youths':																	
Coats.....	x		x			x			x		x	x					
Overcoats.....	x		x			x			x		x	x					
Trousers and knickers, cotton.....	x		x			x			x	x		x					
Trousers and knickers, mohair, silk, linen, etc.....	x		x			x			x		x	x					
Trousers and knickers, wholly or partly of wool.....	x		x			x			x	x		x					
Vests.....	x		x			x			x		x	x					
Suits, boys':																	
Cotton.....	x		x			x			x		x	x					
Mohair, silk, linen, etc.....	x		x			x			x		x	x					
One-pants (knickers).....	x		x			x			x		x	x					
One-pants (not knickers).....	x		x			x			x		x	x					
Two-pants (knickers).....	x		x			x			x		x	x					
Two-pants (not knickers).....	x		x			x			x		x	x					
Two-pants (1 long pants, 1 knickers).....	x		x			x			x		x	x					

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>																	
<b>Clothing, men's, youths', and boys', n. e. c.—regular and contract factories—Continued.</b>																	
Suits, men's and youths':																	
Cotton	x		x					x		x	x						
Mohair, silk, linen, etc.	x		x					x		x	x						
Three-piece	x		x					x		x	x						
Three-piece with extra trousers	x		x					x		x	x						
Tuxedo and dress suits	x		x					x		x	x						
Two-piece	x		x					x		x	x						
Two-piece with extra knickers	x		x					x		x	x						
Two-piece with extra trousers	x		x					x		x	x						
Uniforms, military, naval, and cadet	x		x					x		x	x						
Waterproofed, not including oiled outer garments	x		x					x		x	x						
<b>Clothing, work (including work shirts) and sport garments except leather:</b>																	
Coats, blanket-lined	x		x					x		x	x						
Coats and vests, hunting	x		x					x		x	x						
Coats and jackets, leatherette	x		x					x		x	x						
Industrial garments	x		x					x		x	x						
Mackinaws, boys'	x		x					x		x	x						
Mackinaws, men's and youths'	x		x					x		x	x						
Melton jackets	x		x					x		x	x						
Overalls, children's	x		x					x	x	x	x						
Overalls, except children's	x		x					x	x	x	x						
Overall jackets	x		x					x	x	x	x						
Overall one-piece suits, including industrial	x		x					x	x	x	x						
Pants and breeches, work	x		x					x	x	x	x						
Play suits, children's	x		x					x	x	x	x						
Riding and camp clothing	x		x					x		x	x						
Shirts, work (including flannel)	x		x					x	x	x	x						
Ski suits and snow suits	x		x					x		x	x						
Waterproof outer garments, oiled	x		x					x		x	x						
Windbreakers and lumberjacks, boys'	x		x					x		x	x						
Windbreakers and lumberjacks, men's and youths'	x		x					x		x	x						
<b>Coats, suits, and separate skirts, women's, misses', and juniors'—regular and contract factories:</b>																	
Coats	x		x					x		x	x						
Ensembles (suits)	x		x					x		x	x						
Skirts	x		x					x		x	x						
Suits	x		x					x		x	x						
<b>Corsets and allied garments:</b>																	
Brassieres and bandeaux-brassieres	x		x					x		x	x						
Combination or 1-piece garments	x		x					x		x	x						
Corsets, girdles, and garter belts	x		x					x		x	x						
Corset accessories (clasps, stays, etc.)		x	x							x		x					
<b>Cotton woven goods over 12 inches in width:</b>																	
Blankets, part-wool	x		x					x		x	x						
<b>Colored cotton goods and related fabrics:</b>																	
Bed tickings		x	x					x	x		x	x					
Chambrays and chevots		x	x					x		x	x						
Cottonades and other coverts (except shirting coverts)		x	x					x		x	x						
Coverts, shirting		x	x					x		x	x						
Denims		x	x					x		x	x						
Ginghams		x	x					x		x	x						
Pin stripes, pin checks, and hickory stripes		x	x					x		x	x						
Plaids		x	x					x		x	x						
Seersuckers for men's, women's, and children's wear		x	x					x		x	x						
Other suitings woven with colored yarn		x	x					x		x	x						

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>																	
Cotton woven goods over 12 inches in width—Continued.																	
Cotton duck:																	
Numbered duck:																	
Naught duck		x		x		x		x		x	x						
Paper felts		x								x	x					x	
Sail duck 24 inches and under		x		x		x		x		x	x						
Wide duck, wider than 24 inches		x		x		x		x		x	x						
Ounce duck:																	
Army duck		x		x		x		x		x	x						
Filter cloth		x								x	x					x	
Flat duck, plied filling		x	x			x		x		x	x						
Flat duck, single filling		x	x			x		x		x	x						
Hose and belting duck		x		x		x		x		x	x						
Other ounce duck		x		x		x		x		x	x						
Fine cotton goods, combed or part-combed:																	
Broadcloths		x	x			x		x		x	x						
Cotton mixtures		x	x			x		x		x	x						
Dimities		x	x			x		x		x	x						
Lawns		x	x			x		x		x	x						
Marquisesettes:																	
Beat-up-spot		x	x			x		x		x	x						
Clipped-spot		x	x			x		x		x	x						
Plain		x	x			x		x		x	x						
Organdies		x	x			x		x		x	x						
Oxfords		x	x			x		x		x	x						
Piques		x	x			x		x		x	x						
Pongees		x	x			x		x		x	x						
Poplins		x	x			x		x		x	x						
Sateens		x	x			x		x		x	x						
Shirtings, not elsewhere reported		x	x			x		x		x	x						
Twills		x	x			x		x		x	x						
Voiles		x	x			x		x		x	x						
Other (including cotton crepes)		x	x			x		x		x	x						
Fine carded goods:																	
Carded colored-yarn shirtings		x	x			x		x		x	x						
Other fine carded goods		x	x			x		x		x	x						
Napped fabrics:																	
Blankets (except crib):																	
Jacquard		x				x		x		x	x						
Not jacquard		x				x		x		x	x						
Blankets, crib		x				x		x		x	x						
Flannels:																	
Canton		x	x			x		x		x	x						
Interlining		x	x			x		x		x	x						
Outing		x	x			x		x		x	x						
Moleskin		x	x			x		x		x	x						
Other napped fabrics		x	x			x		x		x	x						
Print-cloth-yarn fabrics:																	
Carded broadcloth		x	x			x		x		x	x						
Pajama checks		x	x			x		x		x	x						
Print cloth narrower than 36 inches, plain		x	x			x		x		x	x						
Print cloth, 36 inches and wider, plain		x	x			x		x		x	x						
Print cloth, fancy		x	x			x		x		x	x						
Three-leaf twills, 40 inches and narrower (except jeans)		x	x			x		x		x	x						
Tobacco and cheese cloth and gauze		x								x	x					x	
Sheetings, narrow, and allied coarse medium yarn fabrics:																	
Bird's-eye diaper cloth		x	x			x		x		x	x						
Drills, 40 inches and narrower		x	x			x		x		x	x						
Four-leaf twills, 40 inches and narrower		x	x			x		x		x	x						
Jeans		x	x			x		x		x	x						
Osnaburgs, all widths		x	x			x		x		x	x						
Sateens, heavy-warp 40 inches and narrower, and carded filling sateens		x	x			x		x		x	x						
Sheetings, 40 inches and narrower		x	x			x		x		y	x						

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>																	
Cotton woven goods over 12 inches in width—Continued.																	
Specialties:																	
Bedspreads:																	
All-cotton, jacquard-figured.....		X	X			X		X			X	X					
All-cotton, seamless-woven.....		X	X			X		X			X	X					
Cotton-warp, rayon, etc.....		X	X			X		X			X	X					
Drapery and upholstery fabrics.....		X	X				X	X			X	X					
Pile fabrics and cotton damask:																	
Corduroys.....		X	X			X		X			X	X					
Cotton table damask.....		X	X			X		X			X	X					
Plushes, velvets, and velvet- eens.....		X	X			X		X			X	X					
Rugs, cotton braided, except bath mats.....	X		X				X		X		X	X					
Other woven fabrics over 12 inches wide:																	
All-cotton.....		X	X			X		X			X	X					
Cotton-warp, rayon, or silk filling.....		X	X			X		X			X	X					
Tire fabrics:																	
Square-woven construction.....		X	X			X		X		X		X					
Tire-cord fabrics.....		X	X			X		X		X		X					
Other tire fabrics and tire ducks.....		X	X			X		X		X		X					
Towels, toweling, etc.:																	
Bath mats.....	X		X			X			X		X	X					
Damask and other jacquard- woven towels and toweling.....	X		X			X			X		X	X					
Dish, scrub, and wiping cloths.....	X		X			X			X		X	X					
Plain-woven towels and toweling.....	X		X			X			X		X	X					
Terry-woven fabrics except tow- els, toweling, washcloths, and bath mats.....		X	X			X		X			X	X					
Turkish and terry-woven towels and toweling, and huck towels and toweling.....	X		X			X			X		X	X					
Washcloths.....	X		X			X			X		X	X					
Wide cotton fabrics:																	
Sheetings for domestic use, wider than 40 inches.....		X	X			X		X			X	X					
Wide fabrics for industrial use:																	
Drills, wider than 40 inches.....		X	X			X		X			X	X					
Pillow tubing.....		X	X			X		X			X	X					
Sheetings, wider than 40 inches.....		X	X			X		X			X	X					
Twills, wider than 40 inches.....		X	X			X		X			X	X					
Warp sateens, wider than 40 inches.....		X	X			X		X			X	X					
Dresses, except house dresses—regular and contract factories:																	
Ensembles (dresses).....	X		X			X			X		X	X					
One-piece dresses:																	
Made to retail under \$2.....	X		X			X			X		X	X					
Made to retail for \$2 and over.....	X		X			X			X		X	X					
Dyeing and finishing, rayon- and silk- fabric:																	
Broad goods (18 inches wide and over):																	
Dress goods, dyed and finished.....		X	X			X		X			X			X			
Linings (including taffetas and twills):																	
Dyed and finished.....		X	X			X		X			X			X			
Printed and finished.....		X	X			X		X			X			X			
Marquisesettes, dyed and finished.....		X	X			X		X			X			X			
Metal cloth, dyed and finished.....		X	X			X		X			X			X			
Neckwear (tie, plain):																	
Dyed and finished.....		X	X			X		X			X			X			
Printed and finished.....		X	X			X		X			X			X			
Novelties (other than dress goods):																	
Dyed and finished.....		X	X			X		X			X			X			
Printed and finished.....		X	X			X		X			X			X			
Tapestries and draperies, dyed and finished.....		X	X				X	X			X			X			
Umbrella, dyed and finished.....		X	X			X		X			X			X			

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B <sub>i</sub>	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>																	
<b>Dyeing and finishing, rayon- and silk-fabric—Continued.</b>																	
Broad goods (18 inches wide and over)—Continued.																	
Underwear (radiums, French crepes):																	
Dyed and finished.....	x	x			x			x			x			x			
Printed and finished.....	x	x			x			x			x			x			
Velvets, dyed and finished.....	x	x			x			x			x			x			
<b>Fabricated textile products, n. e. c.:</b>																	
Belting, other than leather.....	x		x		x			x			x	x					
Horse blankets, fly nets, and related products.....	x		x				x		x		x	x					
<b>Flags, banners, regalia, vestments, robes, and related products:</b>																	
Flags, banners, regalia, vestments, robes, badges, and similar emblems.....	x		x				x		x		x	x					
<b>Hosiery:</b>																	
<b>Boys', misses', and children's:</b>																	
<b>Anklets and slack socks:</b>																	
All-cotton.....	x		x				x		x		x	x					
All-rayon and rayon with cotton tops, heels, and toes.....	x		x				x		x		x			x			
Rayon and cotton.....	x		x				x		x		x	x					
<b>Seamless:</b>																	
All-cotton.....	x		x				x		x		x	x					
All-wool.....	x		x				x		x		x	x					
Rayon with cotton tops, heels, and toes and all-rayon.....	x		x				x		x		x			x			
Rayon-and-cotton.....	x		x				x		x		x			x			
<b>Infants':</b>																	
<b>Anklets and slack socks:</b>																	
All-cotton, all-rayon, and rayon with cotton tops, heels, and toes.....	x		x				x		x		x	x					
Rayon-and-cotton.....	x		x				x		x		x	x					
<b>Seamless:</b>																	
All cotton.....	x		x				x		x		x	x					
All-pure-thread-silk.....	x		x				x		x		x	x					
Rayon with cotton tops, heels, and toes, all-rayon, and rayon-and-cotton.....	x		x				x		x		x			x			
<b>Mens':</b>																	
<b>Anklets and slack socks, all types.</b>																	
Athletic and golf hose, all types.....	x		x				x		x		x	x					
Full-fashioned; all types.....	x		x				x		x		x	x					
Seamless, all types.....	x		x				x		x		x	x					
<b>Women's:</b>																	
<b>Anklets and slack socks:</b>																	
All-cotton.....	x		x				x		x		x	x					
All-rayon and rayon with cotton tops, heels, and toes, and rayon-and-cotton.....	x		x				x		x		x			x			
<b>Full-fashioned:</b>																	
<b>Finished only:</b>																	
All-pure-thread-silk.....	x		x				x		x		x	x					
Pure-thread-silk with lisle or cotton tops, heels, and toes.....	x		x				x		x		x	x					
<b>Knitted only (in the gray):</b>																	
All-cotton.....		x	x				x		x		x	x					
All-pure-thread-silk.....		x	x				x		x		x	x					
Pure-thread-silk with lisle or cotton tops, heels, and toes.....		x	x				x		x		x	x					
Silk-and-cotton and silk-and-rayon.....		x	x				x		x		x			x			
<b>Knitted and finished in same plant:</b>																	
All cotton.....	x		x				x		x		x	x					
All-pure-thread-silk.....	x		x				x		x		x	x					
Pure-thread-silk with lisle or cotton tops, heels, and toes.....	x		x				x		x		x	x					

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—  
Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—</b>																	
continued																	
<b>Hosiery—Continued.</b>																	
<b>Women's—Continued.</b>																	
Seamless:																	
All-cotton	x		x				x			x		x					
All-pure-thread-silk	x		x				x			x		x					
Pure-thread-silk with lisle or cotton tops, heels, and toes	x		x				x			x		x					
Rayon with cotton tops, heels, and toes and all- rayon	x		x				x			x				x			
<b>Linoleum:</b>																	
Cork carpet		x		x			x			x				x			
Inlaid	x		x				x			x				x			
Plain	x		x				x			x				x			
Printed	x		x				x			x				x			
<b>Outerwear, children's and infants'—</b>																	
regular and contract factories:																	
Coats	x		x				x			x		x					
Suits	x		x				x			x		x					
<b>Rayon broad woven goods (18 inches</b>																	
wide and over):																	
Filament-rayon and spun-rayon																	
fabrics:																	
Canton crepes		x	x				x			x				x			
Gamsas, alpacas, romaines, pig- ment taffetas, and acetate taffetas		x	x				x			x				x			
Marquissettes		x	x				x			x				x			
Metal cloth		x	x				x			x				x			
Miscellaneous filament rayon dress goods, not specified		x	x				x			x				x			
Necktie fabrics, plain or colored yarn		x	x				x			x				x			
Novelties (not included else- where)		x	x				x			x				x			
Panne satins		x	x				x			x				x			
Satin crepes		x	x				x			x				x			
Sheers		x	x				x			x				x			
<b>Spun-rayon:</b>																	
Challis and twills		x	x				x			x				x			
Other spun-rayon dress goods		x	x				x			x				x			
Other spun-rayon suitings		x	x				x			x				x			
Tapestries and draperies		x	x				x	x		x				x			
Twills and serges		x	x				x			x				x			
Velvets		x	x				x			x				x			
Other filament-rayon and spun- rayon fabrics		x	x				x			x				x			
<b>Rayon mixtures (warp primarily</b>																	
rayon by weight):																	
<b>Dress goods:</b>																	
Silk filling		x	x				x			x				x			
Other filling		x	x				x			x				x			
Novelties (other than dress goods)		x	x				x			x				x			
Plushes, cotton filling		x	x				x			x				x			
Upholsteries, tapestries, and draperies (except velvets and plushes)		x	x				x	x		x				x			
Velvets		x	x				x			x				x			
<b>Shirts (except work shirts), collars, and</b>																	
nightwear—regular contract factories:																	
Blouses and shirts, boys'	x		x				x			x		x					
Pajamas and nightshirts, boys'	x		x				x			x		x					
Pajamas and nightshirts, men's and youths'	x		x				x			x		x					
Shirts (except work), men's and youths'	x		x				x			x		x					
Shirts, polo or sport of purchased knitted fabrics	x		x				x			x		x					

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>																	
<b>Silk broad woven goods (18 inches wide and over):</b>																	
<b>Silk:</b>																	
Flat crepes.....	x	x			x			x			x	x					
French crepes.....	x	x			x			x			x	x					
Georgettes.....	x	x			x			x			x	x					
Lingerie satins.....	x	x			x			x			x	x					
Necktie fabrics.....	x	x			x			x			x	x					
Satin crepes.....	x	x			x			x			x	x					
Triple sheers.....	x	x			x			x			x	x					
Velvets and plushes.....	x	x			x			x			x	x					
Other silk fabrics.....	x	x			x			x			x	x					
<b>Silk mixtures:</b>																	
Linings, including taffetas and twills.....	x	x			x			x			x	x					
Necktie fabrics.....	x	x			x			x			x	x					
Upholsteries, tapestries, and draperies (except velvets and plushes).....	x	x					x	x			x	x					
Velvets.....	x	x			x			x			x	x					
Other silk mixed fabrics.....	x	x			x			x			x	x					
<b>Woolen woven goods, including woven felts, and worsted woven goods:</b>																	
<b>Auto cloths, woven wholly or in part of woolen or worsted spun yarns:</b>																	
With pile.....	x	x					x	x			x						
Without pile.....	x	x					x	x			x						
Bathrobe flannels, all-wool woolen, all-wool woolen worsted, and all other.....	x	x			x			x			x	x					
Billiard cloths.....	x		x		x			x			x	x					
<b>Blankets, bed and camp, except crib: 25 to 98 percent wool or similar animal fibers</b>																	
.....	x		x				x				x	x					
<b>98 percent or more wool or similar animal fibers</b>																	
.....	x		x				x				x	x					
<b>Coatings, women's-wear:</b>																	
All-wool woolen.....	x	x			x			x			x	x					
All-wool worsted.....	x	x			x			x			x	x					
All-wool woolen worsted.....	x	x			x			x			x	x					
Woolen or worsted filled.....	x	x			x			x			x	x					
Other woolen (except all-wool).....	x	x			x			x			x	x					
Other worsted (except all-wool).....	x	x			x			x			x	x					
<b>Interlinings, with and without horse-hair.....</b>																	
.....	x	x			x			x			x	x					
<b>Necktie and other linings.....</b>																	
.....	x	x			x			x			x	x					
<b>Overcoatings and topcoatings, men's-wear:</b>																	
All-wool woolen.....	x	x			x			x			x	x					
All-wool worsted.....	x	x			x			x			x	x					
Woolen or worsted filled.....	x	x			x			x			x	x					
Other woolen (except all-wool).....	x	x			x			x			x	x					
<b>Shirtings, all-wool woolen, all-wool worsted, and all other.....</b>																	
.....	x	x			x			x			x	x					
<b>Snow and ski suit cloths, all-wool, woolen, other woolen, and all other.....</b>																	
.....	x	x			x			x			x	x					
<b>Suitings and dress fabrics, women's-wear:</b>																	
All-wool woolen.....	x	x			x			x			x	x					
All-wool worsted.....	x	x			x			x			x	x					
All-wool woolen worsted.....	x	x			x			x			x	x					
Woolen or worsted filled, other woolen and worsted (except all-wool).....	x	x			x			x			x	x					
<b>Suitings and pantings, men's-wear:</b>																	
All-wool woolen.....	x	x			x			x			x	x					
All-wool worsted.....	x	x			x			x			x	x					
All-wool woolen worsted.....	x	x			x			x			x	x					
Woolen or worsted filled.....	x	x			x			x			x	x					
Other woolen (except all-wool).....	x	x			x			x			x	x					
Other worsted (except all-wool).....	x	x			x			x			x	x					
<b>Undercollar cloths, all-wool woolen, other woolen, and all other.....</b>																	
.....	x	x			x			x			x	x					
<b>Woven felts, papermakers'.....</b>																	
.....	x										x	x				x	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>																	
Woolen and worsted yarn:																	
Spun on Bradford system:																	
Hand-knitting yarns.....	x				x			x	x		x						
Machine-knitting yarns.....	x		x					x		x		x					
Spun on French system: Machine-knitting yarns.....		x	x		x			x		x		x					
Mill waste.....		x								x		x				x	
<b>FOREST PRODUCTS GROUP</b>																	
Cork products:																	
Gaskets, disks, wafers, and washers.....		x								x			x			x	
Insulation products, blocks, slabs, pipe coverings, etc.....		x								x			x			x	
Stoppers, all kinds.....		x								x			x			x	
All other, including tile, life-preservers, finished articles of natural and artificial cork, and ground and granulated cork and cork waste.....		x								x			x			x	
Furniture, including store and office fixtures:																	
Household:																	
Fiber, rattan, reed, and willow:																	
Bedroom.....	x		x				x		x		x			x			
Juvenile.....	x		x				x		x		x			x			
Living-room and library:																	
Chairs and rockers, upholstered:																	
Pull-up or occasional.....	x		x				x		x		x			x			
Other.....	x		x				x		x		x			x			
Chairs and rockers, not upholstered.....	x		x				x		x		x			x			
Davenport, sofas, daybeds, etc.....	x		x				x		x		x			x			
Desks.....	x		x				x		x		x			x			
Suites, upholstered.....	x		x				x		x		x			x			
Tables.....	x		x				x		x		x			x			
Metal:																	
Bedrooms:																	
Beds.....	x		x				x		x		x			x			
Cribs.....	x		x				x		x		x			x			
Dressers, vanity dressers, commodes, and dressing tables.....	x		x				x		x		x			x			
Camp:																	
Chairs and tables, folding.....	x		x				x		x		x			x			
Cots.....	x		x				x		x		x			x			
Kitchen:																	
Cabinets.....	x		x				x		x		x			x			
Chairs and stools.....	x		x				x		x		x			x			
Tables.....	x		x				x		x		x			x			
Living-room and library:																	
Davenport, sofas, daybeds, studio couches, etc.:																	
Upholstered.....	x		x				x		x		x			x			
Not upholstered.....	x		x				x		x		x			x			
Tables.....	x		x				x		x		x			x			
Porch: Gliders and hammocks.....	x		x				x		x		x			x			
Wood:																	
Bedroom:																	
Beds.....	x		x				x		x		x			x			
Cedar chests.....	x		x				x		x		x			x			
Chairs and benches.....	x		x				x		x		x			x			
Chiffoniers, chiffirobes, wardrobes, and chifforettes.....	x		x				x		x		x			x			
Cribs.....	x		x				x		x		x			x			
Dressers, vanity dressers, commodes, and dressing tables.....	x		x				x		x		x			x			
Suites.....	x		x				x		x		x			x			

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
FOREST PRODUCTS GROUP—continued																	
Furniture, including store and office fixtures—Continued.																	
Household—Continued.																	
Wood—Continued.																	
Built-in furniture.....	x		x				x		x	x					x		
Dining room:																	
Breakfast sets.....	x		x				x		x		x				x		
Buffets, china closets, and servers.....	x		x				x		x		x				x		
Chairs, upholstered.....	x		x				x		x		x				x		
Chairs, not upholstered.....	x		x				x		x		x				x		
Suites.....	x		x				x		x		x				x		
Tables.....	x		x				x		x		x				x		
Furniture in the white.....	x		x				x		x		x				x		
Juvenile furniture.....	x		x				x		x		x				x		
Kitchen:																	
Cabinets.....	x		x				x		x		x				x		
Chairs and stools.....	x		x				x		x	x					x		
Tables.....	x		x				x		x		x				x		
Living-room and library:																	
Bookcase and secretaries.....	x		x				x		x		x				x		
Bridge sets, chairs, and tables.....	x		x				x		x		x				x		
Cabinets, radio and phonograph.....			x	x			x	x			x				x		
Cabinets, sewing machine.....			x	x			x	x			x				x		
Cabinets, other and not specified.....	x		x				x		x		x				x		
Chairs and rockers, upholstered:																	
Pull-up or occasional.....	x		x				x		x		x				x		
Other than pull-up or occasional.....	x		x				x		x		x				x		
Chairs and rockers, not upholstered.....	x		x				x		x		x				x		
Davenport, sofas, day beds, studio couches, etc., upholstered.....	x		x				x		x	x					x		
Desks.....	x		x				x		x		x				x		
Furniture frames.....			x	x			x	x			x				x		
Suites, upholstered.....	x		x				x		x	x					x		
Suites, davenport, sofas, day bed, etc., not upholstered.....	x		x				x		x		x				x		
Tables.....	x		x				x		x		x				x		
Lockers:																	
Metal.....			x		x		x		x		x				x		
Wood.....			x		x		x		x	x					x		
Office furniture:																	
Metal:																	
Chairs.....			x		x		x		x		x				x		
Desks.....			x		x		x		x		x				x		
Filing cabinets and cases.....			x		x		x		x		x				x		
Wood:																	
Chairs.....			x		x		x		x		x				x		
Desks and tables.....			x		x		x		x		x				x		
Filing cabinets and cases.....			x		x		x		x		x				x		
Professional furniture and equipment:																	
Barber shop:																	
Metal chairs, hydraulic.....			x		x		x		x		x				x		
Wood and fiber cabinets and cases.....			x		x		x		x		x				x		
Beauty parlor:																	
Metal dresserettes and miscellaneous.....			x		x		x		x		x				x		
Wood and fiber dresserettes and miscellaneous.....			x		x		x		x		x				x		
Hospital:																	
Metal beds.....			x		x		x		x		x				x		
Metal tables.....			x		x		x		x		x				x		
Wood and fiber beds.....			x		x		x		x		x				x		
Laboratory:																	
Metal cabinets.....			x		x		x		x		x				x		
Wood and fiber cabinets.....			x		x		x		x		x				x		

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>FOREST PRODUCTS GROUP—continued</b>																	
Professional furniture and equipment—Continued.																	
Public buildings' furniture (schools, theaters, assembly halls, churches, libraries, etc.):																	
Metal.....	x		x				x		x		x		x				
Wood and fiber.....	x		x				x		x		x		x				
Seats for public conveyances:																	
Metal.....	x		x				x		x		x		x				
Wood.....	x		x				x		x		x		x				
Shelving:																	
Metal.....	x		x				x		x		x		x				
Wood.....	x		x				x		x		x		x				
Store and lunch room furniture and fixtures:																	
Metal:																	
Chairs and stools.....	x		x				x		x		x		x				
Counters, tables, partitions, window backs, showcases, wallcases, and cabinets.....	x		x				x		x		x		x				
Display fixtures.....	x		x				x		x		x		x				
Wood:																	
Chairs and stools.....	x		x				x		x		x		x				
Counters, tables, partitions, window backs, showcases, wallcases, and cabinets.....	x		x				x		x		x		x				
Display fixtures.....	x		x				x		x		x		x				
Telephone booths, wood.....	x		x				x		x		x		x				
Lumber:																	
Douglas fir.....	x								x		x		x			x	
Ponderosa pine.....	x								x		x		x			x	
Southern pine.....	x								x		x		x			x	
Matches:																	
In books.....	x		x		x				x		x		x				
In boxes, strike-on-the-box, plain.....	x		x		x				x		x		x				
In boxes (large and small boxes), strike-anywhere.....	x		x		x				x		x		x				
Window and door screens and weather strip:																	
Weather strip:																	
Metal.....	x								x		x		x			x	
Other.....	x								x		x		x			x	
Window and door screens:																	
Metal.....	x								x		x		x			x	
Wood.....	x								x		x		x			x	
Kind not specified.....	x								x		x		x			x	
<b>PAPER AND ALLIED PRODUCTS GROUP</b>																	
Paper and paperboard:																	
Absorbent paper:																	
Blotting.....	x										x		x			x	
For vulcanized fiber.....	x										x		x			x	
Other (including paper for parchmentizing).....	x	x		x					x		x		x				
Boards:																	
Binders' board.....	x	x							x	x		x		x			
Bristol board:																	
Index.....	x										x		x			x	
Mill (including specialties).....	x										x		x			x	
Container boards:																	
Chip (plain and test).....	x										x		x			x	
Liners:																	
Jute.....	x										x	x				x	
Kraft.....	x										x		x			x	
Other.....	x										x		x			x	
Straw (for corrugated-container use).....	x										x	x				x	
Other.....	x										x		x			x	
Folding boxboards (bending):																	
Manila-lined (all lined boards).....	x										x		x			x	
Patent-coated.....	x										x		x			x	
Other.....	x										x		x			x	
Leatherboard.....	x	x									x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>PAPER AND ALLIED PRODUCTS GROUP—CON.</b>																	
<b>Paper and paperboard—Continued.</b>																	
<b>Boards—Continued.</b>																	
Set-up boxboards (nonbending):																	
Chip and straw										X				X			
Newsboard		X								X				X		X	
Other (including tube, egg-case, etc.)		X								X				X		X	
<b>Book paper:</b>																	
<b>  Converting:</b>																	
Body stock for coated paper, free from ground wood		X	X				X	X		X	X						
Other		X	X				X	X		X				X			
Lithograph		X	X				X	X		X				X			
<b>  Machine-finished, sized, and supercalendered:</b>																	
Containing ground wood		X	X				X	X		X				X			
Free from ground wood		X	X				X	X		X	X			X			
Offset		X	X				X	X		X				X			
Other		X	X				X	X		X				X			
<b>Building paper:</b>																	
Felts		X						X		X	X					X	
Other than felts and sheathing		X						X		X				X		X	
<b>Cover paper</b>																	
<b>Ground-wood printing and specialty papers:</b>																	
Catalog		X								X				X		X	
Hanging		X						X		X				X		X	
Novel-news and news-tablet		X	X		X			X		X				X			
Printing		X	X		X			X		X				X			
Other		X	X		X			X		X				X			
Newsprint, standard in rolls		X	X		X			X		X				X			
<b>Tissue paper:</b>																	
High-grade (cigarette, condenser, carbon, etc.)		X								X				X		X	
Napkin stock		X	X		X			X		X				X			
Toilet tissue		X	X		X			X		X				X			
Toweling		X	X		X			X		X				X			
Waxing (up to 18 pounds)		X			X					X				X		X	
Wrapping (up to 18 pounds)		X								X				X		X	
<b>Wrapping paper:</b>																	
<b>  Bleached sulphite and bleached sulphate:</b>																	
Machine-glazed wrapping		X								X				X		X	
Waxing (18 pounds and up)		X								X				X		X	
Other grades		X								X				X		X	
Glassine		X								X				X		X	
Greaseproof		X								X				X		X	
<b>  Kraft:</b>																	
<b>    Machine-finished:</b>																	
<b>      Converting:</b>																	
Bag		X								X				X		X	
Other		X								X				X		X	
Wrapping		X								X				X		X	
Machine-glazed, wrapping		X								X				X		X	
Manila, wrapping and envelope		X								X				X		X	
Rope and jute		X								X				X		X	
Tagboard, light manila board, and pattern		X								X				X		X	
<b>  Unbleached sulphite and semi-bleached sulphate:</b>																	
Bag		X								X				X		X	
Butchers' and grocers' paper		X								X				X		X	
Other grades		X								X				X		X	
Other wrapping paper		X								X				X		X	
<b>Writing paper (fine):</b>																	
100-percent rag		X								X	X					X	
50- to 100-percent rag		X								X	X					X	
Less than 50-percent rag		X								X				X		X	
Sulphite bond		X								X				X		X	
Other chemical wood pulp		X								X				X		X	
Other paper		X								X				X		X	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>																	
<b>Ammunition and related products:</b>																	
Blasting and detonating caps		x								x		x					x
Cartridges (rifle, revolver, pistol), loaded paper shells, blanks, and other ammunition and parts	x		x		x			x		x		x					
<b>Chemicals, n. e. c.:</b>																	
<b>Acetates:</b>																	
Amyl		x								x	x						x
Butyl		x								x	x						x
Ethyl		x								x	x						x
Acetone		x								x	x						x
<b>Acids:</b>																	
Acetic		x								x			x				x
Boric (boracic)		x	x		x			x		x		x		x			
Chromic		x								x		x					x
Citric		x	x		x			x		x		x					
Hydrochloric: Made from—																	
Salt		x								x		x					x
Chlorine, and byproduct, and other		x								x		x					x
Mixed (sulfuric-nitric)		x								x		x					x
Nitric		x								x		x					x
Oleic		x								x	x						x
Oxalic		x								x		x					x
Stearic		x								x	x						x
<b>Sulfuric:</b>																	
Chamber process		x								x		x					x
Contact process		x								x		x					x
Tartaric		x	x		x			x		x	x						
<b>Alcohols:</b>																	
Butyl		x								x	x						x
Methyl, synthetic		x								x			x				x
<b>Ammonia:</b>																	
Anhydrous		x								x		x					x
Aqua and liquor		x								x		x					x
<b>Bicarbonates and carbonates:</b>																	
Calcium carbonate (precipitated chalk)		x	x		x			x		x		x					
<b>Soda ash:</b>																	
Ammonia soda		x								x		x					x
Natural and electrolytic soda		x								x		x					x
Sodium bicarbonate		x	x		x			x		x		x					
<b>Bromides:</b>																	
Calcium carbide		x								x		x					x
Carbon, activated		x								x		x					x
Carbon bisulphide		x								x		x					x
Carbon tetrachloride		x								x		x					x
<b>Chlorides:</b>																	
Ammonium (sal ammoniac)		x								x		x					x
Calcium, flake		x								x		x					x
<b>Chromates and bichromates, sodium.</b>																	
Crudes		x								x		x					x
Finished		x	x			x		x		x		x					x
Intermediates		x								x		x					x
Ester gum		x	x					x		x		x					
Ether (ethyl)		x				x		x		x		x					x
Ferroalloys, electric-furnace		x		x			x	x		x		x					
Fluorides		x								x		x					x
<b>Glycerine:</b>																	
Chemically pure		x	x		x			x		x	x						
Crude		x								x	x						x
Dynamite grade		x								x	x						x
<b>Hydroxides:</b>																	
Lime-soda		x								x		x					x
Potassium (caustic)		x								x		x					x
Sodium (caustic), electrolytic		x								x		x					x
Modified sodas		x								x		x					x
<b>Nitrates:</b>																	
Ammonium		x								x		x					x
Silver (lunar caustic)		x								x		x					x
Oxide, tin		x								x		x					x
Peroxide, hydrogen		x								x		x					x

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>																	
<b>Chemicals, n. e. c.—Continued.</b>																	
Phosphates:																	
Calcium, monobasic.....		x								x		x				x	
Sodium:																	
Pyro.....		x	x		x			x		x		x					
Tribasic.....		x								x		x				x	
Plastics:																	
Cellulose acetate.....		x	x				x	x		x	x						
Coal-tar resins, derived from:																	
Phenol and/or cresol.....		x	x				x	x		x		x					
Phthalic anhydride.....		x	x				x	x		x		x					
Finished articles of nitrocellulose (pyroxylin).....		x	x				x	x		x		x					
Sodium borate (borax).....		x	x				x	x		x		x					
Sodium hypochlorite.....		x								x		x				x	
Sodium silicate:																	
Liquid.....		x								x		x				x	
Solid.....		x								x		x				x	
Sodium sulfide.....		x								x		x				x	
Sodium sulfite, formaldehyde and zinc-hydro.....		x								x		x				x	
Sulfates:																	
Aluminum (concentrated alum).....		x								x		x				x	
Ammonium.....		x								x		x				x	
Copper (blue vitriol).....		x								x		x				x	
Magnesium (epsom salt).....		x								x		x				x	
Sodium hyposulfite (thiosulfate).....		x								x		x				x	
Sodium salt cake (crude).....		x								x		x				x	
Zinc.....		x								x		x				x	
Sulfur, refined.....		x								x		x				x	
Vitreous enamels (frit).....		x	x				x	x		x		x					
Compressed and liquefied gases:																	
Ammonia, anhydrous.....		x								x					x	x	
Carbon dioxide (not including "dry ice").....		x	x		x			x		x		x					
Carbon dioxide, solidified ("dry ice").....		x								x		x				x	
Chlorine.....		x								x		x				x	
Hydrogen.....		x								x		x			x	x	
Hydrocarbon gases:																	
Acetylene.....		x								x		x				x	
Liquefied petroleum gases.....		x								x		x				x	
Methyl chloride.....		x								x		x		x		x	
Nitrous oxide.....		x	x		x			x		x		x				x	
Oxygen.....		x								x		x			x	x	
Sulfur dioxide.....		x								x		x				x	
Drugs and medicines:																	
Medicinal products sold direct to or prescribed by physicians:																	
Alkaloids and derivatives:																	
Caffeine.....		x	x		x			x		x		x					
Strychnine.....		x	x		x			x		x		x					
Biological products:																	
For animal use:																	
Antitoxins.....		x								x		x				x	
Bacterins.....		x								x		x				x	
Serums.....		x								x		x				x	
Vaccines.....		x								x		x				x	
Viruses.....		x								x		x				x	
For human use:																	
Antitoxins.....		x		x		x			x		x	x					
Bacterins.....		x		x		x			x		x	x					
Serums.....		x		x		x			x		x	x					
Vaccines.....		x		x		x			x		x	x					
Viruses.....		x		x		x			x		x	x					
Other:																	
Dry preparations (pills, tablets, powders, salts, etc.):																	
U. S. P. and N. F.....		x		x		x			x		x		x				
Special formulas.....		x		x		x			x		x		x				
Gland products:																	
U. S. P. and N. F.....		x		x		x			x		x		x				
Special formulas.....		x		x		x			x		x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
CHEMICALS AND ALLIED PRODUCTS GROUP—continued																	
Drugs and medicines—Continued.																	
Medicinal products sold direct to or prescribed by physicians—Con.																	
Other—Continued.																	
Liquid preparations (tinctures, fluid extracts, sirups, elixirs, solutions, etc.):																	
U. S. P. and N. F.	x		x		x			x		x		x					
Special formulas	x		x		x			x		x		x					
Ointments, cerates, suppositories, globules, etc.:																	
U. S. P. and N. F.	x		x		x			x		x		x					
Special formulas	x		x		x			x		x		x					
Prepared intramuscular, subcutaneous and intravenous products:																	
U. S. P. and N. F.	x		x		x			x		x		x					
arsphenamines	x		x		x			x		x		x					
U. S. P. and N. F., other	x		x		x			x		x		x					
Special formulas	x		x		x			x		x		x					
Pharmaceutical metals and their salts (bromides, citrates, bismuth, etc.):																	
U. S. P. and N. F.	x		x		x			x		x		x					
Special formulas	x		x		x			x		x		x					
Synthetic chemical medicinals																	
U. S. P. and N. F.	x		x		x			x		x		x					
Special formulas	x		x		x			x		x		x					
Vitamin products:																	
U. S. P. and N. F.	x		x		x			x		x		x					
Special formulas	x		x		x			x		x		x					
Medicines in specially prepared packages made for sale to the general public:																	
Dry preparations (pills, tablets, powders, salts, etc.):																	
U. S. P. and N. F.	x		x		x			x		x		x					
Not U. S. P. and N. F.	x		x		x			x		x		x					
Gland products:																	
U. S. P. and N. F.	x		x		x			x		x		x					
Not U. S. P. and N. F.	x		x		x			x		x		x					
Liquid preparations (tinctures, fluid extracts, sirups, elixirs, solutions, etc.):																	
U. S. P. and N. F.	x		x		x			x		x		x					
Not U. S. P. and N. F.	x		x		x			x		x		x					
Ointments, cerates, suppositories, globules, etc.:																	
U. S. P. and N. F.	x		x		x			x		x		x					
Not U. S. P. and N. F.	x		x		x			x		x		x					
Pharmaceutical metals and their salts:																	
U. S. P. and N. F.	x		x		x			x		x		x					
Not U. S. P. and N. F.	x		x		x			x		x		x					
Synthetic chemical medicinals, including U. S. P. and N. F. and other																	
U. S. P. and N. F.	x		x		x			x		x		x					
Not U. S. P. and N. F.	x		x		x			x		x		x					
Poultry and animal remedies (except biological products)																	
U. S. P. and N. F.			x							x		x				x	
Not U. S. P. and N. F.			x							x		x				x	
Fertilizers:																	
Bone meal			x							x		x				x	
Complete fertilizers (mixtures containing nitrogen, phosphoric acid, and potash)			x							x		x				x	
Fish scrap			x							x					x	x	
Superphosphates:																	
Ammoniated (including urea and ammonium-nitrate solutions)			x							x		x				x	
Not ammoniated (including concentrated phosphates)			x							x		x				x	
Superphosphate, potash (mixtures)			x							x		x				x	
Other ammoniated fertilizers (non-potash)			x							x		x				x	
Tankage			x							x		x				x	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>																	
<b>Paints, pigments, and varnishes:</b>																	
<b>Dry colors and pigments:</b>																	
<b>Chemical pigments:</b>																	
Chrome greens, C. P.....	x	x			x		x			x		x					
Chrome yellows and oranges, C. P.....	x	x			x		x			x		x					
Iron blues (Prussian), C. P.....	x	x			x		x			x		x					
<b>Lead oxides:</b>																	
Litharge.....	x	x			x		x			x		x					
Red lead, minium, and other.....	x	x			x		x			x		x					
Lithopone.....	x	x			x		x			x		x				x	
Zinc oxides (Chinese white, zinc white).....	x	x			x		x			x		x				x	
Other oxides.....	x	x			x		x			x		x				x	
<b>Lakes:</b>																	
<b>Coal-tar color lakes:</b>																	
Alizarine.....	x	x			x		x			x		x					
Azo bordeaux.....	x	x			x		x			x		x					
Lithol rubine.....	x	x			x		x			x		x					
Peacock blue.....	x	x			x		x			x		x					
Persian orange.....	x	x			x		x			x		x					
Pigment scarlet.....	x	x			x		x			x		x					
Scarlet 2r.....	x	x			x		x			x		x					
Phosphotungstic-acid lakes, all.....	x	x			x		x			x		x					
<b>Toners, full strength:</b>																	
Eosine and phloxine.....	x	x			x		x			x		x					
Lake-red C.....	x	x			x		x			x		x					
Lithol, C. P.....	x	x			x		x			x		x					
Lithol-rubine.....	x	x			x		x			x		x					
Methyl-violet.....	x	x			x		x			x		x					
Para, C. P.....	x	x			x		x			x		x					
<b>Phosphotungstic acid:</b>																	
Blue.....	x	x			x		x			x		x					
Green.....	x	x			x		x			x		x					
Purple.....	x	x			x		x			x		x					
Other.....	x	x			x		x			x		x					
Red, all other.....	x	x			x		x			x		x					
Toluidines, C. P.....	x	x			x		x			x		x					
Other.....	x	x			x		x			x		x					
<b>Toners, reduced:</b>																	
All reduced organic reds.....	x	x			x		x			x		x					
All other reduced organic toners.....	x	x			x		x			x		x					
Whiting.....	x						x			x		x				x	
<b>Fillers:</b>																	
Dry.....	x								x		x		x			x	
Liquid.....	x								x		x		x			x	
Paste.....	x								x		x		x			x	
<b>Paints:</b>																	
<b>Paste paints:</b>																	
<b>Colors:</b>																	
In oil.....	x								x		x		x			x	
In Japan.....	x	x					x	x			x		x				
Combination or graded whites.....	x								x		x		x			x	
Red lead in oil.....	x								x		x		x			x	
White lead in oil, pure.....	x								x		x		x			x	
Zinc oxide in oil.....	x								x		x		x			x	
Other.....	x								x		x		x			x	
Plastic paints.....	x								x		x		x			x	
<b>Ready-mixed and semipaste paints:</b>																	
<b>Paints in oil, ready-mixed:</b>																	
Stains (not varnish stains).....	x								x		x		x			x	
Undercoatings and primers.....	x								x		x		x			x	
Wall paints and mill whites, flat or gloss.....	x								x		x		x			x	
Other.....	x								x		x		x			x	
<b>Water paints and calcimines, dry or paste:</b>																	
Putty.....	x								x		x		x			x	
Shellac, bleached.....	x								x		x		x			x	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V			VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D			
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>																		
<b>Paints, pigments, and varnishes—Con.</b>																		
<b>Varnishes, lacquers (including enamels), and japans:</b>																		
<b>Enamels:</b>																		
Oil, ester-gum, and natural-resin, varnish base.....		x	x				x	x			x	x						
Synthetic-resin (oil, straight or modified).....		x	x				x	x			x	x						
<b>Japans:</b>																		
Baking.....		x	x				x	x			x	x						
Drying japans and driers.....		x	x				x	x			x	x						
Nitrocellulose (pyroxylin) products:																		
<b>Lacquers:</b>																		
Clear.....		x	x				x	x			x	x						
Pigmented.....		x	x				x	x			x	x						
Lacquer, bases and dopes.....		x		x			x	x			x	x						
Thinners.....		x	x				x	x			x				x			
<b>Varnishes:</b>																		
Spirit, not turpentine.....		x							x		x			x		x		
Synthetic-oleoresinous, straight or modified (100% synthetic resin).....		x							x		x			x		x		
Other resinous except synthetic (100% natural resin).....		x							x		x			x		x		
Other varnishes.....		x							x		x			x		x		
Varnish stains.....		x	x				x	x			x	x		x				
Other products of the varnish group.....		x	x				x	x			x	x						
<b>Rayon and allied products:</b>																		
<b>Rayon:</b>																		
Staple fiber.....		x	x			x		x			x			x				
Waste.....		x	x			x		x			x			x				
<b>Yarns, by denier:</b>																		
75 and finer (87 and less).....		x	x			x		x			x			x				
100 (88-112).....		x	x			x		x			x			x				
125 (113-137).....		x	x			x		x			x			x				
150 (138-162).....		x	x			x		x			x			x				
200 (163-249).....		x	x			x		x			x			x				
300 (250-374).....		x	x			x		x			x			x				
450 and coarser (375 and over).....		x	x			x		x			x			x				
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>																		
<b>Petroleum refining:</b>																		
Acid oil.....		x								x				x		x		
Asphalt, other than liquid asphalt.....		x							x		x			x		x		
Distillates.....		x		x		x			x		x			x				
Gas oils.....		x		x		x			x		x			x				
Gasoline.....		x		x		x			x		x			x				
Illuminating oils.....		x		x		x			x		x			x				
Lubricating greases, including axle grease.....		x									x			x		x		
<b>Lubricating oils:</b>																		
Black, cylinder, red, neutral, pale and paraffin.....		x									x			x		x		
Other, including compounded and unclassified.....		x									x			x		x		
Naphtha.....		x									x			x		x		
Paraffin wax.....		x									x			x		x		
Partially refined oils, sold for re-running.....		x									x			x		x		
Petrolatum, mineral jelly, etc.....		x		x		x				x		x		x		x		
Petroleum coke.....		x									x			x		x		
Residual fuel oils.....		x									x			x		x		
Residuum or tar.....		x								x				x		x		
<b>Road oils:</b>																		
Liquid asphaltic.....		x								x				x		x		
Other.....		x								x				x		x		

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>RUBBER PRODUCTS GROUP</b>																	
Rubber boots and shoes:																	
Arctic and gaiters, buckle, automatic, and style	X		X			X			X		X			X			
Boots	X		X			X			X		X			X			
Canvas shoes, rubber-soled, all kinds	X		X			X			X		X			X			
Lumbermen's and pacs	X		X			X			X		X			X			
Other shoes, rubbers, and footholds	X		X			X			X		X			X			
Rubber tires and inner tubes:																	
Inner tubes:																	
Airplane		X		X		X			X		X			X			
Motorcycle and bicycle	X		X			X			X		X			X			
Passenger-car, truck, and bus	X		X			X			X		X			X			
Other		X		X		X			X		X			X			
Tires and casings, pneumatic:																	
Airplane		X		X		X			X		X			X			
Motorcycle and bicycle:																	
Casings	X		X			X			X		X			X			
Single-tube tires	X		X			X			X		X			X			
Passenger-car	X		X			X			X		X			X			
Truck and bus		X		X		X			X		X			X			
Other		X		X		X			X		X			X			
Tires, solid and cushion:																	
Industrial, truck, tractor, and trailer		X		X			X		X		X			X			
Truck and bus for highway transportation		X		X			X		X		X			X			
Rubber products other than boots and shoes and tires and tubes:																	
Bands		X								X				X		X	
Battery jars, boxes, etc.	X	X				X			X		X			X			
Belting, all types	X		X			X			X		X			X			
Camelback	X		X			X			X		X			X			
Cement	X	X		X		X			X		X			X			
Combs	X		X			X			X		X			X			
Erasers, except pencil plugs	X		X			X			X		X			X		X	
Flooring (tile or sheet)	X		X			X			X		X			X		X	
Gloves, all types	X		X			X			X		X			X			
Gutta-percha products	X	X				X			X		X			X			
Heels	X	X				X			X		X			X			
Hose, all types	X		X			X			X		X			X			
Molded articles for motor vehicles	X	X				X	X		X		X			X			
Mouthpieces for pipes and cigar and cigarette holders	X		X				X		X		X			X			
Nipples and pacifiers	X		X			X			X		X			X			
Miscellaneous hard-rubber goods	X	X				X			X		X			X			
Reclaimed rubber	X	X				X			X		X			X			
Rolls, rubber-covered (all sizes)	X		X			X			X		X			X			
Soles, including composition or fiber	X	X				X			X		X			X			
Soling strips and top-lift sheets	X	X				X			X		X			X			
Sponge-rubber products, n. e. c.	X		X			X			X		X			X			
Thread	X	X				X			X		X			X			
<b>LEATHER AND ITS MANUFACTURES GROUP</b>																	
Belting and packing leather:																	
Belting:																	
Flat	X		X			X			X	X				X			
Other	X		X			X			X		X			X			
Belt lacings	X		X			X			X		X			X			
Packings (cup, U-valve, etc.) except washers	X								X		X			X		X	
Textile leathers (aprons, picker leathers, mill strapping, etc.)	X								X		X			X		X	
Boots and shoes:																	
Athletic:																	
McKay	X		X			X			X		X	X		X			
Stitchdown	X		X			X			X		X	X		X			
Turned	X		X			X			X		X	X		X			
Welded	X		X			X			X		X	X		X			
Ballet slippers: Turned	X		X			X			X		X	X		X			
Beach sandals:																	
Cemented	X		X			X			X		X	X		X			
McKay	X		X			X			X		X	X		X			
Stitchdown	X		X			X			X		X	X		X			
Wood-or-metal-fastened	X		X			X			X		X	X		X			

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>LEATHER AND ITS MANUFACTURES GROUP—continued</b>																	
<b>Boots and shoes—Continued.</b>																	
Canvas, satin, and other fabric uppers with leather soles:																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
<b>Infants':</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
<b>Men's dress:</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
Wood-or-metal-fastened.....	x		x					x		x	x						
<b>Men's work:</b>																	
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
Wood-or-metal-fastened.....	x		x					x		x	x						
<b>Misses' and children's:</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
<b>Part-leather and part-fabric uppers with leather soles:</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
<b>Slippers and moccasins for house wear, all-leather:</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
<b>Slippers and moccasins for house wear, other than all-leather:</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
<b>Women's:</b>																	
Cemented.....	x		x					x		x	x						
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Turned.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
Wood-or-metal-fastened.....	x		x					x		x	x						
<b>Youths' and boys':</b>																	
McKay.....	x		x					x		x	x						
Stitchdown.....	x		x					x		x	x						
Welted.....	x		x					x		x	x						
Wood-or-metal-fastened.....	x		x					x		x	x						
<b>Leather, tanned, curried, and finished:</b>																	
Bag, case, and strap leather, finished grains (sides or equivalent sides)																	
Collar leather (sides).....			x					x	x		x						
<b>Fancy and bookbinders' leather:</b>																	
Buffings, finished (hides).....			x	x				x		x	x						
Cattle hides (sides).....			x	x				x		x	x						
Pig and hog (skins) and pigskins, strips.....			x	x				x		x	x						
Reptile—alligator, snake, lizard, etc., (skins).....			x	x				x		x	x						
Sheep and lamb (skins).....			x	x				x		x	x						

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
LEATHER AND ITS MANUFACTURES GROUP—continued																	
Leather, tanned, curried, and finished—Continued.																	
Glove and garment leather:																	
Cattle grains, including foreign-tanned kips (sides)	x	x			x		x		x		x						
Cattle hides (bellies)	x	x			x		x		x		x						
Deer and elk (skins)	x	x			x		x		x		x						
Goat and kid (skins)	x	x			x		x		x		x						
Horse, colt, ass, and mule:																	
Butts (equivalent butts)		x	x		x		x		x		x						
Half and whole fronts (equivalent fronts)		x	x		x		x		x		x						
Shanks		x	x		x		x		x		x						
Sheep and lamb, except shearlings (skins)		x	x		x		x		x		x						
Shearlings (skins)		x	x		x		x		x		x						
Other		x	x		x		x		x		x						
Harness leather:																	
Oak black and russet (sides)		x		x			x	x			x	x					
Union-black (sides)		x		x			x	x			x	x					
Lace leather (sides)		x			x			x			x	x					
Lining leather:																	
Goat and kid (skins)		x	x			x		x			x		x				
Sheep and lamb—shoe stock (skins)		x	x			x		x			x		x				
Other		x	x			x		x			x		x				
Patent upper leather, cattle and kip sides, japanned (sides)		x	x			x		x			x		x				
Roller leather:																	
Calf and kip (skins)		x		x			x		x		x	x					
Sheep and lamb (skins)		x		x			x		x		x	x					
Rough leather:																	
Bag, case, and strap, crust grains for sale as such (sides or equivalent sides)		x	x				x	x			x	x					
Belting butts for sale as such (butts and butt ends)		x		x			x		x		x						
Rough splits		x	x				x		x		x						
Upholstery leather (auto, furniture, and carriage), russet for sale as such—																	
Buffings (hides)		x	x				x	x			x	x					
Splits, main and second (pieces)		x	x				x	x			x	x					
Whole-hide grains and machine-buffed (hides)		x	x				x	x			x	x					
Skivers (dozens)		x	x				x		x		x	x					
Sole and belting leather:																	
Belting butts, curried (butts and butt ends)		x		x			x		x		x						
Chrome and combination sole (backs, bends, and sides)		x	x				x		x		x						
Horse-sole (butts)		x	x				x		x		x						
Oak and union sole (backs, bends, and sides)		x	x				x		x		x						
Offal (heads, bellies, shoulders, etc.)		x	x				x		x		x						
Splits, other than wax and finished upper and upholstery:																	
Splits for gloves		x	x				x		x		x						
Splits for innersoles		x	x				x		x		x						
Splits for linings		x	x				x		x		x						
Other splits		x	x				x		x		x						
Upholstery leather, finished:																	
Splits (main and second pieces)		x	x				x	x			x	x					
Whole-hide grains and machine-buffed (hides)		x	x				x	x			x	x					
Upper leather:																	
Calf and whole kip, excluding kip sides (whole skins)		x	x				x		x		x						
Cattle, including kip sides (sides)		x	x				x		x		x						
Goat and kid (skins)		x	x				x		x		x						
Horse, colt, ass, and mule (butts and shanks)		x	x				x		x		x						
Kangaroo and wallaby (skins)		x	x				x		x		x						
Wax and finished splits (pieces)		x	x				x		x		x						
Other		x	x				x		x		x						

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
STONE, CLAY, AND GLASS PRODUCTS GROUP																	
Asbestos products, steam and other packing, pipe and boiler covering, and gaskets:																	
Blocks, molded		X						X		X		X				X	
Brake lining, molded		X	X		X			X		X		X					
Brake lining, not molded		X	X		X			X		X		X					
Cement, insulating		X						X		X		X				X	
Cloth		X								X		X				X	
Clutch facings, molded		X								X		X				X	
Clutch facings, not molded		X								X		X				X	
Gaskets		X	X		X			X		X		X				X	
Millboard		X						X		X		X				X	
Miscellaneous textiles		X								X		X				X	
Packing, compressed sheet		X								X		X				X	
Packing, flat fabric		X								X		X				X	
Packing, woven and molded to special sections (with or without other material)		X								X		X				X	
Paper		X								X		X				X	
Pipe and boiler covering:																	
Air-cell asbestos		X								X		X				X	
Other than air-cell asbestos		X								X		X				X	
85 percent magnesia		X								X		X				X	
Shingles		X						X		X		X				X	
Table mats and protectors	X		X			X		X		X		X					
Tape, listings, and tubular lagging		X								X		X				X	
Yarn		X								X		X				X	
Cement:																	
Natural, puzzolan, and masonry		X						X	X			X				X	
Portland		X						X	X			X				X	
Clay products, other than pottery:																	
Brick:																	
Common		X						X	X			X				X	
Face		X						X	X			X				X	
Glazed, other than salt-glazed		X						X	X			X				X	
Hollow		X						X	X			X				X	
Salt-glazed		X						X	X			X				X	
Chimney pipe and tops		X						X	X			X				X	
Clay sold, raw or prepared, including fire-clay dust		X					X			X		X				X	
Fire-clay products:																	
Brick, block, or tile, except high-alumina (9-in. equivalent)		X						X		X		X				X	
Brick, high-alumina		X						X		X		X				X	
Brick, ladle		X						X		X		X				X	
Brick, plastic fire		X						X		X		X				X	
Special shapes		X						X		X		X				X	
Flue lining		X						X		X		X				X	
Glass-house tank blocks, melting pots, stoppers, floaters, and rings		X						X		X		X				X	
Refractory cement (clay)		X						X		X		X				X	
Segment blocks		X						X		X		X				X	
Sewer pipe		X						X	X			X				X	
Stove lining		X		X		X		X		X		X				X	
Terra cotta		X			X			X	X			X				X	
Tile:																	
Ceramic mosaic (vitreous and semivitreous, unglazed)		X						X		X		X				X	
Drain tile, vitrified (under drain)		X						X	X			X				X	
Drain tile, unvitrified		X						X	X			X				X	
Enameled tile and glazed ceramic mosaic		X						X		X		X				X	
Faience tile (including hand-decorated tile)		X						X		X		X				X	
Floor tile		X						X		X		X				X	
Hollow building tile:																	
Conduit tile		X						X	X			X				X	
Floor-arch, silo, and corncrib tile; radial chimney blocks; fire-proofing tile		X						X		X		X				X	
Partition, load-bearing, furring:																	
Glazed		X						X	X			X				X	
Unglazed		X						X	X			X				X	
Roofing tile		X						X		X		X				X	
Wall tile, including trim		X						X		X		X				X	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	C	D				
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP—continued</b>																	
<b>Clay products, other than pottery—Con.</b>																	
Vitrified brick and plates:																	
For paving.....	x							x		x		x				x	
Sewer liners.....	x							x	x			x				x	
Wall coping.....	x							x	x			x				x	
<b>Concrete products:</b>																	
Brick.....	x							x	x			x				x	
Circular structures.....	x							x	x			x				x	
Cast stone.....	x							x	x			x				x	
Concrete, premixed.....	x							x	x			x				x	
Conduits, electric.....	x		x			x		x	x			x				x	
Laundry trays.....	x		x			x		x	x			x				x	
Paving materials.....	x							x		x		x				x	
Piling.....	x							x		x		x				x	
Pipe:																	
Culvert.....	x							x	x			x				x	
Irrigation.....	x		x			x		x	x			x				x	
Pressure.....	x							x		x		x				x	
Sewer.....	x							x	x			x				x	
Poles and posts.....	x		x			x		x	x			x				x	
Squares for walls, ceilings, etc.....	x							x	x			x				x	
Septic tanks.....	x							x	x			x				x	
Tile:																	
Art marble and Spanish floor tile.....	x							x		x		x				x	
Building block and tile, except roofing.....	x							x	x			x				x	
Drain tile.....	x							x	x			x				x	
Roofing tile.....	x							x		x		x				x	
Vaults.....	x		x			x		x	x			x					
<b>Glass:</b>																	
<b>Containers for beverages:</b>																	
Beer bottles.....	x									x		x					x
Liquor ware (including wines and cordials).....	x									x		x					x
<b>Containers for food-products:</b>																	
Fruit jars (home-pack).....	x		x				x	x		x		x					x
Milk bottles.....	x									x		x					x
Narrow-neck (packers' ware).....	x									x		x					x
Wide-mouth bottles and jars (packers' ware).....	x									x		x					x
<b>Containers for medicinal and toilet preparations.....</b>																	
Flat glass, obscured.....	x								x		x	x					x
Flat glass, window.....	x								x		x	x					x
Flat glass, other (including glass block or brick).....	x	x					x	x		x		x					x
Insulators.....	x		x					x		x		x					x
Lamp chimneys.....	x		x					x		x		x					x
Lantern globes.....	x		x					x		x		x					x
Lenses, motor-vehicle.....	x	x						x	x			x					x
<b>Lighting glassware, miscellaneous, including electric-light bulbs and oil lamps.....</b>																	
Pressed and blown glassware not elsewhere specified (including glass cooking ware or ovenware).....	x		x				x	x		x		x					x
Shades, globes, reflectors, etc.....	x		x				x	x		x		x					x
<b>Tableware:</b>																	
<b>Plates, dishes, and cups and saucers:</b>																	
Hand-made, pressed.....	x		x				x	x		x		x					x
Machine-made, pressed and blown.....	x		x				x	x		x		x					x
<b>Tumblers, goblets, and barware:</b>																	
Hand-made, blown.....	x						x	x		x		x					x
Hand-made, pressed.....	x		x				x	x		x		x					x
Machine-made, pressed and blown.....	x		x				x	x		x		x					x
Tubing.....	x									x		x					x
<b>Gypsum:</b>																	
Keene's cement.....	x							x		x		x					x
<b>Plaster:</b>																	
Calced.....	x							x		x		x					x
Industrial.....	x							x		x		x					x
Molding and gaging.....	x							x		x		x					x

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII	
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D			
STONE, CLAY, AND GLASS PRODUCTS GROUP—continued																		
Gypsum—Continued.																		
Plaster—Continued.																		
Neat		X						X		X		X				X		
Prepared finish		X						X		X		X				X		
Sanded		X						X		X		X				X		
Other		X						X		X		X				X		
Plaster board and lath		X						X		X		X				X		
Rock:																		
Agricultural gypsum		X						X		X		X					X	
For Portland cement		X					X		X		X					X		
Other gypsum rock		X								X		X				X		
Tile, partition and wall		X						X		X		X				X		
Wallboard		X						X		X		X				X		
Lime:																		
Agricultural		X							X			X					X	
Hydrated		X						X	X			X				X		
Quicklime		X						X	X			X				X		
Marble, granite, slate, and other stone, cut and shaped:																		
Building stone:																		
Granite, exterior use		X						X		X		X				X		
Limestone, exterior use		X						X	X			X				X		
Limestone, interior use		X						X		X		X				X		
Marble, exterior use		X						X		X		X				X		
Marble, interior use		X						X		X		X				X		
Slate, for roofing		X						X		X		X				X		
Slate, structural and sanitary		X						X		X		X				X		
Other, exterior use		X						X		X		X				X		
Other, interior use		X						X		X		X				X		
Monumental stones:																		
Granite	X		X				X		X		X		X					
Limestone	X		X				X		X		X		X					
Marble	X		X				X		X		X		X					
Other	X		X				X		X		X		X					
Ornamental stones and stones for miscellaneous uses:																		
Granite:																		
Curbing		X							X		X		X				X	
Paving blocks		X							X		X		X				X	
Rubble		X							X		X		X				X	
Marble:																		
Church furniture, altars, etc.		X							X		X		X				X	
Statuary and pedestals		X							X		X		X				X	
Table tops		X	X				X	X			X		X				X	
Terrazzo chips		X							X		X		X				X	
Other		X							X		X		X				X	
Slate:																		
Blackboards and bulletin boards		X		X			X		X		X		X					
Flagstones, walkways, etc.		X							X		X		X				X	
School slates	X		X				X		X		X		X					
Nonclay refractories:																		
Graphite and other carbon:																		
Crucibles and retorts		X		X		X			X		X		X					X
Other carbon refractories		X							X		X		X					X
Magnesite and chrome brick																		
Refractory cement (nonclay):		X							X		X		X					X
Silicon carbide cement		X							X		X		X					X
All other		X							X		X		X					X
Silica brick																		
Other nonclay refractories		X							X		X		X					X
Pottery, including porcelain ware:																		
Art pottery	X		X				X		X		X		X					
Chemical stoneware		X		X			X		X		X		X					
Electrical supplies, porcelain:																		
Insulators:																		
Knobs, tubes, and cleats		X		X			X		X		X		X					
Pin type, below 7,500 volts		X		X			X		X		X		X					
Pin type, 7,500-17,000 volts		X		X			X		X		X		X					
Pin type, 17,000-45,000 volts		X		X			X		X		X		X					
Pin type, 45,000 volts and over		X		X			X		X		X		X					
Suspension type		X		X			X		X		X		X					
Other electrical supplies		X		X			X		X		X		X					
Garden pottery	X		X				X		X	X		X		X				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
STONE, CLAY, AND GLASS PRODUCTS GROUP—continued																	
Pottery, including porcelain ware—Con.																	
Gas radiants and backwalls for use in portable stoves.....		X	X				X	X			X		X				
Hotel china.....		X		X			X		X		X		X				
Plumbing fixtures (exclusive of fittings) vitreous china:																	
Laboratories.....		X							X		X		X			X	
Lowdown flush tanks.....		X							X	X			X			X	
Reverse traps.....		X							X		X		X			X	
Siphon jets.....		X							X		X		X			X	
Stalls.....		X							X		X		X			X	
Washdowns.....		X							X	X			X			X	
Other bathroom and toilet fixtures.....		X							X	X			X			X	
Other vitreous-china fixtures.....		X							X		X		X			X	
Plumbing fixtures (exclusive of fittings), semivitreous or porcelain.....		X							X		X		X			X	
Pyrometric cones.....		X		X		X			X		X		X				
Red earthenware.....	X		X						X	X			X				
Saggers (of own make).....		X		X		X			X		X		X				
Stoneware (except chemical) and yellow and Rockingham ware.....	X		X			X			X		X		X				
White ware, including cream color, white granite, semiporcelain and semivitreous porcelain ware.....	X		X			X			X		X		X				
Wallboard and plaster (except gypsum), building insulation, and floor composition:																	
Floor composition, magnesite.....		X							X		X		X			X	
Floor tile, asphalt.....		X							X		X		X			X	
Insulation board or rigid form of fiber composition and cellular fiber.....		X							X		X		X			X	
Insulating mineral wool:																	
Rock wool.....		X							X		X		X			X	
Slag wool.....		X							X		X		X			X	
Plaster:																	
Magnesite stucco and Portland-cement stucco.....		X							X		X		X			X	
Other nongypsum plasters.....		X							X		X		X			X	
Wallboard (fiber board made of wood or other vegetable pulp; laminated lumber with paper liners).....		X							X		X		X			X	
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP																	
Cast-iron pipe and fittings:																	
Fittings:																	
Gas and water pipe fittings.....		X							X		X		X			X	
Soil and plumbers' pipe fittings.....		X							X		X		X			X	
Other cast-iron pipe fittings and those not reported separately by kind.....		X							X		X		X			X	
Pipe:																	
Bell and spigot.....		X							X		X		X			X	
Culvert.....		X							X		X		X			X	
Flanged.....		X							X		X		X			X	
Soil and plumbers'.....		X							X		X		X			X	
Doors, shutters, and window sash and frames, molding, and trim, metal:																	
Doors:																	
Hollow-metal, iron and steel.....		X							X		X		X			X	
Hollow-metal, nonferrous-metal.....		X							X		X		X			X	
Metal-covered, iron and steel.....		X							X		X		X			X	
Metal-covered, nonferrous-metal.....		X							X		X		X			X	
Solid-metal, iron and steel.....		X							X		X		X			X	
Solid-metal, nonferrous-metal.....		X							X		X		X			X	
Door frames:																	
Hollow-metal.....		X							X		X		X			X	
Metal-covered.....		X							X		X		X			X	
Solid-metal.....		X							X		X		X			X	
Molding and trim:																	
Hollow-metal.....		X							X		X		X			X	
Metal-covered.....		X							X		X		X			X	
Solid-metal.....		X							X		X		X			X	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—  
Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	C	D				
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP— continued</b>																	
Doors, shutters, and window sash and frames, molding, and trim, metal— Continued.																	
Store fronts, hollow, metal-covered and solid metal.....		x						x		x		x			x		
Window sash and frames:																	
Hollow-metal.....		x						x		x		x			x		
Metal-covered, iron and steel.....		x						x		x		x			x		
Metal-covered, nonferrous-metal.....		x						x		x		x			x		
Solid-metal, iron and steel.....		x						x		x		x			x		
Solid-metal, nonferrous-metal.....		x						x		x		x			x		
<b>Files:</b>																	
Metal-working files and rasps.....		x								x		x				x	
Woodworking files and rasps.....		x								x		x				x	
Other files and rasps.....		x								x		x				x	
<b>Firearms:</b>																	
Pistols and revolvers.....	x		x				x	x		x		x					
Rifles, repeating.....	x		x				x	x		x		x					
Rifles, single-shot.....	x		x				x	x		x		x					
Shotguns, single-barrel, repeating.....	x		x				x	x		x		x					
Shotguns, single-barrel, single-shot.....	x		x				x	x		x		x					
Shotguns, double-barrel.....	x		x				x	x		x		x					
<b>Hardware not elsewhere classified:</b>																	
Builders', including lock sets.....		x						x		x		x			x		
Casket.....		x	x				x	x		x		x					
Furniture and cabinet, including locks.....		x	x				x	x		x		x					
Locks not elsewhere specified.....		x					x	x		x		x					
Motor-vehicle, including lock units.....		x	x				x	x		x		x					
Padlocks.....		x					x	x		x		x					
Saddlery and harness.....		x		x			x	x		x		x					
Trunk and suitcase, including locks.....		x	x				x	x		x		x					
Vacuum bottles, jugs, etc.....		x					x	x		x		x					
<b>Heating and cooking apparatus, except electric:</b>																	
Boilers, steam and hot-water heat- ing:																	
Cast-iron.....		x						x		x		x			x		
Steel.....		x						x		x		x			x		
Boiler-burner units:																	
Fuel oil.....		x						x		x		x			x		
Gas.....		x						x		x		x			x		
Brooders.....		x		x				x		x		x					
Burners:																	
Distillate-oil, for cooking and heating stoves.....		x						x	x			x			x		
Gas, commercial and industrial.....		x						x		x		x			x		
Gas, domestic (residence) type.....		x						x		x		x			x		
Oil, commercial, mechanical and forced draft.....		x						x		x		x			x		
Oil, domestic (for central heating systems and water heating):																	
Atmospheric (natural) draft.....		x						x		x		x			x		
Mechanical or forced draft.....		x						x	x			x			x		
Oil, industrial.....		x						x	x			x			x		
Cooking stoves and ranges:																	
Coal and wood, porcelain- enameled.....		x		x				x	x			x					
Coal and wood, other than porce- lain-enameled.....		x		x				x	x			x					
Combination (coal, wood, and gas), porcelain-enameled.....		x		x				x	x			x					
Combination (coal, wood, and gas), other than porcelain- enameled.....		x		x				x		x		x					
Distillate and fuel oil.....		x		x				x	x			x			x		
Gas, porcelain-enameled, with ovens.....		x		x				x	x			x					
Gas, other than porcelain- enameled, with and without ovens.....		x		x				x		x		x					
Gas, porcelain-enameled, with- out ovens.....		x		x				x		x		x					
Gasoline (except camp stoves), porcelain-enameled and other.....		x		x				x		x		x					
Kerosene.....		x		x				x		x		x					

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—  
Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP— continued																	
Heating and cooking apparatus, except electric—Continued																	
Fittings, valves, and faucets.....		X						X		X		X					X
Furnaces, warm-air:																	
Assembled from purchased parts.....		X						X		X		X					X
Manufactured.....		X						X	X			X					X
Parts and registers.....		X	X					X	X			X					X
Furnace-burner units:																	
Fuel oil.....		X						X		X		X					X
Gas.....		X						X		X		X					X
Heating stoves, coal and wood:																	
Cast-iron and cast-steel, porce- lain-enameled.....	X		X				X	X	X			X					
Cast-iron and cast-steel, other than porcelain-enameled.....	X		X				X	X	X			X					
Sheet-metal.....	X		X				X	X	X			X					
Hot plates, gas.....	X		X				X	X	X			X					
Incinerators.....		X						X	X		X						X
Incubators.....		X	X				X	X	X		X						
Laundry, orchard, etc., stoves.....		X	X				X	X	X		X						
Parts for burners, oil and gas.....		X	X					X	X		X						X
Parts for heating boilers.....		X						X			X						X
Parts for stoves, ranges, and heaters:																	
Coal and wood.....		X	X				X	X		X		X					
Gas.....		X	X				X	X		X		X					
Kerosene, distillate, and fuel oil.....		X	X					X		X		X					X
Portable ovens.....	X		X				X		X		X						
Radiators, cast-iron.....		X					X		X		X						X
Radiators, copper.....		X					X		X		X						X
Radiators, gas- and oil-fired.....		X					X		X		X						X
Regulators.....		X						X	X		X						X
Room heaters:																	
Gas.....	X		X				X	X				X					
Kerosene and distillate:																	
Pot-type, space heater.....	X		X				X		X		X						
Sleeve-type.....	X		X				X		X		X						
Wick-type, portable flueless.....	X		X				X		X		X						
Wickless type, portable flue- less.....	X		X				X		X		X						
Steam tables.....		X		X			X		X		X						
Thermostats.....		X					X		X		X						X
Traps.....		X						X	X		X						X
Unit heaters.....	X		X				X		X		X						
Water heaters:																	
Coal and wood, with storage tanks attached.....		X						X		X		X					X
Coal and wood, without storage tanks.....		X						X		X		X					X
Distillate-burning, pot-type and sleeve-type.....		X						X		X		X					X
Gas:																	
With storage tanks attached.....		X						X	X		X						X
Without storage tanks.....		X						X	X		X						X
Gasoline, including parts for gasoline stoves, ranges, and heaters.....		X						X		X		X					X
Kerosene:																	
Wick-type.....		X						X		X		X					X
Wickless-type.....		X						X		X		X					X
Miscellaneous cafeteria, hotel, and kitchen apparatus.....		X		X			X	X	X		X						
Miscellaneous specialties.....		X						X	X		X						X
Equipment not reported by kind.....	X		X				X		X		X						
Plumbers' supplies, not including pipe or vitreous-china sanitary ware:																	
Bathtubs, enameled-iron.....		X						X		X		X					X
Drinking fountains:																	
Enameled-iron.....		X						X		X		X					X
Other than enameled-iron and vitreous-china.....		X						X		X		X					X
Faucets and spigots, brass.....		X						X	X		X						X
Flush tanks, enameled-iron.....		X						X	X		X						X
Laundry trays, concrete.....		X						X	X		X						X
Laundry tubs, enameled-iron.....		X						X		X		X					X
Lavatories, enameled-iron.....		X						X		X		X					X

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP— continued																	
Plumbers' supplies, not including pipe or vitreous-china sanitary ware—Con.																	
Range boilers, copper and nonferrous-alloy, 25- to 180-gallon capacity.		x						x	x			x				x	
Range boilers, galvanized iron, 18- to 192-gallon capacity.		x						x	x			x				x	
Sinks, enameled iron.		x						x		x		x				x	
Sink and laundry tray combinations, enameled-iron.		x						x		x		x				x	
Tanks and shell for water heaters.		x						x		x		x				x	
Toilet seats:																	
Wood.		x						x	x					x		x	
Other than wood.		x						x		x		x		x		x	
Miscellaneous plumbers' brass goods.		x						x	x			x				x	
Steel-works and rolling-mill products:																	
Cinder and scale.		x						x	x			x				x	
Finished hot-rolled products and forgings:																	
Armor plate and ordnance.		x		x			x	x		x		x					
Axles, rolled and forged.		x		x			x	x			x		x				
Bars:																	
Concrete-reinforcing (includ- ing twisted bars).		x							x	x		x				x	
Merchant, etc.:																	
Iron.		x		x			x	x		x		x					
Stainless-steel.		x		x			x	x			x		x				
Steel:																	
Electric and crucible.		x		x			x	x		x		x					
Open-hearth and Bessemer.		x		x			x	x		x		x					
Billets (piercing), rounds, and blanks, for seamless pipes and tubes.		x		x			x	x		x		x					
Piling, sheet, plain.		x		x			x	x			x		x				
Plates, No. 12 (0.109 inches) and thicker, not coated:																	
Saw.		x		x			x	x			x		x				
Sheared.		x		x			x	x			x		x				
Stainless-steel, including sheets.		x		x			x	x			x		x				
Universal.		x		x			x	x			x		x				
Rails.		x		x			x		x		x		x				
Rails, rerolled or renewed.		x		x			x		x		x		x				
Rail joints and fastenings, tie plates, etc.		x		x			x		x		x		x				
Rods:																	
Bolt and nut and spike and chain.		x		x			x	x		x		x					
Wire.		x		x			x	x		x		x					
Sheets, No. 13 (0.095 inches) and thinner, not coated:																	
Black for tinning.		x		x			x	x		x		x					
Plain.		x		x			x	x		x		x					
Skelp.		x		x			x	x		x		x					
Strips, bands, flats, scroll and hoops, narrower than 24 inches:																	
Hot-rolled strips and flats for cold rolling.		x		x			x	x		x		x					
Stainless-steel strips and flats.		x		x			x	x			x		x				
Other hoops, bands, and strips.		x		x			x	x		x		x					
Structural shapes (not assembled or fabricated):																	
Heavy (leg or web 3 inches and over).		x		x			x	x		x		x					
Light (leg or web less than 3 inches).		x		x			x	x		x		x					
Ties, cotton.		x									x		x				x
Wheels, car and locomotive, rolled and forged.		x		x			x	x		x		x					

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY, GROUP—continued</b>																	
<b>Steel-works and rolling-mill products—Continued.</b>																	
Scrap iron and steel.....		X		X			X	X		X				X			
Semifinished rolled products:																	
Bars, muck and scrap.....		X		X			X	X		X				X			
Bars, sheet and tin-plate.....		X		X			X	X		X				X			
Blooms, billets, and slabs, except for forging.....		X		X			X	X		X				X			
Blooms and billets for forging.....		X		X			X	X		X				X			
Unrolled steel:																	
Direct steel castings.....		X		X			X	X		X				X			
Ingots.....		X		X			X	X		X				X			
<b>Structural and ornamental metal work, made in plants not operated in connection with rolling mills:</b>																	
Bars and rods for reinforcing concrete.....		X							X	X				X		X	
Fences and gates, iron (other than wire).....		X							X	X				X		X	
Fire escapes.....		X							X	X				X		X	
Gratings, treads, and flooring, steel.....		X							X	X				X		X	
Grilles and railings.....		X							X	X				X		X	
Lath, expanded metal.....		X							X		X			X		X	
Ornamental bronze work.....		X							X	X				X		X	
Ornamental iron and steel.....		X							X	X				X		X	
Stairs and staircases.....		X							X	X				X		X	
Structural steel, fabricated:																	
For bridges.....		X							X		X			X		X	
For buildings.....		X							X		X			X		X	
<b>Tin cans and other tinware, n. e. c.:</b>																	
Beer cans.....		X								X				X			
Dairy milk cans.....		X		X			X		X	X				X			
Sanitary cans including sweetened-condensed-milk cans.....		X								X				X		X	
Venthole-top cans.....		X								X				X		X	
Other cans and packages.....		X								X				X		X	
Finished tinware other than cans.....	X		X			X			X	X				X			
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>																	
<b>Aluminum products:</b>																	
Aluminum ware. (except electrical appliances):																	
Cast.....	X		X				X		X		X			X			
Spun.....	X		X				X		X		X			X			
Stamped.....	X		X				X		X		X			X			
Castings:																	
Die.....	X		X				X	X		X				X			
Rough (not included with aluminum ware or motor-vehicle accessories).....	X		X				X	X		X				X			
Ingots produced for sale (from pig and scrap).....	X		X				X	X		X				X			
Motor-vehicle accessories and parts, and pistons for internal-combustion engines.....	X	X					X	X		X				X			
Other aluminum products made for sale.....	X		X				X	X		X				X			
<b>Lighting equipment:</b>																	
Commercial fixtures:																	
Auditorium, church, and theater.....	X								X		X			X		X	
Public building, bank, store, office building, school, etc. (other than window and showcase).....	X								X		X			X		X	
Industrial fixtures for factories, porcelain-enameled (including reflectors and shades).....	X								X		X			X		X	
Residence fixtures:																	
Ceiling or chandelier type, except kitchen units.....	X								X		X			X		X	
Wall or bracket type, except kitchen units.....	X								X		X			X		X	
Street and highway lighting fixtures, except traffic signals.....	X								X		X			X		X	

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP—continued</b>																	
Nonferrous-metal alloys; nonferrous-metal products, except aluminum, n. e. c.:																	
Castings, rough:																	
Brass and bronze.....		x		x			x	x			x		x				
Copper.....		x		x			x	x			x		x				
Heat-corrosion-resistant alloys (not including ferro-alloys).....		x		x			x	x			x		x				
Nickel alloys, other than heat-corrosion-resistant.....		x		x			x	x			x		x				
Finished products:																	
Bearings and bushings (including antifriction linings).....		x		x			x	x			x		x				
Bells.....	x		x				x	x			x		x				
Castings, die.....		x		x			x	x			x		x				
Castings, finished, other than cooking utensils.....	x		x				x	x			x		x				
Forged and hot-pressed parts.....	x		x				x	x			x		x				
Spun ware.....	x		x				x	x			x		x				
Ingots and pigs:																	
Antifriction-bearing metal, white base.....		x		x			x	x			x		x				
Antifriction-bearing metal, other.....		x		x			x	x			x		x				
Brass and bronze.....		x		x			x	x			x		x				
Copper (secondary).....		x		x			x	x			x		x				
Lead (secondary).....		x		x			x	x			x		x				
Solders, all kinds.....		x		x			x	x			x		x				
Tin (secondary).....		x		x			x	x			x		x				
Type metal.....		x		x			x	x			x		x				
Zinc (secondary).....		x		x			x	x			x		x				
Plates and sheets:																	
Brass and bronze.....		x		x			x	x			x		x				
Copper.....		x		x			x	x			x		x				
Lead.....		x		x			x	x			x		x				
Nickel alloys.....		x		x			x	x			x		x				
Zinc.....		x		x			x	x			x		x				
Rods:																	
Brass and bronze.....		x		x			x	x			x		x				
Copper.....		x		x			x	x			x		x				
Nickel alloys and other nonferrous-metals and alloys.....		x		x			x	x			x		x				
Shapes, extruded:																	
Brass and bronze.....		x						x			x		x			x	
Other metals.....		x						x			x		x			x	
Tubing (seamless) and pipe:																	
Brass and bronze.....		x		x				x	x				x				
Copper.....		x		x				x	x				x				
Lead.....		x		x				x	x				x				
Nickel alloys.....		x		x				x	x				x				
Other metals.....		x		x				x	x				x				
Buildings, portable steel.....		x		x				x	x				x				
Culverts, flumes, irrigation pipe, etc.		x							x	x			x			x	
Gutters, downspouts, cornices, ventilators, etc.:																	
Copper and other nonferrous-metal.....		x							x	x			x			x	
Galvanized-iron.....		x							x	x			x			x	
Pans, vats, and stills.....		x		x				x	x	x			x				
Pipe and flue (stove and furnace), and air ducts.....		x							x	x			x			x	
Tanks and bins.....		x		x				x	x	x			x				
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>																	
Agricultural implements:																	
Binders, grain, horse- or tractor-drawn.....		x		x				x		x			x				
Combines (harvester-threshers), all widths of cut.....		x		x				x		x			x				
Corn pickers.....		x		x				x		x			x				
Cream separators.....		x		x				x		x			x				
Cultivators:																	
Horse-drawn, 1-row, riding (2-horse).....		x		x				x		x			x				
Tractor-drawn or mounted, 2- to 6-row.....		x		x				x		x			x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued																	
Agricultural implements—Continued.																	
Disk harrows, horse- or tractor-drawn (single or double action).....	x		x				x		x		x		x				
Drills, grain, horse- or tractor-drawn.....	x		x				x		x		x		x				
Ensilage cutters (silo fillers), all types.....	x		x				x		x		x		x				
Forks, hoes, and rakes.....	x		x				x		x		x		x				
Lawn mowers, hand.....	x		x				x		x		x		x				
Manure spreaders, horse- or tractor-drawn.....	x		x				x		x		x		x				
Milking machines (complete units).....	x		x				x		x		x		x				
Mowers (haying machinery), horse- or tractor-drawn.....	x		x				x		x		x		x				
Plows, moldboard:																	
Horse-drawn, walking, 2-horse and larger.....	x		x				x		x		x		x				
Tractor-drawn, 2-bottom.....	x		x				x		x		x		x				
Showels, spades, and scoops.....	x		x				x		x		x		x				
Tractors, wheel type, "all-purpose":																	
Belt horsepower under 30:																	
Rubber tires.....	x		x				x		x		x		x				
Steel tires.....	x		x				x		x		x		x				
Belt horsepower 30 and over, steel and rubber tires.....	x		x				x		x		x		x				
Tractors, wheel type, other than "all-purpose":																	
Belt horsepower under 25, steel and rubber tires.....	x		x				x		x		x		x				
Belt horsepower 25-29, steel and rubber tires.....	x		x				x		x		x		x				
Belt horsepower 30 and over, steel and rubber tires.....	x		x				x		x		x		x				
Wagons, farm.....	x		x				x		x		x		x				
Cash registers, adding and calculating machines and other business machines except typewriters:																	
Adding machines.....	x		x				x		x		x		x				
Addressing and mailing machines.....	x		x				x		x		x		x				
Calculating machines.....	x		x				x		x		x		x				
Cash registers; card punching, sorting, and tabulating machines; change-making machines and coin counters; fare registers and boxes; ticket-counting machines; postal meters.....	x		x				x		x		x		x				
Check-writing, canceling, and perforating machines.....	x		x				x		x		x		x				
Duplicating machines.....	x		x				x		x		x		x				
Listing - adding - bookkeeping machines and typewriter-bookkeeping-billing machines.....	x		x				x		x		x		x				
Numbering machines.....	x		x				x		x		x		x				
Other adding, calculating, and computing devices.....	x		x				x		x		x		x				
Electrical machinery, apparatus, and supplies:																	
Batteries and battery parts:																	
Dry, 6-inch, 1.5 volt.....	x		x				x		x		x		x				
Dry, all other.....	x		x				x		x		x		x				
Storage, motor-vehicle, 9- to 31-plate size.....	x		x				x		x		x		x				
Storage, other than motor-vehicle and radio.....	x		x				x		x		x		x				
Storage, parts and supplies.....	x		x				x		x		x		x				
Wet primary.....	x		x				x		x		x		x				
Carbons:																	
Brushes and contacts (carbon, graphite, and metal-graphite) and parts for making brushes.....	x		x				x		x		x		x				
Others, including packing rings, electrodes, and miscellaneous carbon, graphite, and metal-graphite specialties.....	x		x				x		x		x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>																	
<b>Electrical machinery, apparatus, and supplies—Continued.</b>																	
Conduits and conduit fittings, interior:																	
Conduits, flexible steel.....		x						x		x		x				x	
Conduits, rigid steel.....		x						x		x		x				x	
Fittings, including elbows and couplings.....		x						x		x		x				x	
Fittings, cast-metal outlet, hazardous-location and other.....		x						x		x		x				x	
Switch boxes, outlet boxes, and covers.....		x						x		x		x				x	
Cooking apparatus, commercial.....		x		x			x		x		x		x				
Control apparatus (except railway and vehicle controllers, all types):																	
Industrial magnetic control:																	
For alternating-current motors.....		x		x			x		x		x		x				
For direct-current motors.....		x		x			x		x		x		x				
Industrial manual control: For alternating-current motors.....		x		x			x		x		x		x				
Other control apparatus.....		x		x			x		x		x		x				
Electrotherapeutic and electromedical apparatus:																	
Physical-therapy equipment.....		x		x			x		x		x		x				
X-ray apparatus (exclusive of tubes) for general medical use.....		x		x			x		x		x		x				
Fans (direct motor-driven):																	
Air circulators, 18-inch and larger.....		x		x			x		x		x		x				
Desk fans.....		x		x			x		x		x		x				
Flashlight cases.....		x		x			x		x		x		x				
Furnaces (industrial), resistance.....		x		x			x		x		x		x				
Fuses (except high-voltage and power types):																	
Enclosed renewable, 250 and 600 volts.....		x		x			x		x		x		x				
Nonrenewable plug fuses, 125 volts.....		x		x			x		x		x		x				
Generators:																	
Alternating-current.....		x		x			x		x		x		x				
Direct-current, not including arc welding sets.....		x		x			x		x		x		x				
Other generators, except railway and vehicle power generators.....		x		x			x		x		x		x				
Parts and supplies for generating apparatus.....		x		x			x		x		x		x				
Generator-sets (motor), and dynamotors (not including arc welding sets):																	
1 to 150 kilowatts, inclusive.....		x		x			x		x		x		x				
Over 150 kilowatts.....		x		x			x		x		x		x				
Heating units (industrial); strip, space, and ring heaters.....		x		x			x		x		x		x				
Household apparatus and appliances:																	
Coffee makers, pots, and urns, 660 watts or less, glass.....		x		x			x		x		x		x				
Flatirons, standard:																	
Automatic, under 5 pounds.....		x		x			x		x		x		x				
Automatic, 5 pounds and over.....		x		x			x		x		x		x				
Nonautomatic, all sizes.....		x		x			x		x		x		x				
Heaters, storage water (complete).....		x		x			x		x		x		x			x	
Mixers and whippers.....		x		x			x		x		x		x				
Ranges, electric household, 2½ kilowatts and over.....		x		x			x		x		x		x				
Toasters, automatic.....		x		x			x		x		x		x				
Toasters, nonautomatic.....		x		x			x		x		x		x				
Vacuum cleaners:																	
Floor cleaners.....		x		x			x		x		x		x				
Hand dusters.....		x		x			x		x		x		x				
Waffle irons and griddles.....		x		x			x		x		x		x				
Miscellaneous domestic cooking and heating equipment and appliances.....		x		x			x		x		x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued																	
Electrical machinery, apparatus, and supplies—Continued.																	
Ignition apparatus for internal-combustion engines:																	
Coils.....		x	x				x	x			x			x			
Distributors.....		x	x				x	x			x			x			
Magnetos.....		x	x				x	x			x			x			
Spark plugs.....	x		x				x			x				x			
All other, including magnetic generators.....		x	x				x	x			x			x			
Insulated wire and cable and armored conductor:																	
Appliance and extension cords with attachments, complete.....	x		x				x			x				x			
Armored cable or conductor.....		x							x		x			x		x	
Asbestos-insulated.....		x							x		x			x		x	
Cotton-insulated.....		x							x		x			x		x	
Ignition-cable sets or wire assemblies for internal-combustion engines.....																	
Magnet:		x	x				x	x			x			x			
Cotton, silk, and rayon covered.....		x		x			x				x			x			
Enameled.....		x		x			x				x			x			
Paper-insulated.....		x		x			x				x			x			
Rubber-insulated:																	
Lighting and power circuit, braided.....		x		x			x			x				x			
Lighting and power circuit, leaded.....		x		x			x			x				x			
Telephone.....		x		x			x			x				x			
Flexible cords (cotton, silk, and rayon covered).....		x		x			x			x				x			
Varnished-cambrie-insulated.....		x		x			x			x				x			
Other insulated wire and cable.....		x		x			x			x				x			
Lamps, incandescent-filament:																	
Large tungsten.....	x		x				x			x				x			
Miniature tungsten:																	
Christman-tree and flashlight.....	x		x				x			x				x			
Motor-vehicle.....	x		x				x			x				x			
Lamps, other, including vapor lamps, photoflash, and photoflood.....		x		x			x			x				x			
Lightning arresters and coke coils, except radio and telephone.....		x		x			x			x				x			
Meters, miniature, 3½ inch and under (not including meters for motor vehicles).....		x		x			x			x				x			
Meters, watt-hour, a c.....		x		x			x			x				x			
Motors (except railway), stationary:																	
Under ½o horsepower (toy motors, etc.).....		x		x			x			x				x			
½o horsepower and over but under 1 horsepower:																	
Capacitor type.....		x		x			x			x				x			
Direct-current.....		x		x			x			x				x			
Polyphase.....		x		x			x			x				x			
Repulsion-induction.....		x		x			x			x				x			
Split-phase.....		x		x			x			x				x			
Universal.....		x		x			x			x				x			
Other.....		x		x			x			x				x			
1 horsepower and over:																	
Alternating-current:																	
Polyphase-induction:																	
1 to 200 horsepower, inclusive.....		x		x			x			x				x			
Over 200 horsepower.....		x		x			x			x				x			
Repulsion-induction.....		x		x			x			x				x			
Synchronous motors, over 200 horsepower.....		x		x			x			x				x			
Direct-current, 1 to 200 horsepower, inclusive.....		x		x			x			x				x			
Direct-current, 200 horsepower and over.....		x		x			x			x				x			

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>																	
Electrical machinery, apparatus, and supplies—Continued.																	
Motors, automotive starter-motors (not including vehicle motors or control switches).....		x	x				x	x			x		x				
Motor parts and supplies.....		x		x			x		x		x		x				
Radio parts (coils, condensers, etc.).....		x	x				x	x			x		x				
Rectifying apparatus, electronic-tube apparatus, and other.....		x		x			x		x		x		x				
Relays (excluding industrial motor-control and telephone).....		x		x			x	x			x		x				
Signaling apparatus, all types.....		x		x			x		x		x		x				
Switchboard apparatus:																	
Circuit breakers:																	
Air circuit breakers, 1,200 volts and under.....		x		x			x		x		x		x				
Indoor oil circuit breakers, all voltages, and air circuit breakers over 1,200 volts.....		x		x			x		x		x		x				
Outdoor oil circuit breakers, 34,500 volts and below.....		x		x			x		x		x		x				
Outdoor oil circuit breakers, over 34,500 volts.....		x		x			x		x		x		x				
Fuse cut-outs and fuse links, 2,300 to 15,000 volts, a. c., service.....		x		x			x		x		x		x				
Panelboards including enclosing cabinets.....		x		x			x		x		x		x				
Switches, knife.....		x		x			x		x		x		x				
Switches, time.....		x		x			x		x		x		x				
Switches, other.....		x		x			x		x		x		x				
Switchboards and equipment, power:																	
Automatic and manual panels, and metal-enclosed switchgear and bus-bar structures.....		x		x			x		x		x		x				
Relays, regulators, etc.....		x		x			x		x		x		x				
Switchboards, distribution.....		x		x			x		x		x		x				
Switchboards, other.....		x		x			x		x		x		x				
Switching equipment, power:																	
Indoor.....		x		x			x		x		x		x				
Outdoor.....		x		x			x		x		x		x				
Telephone and telegraph apparatus.....		x		x			x		x		x		x				
Transformers:																	
Natural-draft air-cooled:																	
General-purpose and miscellaneous.....		x		x			x		x		x		x				
Ignition and luminous tube.....		x		x			x		x		x		x				
Radio for receiving sets.....		x		x			x	x			x		x				
Employing oil or other insulating liquid, and air-blast:																	
Distribution, ½-500 kilovolt-amperes.....		x		x			x		x		x		x				
Power, 501 kilovolt-amperes and over.....		x		x			x		x		x		x				
Other transformers, current-limiting reactors, and induction stepfeeder voltage regulators and boosters.....		x		x			x		x		x		x				
Transformers, instrument and meter.....		x		x			x		x		x		x				
Vacuum tubes, X-ray, other than rectifying-valve.....		x		x			x		x		x		x				
Welding apparatus:																	
Arc welding electrodes, covered.....		x		x			x		x		x		x				
Direct-current arc welding apparatus, motor-driven.....		x		x			x		x		x		x				
Resistance welding apparatus and accessories, butt, spot, and line.....		x		x			x		x		x		x				
Wiring devices:																	
Attachment plugs and caps.....		x							x		x		x				x
Brass shell sockets (standard size).....		x							x		x		x				x

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>																	
Electrical machinery, apparatus, and supplies—Continued.																	
Wiring devices—Continued.																	
All other lamp sockets and receptacles (all bases).....		x						x		x		x				x	
Convenience outlets.....		x						x		x		x				x	
Miscellaneous wiring devices, n. e. c.....		x						x		x		x				x	
Snap switches, all types and sizes.....		x						x		x		x				x	
Wiring supplies, pole-line hardware.....		x		x			x			x		x					
Other miscellaneous electrical machinery and apparatus.....		x		x			x		x		x						
Engines, turbines, water wheels, and windmills:																	
Engines, internal-combustion:																	
Carburetor engines:																	
Aircraft.....		x		x			x	x			x		x				
Industrial:																	
Portable.....		x		x			x		x		x		x				
Stationary.....		x		x			x		x		x		x				
Marine:																	
Inboard.....		x	x				x	x			x		x				
Outboard.....		x		x			x		x		x		x				
Motor-vehicle:																	
Automobile (including taxicab) and light truck and bus.....		x		x			x	x			x		x				
Heavy truck and bus.....		x		x			x	x			x		x				
Railway-car.....		x		x			x	x			x		x				
Tractor, made for sale separately.....		x		x			x	x			x		x				
Other and not specified types.....		x		x			x		x		x		x				
Injection type:																	
Compression-ignition (Diesel):																	
Marine:																	
For direct connection to propeller shaft.....		x		x			x	x			x		x				
For electric drive and auxiliary use.....		x		x			x	x			x		x				
For connection to propeller shaft by reduction gearing.....		x		x			x	x			x		x				
Stationary.....		x		x			x		x		x		x				
Surface-ignition (hot-spot, hot-bulb, etc.), all types.....		x		x			x		x		x		x				
With spark ignition.....		x		x			x		x		x		x				
Mixing-valve engines.....		x		x			x	x			x		x				
Parts for all types of internal-combustion engines.....		x		x			x		x		x		x				
Engines, steam, marine (reciprocating).....		x		x			x	x			x		x				
Turbines, steam:																	
Marine.....		x		x			x	x			x		x				
Other than marine.....		x		x			x		x		x		x				
Parts for steam turbines and engines.....		x		x			x		x		x		x				
Water wheels and water turbines.....		x		x			x		x		x		x				
Windmills.....		x		x			x		x		x		x				
Windmill towers.....		x		x			x		x		x		x				
Machine-tool accessories and machinists' precision tools:																	
Arbors and collars.....		x		x			x		x		x		x				
Attachments for—																	
Boring-machine.....		x		x			x		x		x		x				
Drilling-machine.....		x		x			x		x		x		x				
Lathe (engine).....		x		x			x		x		x		x				
Milling-machine.....		x		x			x		x		x		x				
Chucks:																	
Drill.....		x		x			x		x		x		x				
Lathe.....		x		x			x		x		x		x				
Magnetic.....		x		x			x		x		x		4				
Collets or sockets, etc. (lathe, milling-machine, and drill).....		x		x			x		x		x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>																	
Machine-tool accessories and machinists' precision tools—Continued.																	
Counterbores.....		x		x			x		x		x		x				
Countersinks and combination counter sinks and drills.....		x		x			x		x		x		x				
Dies, die-casting.....		x		x			x		x		x		x				
Drills:																	
Carbon.....		x		x			x		x		x		x				
High-speed.....		x		x			x		x		x		x				
Gages (plug, ring, snap, thread, etc.).....		x		x			x		x		x		x				
Gear cutters (other than hobbing).....		x		x			x		x		x		x				
Hobbing cutters (high-speed and carbon).....		x		x			x		x		x		x				
Jigs, fixtures, dies, etc., and specially designed tools.....		x		x			x		x		x		x				
Lathe, planer, and shaper tools:																	
Carbon steel and high-speed steel.....		x		x			x		x		x		x				
Tungsten-carbide tipped.....		x		x			x		x		x		x				
Milling cutters (all types):																	
Inserted-teeth.....		x		x			x		x		x		x				
Solid:																	
Carbon steel.....		x		x			x		x		x		x				
High-speed steel.....		x		x			x		x		x		x				
Tungsten-carbide tipped.....		x		x			x		x		x		x				
Precision measuring tools (micrometer and vernier).....		x		x			x		x		x		x				
Reamers:																	
Carbon.....		x		x			x		x		x		x				
High-speed.....		x		x			x		x		x		x				
Semifinished products (die sets, leader pins, bushings, etc.).....		x		x			x		x		x		x				
Special machinery (other than machine tools), model and experimental work.....		x		x			x		x		x		x				
Threading tools, pipe-threading:																	
Chasers.....		x		x			x		x		x		x				
Dies.....		x		x			x		x		x		x				
Pipe stocks, complete with dies.....		x		x			x		x		x		x				
Taps:																	
Except collapsible.....		x		x			x		x		x		x				
Collapsible.....		x		x			x		x		x		x				
Threading tools, not pipe-threading:																	
Chasers.....		x		x			x		x		x		x				
Dies:																	
Carbon.....		x		x			x		x		x		x				
High-speed.....		x		x			x		x		x		x				
Self-opening.....		x		x			x		x		x		x				
Taps (except collapsible):																	
Carbon.....		x		x			x		x		x		x				
High-speed.....		x		x			x		x		x		x				
Taps, collapsible.....		x		x			x		x		x		x				
Tools for screw and automatic machines.....		x		x			x		x		x		x				
Vises (machines).....		x		x			x		x		x		x				
Machine tools:																	
Bending machines:																	
I-beam, pipe, plate, etc.....		x		x			x		x		x		x				
Sheet-metal brakes.....		x		x			x		x		x		x				
Boring machines:																	
Horizontal:																	
Boring, drilling, and milling combined.....		x		x			x		x		x		x				
General utility.....		x		x			x		x		x		x				
Special types:																	
Jig borers.....		x		x			x		x		x		x				
Precision boring machines.....		x		x			x		x		x		x				
Vertical (not vertical boring mills).....		x		x			x		x		x		x				
Boring mills (vertical—work revolving):																	
General utility (59-inch table and under):																	
With side head.....		x		x			x		x		x		x				
Without side head.....		x		x			x		x		x		x				
Heavy duty (above 59-inch table) with or without side head.....		x		x			x		x		x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued																	
Machine tools—Continued.																	
Broaching machines (other than keyseaters).....	x		x				x		x		x		x				
Cutting-off machines:																	
Bandsaw.....		x		x				x		x			x				
Hacksaw.....		x		x				x		x			x				
Die-casting machines:		x		x				x		x			x				
Drilling machines:																	
Combined vertical and horizontal (way drills).....		x		x				x		x			x				
Drilling and tapping.....		x		x				x		x			x				
Horizontal.....		x		x				x		x			x				
Radial (plain and universal).....		x		x				x		x			x				
Vertical:																	
Multiple-spindle (other than sensitive).....		x		x				x		x			x				
Multiple-spindle, sensitive.....		x		x				x		x			x				
Single-spindle, sensitive.....		x		x				x		x			x				
Standard.....		x		x				x		x			x				
Drills:																	
Electric, portable.....		x		x				x		x			x				
Pneumatic, portable.....		x		x				x		x			x				
Filing machines.....		x		x				x		x			x				
Flexible-shaft machines, portable.....		x		x				x		x			x				
Forging machines:																	
Drop hammers and presses (impression-die).....		x		x				x		x			x				
Forging hammers (flat-die).....		x		x				x		x			x				
Gear-cutting machines:																	
Formed rotary-cutter type.....		x		x				x		x			x				
Generator and other.....		x		x				x		x			x				
Hobbing machines.....		x		x				x		x			x				
Grinders:																	
Electric, portable.....		x		x				x		x			x				
Pneumatic, portable.....		x		x				x		x			x				
Grinding machines:																	
Cutter and tool (except lathe and planer tool grinders).....		x		x				x		x			x				
Cylindrical-external, plain.....		x		x				x		x			x				
Cylindrical-internal.....		x		x				x		x			x				
Surface, horizontal.....		x		x				x		x			x				
Surface, vertical.....		x		x				x		x			x				
Tool or snagging (wet or dry, bench or pedestal) grinders.....		x		x				x		x			x				
Universal.....		x		x				x		x			x				
Hammers (chipping, riveting, calking, etc.):																	
Electric, portable.....		x		x				x		x			x				
Pneumatic, portable.....		x		x				x		x			x				
Honing and lapping machines.....		x		x				x		x			x				
Lathes:																	
Automatic single-spindle:																	
Bar.....		x		x				x		x			x				
Center type.....		x		x				x		x			x				
Chucking.....		x		x				x		x			x				
Automatic multiple-spindle:																	
Bar.....		x		x				x		x			x				
Chucking.....		x		x				x		x			x				
Bench (plain and screw-cutting).....		x		x				x		x			x				
Engine, general-utility:																	
16-inch swing and under.....		x		x				x		x			x				
Over 16-inch swing and including 22-inch.....		x		x				x		x			x				
Over 22-inch swing and including 36-inch.....		x		x				x		x			x				
Heavy-duty, over 36-inch swing.....		x		x				x		x			x				
Gap.....		x		x				x		x			x				
Turret, horizontal hand-operated:																	
Ram type.....		x		x				x		x			x				
Saddle type (standard and heavy-duty).....		x		x				x		x			x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP— <i>con.</i>																	
Machine tools—Continued.																	
Milling machines:																	
Hand-feed		x		x			x		x		x		x				
Power-feed:		x		x			x		x		x		x				
Automatic		x		x			x		x		x		x				
Plain (including Lincoln type)		x		x			x		x		x		x				
Planer-type		x		x			x		x		x		x				
Universal		x		x			x		x		x		x				
Vertical		x		x			x		x		x		x				
Planers:																	
Open-side		x		x			x		x		x		x				
Standard, over 36-inch		x		x			x		x		x		x				
Presses (except forging):																	
Forming and stamping		x		x			x		x		x		x				
Punch		x		x			x		x		x		x				
Punching machines (not portable)		x		x			x		x		x		x				
Riveting machines (not portable)		x		x			x		x		x		x				
Shapers, horizontal:																	
20-inch stroke and under		x		x			x		x		x		x				
Over 20-inch stroke and including 28-inch		x		x			x		x		x		x				
Over 28-inch stroke		x		x			x		x		x		x				
Shapers, vertical, and slotters		x		x			x		x		x		x				
Shears (power):																	
Alligator, rotary, and combination punch and shear		x		x			x		x		x		x				
Straight		x		x			x		x		x		x				
Threading machines:																	
Pipe cutting and threading:																	
Multiple-head		x		x			x		x		x		x				
Single-head		x		x			x		x		x		x				
Other than pipe-threading:																	
Dye and rolling type		x		x			x		x		x		x				
Milling type		x		x			x		x		x		x				
Tapping type		x		x			x		x		x		x				
Replacement and repair parts		x		x			x		x		x		x				
Radio apparatus and phonographs:																	
Disk records for phonographs		x		x			x		x		x		x				
Loud speakers made for sale separately		x		x			x		x		x		x				
Phonographs for mechanical reproduction of records, including cabinets		x		x			x		x		x		x				
Public-address and music-distribution apparatus		x		x			x		x		x		x				
Radio-phonograph combinations		x		x			x		x		x		x				
Receiving sets for automobiles, general use:																	
Factory price not over \$25		x		x			x		x		x		x				
Over \$25		x		x			x		x		x		x				
Receiving sets for home and general use, complete, standard broadcast:																	
Battery-operated, all prices		x		x			x		x		x		x				
Socket-power-operated:																	
Factory price not over \$11		x		x			x		x		x		x				
Over \$11 but not over \$18		x		x			x		x		x		x				
Over \$18 but not over \$30		x		x			x		x		x		x				
Over \$30		x		x			x		x		x		x				
Receiving sets for home and general use, complete, extending beyond standard broadcast band:																	
Battery-operated, all prices		x		x			x		x		x		x				
Socket-power-operated:																	
Factory price not over \$18		x		x			x		x		x		x				
Over \$18 but not over \$30		x		x			x		x		x		x				
Over \$30 but not over \$45		x		x			x		x		x		x				
Over \$45 but not over \$65		x		x			x		x		x		x				
Over \$65 but not over \$100		x		x			x		x		x		x				
Over \$100		x		x			x		x		x		x				
Receiving set chassis sold separately		x		x			x		x		x		x				
Tubes, receiving:																	
Initial equipment:																	
Alternating-current, glass		x		x			x		x		x		x				
Alternating-current, metal		x		x			x		x		x		x				

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—con.																	
Radio apparatus and phonographs—Con.																	
Tubes, receiving—Continued.																	
Replacement:																	
Alternating-current, glass and metal	x		x				x		x		x		x				
Direct-current, glass and metal	x		x				x		x		x		x				
Rectifiers			x	x			x	x			x		x				
Tubes, transmitting, for initial equipment and for replacement			x				x		x		x		x				
Transmitters, aircraft			x				x		x		x		x				
Refrigerators and refrigerating and ice-making apparatus:																	
Cabinets, etc., for mechanical refrigerators, made for sale separately:																	
Commercial:																	
Display, storage, etc., cases			x		x			x	x		x		x				
Refrigerator cabinets			x		x			x	x		x		x				
Remote fountains or water coolers (low sides) and other commercial cabinets			x		x			x	x		x		x				
Domestic (household)			x	x				x	x		x		x				
Condensing units (high sides) for air conditioning			x		x			x		x		x					
Ice refrigerators and ice-boxes:																	
Commercial (milk and water coolers, etc.)			x		x			x		x		x		x			
Domestic (household)			x		x			x		x		x		x			
Mechanical refrigerators, compression type, electric:																	
Commercial:																	
Beverage coolers (bottled beverage)			x		x			x		x		x		x			
Ice-cream cabinets, self-contained			x		x			x		x		x		x			
Water coolers, self-contained			x		x			x		x		x		x			
Other, self-contained			x		x			x		x		x		x			
Domestic (household):																	
Capacity under 6 cubic feet	x		x					x		x		x		x			
6 to 10 cubic feet	x		x					x		x		x		x			
10 cubic feet and over	x		x					x		x		x		x			
Refrigerating and ice-making machines, commercial and industrial:																	
Complete machine:																	
Capacity less than 10 tons per 24 hours			x		x			x		x		x		x			
10 or more but under 100 tons			x		x			x		x		x		x			
Compressors made for sale separately			x		x			x	x		x		x				
Systems for mechanical refrigerators (commercial and domestic):																	
Evaporators made for sale separately			x		x			x	x		x		x				
High sides made for sale separately			x	x				x	x		x		x				
Low sides made for sale separately			x	x				x	x		x		x				
Systems complete without cabinets			x	x				x	x		x		x				
Typewriters and parts:																	
Portable			x		x			x		x		x		x			
Rebuilt			x		x			x		x		x		x			
Standard, including long-carriage			x		x			x		x		x		x			
Parts and attachments			x		x			x		x		x		x			
Washing machines, wringers, driers, and ironing machines for household use:																	
Ironing machines, electric	x		x					x		x		x		x			
Washing machines:																	
Electric, standard size	x		x					x		x		x		x			
Gas or gasoline-engine-driven, standard size	x		x					x		x		x		x			
Wringers, driers, and extractors	x		x					x		x		x		x			
Parts and accessories	x		x					x		x		x		x			

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	R	A	B	A	B	C	D		
TRANSPORTATION EQUIPMENT, AIR, LAND, AND WATER GROUP																	
Motor-vehicles, not including motorcycles:																	
Commercial cars, trucks, and busses		X		X			X		X		X		X				
Passenger cars and passenger car chassis	X		X				X		X		X		X				
MISCELLANEOUS INDUSTRIALS GROUP																	
Asbestos products:																	
Gaskets, other than asbestos textile		X									X		X				X
Metallic and semimetallic packing		X									X		X				X
Cigarettes	X		X		X				X		X	X					
Cigars	X		X		X				X		X	X					
Mattresses and bed springs, n. e. c.:																	
Bed springs:																	
Box	X		X				X		X		X	X					
Coil	X		X				X		X		X	X					
Fabric	X		X				X		X		X	X					
Mattresses:																	
Inner-spring	X		X				X		X		X	X					
Other than inner-spring	X		X				X		X		X	X					
Pads for couches and cots		X	X				X	X		X		X					
Spring cushions		X	X				X	X		X		X					
Musical instruments, n. e. c.:																	
Accordions	X		X				X		X		X		X				
Clarinets	X		X				X		X		X		X				
Cornets and trumpets	X		X				X		X		X		X				
Drums	X		X				X		X		X		X				
Guitars	X		X				X		X		X		X				
Saxophones	X		X				X		X		X		X				
Miscellaneous wind instruments, except organs	X		X				X		X		X		X				
Musical instruments, pianos: Pianos, all types except coin-operated and reproducing																	
	X		X				X		X		X		X				
Photographic and projection apparatus:																	
Cameras, including motion-picture	X		X				X		X		X		X				
Films, exclusive of X-ray		X								X				X			X
Films, X-ray		X	X				X	X			X		X				
Paper:																	
Photo-copying, blueprint		X									X			X			X
Photo-copying, brown or black and white		X									X			X			X
Sensitized photographic		X	X				X	X			X		X				X
Plates and slides, sensitized		X									X		X				X
Projectors:																	
Motion-picture, standard gage		X		X			X		X		X		X				
Motion-picture, substandard gage	X		X				X		X		X		X				
Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:																	
Fabrics, waterproofing		X							X		X	X					X
Felt, asphalt-saturated		X							X		X	X					X
Felt, tar-saturated		X							X		X	X					X
Roof cements (solid), asphalt		X							X		X		X				X
Roof cement, fibrous plastic		X							X		X		X				X
Roof coating, fibrous liquid		X							X		X		X				X
Roof coating, nonfibrous liquid		X							X		X		X				X
Roofing, asphalt grit roll		X							X		X		X				X
Roofing, asphalt smooth roll		X							X		X		X				X
Roofing pitch, coal-tar		X							X		X		X				X
Shingles, asphalt individual		X							X		X		X				X
Shingles, asphalt strip		X							X		X		X				X
Siding, asphalt brick		X							X		X		X				X
Sporting and athletic goods:																	
Baseballs	X		X				X		X		X	X					
Baseball bats	X		X				X		X		X			X			
Basketballs	X		X				X		X		X	X					
Fishing rods, bamboo	X		X				X		X		X			X			
Fishing rods, steel	X		X				X		X		X			X			
Footballs	X		X				X		X		X	X					
Golf balls	X		X				X		X		X			X			
Golf clubs	X		X				X		X		X			X			
Golf club shafts	X		X				X		X		X			X			
Tennis balls	X		X				X		X		X			X			

TABLE 1D.—Classification of the 1,807 products by product characteristics, 1937—Continued

Product	I		II		III			IV		V		VI				VII	VIII
	A	B	A	B	A	B	C	A	B	A	B	A	B	C	D		
MISCELLANEOUS INDUSTRIES GROUP—con.																	
Tobacco (chewing and smoking) and snuff:																	
Chewing tobacco, plug.....	x		x		x			x		x	x						
Chewing tobacco, scrap.....	x		x		x			x		x	x						
Chewing tobacco, twist.....	x		x		x			x		x	x						
Chewing and smoking tobacco, fine-cut.....	x		x		x			x		x	x						
Smoking tobacco.....	x		x		x			x		x	x						
Snuff.....	x		x		x			x		x	x						

\* KEY TO THE CLASSIFICATIONS

- I. Type of immediate purchaser:
  - A. Consumer.
  - B. Producer.
- II. Type of ultimate user:
  - A. Consumer.
  - B. Producer.
- III. Degree of durability:
  - A. Nondurable.
  - B. Semidurable.
  - C. Durable.
- IV. Degree of fabrication:
  - A. Semimanufactured.
  - B. Finished.
- V. Type of market:
  - A. Regional.
  - B. National.
- VI. Source of raw material:
  - A. Agricultural.
  - B. Mineral.
  - C. Forest.
  - D. Other.
- VII. Construction materials.
- VIII. Producers' supplies.

NOTE—Those products listed as construction materials and as producers' supplies are not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies are not classified as to degree of fabrication.

TABLE 2D.—Distribution of the 1,807 products by product characteristics and by concentration ratio classes, 1937

Concentration ratio class	Type of immediate purchaser		Type of ultimate user*		Degree of durability*			Degree of fabrication*		Type of market			Source of raw material			Construction materials	Producers' supplies
	Consumer	Producer	Consumer	Producer	Non-durable	Semi-durable	Durable	Semi-finished	Finished	Regional	National	Agricultural	Mineral	Forest	Other		
Total	511	1,296	892	436	190	488	650	1,106	231	1,576	560	1,008	234	5	283	196	
0.1 to 10.0 percent	8	3	5	4	1	3	1	7	4	4	4	3	1	5	3	1	
10.1 to 20.0 percent	38	15	26	4	6	12	12	33	4	14	19	10	8	1	7	1	
20.1 to 30.0 percent	90	43	54	8	9	27	26	70	27	63	39	29	22	1	22	6	
30.1 to 40.0 percent	123	41	82	12	17	42	24	81	39	84	58	51	14	1	31	9	
40.1 to 50.0 percent	166	61	105	15	34	42	39	99	25	141	75	67	23	1	28	23	
50.1 to 60.0 percent	183	59	124	100	38	51	60	108	25	158	70	90	23	1	21	18	
60.1 to 70.0 percent	230	51	179	112	45	73	61	129	18	212	70	133	26	1	45	28	
70.1 to 80.0 percent	259	66	193	124	70	79	96	153	22	237	76	139	24	1	38	27	
80.1 to 90.0 percent	218	61	157	94	20	48	93	147	13	205	49	140	28	1	35	22	
90.1 to 100.0 percent	164	31	133	62	9	35	82	105	9	155	29	113	21	1	21	17	
(1)	153	42	111	70	46	12	53	83	15	138	31	105	17	1	20	17	
(2)	175	28	147	74	13	43	85	91	10	165	40	108	27	1	6	28	

\* Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 3D.—Distribution of number and value of products according to type of immediate purchaser, by concentration ratio classes, 1937

Concentration ratio class	All products	Consumers		Producers	
	Number	Number	Percent	Number	Percent
Total.....	1, 807	511	100.0	1, 296	100.0
0.1 to 10.0 percent.....	8	5	1.0	3	.2
10.1 to 20.0 percent.....	38	23	4.5	15	1.2
20.1 to 30.0 percent.....	90	43	8.4	47	3.6
30.1 to 40.0 percent.....	123	41	8.0	82	6.3
40.1 to 50.0 percent.....	166	61	11.9	105	8.1
50.1 to 60.0 percent.....	183	59	11.6	124	9.6
60.1 to 70.0 percent.....	230	51	10.0	179	13.8
70.1 to 80.0 percent.....	259	66	12.9	193	14.9
80.1 to 90.0 percent.....	218	61	11.9	157	12.1
90.1 to 100.0 percent.....	164	31	6.1	133	10.3
(1).....	153	42	8.2	111	8.6
(2).....	175	28	5.5	147	11.3
	Value (thousands of dollars)	Value (thousands of dollars)	Percent	Value (thousands of dollars)	Percent
Total.....	29, 505, 693	14, 818, 142	100.0	14, 687, 551	100.0
0.1 to 10.0 percent.....	711, 095	655, 218	4.4	55, 877	.4
10.1 to 20.0 percent.....	1, 270, 300	1, 020, 032	6.9	250, 268	1.7
20.1 to 30.0 percent.....	2, 758, 967	1, 197, 194	8.1	1, 561, 773	10.6
30.1 to 40.0 percent.....	4, 314, 384	2, 394, 553	16.1	1, 919, 831	13.1
40.1 to 50.0 percent.....	3, 521, 436	1, 706, 861	11.5	1, 814, 575	12.4
50.1 to 60.0 percent.....	2, 654, 925	1, 374, 195	9.3	1, 280, 730	8.7
60.1 to 70.0 percent.....	2, 732, 775	1, 098, 098	7.4	1, 634, 677	11.1
70.1 to 80.0 percent.....	3, 913, 852	1, 256, 477	8.5	2, 657, 375	18.1
80.1 to 90.0 percent.....	2, 098, 223	1, 181, 535	8.0	916, 688	6.2
90.1 to 100.0 percent.....	3, 115, 851	2, 472, 048	16.7	643, 803	4.4
(1).....	1, 827, 858	399, 493	2.7	1, 428, 365	9.7
(2).....	586, 027	62, 438	.4	523, 589	3.6

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 4D.—*Distribution of number and value of products according to type of ultimate user, by concentration ratio classes, 1937*

Concentration ratio class	All products	Consumers		Producers	
	Number	Number	Percent	Number	Percent
Total.....	1,328	892	100.0	436	100.0
0.1 to 10.0 percent.....	5	5	.6	.....	.....
10.1 to 20.0 percent.....	30	26	2.9	4	.9
20.1 to 30.0 percent.....	62	54	6.0	8	1.8
30.1 to 40.0 percent.....	83	71	8.0	12	2.8
40.1 to 50.0 percent.....	115	100	11.2	15	3.4
50.1 to 60.0 percent.....	138	100	11.2	38	8.7
60.1 to 70.0 percent.....	157	112	12.6	45	10.3
70.1 to 80.0 percent.....	194	124	13.9	70	16.1
80.1 to 90.0 percent.....	161	94	10.5	67	15.4
90.1 to 100.0 percent.....	126	62	7.0	64	14.7
(1).....	116	70	7.8	46	10.6
(2).....	141	74	8.3	67	15.3
	Value (thousands of dollars)	Value (thousands of dollars)	Percent	Value (thousands of dollars)	Percent
Total.....	24,583,211	19,260,403	100.0	5,322,808	100.0
0.1 to 10.0 percent.....	655,218	655,218	3.4	.....	.....
10.1 to 20.0 percent.....	1,207,655	1,105,881	5.7	101,774	1.9
20.1 to 30.0 percent.....	1,827,020	1,547,263	8.0	279,757	5.3
30.1 to 40.0 percent.....	3,542,973	3,370,813	17.5	172,160	3.2
40.1 to 50.0 percent.....	2,808,928	2,594,184	13.5	214,744	4.0
50.1 to 60.0 percent.....	2,277,145	1,663,901	8.6	613,244	11.5
60.1 to 70.0 percent.....	2,065,630	1,640,377	8.5	425,253	8.0
70.1 to 80.0 percent.....	3,489,815	1,792,473	9.3	1,697,342	31.9
80.1 to 90.0 percent.....	1,861,389	1,351,205	7.0	510,184	9.6
90.1 to 100.0 percent.....	2,907,559	2,569,784	13.4	337,775	6.3
(1).....	1,474,196	703,705	3.7	770,491	14.5
(2).....	465,683	265,599	1.4	200,084	3.8

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 5D.—Distribution of number and value of products according to degree of durability by concentration ratio classes, 1937

Concentration ratio class	All products			Nondurable			Semidurable			Durable		
	Number	Total		Producers	Total		Producers	Total		Producers	Total	
		Number	Per cent		Number	Per cent		Number	Per cent		Number	Per cent
Total	1,328	100.0	100.0	488	100.0	87.1	12.9	650	100.0	42.6	57.4	
0.1 to 10.0 percent	5	0.5	0.5	3	0.6	0.6	0.4	1	0.2	0.2	0.3	
10.1 to 20.0 percent	30	3.2	3.2	12	2.5	2.0	1.8	12	1.8	1.5	1.1	
20.1 to 30.0 percent	62	4.7	4.7	27	5.5	5.3	5.3	26	4.0	2.9	2.1	
30.1 to 40.0 percent	83	8.9	8.9	42	8.6	7.6	1.0	24	3.7	2.6	1.1	
40.1 to 50.0 percent	115	18.0	18.0	42	8.6	8.0	0.6	39	6.0	4.2	1.8	
50.1 to 60.0 percent	138	14.2	14.2	51	10.5	8.4	2.1	60	9.2	4.9	4.3	
60.1 to 70.0 percent	157	12.1	12.1	73	15.0	13.2	1.8	61	9.4	3.9	5.5	
70.1 to 80.0 percent	184	10.0	10.0	79	16.2	14.6	1.4	66	14.8	5.2	9.6	
80.1 to 90.0 percent	161	10.5	10.5	48	9.8	8.4	1.4	83	14.3	5.1	9.2	
90.1 to 100.0 percent	126	4.7	4.7	35	7.2	5.7	1.5	82	12.6	3.8	8.5	
(1)	116	6.3	6.3	33	6.7	5.9	0.8	71	10.9	4.4	6.5	
(2)	141	6.9	6.9	43	8.8	7.3	1.5	85	13.1	3.9	9.2	
	Value (thousands of dollars)	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent	
Total	24,583,211	8,374,722	100.0	6,263,327	100.0	93.0	7.0	9,945,162	100.0	50.8	49.2	
0.1 to 10.0 percent	655,218	34,314	0.4	585,183	9.3	9.3	0.3	35,721	0.4	0.4	0.9	
10.1 to 20.0 percent	1,207,655	394,196	1.2	775,519	12.4	12.1	1.2	334,940	3.4	2.5	2.8	
20.1 to 30.0 percent	1,827,020	394,987	4.7	905,807	14.5	14.5	(*)	526,226	5.3	2.5	5.4	
30.1 to 40.0 percent	3,542,928	2,393,585	28.6	836,129	13.3	13.0	0.3	313,259	3.1	1.6	1.5	
40.1 to 50.0 percent	2,808,928	1,503,151	18.0	764,682	12.2	11.4	0.8	541,095	5.4	3.7	7.1	
50.1 to 60.0 percent	2,277,145	1,158,743	13.8	338,600	5.4	4.1	1.3	779,793	7.8	2.5	5.3	
60.1 to 70.0 percent	2,065,630	823,605	9.8	510,778	8.2	7.3	0.9	731,157	7.4	3.7	3.7	
70.1 to 80.0 percent	3,489,815	642,056	7.7	908,239	15.0	13.2	2.7	1,849,520	18.6	3.2	15.4	
80.1 to 90.0 percent	1,851,389	1,037,795	12.4	182,568	2.9	2.7	0.2	641,026	6.4	1.4	3.0	
90.1 to 100.0 percent	2,907,559	86,680	1.0	50,830	0.8	0.7	0.1	2,770,049	27.9	24.6	3.3	
(1)	1,474,196	150,056	1.8	232,179	3.7	3.4	0.3	1,061,961	11.0	3.4	7.6	
(2)	1,465,683	52,464	0.6	82,804	1.4	1.3	0.1	330,415	3.3	1.3	2.0	

1 Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.  
 2 Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.  
 \*Less than one-tenth of 1 percent.



TABLE 7D.—Distribution of number and value of products according to type of market, by concentration ratio classes, 1937

Concentration ratio class	All products	Regional		National	
	Number	Number	Per cent	Number	Per cent
Total.....	1, 807	231	100. 0	1, 576	100. 0
0.1 to 10.0 percent.....	8	4	1. 8	4	0. 3
10.1 to 20.0 percent.....	38	24	10. 4	14	. 9
20.1 to 30.0 percent.....	90	27	11. 7	63	4. 0
30.1 to 40.0 percent.....	123	39	16. 9	84	5. 3
40.1 to 50.0 percent.....	166	25	10. 8	141	8. 9
50.1 to 60.0 percent.....	183	25	10. 8	158	10. 0
60.1 to 70.0 percent.....	230	18	7. 8	212	13. 5
70.1 to 80.0 percent.....	259	22	9. 5	237	15. 0
80.1 to 90.0 percent.....	218	13	5. 6	205	13. 0
90.1 to 100.0 percent.....	164	9	3. 9	155	9. 8
(1).....	153	15	6. 5	138	8. 8
(2).....	175	10	4. 3	165	10. 5
	Value (thousands of dollars)	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent
Total.....	29, 505, 693	4, 177, 849	100. 0	25, 327, 844	100. 0
0.1 to 10.0 percent.....	711, 095	106, 294	2. 5	604, 801	2. 4
10.1 to 20.0 percent.....	1, 270, 300	451, 020	10. 8	819, 280	3. 2
20.1 to 30.0 percent.....	2, 758, 967	841, 781	20. 2	1, 917, 186	7. 6
30.1 to 40.0 percent.....	4, 314, 384	407, 186	9. 7	3, 907, 198	15. 4
40.1 to 50.0 percent.....	3, 521, 436	350, 684	8. 4	3, 170, 752	12. 5
50.1 to 60.0 percent.....	2, 654, 925	469, 924	11. 3	2, 185, 001	8. 6
60.1 to 70.0 percent.....	2, 732, 775	177, 037	4. 2	2, 555, 738	10. 1
70.1 to 80.0 percent.....	3, 913, 852	698, 760	16. 7	3, 215, 092	12. 7
80.1 to 90.0 percent.....	2, 098, 223	132, 349	3. 2	1, 965, 874	7. 8
90.1 to 100.0 percent.....	3, 115, 851	16, 151	. 4	3, 099, 700	12. 2
(1).....	1, 827, 858	483, 143	11. 6	1, 344, 715	5. 3
(2).....	586, 027	43, 520	1. 0	542, 507	2. 2

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 8D.—*Distribution of number and value of products according to source of raw material by concentration ratio classes, 1937*

Concentration ratio class	All products	Agricultural		Mineral	
	Number	Number	Per cent	Number	Per cent
Total.....	1, 807	560	100. 0	1, 008	100. 0
0.1 to 10.0 percent.....	8	4	0. 7	3	0. 3
10.1 to 20.0 percent.....	38	19	3. 4	10	1. 0
20.1 to 30.0 percent.....	90	39	7. 0	29	2. 9
30.1 to 40.0 percent.....	123	58	10. 4	51	5. 0
40.1 to 50.0 percent.....	166	75	13. 5	67	6. 6
50.1 to 60.0 percent.....	183	70	12. 5	90	8. 9
60.1 to 70.0 percent.....	230	70	12. 5	133	13. 2
70.1 to 80.0 percent.....	259	70	13. 6	159	15. 9
80.1 to 90.0 percent.....	218	49	8. 7	140	13. 9
90.1 to 100.0 percent.....	164	29	5. 2	113	11. 2
(1).....	153	31	5. 4	105	10. 4
(2).....	175	40	7. 1	108	10. 7
	Value (thousands of dollars)	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent
Total.....	29, 505, 693	11, 823, 881	100. 0	15, 063, 494	100. 0
0.1 to 10.0 percent.....	711, 095	619, 498	5. 2	84, 593	0. 6
10.1 to 20.0 percent.....	1, 270, 300	887, 524	7. 5	150, 353	1. 0
20.1 to 30.0 percent.....	2, 758, 967	1, 491, 626	12. 6	975, 311	6. 5
30.1 to 40.0 percent.....	4, 314, 384	1, 686, 631	14. 3	2, 353, 039	15. 6
40.1 to 50.0 percent.....	3, 521, 436	2, 060, 058	17. 3	1, 160, 445	7. 8
50.1 to 60.0 percent.....	2, 654, 925	1, 372, 513	11. 6	1, 111, 556	7. 4
60.1 to 70.0 percent.....	2, 732, 775	1, 110, 576	9. 4	1, 373, 865	9. 1
70.1 to 80.0 percent.....	3, 913, 852	991, 114	8. 4	2, 223, 237	14. 7
80.1 to 90.0 percent.....	2, 098, 223	1, 098, 044	9. 3	837, 087	5. 5
90.1 to 100.0 percent.....	3, 115, 851	129, 405	1. 1	2, 916, 848	19. 4
(1).....	1, 827, 858	244, 820	2. 1	1, 486, 211	9. 9
(2).....	586, 027	137, 072	1. 2	381, 949	2. 5

Concentration ratio class	Forest		Other	
	Number	Per cent	Number	Per cent
Total.....	234	100. 0	5	100. 0
0.1 to 10.0 percent.....	1	0. 4	—	—
10.1 to 20.0 percent.....	8	3. 4	1	20. 0
20.1 to 30.0 percent.....	22	9. 4	—	—
30.1 to 40.0 percent.....	14	6. 0	—	—
40.1 to 50.0 percent.....	23	9. 8	1	20. 0
50.1 to 60.0 percent.....	23	9. 8	—	—
60.1 to 70.0 percent.....	26	11. 1	1	20. 0
70.1 to 80.0 percent.....	24	10. 3	—	—
80.1 to 90.0 percent.....	28	12. 0	1	20. 0
90.1 to 100.0 percent.....	21	9. 0	1	20. 0
(1).....	17	7. 3	—	—
(2).....	27	11. 5	—	—
	Value (thousands of dollars)	Per cent	Value (thousands of dollars)	Per cent
Total.....	2, 556, 294	100. 0	57, 024	100. 0
0.1 to 10.0 percent.....	7, 004	0. 3	—	—
10.1 to 20.0 percent.....	227, 818	8. 9	4, 605	8. 1
20.1 to 30.0 percent.....	292, 030	11. 5	—	—
30.1 to 40.0 percent.....	274, 714	10. 7	—	—
40.1 to 50.0 percent.....	276, 303	10. 8	15, 630	27. 4
50.1 to 60.0 percent.....	170, 856	6. 7	—	—
60.1 to 70.0 percent.....	246, 486	9. 6	1, 848	3. 2
70.1 to 80.0 percent.....	699, 501	27. 4	—	—
80.1 to 90.0 percent.....	154, 224	6. 0	8, 868	15. 6
90.1 to 100.0 percent.....	43, 525	1. 7	26, 073	45. 7
(1).....	96, 827	3. 8	—	—
(2).....	67, 006	2. 6	—	—

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.



## APPENDIX E

### BASIC DATA FOR THE 407 PRODUCTS ANALYZED FOR THE 1929-33 AND 1933-37 PERIODS

TABLE 1E.—Percentage change in quantity and price<sup>a</sup> between 1929-33 and between 1933-37, for the sample of 407 products

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
	(1)	(2)	(3)	(4)	(5)
<b>FOOD AND KINDRED PRODUCTS GROUP</b>					
<b>Canned fruits and vegetables; canned and bottled juices:</b>					
Canned fruit:					
Apples.....	60.0	-29	+9	-26	+1
Apricots.....	27.8	-42	+133	-40	+19
Blackberries.....	39.0	-53	+75	-36	+35
Blueberries.....	54.7	+28	+58	-46	+15
Fruit salad and fruit cocktail.....	48.8	+33	+113	-37	+6
Grapefruit sections.....	56.4	+94	+116	-39	-25
Loganberries.....	54.8	-52	-52	-34	+28
Olives, ripe.....	46.0	-56	+166	-14	-12
Peaches.....	40.6	+20	+30	-43	+26
Pears.....	41.6	-2	+6	-46	+8
Plums.....	81.5	+9	+57	-32	+10
Prunes.....	36.3	-24	+125	-38	+5
Strawberries.....	57.2	-75	+34	-42	+38
Canned vegetables:					
Asparagus.....	53.8	-24	+33	-38	+35
Beans, baked.....	58.2	-4	+11	-28	+12
Beets.....	26.0	-35	+174	-35	-2
Corn.....	23.6	-39	+155	-21	-2
Hominy.....	58.5	-34	+41	-14	+7
Kraut.....	43.3	-21	+37	-22	+1
Peas.....	24.0	-24	+84	-15	-10
Pimientos.....	61.7	-47	+132	-25	0
Pumpkin and squash.....	41.6	-28	-2	-14	-1
Spaghetti.....	78.0	-25	+72	-10	-7
Spinach.....	23.2	-47	+113	-23	-7
Succotash.....	48.3	-70	+312	-26	-4
Sweetpotatoes.....	69.5	-57	+335	-21	-19
Tomatoes.....	8.9	-26	+48	-16	-12
Tomato sauce.....	69.5	+96	-14	-36	+19
Vegetables, mixed.....	46.0	-29	+326	-42	+31
<b>Corn sirup, corn sugar, corn oil, and starch:</b>					
Corn oil:					
Crude.....	67.8	-23	-27	-57	+153
Refined.....	(2)	-32	+90	-32	+7
Corn-oil cake and meal.....	(2)	-28	+37	-63	+78
Corn sirup:					
Mixed with other sirups.....	70.5	-17	+18	-37	+58
Unmixed.....	(1)	+25	-31	-37	+52
Corn sugar.....	(1)	-8	-43	-35	+55
Starch:					
Corn.....	89.2	-8	-3	-26	+36
Potato.....	85.5	-36	+1	-21	+15
<b>Flour and other grain-mill products:</b>					
Bran and middlings.....	28.4	-15	+6	-50	+82
Corn meal.....	19.5	-15	-22	-49	+83
Feed, screenings, etc.....	20.9	-60	+30	-47	+66
Flour:					
Rye.....	62.6	+14	-25	-40	+43
Wheat: Graham and whole-wheat.....	47.1	-9	+11	-27	+30
Prepared.....	26.5	+2	+5	-30	+27
Semolina.....	61.3	-16	0	-21	+57
White.....	31.1	-16	+4	-28	+32

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
	(1)	(2)	(3)	(4)	(5)
<b>FOOD AND KINDRED PRODUCTS GROUP—CON.</b>					
Meat packing, wholesale:					
Hides, skins, and pelts:					
Calfskins, cured	74.2	+17	+67	-39	+49
Cattle hides:					
Cured	65.7	+14	+25	-52	+75
Uncured	28.4	-57	+5	-52	+69
Sheep and lamb pelts:					
Cured	74.1	+54	+4	-55	+109
Uncured	(1)	+18	-16	-51	+132
Sheepskins and lambskins, pickled	100.0	+113	+11	-69	+122
Lard	48.8	-6	-46	-55	+122
Meat:					
Cured:					
Beef, pickled and other cured	53.1	-15	+17	-55	+53
Pork:					
Dry-salted:					
Smoked	40.7	+9	+3	-47	+95
Not smoked	54.6	-29	-29	-56	+157
Pickled and dry-cured:					
Smoked	45.9	-4	-20	-53	+115
Not smoked	70.1	-22	-35	-53	+118
Fresh:					
Beef	58.2	+1	+13	-58	+73
Mutton and lamb	74.5	+23	+4	-53	+45
Pork	45.5	-6	-25	-59	+136
Veal	59.4	+5	+41	-61	+64
Edible organs, tripe, etc.	63.5	-11	+25	-48	+55
Oleomargarine (margarine) made in the oleomargarine, meat-packing, and other industries: Oleomargarine, all	48.9	-34	+62	-56	+80
Shortenings (other than lard), vegetable cooking oils, and salad oils: Shortenings	65.9	-23	+64	-46	+86
Sugar, beet:					
Molasses, sold or transferred for desugarization	73.5	+54	-13	-65	+83
Pulp:					
Dried, exclusive of molasses	57.8	+51	-68	-43	+84
Moist, exclusive of molasses	86.5	+35	-8	-43	+52
Molasses	(2)	+71	+22	-55	+21
Sugar:					
Granulated	75.8	+52	-21	-21	+4
Unfinished	69.5	-41	0	+17	+20
Sugar, cane, not including products of refineries:					
Bagasse, for sale as such	(1)	+103	-34	-67	+67
Molasses, other than blackstrap	54.2	+1	-47	-25	-7
Sirup	64.8	-26	-13	-12	+22
Sugar:					
Clarified	53.0	+79	+131	-16	+6
Granulated	73.0	+138	-31	-23	+11
Raw	41.4	+8	+98	-17	+4
Sugar refining, cane:					
Refiners' blackstrap and nonedible sirup	33.1	-32	+70	-52	+20
Refiners' sirup, edible	(1)	-15	-26	-29	+32
Refined sugar:					
Hard	64.6	-24	+16	-13	+9
Soft or brown	82.6	-14	-4	-16	+12
<b>TEXTILES AND THEIR PRODUCTS GROUP</b>					
Clothing, men's, youths', and boys', not elsewhere classified, regular and contract factories:					
Separate garments, men's and youths':					
Coats	21.2	-63	+4	-21	-10
Overcoats and topcoats	11.9	-42	+46	-29	+21
Suits:					
Boys', 2-pants (knickers)	36.7	-34	-43	-22	+24
Men's and youths':					
3-piece	13.5	-40	+55	-29	+26
3-piece with extra trousers	23.6	-20	-12	-26	+30
2-piece with extra trousers	50.0	-22	+20	-17	+16
Waterproofed, not including oiled outer garments.	50.4	-32	+13	-34	+33

See footnotes at end of table

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>					
Clothing, work (including work shirts) and sport garments except leather:					
Pants and breeches, work.....	16.3	+68	+19	-24	+9
Play suits, children's.....	37.5	-64	+64	-28	-4
Shirts, work (including flannel).....	36.8	-12	+21	-42	+40
Coats, suits, and separate skirts, women's, misses', and juniors', regular and contract factories:					
Coats.....	7.6	-23	+29	-42	+9
Skirts.....	19.0	+315	+31	-38	-7
Suits.....	14.0	+53	+106	-51	+5
Corsets and allied garments:					
Brassieres and bandeaux-brassieres.....	28.5	+47	+20	-55	+1
Combination or 1-piece garments.....	29.0	-39	+37	+6	+1
Corsets, girdles, and garter belts.....	19.3	+32	+19	-31	+2
Cotton woven goods over 12 inches in width:					
Colored cotton goods and related fabrics:					
Bed tickings.....	54.2	-2	+21	-30	+10
Cottonades and other coverts (except shirting coverts).....	63.8	+56	+4	-29	+23
Denims.....	71.5	+6	+3	-34	+21
Ginghams.....	65.0	-51	-84	-27	+36
Pin stripes, pin checks, and hickory stripes.....	52.2	-7	-56	-31	+19
Cotton duck:					
Numbered duck:					
Naught duck.....	88.4	+66	-75	-14	-10
Sail duck, 24 inches and under.....	(1)	-44	-6	-25	+5
Wide duck, wider than 24 inches.....	55.4	-32	+49	-37	+30
Ounce duck:					
Filter cloth.....	81.4	-11	+22	-40	+24
Hose and belting duck.....	84.7	-35	+7	-23	+14
Fine cotton goods, combed or part-combed, voiles.....	78.9	-49	-45	-28	+20
Napped fabrics:					
Blankets, crib.....	(2)	-21	+42	-44	+38
Flannels, canton.....	58.9	+5	+20	-45	+44
Print-cloth-yarn fabrics:					
Print cloth, 36 inches and wider, plain.....	22.3	+17	+19	-38	+33
Tobacco and cheese cloth and gauze.....	77.2	-12	+25	-31	+30
Sheetings, narrow, and allied coarse medium yarn fabrics:					
Drills, 40 inches and narrower.....	39.4	-35	+59	-35	+24
Osnaburgs, all widths.....	35.5	-17	+39	-37	+27
Sheetings, 40 inches and narrower.....	19.1	-7	+2	-35	+28
Specialties:					
Drapery and upholstery fabrics.....					
Pile fabrics and cotton damask:	32.1	-12	+38	-46	-2
Corduroys.....	70.8	+3	+25	-44	+32
Cotton table damask.....	77.4	-56	-3	-22	+9
Plushes, velvets, and velveteens.....	40.4	-65	+43	-30	+11
Rugs, cotton braided, except bath mats.....	85.7	-47	+369	+39	-41
Towels, toweling, etc.:					
Bath mats.....	62.4	-22	+43	-17	+14
Plain-woven towels and toweling.....	75.6	+1	+125	-34	+42
Washcloths.....	81.1	-10	+82	-25	-7
Wide cotton fabrics for industrial use:					
Drills, wider than 40 inches.....	54.7	-56	-25	-38	+41
Pillow tubing.....	73.8	-43	+32	-38	+12
Hosiery:					
Boys', misses', and children's:					
Seamless:					
All-cotton.....	32.0	-13	-19	-30	+3
All-wool.....	100.0	-51	-76	-41	+32
Rayon, with cotton tops, heels, and toes, and all-rayon.....	81.9	-36	-76	-55	-4
Rayon-and-cotton.....	51.3	-6	-75	-45	-12
Infants':					
Seamless:					
All-cotton.....	69.3	+33	+41	-28	+2
All-pure-thread-silk.....	(2)	-61	-5	-42	-38

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>TEXTILES AND THEIR PRODUCTS GROUP—continued</b>					
<b>Hosiery—Continued.</b>					
Women's:					
Seamless:					
All-cotton.....	31.5	-17	-47	-28	+17
All-pure-thread-silk.....	56.2	-26	+147	-57	-8
Pure-thread-silk with lisle or cotton tops, heels, and toes.....	66.7	-47	+249	-54	-23
Linoleum: All linoleum.....	100.0	-68	+130	-21	+4
Outerwear, children's and infants', regular and contract factories: Coats.....	31.4	-55	-44	-15	+6
Shirts (except work shirts), collars, and nightwear, regular and contract factories:					
Blouses and shirts, boys'.....	37.0	-11	0	-30	+11
Shirts (except work), men's and youths'.....	22.5	-11	+24	-36	+26
Woolen woven goods, including woven felts, and worsted woven goods: Woven felts, papermakers'.....	59.0	-26	-3	-6	+26
<b>PAPER AND ALLIED PRODUCTS GROUP</b>					
<b>Paper and paperboard:</b>					
Absorbent paper, blotting.....	70.1	-50	+67	-25	+23
<b>Boards:</b>					
Binder's board.....	91.6	-59	+96	-19	+18
Leatherboard.....	79.1	-12	+27	-31	-2
<b>Book paper:</b>					
Lithograph.....	85.2	-16	+202	-28	+40
Offset.....	39.4	+1	+128	-25	+24
Cover paper.....	47.4	-55	+92	-28	+16
<b>Ground-wood printing and specialty papers:</b>					
Catalog.....	87.9	-44	+60	-21	+7
Hanging.....	67.3	-35	+92	-30	+21
Tissue paper, toilet tissue.....	47.2	+42	+25	-25	+3
<b>Wrapping paper:</b>					
Glassine.....	59.0	-19	+22	-10	+14
Grease-proof.....	61.6	+98	-6	-14	+8
<b>Writing paper (fine):</b>					
Sulphite bond.....	29.8	-1	+18	-29	+22
Other chemical wood-pulp.....	40.5	-37	+29	-31	+22
<b>CHEMICALS AND ALLIED PRODUCTS GROUP</b>					
<b>Chemicals, not elsewhere classified:</b>					
<b>Acetates:</b>					
Amyl.....	(1)	+236	+150	-58	+7
Butyl.....	86.9	-17	+148	-46	-21
Ethyl.....	68.2	-54	+37	-37	-20
<b>Acids:</b>					
Acetic.....	73.4	-2	+102	-37	-24
Boric (boracic).....	100.0	-17	+88	-34	-3
Chromic.....	100.0	+18	+81	-36	+30
Citric.....	100.0	-47	+218	-30	-28
Mixed (sulphuric-nitric).....	(2)	-34	+30	-32	+2
Nitric.....	81.3	-10	+19	-23	+5
Tartaric.....	100.0	+39	+57	-48	+6
<b>Ammonia:</b>					
Anhydrous.....	89.5	-13	+49	-37	+3
Aqua and liquor.....	71.5	-62	+124	+37	-38
<b>Bicarbonates and carbonates:</b>					
<b>Soda ash:</b>					
Ammonia soda.....	(2)	-8	+39	-23	0
Natural and electrolytic soda.....	(2)	-29	+74	-32	-17
Sodium bicarbonate.....	(2)	-8	+10	-4	-9
Carbon bisulphide.....	(2)	+27	+72	-10	-14
Carbon tetrachloride.....	(2)	-7	+159	-15	-13
Chromates and bichromates, sodium.....	100.0	-26	+67	-14	+8
Ether (ethyl).....	(2)	+15	+76	-36	-83
Ferroalloys, electric-furnace.....	(1)	-45	+192	-25	+31
<b>Glycerine:</b>					
Crude.....	40.2	-23	+9	-34	+178
Dynamite grade, and chemically pure.....	(2)	-5	+13	-35	+138

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>CHEMICALS AND ALLIED PRODUCTS GROUP—continued</b>					
<b>Chemicals, not elsewhere classified—Continued.</b>					
Hydroxide, potassium (caustic).....	(2)	+30	+16	+5	+43
Modified sodas.....	(2)	-63	+21	+18	+12
Nitrate, silver (lunar caustic).....	(2)	-27	+75	-27	+22
Peroxide, hydrogen.....	(2)	+42	+89	-29	-16
Phosphate, sodium, tribasic.....	76.9	-3	+48	-24	-22
Plastics, nitrocellulose (pyroxylin).....	(2)	-41	+47	-25	+9
Sodium borate (borax).....	100.0	+2	+35	-5	-20
Sodium hypochlorite.....	53.5	+21	+131	-15	+31
Sodium sulphide.....	78.2	-7	-11	+3	+27
<b>Sulphates:</b>					
Aluminum (concentrated alum).....	31.8	-7	+22	-12	+11
Copper (blue vitriol).....	82.4	-29	+41	-55	+100
Magnesium (Epsom salt).....	100.0	+1	+11	-13	-11
Sodium hyposulphite (thiosulphate).....	(2)	-27	+82	+16	+2
Sodium salt cake (crude).....	63	-33	+111	+8	-24
Zinc.....	(1)	+20	+26	-39	+76
Sulfur, refined.....	(1)	-38	+56	-9	-14
<b>Compressed and liquefied gases:</b>					
Carbon dioxide (not including "dry ice").....	(1)	-14	-14	-25	+29
Chlorine.....	59.4	-14	+130	-27	+1
Hydrogen.....	66.1	+183	+87	-77	+8
Hydrocarbon gases, acetylene.....	92.7	-22	+100	-14	-13
Nitrous oxide.....	90.5	-25	+20	-9	+15
Oxygen.....	91.4	-40	+136	-7	-15
Sulfur dioxide.....	(2)	+11	+47	-11	+4
<b>Fertilizers:</b>					
Bone meal.....	49.9	-48	+314	-40	-3
Complete fertilizers (mixtures containing nitrogen, phosphoric acid, and potash).....	25.0	-45	+74	-34	+21
Fish scrap.....	17.2	-42	+160	-21	+19
<b>Superphosphates:</b>					
Not ammoniated (including concentrated phosphates).....	45.0	-39	+101	-26	+7
Potash (mixtures).....	36.3	-59	+160	-31	+24
<b>Paints, pigments, and varnishes:</b>					
<b>Dry colors and pigments:</b>					
<b>Chemical pigments:</b>					
<b>Lead oxides:</b>					
Litharge.....	(1)	-30	+44	-39	+46
Red lead, minium, and other.....	(1)	-49	+80	-33	+21
Lithopone.....	94.6	-33	+19	-9	-2
Zinc oxides (Chinese white, zinc white).....	87.3	-44	+31	-21	+2
<b>Paints:</b>					
<b>Paste paints:</b>					
Colors in oil.....	29.9	-37	+9	-17	+1
White lead in oil, pure.....	90.6	-52	+22	-28	+36
Ready-mixed and semipaste paints: Paints in oil, ready mixed.....	28.0	-18	+10	-18	+11
Water paints and calcimines, dry or paste.....	39.4	-33	+44	-15	+31
Putty.....	28.7	-41	+54	-14	+11
Shellac, bleached.....	63.3	0	+31	-66	+7
<b>Varnishes, lacquers (including enamels), and japans:</b>					
<b>Japans:</b>					
Baking.....	39.5	-43	+42	-18	+9
Drying japans and driers.....	41.5	-58	+60	0	+6
<b>Nitrocellulose (pyroxylin) products:</b>					
<b>Lacquers:</b>					
Clear.....	22.5	-28	+104	-28	-1
Pigmented.....	43.7	-50	+96	-18	-9
<b>Varnishes:</b>					
Spirit, not turpentine.....	21.3	-27	+56	-46	+5
Other varnishes.....	25.1	-42	+346	-20	-38
Varnish stains.....	32.8	-6	+7	-38	+32

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
	(1)	(2)	(3)	(4)	(5)
<b>PRODUCTS OF PETROLEUM AND COAL GROUP</b>					
<b>Petroleum refining:</b>					
Acid oil.....	(1)	+146	-33	-37	+67
Asphalt, other than liquid asphalt.....	62.9	-43	+66	-10	+5
Distillates.....	58.1	+56	+87	-18	+29
Gas oils.....	48.3	-31	+60	-18	+43
Gasoline.....	35.8	-8	+41	-46	+36
Illuminating oils.....	47.9	-17	+29	-43	+25
Lubricating greases, including axle grease.....	69.2	-29	+43	-26	+25
Lubricating oils:					
Black, cylinder, red, neutral, pale, and paraffin.....	44.5	-31	+49	-56	+81
Other, including compounded and unclassified.....	46.6	-35	+38	-22	+16
Naphtha.....	50.5	-66	+23	-45	+30
Paraffin wax.....	39.4	-14	+24	-36	+26
Petrolatum, mineral jelly, etc.....	69.2	+8	+57	-32	+35
Petroleum coke.....	72.9	+38	-24	-26	+19
Residual fuel oils.....	39.8	-22	+35	-25	+40
Residuum or tar.....	(1)	-38	-69	-33	+100
Road oils, liquid asphaltic.....	51.2	-7	+60	-18	+7
<b>LEATHER AND ITS MANUFACTURES GROUP</b>					
<b>Belting and packing leather: Belting, flat.....</b>					
	32.7	-59	+56	-12	+3
<b>Leather, tanned, curried, and finished:</b>					
Collar leather (sides).....	83.7	-30	+49	-11	+6
<b>Glove and garment leather:</b>					
Horse, colt, ass, and mule, half and whole fronts (equivalent fronts).....	91.0	-34	+23	-50	+37
Sheep and lamb, except shearlings (skins).....	69.8	+139	-6	-53	+29
Shearlings (skins).....	90.2	-25	+20	-50	+99
Harness leather, oak black and russet (sides).....	74.0	-32	+37	-36	+24
<b>Sole and belting leather:</b>					
Chrome and combination sole (backs, bends, and sides).....	62.4	+1	+74	-47	+7
Oak and union sole (backs, bends, and sides).....	46.7	-17	+60	-50	+28
Offal (heads, bellies, shoulders, etc.).....	53.1	-15	+18	-25	+7
<b>Upper leather:</b>					
Calf and whole kip, excluding kip sides (whole skins).....	41.1	-13	0	-42	+46
Cattle, including kip sides (sides).....	31.3	+29	+26	-41	+28
Goat and kid (skins).....	60.3	-24	-1	-37	+28
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP</b>					
<b>Asbestos products, steam and other packing, pipe and boiler covering, and gaskets:</b>					
<b>Brake lining:</b>					
Molded.....	75.2	+9	+146	+24	0
Not molded.....	64.9	-68	+31	-14	+9
Cloth.....	75.6	-30	+68	-45	+22
Clutch facings, molded and not molded.....	92.2	-51	+193	-18	+42
Gaskets.....	47.5	-54	+10	-28	+34
<b>Pipe and boiler covering:</b>					
Air-cell asbestos.....	56.6	-71	+59	-16	+3
Other than air-cell asbestos.....	67.7	-69	+91	+11	+39
Shingles.....	97.4	-54	+415	-24	+23
Tape, listings, and tubular lagging.....	63.8	-22	+88	-38	+19
Yarn.....	83.9	-45	+65	-46	+36
<b>Clay products, other than pottery:</b>					
<b>Brick:</b>					
Common.....	7.0	-82	+219	-19	+21
Face.....	15.9	-87	+247	-17	+9
Hollow.....	57.6	-83	+24	+38	-49
Chimney pipe and tops.....	68.5	-73	+122	-31	+06
Clay sold, raw or prepared, including fire-clay dust.....	44.7	-59	+105	+11	-19

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>STONE, CLAY, AND GLASS PRODUCTS GROUP—contd.</b>					
Clay products, other than pottery—Continued.					
Fire-clay products:					
Brick, block, or tile, except high-alumina (9-inch equivalent).....	43.6	-60	+88	-10	+33
Brick, high-alumina.....	67.0	-60	+188	-15	+3
Special shapes.....	51.4	-41	+72	-4	+20
Flue lining.....	33.0	-81	+221	+1	+34
Glass-house tank blocks, melting pots, stoppers, floaters, and rings.....	79.1	-39	+79	+26	+6
Refractory cement (clay).....	44.0	-54	+120	+36	+6
Sewer pipe.....	37.4	-73	+116	-15	+30
Stove lining.....	66.2	-65	+109	+38	-34
Terra cotta.....	64.9	-81	+12	-31	+42
Tile:					
Ceramic mosaic (vitreous and semi-vitreous, unglazed).....	56.8	-77	+177	-20	+21
Enameled tile and glazed ceramic mosaic.....	48.2	-55	+279	-39	+9
Falence tile (including hand-decorated tile).....	75.4	-66	+42	-65	+29
Floor tile.....	62.5	-64	+129	-35	-15
Hollow building tile:					
Conduit tile.....	92.4	-98	+60	-27	+20
Floor-arch, silo, and corner tile; radial chimney blocks; fire-proofing tile.....	45.0	-80	+38	-32	+66
Roofing tile.....	73.4	-72	+121	-17	+2
Wall tile, including trim.....	53.8	-67	+1	-58	+73
Vitrified brick and plates, for paving.....	44.4	-80	+57	-6	+18
Wall coping.....	50.4	-82	+176	-13	+32
Concrete products:					
Brick.....	32.4	-74	+1,083	+2	+5
Circular structures.....	82.0	-88	+150	+45	+68
Cast stone.....	19.9	-91	+203	-29	-12
Laundry trays.....	38.4	-73	+194	-7	-18
Paving materials.....	88.7	-86	+1,966	-14	-62
Pipe:					
Culvert.....	30.3	-35	+146	-10	+6
Irrigation.....	27.5	-74	+159	-12	+12
Pressure.....	(1)	-96	+4,591	+28	-20
Sewer.....	34.0	-81	+185	-10	-4
Poles and posts.....	69.8	-81	+196	-27	-15
Tile:					
Building block and tile except roofing.....	7.9	-88	+356	-17	+8
Drain tile.....	35.6	-84	+469	+17	-19
Roofing tile.....	95.9	-91	+519	+35	-7
Vaults.....	15.3	-32	+96	-8	-8
Glass:					
Containers for food products, milk bottles.....	89.2	-25	+37	+4	+14
Containers for medicinal and toilet preparations.....	70.0	-11	+30	-20	-7
Flat glass, window.....	85.0	-36	+139	-35	+21
Lenses, motor-vehicle.....	80.1	-67	+271	-29	-1
Nonclay refractories:					
Magnesite and chrome brick.....	100.0	-48	+152	-12	+3
Silica brick.....	72.7	-62	+98	-19	+39
Pottery, including porcelain ware:					
Plumbing fixtures (exclusive of fittings), vitreous china:					
Lavatories.....	88.1	-77	+235	-31	+23
Lo-down flush tanks.....	61.3	-35	+51	-33	+23
Reverse traps.....	79.6	-70	+408	-6	+32
Siphon jets.....	80.5	-83	+158	-11	+39
Washdowns.....	63.2	-45	+25	-25	+29
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY GROUP</b>					
Cast-iron pipe and fittings:					
Pipe:					
Bell and spigot.....	66.9	-72	+84	-13	+46
Culvert.....	(1)	-78	+117	-41	+28
Flanged.....	85.6	-69	+60	+4	+25
Heating and cooking apparatus, except electric:					
Portable ovens.....	72.3	-25	+11	-71	+5

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>IRON AND STEEL AND THEIR PRODUCTS, NOT INCLUDING MACHINERY GROUP—continued</b>					
Plumbers' supplies, not including pipe or vitreous-china sanitary ware:					
Bathtubs, enameled-iron .....	73.4	-69	+144	-23	+26
Lavatories, enameled-iron .....	69.4	-60	+113	-22	+15
Range boilers, copper and nonferrous-alloy, 25- to 180-gallon capacity .....	57.9	+16	+3	-22	-2
Steel-works and rolling-mill products:					
Steel-works and rolling-mill products—Continued:					
Cinder and scale .....	40.4	-60	+93	-17	+33
Finished hot-rolled products and forgings:					
Armor plate and ordnance .....	(1)	-24	+163	-16	+55
Axles, rolled and forged .....	(1)	-64	+132	-36	+77
Bars, concrete-reinforcing (including twisted bars) .....	58.6	-63	+128	-21	+31
Bars, merchant, etc:					
Iron .....	49.8	-76	+57	+4	+25
Steel, electric and crucible .....	54.7	-64	+210	-15	+2
Steel, open-hearth and Bessemer .....	71.7	-59	+83	-17	+37
Rails .....	100.0	-85	+258	-10	-1
Rails, rerolled or renewed .....	(1)	-68	+76	-14	+43
Rail joints and fastenings, tie plates, etc. ....	68.6	-77	+133	-14	+10
Rods, bolt and nut and spike and chain .....	(1)	-72	+9	-15	+17
Rods, wire .....	64.0	-44	+50	-17	+38
Sheets, No. 13 (0.095-inch) and thinner, not coated, plain .....	55.3	-34	+87	-36	+16
Skeip .....	82.2	-58	+121	-16	+35
Strips, bands, flats, scroll and hoops, narrower than 24 inches:					
Hot-rolled strips and flats for cold rolling ..	86.0	+13	+149	-9	+41
Other hoops, bands, and strips .....	74.6	-54	+34	-15	+41
Structural shapes (not assembled or fabricated):					
Heavy (leg or web 3 inches and over) .....	(1)	-80	+212	-16	+32
Light (leg or web less than 3 inches) .....	67.9	-63	+222	-18	+43
Ties, cotton .....	100.0	+20	+36	-33	+65
Wheels, car and locomotive, rolled and forged .....	(1)	-67	+149	+1	-4
Scrap iron and steel .....	70.6	-63	+92	-34	+121
Semifinished rolled products:					
Bars:					
Muck and scrap .....	(1)	-86	+85	-21	+31
Sheet and tin-plate .....	(1)	-55	-47	-28	+41
Blooms, billets, and slabs, except for forging ..	76.5	-46	+28	-26	+49
Blooms and billets for forging .....	83.8	-76	+421	-18	+46
Unrolled steel:					
Direct steel castings .....	29.1	-82	+364	-8	+23
Ingots .....	60.8	-86	+599	+22	+18
Tin cans and other tinware, n. e. c.:					
Dairy milk cans .....	68.3	-43	+62	+13	+22
Sanitary cans including sweetened-condensed-milk cans .....	(1)	-2	+76	-23	+6
Venthole-top cans .....	88.8	+2	+4	-33	+26
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP</b>					
Aluminum products:					
Castings, rough (not included with aluminum ware or motor-vehicle accessories) .....	47.6	-67	+73	-26	+31
Ingots produced for sale (from pig and scrap) ..	81.7	-41	+114	-36	+29
Nonferrous-metal alloys: nonferrous metal products, except aluminum, n. e. c.:					
Castings, rough:					
Brass and bronze .....	22.1	-75	+148	-32	+20
Copper .....	52.4	-72	+185	-12	+17
Ingots and pigs:					
Brass and bronze .....	52.4	-60	+137	-54	+81
Copper (secondary) .....	89.2	-42	+36	-57	+67
Lead (secondary) .....	68.5	-22	+5	-41	+48
Solders, all kinds .....	62.3	-53	+119	-17	+16

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>NONFERROUS METALS AND THEIR PRODUCTS GROUP—continued</b>					
Nonferrous-metal alloys; nonferrous-metal products, except aluminum, n. e. c.—Continued.					
Ingots and pigs—Continued					
Tin (secondary).....	89.6	-22	+100	-19	+48
Type metal.....	56.7	-47	+55	-34	+46
Zinc (secondary).....	70.4	-41	+105	-37	+49
Plates and sheets:					
Brass and bronze.....	73.3	-50	+66	-42	+66
Copper.....	90.5	-46	+51	-47	+40
Lead.....	(1)	-66	+83	-31	+34
Nickel alloys.....	84.3	-61	+68	-21	+12
Zinc.....	64.9	-54	+155	-2	+12
Rods:					
Brass and bronze.....	65.8	-45	+103	-43	+49
Copper.....	(1)	-65	+148	-56	+41
Tubing (seamless) and pipe:					
Brass and bronze.....	78.9	-46	+104	-45	+59
Copper.....	70.8	-40	+96	-42	+48
Lead.....	(1)	-64	+70	-23	+18
Nickel alloys.....	93.7	-56	+142	-47	+49
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP</b>					
Agricultural implements:					
Combines (harvester-threshers), all widths of cut.....	79.1	-90	+8,206	-33	-22
Cultivators, horse-drawn, 1-row, riding (2-horse).....	77.2	-86	+198	-13	+25
Disk harrows, horse- or tractor-drawn (single or double action).....	77.7	-91	+1,006	-40	+92
Drills, grain, horse- or tractor-drawn.....	90.8	-94	+1,269	-60	+118
Manure spreaders, horse- or tractor-drawn.....	84.8	-91	+836	-23	+32
Mowers (haying machinery), horse- or tractor-drawn.....	87.2	-70	+236	-14	+32
Plows, moldboard, horse-drawn, walking, 2-horse and larger.....	65.7	-73	+187	-14	+5
Cash registers, adding and calculating machines and other business machines except typewriters: Calculating machines.....	(2)	-84	+472	+14	+10
Electrical machinery, apparatus, and supplies:					
Fans (direct motor-driven), desk fans.....	54.4	+23	+136	-78	+113
Fuses (except high-voltage and power types):					
Nonrenewable plug fuses, 125 volts.....	71.6	-12	+21	-12	+9
Household apparatus and appliances:					
Ranges, electric household, 2½ kw. and over.....	(1)	-77	+568	+11	-9
Waffle irons and griddles.....	52.6	-41	+90	-50	-2
Lamps, incandescent-filament:					
Large tungsten.....	(1)	-13	+64	-26	-12
Miniature tungsten, motor-vehicle.....	(1)	-53	+171	-23	-19
Motors (except railway), stationary:					
½ horsepower and over, but under 1 horsepower: Repulsion-induction.....	60.6	-31	-8	-31	+30
Transformers, instrument and meter.....	(1)	-75	+334	-29	+35
Engines, turbines, water wheels, and windmills:					
Engines, internal-combustion:					
Carburetor engines:					
Aircraft.....	(1)	-71	+238	+19	-3
Marine:					
Inboard.....	60.5	-75	+298	-44	-15
Outboard.....	100.0	-69	+332	-48	-19

See footnotes at end of table.

TABLE 1E.—Percentage change in quantity and price between 1929-33 and between 1933-37, for the sample of 407 products—Continued

Product	Concentration ratio	Percentage change			
		Quantity		Average realized price	
		1929-33	1933-37	1929-33	1933-37
(1)	(2)	(3)	(4)	(5)	
<b>MACHINERY, NOT INCLUDING TRANSPORTATION EQUIPMENT GROUP—continued</b>					
<b>Machine tools:</b>					
Boring machines: Vertical (not vertical boring mills).....	100.0	-92	+120	-26	+76
Drilling machines:					
Vertical:					
Multiple-spindle (other than sensitive)....	73.8	-95	+1,624	-17	-10
Multiple spindle, sensitive.....	92.0	-98	+1,291	+9	+74
Single spindle, sensitive.....	69.7	-93	+11,325	-45	-72
Standard.....	84.5	-93	+155	-26	+253
Drills:					
Electric, portable.....	88.5	-83	+445	+1	-2
Pneumatic, portable.....	95.5	-74	+597	-2	+27
Grinders:					
Electric, portable.....	76.6	-83	+304	-35	+30
Pneumatic, portable.....	(2)	-78	+394	-20	-2
Hammers (chipping, riveting, calking, etc.):					
Electric, portable.....	(2)	-89	+555	-18	-19
Pneumatic, portable.....	(2)	-79	+58	-7	+9
Honir and lapping machines.....	95.7	-69	+167	-32	+107
Milling machines:					
Power-feed, universal.....	98.4	-95	+813	-5	+62
Power-feed, vertical.....	80.9	-85	+1,249	-9	+61
Presses (except forging): Forming and stamping.....	73.0	-80	+365	-13	+57
Radio apparatus and phonographs: Radio-phonograph combinations.....	73.2	-80	+92	-68	+69
Typewriters and parts: Standard, including long-carriage.....	91.2	-55	+111	-26	+5
Washing machines, wringers, driers, and ironing machines for household use: Washing machines, electric, standard size.....	63.0	+5	+47	-40	-3
<b>TRANSPORTATION EQUIPMENT, AIR, LAND, AND WATER GROUP</b>					
<b>Motor-vehicles, not including motorcycles:</b>					
Commercial cars, trucks, and busses.....	75.3	-64	+178	-21	+13
Passenger cars and passenger car chassis.....	90.4	-65	+152	-22	+21
<b>MISCELLANEOUS INDUSTRIES GROUP</b>					
<b>Roofing, built-up and roll; asphalt shingles; roof coatings other than paint:</b>					
Roof cement:					
Solid, asphalt.....	83.5	-70	+1,183	+3	-32
Fibrous, plastic.....	47.8	-74	+299	+7	-34
Roof coating:					
Fibrous liquid.....	30.3	-39	+171	-21	-14
Nonfibrous liquid.....	66.9	-59	+921	-56	+30

<sup>1</sup> Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

<sup>2</sup> Withheld to avoid disclosing the operations of remaining companies. There is not necessarily a disclosure among the leading 4 companies.

TABLE 2E.—Distribution of the 407 products by concentration ratio classes and by product characteristics

Concentration ratio class	Total		Type of immediate purchaser		Type of ultimate user*		Degree of durability*			Degree of fabrication*		Type of market		Source of raw material				Construction materials	Producers' supplies			
	407	Total	Consumer	Producer	Consumer	Producer	Non-durable	Semi-durable	Durable	Semi-manufactured	Finished	Regional	National	Agricultural	Mineral	Forest	Other			3	68	76
Total	407	307	179	84	80	76	107	134	197	79	328	161	224	19	3	68	76					
0.1 to 10.0	4	2	2	1	1	1	1	1	4	3	1	2	2			2						
10.1 to 20.0	12	8	9	3	6	7	4	5	10	6	6	8	3		1	2						
20.1 to 30.0	26	11	14	3	6	7	4	5	17	8	18	16	7			5						
30.1 to 40.0	32	10	20	1	5	11	5	11	18	10	22	18	13			8						
40.1 to 50.0	42	16	26	2	18	5	5	13	23	7	35	23	16			8						
50.1 to 60.0	48	17	31	26	6	8	9	15	25	9	39	24	22			8						
60.1 to 70.0	56	10	46	24	12	10	14	21	27	12	44	21	31			12						
70.1 to 80.0	50	9	41	20	7	11	18	20	22	6	44	17	30			6						
80.1 to 90.0	43	5	38	10	4	5	16	15	17	6	37	12	28			7						
90.1 to 100.0	36	5	31	12	4	4	14	10	18	3	33	6	28			6						
(1)	34	4	30	10	4	6	15	20	9	7	27	7	27			4						
(2)	24	3	21	4	3	1	6	3	7	2	22	7	17			4						

\* Those products listed as construction materials and as producers' supplies were not classified as to type of ultimate user nor as to degree of durability; products listed as producers' supplies were not classified as to degree of fabrication.

† Withheld to avoid disclosing the operations of individual companies. See appendix A for rules governing disclosures as used in this study.

‡ Withheld to avoid disclosing the operations of remaining companies. † There is not necessarily a disclosure among the leading 4 companies.

APPENDIX F

BASIC DATA FOR THE PRODUCTS OF MINES ANALYZED FOR 1935

[NOTE.—These data were prepared for the Temporary National Economic Committee by the Bureau of Mines, Department of the Interior]

Product	Number of mines, quarries, or wells			Value of products			Number of wage earners			Wages paid		
	Total	Percent of total		Total (thousands of dollars)	Percent of total		Total	Percent of total		Total (thousands of dollars)	Percent of total	
		Leading 4 companies	Leading 8 companies		Leading 4 companies	Leading 8 companies		Leading 4 companies	Leading 8 companies			
<b>Metals:</b>												
Baryte.....	11	63.6	( <sup>1</sup> )	1,545	92.6	( <sup>2</sup> )	559	86.6	( <sup>3</sup> )	330	83.7	( <sup>4</sup> )
Gold, silver, copper, lead, and zinc.....	12,969	0.3		226,208	32.3		61,385	17.8		65,951	22.9	32.3
Iron ore.....	199	21.1		76,734	64.0		14,873	63.7		14,624	63.4	77.2
Mercury.....	43	11.6		990	76.9		451	47.7		385	52.9	76.9
<b>Nonmetals:</b>												
Asphalt, native.....	19	21.1		2,149	62.6		386	53.9		328	55.1	80.6
Basalt.....	270	5.2		10,855	15.8		3,147	12.4		2,841	14.7	19.7
Clay.....	219	3.7		7,056	41.6		3,687	40.2		2,097	37.3	48.1
<b>Coal:</b>												
Anthracite, Pa.....	350	29.7		210,351	48.1		89,385	50.8		116,364	46.2	69.7
Bituminous.....	6,311	1.4		658,475	10.9		435,426	8.7		402,677	10.3	14.1
Fluorspar.....	78	3.1		1,560	46.1		783	26.9		568	35.2	56.5
Fuller's earth.....	19	42.1		2,237	67.3		5,940	10.7		498	64.0	87.7
Granite.....	404	2.2		13,491	18.3		2,928	67.5		4,972	13.6	24.4
Gypsum.....	58	50.0		18,860	80.3		29,681	7.7		21,585	68.1	82.6
Limestone.....	1,924	0.7		55,544	11.0		2,088	75.3		1,413	77.7	85.6
Marble.....	33	27.3		2,169	84.4		93.3	11.6		1,413	8.9	14.1
Petroleum.....	340,990	( <sup>1</sup> )		961,440	19.5		93,450	15.5		126,703	17.6	30.0
Phosphate rock.....	( <sup>1</sup> )	( <sup>1</sup> )		11,423	61.7		2,638	45.4		1,807	48.6	77.7
Potash.....	4	100.0		4,240	100.0		1,271	100.0		1,796	100.0	
Pumice.....	22	31.8		246	76.9	( <sup>2</sup> )	77	79.2	( <sup>2</sup> )	65	70.9	( <sup>2</sup> )
Salt.....	63	22.2		23,906	42.7		4,824	44.3		5,070	50.2	65.1
Sand and gravel.....	1,798	0.9		53,701	9.6		8,566	10.5		8,340	10.8	18.3
Sandstone.....	289	3.5		4,365	32.8		2,278	27.0		1,595	27.9	39.3
Talc and ground soapstone.....	20	23.0		1,804	70.4		534	65.4		387	66.9	81.0
Tripoli.....	9	53.6	( <sup>1</sup> )	374	83.6	( <sup>1</sup> )	116	70.7	( <sup>1</sup> )	93	76.5	( <sup>1</sup> )

<sup>1</sup> Percent of total accounted for by the leading 3 companies.

<sup>2</sup> Not at liberty to publish.

<sup>3</sup> Data represent total net value of products.

<sup>4</sup> Data not available.

<sup>5</sup> Figures exclude data on potash materials recovered as a by-product of manufacturing processes.



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PART VI

**THE PRODUCT STRUCTURES OF LARGE  
CORPORATIONS**

BY

**WALTER F. CROWDER  
ADOLPH G. ABRAMSON  
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# THE PRODUCT STRUCTURES OF LARGE CORPORATIONS

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# THE PRODUCT STRUCTURES OF LARGE CORPORATIONS <sup>1</sup>

## CHAPTER I

### THE IMPORTANCE OF THE LARGEST 50 MANUFACTURING COMPANIES

An investigation of the role played by modern giant manufacturing corporations in the economy may be approached from many angles. Their influence might be measured in terms of the assets controlled by them or in terms of their control over employment opportunities. Or, again, the influence of big corporations in the creation, stimulation, or modification of demand through advertising might be investigated. Further, their price and production policies in periods of increasing and decreasing economic activity might be examined in the light of the effect of these policies on the organizing and coordinating action of the market. The object of this study is much narrower in its scope and, in a sense, is more objective. Although the implications of the exercise of control are of primary interest in the formulation of governmental policy, there is a basic problem of measuring or describing the product composition of each company's output and the extent of control which each corporation has over the supply of the products it produces. This study is concerned then with measuring (1) the importance to the corporations of each product which they manufactured, and (2) the extent to which these big corporations controlled the supply of the products manufactured by them. In other words, we are concerned with an objective description of the product structures of large manufacturing corporations.

In sketching this picture of how big companies look productwise, factual information will be presented which will be of value in formulating answers to a number of questions. How widely scattered are the activities of large corporations? In how many industries do large companies operate? How many establishments do they control? How many different products do they manufacture? What is the relationship of these products to one another that causes them to be produced by one concern? What percentage of a company's total value of product is represented by each product? Do large companies tend to concentrate production in a few items and perhaps manufacture small amounts of many others or do they manufacture approximately equal amounts of each of their products? What percent of the entire domestic production does each of their products represent? Do they produce a large percentage of the United States value of all

<sup>1</sup> Adolph G. Abramson contributed substantially to the planning of the presentation in chapters I and II and prepared a draft of the manuscript which appears as chapters IV and V. Esther W. Staudt supervised the tabulation of the basic data, planned the summary tables, and prepared a draft of the manuscript which appears as chapter III. The interviews upon which chapter IV is based were conducted by Mr. Abramson and Mr. William L. Batt, Jr. At the preliminary planning stage of the study, Professor Paul O'Leary and Grace W. Knott made many helpful suggestions. W. F. C.

the products they make or is it possible that they produce very small percentages of a great many products, which, in the aggregate, make the company big? Finally, are those products in which they do control an important part of the supply of great importance to the companies?

The analysis which follows is based on product data for the largest 50 manufacturing companies reporting in the Census of Manufactures for 1937. The companies were selected on the basis of their value of product; that is, the concerns reporting in the Census of Manufactures for 1937 were arrayed in terms of the total value of their products and the largest 50 selected. The original tabulations for each company were prepared in the Bureau of the Census from the confidential reports submitted by the companies and released for further analysis in the anonymous form of the data presented in appendix B.

Since the Bureau of the Census is prohibited by Federal statute from revealing the confidential data supplied by reporting companies, the data for individual companies and products are presented under symbols. While this procedure undoubtedly reduces the general interest and news value of the data, it still makes possible the presentation of significant facts about the product structures of large American manufacturing companies. Indeed, comparisons of these corporations in abstract product symbols bring out structural similarities and differences which might not be so apparent if attention were directed to the concrete nature of the several product structures.

Each of these 50 companies is a central office in the meaning used by the Census; that is, each concern operates more than one establishment and the production data from all are brought together and reported from one central office. The control over establishments is limited to those which are owned outright or those of subsidiary companies in cases where the majority of the voting stock is controlled. There are undoubtedly some cases of majority voting stock control not known to the Census although the margin of error from this source is probably small. There are obviously many situations in which less than majority voting stock is sufficient to give effective working control to the compact minority owner. Interlocking directorates, common banking interests, well organized trade associations, and a variety of collusive agreements which are functionally of vast importance in a study of concentration of control are not measured in the data presented here.

The thousands of physical commodities produced by our industries and listed separately by the Census of Manufactures as products differ among themselves with respect to physical characteristics, although frequently the differences are very slight. Physical differences between two census products are in some cases, indeed, so slight as to make it doubtful that the products are significantly different in an economic sense, one being so easily substituted for the other as to render them functionally homogeneous for all important valuation decisions. It is impossible to say just when a gap in substitutability exists sufficient to warrant saying that two different physical things are economically different products. The Census of Manufactures treats 100-percent-wool blankets as a different product from 90-percent-wool blankets. Obviously the functional economic difference here is not of the same order as that between either one of these blanket products and a cast-iron radiator. In fact, it may not be

so great as the difference between two identical blankets sold under two different brand names by means of two different advertising programs. In general, however, one is warranted in assuming that census product differentiations do reflect in varying degrees significant economic functional differences since they represent in large measure the cumulative result of suggestions and requests made through the years by manufacturers and their trade associations. (For further discussion of a census product, see appendix A, pp. 673-674.)

#### THE SIGNIFICANCE OF THE LARGEST 50 MANUFACTURING COMPANIES

The role played by these 50 large companies in all manufacturing may be reviewed and their significance in the entire economy may be appraised by an inspection of the material presented in table 1. While these 50 companies and the 2,869 establishments operated by them represented only 0.03 percent of the number of concerns engaged in manufacturing and only 1.7 percent of the total number of establishments, they accounted for 28 percent of the value of all manufactured products and 20 percent of the value added by manufacture. Furthermore, these 50 companies employed 16 percent of all wage earners in manufacturing and the wages paid by them amounted to slightly more than 21 percent of the total wage bill in manufacturing. These companies manufactured 2,043 different products, and these products were classified in 176 of the 351 census industries scattered throughout all 15 industry groups.

TABLE 1.—Importance of the largest 50 manufacturing companies, 1937

Measures of importance	All manufacturing	Largest 50 companies	Percent of all manufacturing
Number of concerns.....	146,720	50	0.03
Number of establishments.....	166,794	2,869	1.7
Wage earners:			
Average number for the year.....	8,569,231	1,390,503	16.2
Wages paid (thousands of dollars).....	10,112,883	2,155,038	21.3
Salaried employees:			
Average number for the year.....	1,217,171	189,354	15.6
Salaries paid (thousands of dollars).....	2,716,866	425,939	15.7
Value of products (thousands of dollars).....	60,712,872	16,805,135	27.7
Cost of materials, fuels, energy, etc. (thousands of dollars).....	35,539,333	11,719,824	33.0
Value added by manufacturer (thousands of dollars).....	25,173,539	5,085,309	20.2

The total value of the manufactured products of the fiftieth company in the array was approximately \$108,000,000. It should be noted that this amount represented the value of the manufacturing portion of the corporation's activity. It is impossible to state definitely, of course, whether or not this particular company was engaged in operations other than manufacturing, but certainly some of the 50 companies were active in lines other than manufacturing, i. e., agriculture, mining, transportation, public utilities, service, finance, etc.

The differences in size, as measured in terms of value of products of the companies included in the list, were quite wide. In fact, the relative difference between the value of the products manufactured by the largest company and that of the fiftieth was approximately five times as great as the difference between the value output of the fiftieth and that of the two-hundredth company in the array. Stated in another way, the total value of the manufactured products of the

largest company was roughly 20 times as large as the total value of products of the fiftieth company, while the total value of the fiftieth company was only twice as great as that of the one-hundredth company and 4 times that of the two-hundredth company. Thus, within the list of the 50 companies upon which this analysis is based, there were wide differences in the degrees of bigness of the corporations. Over-all data reflecting the importance of the largest 100 and of the largest 200 manufacturing corporations comparable to that shown here for the largest 50 are presented in table 1C, appendix C.

#### IMPORTANCE IN VARIOUS INDUSTRY GROUPS

The activities of these largest 50 manufacturing companies tended to be much more heavily concentrated in certain general lines of activity or in certain census industry groups than in others. On the basis of their predominant activity (measured by value of products) 10 of the 50 companies were classified in the iron and steel group, 7 in the food and kindred products group, 7 in the products of petroleum and coal group, 5 in the transportation group, and 4 each in the chemicals group, the nonferrous metal group, and the machinery group. The extent to which these large companies were competing with each other in the marketing of individual products is examined in some detail in the subsequent analysis.

As may be seen in table 2, almost 70 percent of the total value of products in the transportation equipment group was accounted for by the output of establishments controlled by 14 of these 50 companies. And, although the data are not broken down in a way to reveal the fact, we are warranted in assuming that the great majority of this output was accounted for by the 5 large automobile concerns while the operation of establishments by the 9 remaining companies active in this group probably represented secondary activities on their part. At the other extreme, the output of establishments controlled by 12 of the 50 companies made up only 1 percent of the total value of products in the textiles group.

In the aggregate, the output of these 50 companies made up a significant portion of the value of products in 10 of the 15 census industry groups, while their role was relatively insignificant in the remaining industry groups. The activities of these large companies in the groups where they were of little importance is to be accounted for by the fact that many of the companies were engaged in the production of auxiliary, minor complementary, or successive products used in the production or sale of their primary products as well as in the processing of by-products and waste materials. Thus, in the textiles industry the activity was largely confined to making cloth bags, sacks, and twine, and certain products in integrated organizations. In large measure, those operating in the forest products group were making wooden packing cases and boxes.

This concentration in certain industry groups points to the conclusion that there is probably something in the nature of the products or in the technology under which they must be produced that is conducive to mass production or that requires extensive aggregates of resources for optimum operation.

TABLE 2.—Importance of the largest 50 manufacturing companies by industry groups, 1937 (on an establishment basis)

[NOTE.—Values represent total production of establishments classified in each industry group and include the value of minor products manufactured in the establishments although those products may belong properly in other industry groups]

Industry groups	Number of companies among largest 50 that operated establishments in each group		Number of establishments		Number of wage earners (average for the year)		Value of products (thousands of dollars)		
	All man-ufacturing	Largest 50 com-panies	Percent of total	All man-ufacturing	Largest 50 com-panies	Percent of total	All man-ufacturing	Largest 50 com-panies	Percent of total
1. Food and kindred products.....	9	1, 201	2. 5	988, 298	101, 649	11. 4	11, 265, 610	2, 311, 028	20. 5
2. Textiles and their products.....	12	20, 616	. 1	1, 814, 387	14, 768	. 8	7, 061, 609	69, 035	1. 0
3. Forest products.....	21	18, 012	. 3	694, 341	11, 736	1. 7	2, 439, 530	50, 063	2. 1
4. Paper and allied products.....	18	25, 804	. 2	617, 563	12, 198	2. 0	4, 646, 548	166, 082	3. 6
5. Printing, publishing, and allied products <sup>1</sup> .....	22	7, 419	5. 1	314, 520	67, 402	21. 4	3, 721, 531	825, 844	22. 2
6. Chemicals and allied products.....	19	675	20. 1	106, 473	64, 007	60. 1	2, 954, 465	1, 693, 298	57. 3
7. Products of petroleum and coal.....	5	478	5. 4	129, 818	58, 560	45. 1	883, 033	428, 709	48. 5
8. Rubber products.....	4	3, 364	2. 6	331, 965	31, 274	9. 4	1, 491, 513	198, 096	13. 3
9. Leather and its manufactures.....	10	6, 071	2. 9	300, 278	9, 414	3. 1	1, 895, 888	51, 370	3. 7
10. Stone, clay, and glass products.....	26	8, 345	3. 9	1, 166, 287	390, 520	33. 5	7, 480, 360	3, 362, 154	44. 9
11. Iron and steel and their products, not including machinery.....	16	5, 303	2. 2	270, 327	54, 996	20. 3	2, 783, 285	1, 196, 075	42. 9
12. Nonferrous metals and their products.....	21	9, 961	2. 2	955, 975	197, 607	20. 7	5, 891, 599	1, 386, 465	23. 5
13. Machinery, not including transportation equipment.....	14	1, 942	7. 5	623, 845	333, 718	53. 5	5, 985, 889	4, 162, 631	69. 5
14. Transportation equipment, air, land, and water.....	14	1, 942	7. 5	623, 845	333, 718	53. 5	5, 985, 889	4, 162, 631	69. 5
15. Railroad repair shops <sup>2</sup> .....	9	10, 077	. 6	355, 164	42, 654	12. 0	2, 712, 042	905, 284	33. 4
16. Miscellaneous industries.....	9	10, 077	. 6	355, 164	42, 654	12. 0	2, 712, 042	905, 284	33. 4

<sup>1</sup> Combined with "Paper and allied products group" to avoid disclosing operations of individual companies or establishments.

<sup>2</sup> This group was abandoned as an industry group in 1937 by the Bureau of the Census and will not be carried in subsequent tables showing industry group data.

The material presented in table 2 threw light on the activities of the largest 50 companies in terms of the establishments operated by them and the total value of output of the establishments classified in the various industry groups. In table 3, the importance of the 50 companies is measured in terms of the proportion of the total output of census products accounted for by these companies in the various industry groups. The number of companies manufacturing products in each industry group may be greater than the number of companies operating establishments in these groups due to the fact that some minor or secondary products may be produced in establishments classified in a different industry group.<sup>2</sup> From this latter table it is possible to get a more exact picture of the importance of the value of the output of the largest 50 companies in the sense that the comparison is in terms of their aggregate proportionate contribution to the total value output of the products they were actually producing. In table 2, of course, their output was stated as a proportion of the output of all products classified in the group even though some of the products were not produced by the largest 50 companies.

In table 3 it may be noted that the largest 50 companies were active in the production of 2,043 products or approximately one-half of all the products distinguished in the Census of Manufactures for 1937. These products had an aggregate value in excess of \$44,512,264,000, and of this total the output of the largest 50 companies accounted for \$16,805,135,000, or 37.8 percent of the total value of those products in the production of which they were actually engaged. It will be recalled that these 50 companies accounted for 27.7 percent of the total value of all manufactured products (table 1).

The relative concentration of activity among the industry groups, when measured on this actual product basis, is about the same as that in terms of establishments. The proportion of the total output accounted for by the 50 companies was, of course, higher in almost every industry group when the computation was on the product basis. Reading from table 3, 9 of the 50 companies manufactured 265 products classified by the Census in the food and kindred products group.

<sup>2</sup> "Each establishment as a whole . . . is assigned, on the basis of its product or group of products of chief value, to some one industry classification.

"The 'general statistics' (those for number of establishments, employees, salaries, and wages, cost of materials, fuel, etc., value of products, and value added by manufacture) for any particular industry cover the total manufacturing activities of the establishments classified in that industry. Many of the establishments make secondary products which normally belong to other industries. For example: Some of the establishments classified in the 'Cheese' industry manufacture butter as a secondary product, and both butter and cheese are made as secondary products by some of the plants classified in the 'Condensed and evaporated milk' industry.

"The treatment of each establishment as a unit and its assignment to some one industry according to its product of chief value sometimes results in overrating the importance of certain industries and underrating that of others. For example: The industry classified as 'Wire drawn from purchased rods' embraces, as its title signifies, only those establishments which draw wire from rolled rods purchased from other establishments. Many rolling mills operate wire-drawing departments; and wire and wire products are also manufactured in considerable quantities by establishments classified under the designations 'Nonferrous-metal alloys; nonferrous-metal products, except aluminum, not elsewhere classified' and 'Electrical machinery, apparatus, and supplies'. The total output of wire and wire products by the establishments in the 'Wire drawn from purchased rods' industry in 1937 was valued at \$166,108,234, whereas the total value of wire and wire products manufactured by all establishments which drew wire in 1937 amounted to \$494,599,412. Thus the output of the 'Wire drawn from purchased rods' industry represented only about one-third of the value of wire and wire products manufactured in all wire-drawing establishments. On the other hand, it should be noted that the \$494,599,412 reported as the total for all establishments engaged in drawing wire does not represent the value of wire alone but includes a considerable value for products manufactured from wire, such as wire fencing, wire nails and spikes, and wire rope and strand-products similar to those manufactured from purchased wire by establishments under other classifications.

"To facilitate the comparison of one broad class of manufacturing industries with another, the industries as constituted for census purposes are distributed into 15 general groups.

"This grouping is based in most cases on the character of the principal materials used, but several of the groups are constituted on the basis of the purpose or use of the chief products, and two, 'Printing, publishing, and allied industries' and 'Chemicals and allied products', on the character of the processes employed" (Census of Manufactures, Part I, 1937, p. 6).

These 265 products had an aggregate value of \$8,449,060,000, and of this total the production of the 9 (of the 50) companies amounted to \$2,285,644,000, or 27.1 percent of the total output of these products.

TABLE 3.—Importance of the largest 50 manufacturing companies by industry groups, 1937 (on a product basis)

{NOTE.—Values represent total production of the products classified in each industry group although some of the products may have been manufactured in establishments classified in other industry groups}

Industry groups	Number of companies among largest 50 that manufactured products in each group	Number of products manufactured	Value of products		
			Total United States production	Production by largest 50 companies	Percent of total
All industries.....		2,043	44,512,264	16,805,135	37.8
1. Food and kindred products.....	9	265	8,449,060	2,285,644	27.1
2. Textiles and their products.....	12	60	1,433,593	71,740	5.0
3. Forest products.....	23	54	1,324,118	54,784	4.1
4. Paper and allied products.....	19	38	3,050,967	167,597	5.5
5. Printing, publishing, and allied products <sup>1</sup>					
6. Chemicals and allied products.....	38	429	3,110,848	876,441	28.2
7. Products of petroleum and coal.....	20	43	2,980,408	1,673,996	56.2
8. Rubber products.....	6	79	895,142	434,639	48.6
9. Leather and its manufactures.....	5	88	1,147,917	197,197	17.2
10. Stone, clay, and glass products.....	10	36	558,131	54,102	9.7
11. Iron and steel and their products, not including machinery.....	30	263	7,714,408	3,541,809	45.9
12. Nonferrous metals and their products.....	19	112	2,025,936	1,135,221	56.0
13. Machinery, not including transportation equipment.....	25	391	4,430,194	1,292,095	29.2
14. Transportation equipment, air, land, and water.....	15	100	5,772,807	4,114,469	71.3
16. Miscellaneous industries.....	13	85	1,618,735	905,401	55.9

<sup>1</sup> Combined with "Paper and allied products group" to avoid disclosing operations of individual companies or establishments.

As in the earlier tabulation the largest proportion of the total accounted for by individual companies among the 50 occurred in the transportation equipment group and the smallest proportion was again in the textiles group.

#### NUMBER OF COMPANIES PRODUCING THE VARIOUS PRODUCTS

It was pointed out in a preceding paragraph that several of the 50 companies had the major portion of their operations in one industry group, while other companies were predominantly active in others. From table 4 a somewhat more extended and detailed picture of the intercompany competition may be obtained. These 50 companies taken together manufactured 2,043 distinct census products. Of this total 1,066, or slightly more than half, were produced by only one of the 50 companies, while at the other extreme there were 4 products produced by 13 of the 50 companies. About one-quarter of the products were produced by 2 companies; a little more than one-tenth by 3 companies and the remaining products by more than 3 companies.



		Percentage distribution												
		100.0	52.2	24.9	11.2	5.3	2.2	1.1	1.5	0.8	0.2	0.3	0.1	0.2
	All industries.....	100.0	52.2	24.9	11.2	5.3	2.2	1.1	1.5	0.8	0.2	0.3	0.1	0.2
1	Food and kindred products.....	100.0	57.4	16.2	6.4	14.3	5.3	.4						
2	Textiles and their products.....	100.0	78.3	13.3	5.0	1.7	1.7							
3	Forest products.....	100.0	62.9	25.9	7.4				1.9	1.9				
4	Paper and allied products.....	100.0	65.8	15.8	10.5	5.3		2.6						
5	Printing, publishing, and allied products <sup>1</sup> .....	100.0												
6	Chemicals and allied products.....	100.0	53.6	25.6	11.4	5.1	2.3	.9	.3		.3			.6
7	Products of petroleum and coal.....	100.0	18.6	7.0	7.0	9.3	7.0	14.0	25.6		.3	2.3	4.6	4.6
8	Rubber products.....	100.0	19.0	31.7	40.5	6.3	2.5							
9	Leather and its manufactures.....	100.0	72.7	17.1	10.2									
10	Stone, clay, and glass products.....	100.0	72.2	22.2	5.6									
11	Iron and steel and their products, not including machinery.....	100.0	40.7	16.0	14.1	7.2	3.8	3.0	6.5	5.3	1.5	1.9		
12	Nonferrous metals and their products.....	100.0	60.7	22.3	10.7	3.6	2.7							
13	Machinery, not including transportation equipment.....	100.0	42.7	44.5	9.9	1.8	.3	.5		.3				
14	Transportation equipment, air, land, and water.....	100.0	54.0	25.0	13.0	6.0	1.0	1.0						
16	Miscellaneous industries.....	100.0	81.2	12.9	5.9									

<sup>1</sup> Combined with "Paper and allied products group" to avoid disclosing operations of individual companies or establishments.

The distribution of products by the number of companies producing them varied widely among the industry groups. This may be accounted for by the variation in the absolute number of companies active in each major industry classification and by the differences in the nature of the products classified in each industry group. For example, there was a tendency for each of the large companies classified in the petroleum group (there were seven)<sup>3</sup> to produce gasoline and lubricating oils; but in other groups where the products are more diverse—that is, where there were four, five, six, or more products nearly equal in significance—there may be a tendency for one or two of these large companies to specialize in the production of one product while another company may concentrate in the production of a different product.

It will be noted that 16 of the 43 products in the petroleum group were produced by 7 companies or more while in the stone, clay, and glass and in the leather groups (there was a much smaller number of the 50 companies classed as predominantly active in these groups than in the petroleum group) there were no products produced by more than 3 of the companies and more than 70 percent of the products in these 2 groups were produced by only 1 of the companies.

As was pointed out earlier, 10 of the 50 companies were predominantly active (as measured by value of product) in the iron and steel group. It will be noted, however, that 30 companies from the list manufactured products classified in the industries of this group. Of the 263 products which these companies manufactured only 5 were produced by 10 companies (not necessarily the same 10 companies that were predominantly active in this group), while 107 products were manufactured by only 1 company. It is a characteristic of this industry group that the companies which dominate the output of the group are integrated units. Furthermore, all the major units tend to carry on the primary stages in the manufacture of the products; i. e., smelting and refining. Although 2 of the companies produce almost all the steel products distinguished in the Census of Manufactures, many of the economically important products fabricated from the refined steel tended to be divided up among the other producers, one concentrating more heavily on the production of 1 item and another on a different product. Thus, although there were 10 large companies classified in this industry group, almost 80 percent of the products were produced by 4 or less of the 50 companies. The situation in this group may be compared with that in the petroleum group, where 7 of the 50 companies were classified but in which only 40 percent of the products were produced by as few as 4 producers.

#### SUMMARY

Although there were approximately 147,000 concerns active in manufacturing in 1937, the largest 50 companies accounted for 16 percent of the average number of wage earners employed during the year, paid 21 percent of the entire wage bill, and produced a value output equal to about 28 percent of the total in all manufacturing.

<sup>3</sup> Although 20 of the 50 companies manufactured some product in the petroleum group, only 7 of the companies were actually classified (on the basis of major activity) in this group.

The activities of these giant concerns tended to be concentrated in a few general lines; 10 of the companies were predominantly active in the iron and steel group, 7 in the food group, 7 in the petroleum and coal group, etc. It thus appears that, to some extent, or in some products at least, these big corporations were "competing" with each other.

These 50 companies manufactured 2,043 distinct census products and, of this total, slightly over one-half were produced by only 1 of the 50 companies and about one-quarter by 2 companies, the balance, of course, being produced by 3 or more companies.

## CHAPTER II

### THE PRODUCT STRUCTURES OF THE LARGEST 50 MANUFACTURING COMPANIES

The role played by the largest 50 companies in all manufacturing was examined in the preceding chapter. We may now proceed with a detailed analysis of the individual product structures of these companies. The investigation is divided into three major parts in each of which quantitative data are presented that will be of assistance in answering three questions: (1) How widely were the operations of the companies extended? (2) How important was each product in the total value output of each company? (3) How important was an individual company's output of each product in the entire domestic production of that product?

#### THE EXTENT OF THE OPERATIONS OF THE LARGEST 50 MANUFACTURING COMPANIES

In measuring the extent of operation at this point we are concerned with presenting a picture of the structural framework of the 50 companies. It is around this economic framework that product control is built.

##### *Number of Industries in Which the Various Companies Were Active.*

The operations of these 50 companies were spread over many industries, but there were rather wide variations among the individual companies. One company operated establishments which were classified in 25 census industries, while the operations of 4 other companies were confined to only 2 industries. In table 5 the distributions of companies by the number of industries in which they were active are presented on the basis of 2 methods of calculation. On the first basis, the distribution of the 50 companies is in terms of the number of industries in which they operated establishments; on the second basis of calculation, the distribution of the 50 companies is in terms of the number of industries in which the products manufactured by these companies were classified. Looking at the table it may be seen that there were 4 companies which operated establishments classified in 2 industries, while there was only 1 company which manufactured products classified in as few as 2 industries.

On the product basis of calculation, the activities of the companies appear to have been more widely spread than when the calculation is in terms of establishments. One of the companies actually manufactured products which were classified in 39 census industries. Furthermore, 27 of the 50 companies manufactured products classified in 10 industries or more, while only 15 of the companies operated establishments in 10 or more industries. The product basis of calculation probably gives a better picture of the diverse nature of the activities of these companies than may be obtained under the estab-

lishment basis of calculation since this measure does not obscure operations which result in the production of secondary products in establishments. It should be recognized, however, that both the minor and the major products were produced in the same establishment. The minor products may have resulted from the processing of by-products or waste materials. The causes for the differences which arise under these two bases of calculation were examined in the preceding chapter of this study.

TABLE 5.—Distribution of the largest 50 companies according to the number of industries in which they were active, 1937

Number of industries	Distribution of companies					
	On an establishment basis			On a product basis		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
1.....	0	0.0	0.0	0	0.0	0.0
2.....	4	8.0	8.0	1	2.0	2.0
3.....	6	12.0	20.0	1	2.0	4.0
4 and 5.....	11	22.0	42.0	8	16.0	20.0
6 and 7.....	6	12.0	54.0	7	14.0	34.0
8 and 9.....	8	16.0	70.0	6	12.0	46.0
10 to 14.....	7	14.0	84.0	8	16.0	62.0
15 to 19.....	6	12.0	96.0	7	14.0	76.0
20 to 24.....	1	2.0	98.0	3	6.0	82.0
25 to 29.....	1	2.0	100.0	5	10.0	92.0
30 to 34.....	0	0.0	100.0	2	4.0	96.0
35 to 39.....	0	0.0	100.0	2	4.0	100.0

*Number of Establishments Operated.*

The establishment does, however, afford a very convenient measure of operation in the sense that the use of the establishment as a unit permits measurement of the control which these corporations had over physical plants. The distribution of the 50 companies according to the number of establishments operated per company is shown in table 6. Three of the companies operated only 7 establishments each, while 1 company operated 497 establishments. Almost half—48 percent—of the companies operated 25 or fewer establishments.

TABLE 6.—Distribution of the largest 50 companies by number of establishments per company, 1937

Number of establishments per company	Companies			Number of establishments per company	Companies		
	Number	Percent	Cumulative percent		Number	Percent	Cumulative percent
1 to.....	0	0.0	0.0	51 to 55.....	2	4.0	72.0
6 to 10.....	8	16.0	16.0	56 to 60.....	4	8.0	80.0
11 to 15.....	6	12.0	28.0	61 to 65.....	3	6.0	86.0
16 to 20.....	6	12.0	40.0	80.....	1	2.0	88.0
21 to 25.....	4	8.0	48.0	86.....	1	2.0	90.0
26 to 30.....	4	8.0	56.0	133.....	1	2.0	92.0
31 to 35.....	2	4.0	60.0	146.....	1	2.0	94.0
36 to 40.....	1	2.0	62.0	330.....	1	2.0	96.0
41 to 45.....	0	0.0	62.0	373.....	1	2.0	98.0
46 to 50.....	3	6.0	68.0	497.....	1	2.0	100.0

The number of establishments operated by a concern depends largely on the type of product being manufactured and on the number of different and unrelated items which make up the product structure of the corporation. For example, the producer of a product such as rayon might find that a relatively few scattered establishments would be adequate, while a producer of fresh meat products might find it necessary to have hundreds of plants located near the consumers. In the former case, the product is stable, has high value, and low bulk and may thus be shipped long distances economically; in the latter case, however, the product is perishable and bulky and thus cannot be transported long distances without considerable expense relative to its value and without deterioration in quality. In both cases, the availability of raw materials is also an important factor in determining the number and location of plants. Further, one concern may be producing scores of items from one raw material, while another concern may be processing a raw material that eventuates in only two or three products. If the scale of operations is sufficient in both cases to warrant separate plants for handling each of the by-products or joint products, the former company will obviously have a larger number of establishments than the latter. There is also the case, of course, of the concern which is engaged in the manufacture of many quite diverse lines not related through the production of joint products or by-products or successive products in a vertically integrated organization. In all of these cases, the various factors account in varying degrees for the differences among the companies in the number of establishments per concern.

*Number of Products per Establishment.*

In order that the extent of the operations of these 50 companies may be appraised in product terms it is necessary to answer another question: How many products are manufactured per plant or establishment? It is recognized, of course, that the answer here, since it is in terms of census products, is conditioned by the wideness or narrowness of the census definitions. (The nature of a census product is discussed at some length in appendix A.) With this limitation in mind, the distribution presented in table 7 may be examined. There were 735 establishments, or slightly more than one-fourth of the total number operated by the largest 50 companies, which manufactured only one product. At the other extreme, one of the companies operated an establishment which manufactured 88 census products. In general, however, there was a tendency for the concerns to organize their activity in such a manner that only a few products were manufactured in each establishment—actually, there were five or less products manufactured in 75 percent of the establishments and almost 90 percent of the establishments produced 11 products or less.

The tendency for these 50 companies to manufacture only a few products in each establishment may be appraised by consulting the right-hand column of table 7. There it is seen that 41 of the 50 companies controlled establishments (735) in which only 1 product was manufactured. Although several companies were operating establishments in which 10, 11, 12 \* \* \* 20 products were manufactured, it was far more common for the companies to manufacture only a few products in each of their various establishments.

TABLE 7.—*Distribution of establishments operated by the largest 50 companies by number of products per establishment, 1937*

Number of products per establishment	Establishments			Number of companies operating establishments
	Number	Percent	Cumulative percent	
1.....	735	25.6	25.6	41
2.....	562	19.6	45.2	38
3.....	372	13.0	58.3	45
4.....	290	9.8	68.0	40
5.....	201	7.0	75.0	35
6.....	138	4.8	79.8	38
7.....	97	3.4	83.2	32
8.....	59	2.1	85.3	26
9.....	64	2.2	87.5	29
10.....	37	1.3	88.8	22
11.....	28	1.0	89.8	19
12.....	36	1.3	91.1	18
13.....	15	.5	91.6	10
14.....	25	.9	92.5	17
15.....	20	.7	93.2	9
16.....	18	.6	93.8	12
17.....	16	.6	94.4	12
18.....	13	.5	94.9	9
19.....	9	.3	95.2	8
20.....	9	.3	95.5	8
21 to 25.....	55	1.9	97.4	18
26 to 30.....	27	.9	98.3	13
31 to 35.....	23	.8	99.1	9
36 to 40.....	15	.5	99.6	9
41 to 45.....	7	.2	99.8	6
46 to 50.....	4	.1	99.9	4
51 to 75.....	3	.1	100.0	3
76 to 100.....	1	(1)	100.0	1

<sup>1</sup> Less than one-tenth of 1 percent.

### *Number of Products per Company.*

The distribution of the 50 companies according to the number of products manufactured by each is brought together in table 8. One of the companies produced only 6 products, while, at the other extreme, 1 company manufactured 302 separate products. Between these limits, the companies tended to cluster at the lower end of the range. Approximately three-fourths of the companies manufactured 100 or less products; thus, three-fourths of the companies fell in the lower third of the range.

There is a rather strongly marked relation between the number of products manufactured by each of the 50 companies and the number of industries in which each company operated (chart 1). It will be observed that the 4 companies producing more than 220 products did not conform very closely to the general pattern of the other 46 companies. This is to be accounted for more in terms of the nature of the census classifications of the industries than in any particular characteristic of the companies themselves. For example, one concern might have been active in a group of industries in which the Census included a large number of products under one industry designation, while another company might have been predominantly active in a group of industries in which only a few products were listed under a single industry category. It must be remembered that census industries vary widely in terms of the number of products per industry. To cite extreme cases, there were 359 products distinguished in the "electrical machinery, apparatus, and supplies" industry, while in the "cigarettes" industry only one product—cigarettes—was dis-

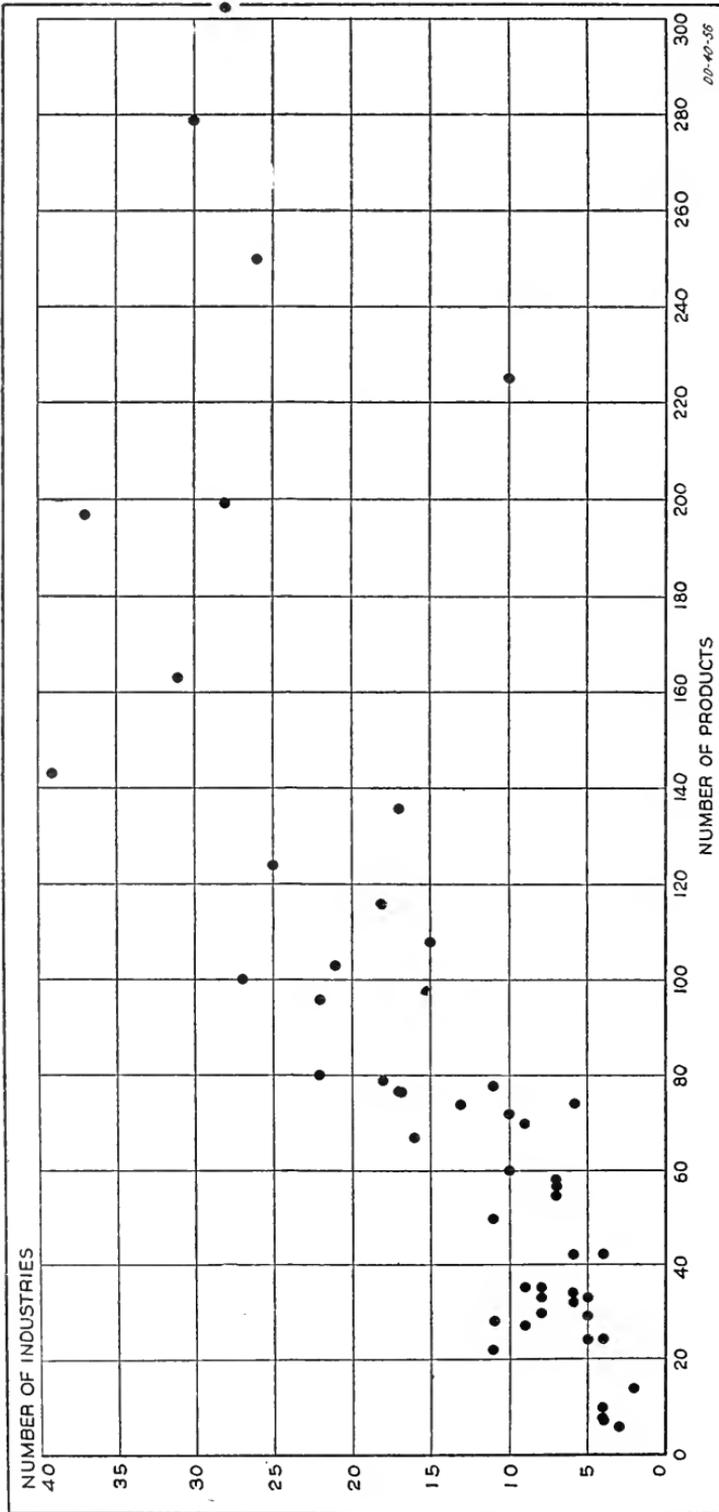


CHART I. RELATION BETWEEN THE NUMBER OF PRODUCTS AND THE NUMBER OF INDUSTRIES FOR EACH OF THE LARGEST 50 MANUFACTURING COMPANIES, 1937.

tinguished. As a result of this situation, the relationship between the number of products manufactured by each company and the number of industries in which it was active is affected both by the census classification of industries and by the types of product integration exhibited.

TABLE 8.—*Distribution of the largest 50 companies by number of products manufactured per company, 1937*

Products per company	Companies			Products per company	Companies		
	Number	Percent	Cumulative percent		Number	Percent	Cumulative percent
1 to 5.....	0	0.0	0.0	76 to 80.....	5	10.0	70.0
6 to 10.....	4	8.0	8.0	81 to 85.....	0	0.0	70.0
11 to 15.....	1	2.0	10.0	86 to 90.....	0	0.0	70.0
16 to 20.....	0	0.0	10.0	91 to 95.....	0	0.0	70.0
21 to 25.....	3	6.0	16.0	96 to 100.....	2	4.0	74.0
26 to 30.....	4	8.0	24.0	101 to 125.....	4	8.0	82.0
31 to 35.....	6	12.0	36.0	126 to 150.....	2	4.0	86.0
36 to 40.....	0	0.0	36.0	151 to 175.....	1	2.0	88.0
41 to 45.....	2	4.0	40.0	176 to 200.....	2	4.0	92.0
46 to 50.....	1	2.0	42.0	201 to 225.....	1	2.0	94.0
51 to 55.....	1	2.0	44.0	226 to 250.....	1	2.0	96.0
56 to 60.....	3	6.0	50.0	251 to 275.....	0	0.0	96.0
66 to 65.....	0	0.0	50.0	276 to 300.....	1	2.0	98.0
61 to 70.....	2	4.0	54.0	301 to 325.....	1	2.0	100.0
71 to 75.....	3	6.0	60.0				

There appears to be some positive relationship between the number of products manufactured by each company and the number of establishments operated by it (chart 2). The scatter of the company-points is quite wide, however, indicating only a very broad sort of association. This, again, may be accounted for largely by the varying nature of the inclusiveness of the census categories.

From the foregoing analysis it is evident that the largest 50 companies were operating many different establishments and that each establishment was producing a few products. Were the same products being produced in different establishments or did each establishment tend to produce different products? What was the structural relation of the products manufactured in these different establishments to the functional organization of the enterprise?

#### *The Integration of Operations.*

The anonymous nature of the data as they were made available by the Bureau of the Census precludes an extended analysis of the relation of the various products manufactured by each company in the functioning of the concern as an operating unit.<sup>1</sup> The operations of a concern may have been related in the sense that several plants were engaged in the production of the same product—horizontal integration—or the operations of the concern may have been related in the sense that the different products it manufactured represented joint or by-products fabricated from the same raw material, or, again, the relation may have been founded on the manufacture of successive

<sup>1</sup> In pt. II of this study, "The Integration of Manufacturing Operations," the functional relation of establishments operated by central offices to the activities of the entire concern was examined. There the scheme of analysis was based on the predominant product of the establishment. The analysis at that point was limited since many minor products of particular establishments were omitted from consideration. It affords, however, the most extensive and detailed analysis of integration of manufacturing operations that can be made from the confidential data of the census.

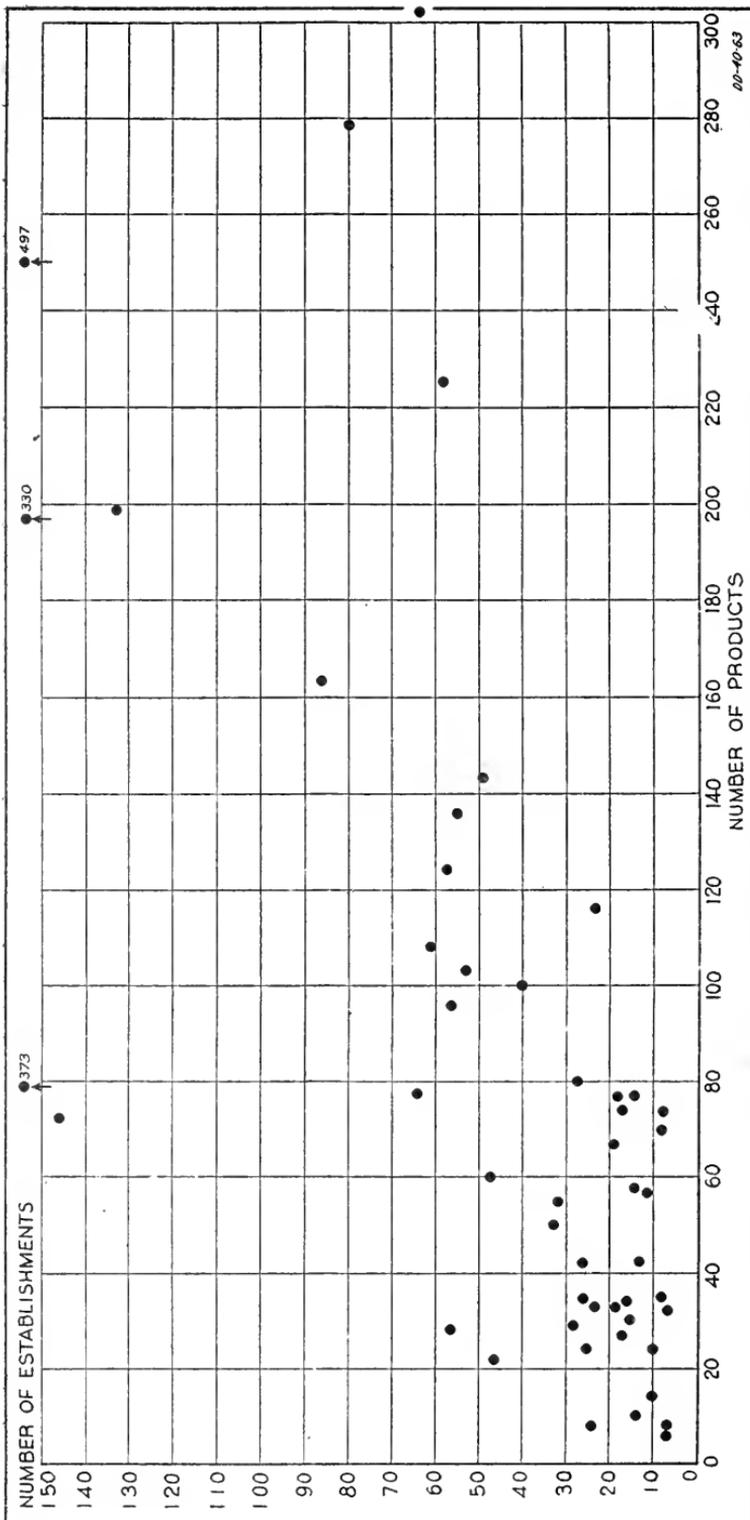


CHART 2. RELATION BETWEEN THE NUMBER OF PRODUCTS AND THE NUMBER OF ESTABLISHMENTS FOR EACH OF THE LARGEST 50 MANUFACTURING COMPANIES, 1937

products in a vertically integrated concern. Further, there may have been a relation among the products arising out of the desire to control the supply, either quantity or quality, of auxiliary or complementary products. In other cases, the basis of the relation may have been of a more technical nature—two or three products all requiring the same technical treatment in processing may have been produced by the same firm. And finally, several different products may have been manufactured by a single concern due to economies in marketing—different products may be marketed through the same distribution channel. An analysis of the extent of integration of any of these types would require knowledge of the names of the products. This information is, of course, not available. It is possible, however, to measure the extent to which there were instances of duplication in the production of products among the various plants operated by these 50 companies.

Data were available showing the number of products manufactured in each establishment operated by each company. (See table 2C, appendix C.) From this table it is possible to compute the actual instances of production for each company. An instance of production should not be confused with a product since a particular product may be produced in a number of plants and in each such case would be counted as an instance of production. The total instances of production for each company are presented in table 9. This table also shows the number of instances of duplication. For example, there were 358 instances of production in company "A",<sup>2</sup> while this company produced only 108 separate products. Thus, 250 of the instances of production represented duplications. The extent of duplication for each company is measured by expressing the instances of duplication as percentages of the instances of production; this is called the duplication ratio.

The 50 companies varied widely in the extent to which their activities were duplicated from one plant to another. From table 9 it may be seen that 14.0 percent of all the instances of production for company "V" were instances in which products manufactured in one plant were duplicated in another, while at the other extreme, 91.3 percent of the total instances of production of company "AE" involved instances of duplication. The distribution of the 50 companies by their duplication ratios is presented in table 10. From this table it will be noted that more than one-half of all the companies had duplication ratios in excess of 65 percent. In other words, more than 65 percent of the instances of production of each of 28 companies represented duplication, or cases in which 2 or more plants were making the same product.

This is not a measure of horizontal integration since the available data do not reflect the actual number of different products which may have been manufactured in 2 or more plants. For example, 1 product may have been manufactured in 11 different plants operated by the same company or 10 different products may each have been manufactured in 2 different plants; in the former case only 1 product was duplicated while in the latter case 10 products were duplicated, but in both cases the instances of duplication were 10.

<sup>2</sup> Throughout the tables and charts the identity of each company is indicated by the same code letter. The assignment of letters was not related in any way to a particular company characteristic.

TABLE 9.—Extent of duplication of operations for each of the largest 50 companies, 1937

Company	Total instances of production	Number of products manufactured	Instances of duplication	Duplication ratio (instances of duplication expressed as percent of total instances of production)
A	358	108	250	69.8
B	69	33	36	52.2
C	124	28	96	77.4
D	133	60	73	54.9
E	126	35	91	72.2
F	105	29	76	72.4
G	42	27	15	35.7
H	216	100	116	53.7
I	1,651	197	1,454	88.1
J	431	136	295	68.4
K	53	14	39	73.6
L	39	10	29	74.4
M	110	42	68	61.8
N	92	22	70	76.1
O	427	96	331	77.5
P	632	279	353	55.9
Q	133	77	56	42.1
R	425	143	282	66.4
S	534	302	232	43.4
T	116	24	92	79.3
U	480	163	317	66.0
V	86	74	12	14.0
W	178	58	120	67.4
X	73	24	49	67.1
Y	64	8	56	87.5
Z	122	67	55	45.1
AA	175	78	97	55.4
AB	102	70	32	31.4
AC	13	8	5	38.5
AD	53	32	21	39.6
AE	911	79	832	91.3
AF	60	35	25	41.7
AG	81	57	24	29.6
AH	203	50	153	75.4
AI	394	103	291	73.9
AJ	31	6	25	80.6
AK	103	34	69	67.0
AL	193	42	151	78.2
AM	141	30	111	78.7
AN	164	80	84	51.2
AO	2,350	250	2,100	89.4
AP	151	33	118	78.1
AQ	293	72	221	75.4
AR	189	116	73	38.6
AS	1,223	199	1,024	83.7
AT	104	55	49	47.1
AU	390	225	165	42.3
AV	124	77	47	37.9
AW	440	124	316	71.8
AX	137	74	63	46.0

It is possible to estimate the minimum and maximum number of products which may have been duplicated (horizontally integrated) in each of the 50 companies. In company "A", to return to the earlier example, there were 250 instances of duplication and these instances may have been distributed among as few as 12 products or over as many as all 108 products.<sup>3</sup>

<sup>3</sup> Company "A" manufactured 108 different products in 61 establishments and each establishment produced varying numbers of products. The total instances of production were 358 and there were, thus, 250 instances of duplication. From these available data it is theoretically possible that as few as 12 or as many as 108 products might have been duplicated. We may assume that each of the first 5 largest plants produced different products. Under this assumption, 107 of the 108 different products could have been produced without duplication (28+22+20+20+17=107; see table 2C, appendix C). The sixth plant which manufactured 12 products could have made the 108th product and its remaining 11 products would thus duplicate products already being produced in different plants. But the seventh plant also made 12 products and each of its products would likewise have to duplicate products manufactured in plants accounting for the 108. It is possible, since no other remaining plant made more than 12 products, for all the products of the remaining plants to duplicate these 12 products exclusively. Thus, at one extreme, company "A" might have had only 12 of its 108 products duplicated. On the other hand, there were 250 more instances of production than there were distinct products manufactured. It is possible, at the other extreme, that these instances could have been distributed over all the 108 products manufactured by company "A".

TABLE 10.—*Distribution of companies by duplication ratios, 1937*

Duplication ratio	Companies		
	Number	Percent	Cumulative percent
10.1 to 15.0.....	1	2.0	2.0
15.1 to 20.0.....	0	0.0	2.0
20.1 to 25.0.....	0	0.0	2.0
25.1 to 30.0.....	1	2.0	4.0
30.1 to 35.0.....	1	2.0	6.0
35.1 to 40.0.....	5	10.0	16.0
40.1 to 45.0.....	4	8.0	24.0
45.1 to 50.0.....	3	6.0	30.0
50.1 to 55.0.....	4	8.0	38.0
55.1 to 60.0.....	2	4.0	42.0
60.1 to 65.0.....	1	2.0	44.0
65.1 to 70.0.....	7	14.0	58.0
70.1 to 75.0.....	6	12.0	70.0
75.1 to 80.0.....	9	18.0	88.0
80.1 to 85.0.....	2	4.0	92.0
85.1 to 90.0.....	3	6.0	98.0
90.1 to 95.0.....	1	2.0	100.0

THE IMPORTANCE TO THE INDIVIDUAL COMPANY OF EACH PRODUCT  
MANUFACTURED

The analysis of the individual product structures of these 50 large manufacturing corporations is based on two measures of the significance of each product in the company aggregate. First, the importance of each product to each company is measured in terms of the contribution that product made to the total value of the company's output and, second, the importance of each company's output of each product is measured in terms of the proportion which that output was of the total United States value of the product. Percentage calculations on the basis of these two measures are shown for each product manufactured by each company in appendix B. In this section the analysis of the product structures of the 50 companies is based on the data derived from the first measure.

*The Importance of Minor Products.*

The total number of products manufactured by these 50 companies was 4,085. This does not mean that these companies manufactured 4,085 distinct and separate products. It only represents a cumulation of the number of products manufactured by each company.<sup>4</sup> Of this total, there were 1,472 products, or 36 percent, which accounted individually for less than 0.1 percent of the total output of each company. (See table 11.) Furthermore, there were 1,929 products which accounted for 0.1-1.0 percent of any company's total. In other words, 83.3 percent of all the products manufactured by these 50 companies accounted individually for 1 percent or less of a company's total output and 94.7 percent of the total number of products manufactured accounted individually for 5 percent or less of any company's output. Each of 3 products, on the other hand, made up 80-85 percent of a company total. The startling nature of this distribution may be accounted for in part (just as a matter of arith-

<sup>4</sup> Since the same census product may be made by more than 1 company, this amount (4,085) is larger than the number of different census products made by the 50 companies. If all duplications are removed, it is found that these companies, in total, made 2,042 different census products. For purposes of analyzing the product structures of individual companies every product must be included regardless of whether or not the same product was made by 1 or more other companies among the 50.

metic) when it is remembered that these companies were manufacturing many products. If a company produced only 50 products and if each product contributed equally to the company total, each product would account for only 2 percent of the total.

TABLE 11.—*Distribution of all products manufactured by the largest 50 companies according to the proportion of the company's total output accounted for by each product, 1937*

Percent of company's total value of products	Number of products	Percent of products	Cumulative percent of products	Number of companies represented
Total.....	4,085	100.0		
Less than 0.1.....	1,472	36.0	36.0	49
0.1 to 1.0.....	1,929	47.3	83.3	50
1.1 to 2.0.....	242	5.9	89.2	43
2.1 to 3.0.....	113	2.8	92.0	41
3.1 to 4.0.....	65	1.6	93.6	29
4.1 to 5.0.....	46	1.1	94.7	30
0.1 to 5.0.....	2,395	58.7	94.7	50
5.1 to 10.0.....	199	2.9	97.6	45
10.1 to 15.0.....	40	1.0	98.6	26
15.1 to 20.0.....	17	.4	99.0	13
20.1 to 25.0.....	10	.2	99.2	10
25.1 to 30.0.....	6	.1	99.3	6
30.1 to 35.0.....	6	.1	99.4	6
35.1 to 40.0.....	4	.1	99.5	4
40.1 to 45.0.....	2	.1	99.6	2
45.1 to 50.0.....	3	.1	99.7	3
50.1 to 55.0.....	1	( <sup>1</sup> )	99.7	1
55.1 to 60.0.....	4	.1	99.8	4
60.1 to 65.0.....	2	.1	99.9	2
65.1 to 70.0.....	0	.0	99.9	0
70.1 to 75.0.....	0	.0	99.9	0
75.1 to 80.0.....	1	( <sup>1</sup> )	99.9	1
80.1 to 85.0.....	3	.1	100.0	3

<sup>1</sup> Less than one-tenth of 1 percent.

There was one company that did not manufacture a product which accounted for as little as 0.1 percent of the company total but all companies manufactured products in the 0.1 to 5.0 percent class. Three companies, of course, were manufacturing the three products which accounted for 80 to 85 percent of the company totals.

The fact that each company manufactured many products that individually accounted for a very small proportion of the company's total value of product is pictured in rather striking graphic fashion in chart 3. (See also table 3C, appendix C.) At least half of the products manufactured by 47 of the 50 companies accounted individually for less than one-half of 1 percent of the total value of products of these companies, and further, 60 percent of the products manufactured by 37 of the 50 companies each contributed less than one-half of 1 percent to the totals for these companies.

From this chart it appears that the companies producing the largest number of products also had the highest percent of the number of their products in the one-half of 1 percent category, while those companies manufacturing a smaller number of products tended to have a smaller percent of their products in this category. It is interesting to note, however, that half of the products manufactured by the company which produced only six products were items which individually contributed less than one-half of 1 percent to this company's total value of product.

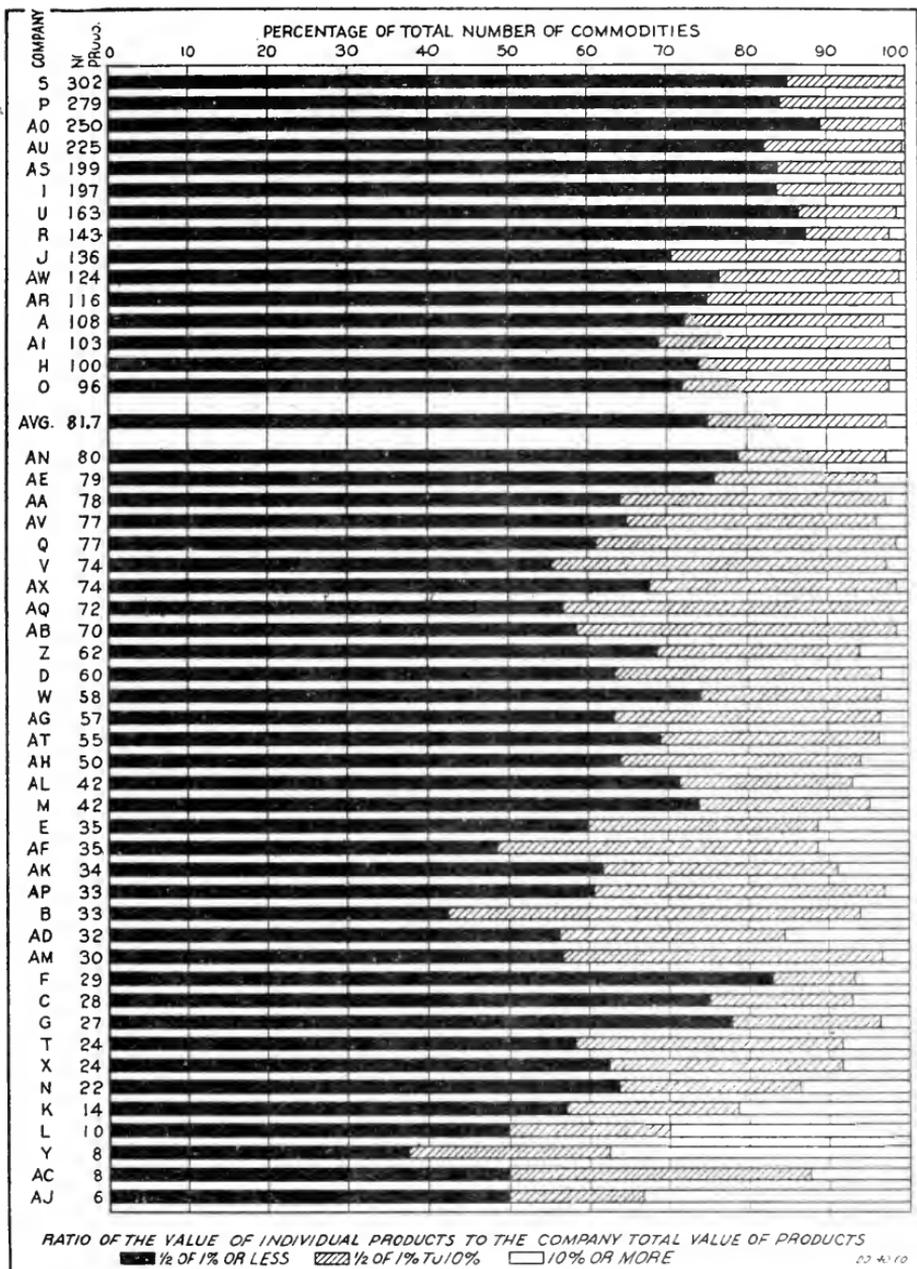


CHART 3.—PERCENTAGE DISTRIBUTION OF THE NUMBER OF PRODUCTS MANUFACTURED BY EACH OF THE LARGEST 50 MANUFACTURING COMPANIES ACCORDING TO THE PERCENT OF THE COMPANY'S TOTAL VALUE OF PRODUCT ACCOUNTED FOR BY EACH PRODUCT, 1937.

It is important to remember that in absolute terms a product which accounted for only one-half of 1 percent of the total value of products of one of these extremely large companies may in itself have been quite large. For example, the absolute value of a product that accounted for one-half of 1 percent of the total value output of a corporation with sales of \$2,000,000,000 would be \$10,000,000. All products with value contributions of less than one-half of 1 percent were, of course, included in this class, and it may be pointed out that the contribution of some of the products was really infinitesimal in both a proportionate and an absolute sense.

Although these products which separately accounted for a small proportion of each company's total output represented the majority of the number of each company's products, they made up, even in the aggregate, only a small percent of the total value of products of the individual companies. In chart 4b, the proportion of the total value output for each company accounted for by the major products is shown graphically (the basic data for this chart are presented in table 4C, appendix C). The relative variation in the number of products manufactured per company is shown in chart 4a and by inspecting these charts together a visual comparison of the percentage contribution of each product to the company total and the absolute number of products per company may be obtained. From chart 4b the relative significance of the aggregate values of the minor products discussed in the preceding paragraph may be seen. Only in company "S" which produced the largest number of products, 302, did the aggregate value of minor products amount to more than 20 percent of the company's total value of products. For the majority of the companies the aggregate value of these products was less than 5 percent of the company's total.

#### *The Importance of the Leading Products to Each Company.*

Turning now to an examination of the contribution of the major products of each company, we see there was a tendency for a few products to account for a large proportion of the total value of each company's output. The length of the shaded horizontal bars in chart 4b indicates the percentage contribution of the most important product (valuewise) to each company and the subsequent sections of each bar indicate the contribution of each succeeding product in order of importance. At one extreme, the most important product of company "S" accounted for 8.4 percent of the total output of that company, while, at the other extreme, the most important product of company "AJ" accounted for 84.6 percent of the total value output of that company.

Between these extremes there was considerable individual variation among the companies, but, in general, there was a tendency for the leading product of a company producing a large number of products to account for a small proportion of its total value output and for the leading product of a company producing a small number of products to account for a large proportion of its output. This broad inverse relation between the number of products manufactured by a company and the contribution of the leading product to the company's total value output is subject to rather wide divergence in the product structures of the individual companies. Both companies "AC" and "Y" manufactured eight products, but the contribution of the leading

product to company "AC" was 83.4 percent, while the contribution of the leading product to the total output of company "Y" was only 33.8 percent. Viewed from another angle the variation is equally great. The leading product of 13 of the companies accounted for 10 to 20 percent of the total output of these companies but the number of products manufactured by these companies ranged from 35 to 250.

The distribution of the 50 companies according to the percent of the total value output of each company contributed by the leading product, by the leading 5 products, and by the leading 10 products is presented in table 12. The leading product of 3 companies contributed less than 10 percent of the total output of each company, while there were also 3 companies whose leading product contributed between 80 and 85 percent of the total value output of these companies. The value contribution of the leading product amounted to more than one-fourth of the total production of a little more than one-half of the 50 companies—specifically, the leading product of 28 of the 50 companies accounted for more than 25 percent of the total value of products of these companies. Generally, then, these 50 companies tended to derive a very significant portion of their revenue from the sale of a single product.

The significance to each company of its major products may be further examined by measuring the aggregate contribution of the leading 5 products and the leading 10 products to each company's total revenue. The data were released in a form which makes it impossible to determine the extent of the relation which might have existed between these leading products. From information on large companies derived from other sources, however, it is possible to say that in many of these cases the products were closely related. For example, if we were considering a meat-packing concern, the production of the various census products distinguished under the titles, fresh pork, smoked ham, bacon, fresh sausage, smoked sausage, salted pork, lard, etc., may be viewed as closely related. To be sure, the meat-packing concern might be producing unrelated products and, certainly, many of the companies which may be included in the list were operating in quite diverse and unrelated lines, but we are certainly safe in presuming that a large number of the products of most of the companies were related in a functional sense. The relation may be quite obvious, as in the above example, or it may be much less evident. Certainly, the same closeness of relation does not exist in a situation where hot water bottles as well as tires and tubes are produced by a rubber company as exists in the production of various pork products by a meat-packing concern.

The leading 5 products of one of the companies accounted for 24.9 percent of that concern's total output while, at the other extreme, the leading 5 products of another concern accounted for 99.9 percent of that concern's total output. The smallest percentage contribution of 5 products occurred in company "S", the concern which manufactured the largest number of products, and the largest contribution occurred in company "AJ", the company which manufactured the smallest number of products. It should be noted, however, that the leading 5 products manufactured by 7 companies accounted individually for more than 95 percent of the output of these companies. As has already been indicated, 1 of these companies manufactured only 6 products, but another was active in the production of 29

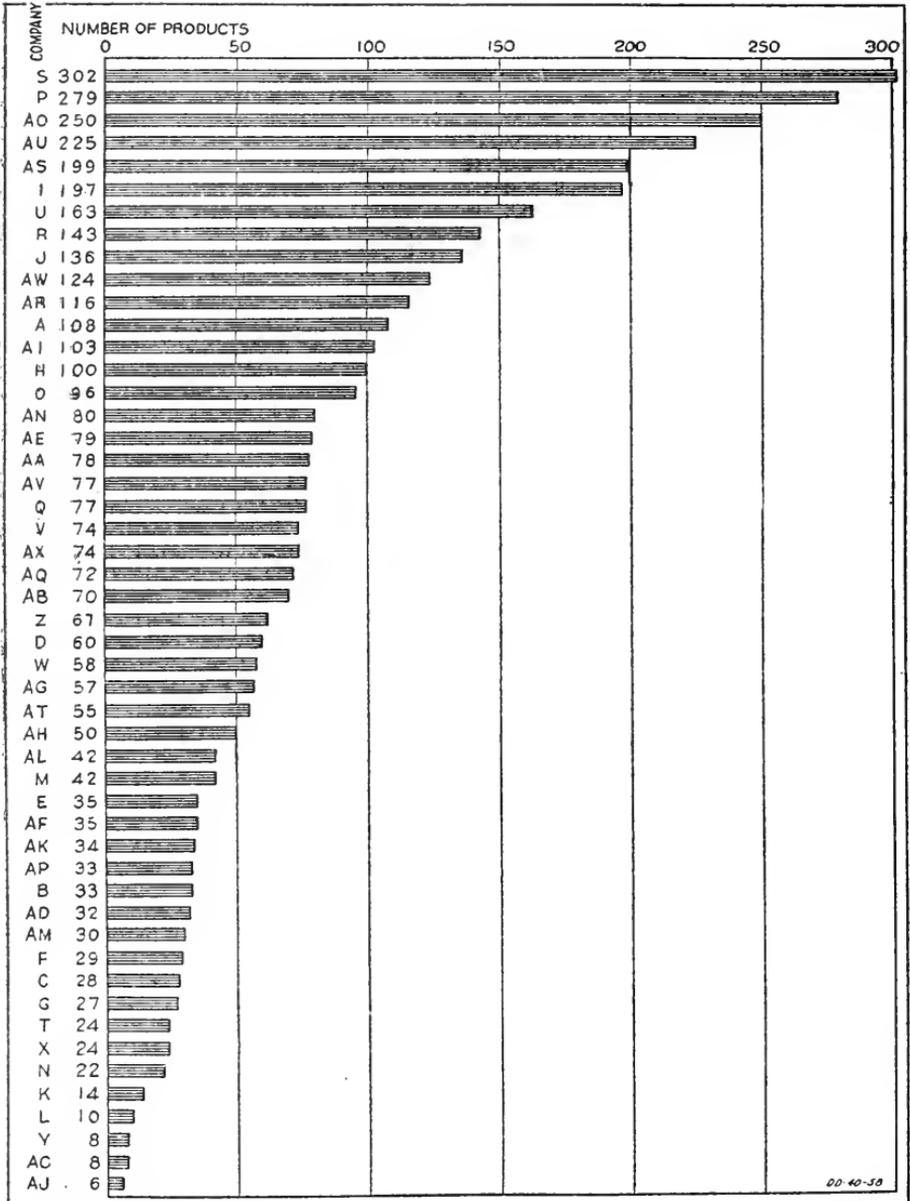


CHART 4a.—NUMBER OF PRODUCTS MANUFACTURED BY EACH OF THE LARGEST 50 MANUFACTURING COMPANIES, 1937.

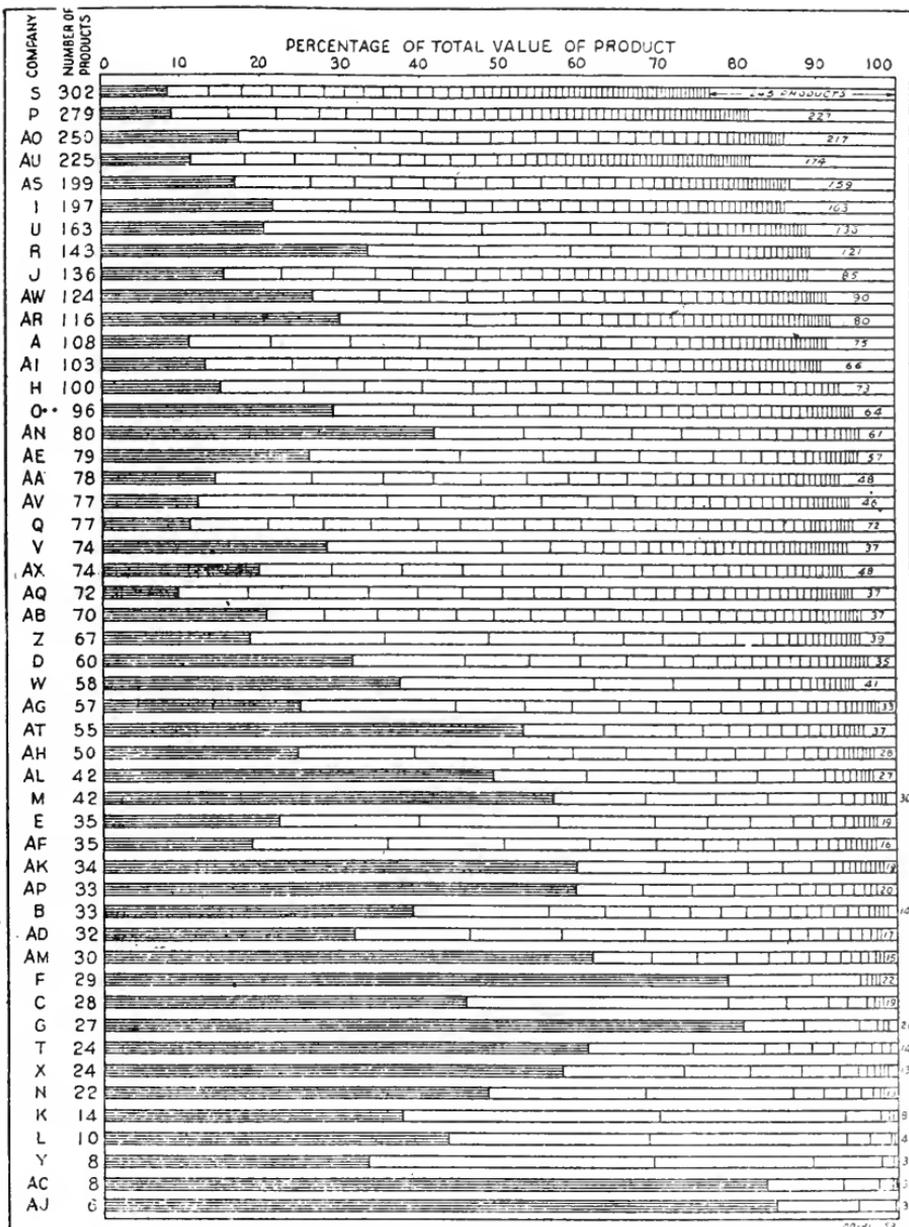


CHART 4b.—PERCENTAGE CONTRIBUTION OF INDIVIDUAL PRODUCTS TO THE TOTAL VALUE OF PRODUCTS OF EACH OF THE LARGEST 50 MANUFACTURING COMPANIES, 1937.

NOTE.—The products grouped in the right-hand portion of each bar accounted individually for less than one-half of 1 percent of the company's total value of products.

products—company "F". In the case of 28 of the 50 companies, the aggregate value of output derived from the leading 5 products amounted to more than 65 percent of the total value of products for each company.

TABLE 12.—*Distribution of the largest 50 companies according to the percent of the total value of products of each company accounted for by the leading product, the leading 5 products, and the leading 10 products, 1937*

Percent of company's total value of product	Distribution of companies								
	The leading product			The leading 5 products			The leading 10 products		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
5.1 to 10.0	3	6.0	6.0						
10.1 to 15.0	7	14.0	20.0						
15.1 to 20.0	6	12.0	32.0						
20.1 to 25.0	6	12.0	44.0	1	2.0	2.0			
25.1 to 30.0	5	10.0	54.0	0	0.0	2.0			
30.1 to 35.0	4	8.0	62.0	2	4.0	6.0			
35.1 to 40.0	3	6.0	68.0	3	6.0	12.0	1	2.0	2.0
40.1 to 45.0	2	4.0	72.0	4	8.0	20.0	1	2.0	4.0
45.1 to 50.0	3	6.0	78.0	5	10.0	30.0	1	2.0	6.0
50.1 to 55.0	1	2.0	80.0	2	4.0	34.0	0	0.0	6.0
55.1 to 60.0	4	8.0	88.0	1	2.0	36.0	3	6.0	12.0
60.1 to 65.0	2	4.0	92.0	4	8.0	44.0	5	10.0	22.0
65.1 to 70.0	0	0.0	92.0	6	12.0	56.0	5	10.0	32.0
70.1 to 75.0	0	0.0	92.0	2	4.0	60.0	4	8.0	40.0
75.1 to 80.0	1	2.0	94.0	3	6.0	66.0	1	2.0	42.0
80.1 to 85.0	3	6.0	100.0	4	8.0	74.0	4	8.0	50.0
85.1 to 90.0				2	4.0	78.0	6	12.0	62.0
90.1 to 95.0				4	8.0	86.0	6	12.0	74.0
95.1 to 100.0				7	14.0	100.0	13	26.0	100.0

<sup>1</sup> Includes 4 companies whose total value of product is accounted for by 10 products or less.

TABLE 13.—*Distribution of the largest 50 companies according to the number of products required to account for 25, 50, and 75 percent of the total value of products of each company, 1937*

Number of products	25 percent of the total value of products of each company		50 percent of the total value of products of each company		75 percent of the total value of products of each company	
	Number of companies (cumulative)	Percent (cumulative)	Number of companies (cumulative)	Percent (cumulative)	Number of companies (cumulative)	Percent (cumulative)
Less than 1	28	56.0	11	22.0	4	8.0
Less than 2	41	82.0	20	40.0	5	10.0
Less than 3	47	94.0	30	60.0	13	26.0
Less than 4	49	98.0	33	66.0	18	36.0
Less than 5	49	98.0	35	70.0	20	40.0
Less than 6	50	100.0	39	78.0	23	46.0
Less than 7			44	88.0	27	54.0
Less than 8			47	94.0	29	58.0
Less than 9			47	94.0	29	58.0
Less than 10			47	94.0	30	60.0
Less than 11			48	96.0	31	62.0
Less than 12			48	96.0	31	62.0
Less than 13			48	96.0	35	70.0
Less than 14			49	98.0	38	76.0
Less than 15			49	98.0	40	80.0
Less than 16			49	98.0	42	84.0
Less than 17			49	98.0	43	86.0
Less than 18			50	100.0	44	88.0
Less than 19					45	90.0
Less than 22					46	92.0
Less than 24					47	94.0
Less than 38					48	96.0
Less than 41					49	98.0
Less than 55					50	100.0

The distribution of the 50 companies according to the percent of the total value of products of each company contributed by the leading 10 products is also shown in table 12. The leading 10 products of 1 company accounted for only 37.6 percent of the total output of the company (this again was company "S"), while 13 of the 50 companies derived more than 95 percent of their total value of products from their 10 most important products. Since there were 4 companies which produced 10 products or less, 100 percent of the output of these companies was, of course, accounted for by these products. One-half of the companies derived 85 percent or more of their total revenue from their 10 leading products.

*Number of Products Which Accounted for Various Proportions of Each Company's Output.*

The importance of the leading products in the output of each of the 50 companies may be judged also by the number of products necessary to make up selected percentages of the total value of products of the companies. In table 13 the distributions of the 50 companies according to the number of products which accounted for 25, 50, and 75 percent of each company's total value of products are presented. In the case of 28 of the 50 companies the value contribution of 1 product or less accounted for 25 percent of each company's total output. Furthermore, the value of 1 product accounted for 50 percent of the total value of products of 11 companies and 1 product accounted for 75 percent of the total value of products of 4 companies. For only 3 companies was it necessary to add the value of more than 3 products in order to arrive at 25 percent of the total value of output and there was only 1 company that required the addition of the output of more than 4 products to reach 25 percent of the company's total output.

To summarize the material presented in this section, the largest 50 manufacturing companies were engaged in the manufacture of many products. The majority of these products, taken individually, made relatively small contributions percentagewise to the total value of products of the companies. On the other hand, the major portion of the total value of products of these companies was accounted for by the value contribution of relatively few products. In some of the companies these major products were probably related in the sense that they were joint products, by-products, or successive products in a vertically integrated organization, but, for other companies, the major products were probably not so closely related.

PROPORTION OF THE TOTAL OUTPUT OF INDIVIDUAL PRODUCTS  
ACCOUNTED FOR BY EACH COMPANY

In the preceding section, the importance of each item in the product structure of each of these large corporations was evaluated in terms of the relative contribution of the individual product to the company's total value of products. But this is only half of the picture. What proportion of the total United States output of each product was accounted for by the production of the individual companies? For some of the products the individual company production may have represented a large proportion of the total domestic output, while for others the individual companies may have accounted for only a

very small proportion of the total. The major products of some companies, while ranking high in importance to the individual companies, may have represented a relatively small proportion of the total output of the products while other products may have been quite insignificant to the company, but this output may have represented the entire domestic production.

In describing the bigness of these 50 companies in the preceding section it was seen that their total value output resulted from the production of many products. In this section the output of each product of each company is measured against the total United States output of the product. The data presented will help to clarify the relationship between bigness and concentration in the control of supply.

The product data are computed on a national basis and the output of a given product by an individual company represents the aggregate production of that product in the various plants operated by the concern. To the extent the market for any particular product was not national in scope the measure of concentration of control developed here understates the true situation. The market is defined geographically by the area over which sellers compete and, when this area is reduced by transportation costs or difficulties of communication among potential sellers and buyers, the number of competitors is reduced and the degree of concentration correspondingly increased. In other words, the bigness or smallness of a concern must be measured in terms of the size of its market. The local gristmill of frontier days, although extremely small in terms of the volume of output, presumably was much larger relative to the size of the market than the big flour milling concern of today, selling on a national basis.

It is believed, however, that this limitation is not particularly important. For these large corporations to attain their size, the major products manufactured by them must *ipso facto* be products for which there is an enormous mass demand derived from a large part of the population. The products must also have high unit value relative to transportation costs and have a developed technique of mass production. The techniques of communication and transportation have greatly extended the market for many products. Without these developments the modern big manufacturing corporation would be an economic impossibility. For some of their minor products for which the market was restricted, or for items which were highly specialized, however, the control over supply may have been much greater than indicated by the concentration percentages. To the extent that producers voluntarily divide the market areas in which they would normally compete, these concentration percentages also understate the companies' true market position. With these limitations in mind, the importance of each company's output of individual products may be examined.

#### *The Range of Concentration Percentages.*<sup>5</sup>

An inspection of table 14 reveals that 44 of the 50 companies manufactured at least 1 product in which the output of the com-

<sup>5</sup> The relation between a company's output of a product and the total United States production of that product has been expressed in percentage form in appendix B. Throughout the remaining portion of the analysis this ratio is referred to as the *concentration percentage* of a product. For ease in analysis, these various *concentration percentages* have been grouped into 5 percent intervals and in the ensuing discussion these groupings are called *concentration classes*. This concept should not be confused with the *concentration ratio* used in part V of this report. (The *concentration ratio* measures the proportion of the total domestic output of the product accounted for by the leading four producers of that product, while the *concentration percentage* measures the proportion of the total domestic output of a product accounted for by one producer.)

pany was less than 0.1 percent of the United States total. There was 1 company whose least important product accounted for 9.3 percent of the total for that product. (Detailed summary tables 5C and 6C showing the number of products for each company which fell in each percentage class are presented in appendix C.)

TABLE 14.—*Distribution of the largest 50 companies according to lowest and highest concentration percentage for each company, 1937*

Concentration class <sup>1</sup> (percent of United States total)	Companies					
	Lowest concentration percentage			Highest concentration percentage		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
Less than 0.1.....	44	88.0	88.0			
0.1 to 5.0.....	5	10.0	98.0			
5.1 to 10.0.....	1	2.0	100.0			
10.1 to 15.0.....				1	2.0	2.0
15.1 to 20.0.....				2	4.0	6.0
20.1 to 25.0.....				4	8.0	14.0
25.1 to 30.0.....				1	2.0	16.0
30.1 to 35.0.....				0	0.0	16.0
35.1 to 40.0.....				3	6.0	22.0
40.1 to 45.0.....				1	2.0	24.0
45.1 to 50.0.....				3	6.0	30.0
50.1 to 55.0.....				0	0.0	30.0
55.1 to 60.0.....				0	0.0	30.0
60.1 to 65.0.....				0	0.0	30.0
65.1 to 70.0.....				2	4.0	34.0
70.1 to 75.0.....				2	4.0	38.0
75.1 to 80.0.....				3	6.0	44.0
80.1 to 85.0.....				1	2.0	46.0
85.1 to 90.0.....				4	8.0	54.0
90.1 to 95.0.....				3	6.0	60.0
95.1 to 99.9.....				7	14.0	74.0
100.0.....				13	26.0	100.0

<sup>1</sup> The relation between a company's output of a product and the total United States production of that product has been expressed in percentage form in appendix B. For ease in analysis, these various concentration percentages have been grouped into 5 percent intervals and in this and the ensuing tables these groupings are called concentration classes.

On the other hand, the product of each of these 50 companies with the highest concentration ranged from 12.9 percent of the domestic total in the case of 1 company to 100 percent of the total in the case of 13 other companies. These 13 companies, in other words, produced at least 1 product in which they accounted for the entire output. It is interesting to note that there were 7 companies which produced no product in which their output was more than 25 percent of the domestic total. In every case, however, these 7 companies manufactured at least 4 products in which their output made up 10 to 25 percent of the total. In all cases these companies were producing less than the average number of products—the number of products per company ranged from 8 to 77. And further, in every case these products represented a large proportion of the total value of products of the company. The fact that these companies manufactured no product which accounted for more than 25 percent of the United States total means that they were operating exclusively in lines where the competition for the market was keen. It may be that the competition came from other companies among the largest 50 or it may have come from companies not included in the list. They were probably large companies, however, since we have seen that these products made up a large proportion of each company's total output.

*Distribution of the Number of Products in Each Concentration Class.*

The data which show the range of the importance in the United States of the products manufactured by these 50 companies cover wide differences in the actual proportions of the national totals accounted for by each product of each company. In table 15 all products manufactured by the 50 companies are distributed according to the percent of the United States total accounted for by each product. The relative number of products falling in various percentage classes for each company are shown graphically in chart 5 (the basic summary statistics are presented in tables 5C and 6C in appendix C). From this chart it will be seen that the differences among the companies do not vary with the number of products manufactured by each company.

If the number of census products produced by each of the 50 companies are added together, it is found that these companies manufactured 4,085 products. As was pointed out earlier, this total includes duplications—more than one company may have manufactured the same product. Forty-three percent of this number, or 1,758 products, were items in which the companies individually manufactured less than 5 percent of the total value of each product. Further, the concentration percentage for 157 of these products was less than 0.1 percent. If each of the largest 50 manufacturing companies is looked at separately, it is seen, then, that a large percentage of the number of instances of production occurred in the manufacture of products in which the companies were small producers. As was indicated earlier, every product manufactured by 1 company accounted individually for 9.3 percent or more of the United States total. Notwithstanding this one exception, the general observation is certainly valid.

TABLE 15.—*The distribution of the number of products manufactured by the largest 50 companies, by concentration classes, 1937*

Concentration class (percent of United States total)	Products		Number of com- panies repre- sented	Concentration class (percent of United States total)	Products		Number of com- panies repre- sented
	Num- ber <sup>1</sup>	Per- cent			Num- ber <sup>1</sup>	Per- cent	
Total.....	4,085	100.0		45.1 to 50.0.....	79	1.9	26
Less than 0.1.....	157	3.8	44	50.1 to 55.0.....	46	1.1	16
0.1 to 5.0.....	1,601	39.2	49	55.1 to 60.0.....	39	1.0	18
5.1 to 10.0.....	602	14.8	48	60.1 to 65.0.....	43	1.1	18
10.1 to 15.0.....	363	8.9	47	65.1 to 70.0.....	30	.7	18
15.1 to 20.0.....	271	6.6	46	70.1 to 75.0.....	17	.4	12
20.1 to 25.0.....	224	5.5	40	75.1 to 80.0.....	32	.8	10
25.1 to 30.0.....	168	4.1	37	80.1 to 85.0.....	13	.3	9
30.1 to 35.0.....	121	3.0	29	85.1 to 90.0.....	26	.6	15
35.1 to 40.0.....	89	2.2	24	90.1 to 95.0.....	17	.4	11
40.1 to 45.0.....	88	2.2	29	95.1 to 99.9.....	17	.4	13
				100.0.....	42	1.0	13

<sup>1</sup> The number of products listed here include many duplications in that several companies may manufacture the same product. Two or more companies may be producing the same product at the same concentration level or the products may be produced under different conditions of concentration and the products would thus be listed in different concentration classes.

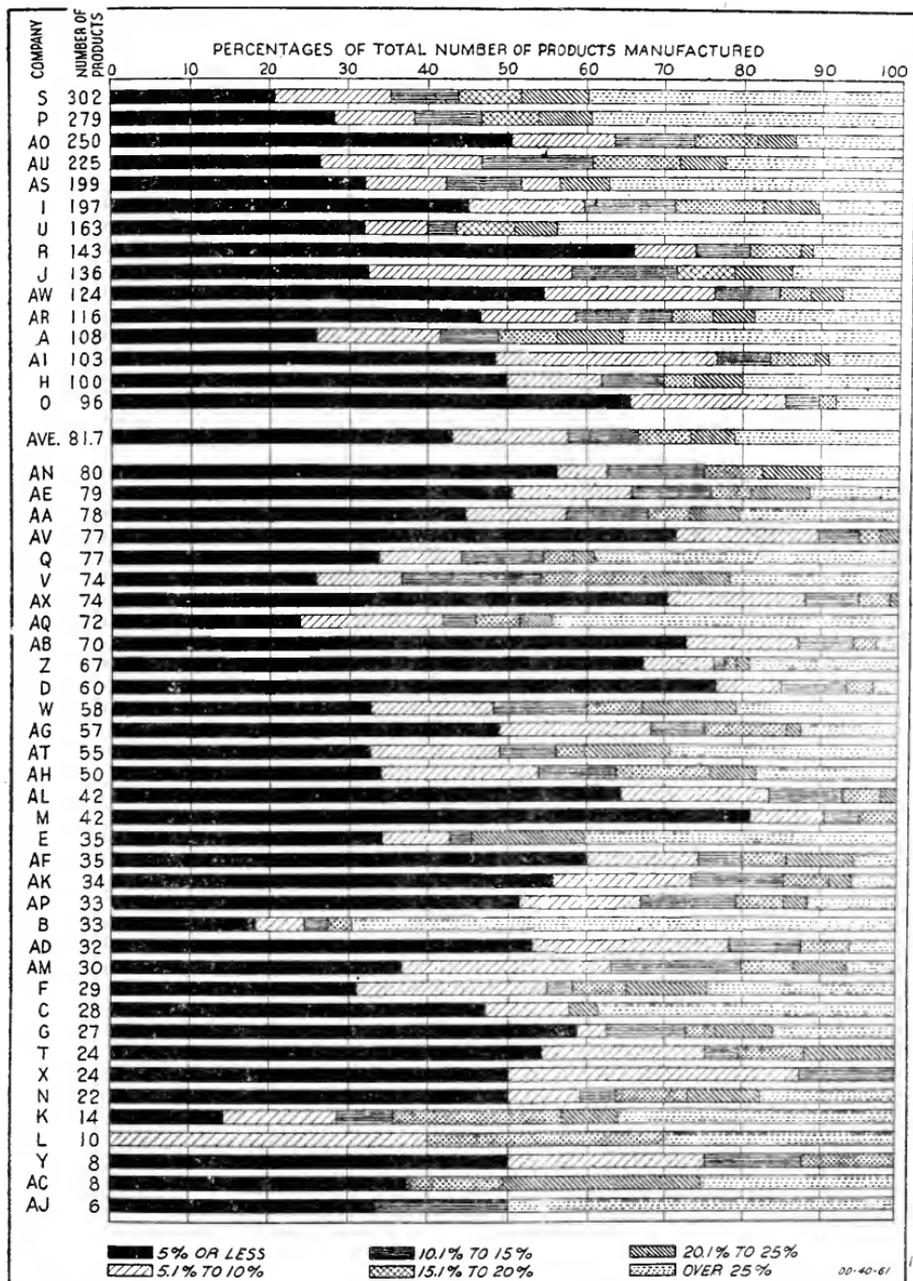


CHART 5.—PERCENTAGE DISTRIBUTION OF THE NUMBER OF PRODUCTS OF EACH OF THE LARGEST 50 MANUFACTURING COMPANIES BY UNITED STATES CONCENTRATION CLASSES, 1937.

TABLE 16.—Distribution of the largest 50 companies by percent of the total number of products accounting for given percentages of United States totals, 1937

Percent of company's total number of products	Concentration percentage classes											
	Less than 0.1			5.0 and less			10.0 and less			15.0 and less		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
0.0.....	6	12.0	12.0	1	2.0	2.0						
0.1 to 5.0.....	23	46.0	58.0	0	0.0	2.0						
5.1 to 10.0.....	15	30.0	88.0	0	0.0	2.0						
10.1 to 15.0.....	5	10.0	98.0	1	2.0	4.0						
15.1 to 20.0.....	0	0.0	98.0	1	2.0	6.0						
20.1 to 25.0.....	1	2.0	100.0	2	4.0	10.0	1	2.0	2.0	1	2.0	2.0
25.1 to 30.0.....				4	8.0	18.0	1	2.0	4.0	1	2.0	2.0
30.1 to 35.0.....				10	20.0	38.0	1	2.0	6.0	0	0.0	2.0
35.1 to 40.0.....				2	4.0	42.0	6	12.0	18.0	3	6.0	8.0
40.1 to 45.0.....				1	2.0	44.0	5	10.0	28.0	2	4.0	12.0
45.1 to 50.0.....				7	14.0	58.0	3	6.0	34.0	5	10.0	22.0
50.1 to 55.0.....				7	14.0	72.0	1	2.0	36.0	3	6.0	28.0
55.1 to 60.0.....				4	8.0	80.0	5	10.0	46.0	2	4.0	32.0
60.1 to 65.0.....				2	4.0	84.0	5	10.0	56.0	3	6.0	38.0
65.1 to 70.0.....				3	6.0	90.0	4	8.0	64.0	3	6.0	44.0
70.1 to 75.0.....				3	6.0	96.0	5	10.0	74.0	5	10.0	54.0
75.1 to 80.0.....				1	2.0	98.0	5	10.0	84.0	8	16.0	70.0
80.1 to 85.0.....				1	2.0	100.0	2	4.0	88.0	4	8.0	78.0
85.1 to 90.0.....							5	10.0	98.0	4	8.0	86.0
90.1 to 95.0.....							1	2.0	100.0	5	10.0	96.0
95.1 to 99.9.....										1	2.0	98.0
100.0.....										1	2.0	100.0

Percent of company's total number of products	Concentration percentage classes											
	20.0 and less			25.0 and less			50.0 and less			75.0 and less		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
0.0.....												
0.1 to 5.0.....												
5.1 to 10.0.....												
10.1 to 15.0.....												
15.1 to 20.0.....												
20.1 to 25.0.....												
25.1 to 30.0.....												
30.1 to 35.0.....	1	2.0	2.0	1	2.0	2.0						
35.1 to 40.0.....	0	0.0	2.0	0	0.0	2.0						
40.1 to 45.0.....	0	0.0	2.0	0	0.0	2.0						
45.1 to 50.0.....	3	6.0	8.0	1	2.0	4.0						
50.1 to 55.0.....	4	8.0	16.0	0	0.0	4.0	1	2.0	2.0			
55.1 to 60.0.....	4	8.0	24.0	2	4.0	8.0	0	0.0	2.0			
60.1 to 65.0.....	1	2.0	26.0	7	14.0	22.0	0	0.0	2.0			
65.1 to 70.0.....	4	8.0	34.0	1	2.0	24.0	0	0.0	2.0	1	2.0	2.0
70.1 to 75.0.....	4	8.0	42.0	2	4.0	28.0	1	2.0	4.0	0	0.0	2.0
75.1 to 80.0.....	5	10.0	52.0	7	14.0	42.0	2	4.0	8.0	0	0.0	2.0
80.1 to 85.0.....	6	12.0	64.0	4	8.0	50.0	2	4.0	12.0	0	0.0	2.0
85.1 to 90.0.....	7	14.0	78.0	8	16.0	66.0	7	14.0	26.0	4	8.0	10.0
90.1 to 95.0.....	3	6.0	84.0	7	14.0	80.0	9	18.0	44.0	7	14.0	24.0
95.1 to 99.9.....	5	10.0	94.0	3	6.0	86.0	13	26.0	70.0	19	38.0	62.0
100.0.....	3	6.0	100.0	7	14.0	100.0	15	30.0	100.0	19	38.0	100.0

In the upper concentration range there were 59 products for which the output of individual companies accounted for 95 to 100 percent of the total domestic output, and 20 of the 50 companies participated in their production. About one-fifth of the number of products were those for which the output of individual companies accounted for more than 25 percent of the United States total.

The question might well be asked, What percent of each of the companies' products fell in each concentration class? In table 15, we saw that 49 companies were manufacturing 1,758 products for which the individual company output was less than 5 percent of the total. Some of the companies may have had a large percent of the number of their products in this class, while others may have had a small percent. Data which will clarify this point are presented in table 16. There it may be seen that one company manufactured no products in which it accounted for as little as 5 percent of the United States total and 10 to 15 percent of the products of another company fell in the less than 5 percent class. At the other extreme, 80 to 85 percent of the products of another company fell in this concentration class. In the first case the company manufactured 10 products, the second mentioned company manufactured 14 products, while in the latter case the company manufactured 42 products.

About one-half of the products of one-half of the companies were manufactured under conditions such that the output of these particular products was less than 5 percent of the total.

In the distribution of the companies in the "25.0 percent and less" class, it may be seen that more than 85 percent of the products of half the companies were items in which the individual company output was 25 percent or less of the total. Further, more than 55 percent of the products of 48 of the 50 companies had concentration percentages of 25 percent or less, more than 70 percent of the products of 49 companies had concentration percentages of 50 percent or less, and more than 85 percent of the products of 49 companies had concentration percentages of 75 percent or less.

All of the products of 19 companies had concentration percentages of 75 percent or less, all the products of 15 companies had concentration percentages of 50 percent or less, and all the products of 7 companies had concentration percentages of 25 percent or less.

Certain generalizations of a summary nature concerning the product structures of the largest 50 manufacturing corporations may be drawn from the preceding analysis: (1) A very large proportion of the number of products manufactured by these companies were items in which the output of the individual companies made up a very small proportion of the United States total; (2) 7 of the companies did not manufacture a product in which the individual company output accounted for more than 25 percent of the United States total; (3) on the other hand, 13 of the companies manufactured at least one product in which the output of the individual concern made up the entire domestic production; (4) although the product structures of the companies varied widely, there was a decided tendency for the products in each company structure to cluster in the low concentration range.

#### *The Distribution of the Value of Products by Concentration Classes.*

In the preceding section interest was centered in a description of the proportion of the *number* of products falling in the various concentration classes. There it was seen that the majority of the number of products were those in which the individual company production made up a small portion of the domestic total. How important were these products in *value* terms? Conversely, how important in value terms were those much fewer products, numerically, in which there was higher concentration in output?

The distribution of the aggregate *value* of the products falling in each concentration class is presented in table 17. In order that comparisons may be made more easily, the distribution of the *number* of products falling in each concentration class, as shown in table 15, has been reproduced in this table. The aggregate value of the 1,758 products falling in the "less than 5.1 percent" class was \$1,052,671,000 or 6.3 percent of the total value of products of the 50 companies. Thus, it may be seen that 43 percent of the total *number* of products manufactured by the 50 companies (actually one company did not produce a product with a concentration percentage as low as 5 percent) were those in which the individual company output was 5 percent or less of the United States total, while the value of these products made up only 6.3 percent of the total *value* of products of the companies. The relative number and value of products are quite similar in the next two concentration classes, but for the products with concentration percentages above 15 percent the value greatly exceeds the number. In fact, one-third of the number of products fell in this range, but these products accounted for more than two-thirds of the total value of all the products.

TABLE 17.—*Distribution of the number and value of products manufactured by the largest 50 companies by concentration classes, 1937*

Concentration class	Value of products			Number <sup>1</sup> of products			Number of companies represented
	Total (thousands of dollars)	Percent	Cumulative percent	Total	Percent	Cumulative percent	
Total.....	16, 805, 135	100.0	-----	4, 085	100.0	-----	-----
Less than 5.1.....	1, 052, 671	6.3	6.3	1, 758	43.0	43.0	49
5.1 to 10.0.....	2, 252, 411	13.4	19.7	602	14.8	57.8	48
10.1 to 15.0.....	1, 419, 701	8.4	28.1	363	8.9	66.7	47
15.1 to 20.0.....	1, 796, 446	10.7	38.8	271	6.6	73.3	46
20.1 to 25.0.....	2, 173, 560	12.9	51.7	224	5.5	78.8	40
25.1 to 30.0.....	1, 788, 431	10.6	62.3	168	4.1	82.9	37
30.1 to 35.0.....	1, 080, 319	6.4	68.7	121	3.0	85.9	29
35.1 to 40.0.....	1, 227, 691	7.3	76.0	89	2.2	88.1	24
40.1 to 45.0.....	958, 016	5.7	81.7	88	2.2	90.3	29
45.1 to 50.0.....	504, 603	3.0	84.7	79	1.9	92.2	26
50.1 to 55.0.....	348, 568	2.1	86.8	46	1.1	93.3	16
55.1 to 60.0.....	481, 902	2.9	89.7	39	1.0	94.3	18
60.1 to 65.0.....	670, 522	4.0	93.7	43	1.1	95.4	18
65.1 to 70.0.....	172, 263	1.0	94.7	30	.7	96.1	18
70.1 to 75.0.....	53, 680	.3	95.0	17	.4	96.5	12
75.1 to 80.0.....	464, 768	2.8	97.8	32	.8	97.3	10
80.1 to 85.0.....	26, 198	.2	98.0	13	.3	97.6	9
85.1 to 90.0.....	206, 374	1.2	99.2	26	.6	98.2	15
90.1 to 95.0.....	37, 307	.2	99.4	17	.4	98.6	11
95.1 to 100.0.....	89, 704	.6	100.0	59	1.4	100.0	20

<sup>1</sup> The number of products listed here includes many duplications in that several companies may manufacture the same product. Two or more companies may be producing the same product at the same concentration level or the products may be produced under different conditions of concentration and the products would thus be listed in different concentration classes. A comparable distribution on an unduplicated basis is presented in table 21.

Somewhat more than three-fourths of the total number of products had concentration percentages less than 25 percent but these products made up only slightly more than one-half of the total value of all products. In general, then, those products in which the company proportion of the domestic total was low were the relatively less important products valuelwise while the most important products were those in which the output of individual companies represented an important portion of the United States total.

*Relation Between the Importance of Each Product to Each Company and the Importance of Each Product in the Domestic Total.*

The importance of each product to each of these 50 large corporations was analyzed in an earlier section of this chapter and we have just examined the significance in the United States of each company's output of each product. We may now put the materials of these segments together and study the interrelation of the parts. There were 1,472 products which individually accounted for less than 0.1 percent of the companies' total output. The value contribution of each of 152 of these to the total domestic production was less than 0.1 percent and the value contribution of 1,041 items was 5 percent or less of the national total (table 18). There were 14 instances, however, in which a product that made up less than 0.1 percent of the company total accounted for the entire output of the particular product.

There were three products from the list which accounted for 80 to 85 percent of the producing company's total output and two of these products accounted for 20 to 25 percent of the United States output of the products, and the third accounted for 25 to 30 percent of the United States total.

This table is somewhat complex and in order that the substance of the material may be more readily available it is perhaps well to consider it in parts. If we may visualize the table divided into four quadrants set apart by intersecting lines drawn vertically at the upper limit of the "0.1 to 5.0 percent of the company total" class and horizontally at the upper limit of the "5.1 to 10.0 percent" concentration class, the interrelation between the importance of a product to the company and its importance in the United States may be made to stand out more sharply.

These limits are, of course, quite arbitrary. The decision of just what percentage of the total should be selected to divide the important from the unimportant cannot be made on the basis of any hard and fast criteria but is subject in each case to particular and unique conditions of production surrounding each product. One company's output of a product may have represented 10 percent of the total production and yet have been relatively unimportant if there were a number of other concerns each producing an equal or larger portion of the total, while another company may have been manufacturing 10 percent of the total of a product and have been a dominant factor in the field if the balance of the output was accounted for by a large number of producers whose individual contributions to the total were very small. The same general sort of reasoning applies, of course, to the selection of 5.0 percent of the company's total as a breaking point. For the sake of this analysis, however, we may consider percentages above these limits as representing an important portion of the United States output and also an important portion of each company's total.

The most striking fact revealed by this breakdown of the table is that 56 percent of all the products are in the upper left-hand quadrant of the table. This means that 56 percent of all the products manufactured by these largest 50 companies were, individually, relatively unimportant to the company and each company's output of each of these products was relatively unimportant in the United States.

TABLE 18.—Distribution of products manufactured by the largest 50 companies, by percentage of company total and by concentration percentage, 1937

Concentration class (percent of United States total)	Percent of company total value of products																			
	Total	Less than 0.1	0.1 to 1.0	1.0 to 5.1	5.1 to 10.1	10.1 to 15.1	15.1 to 20.1	20.1 to 25.1	25.1 to 30.1	30.1 to 35.1	35.1 to 40.1	40.1 to 45.1	45.1 to 50.1	50.1 to 55.1	55.1 to 60.1	60.1 to 65.1	65.1 to 70.1	70.1 to 75.1	75.1 to 80.1	80.1 to 85.0
Total	4,085	1,472	2,395	119	40	17	10	6	6	6	4	2	3	1	4	2	1	1	3	3
Less than 0.1	157	152	5	9	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0.1 to 5.0	1,602	889	697	20	9	2	1	2	1	1	1	1	1	4	1	1	1	1	1	1
5.1 to 10.0	602	152	409	9	9	2	1	2	1	1	1	1	1	4	1	1	1	1	1	1
10.1 to 15.0	363	69	264	17	8	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15.1 to 20.0	271	37	208	11	7	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1
20.1 to 25.0	223	35	166	13	7	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
25.1 to 30.0	168	24	131	4	3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
30.1 to 35.0	121	17	96	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
35.1 to 40.0	89	13	67	5	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
40.1 to 45.0	88	14	65	6	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
45.1 to 50.0	79	8	64	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50.1 to 55.0	46	8	35	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
55.1 to 60.0	39	7	30	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60.1 to 65.0	43	6	28	6	6	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
65.1 to 70.0	30	4	23	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
70.1 to 75.0	17	2	12	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
75.1 to 80.0	32	3	21	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80.1 to 85.0	13	6	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
85.1 to 90.0	26	4	18	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90.1 to 95.0	17	5	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
95.1 to 99.9	17	3	12	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100.0	42	14	28	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Concentration class (percent of United States total)	Number										
	Total	Less than 0.1	0.1 to 5.0	5.1 to 10.0	10.1 to 15.0	15.1 to 20.0	20.1 to 25.0	25.1 to 30.0	30.1 to 35.0	35.1 to 40.0	40.1 to 45.0
Total	4,085	1,472	2,395	119	40	17	10	6	6	4	2
Less than 0.1	157	152	5	9	5	2	1	1	1	1	1
0.1 to 5.0	1,602	889	697	20	9	2	1	2	1	1	1
5.1 to 10.0	602	152	409	9	9	2	1	2	1	1	1
10.1 to 15.0	363	69	264	17	8	2	1	1	1	1	1
15.1 to 20.0	271	37	208	11	7	2	1	3	1	1	1
20.1 to 25.0	223	35	166	13	7	3	2	1	1	1	1
25.1 to 30.0	168	24	131	4	3	1	1	1	2	1	1
30.1 to 35.0	121	17	96	5	5	1	1	1	1	1	1
35.1 to 40.0	89	13	67	5	1	2	2	1	1	1	1
40.1 to 45.0	88	14	65	6	1	2	2	1	1	1	1
45.1 to 50.0	79	8	64	3	2	2	1	1	1	1	1
50.1 to 55.0	46	8	35	1	1	2	2	1	1	1	1
55.1 to 60.0	39	7	30	1	1	2	1	1	1	1	1
60.1 to 65.0	43	6	28	6	6	2	1	1	1	1	1
65.1 to 70.0	30	4	23	3	3	1	1	1	1	1	1
70.1 to 75.0	17	2	12	3	2	1	1	1	1	1	1
75.1 to 80.0	32	3	21	5	2	1	1	1	1	1	1
80.1 to 85.0	13	6	3	2	2	1	1	1	1	1	1
85.1 to 90.0	26	4	18	2	1	1	1	1	1	1	1
90.1 to 95.0	17	5	11	1	1	1	1	1	1	1	1
95.1 to 99.9	17	3	12	2	1	1	1	1	1	1	1
100.0	42	14	28	2	2	1	1	1	1	1	1

Concentration class (percent of United States total)	Percentage distribution										
	Total	Less than 0.1	0.1 to 5.0	5.1 to 10.0	10.1 to 15.0	15.1 to 20.0	20.1 to 25.0	25.1 to 30.0	30.1 to 35.0	35.1 to 40.0	40.1 to 45.0
Total	100.0	36.0	58.7	2.9	1.0	0.4	0.2	0.1	0.1	0.1	0.1
Less than 0.1	100.0	96.8	3.2	0.6	0.3	0.2	0.1	0.1	0.1	0.1	0.1
0.1 to 5.0	100.0	55.6	43.5	0.6	0.3	0.2	0.3	0.2	0.2	0.2	0.2
5.1 to 10.0	100.0	25.2	67.9	3.3	1.5	0.3	0.2	0.2	0.2	0.2	0.2
10.1 to 15.0	100.0	19.0	72.7	4.6	2.2	0.6	0.3	0.3	0.3	0.3	0.3
15.1 to 20.0	100.0	13.6	76.7	4.1	2.6	0.7	0.4	0.4	0.4	0.4	0.4
20.1 to 25.0	100.0	15.7	74.2	5.8	2.6	0.7	0.4	0.4	0.4	0.4	0.4

	100.0	14.3	77.9	2.4	1.8	.6	.6	1.2	.6	.8	.6	.6
25.1 to 30.0.....	100.0	14.3	77.9	2.4	1.8	.6	.6	1.2	.6	.8	.6	.6
30.1 to 35.0.....	100.0	14.1	79.4	4.1	1.1	.8	.8					0.8
35.1 to 40.0.....	100.0	14.6	75.2	5.6	1.1	2.2	2.3			1.1		
40.1 to 45.0.....	100.0	15.9	73.9	6.8	1.1							
45.1 to 50.0.....	100.0	10.1	81.0	3.8	2.5			1.3		1.3		
50.1 to 55.0.....	100.0	17.4	76.1	2.2	2.6	4.3						
55.1 to 60.0.....	100.0	17.9	76.9	2.6	2.6							
60.1 to 65.0.....	100.0	13.9	65.1	14.0		4.7	2.3					
65.1 to 70.0.....	100.0	13.3	76.7	10.0								
70.1 to 75.0.....	100.0	11.7	70.6	17.7					3.1			
75.1 to 80.0.....	100.0	9.4	65.6	15.6	6.3							
80.1 to 85.0.....	100.0	46.2	38.5	15.3		3.8				3.8		
85.1 to 90.0.....	100.0	15.4	69.3	7.7								
90.1 to 95.0.....	100.0	29.4	64.7	5.9								
95.1 to 99.9.....	100.0	17.7	70.6	11.7								
100.0.....	100.0	33.3	66.7									
Percentage distribution												
Total.....	100.0	10.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 0.1.....	3.8											
0.1 to 5.0.....	39.3	60.5	29.0	7.7	12.5			16.6				
5.1 to 10.0.....	14.7	10.3	17.1	16.9	22.5	11.8	10.0	33.3	25.0	33.4	100.0	100.0
10.1 to 15.0.....	8.9	4.7	11.0	14.3	20.0	11.8	10.0	16.7	16.7	50.0	50.0	50.0
15.1 to 20.0.....	6.6	2.5	8.7	9.2	17.5	11.8	10.0	16.7	25.0		50.0	
20.1 to 25.0.....	5.5	2.4	6.9	10.0	2.5	17.6	23.0	16.7	25.0			
25.1 to 30.0.....	4.1	1.6	5.5	3.4	7.5	5.8	10.0		33.3	25.0		66.7
30.1 to 35.0.....	3.0	1.2	4.0	4.2					50.0			83.3
35.1 to 40.0.....	2.2	.8	2.8	4.2	2.5	11.8	10.0			33.3		100.0
40.1 to 45.0.....	2.2	1.0	2.7	5.0	2.5		20.0					
45.1 to 50.0.....	1.9	.5	2.6	2.5	5.0					33.3		
50.1 to 55.0.....	1.1	.5	1.5	.8		11.8		16.7				
55.1 to 60.0.....	1.0	.5	1.3	.8	2.5							
60.1 to 65.0.....	1.1	.4	1.2	5.0		11.8	10.0					
65.1 to 70.0.....	.7	.3	1.0	2.5								
70.1 to 75.0.....	1	.1	.5	4.2					25.0			
75.1 to 80.0.....	.8	.2	.9	4.2	5.0							
80.1 to 85.0.....	.3	.4	2	1.7								
85.1 to 90.0.....	.6	.3	.8	1.7		5.8						
90.1 to 95.0.....	.4	.3	.4	.8								
95.1 to 99.9.....	.4	.2	.5	1.7								
100.0.....	1.0	1.0	1.2									

† Less than one-tenth of 1 percent.

Looking at those products falling to the left of the vertical line, it may be seen that 3,867 products, or 95 percent of the total, were relatively unimportant to the individual companies and thus 218 products were relatively important. It may appear from this fact that it would be necessary to go below 5 percent of the company total to find a satisfactory dividing line between the important and the unimportant. That may well be the case. It should be remembered, however, that, although these large companies produced many products, there were only a very few items that made up the bulk of the total value output of each company. For example, the leading product of every one of the companies accounted for more than 15 percent of the company total (table 12). Furthermore, in table 13 it was shown that 49 of the 50 companies derived 25 percent or more of their value of products from 4 products, 33 of the companies derived 50 percent or more of their value of products from 4 products, and 18 of the companies derived 75 percent or more of their output from 4 products. (The leading 4 products of the 50 companies would account for 200 instances. All of these instances, however, might not be included in the 218.)

Of these 3,867 products which individually accounted for less than 5 percent of each company's output, about 60 percent constituted relatively unimportant proportions of the United States totals, while about 40 percent were important in the United States. To the right of this vertical line there were 218 products which may be considered very important in each company's total output. Of these, 56 products were relatively unimportant in the United States and 162 were products in which the individual company's output represented an important share of the total domestic output.

Reading above the horizontal line we see that 2,360 products, or 58 percent of the total number, were items in which the individual company's output was relatively unimportant in the United States (less than 10 percent). Of these products almost 98 percent were also relatively unimportant to the companies. There were 1,725 products which made relatively important contributions to the United States totals and of these about 90 percent were unimportant to the companies.

Certain general conclusions may be drawn from the data of this table: (1) More than half of the products manufactured by the largest 50 companies were items which were relatively unimportant to the individual concerns and were also items in which each company's output was relatively unimportant in the domestic total; (2) Of the products which were important (valuewise) to the companies about three-fourths were also important in the United States; and (3) Of the products which were unimportant (valuewise) to the companies about 40 percent were important in the United States. There were 42 products in which the individual company output accounted for the entire production and in every case these products were unimportant to the companies.

*Distribution of the Companies by the Percent of the Value of Their Output Derived from Products in the Various Concentration Classes.*

From the preceding analysis it is impossible to determine the proportion of the total value output of the various companies derived from items which were important to the companies and from those which were unimportant. In table 19, the number of companies

deriving stated percentages of their output from the products they produced at various concentration levels are shown. Reading from the table, there were two companies which derived less than 0.1 percent of their income from those products in which their output was 5 percent or less of the United States total (one company did not produce a product with a concentration percentage as low as 5 percent). At the other extreme, one company derived 55 to 60 percent of the total value of its output from products with concentration percentages of 5 percent or less.

The distribution of the companies in the "25 percent and less" column reveals that two companies derived only 0.1 to 5.0 percent of their total revenue from products with concentration percentages of 25 and less, while all of the output of seven companies was accounted for by products with concentration percentages of 25 and below. This means that these seven companies did not manufacture a product with a concentration percentage in excess of 25 percent.

In the "75 percent and less" column, all but two of the companies derived more than 50 percent of their total output from products with concentration percentages of 75 and less, and 19 of the companies derived all their value from products with concentration percentages below 75 percent.

In general, this table shows that the companies derived in the aggregate only a relatively small proportion of their total income from products with concentration percentages below 5 percent, but that three-fourths of the income of approximately one-half of the companies was derived from products with concentration percentages below 25 percent. Only 10 companies got more than 75 percent of their revenue from products with concentration percentages in excess of 25 percent.

The relation of the number of products and the value of products of each company falling in various concentration classes is shown graphically in chart 6 (see also tables 6C and 7C of appendix C). Here, again, it will be observed that those products in which the company's output represented a small proportion of the United States total, while large in terms of the total *number* of products, generally, contributed in the aggregate a relatively smaller proportion of each company's total *value* of products.

*The Importance in the United States Total of the Leading Product, the Leading 5 Products, and the Leading 10 Products of Each Company.*

The importance to each company of the value contribution of their leading products was examined in an earlier section (see table 12). We are now in a position to answer the question: The value of the leading products of the various companies accounted for what proportion of the national output of these particular products? Data helpful in analyzing this problem are presented in table 20. The value output of the most important product of one of the companies accounted for only 3.1 percent of the total production of that product. This particular concern was company "AD" which produced 32 products. For other of its products the concentration percentages were higher, although the percent of the company total was lower in each case; for example, it produced 49.3 percent of the entire output of another product, but this particular item accounted for only 2.3 percent of the company total.

TABLE 19.—Distribution of the largest 50 companies by percent of the total value of products accounting for given percentages of United States totals, 1937

Percent of company's total value of products	Percentage concentration classes																					
	5 and less			10 and less			15 and less			20 and less			25 and less			50 and less			75 and less			
	Num-ber	Per-cent	Cumulative percent	Num-ber	Per-cent	Cumulative percent	Num-ber	Per-cent	Cumulative percent	Num-ber	Per-cent	Cumulative percent	Num-ber	Per-cent	Cumulative percent	Num-ber	Per-cent	Cumulative percent	Num-ber	Per-cent	Cumulative percent	
Less than 0.1	2	4.0	4.0	12	24.0	24.0	8	16.0	16.0	5	10.0	10.0	2	4.0	4.0	2	4.0	4.0				
0.1 to 5.0	28	56.0	60.0	9	18.0	42.0	2	4.0	20.0	1	2.0	12.0	2	4.0	8.0	1	2.0	2.0				
5.1 to 10.0	7	14.0	74.0	4	8.0	50.0	3	6.0	32.0	3	6.0	18.0	2	4.0	10.0	1	2.0	2.0	1	2.0	2.0	2.0
10.1 to 15.0	3	6.0	80.0	3	6.0	56.0	4	8.0	40.0	2	4.0	22.0	2	4.0	14.0	0	0.0	2.0	0	0.0	2.0	2.0
15.1 to 20.0	2	4.0	84.0	5	10.0	66.0	6	12.0	52.0	6	12.0	34.0	3	6.0	20.0	1	2.0	2.0	0	0.0	2.0	2.0
20.1 to 25.0	2	4.0	88.0	1	2.0	68.0	2	4.0	56.0	2	4.0	38.0	2	4.0	23.0	0	0.0	4.0	0	0.0	4.0	4.0
25.1 to 30.0	1	2.0	90.0	0	0.0	70.0	3	6.0	62.0	5	10.0	48.0	3	6.0	30.0	2	4.0	4.0	2	4.0	4.0	4.0
30.1 to 35.0	2	4.0	94.0	1	2.0	70.0	0	0.0	70.0	0	0.0	62.0	3	6.0	36.0	1	2.0	8.0	0	0.0	8.0	8.0
35.1 to 40.0	1	2.0	96.0	0	0.0	72.0	0	0.0	62.0	1	2.0	50.0	1	2.0	32.0	0	0.0	8.0	0	0.0	8.0	8.0
40.1 to 45.0	1	2.0	98.0	1	2.0	74.0	1	2.0	64.0	0	0.0	54.0	2	4.0	36.0	2	4.0	36.0	0	0.0	8.0	8.0
45.1 to 50.0	0	0.0	98.0	1	2.0	74.0	0	0.0	64.0	2	4.0	54.0	3	6.0	42.0	0	0.0	8.0	0	0.0	8.0	8.0
50.1 to 55.0	0	0.0	98.0	0	0.0	74.0	0	0.0	64.0	0	0.0	54.0	0	0.0	42.0	0	0.0	8.0	0	0.0	8.0	8.0
55.1 to 60.0	1	2.0	100.0	1	2.0	76.0	3	6.0	70.0	0	0.0	54.0	0	0.0	42.0	0	0.0	10.0	1	2.0	10.0	10.0
60.1 to 65.0				0	0.0	78.0	0	0.0	74.0	1	2.0	56.0	0	0.0	42.0	0	0.0	10.0	0	0.0	10.0	10.0
65.1 to 70.0				1	2.0	80.0	2	4.0	74.0	3	6.0	62.0	3	6.0	48.0	3	6.0	12.0	0	0.0	12.0	12.0
70.1 to 75.0				2	4.0	82.0	0	0.0	74.0	1	2.0	64.0	2	4.0	52.0	4	8.0	20.0	0	0.0	20.0	20.0
75.1 to 80.0				0	0.0	82.0	2	4.0	74.0	2	4.0	68.0	0	0.0	52.0	1	2.0	22.0	1	2.0	22.0	22.0
80.1 to 85.0				4	8.0	90.0	2	4.0	78.0	1	2.0	70.0	1	2.0	60.0	1	2.0	32.0	0	0.0	32.0	32.0
85.1 to 90.0				4	8.0	98.0	2	4.0	82.0	2	4.0	80.0	4	8.0	86.0	5	10.0	40.0	5	10.0	40.0	40.0
90.1 to 95.0				1	2.0	100.0	3	6.0	88.0	2	4.0	84.0	4	8.0	90.0	6	12.0	74.0	4	8.0	74.0	74.0
95.1 to 99.9							5	10.0	98.0	7	14.0	94.0	6	12.0	86.0	15	30.0	70.0	15	30.0	70.0	70.0
100.0							1	2.0	100.0	3	6.0	100.0	7	14.0	100.0	15	30.0	100.0	19	38.0	100.0	100.0

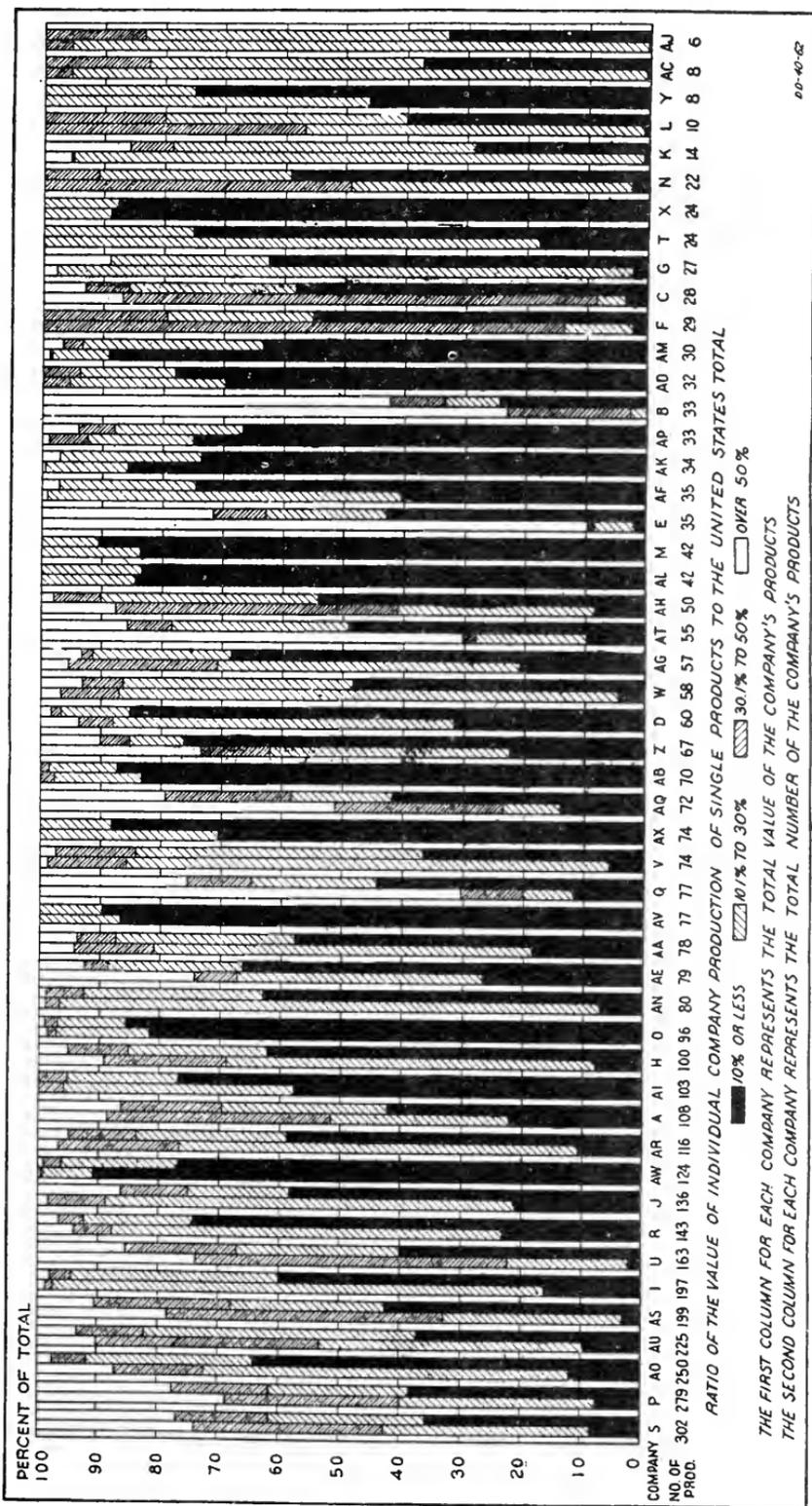


CHART 6.—PERCENTAGE DISTRIBUTION OF THE NUMBER AND VALUE OF PRODUCTS EACH OF THE LARGEST 50 MANUFACTURING COMPANIES BY UNITED STATES CONCENTRATION CLASSES, 1937.

At the other extreme, the value output of the most important product of each of 3 companies made up 75 percent or more of the total domestic production of these 3 products. For 29 of the 50 companies, however, the value output of the leading product of each company accounted for 25 percent or less of the total production of these products, and the value output of the leading product of 35 of the companies accounted for at least 10 percent of the United States total.

TABLE 20.—*Distribution of the largest 50 companies by the number of leading products at each United States concentration percentage level (cumulative), 1937*

Number of products	Percentage concentration classes											
	5.0 and less	10.0 and less	15.0 and less	20.0 and less	25.0 and less	30.0 and less	35.0 and less	40.0 and less	45.0 and less	50.0 and less	75.0 and less	100.0 and less
I. The leading product												
1 (the leading product).....	1	14	19	23	29	34	37	39	42	44	47	50
II. The leading 5 products												
None of the leading 5 products.....	34	23	17	11	6	4	4	2	2	2	0	0
1 of the leading 5 products.....	13	8	7	8	3	3	2	3	2	0	0	0
2 of the leading 5 products.....	3	7	7	5	9	5	3	2	2	3	1	0
3 of the leading 5 products.....	0	4	6	6	9	11	9	6	4	2	2	0
4 of the leading 5 products.....	0	5	4	8	8	9	12	14	13	13	8	0
5 of the leading 5 products.....	0	3	9	12	15	18	20	23	27	30	39	50
III. The leading 10 products												
None of the leading 10 products.....	22	11	7	5	2	2	2	0	0	0	0	0
1 of the leading 10 products.....	11	9	7	2	3	3	2	2	1	1	0	0
2 of the leading 10 products.....	8	6	2	5	2	0	1	2	3	1	0	0
3 of the leading 10 products.....	3	6	11	4	3	2	0	1	0	2	0	0
4 of the leading 10 products.....	4	4	2	4	5	1	2	0	0	0	2	0
5 of the leading 10 products.....	2	3	4	6	4	7	4	3	2	0	0	0
6 of the leading 10 products.....	0	6	3	2	4	5	4	6	15	13	12	11
7 of the leading 10 products.....	0	0	4	6	4	1	6	2	4	4	1	0
8 of the leading 10 products.....	0	2	2	17	18	11	17	29	26	26	25	22
9 of the leading 10 products.....	0	2	3	2	5	5	8	9	12	11	9	0
10 of the leading 10 products.....	0	1	5	7	10	13	14	16	17	22	31	47

<sup>1</sup> Includes all of the products of one company.

<sup>2</sup> Includes all of the products of two companies.

In the second section of the table, the importance of the leading 5 products of each company is measured in terms of the proportion of the total United States value of each product accounted for by them. Reading from the table, it may be seen that none of the leading 5 products of 34 companies fell in the "5 percent and less" concentration class, at least 1 of the first 5 products of 13 of the companies fell in this class, while 2 of the leading 5 products of only 3 companies fell in this class. It may have happened, of course, that 2, 3, 4, or more of the 50 companies were each producing the same product. At the other extreme, the value of the output of 3 of the leading 5 products of 1 company, 2 of the leading products of 2 companies, and 1 of the leading 5 products of 8 companies exceeded 75 percent of the United States output of these products.

The value output of the leading 5 products of 3 of the companies amounted to 10 percent or less of the United States total and 9 companies had all 5 of their leading products in the "15 percent or less"

concentration class. At the other end of the distribution the concentration percentages of the leading 5 products of 2 separate companies were above 50 percent. Stated in another way, the leading 5 products of these 2 companies accounted in every case for more than one-half of the total output of the individual products.

The same general sort of interpretation may be applied to the third section of the table which deals with the relative proportion in the total domestic output of the leading 10 products of each of the 50 companies. The analysis will not be labored at this point by pointing out further particular divergent tendencies in the company patterns. In general, it may be said that the leading products were quite important in the individual product structures of these 50 companies (by definition) and these leading products individually also accounted for an important proportion of the total United States value of the products. Approximately 70 percent of the leading 10 products of the 50 companies (actually there were 492 instances, not 500, since 3 companies did not manufacture as many as 10 products) had concentration percentages in excess of 10 percent. There were, however, wide variations. All of the leading 10 products of 11 companies had concentration percentages in excess of 10 percent while all of the leading 10 products of 1 company had concentration percentages below 10 percent.

*Distribution of Number and Value of Products on an Unduplicated Basis by Concentration Classes.*

In table 17, the distributions of the number and value of products by concentration classes were presented. At that time it was pointed out that a given product might have been produced by several of the companies. For example, in the production of product "1", company "A" might have produced 42 percent of the United States total and company "B" 6 percent and company "C" 9 percent. In table 17, product "1" would have appeared three times, once in the 40 to 45 concentration class and twice in the 5 to 10 concentration class. In table 21, the distributions of the number and value of products on an *unduplicated* basis are presented. In other words, in the illustration above, product "1" would appear only once in this unduplicated distribution and that appearance would be in the 55 to 60 concentration class. Here we are measuring the significance of the 50 companies in the sense that we are aggregating the output of the various companies active in the production of any particular product and expressing this total as a percent of the total domestic production of that product.

There were 533 distinct products manufactured by members of the "50 company" group for which the output of these companies *taken together* did not exceed 5 percent of the United States total. The aggregate value of the products falling in this class amounted to \$131,925,000 or 0.8 percent of the total value output of the 50 companies. Although the number of products tended to bunch at the lower concentration levels, the bulk of the value was accounted for by products in the upper concentration range. Specifically, those products for which the combined output of the various members of the "50 company" group made up more than 25 percent of the national output accounted for 46 percent of the total *number* of products and for 90 percent of the total *value* of the 50 company output.

TABLE 21.—*Distribution of number and aggregate value of products manufactured by the largest 50 companies (combined) according to the percent of the United States total value represented, 1937*

Percent of United States total value of product (aggregate) of producing companies	Number of products (unduplicated)	Percent of total products	Cumulative percent of total products	Aggregate value of products (thousands of dollars)	Percent of total value	Cumulative percent of total value
Total.....	2,043	100.0	-----	16,805,135	100.0	-----
Less than 5.1.....	533	26.1	26.1	131,925	0.8	0.8
5.1 to 10.0.....	193	9.4	35.5	225,048	1.3	2.1
10.1 to 15.0.....	136	6.7	42.2	408,671	2.4	4.5
15.1 to 20.0.....	128	6.3	48.5	554,590	3.3	7.8
20.1 to 25.0.....	113	5.5	54.0	295,039	1.8	9.6
25.1 to 30.0.....	93	4.5	58.5	408,853	2.4	12.0
30.1 to 35.0.....	75	3.7	62.2	391,441	2.3	14.3
35.1 to 40.0.....	76	3.7	65.9	331,834	2.0	16.3
40.1 to 45.0.....	77	3.8	69.7	258,417	1.5	17.8
45.1 to 50.0.....	77	3.8	73.5	902,266	5.4	23.2
50.1 to 55.0.....	63	3.1	76.6	471,366	2.8	26.0
55.1 to 60.0.....	53	2.6	79.2	1,893,846	11.3	37.3
60.1 to 65.0.....	50	2.4	81.6	840,922	5.0	42.3
65.1 to 70.0.....	49	2.4	84.0	660,283	3.9	46.2
70.1 to 75.0.....	49	2.4	86.4	1,070,928	6.4	52.6
75.1 to 80.0.....	55	2.7	89.1	1,664,189	9.9	62.5
80.1 to 85.0.....	49	2.4	91.5	2,524,799	15.0	77.5
85.1 to 90.0.....	41	2.0	93.5	1,100,611	6.6	84.1
90.1 to 95.0.....	39	1.9	95.4	1,904,464	11.3	95.4
95.1 to 100.0.....	94	4.6	100.0	765,643	4.6	100.0

The same general divergent tendency in the distribution of the number and of the value of products noted in table 17 is evident in even more extreme form here since combinations of the outputs of various companies lift the aggregate output of a particular product into a higher concentration class. In the earlier table there were 867 instances in which a company produced more than 25 percent of the total value of each product and 322 instances in which a company produced more than 50 percent of the United States value of a product. When these 50 companies are taken together, however, it is seen that there were 940 different products in which the combined production was more than 25 percent of the total for that product and, further, there were 542 different products above the 50 percent concentration level.

The preceding analysis has been in terms of the joint contributions of various members of the "50 company" group to the total output of the particular product. How many of these 50 companies participated in the production of the various products? To what extent did these 50 companies compete among themselves in the production of the separate products? A distribution of the products according to the number of companies manufacturing each product is shown in table 22. There it will be observed that, of the 533 distinct products manufactured by various members of the "50 company" group in the "5 percent or less" class, 418 were produced by only 1 company, 75 by 2 companies, 27 by 3 companies, etc. Taking all products together, 52.2 percent were produced by only 1 company, 24.9 percent by 2 companies, 11.2 percent by 3 companies, etc.

There was a tendency for the products in the middle and higher concentration classes to be produced by a large number of companies. Approximately one-fifth of the products having concentration percentages between 60 and 85 were produced by 5 or more companies. Actually, 13 of the 50 companies participated in the production of 4 of the products.



TABLE 22.—Distribution of products manufactured by the largest 50 companies by percent of the United States total value represented and by the number of companies manufacturing each product, 1937—Continued

Percent of United States total value of product (aggregate of producing companies)	Distribution of products by number of companies producing												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Number of products	100.0	24.9	11.2	5.3	2.2	1.1	1.5	0.8	0.2	0.3	0.1	0.2	
Percentage distribution													
Allclasses	100.0	52.2	24.9	11.2	5.3	2.2	1.1	1.5	0.8	0.2	0.1	0.2	
Less than 0.1	100.0	97.0	5.4	1.4	0.8	0.2	0.2						
0.1 to 5.0	100.0	77.2	14.8	5.4	1.4	0.8	0.2						
5.1 to 10.0	100.0	66.9	20.7	6.7	2.1	1.6	1.0	0.5	0.2				
10.1 to 15.0	100.0	55.2	29.4	5.9	5.1	2.2	1.5	.7	.5				
15.1 to 20.0	100.0	51.5	30.5	11.7	3.1	1.8	1.6	.8					
20.1 to 25.0	100.0	48.7	26.5	12.4	9.7	1.8	1.9						
25.1 to 30.0	100.0	40.5	29.0	13.4	5.4	3.2	1.1	1.1					
30.1 to 35.0	100.0	42.7	24.0	20.0	6.7	3.3	1.3	1.3					
35.1 to 40.0	100.0	28.9	38.2	18.4	6.6	6.6	1.3	1.3					
40.1 to 45.0	100.0	42.8	31.2	16.9	3.9	2.6	1.3	1.3					
45.1 to 50.0	100.0	38.9	23.4	14.3	7.8	5.2	2.6	2.6			1.3		
50.1 to 55.0	100.0	25.4	30.1	14.3	12.7	11.1	1.6	3.2	1.6		1.9		
55.1 to 60.0	100.0	30.2	26.4	17.0	13.2	1.9	1.9	7.5			1.9		
60.1 to 65.0	100.0	26.0	28.0	18.0	8.0	4.0	6.0	4.0			4.0		
65.1 to 70.0	100.0	22.5	36.7	10.2	10.2	4.1	4.1	4.1	2.0		2.0		
70.1 to 75.0	100.0	22.5	32.7	20.4	12.3	4.1	2.0	2.0	2.0		2.0		
75.1 to 80.0	100.0	16.4	34.6	27.3	3.6	2.0	2.0	3.6	3.6		3.6		
80.1 to 85.0	100.0	24.5	34.7	14.3	8.2	2.0	2.0	2.0	2.0		2.0		
85.1 to 90.0	100.0	32.1	26.6	9.8	4.9	2.4	2.4	2.4	2.4		2.4		
90.1 to 95.0	100.0	25.6	23.1	20.5	20.5	2.6	2.6	5.1	2.6		5.1		
95.1 to 100.0	100.0	57.4	23.8	6.3	3.3	1.1	1.1	1.1	1.1		1.1		

The data as released by the Bureau of the Census do not permit a thorough study of the varying amounts of production contributed by each company in those situations where 2 or more companies manufactured the same product. A comparison of the distribution of the individual instances of production (table 17) with the distribution of the combined production in terms of actual products (table 21) shows that the number of products exceeds the instances of production in all the concentration classes above 50 percent. It is apparent that a substantial number of the duplications of products by 2 or more of the 50 companies were made up of cases in which the product was manufactured by 1 company which accounted for a very small proportion of the total production and another which accounted for a substantial portion of the output. For example, 1,047 of the 1,758 instances of production in the "5 percent or less" concentration class were absorbed in combinations with the output of other companies at higher concentration levels.<sup>6</sup> Although not indicated by the data as presented here, a few cases were noted in which there was apparent division of the field by leading producers, particularly in those industries requiring large capital outlays or specialized techniques of manufacture. Such divisions may be effected by companies producing for a national market in either of two ways: (1) 2 or more companies operating in the same general line may specialize in the production of different products; or (2) 2 or more companies may manufacture products which are identical but one company will take the lead in one product and the second company will take the lead in another product.

## SUMMARY

Although these 50 large manufacturing corporations were active in the production of many different products, the major portion of their total revenue tended in most cases to be derived from relatively few products. Furthermore, from the general knowledge of large corporations available from other sources coupled with the detailed, but anonymous, data of this study, we know that in most of the instances these major products had a rather close functional relation to each other.

We know, for example, that large steel companies derive the major portion of their income from the sale of a limited number of very important steel products and that large petroleum companies derive the major portion of their income from the sale of gasoline and lubricating oil. We also know that the large automobile companies derive the major portion of their income from the sale of passenger automobiles and trucks but any cursory reading of advertisements, institutional literature, or company reports tells us that the major automobile concerns are also active in the production of a number of other products, such as electric refrigerators, air-conditioning equipment, self-contained electric systems, oil-burners, etc. These prod-

<sup>6</sup> The figure 1,047 is arrived at by subtracting the computed instances of duplication from the total instances of production (1,758). Through a rather tedious calculation of the data of table 22, it is possible to account for these duplications. Obviously, the 418 products produced by only 1 company in the "less than 5 percent" class involved no duplication. Seventy-five products were manufactured by 2 companies which accounts for 150 instances; 27 products were manufactured by 3 companies accounting for 81 instances; 7 products were manufactured by 4 companies accounting for 28 instances; 4 products by 5 companies accounting for 20 instances; 1 product by 6 companies and 1 product by 8 companies accounting for 6 and 8 instances each. Thus, in totaling the instances of production at this concentration level which have been accounted for we get 711 ( $418+150+81+28+20+6+8=711$ ); and  $1,758-711=1,047$ . Therefore, these 1,047 instances of production from this concentration class were absorbed with the output of companies at higher concentration levels.

ucts are also relatively important to the companies but there is no very close functional relation between the production of these items and the production of passenger automobiles and trucks. Or again, we know that large packing concerns are producing a considerable number of pork products directly related to the slaughter of hogs, and we also know that these concerns are producing a large number of meat products derived from their slaughter of cattle, sheep and lambs, poultry, etc. The relation among the products in all these instances is rather close—the same general processes are involved—but we know further that in certain cases packing concerns, or their subsidiaries, are active in the packing of fruits and vegetables or in the production of sporting goods and sportswear. In these latter instances, the difference in relationship between the products is one of kind and not of degree although the reasons which explain this diverse activity may be quite understandable. The causes and significance of product diversification are investigated at some length in chapters IV and V.

For the large number of relatively unimportant products produced by large manufacturing concerns, general knowledge of large corporations is not particularly helpful in uncovering the nature of the relationship which may exist among these minor products and the rest of the operations of the 50 companies. We do know, however, that many of these minor products were in the nature of parts or were auxiliary or complementary materials or supplies used in the final product. Many of the concerns made wooden crates and packing boxes as well as sacks, bags, labels, and containers for their products. In the course of the analysis in Part II, "The Integration of Manufacturing Operations," it was seen that a rather definite functional relation existed between the major products of the great majority of establishments. At that time it was shown that there were only 95 combinations from the list of the 2,051 complex multi-plant concerns for which it was impossible to determine a functional relationship among the constituent units.

The proportion of each company's output of each of its products to the total domestic production of these products ranged from a truly infinitesimal figure for some products to 100 percent for others. The majority of the products, however, were those in which each company's output represented a relatively small proportion of the aggregate production. Specifically, 58 percent of the total number of products manufactured by these 50 companies were items in which each company's output amounted to 10 percent or less of the total. Although the majority of the *number* of products had concentration percentages of 10 percent or below, less than 20 percent of the aggregate *value* of the output of these 50 companies was accounted for by products with concentration percentages below 10 percent.

It is impossible without an intimate knowledge of the market structure of each of the products to evaluate the importance or influence which should be attached to any given company's proportionate share in the national output of a product. One company may be able to dominate or control the price and production policies which surround the marketing of a particular product although it accounts for only a very small proportion of the total while another company with a much higher proportionate share of the total output may

have little effect in the marketing of a particular product. The influence of many factors other than control of any particular segment of the supply of a product must be considered if a complete picture of the role in the price-production structure of any one of these companies' output of any particular product is to be available. Certainly the relative roles played by the other producers in the manufacture of a product must be considered along with all the institutional factors which form the framework within which the product is produced and sold. The role of the largest 50 companies as leaders of the products analyzed in part III, "The Concentration of Production in Manufacturing," throws some light on the distribution of control. This point is examined in some detail in the next chapter.

The very fact that these large corporations are manufacturing many different products introduces additional elements in the analysis which would not be present if only one product were produced. Multi-product concerns may pursue policies in the marketing of one product which results in an immediate loss on that item, but this loss may be offset by gains in other directions. The effectiveness of the operations of these concerns tends to be judged in terms of the net results of the enterprise as a whole and not in terms of the separate results in each of the parts. Under such conditions there may be a wide difference between the competitive strength of a one-product concern and a multi-product company even though both may produce the same proportionate share of the total output of the product in question.

From data which were available for this study it is impossible of course to present a detailed picture of all the conditioning factors which surround the production and sale of any particular product. We have supplied only the skeleton. The flesh which gives each product its distinguishing identity must be supplied by detailed product studies.

## CHAPTER III

### THE ROLE OF THE LARGEST 50 MANUFACTURING COMPANIES AS LEADING PRODUCERS

In the earlier study of "The Concentration of Production in Manufacturing," which appears as part V of this report on The Structure of Industry, the percentage of the total value output of 1,807 census products accounted for by the leading four producers of each of those products was presented. The material assembled in that study makes it possible here to express in terms of another measure the importance or significance of the largest 50 companies in the whole picture of manufacturing production. Two lines of investigation are suggested by the data available from the earlier study: (1) The significance of the largest 50 companies (as a group) among all the leading producers;<sup>1</sup> and (2) the frequency with which each company appeared as a leading producer of its analyzed products.

#### THE IMPORTANCE OF THE LARGEST 50 MANUFACTURING COMPANIES (AS A GROUP) AMONG ALL THE LEADING PRODUCERS OF THE 1,807 ANALYZED PRODUCTS

Of the 1,807 census products analyzed in the study of "The Concentration of Production in Manufacturing" there were 3,752 different companies which appeared as a leading producer of at least one product. Among these companies were 47 of the largest 50 manufacturing companies in the United States.<sup>2</sup> One of the largest 50 concerns appeared as a leading producer of only one product, while another of the companies appeared as one of the leaders in the production of 99 different analyzed products. In general, however, the companies included in the list of 47 "largest" manufacturers appeared among the leaders in a number of different products.

In table 23, the "largest" 47 companies are distributed according to the number of appearances they made as leaders in the production of analyzed products. Among the 3,752 companies that appeared as leaders only 549, or approximately 15 percent, were leading producers of 3 or more products, while 45 of the 47 "largest" companies were among the leading producers of 3 or more products. There were 71 companies which appeared as one of the leaders of 10 or more of the 1,807 products and among these were 24 of the 47 "largest" companies in the United States. Each of the 10 companies which appeared as one of the leading producers of 26 or more products was one of the largest companies. To put it differently, these 47 companies accounted for slightly more than 1 percent of all the companies which appeared as leaders in the earlier study, but they accounted for 8 percent of the number of companies which appeared as leaders of 3 or more products, 34 percent of the companies which appeared as the leaders of 10 or more products, and only companies included in the list of the 47 "largest" appeared as leading producers of 26 or more products.

<sup>1</sup> Here, as in the earlier study, "leader" or "leaders" is taken to include the leading four producers of a given product. A detailed statement of methods and definitions of terms used in that study may be found in appendix A of "The Concentration of Production in Manufacturing."

<sup>2</sup> In selecting the products to be included in the study of "The Concentration of Production in Manufacturing," the products classified in approximately  $\frac{3}{5}$  of the census industries were not analyzed. Two of the 50 companies had all of their operations confined to these omitted industries, while the remaining company produced as by-products small quantities of 6 of the analyzed products.

Because of the relatively large number of appearances per company, these 47 companies accounted for approximately 12 percent of all the appearances (847 of 7,201).

TABLE 23.—*Distribution of all "leading" companies and the largest 50 companies, by number of appearances, 1937*

Total number of appearances	Number of companies		Number of company-appearances	
	Total <sup>1</sup>	Largest 50 companies	All companies	Largest 50 companies
1.....	2,656	1	2,656	1
2.....	547	1	1,094	2
3.....	222	5	666	15
4.....	98	2	392	8
5.....	70	5	350	25
6.....	37	2	222	12
7.....	22	3	154	21
8.....	16	2	128	16
9.....	13	2	117	18
10.....	8	1	80	10
11.....	9		99	
12.....	4	2	48	24
13.....	6		78	
14.....	3	1	42	14
15.....	4		60	
16.....	5	3	80	48
17.....	3	1	51	17
18.....	5	1	90	18
19.....	8	3	152	57
21.....	2	1	42	21
22.....	1	1	22	22
25.....	2		50	
26.....	1	1	26	26
28.....	1	1	28	28
30.....	1		30	
31.....	1	1	31	31
33.....	1	1	33	33
34.....	1	1	34	34
41.....	1	1	41	41
52.....	1	1	52	52
72.....	1	1	72	72
82.....	1	1	82	82
99.....	1	1	99	99
Total.....	3,752	47	7,201	847

<sup>1</sup> Data taken from "The Concentration of Production in Manufacturing."

### *Position of Appearances.*

Is this high percentage of the appearances made by the "largest" 47 concerns accounted for by a large number of fourth-place appearances, or did these large companies appear equally in first, second, third, and fourth place? The answer to this question was suggested in the analysis of all leading companies in the study of "The Concentration of Production in Manufacturing" when it was observed that companies making a large number of appearances tended to have a high proportion of those appearances in first or second place. This same tendency is evident among the "largest" 47 companies. As may be seen in table 24, they made 847 appearances, or approximately 12 percent, of the total number of the appearances; but they accounted for 327, or 18 percent, of all first-place appearances; 252, or 14 percent, of all second-place appearances; 170, or 9 percent, of all third-place appearances; and 98, or 5 percent, of the fourth-place appearances.

TABLE 24.—Distribution of appearances of the "largest" 47 companies for all analyzed products, by position of appearance and by industry groups 1937

Group No.	Industry group	Total products analyzed	Products in which "largest" 47 com- panies were leaders	Total appear- ances made by all com- panies	Appearances of 47 "largest" companies									
					Total		1st place		2d place		3d place		4th place	
					Number (4)	Percent of all appear- ances <sup>1</sup> (5)	Number (6)	Percent of all appear- ances <sup>2</sup> (7)	Number (8)	Percent of all appear- ances <sup>2</sup> (9)	Number (10)	Percent of all appear- ances <sup>2</sup> (11)	Number (12)	Percent of all appear- ances <sup>2</sup> (13)
	All Industries.....	1,807	507	7,201	11.8	327	18.1	252	13.9	170	9.4	98	5.4	
1	Food and kindred products.....	136	65	544	23.0	41	30.1	39	28.7	27	19.8	18	13.2	
2	Textiles and their products.....	290	4	1,156	0.3	2	0.7	1	0.3	1	0.3	0	0.0	
3	Forest products.....	99	3	393	0.8	1	1.0	2	2.0	0	0.0	0	0.0	
4	Paper and allied products.....	63	2	252	0.8	2	3.2	1	1.6	0	0.0	0	0.0	
5	Printing, publishing, and allied industries <sup>3</sup> .....	212	100	847	16.2	52	24.5	38	17.9	30	14.1	17	8.1	
6	Chemicals and allied products.....	18	18	72	76.0	15	83.3	13	72.2	16	88.9	9	50.0	
7	Products of petroleum and coal.....	39	33	156	39.1	26	66.7	23	59.0	8	20.5	4	10.3	
8	Rubber products.....	112	34	445	17.8	9	8.0	6	5.3	6	5.3	2	1.8	
9	Leather and its manufactures.....	182	6	725	1.0	3	1.6	2	1.1	2	1.1	0	0.0	
10	Stone, clay, and glass products.....	177	49	705	15.0	34	19.2	34	19.2	21	11.9	17	9.8	
11	Iron and steel and their products, not including machinery.....	55	31	220	17.3	17	30.9	10	18.2	9	16.4	2	3.6	
12	Nonferrous metals and their products.....	365	134	1,451	16.0	97	26.6	70	19.2	41	11.2	24	6.7	
13	Machinery, not including trans- portation equipment.....	2	2	8	87.5	2	100.0	2	100.0	2	100.0	1	50.0	
14	Transportation equipment, air, land, and water.....	57	26	227	16.4	16	28.1	9	15.8	6	10.5	4	7.1	
15	Railroad repair shops <sup>4</sup> .....													
16	Miscellaneous industries.....													

<sup>1</sup> Percentages in column (5) = (4) ÷ (3).

<sup>2</sup> Percentages in column (7) = (6) ÷ (1).

<sup>3</sup> Percentages in column (9) = (8) ÷ (1).

<sup>4</sup> Percentages in column (11) = (10) ÷ (1).

<sup>5</sup> Percentages in column (13) = (12) ÷ (1).

The number of products and the number of 1st-, 2d-, and 3d-place appearances are identical. The number of all 4th-place appearances is less than the number of all products since 28 products were each made by only 3 companies. This is also true of the industry groups numbered 2, 3, 6, 9, 10, 11, 13, and 16. The highest possible percent is 100.

<sup>6</sup> None of the products in this industry group was analyzed in the study of "Concentration of Production in Manufacturing."

<sup>7</sup> This group was abandoned as an industry group in 1937 by the Bureau of the Census.

*Appearances by Industry Groups.*

Thus far, the importance of the largest companies in all manufacturing has been considered without regard to the different appearance patterns in the various industry groups. The 47 companies were active in the production of approximately one-third of all the products analyzed in the earlier study, and these products were, for the most part, classified in 9 industry groups. In table 24, the total number of products analyzed and the number of products in which the 47 companies appeared as leaders, the total number of appearances, and the number of appearances of the "largest" 47 companies, classified by place of appearance, are shown for each industry group. For example, 136 products were analyzed in the foods group and at least 1 of the 47 companies appeared as a leading producer of 65 of these. There were a total of 544 appearances (65 products multiplied by 4 possible appearances per product) in the foods group and the 47 companies accounted for 125, or 23.0 percent, of these. The "largest" 47 companies made 41, or 30.1 percent, of all the first-place appearances; 39, or 28.7 percent, of all second-place appearances; 27, or 19.8 percent, of all the third-place appearances; and 18, or 13.2 percent, of all the fourth-place appearances in the foods group.

From this table, it is apparent that these 47 companies accounted for a very large proportion of the possible appearances in some industry groups and a very small proportion in others. At one extreme the 47 companies made 7 of the 8 possible appearances in the transportation group, and 53 of the 72 possible appearances in the petroleum group, while in 4 industry groups—textiles, forest products, paper products, and stone, clay, and glass products—they played a relatively unimportant role. It is sufficient to note here that these large companies accounted for at least 15 percent of the appearances in each of the 9 industry groups in which they had major operations.

Of the possible appearances in each place and in each industry group, the 47 companies tended to have the largest proportion of their appearances in first and second place. Thus, if their appearances had been equally distributed among the 4 places in the foods group, for example, they would have accounted for 23 percent of the possible appearances in each place. Their appearances tended to be bunched in first and second place, however, and thus they accounted for 30 percent of the possible first-place appearances, 29 percent of the second-place appearances, 20 percent of all third-place appearances, and 13 percent of the fourth-place appearances. This same tendency is evident in all industry groups.

*Appearances Among Products With High Concentration Ratios.*

It should be remembered that the mere fact of leadership, as defined in this study, does not necessarily imply domination of the market. In 1 instance the leading 4 producers together accounted for less than 5 percent of the total production of an individual product. If a measure of the real significance of these "largest" 47 manufacturers in the control of production is to be obtained, it is necessary to know not only the frequency with which they appeared as leaders and the relative positions of leadership held by them, but also the frequency with which they appeared as leading manufacturers of products with high concentration ratios.

The total number of analyzed products with concentration ratios over 75 percent and the number of these products in which one or more of the "largest" 47 companies was a leader, the total number of appearances in these products and the total number of appearances made by the "largest" 47 companies, classified by place of appearance, are shown in table 25. This table gives the same information for products with high concentration ratios that was given for "all products" in table 24.

Of the 1,807 products analyzed, 845 had concentration ratios greater than 75 percent. That is, 4 companies accounted for more than 75 percent of the total production of each of 845 products. One or more of the "largest" 47 companies appeared among the leading 4 producers of 264 of these products. There was a total of 3,353 appearances<sup>3</sup> among the 845 products and the "largest" 47 companies accounted for 438, or 13.1 percent, of these. The 47 companies made 180, or 21.3 percent, of all the first-place appearances; 137, or 16.2 percent, of all second-place appearances; 83, or 9.8 percent, of all third-place appearances; and 38, or 4.6 percent, of all fourth-place appearances among the products with high concentration ratios.

A comparison of the material included in tables 24 and 25 indicates that the 47 companies accounted for a somewhat larger proportion of appearances among products with high concentration ratios than they did among "all products." Thus, while these companies accounted for 11.8 percent of the appearances among "all products," they made 13.1 percent of the appearances among products with high concentration ratios. The percentages quoted are, of course, weighted averages of the percentages of appearances in each industry group. The increase is to be explained by the situation in four industry groups which showed relatively large increases in the percent of appearances made by the 47 companies in products with high concentration ratios as compared with all products. In these groups the large companies were engaged in the manufacture of products with relatively high value and these were also the products with high concentration ratios.<sup>4</sup>

The tendency for these large companies to have the greatest proportion of their appearances in first and second place is even more pronounced among products with high concentration ratios than among all products analyzed. While these companies accounted for 18.1 percent of first-place appearances and 13.9 percent of second-place appearances among all products analyzed, they accounted for 21.3 percent of all first-place appearances and 16.2 percent of all second-place appearances among products with high concentration ratios. This is true of their appearances in products with high concentration ratios in all but three industry groups. In two of these groups, however, the 47 companies were unimportant, accounting for less than 2 percent of the possible appearances. The third exception was the petroleum group. In this group nearly all the companies appearing as leaders were among the "largest" companies so that they were competing largely among themselves and the proportions of their appearances in each place were necessarily equalized.

<sup>3</sup> Twenty-seven of the 845 products were manufactured by only 3 companies so that the number of possible appearances is 27 less than 4 times 845.

<sup>4</sup> See charts 2A and 2B in the study of "The Concentration of Production in Manufacturing."

TABLE 25.—Distribution of appearances of the "largest" 47 companies for products with concentration ratios over 75 percent, by position of appearance and by industry groups, 1937

Group No.	Industry group	Analyzed products with concentration ratios over 75 percent (1)	Products in which "largest" 47 companies were leaders (2)	Total appearances made by all companies analyzed with concentration ratios over 75 percent (3)	Appearances of "largest" 47 companies									
					Total		1st place		2d place		3d place		4th place	
					Num-ber (4)	Percent of all appearances <sup>1</sup> (5)	Num-ber (6)	Percent of all appearances <sup>1</sup> (7)	Num-ber (8)	Percent of all appearances <sup>1</sup> (9)	Num-ber (10)	Percent of all appearances <sup>1</sup> (11)	Num-ber (12)	Percent of all appearances <sup>1</sup> (13)
	All industries.....	845	264	3,353	438	13.1	180	21.3	137	16.2	83	9.8	38	4.6
1	Food and kindred products.....	29	13	116	25	21.6	7	24.1	8	27.6	7	24.1	3	10.3
2	Textiles and their products.....	100	2	396	2	0.0	0	0.0	1	1.0	0	0.0	0	0.0
3	Forest products.....	40	1	157	1	.6	1	2.5	0	0.0	0	0.0	0	0.0
4	Paper and allied products.....	17	1	68	1	1.5	0	0.0	0	0.0	1	5.9	0	0.0
5	Printing, publishing, and allied industries <sup>2</sup> .....	110	62	439	87	19.8	36	32.7	25	22.7	18	16.4	8	7.3
6	Chemicals and allied products.....	4	4	16	10	62.5	2	50.0	2	50.0	3	75.0	3	75.0
7	Products of petroleum and coal.....	23	18	92	36	39.1	18	78.3	14	60.9	3	13.0	1	4.3
8	Rubber and its manufactures.....	56	13	221	13	5.9	8	14.3	4	7.1	1	1.8	0	0.0
9	Stone, clay, and glass products.....	84	3	333	4	1.2	1	1.2	2	2.4	1	1.2	0	0.0
10	Iron and steel and their products, not incl. ing machinery.....	78	29	309	62	20.1	20	25.6	21	26.9	10	12.8	11	14.7
11	Nonferrous metals and their products.....	25	15	100	19	19.0	9	36.0	5	20.0	5	20.0	0	0.0
12	Machinery, not including transportation equipment.....	248	85	983	147	15.0	63	25.4	48	19.4	26	10.5	10	4.2
13	Transportation equipment, air, land, and water.....	2	2	8	7	87.5	2	100.0	2	100.0	2	100.0	1	50.0
14	Railroad repair shops <sup>3</sup> .....	29	16	115	24	20.9	13	44.8	5	17.2	5	17.2	1	3.6
15	Miscellaneous industries.....													

<sup>1</sup> Percentages in column (5) = (4) ÷ (3). The highest possible percent is 100.

<sup>2</sup> Percentages in column (7) = (6) ÷ (1).

<sup>3</sup> Percentages in column (9) = (8) ÷ (1).

Percentages in column (11) = (10) ÷ (1).

Percentages in column (13) = (12) ÷ (1).

The number of products and the number of 1st-, 2d-, and 3d-place appearances are identical. The number of all 4th-place appearances is less than the number of all products in 28 products were each made by only 3 companies. This is also true of the industry groups numbered 2, 3, 6, 9, 10, 11, 13, and 16. The highest possible percent is 100. None of the products in this industry group was analyzed in the study of "Concentration of Production in Manufacturing." This group was abandoned as an industry group in 1937 by the Bureau of the Census.

In summary, then, we find this numerically small number of companies played an important role in our manufacturing economy. Though numbering less than 0.03 percent of all companies reporting to the Bureau of the Census, they manufactured nearly 30 percent of the value of all products. Though numbering only 1 percent of all the leaders in the study of "The Concentration of Production in Manufacturing," they accounted for 11.8 percent of all the appearances and 18.2 percent of the appearances in first place. Further, they accounted for 13.1 percent of all the appearances in products with high concentration ratios and 21.3 percent of the first-place appearances among these products.

FREQUENCY WITH WHICH EACH COMPANY APPEARED AS A LEADING PRODUCER OF ITS ANALYZED PRODUCTS

In the preceding analysis we were concerned with the total number of appearances made by the largest 50 companies as a group. In this section we shall examine the number of appearances made by each company as a separate unit and the relation these appearances bore to the total opportunities for appearance.

The products analyzed in the study of "The Concentration of Production in Manufacturing" were selected in such a manner that they afford a comprehensive sample of all manufactured products. Approximately 40 percent, or 702, of the 1,807 products analyzed were manufactured by 1 or more of the largest 50 companies. On the other hand, only 40 percent of all the products made by the 50 companies were included in the sample of the earlier study. The percentage of total products analyzed varied among the companies. Almost 90 percent of the number of products of 1 company were included in the sample of products analyzed in the study of "The Concentration of Production in Manufacturing," while none of the products of 2 companies was included. An analysis of the significance of the appearances to the companies themselves must be in terms of the products analyzed rather than all products which they manufactured. That is, the opportunities for appearance as a leader include not all the products made by a company but only those of its products which were analyzed in the study of "The Concentration of Production in Manufacturing."

Apparently, however, there was very little relation between the ratio of appearances to opportunities for each company and the ratio of opportunities to total products manufactured for each company.<sup>5</sup> A possible explanation for this situation may lie in the manner by which products were selected for analysis. All of the products in one-third of the industries were analyzed. This procedure was chosen as a method by which a comprehensive sample of all manufactured goods might be obtained. The 1,807 sample is not representative, however, of the manufacturing activity of any one company. It is possible that a company may have been a leading producer in nearly all the products

<sup>5</sup> The calculation of the ratio of opportunities to total products manufactured is only approximate inasmuch as "products" of the 50 companies, as listed in this study, are not strictly comparable with "products" listed in the study of "The Concentration of Production in Manufacturing." Owing to the fact that only published figures were used in the concentration study, some of the "products" actually represent two or more products in the 50 company study. In other words, one "opportunity for appearance as leader" may include the production of two or more products in the company. Specifically, there were 645 exact matches of products in the two studies. In addition, the concentration study listed 57 combinations representing a total of 185 separate products listed in the 50 company study.

it made in one industry and relatively unimportant in a great number of products classified in other industries. If the first industry was included in the sample of the study of "The Concentration of Production in Manufacturing," and the remaining industries omitted, that company would then have appeared as the leading producer of a large percentage of its analyzed products although these products represented only a small portion of the total number of products manufactured by the company.

#### *Number of Appearances by Each Company.*

Of the 702 products, cited above, there were 507 in which 1 or more of the 47 companies appeared as a leader. For several of the products 2 or more of the 47 companies were leaders; thus, among the 507 products, these companies made 847 appearances. Approximately 39 percent of these appearances were in first place, 29 percent in second place, 20 percent in third place, and 12 percent in fourth place. The basic leadership data for each of the 50 companies are given in table 26. This tabulation shows for each company the total number of products manufactured, the number of products analyzed in the study of "The Concentration of Production in Manufacturing," the number of appearances of the company as a leading producer of these products, and the appearances classified by the first, second, third, and fourth position.

The number of products in which any one of the 47 companies was a leading producer varied from 1 to 99. As was noted previously, relatively few companies were leading producers of more than 2 of the products analyzed in the study of "The Concentration of Production in Manufacturing." On the other hand, 45 of the "largest" 47 companies were leading producers of at least 3 of the analyzed products, 33 were leading producers of at least 6 products, and 23 were leading producers of 10 or more products.

#### *Relation of Appearances to Opportunities for Appearance.*

A more significant measure of each company's leadership than the total number of appearances made by a company is the percentage which its appearances represented of its total opportunities to appear as one of the leading four producers. That is, 2 companies may each have appeared as a leading producer of 10 products, but for 1 company this may have represented 10 appearances out of 10 opportunities and for the second company, 10 appearances out of 100 opportunities.

The "largest" 47 companies appeared in a fairly high percentage of their opportunities. Only 1 of the 47 companies appeared in less than 10 percent of its opportunities. That is, only 1 company appeared as a leading producer of less than 10 percent of the products which it manufactured and which were also analyzed in the earlier study. On the other hand, 8 of the 47 companies appeared in more than 70 percent of their opportunities, 25 appeared in more than 50 percent of their opportunities, and 38 appeared in more than 30 percent of their opportunities.

In table 27, the "largest" 47 companies are distributed according to the number of appearances and the ratio those appearances bear to the total opportunities for appearance. The number of appearances (by class intervals) are shown on the horizontal scale and the ratio of appearances to opportunities (by class intervals) on the vertical

scale. Reading vertically, for example, 14 companies appeared from 1 to 5 times. These appearances represented from 0.1 to 10.0 percent of the opportunities for appearance of 1 of the 14 companies, 10.1 to 20.0 percent of the opportunities of 4 companies, 20.1 to 30.0 percent of the opportunities for 2 companies, etc. Reading horizontally, 1 company appeared in from 0.1 to 10.0 percent of its opportunities and its appearances numbered from 1 to 5.

TABLE 26.—*Distribution of appearances made by the largest 50 companies by place of appearance, 1937*

Company (1)	Total products manufactured (2)	Total products analyzed <sup>1</sup> (3)	Number of appearances				
			Total (4)	First place (5)	Second place (6)	Third place (7)	Fourth place (8)
Y.....	8	0					
K.....	14	0					
AE.....	79	6	0	0	0	0	0
AV.....	77	24	1	0	0	1	0
L.....	10	4	2	0	1	1	0
M.....	42	29	3	0	0	2	1
Z.....	67	16	3	0	0	0	3
AF.....	35	14	3	1	1	1	0
AJ.....	6	5	3	2	1	0	0
AX.....	74	21	3	1	1	0	1
C.....	28	8	4	3	1	0	0
N.....	22	6	4	1	3	0	0
G.....	27	11	5	1	1	3	0
R.....	143	40	5	0	1	3	1
X.....	24	15	5	0	3	1	1
AC.....	8	7	5	2	2	1	0
AG.....	57	30	5	3	1	0	1
AH.....	50	10	6	2	1	1	2
AK.....	34	21	6	1	0	5	0
F.....	29	10	7	4	1	2	0
T.....	24	9	7	5	1	0	1
AB.....	70	24	7	0	1	3	3
B.....	33	12	8	4	2	1	1
D.....	60	19	8	3	2	2	1
E.....	35	14	9	2	3	4	0
AP.....	33	19	9	2	3	2	2
AD.....	32	16	10	2	0	3	5
AL.....	42	33	12	2	1	6	3
AM.....	30	19	12	2	4	3	3
Q.....	77	26	14	8	1	4	1
O.....	96	36	16	1	0	5	10
AI.....	103	34	16	1	5	6	4
AN.....	80	27	16	10	3	3	0
H.....	100	42	17	8	3	4	2
AQ.....	72	20	18	10	5	1	2
W.....	58	29	19	8	8	3	0
AR.....	116	52	19	11	3	3	2
AT.....	55	36	19	7	4	4	4
AW.....	124	46	21	1	5	12	3
J.....	136	37	22	1	17	2	0
V.....	74	34	26	9	12	2	3
AA.....	78	46	28	17	6	4	1
AS.....	199	63	31	23	4	1	3
U.....	163	55	33	14	11	6	2
A.....	108	43	34	12	14	4	4
I.....	197	55	41	8	27	3	3
AO.....	250	98	52	26	13	10	3
AU.....	225	101	72	9	40	16	7
P.....	279	113	82	35	21	16	10
S.....	302	143	99	65	15	14	5
Total.....			847	327	252	170	98

<sup>1</sup> In some instances, 1 "analyzed product" represents a combination of 2 or more different products as shown in column 2. See footnote 5, p. 638.

There appeared to be a definite tendency for companies which made a large number of appearances to show also high ratios of appearances to opportunities for appearance. Thus, companies appearing six or

more times also appeared in at least 20.1 percent of their opportunities; companies appearing 11 or more times appeared in at least 30.1 percent of their opportunities; companies appearing 21 or more times appeared in at least 40.1 percent of their opportunities; and companies appearing 41 or more times appeared in at least 50.1 percent of their opportunities. The minimum ratio rises with the number of appearances made per company, yet there is considerable spread in the ratios of the companies at each appearance level. The maximum ratio of appearances to opportunities, however, was almost equally high in all appearance classes.

TABLE 27.—Distribution of the "largest" 47 companies by number of appearances and by the ratio of appearances to opportunities, 1937

Ratio of appearances to opportunities	Number of appearances										Total number of companies	
	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50		51 to 100
01. to 10.0	1											1
10.1 to 20.0	4											4
20.1 to 30.0	2	2										4
30.1 to 40.0	1		1	1								3
40.1 to 50.0	3	2		3	1		1					10
50.1 to 60.0	1	1	1	2	1		1				1	8
60.1 to 70.0	1	4	1	1		1					1	9
70.1 to 80.0	1	1				1	1		1		2	7
80.1 to 90.0				1								1
90.1 to 100.0												0
Total number of companies	14	10	3	8	2	2	3	0	1	0	4	47

Position of Appearance.

A comparison of the number of appearances made by each of the 47 companies with the percent of these appearances in first and second place is given in table 28. Three of the 47 companies had none of their appearances in first and second place, while 3 other companies had all of their appearances in first and second place. Thirteen of the companies had more than 80 percent of all their appearances in first and second place, 28 had more than 60 percent, 35 had more than 40 percent, and 39 had more than 20 percent of all their appearances in first and second place.

TABLE 28.—Distribution of the "largest" 47 companies by number of appearances and by percent of appearances in first and second place, 1937

Percent of appearances in first and second place	Number of appearances										Total number of companies	
	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50		51 to 100
0	3											3
0.1 to 10.0				1								1
10.1 to 20.0	1	3										4
20.1 to 30.0			1		1							2
30.1 to 40.0	1			1								2
40.1 to 50.0	1	1	1									3
50.1 to 60.0	1	2		1								4
60.1 to 70.0	2	1	1	1							2	7
70.1 to 80.0	2	2		1			2				1	8
80.1 to 90.0		1		3	1	2	1		1		1	10
90.1 to 100.0	3											3
Total number of companies	14	10	3	8	2	2	3	0	1	0	4	47

<sup>1</sup> These 3 companies had all of their appearances in first and second place.

Regardless of the number of appearances made, nearly all of the "largest" 47 companies had a high percentage of their appearances in first and second place. It may be said, however, that there was some tendency for the companies appearing most often also to have a higher "minimum" percentage of appearances in first and second place. All of the companies which appeared as leading producers of more than 25 products made more than 60 percent of their appearances in the first two places.

*Appearances in Products With High Concentration Ratios.*

To obtain a complete picture of the importance of each of these large companies as leaders, we should know not only the number of products of which they were one of the four leading producers and their relative position among the leaders but also the concentration ratios of the products in which they were the leading producers. The distribution of the number of appearances made by these companies in products with high concentration ratios (above 75 percent) is shown in table 29. More than half of all the appearances made by the "largest" 47 companies were in products having concentration ratios of 75 percent or more. Furthermore, approximately 55 percent of the appearances in first and second place were made in products having high concentration ratios; almost half of the appearances in third place were in such products; and approximately one-fourth of the fourth-place appearances were among products with high concentration ratios.

TABLE 29.—Appearances of the "largest" 47 companies in products with high concentration ratios, 1937

Place of appearance	All appearances		Appearances in products with concentration ratios of 75 percent or more	
	Number	Percent	Number	Percent
All appearances.....	847	100.0	438	100.0
First place.....	327	38.6	180	41.1
Second place.....	252	29.7	137	31.3
Third place.....	170	20.1	83	18.9
Fourth place.....	98	11.6	38	8.7

*Leadership of the Largest 50 Companies in Unanalyzed Products.*

Earlier in this section, it was pointed out that approximately 40 percent of all products manufactured by the largest 50 companies were analyzed in the study of "The Concentration of Production in Manufacturing." Since approximately three-fifths of the products manufactured by these companies were not analyzed, the measure of the significance of the largest companies as leading producers of the analyzed products does not adequately reflect their significance in terms of all their products. This deficiency may be overcome in part at least by an analysis of the unanalyzed products manufactured by each of the 50 companies.

If one of the 50 companies produced at least 25 percent of the total United States value of a particular product, then that company would, ipso facto, be one of the leading four producers of that product. This is, however, a minimum basis of measurement since it involves an

understatement of leaderships arising in two possible types of situations:

(1) Setting a minimum limit of 25 percent excludes all those instances of leadership in which the leading four companies account for the entire output of a product but in which the distribution of control over output among the four leaders is uneven. Thus, if the leading four producers of a product accounted for 70 percent, 15 percent, 10 percent, and 5 percent of the total United States value of that product, there would be only one instance of leadership recorded since the output of only one company exceeded 25 percent of the total. Yet the three remaining companies should have been included under the definition of leadership used in the earlier study. If the distribution is uneven and the concentration ratio is less than 100 percent, the undercounting would be even more pronounced.

(2) Setting a minimum limit of 25 percent also excludes many instances of leadership in those products in which the distribution of control among the four leaders is fairly even and the aggregate value-output of the four leaders is less than 100 percent. Thus, if the leading four companies accounted for 80 percent of the total value of product, the leaders could each account for 20 percent of the total and not be counted as instances of leadership under the present measure since no one company accounted for 25 percent or more of the total United States value of that product.

Notwithstanding these limitations, additional light may be thrown on the role of the largest 50 companies as leaders by an enumeration of the instances in which a company produced 25 percent or more of the total value of a product.

The largest 50 companies manufactured 2,043 distinct products representing 4,085 instances of production (several products were made by more than 1 of the 50 companies). Of this total, 830 products were analyzed in the study of "The Concentration of Production in Manufacturing" and these 830 products accounted for 1,578 instances of production among the 50 companies. There remain, therefore, 1,213 distinct products, representing 2,507 instances of production, which were not analyzed in the earlier study. Among these 2,507 instances of production, there were 444 instances in which 1 of the largest 50 companies accounted for 25 percent or more of the total United States production. One company produced 25 percent or more of the total value of 48 of its unanalyzed products and still another more than 25 percent of 41 of its unanalyzed products, while 10 companies made no further appearances under this basis of counting. Thus, the 50 companies made 847 appearances as leaders of the analyzed products and would have appeared a minimum of 444 times as leaders of their unanalyzed products. As a minimum, then, they would have appeared as leading producers in 32 percent of their products.

#### SUMMARY

In the first section of this chapter, we saw that the largest 50 companies, taken together, accounted for nearly 12 percent of all the appearances among the leading producers of 1,807 products analyzed in the study of "The Concentration of Production in Manufacturing." We saw, further, that these companies accounted for 16 percent of all appearances made in first and second places and 8 percent of all ap-

pearances in third and fourth places. They also accounted for 13 percent of all the appearances made in products with high concentration ratios.

While there was considerable variation in the number of appearances made by each company as well as in the ratio of these appearances to the opportunities for appearance of each company, some generalizations may be made regarding the appearances of individual companies. Approximately one-half of the companies appeared as a leading producer of 10 or more products. This fact is not surprising, of course, when it is remembered that these large companies were engaged in the manufacture of a large number of products and therefore had several opportunities for appearance. Half of the companies, however, not only appeared a number of times but their appearances represented more than half of their opportunities for appearance. Furthermore, a majority of the companies had more than 60 percent of their appearances in first and second places, and a majority of all the appearances were in products with high concentration ratios (products with concentration ratios of 75 percent or more). Finally, while the 50 companies were among the leading producers of more than half of their analyzed products, it may be said that they were leading producers of at least 32 percent of all their products.

## CHAPTER IV

### THE CAUSES OF PRODUCT DIVERSIFICATION

The statistical materials presented in the preceding chapters indicated that large manufacturing companies, while concentrating production in a relatively few products, were actually engaged in the manufacture of a large number of different products classified by the Census in a number of separate industries. A descriptive accounting for the bigness of large corporations must take cognizance, then, of the fact that the activities of these large corporations represent aggregates of operations in many lines. In some cases these different operations eventuated in the production of unrelated products, while in other cases the relation between the items was quite close. For the purpose of the analysis in this and the succeeding chapter, product diversification may be said to exist when the productive activity of a concern results in separate end products. Although the intermediate products of an integrated firm represent different products in a productive sense, they are all merged in one final end product and it is with the end products which enter the market that we are concerned. Certainly, joint products and by-products are as closely related in a functional sense as the intermediate products of an integrated concern, but in the former cases distinct and separate end products result. The economic causes of vertical integration have been rather thoroughly examined by many writers in the past. In this chapter we shall endeavor to extend the available information on big corporations by inquiring into the causes of product diversification.<sup>1</sup>

A study of the causes of product diversification will be useful in an analysis of the effect of large size, due to diversification, upon price and other economic measures. A knowledge of the circumstances and considerations that led corporations to produce different products will permit a more exact evaluation of the economic effect of such action. The explanation of why the management of a corporation decided to produce different things should be stated in such terms, however, that the effect of the action on price, employment, rivalry, etc., may be examined. The following distinctions have been made in order that the economic effect of diversification may stand out clearly:

First. In general terms it may be said that the activities of businessmen are motivated by the desire to make profits.<sup>2</sup> Any steps they take might be explained in this way. It follows from this that individual companies diversify their output because they find that

<sup>1</sup> One product may be called different from another product because of differences in use or because of differences in physical characteristics or for other reasons. The basis used in determining a Census of Manufactures product is discussed in appendix A. It should be noted here, however, that the things that are called different products are different by both the use and the physical characteristics tests. The classification in the present chapter conforms more closely to so-called "lines of activity" than to the narrower census classification. Since the purpose here is to investigate the causes of product diversification, the use of the broader classification reduces the number of instances of diversification but makes the relationship of the products to each other more clear cut.

<sup>2</sup> The period over which profit is to be maximized is not always short. Rather, the actions taken may be for the purpose of maximizing profit over long periods even though the immediate result of the action may be a loss.

action to be, in their judgment, the most profitable of all the courses available to them. It is obvious, however, that the study of the economic implications of product diversification is not furthered by the knowledge that diversification was profitable or thought to be profitable. It is necessary to know in more detail the circumstances that lead to the addition of what appeared to be a different product.

Second. There may be a difference between the reasons for diversification and the reasons for the selection of the particular commodity to effect the diversification. Where these differences exist, the analysis is concerned with the former. For example, one of the corporations studied here had difficulty in maintaining a steady supply of labor because of the seasonal nature of its business. The firm's managers solved the problem by adding the manufacture of a product that had a complementary production period. Many commodities might have met this need. The selection of the particular goods to be manufactured was determined by a number of factors, chief among them being the fact that the owner of the company was an inventor who had developed a new type of sled for his children. The idea that had been developed as an avocation was used to even out the seasonal pattern of production in the concern. In this case the seasonal nature of the business was regarded as the cause of product diversification although the selection of the particular commodity was the result of other factors.

Third. It appears to be desirable to go beyond the functional explanation of the products manufactured by one company when there is a different causal explanation. The products of one company may, for example, be related functionally because they are uniform products, joint products, by-products, dissimilar products of similar processes, complementary products, auxiliary products, dissimilar products for the same market, successive products, or unrelated products.<sup>3</sup> In any particular case the addition to output may be explained by one or more of the listed functional relationships. However, the cause of diversifying output may lie elsewhere.

A company engaged in the production of machinery, for example, took on the production of certain materials that were used with one machine. The combined products might be classified functionally as dissimilar products for the same market. The causal explanation, however, was that the performance of the machine depended upon the nature and quality of the materials processed on the machine. Production of the materials—a new product—was undertaken by the machinery company to prevent the machine from being discredited. In this case the functional explanation of diversification—dissimilar products for the same market—was not taken as the cause of diversification because it diverged from the "causal" explanation—technical necessity of carrying certain combinations of products.

To determine the actual causes for diversification as they exist in the business world, the officials of 27 large manufacturing corporations were interviewed. The investigation was confined to the manufacturing activities of the corporations interviewed and the survey included the wholly and majority-owned subsidiaries. An attempt was made to find the reasons for the present product structure of each company. In cases where differences in products were not apparent to the non-

<sup>3</sup> See Willard L. Thorp, "The Integration of Industrial Operations," Census monograph III, and "The Integration of Manufacturing Operations," part II of the report on "The Structure of Industry." It should be noted that these analyses are based on census industries rather than census products.

technical observer, the company officials were called upon to classify their output into separate products. Insofar as possible, only those products exhibiting wide differences were analyzed.

Five of the 27 corporations interviewed were included in the list of the largest 50 manufacturing corporations, and 17 of the interviewed corporations were included in the largest 200—that is, within those corporations whose value of manufactured products in 1937 was 29 million dollars or over. All the firms interviewed produced a number of products that were different as to use and were more or less unrelated. Based on the major products of each company, the interviewed firms show the following distribution among the industry groups designated by the Bureau of the Census:

TABLE 30.—*Distribution of the interviewed companies by the industry groups in which they were predominantly active*

Group No.	Industry group	Number of companies
	All industries.....	27
1	Food and kindred products.....	3
2	Textiles and their products.....	1
3	Forest products.....	1
4	Paper and allied products.....	2
5	Printing, publishing, and allied industries.....	
6	Chemicals and allied products.....	3
7	Products of petroleum and coal.....	1
8	Rubber products.....	1
9	Leather and its manufactures.....	
10	Stone, clay, and glass products.....	2
11	Iron and steel and their products, not including machinery.....	3
12	Nonferrous metals and their products.....	2
13	Machinery, not including transportation equipment.....	6
14	Transportation equipment, air, land, and water.....	2
16	Miscellaneous industries.....	

The reasons for certain actions taken by businessmen as explained by the men responsible for or familiar with those actions are the basic data of this study. It is well to recognize certain limitations on this type of data. Many of the companies interviewed were established in the middle or late nineteenth century. A certain portion of the history of the company was therefore beyond the memory of present officials. Consequently, some explanations of product diversification did not come from the actual experience of the men interviewed. Furthermore, even where the present officials were "in on" the decision, they did not know in some instances precisely why the action was taken, or the explanation was in such form that it would not serve the needs of this study.

It must be recognized also that in some instances there was probably a tendency for the corporation officials to "edit" the reasons given—to exclude certain answers which might picture the company in what they regarded as an unfavorable light. Consequently, the data are deficient in this respect.

The sample, is of course, very small. This may give rise to some doubt as to the representativeness of the causal forces presented in the subsequent analysis. The recurrence of certain causes and the small number of different causes which were cited, however, seem to indicate that the analysis includes at least the most important forces leading to diversification of output and thus is significant in the explanation of bigness.

## CAUSES OF PRODUCT DIVERSIFICATION

*Research Conducted as a General Business Policy.*

Most of the corporations interviewed maintain research laboratories.<sup>4</sup> This appears to be a practice common to almost all large companies as well as many small ones. A number of factors may have been operative in the decision to devote resources to the maintenance of this activity.

There are business advantages that follow from being first in the field with an improved or a new commodity. Furthermore, research laboratories may be maintained to increase the efficiency of existing products. Also, it is the experience of some businessmen that in a changing economic society they are constantly faced with shifts in demand that threaten the growth or continued existence of their organization as a profitable enterprise. To meet this situation they carry on research to find new applications for the technology or techniques or materials involved in production. Other reasons also may be operative in the decisions of industrial units to carry on research. Such activities may be pursued, however, without the production of new commodities or the diversification of output as the objective. Yet diversification has frequently resulted because the company concerned did have a research laboratory. Several reasons for diversification growing out of research were given by the companies interviewed.

(a) The existing technology and materials involved in production had wide application. Through research activities it was discovered that new products could be made even though no advances in techniques were involved.

In terms of use, a refrigerator and an automobile motor are quite different, yet in terms of technology they are related. The electric refrigerator represents a case of a new product developed from research and is a new application of existing techniques. A company manufacturing hearing aids found their skills adaptable to the production of interoffice communication systems and radio parts.

A manufacturer of cotton, wool, and rayon products maintained a research laboratory to study problems associated with waterproofing, coloring, and the application of their products to industrial uses. One of the products of this concern, plain cotton cloth, had been used for insulation purposes for some time. Research activities were directed toward improving the insulating quality of the material in response to a potential demand on the part of motor manufacturers for a more efficient insulation for the wiring in the motor. The problem was solved by treating the cloth with chemicals and giving it a finish that made it especially suited for electrical insulation. The techniques involved in developing one treatment produced a number of others and so output was diversified.

A firm engaged in producing, refining, and transporting petroleum and its products devoted part of its research activities to the development of an industrial white oil. They were successful and after further experimentation produced a medicinal oil suitable for internal use. In this way they became manufacturers of mineral oil, a product that represented a diversification of output.

<sup>4</sup> For an analysis of the extent of industrial research in the United States see "Industrial Research and Changing Technology," by George Perazich and Philip M. Field, Work Projects Administration National Research Project, January 1940. In 1938, 1,769 companies reported the maintenance of research laboratories.

Some companies found that the solution to a particular problem of operation in connection with one commodity was applicable to other commodities not handled at the time. They were led to make use of their discovery by taking on the production of the other products to which it could be applied. In one case, a company developed a method of packing as a solution to the problem of deterioration of a raw material while in transit. They were able to use this method to import another good that, under ordinary packing methods, deteriorated so much that it was unprofitable to handle. The importation and sale of this raw material led the company into the business of selling an oil to be mixed with paint, a product quite new to them.

Another company interviewed developed a product necessary to a long-life battery radio for farm use. They found that this product—a tube—could be used in making a small portable radio—a product not developed prior to that time.

A company in the oil business sought some way of diluting oil. They discovered that alcohol could be made from waste gasses in the refineries and could successfully be put back into the refined gasoline. As a result of producing alcohol, the company also makes an anti-freeze, a basic chemical solvent, anti-knock fluid, and other products. The diversity of products that can be made of the same raw material was a cause of diversification in this case, along with the wide application of techniques of production and research.

(b) The maintenance of research activities may bring about the production of new products because some technological advance is made which in turn makes the production of new products possible. These cases merge into those above since it is not always easy to identify an advance in technique. In any event it is possible to recognize the existence of new products flowing from advances in technology due to research as distinct from product diversification that results from research with existing techniques. In both instances the techniques have wide application—this is the important fact and we do not detract from it by distinguishing between cases in which there were or were not advances in the technology.

Advances in rubber chemistry resulted in the use of rubber for purposes for which it had never been used. As a result, a company engaged primarily in the manufacture of tires and footwear began to produce mattresses and automobile cushions. In another case, experimentation on a gasoline motor involved research in the basic sciences. New developments in physics and chemistry enabled the company to enter other fields because the principles of these sciences have wide industrial application.

A company manufacturing electrical goods expanded into the production of new products through experimentation that led to the discovery of air cleaning by electrostatic precipitation of dust particles and sanitization by ultra-violet radiation. Cleaning machines and sterilizing lamps were consequently added to output.

A producer of glass bulbs and tubing developed a colored glass and low expansion glass to serve special railroad needs. The glass lenses used in signaling systems did not have sufficient resistance to temperature change. There was a tendency for them to be cracked by rain after a hot sun. The problem was solved with a low expansion boro-silicate glass which was unbreakable as well as acid- and heat-resisting. Up to this time, all glass had been made with either lime

or lead. This new kind of glass led the company into the manufacture of a number of products which either had been made less well, or could not have been made at all with the old glass. Chief among them were: Glassware for industrial use (principally in the chemical industry), baking ware, high tension insulators for power lines, insulators for high frequency telephone lines, radio insulators, and light-gathering mirrors for telescopes. This company also developed thick glass that could be used over a flame and a controlled-beam headlight cover glass for automobiles. Further diversification resulted when research activities produced a fundamentally new type of refractory for glass furnaces, and the company began manufacturing this producers' good. The manufacture of structural blocks, architectural panels, and decorative shapes for building purposes and glass fiber added to the number of different items included in the company's output. These things were all results of research and flowed from some advance in techniques.

(c) Research activities may result in an improvement in an existing product so that it performs its function more efficiently. This improvement may be of such nature that the product acquires new uses. The number of uses it serves may have been increased, and the improved product may, in this sense, be regarded as a new one. Research may produce this kind of diversification even though there have been no advances in technology.

A converter of materials made paper tags that were fastened with twine or pins. The development of the idea of reinforcing the hole in the tag with paper washers led to a great increase in its popularity, and the tag, which had previously been used mainly for shipping, soon had many "inside" uses. The gummed label, introduced by this company, was in part a substitute for the tags, but it had other uses also. The company sold plain tissue paper to the jewelry trade and colored tissue paper to those who wished to make novelties. It was discovered that crinkling tissue paper increased the artistic effect for some purposes. Crepe paper, thus developed, had many uses that plain and colored tissue paper did not have.

A discovery that enabled the production of a new commodity may not have been sought by the research workers. It may have been quite accidental. As a result of mechanical research, for example, it was discovered that certain chemicals, when added to gasoline, made possible the use of gasoline in a high compression engine which yielded much greater efficiency than any engine heretofore available. The chemical so discovered was made available to all gasoline companies. The development of some artificial leathers also falls in this category. We must recognize, then, that the particular developments which flowed from research may or may not have been the result of deliberate and conscious search.

For all these discoveries which result in an improvement in a product, the company must decide whether or not to manufacture the goods themselves. Some instances were cited in which the concerns were unable to induce anyone to make use of their discovery. As a result, the companies began the production of their items themselves because it was felt such action would lead to a larger demand for other parts of their output.

The success, in terms of profit, of the policy adopted by some companies of carrying on research results in other companies following

suit. The officials of one company selected a potential item out of a group of possibilities in their field and began research to make the good salable. They succeeded. The resultant addition to output made the company's product structure more diverse.

Numerous business considerations may dictate the desirability of carrying on research activities. While the primary purpose of this research is not to diversify output, sometimes it does have that effect. No consideration has been given here to those cases where companies produced only to order or for special applications and maintained research staffs for that purpose. In these cases diversification is itself a business policy.

#### *The Business Policy of Carrying a Full Line.*

Most organizations feel that they are engaged in a particular line of activity. This activity may be widely divergent as to scope and may therefore embrace a number of different commodities. The number of different products a company carries may depend on what its business is and therefore what is included in a full line. A cause of diversification, then, may be the forces which determine what a company conceives its business to be, and therefore what a full line is. This reason for product diversification should be distinguished from changes in the line of activity in which a company is engaged.

(a) A number of instances leading to product diversification relate to problems of distribution. Organizations may take on new products in order to provide a full line for distributors or salesmen.

Distributors of radios, for example, began to carry other electric household appliances when the radio business became seasonal. These distributors preferred to deal with manufacturers who could provide a number of household appliances. Some manufacturers diversified their output to meet this need by adding air conditioning equipment, washing machines, oil burners, etc. Others found it necessary to follow suit.

In another case, a company that produced and processed oil got into the drug business through developing a mineral oil. They later added other drug-store products, including cosmetics and nasal sprays. One company interviewed was formed by a combination of retail druggists with the purpose of manufacturing their own patent medicines. This organization now produces surgical dressings, rubber sundries, grape juice, crushed fruits and sirups, envelopes, drinking cups, chocolate, cocoa, candy coatings, surgical gauze, drugs, and other articles commonly sold in drug stores.

In one instance a company formed to manufacture heating and plumbing apparatus now produces many commodities carried by heating and plumbing trade supply jobbers. The company now produces plumbing fixtures, radiators, copper pipe and fittings, oil burners, ventilating systems, precision brass goods, heating controls, toilet seats, dust collectors, water heaters, and air conditioning equipment. A firm that made tire chains and other automotive accessories, wire rods, and welding rods added garage equipment to their output.

In another instance, new products were added so that salesmen could make better use of their time. Since retailers had to be called upon, the company added many products sold by the retailers so that the salesmen's time would be more profitably utilized.

To maintain their outlets or to prevent a loss of business in their regular lines, or to make full use of salesman time, some manufacturers diversified their output by adding other products the distributor could sell. In deciding the best combination of commodities, manufacturers took into account many factors other than the line of goods carried by the distributors of their products, but in some cases this was the deciding factor.

(b) Companies may think it desirable in terms of distribution costs to manufacture a number of items which are normally purchased by the same ultimate consumer. In this situation the company may decide that distributors or salesmen are not carrying the "best" combination of products and thus take on new products. For example, a company may decide that its distributors and salesmen should handle all kinds of office equipment or all kinds of lumber dealer products. One company interviewed was formed for the purpose of effecting economies in distribution by combining a number of products needed to outfit and to maintain an office.

A manufacturer of glass bulbs entered the production of glass tubing, because they were both used by the same customers. In another case a firm which began business as a manufacturer of boxes for the jewelry trade soon added jewelers' tags, white display cards, twine, cotton, and other findings. A manufacturer of shoe-making machinery added many different kinds of such machines and went into the production of tanning machinery and chemical items insofar as they related to shoe manufacture.

(c) A company may determine the composition of its output on the basis of what is necessary to the efficient performance of its major line. The successful performance of some machines depends on the nature and quality of auxiliary products with which they are used. A manufacturer of paper bags decided to make bag filling machinery which could be used only with the bag produced by the company. The two commodities were designed to be used together.

At the time shoe machinery was being introduced, it was found that shoemakers were reluctant to change from hand manufacture. They were hostile to machines and blamed every production defect in the shoe on the machine. The successful performance of the machine, however, was affected by the materials used in connection with the production of shoes on the machine. The company found it necessary to add some of these auxiliary products of prescribed nature and quality to its output so that the machine itself would not be discredited. Among the commodities added for this reason were sandpaper, eyelets, nails, tacks, lasts, brushes, dies, and other accessories which were sold in competition with other concerns supplying similar items.

(d) Several of the companies interviewed ascribed their product diversification to the fact that they were copying the actions of competitors. This was found to be desirable in order to prevent a loss of business on their regular lines or in order to enter a field demonstrated to be profitable. This cause of diversification was operative in the case of a food company that took on a line of puddings. The actions of competitors were the incentive for another concern to start the production of a particular type of floor covering. The same cause was operative in several additions to the products of a machinery manufacturer, while a producer of cotton textiles added wide sheetings to meet competition.

This cause of product diversification differs somewhat from the others. "The actions of competitors" may be only an explanation of how product diversification spreads and not of how it starts. In terms of the experience of individual firms, however, this is a reason on the same level as the others. In terms of all firms, it is a cause if the company copied did not become a multi-product concern by virtue of the addition of the product in question.

#### *Utilization of Resources.*

(a) A company may be influenced in the determination of the composition of its output by its managerial and manufacturing facilities. In the event it may be deemed undesirable to increase production of the goods already being made, additional commodities may be taken on and thus diversification of output may result.

In one company interviewed, products were added to a newly organized division because there weren't enough items to carry the overhead. There may be many different reasons for dividing an existing company into separately operating units, but, once done, each unit must adapt itself to the new situation. In some cases the process of adjustment involved adding new commodities to make full use of facilities assigned to the division.

Even in those situations where there was no internal reorganization, a company may find that the best use has not been made of its managerial and other facilities and so take on new lines. A manufacturer of sound transmission equipment took on the production of electric razors and coin-weighing machines for this reason. All the products involved precision work and were made under the same managerial staff.

(b) In some instances a decrease in demand for products of a company resulted in idle facilities. This contraction in demand may be due to seasonal, cyclical, or secular fluctuations. When faced with this situation, some of the companies interviewed took on the production of a new product.

One of the companies which had made a product used in battery sets found the demand for battery sets was greatly reduced when electric radio sets came on the market. This company entered the manufacture of radios to make use of their organization and as an alternative to going out of business or operating on a greatly reduced scale. The introduction and growth of the automobile and the decline in demand for products used on harness, saddles, and carriages resulted in the addition of new products by some concerns. One organization making sleds found demand shifting to skis and began producing the latter product also. Idle equipment which had previously been used in the manufacture of plastic lighting fixtures was converted to the production of plastic dishes.

Changes in the methods of refining oil decreased the need for filtering plants, and one company engaged in filtering operations began the manufacture of industrial lubricants. One manufacturer of large and expensive equipment, the demand for which was sporadic, usually just "waited out" the periods of idleness. However, as the length of depression increased, the company diversified output. At one time people using containers and closures bought each separately. A change in buying habits resulted in demand for a complete container, and this caused manufacturers in the closure business to take on the production of containers. In one instance idle equipment

formerly used to make receivers for wired radio was converted to the manufacture of interoffice communication sets. A glass manufacturer acquired additional plant facilities in order to have enough capacity to meet the Government's demand for bulbs and other war materials. When the war was over, the plant was converted to the manufacture of luxury glassware. This represented the addition of a new product for the company in question.

In another case, a manufacturer of newsprint paper found some of his mills unutilized because of a shift of production to Canada. To meet this situation the company began producing book, bond, and hanging paper. The same organization had to deal, at a later date, with a decline in the demand for so-called "valve" bags. It set up a new plant and equipment to produce "open-mouth," "pasted," and "snake stitch" bags—products for which demand seemed to be increasing. Several years later the consumption of liner board fell off, and the company converted the idle equipment created by this change to the production of bleached kraft paper.

A manufacturer of cotton, wool, and rayon textiles believed changes in demand to be a very important cause of the diversification of their product structure. The company does both spinning and weaving and finds it difficult to keep all of both types of equipment busy. A shift in demand that changes the fineness of the cloth may be sufficient to upset the balance and make some of the capacity idle. Many commodities have been taken on to utilize the excess spinning or weaving capacity resulting from such changes in demand. A decrease in the demand for alpaca, for example, caused one company to shift to the production of automobile fabrics. And again, a company began the production of rayon goods when these products began to encroach upon the demand for cotton goods. Some of the added products were substitutes for things previously made of cotton, but some were quite different in nature or use. Changes in styles are often so great that they are responsible for the addition of new products. Practically all the new items of women's wear made by one company were taken on because of changes in styles. A converter of materials produced hand-made boxes for jewelers. When the demand in that trade decreased, the company shifted to machine-made boxes for a variety of uses.

Manufacturers of products with a seasonal demand are sometimes faced with particular problems that can be solved only by the addition of commodities with periods of sale that will supplement those of the regular products. In some instances such additions represent product diversification. The commodity taken on to meet the problems arising from seasonal factors is determined, in part, by the particular problem to be solved.

To take an instance, if the seasonal nature of demand results in periods of idleness during which time trained labor supply is lost, the new product must be one that will keep that labor force busy. It must not only have the correct time of sale period, but it must also require a particular labor factor for its manufacture. One firm interviewed was faced with this specific difficulty arising out of the seasonal nature of demand.

#### *Changes in Demand.*

(a) In all the preceding cases changes in demand resulted in some decrease in the regular business of the concern and the companies

added new products to meet the situation. There were other instances among the companies interviewed in which changes in demand did not cause any reduction in activity in the regular lines but at the same time did cause product diversification.

The development of alloy steel and the growth of the automobile business resulted in tremendous changes in the demand for steel products. Companies buying steel set up many different and new specifications. This increase in the number and variety of specifications resulted in a demand for many new alloys and for many new and varied steel products. Steel companies, thus, added to their lines the manufacture of many new and different products. In another case, the development of the electric refrigerator made possible the sale of commodities that previously couldn't be kept in the home. These products were taken on by existing food companies. And again, a company manufacturing products sold in drug stores made changes in the composition of its general lines due to shifts in demand. For example, vitamin products were added to the drug lines and finger nail polish to the cosmetics group.

(b) In the companies interviewed for this study, product diversification resulted in another way from changes in demand. A company which was making a cork product shifted to the production of the same product made of tin, plastics, and glass as the demand changed. The company entered the manufacture of the item made of the other materials by buying out companies already making them. The glass company which was acquired was making a number of other glass commodities and the production of these things was continued. A producer who was a converter of materials diversified output because new materials were used. For example, the shift from paper to cellophane and pliofilm meant that the finished goods had new uses. Converted pliofilm—a transparent, vapor-proof and moisture-proof material—had uses different from converted paper.

#### *Corollary of Vertical and Horizontal Integration.*

(a) Product diversification sometimes results from steps taken to integrate a company vertically or horizontally. One company interviewed was formed as a combination of manufacturers of rubber boots and shoes. One of the acquired firms also made insulated wire. In one case a manufacturer needed castings as part of the final product and bought out a company which produced not only the required castings but other products as well. An organization that needed some rubber chemicals in its business bought a company that also manufactured non-rubber chemicals. In all these instances, the output of the companies became diversified because the companies added to get particular products necessary to bring about vertical or horizontal integration produced other commodities, the manufacture and sale of which were continued after the acquisition.

The same cause of product diversification was present in the case of a company whose principal business for many years was mining, smelting, and selling copper. In order to get some valuable water rights near one of their plants they bought out an organization engaged in manufacturing tire pumps. The production of these pumps was continued after the acquisition. As a step in vertical integration, the subject company at another time purchased a concern engaged in jobbing brass and copper products. This jobber also produced screen cloth.

(b) Product diversification may result from vertical integration for another reason. Commodities necessary to or desirable for vertical integration at one time may cease to occupy that position because of changes in manufacturing technique or for other reasons. These commodities are then sold outside. For example, as a step in vertical integration, a producer of heating and plumbing equipment at one time acquired a coal mining and coke company and a manufacturer of pig iron. At the present time coal is no longer used by the company in its own manufacturing operations, so the major portion of the coal is now processed into coke and sold separately. In addition, technological change has reduced the value of pig iron to the company. This iron is now largely sold outside.

(c) Product diversification may also result when commodities added to effect vertical integration are sold separately. A rubber footwear company added the production of zippers to its output, but also sold zippers separately. Another company began manufacturing cans for their own use and also sold some outside. The same situation existed in the case of the maker of felt-base floor covering who bought a felt factory but did not use all of the output in his own products.

#### *Customer Requests.*

(a) In some of the companies interviewed, it was stated that product diversification resulted from addition of commodities to meet the requests of single large buyers. The commodities, once taken on to meet these requests, were later sold to other customers, as a regular product of the company. A large chain store asked a chemical manufacturer to make dog soap and linoleum paste. A manufacturer of tin cans was asked by an important customer to make a container of paper (with tin ends). This was done to avoid the danger of losing the customer's business in tin containers.

(b) Product diversification resulted from customer requests in another way. Salesmen receive inquiries or suggestions from customers for some product they would like to have. These comments are passed on to the company officials who decide on the addition to output. A manufacturer of radios added a furniture polish to his line after a number of radio buyers had suggested the addition. A manufacturer of auto lubricants and chemicals began to produce tire patch kits at the request of a number of buyers. A manufacturer of glass bulbs began making special tubing for fluorescent lamps and neon signs as a result of customer demand. A producer of electrical equipment added new types of "oilless" and "oil-poor" circuit breakers for electric power stations and equipment to prevent electrolysis in pipe lines and tanks.

#### *Government Requests.*

In some instances, particularly in connection with matters of national defense, the Government calls upon large companies to manufacture specific commodities or to carry on research in order to improve an existing good or to develop a new one. These requests may necessitate experimentation or manufacture along new lines. Examples of this cause for diversification are found in the production of airplane engines and submarine engines by an automobile manufacturer.

*Diversity of Products That Can Be Made of the Same Raw Material.*

(a) In some instances, manufacturers diversify output by seeking to make use of waste materials. A manufacturer of breakfast foods used only the center of the corn kernel for making the cereal. The remainder of the grain was used to make cattle and chicken feed and corn oil. Brewing material was made from the waste portion of another grain. Corkboard insulation was produced by one organization partly because waste cork, formerly used for fuel, could be utilized in its manufacture. A paper company added fiberboard to its output to make use of waste screenings or tailings.

(b) The attempt to make use of a raw material may be a cause of diversification in quite another way. Some organizations feel that their field of activity lies in things made of particular raw materials. They may have this attitude because some particular technique is involved in handling, treating, and processing the material, or because they own sources of supplies of the material, or for other reasons. In any event, the search for new uses for a raw material may result in diversification because things with divergent uses may be made from the same good. This was true of companies interviewed which made number of products out of cork and out of rubber.

*To Collect Receivables.*

In one company interviewed, motors were sold to a manufacturer of elevators. The customer was unable to pay his bills and a controlling interest was taken over by the seller in settlement of the claim. As a result the output of the motor manufacturer was further diversified. In another instance a manufacturer of rubber footwear received a controlling interest in the business of a customer as payment for accounts receivable. The company taken over was a distributor of rubber footwear and also made leather shoes.

*Miscellaneous.*

In one case the president of a company that manufactured industrial oils wanted to get his son into the company. The son at that time was experimenting on a new process for making industrial leathers and agreed to join his father's company on condition that this experimentation could be continued. Many years later the son completed his experiments and the industrial oil company entered the manufacture of industrial leather.

An automotive chemical company that also made metal containers received an order that involved the canning of an insecticide made by another producer. The insecticide was for sale to foreign countries. The company became interested in this product, after learning of its profitability, and later began manufacture for themselves.

In another case, a manufacturer rented part of one of his buildings to a producer of electric razors. The officials of the two concerns discussed the probable market and future of the new razor. The company that owned the buildings was in constant contact with the new product due to the physical proximity of the manufacturing operations. The company officials said they would probably never have entered this field had it not been for the renting of the floor space and the consequent contact with the product. It is not the policy of the company to look for new products outside its general line of business.

A paper manufacturer bid successfully on a Post Office Department contract for envelopes and newspaper wrappers. The company did not make these products at the time and had no facilities for their manufacture although it did manufacture the paper from which the envelopes and newspaper wrappers were to be ultimately manufactured. A plant was purchased to carry out the converting operations.

## SUMMARY

The following causes of product diversification were operative in the experience of the companies interviewed:

1. Research conducted as a general business policy:
  - (a) The existing technology and materials involved in production may have wide application. Research may discover new uses or remove known obstacles.
  - (b) The maintenance of research activities may bring about the production of new products because some advance is made in technology.
  - (c) Research activities may result in an improvement in an existing commodity so that it performs its function more efficiently.
2. Business policy of carrying a full line:
  - (a) The composition of a full line may be determined by what is carried by distribution outlets and these products may be diverse.
  - (b) The full line may be made up of things sold to the same ultimate consumer and these may be diverse. Differs from (a) in that manufacturers do not make what distributors sell but cause distributors to sell what a single type of consumer buys.
  - (c) The full line may be made up of a number of products whose efficiencies are interdependent. These commodities may not be related vertically in the manufacturing process and their combination in one company may represent diversification.
  - (d) Some companies interviewed found it necessary to take on commodities to prevent loss of their regular business to competitors who were selling a new good.
3. Utilization of resources:
  - (a) The composition of the output of a company may be determined by whatever the management and manufacturing facilities can handle and these products may be diverse. That is, diversification may result from an attempt to make full use of managerial or manufacturing capacity.
  - (b) A contraction in the volume of regular business creates idle physical capacity which the company may seek to utilize. This utilization may result in diversification since the commodities taken on are not always substitutes for ordinary lines.

4. Changes in demand:
  - (a) In some instances diversification results from changes in demand that do not cause any falling off of regular business.
  - (b) Corollary of changes in raw material used.
5. Corollary of vertical and horizontal integration:
  - (a) A company acquired in order to secure control of the supply of a product necessary for vertical or horizontal integration may also produce other products.
  - (b) Products necessary to or desirable for vertical integration at one time may cease to occupy that position because of changes in manufacturing technique or other factors. These commodities may then be sold outside.
  - (c) The addition of a product to be used by the company itself may also be sold separately.
6. Customer requests:
  - (a) Requests of single large buyer, taken because of fear of losing his business or for other reasons, may result in product diversification. The commodity so added is sometimes kept on as a regular line.
  - (b) Commodity requested by a number of buyers.
7. Government requests.
8. Diversity of products that can be made of the same raw material:
  - (a) Diversification may flow from attempts to make use of waste material.
9. To collect receivables.
10. Miscellaneous.

## CHAPTER V

### THE ECONOMIC SIGNIFICANCE OF MULTI-PRODUCT PRODUCTION

Diversification of output appears to be a common characteristic among large manufacturing companies. The nature of the reasons for this accumulation of many products within the single enterprise was indicated in the self-analysis of 27 corporations already presented. Economic advantages and disadvantages flow from product diversification beyond its significance for the individual firm. In this chapter, a brief examination will be made of the probable relationship of product diversification to such broader factors as prices, the efficiency of the firm, number of competitors, and the mobility of the factors of production. However, consideration will first be given to the history and methods used in bringing about this condition of affairs.

#### THE HISTORY OF PRODUCT EXPANSION IN 16 COMPANIES

Annual records of product expansion were obtained from 16 of the companies interviewed and these are shown in table 31. Product diversification apparently is not a new phenomenon. The experience of these companies, however, indicated that additions of unrelated products to the original line were less frequent and somewhat more sporadic previous to the early 1920's. The relatively greater number of additions reported in the more recent period may be due in some degree to the ability of company officials to remember what happened in recent years more fully than in past periods. In most instances, however, the companies listed here had made some review of their past histories prior to the interview.

It is difficult to be sufficiently certain of the exact timing given in the table or the over-all representativeness of the companies, to feel that it is possible to determine the relationship of product expansion to business conditions. At least two companies among the group reported a new product in each year since 1921. The peak was reached in 1929, with eight cases. It is interesting to note that except for that 1 year, the 8 years from 1926 to 1933 ran at a level of four or five instances of product expansion each year. A part of the increase in products added in recent years is to be accounted for, of course, by the larger number of companies in the sample in the later years.

The record is much more erratic during the last 6 years, but in general the number is lower since 1933 than for the earlier period. The 2 years of 1936 and 1937 each reported only two instances, and 1939 only three, although 1938 with six, is next to the peak year for the entire period. Perhaps all that can be said on the basis of the scattered record is that the movement was most active in the late

twenties and carried over at such levels until 1933, since which time it has been erratic, fluctuating widely around a lower general average. Perhaps a larger sample might disclose some trend more distinctly.

TABLE 31.—History of additions of new products by 16 companies, 1900 to 1939<sup>1</sup>

Year	Companies (designated by code numbers)															
	1	2	3	6	7	8	9	11	13	15	16	18	19	21	22	27
Prior to 1900		F 1860	F 1889	F 1871 X	F 1831 X X	F 1892						F 1868 X X			F 1898	F 1884 X X X X X
1900																
1901																
1902		X							F							
1903																
1904		X								F						
1905			X			X										
1906	F															
1907									X							
1908		X														
1909																
1910						X										
1911																
1912		X	X								X		F			
1913																
1914		X											X	X	F	
1915																
1916																
1917						X			X			X				X
1918																
1919						X							X			
1920												X	X			X
1921																
1922		X	X									X				
1923									X					X		
1924		X				X						X				X
1925			X									X				
1926		X			X				X			X				
1927			X				F			X		X	X		X	
1928	X										F; X	X	X		X	
1929		X						F; X		X	X	X	X	X		X
1930		X	X			X					X	X	X			
1931		X			X			X				X			X	
1932			X	X		X						X				
1933		X				X		X				X				
1934		X				X						X			X	
1935		X						X	X			X				
1936		X										X				
1937	X											X				
1938	X	X	X			X	X				X					
1939	X			X		X					X					

<sup>1</sup> Each "X" indicates an addition to output during that year; each "F" indicates year of formation of the company.

### The Method of Effecting Product Diversification.

The effect of diversification on the market may depend in part upon the method by which the expansion was accomplished. A firm may undertake the manufacture of a new commodity by acquiring a company already producing the item, by using its own idle facilities, or by constructing or purchasing new equipment. The method of expansion, therefore, may determine the effect of diversification on the amount and location of employment as well as other economic phenomena.

The methods employed by 15 companies, who added a total of 108 products to their original lines, are summarized in table 32. All of these concerns did not follow the same pattern of expansion in effecting diversification. Creation of new facilities however, accounted for exactly one-half of all the cases. Purchase of existing facilities accounted for 35 percent of the cases and fuller utilization of the company's own machinery accounted for the remainder of the cases.

TABLE 32.—*Distribution of additions by methods of effecting additions by each company interviewed*<sup>1</sup>

Method	Companies (designated by numbers)																	All cases
	1	2	3	4	5	6	7	8	9	16	18	19	21	22	27			
Purchase or construction of new facilities.....	2	9	4	---	9	1	---	5	2	---	7	3	1	3	8		54	
Acquisition of productive facilities operated by other corporations.....	1	5	---	2	---	---	4	5	1	3	2	6	4	5	---		38	
Fuller utilization of company's own facilities.....	3	---	6	3	---	1	---	1	---	---	---	---	---	2	---		16	
All methods.....	6	14	10	5	9	2	4	11	3	3	9	9	5	10	8		108	

<sup>1</sup> This table includes all cases for which the information on method of effecting diversification was given for the commodities added. The completeness of the history varies by company but the table does give a general indication of the relative importance of each method of expansion for these particular cases. Where only one method is indicated those cases are probably exaggerated by the incompleteness of the data.

#### ECONOMIC IMPLICATIONS OF MULTI-PRODUCT ACTIVITY

It has been indicated by some writers<sup>1</sup> that, as an industry develops, there is a tendency toward increased specialization and a consequent reduction in the number of commodities produced by single firms. That is, as the industry develops, larger quantities of single products can be sold. The increase in the size of the market thus makes it possible and often advantageous for firms to specialize. Likewise, the actual process may be broken into separate steps carried on by separate enterprises. When the textile industry, for example, grew sufficiently large it became possible for firms to engage only in bleaching or making findings, etc. Specialization may appear in terms of stages, or of parts. If the tendency is for functions to be split off and taken up by separate firms, the economic area covered by each is narrowed and simplified. One alleged effect of the growth of industry is thus the reduction in scope of single firms.

The earlier analysis of the causes of diversification in the history of 27 corporations, however, indicates, if the experience of these companies is representative, that there are strong forces which tend to increase the number of commodities produced by single corporations, regardless of the expanding or contracting nature of the industry in which the firm operates. It seems to be true, for example, that the maintenance of research laboratories or the attempts to meet the problems arising from the seasonal nature of demand are causes of diversification that would apply to firms in either expanding or contracting industries. There seems to be no reason for regarding any of the causes presented in this study as operative only in contracting industries. Thus the alleged tendency of firms in expanding industries to reduce the number of products manufactured by each firm may be offset by the forces making for diversification. At least, it must be admitted that along with the development of specialization, there have emerged a number of large enterprises characterized by multi-product activity.

<sup>1</sup> Allyn Young, "Increasing Returns and Economic Progress," *Economic Journal*, 1928, vol. 38, pp. 527-542, and N. Kaldor, "Market Imperfection and Excess Capacity," *Economica*, vol. 2, 1935, pp. 33-50, 47.

*Fuller and Less Fluctuating Use of Resources.*

Perhaps the most obvious effect of product diversification has to do with the use of resources. It is not always possible to have producing units which will, when fully employed and when utilizing the most "efficient" methods, produce precisely one, two, three, four, etc., units of any given commodity. A producer who wants to build a new factory or start a new company does not have completely free choice as to the potential capacity of the new unit. He may be able to set up a unit to produce either 100,000 or 500,000 units of a commodity—there may be nothing in between these two choices, or the ones in between may be relatively "inefficient."

It is also possible that the same selling or managerial organization may be the most efficient for handling considerably different amounts of business. No change may be possible or desirable just because sales fall off or increase by one or several units of output. Productive units with infinite gradations of single commodity output under full employment are not possible in the actual world.

This indivisibility of the factors of production means that it is sometimes necessary to construct and equip factories which, under existing demand conditions, cannot be utilized fully in producing one commodity. It may not be possible to produce precisely the number of units of a commodity that will be taken under given price and cost relationships. As a result the physical and human instruments of production that are committed to particular uses may not be fully employed.

Product diversification by individual firms assists them in overcoming the uneconomic consequences of indivisibilities of the factors of production. Individual firms find it possible to utilize their facilities in the production of commodities other than those for which the facilities were constructed. Also, when planning new companies or additions to existing ones, a combination of commodities may have the effect of removing the indivisibilities that would exist were only one commodity manufactured. Consequently, the production of different commodities by one firm results in fuller utilization of the imperfectly divisible factors that exist in the actual world.<sup>2</sup>

But the problem is by no means merely one of technical sizes. The specialized company is subject to the vicissitudes of economic change as focused upon a single point. Its demand may not be at all regular. The basic nature of its activity may be one of fluctuation, for example, subject to a considerable seasonal fluctuation. Even without such a condition, it is subject to the factors in a single market. If a com-

<sup>2</sup> . . . in reality the majority of producers produce a series of different products, if products are to be defined by the same rigid market criteria as were applied in the earlier parts of this article. And at first sight at any rate, it does appear as if the spreading of production over a series of different products is the way in which the producers can overcome the effect of these 'indivisibilities' which form the *conditio sine qua non* of imperfect competition. If there is not a sufficiently great demand to produce one product on an 'optimal scale,' the producer may still utilize his plant fully by producing 2 or more products, rather than building a smaller sub-optimal plant or leaving his existing plant under-employed. In this way, 'indivisibilities' will be overcome; and consequently 'excess capacity' will not make its appearance either. The effect of 'competition from outside' will be to induce producers to produce a larger series of products, rather than to reduce the scale of output as a whole.

"For our view this line of reasoning is not strictly accurate; for even if it is admitted that varying the number of different kinds of products produced provides one line of adjustment for the entrepreneur, this does not imply that the essential consequences of this type of situation (that increased competition will lead to an increase in costs) can thereby be avoided. Whether they will or not, will depend on the nature of the cost-function of the jointly produced products." Nicholas Kaldor, "Market Imperfection and Excess Capacity," *Economica*, vol. II, p. 47.

(For purposes of the present study the qualification in the second paragraph of this quotation does not limit the use made of the idea expressed in the first paragraph. We are concerned here with the effect of product diversification on the divisibility of the factors and not with the effect on the relationship between an increase in competition and cost.)

pany's activity is variable with fluctuations in employment, its overhead costs may be established on a basis of more than average activity.

The extension of activity to additional products may be so planned as deliberately to offset such factors as seasonal fluctuation. In those instances where diversification resulted from attempts to overcome the effects of the seasonal nature of demand, fuller utilization of facilities devoted to a particular use clearly resulted. That is, machines and men working on a part-time basis or on a part-year (seasonal) basis were employed for a greater number of working days during the year because the firm diversified its output. Some new machines or men may also have been added. In all these instances additional materials were consumed.

Products were added in some cases to overcome the effects of a contraction in the regular business not due to the seasonal nature of demand. Here the effect of adding the new commodity was to maintain the company at or nearer the level of activity attained prior to the change in demand. In manufacturing the new product, the old combination of men and machines was not always exactly maintained and all the old factors were not always employed. However, diversification arising from changes in demand did result in new employment—more than existed in the one company after the shift in demand, but not necessarily more than existed prior to the shift. The situation here is the same as that created by diversification to meet the problems of seasonal demand.

The degree to which expansion leads to fuller use of machines or men is not always clear. In the cases where an addition to output was made because of the policy of carrying a full line, new plant or employment skills may have been added at some parts of the operations. In other cases, such as those arising out of the research activities of a company, the diversification meant additional employment of many or all of the factors involved in producing the goods. New buildings and machinery were added, additional labor was hired, and larger quantities of raw material were consumed. Even in cases where completely new manufacturing facilities were added, however, there was frequently no change in selling or managerial employment.

The above analysis may be stated in general terms as possible. Product diversification is a form of expansion of the individual business unit. This diversification necessarily results in additional employment of men and machines by the firm; it does not always represent an addition to total employment. The increased demand for facilities of production by one firm may be met by its own facilities already partially or fully employed, and expansion may be necessary for some but not all of the various elements necessary to production. The increase may be an increase in the sense that employment is given men and machines who were employed but just about to be made idle. Since the method, as well as the cause, of carrying out the production of "new" commodities is an important determinant of the economic effect of diversification, the increase by one firm may cause a decrease elsewhere.

As far as the individual enterprise is concerned, it seems reasonable to expect that most cases of diversification lead to increased stability, on the "eggs-in-several-baskets" theory. The enterprise is not so exposed to limited factors of disturbance. It may be able to shift men and machinery among its various activities. Its overhead rests on a multiple base.

This study has not concerned itself with the termination of activity in a declining industry. When a specialized enterprise is caught with a product for which the demand is disappearing, its demise is apt to lead to a definite break in employment both of men and machines. In the case of the large multi-product enterprise, on the other hand, there is more likelihood, though no certainty, that the transition can be carried out in an orderly way with a maximum of salvage. The degree to which the various possibilities of stabilization and fuller use of resources are actually achieved will always depend largely upon the caliber of the management.

### *Economies.*

Large corporations are said to possess certain cost advantages simply because of their size. Do these economies result regardless of the nature of the operations? Does it matter whether the large company is horizontally or vertically integrated or is a multi-product enterprise? If *all* large units enjoy the same possible economies, then multi-product companies have cost advantages simply because they are large and, if these are not offset by increased costs at other points, some price reductions might flow from size alone. This possibility can be explored by examining a list of the economies said to characterize large units.<sup>3</sup>

#### Purchasing advantages:

1. Certainty in supply of raw material.
2. Assurance of good quality in raw material.
3. Elimination of intermediate selling organizations.
- (x) 4. Purchase of large quantities.
5. Smaller inventories.

#### Manufacturing advantages:

1. Saving in handling and reheating.
2. Specialization as between plants.
3. Reduction in the number of styles and sizes.
- (x) 4. Savings on insurance.
5. More effective use of patents.
- (x) 6. Utilization of scrap.

#### Selling advantages:

- (x) 1. Reduction in number of salesmen.
- (x) 2. Better service departments.
3. Lower delivery costs.
4. Saving in cross freights.
- (x) 5. Seasonal dovetailing of products.
6. Saving in advertising.

#### Finance advantages:

- (x) 1. Lower interest rates.

#### Administrative advantages:

1. Better industrial planning.
- (x) 2. Productive scientific research.
3. Exchange of cost information between plants.
- (x) 4. Expert technical advice.

There may be disagreement as to how many of these advantages apply to firms producing a large number of unrelated products. Those marked with an "x" seem to be applicable.

Many of the advantages listed above are dependent upon the presence of horizontal or vertical integration. Where diversification

<sup>3</sup> These are taken from R. W. Owens, "Business Organization and Combination," p. 301 ff. The wording is changed and the selection is not complete, but no advantages applicable to multi-product units have been omitted.

The problem of the validity of these or other suggested economies of vertical and horizontal integration is beyond the scope of the study. It should be noted that there is disagreement as to the extent of such economies. In some instances the causes of integration are not found in expected "economies" but in other factors. See S. R. Dennison, "Vertical Integration and the Iron and Steel Industry," *Economic Journal*, June 1939, pp. 244-258.

exists as a corollary of vertical and horizontal integration the full economies of size are present. Certain of the advantages, however, are dependent upon size alone and all large producers share them irrespective of the type of products made. Finally, large corporations manufacturing a number of different products may effect economies directly due to the diversification of products. If cost reductions are net and are passed on, product diversification results in lower prices.

One reason for adding new products is the business policy of carrying a full line. In some cases companies find that additional commodities are necessary to make full use of marketing or managerial facilities. Such additions may be said to share the expenses of selling and management. Additions may be made also because of the seasonal nature of or changes in demand that create idle capacity. New products that absorb this capacity might reduce the expenses of production of the other commodities. The "cost per unit" of the old commodities depends in part on the profitability of the additions and the method of cost allocation. It is conceivable that the "cost per unit" of the old commodities would be reduced by the addition of new commodities resulting in fuller use of existing resources.

On the other hand, product diversification may arise from causes of such nature that any change in the expenses of production of existing products of the company would seem improbable. Developments arising out of research activities or the attraction of the company's resources, for example, may have no necessary effect on the cost of the other commodities. The existing resources may already be employed to the maximum—the addition may not have been made primarily to meet a condition of idle or partially employed facilities.

Of course, if the judgment underlying the expansion is bad, the result may be to create a burden on the enterprise which will increase costs throughout its entire operation. It may require so much supervision as to distract the management from its earlier interests. It may even act to reduce customer good-will. Thus, for example, the combination of electric companies and ice plants raised difficulties when competing ice companies were purchasers of power. All this is merely to say that the success of expansion into new products depends in large measure upon selecting the right products.

#### *Character of Competition.*

The entrance into the market of sellers whose productive activity covers many products has a decided effect upon the nature of competition and the operation of market processes. It can be summarized by saying that it may tend to blur the demand and supply factors for each specific commodity, since such enterprises are concerned with their over-all results. The greatest total for the entire company may not correspond to the maximum for each product. This is clearest in the case where several substitute commodities are produced by the same enterprise.

The blurring of the market is in part due to the difficulty of determining costs for specific commodities. When a firm produces several commodities, the cost, and hence the profitability, of each usually can be determined only by an allocation of expenses. There are usually some items of expense which are common to several or all of the products of the company. The cost of each commodity is indeterminate in the sense that the cost depends on the method or basis

of the distribution of common expenses. The market control, through the process of eliminating high cost operations, passes only on the total activity of the company. The profitability—and the decision to produce or discontinue operation—of a single commodity that is only part of a diversified output may be determined arbitrarily within the company and the market may exercise little influence.<sup>4</sup>

Under the above conditions, it is conceivable that the market forces never "pass on" the price and cost relationship of some of the individual commodities produced by firms with diversified outputs. In this sense one may say that companies making different products might continue to produce commodities in which they are relatively "inefficient," their own accounting not being as ruthless an eliminator as are the forces of the market.

It should be noted also that the production of only one product by a firm does not of itself assure the presence of the most "efficient" unit. The optimum firm is a combination of the optimum manufacturing, marketing, financial, and managerial units. It is apparent that the production of only one product does not assure this combination. The increase in efficiency, if any, gained by the greater market control present when only one product is manufactured may be offset by the failure of one-product units to attain optimum size.

But even if costs were known, the flow of supply might not follow accordingly. The company managers are interested in the profitability of the entire unit. Naturally it does not seem advisable deliberately to carry unprofitable lines, but there are situations where the greatest total profit might flow from stimulating the sale of high profit lines by means of selling low profit lines at an accounting loss. The company may be divided into several departments each of which would be judged as a separate unit, or the entire company might be the unit of judgment. In any event, as long as there are several products with different profit ratios, total profit may be maximized in some cases by selling some lines below accounting cost. This is true where the sale of those lines stimulates the sale of more profitable lines, i. e., the sale of electric household equipment might increase the load of utilities which might, in turn, require more generating equipment. In some cases where companies produce several items used together—such as bags and bag filling machines, or razors and razor blades, or tags and application machines—they may be made so that they must be used together. Price reductions to stimulate the sale of one might mean more sales of the other. This situation in a manufacturing company is comparable to the "loss leader" device in retail and wholesale establishments.

When there is an imperfect market it may be profitable for firms to operate at less-than-full capacity. That is, under conditions of monopolistic competition, firms faced with a falling demand may find the most profitable policy to be the limitation of output, and the maintenance of price. There are various gradations of this capacity to restrict output and maintain price and thereby maximize gain. There are some situations where restriction might not be profitable in the short run. The conditions shade into one another—there are borderline cases, cases where restriction does not destroy all profit and cases where it does. The result depends in part on how much business will be lost if price is maintained.

<sup>4</sup> See A. R. Burns, "The Decline of Competition," p. 450.

When firms are producing more than one product, the profits from one part of their output may be used to compensate for the losses arising from restriction of other parts of the output. That is, a firm may want to maintain prices for fear of "spoiling" the future market by price reductions. However, it may be unable to restrict output without incurring a temporary loss—the demand and cost situation may be such as to make price maintenance temporarily unprofitable. Yet the judgment of the managers might be that, viewed over a long period, the loss should be incurred in the expectation that the situation would be temporary and that future profits would be greater by virtue of their not having "spoiled" the market by price reductions. It may be necessary to finance restriction in some instances because a temporary loss, that the company could not carry, would result.

The restriction may be financed in many ways. The profits from other parts of the output is one possibility. The operations of the entire company may show a profit even though some lines do not. It is conceivable that a company might not be able to carry out a policy of restricting output and maintaining the price of some commodities were it not for the fact that other commodities were produced—other commodities that were profitable or that absorbed part of the loss resulting from restriction. It must be repeated that in some situations restriction of output does not result in any loss even though only one commodity is produced.

On the demand side, the market may be modified by the development of full lines as against single commodities. This becomes particularly important when it is related to advertising, trade-marks, brands, etc. That is, some firms are able to convince the consumer by advertising or other means that a particular product with a particular name has qualities that make it different from all other products that serve the same general need. There may or may not be any real basis for this differentiation. The point is that anyone can make, say, a toothpaste but no one can make "X" toothpaste except the "X" company. As long as a sufficient group of consumers considers "X" toothpaste as something different from other dentifrices, there is an impassible obstacle to movement into the production of "X" toothpaste.

The practice among established companies of manufacturing a number of different commodities (here called product diversification) may reduce the strength of the immobility created by product differentiation. That is, it may be very difficult for a new company with an unknown name to enter the manufacture of a commodity being produced by well known corporations with branded products. But the rivalry does not always come from unknown companies. When established firms diversify output, they sometimes enter fields where advertised products are already being sold. The firm entering the new field may be well known in its own field and consequently may not face the difficulties of an unknown organization. In other words, it appears to be less difficult for a company well known in one field than for a new corporation to overcome the obstacle of differentiation in entering another field. The instances of product diversification presented in the preceding chapter indicate that some old corporations do enter the production of commodities being made by other established firms. When a large rubber company developed a mattress,

for example, an attempt was made to enter the field of branded, differentiated mattresses made of other materials. The rivalry from the rubber mattress made by a well known firm will probably be greater than it would be were the new mattress being made by some new firm.

However, when large firms add the manufacture of substitutes for their own rather than another firm's products, the result is to decrease mobility through strengthening control over supply. A combination of substitute products may not, however, constitute product diversification. If the products are close substitutes for each other, they are considered here as only one commodity and there is no diversification. As indicated in the previous chapters of this report, an attempt has been made to call products separate commodities only when they appear to serve different uses. This, of course, is a matter of individual judgment. If diversification is taken to include the manufacture of a number of close substitutes, then diversification may decrease mobility.

#### *The Place of the Large Enterprise.*

The picture of the large multi-product enterprise needs to have one additional aspect emphasized. It is a pooling of men and machines to work on many products. Its greatest assets are that it may indulge in rather elaborate research, but particularly that it has financial resources with which to proceed. It is not a matter of chance that so many of the product developments of recent years have appeared as contributions of large enterprises. In fact, such demonstrations far exceed the output of their own laboratories. Individuals come to them because they have the resources necessary for commercial exploitation.

The reader will recall that research activities and the attraction of the company's resources were two causes of diversification. The capacity to effect diversification by these means is limited to the business units large enough to maintain research laboratories or with resources enough to put over new ideas. Research activity is an important cause of expansion into new products. This indicates that large established units play an important part in diversification and, hence, in whatever increases in the number of competitors result therefrom. Small units not having research programs or resources large enough to attract people with new ideas may be unable to effect such diversification. Once the new products are introduced, however, the smaller units may be able to manufacture a duplicate. But the advantage of being the first in the field through research developments or the attraction of resources probably rests mostly with the large corporations.

One common obstacle to entrance by new firms is that of the size of capital requirements for developing certain products. It is difficult to assume the production of some commodities because large quantities of capital must be invested before production can be started. As a result, freedom of entry is restricted. New corporations may find it hard to raise enough funds to enter an attractive field when a relatively large sum is involved.

The effect of product diversification is, in some instances, to remove or reduce the obstacles described in the preceding paragraph. Large firms with good credit facilities or surplus funds or idle capacity do

not find large capital requirements a serious obstacle to entering other fields of production. The seriousness of the obstacle to an old, established, big corporation is less than to either a small existing firm or an entirely new one. An analysis of mobility in an actual society should take into account the fact that movement may take place through changes in the sphere of activity of existing organizations. The obstacles to entry that face a new enterprise are sometimes not operative in the case of a firm already in business. Thus the rapidity of movement is increased by diversification because the new rivalry comes from old firms (who may also have idle capacity) and the process of establishing new firms and breaking into the market need not be gone through at all or is made less difficult and time consuming.

When one company makes an addition to output by purchasing a company already in the field, there is no addition to the number of producers of the new commodity. The purchase of existing companies by a concern not already in the field was a method of diversification used by the companies interviewed. Product diversification, when so effected, results in no change in the number of producers if the addition to the output of a firm is made by removing only one firm from the scene. The number of producers of a commodity is reduced when more than one producer is bought out or added to the company making the addition to output.

In some instances the diversification of output by one company did represent an addition to the total number of producers of the commodity added. In those instances where research activities resulted in a new commodity or a new use for a raw material or a new use for a technique, etc., a substitute for some existing product was developed. The production of this item by the company making the discovery did, in some cases, represent an increase in the number of producers.

In many lines, where large enterprises are already established, it would be foolhardy for a new, small enterprise to endeavor to break into the field. However, there are many illustrations where some other large enterprise does undertake such an invasion. As in pugilism, there seems to be a division for heavy-weights, where the light-weight is allowed to fight if he wishes, but would never dream of doing so.

It should also be noted that diversification at the manufacturing level has certain implications for distributive activity. Retailing is already highly integrated productwise. It is difficult to think of any retail outlet which deals in but one product. Probably the automobile dealer or the milkman come closest to the condition, but the first usually includes second-hand cars, parts, gasoline, and various forms of garage service, and the second frequently carries cream, butter, and cheese. So in the distributive process, there must be some means whereby single-product manufacturers can reach the multi-product retailer. Historically, this has been one of the great functions of the wholesaler. However, as manufacturers have come to carry fuller lines, the possibilities of direct manufacturer-to-retailer selling has been enhanced.

## SUMMARY

Product diversification is a method of individual firm expansion—in some instances it is a cause of bigness. The economies of large-scale enterprise that accrue to firms vertically and horizontally integrated do not all apply to those elements of bigness arising from diversification of output. It is not possible to hold product diversification by the firm as an unmitigated good or evil. In some instances economic advantages in the form of lower prices, larger employment, more competitors, more “efficient” firms, greater mobility of the factors of production, and more rapid adjustment to change have resulted. In other instances product diversification has resulted in less “efficient” firms (through making the control by market forces more remote) and has enabled companies to consolidate or enlarge monopolistic positions already enjoyed or to create new ones.

## APPENDIX A

### STATEMENT OF DEFINITIONS AND METHODS

The basic data presented in this study were compiled from unpublished records of the Bureau of the Census.

#### SCOPE OF THE STUDY

The data released by the Bureau of the Census to the Temporary National Economic Committee for analysis included the following information for each of the largest 50 manufacturing companies reporting in the Census of Manufactures for 1937: The number of establishments operated by each company, the number of products manufactured in each establishment, the number of industries in which the establishments were classified, the number of products manufactured by the company, the number of industries in which the products were classified, and for each product (1) the percentage relationship between the value of each product and the total value of products of the company, and (2) the percentage relationship between the company's value of each product and the total United States value of that product.

#### SELECTION OF THE SAMPLE

The companies were selected on the basis of their value of product; that is, the concerns reporting in the Census of Manufactures for 1937 were arrayed in terms of the total value of their products and the largest 50 selected.

#### METHOD OF COMPUTATION OF BASIC DATA

The basic reporting unit used in the Census of Manufactures is an establishment rather than a company. The Bureau of the Census receives a schedule covering the manufacturing activity of each establishment. If establishments are members of a central-office group, their schedules are given the code number of that concern so that it is possible to bring together the reports of all the establishments within one central-office group. The number of establishments operated by each of the largest 50 companies varied from 7 to 497. The company figures employed in this study, then, represent aggregates of the activities of all the establishments owned or operated by them. That is to say, the company value of output of each product is the aggregate of the value output of that product in all of its establishments. As released to the Temporary National Economic Committee, each product was designated by a number and the value of each product was expressed as a percent of the company's total value of products and as a percent of the United States total value of that product. Each company was given a code letter which was not related in any way to a particular company characteristic. (See appendix B.)

## DEFINITION OF TERMS

In general, the terms employed in this study are the same as those used by the Census and have the same meaning as in census usage.

*Establishment.*

As a rule, the term "establishment" signifies a single plant or factory. A more detailed statement of the meaning of the term is given in the Biennial Census of Manufactures, Part I, 1937, p. 4-5.

*Company.*

Each of the largest 50 manufacturing companies reporting in 1937 was a central-office concern. A central-office group exists, in the meaning employed by the Bureau of the Census, when two or more establishments are controlled or operated by one ownership interest. The control over establishments is limited to those which are owned outright or those of subsidiary companies in cases where the majority of the voting stock is controlled. For a more detailed statement of the census use of the term and the method by which central-office data are obtained see Part II of this study, "The Integration of Manufacturing Operations," chapter 1, page 107.

*Product.*

The meaning of the term "product" as used in this study is essentially the same as that employed by the Bureau of the Census. An effort has been made, however, to align census products more closely with economic commodities whenever possible.<sup>1</sup> The following exceptions to census designations, therefore, should be noted.

(1) It is the practice of the Bureau of the Census to combine the values of certain distinct products in its published reports in order to avoid disclosing the operations of individual establishments or companies. Since neither names nor dollar-values of products are given in this study, it was possible to use more detailed break-downs where the nature of the combined products warranted it. Specifically, there are listed separately in this study 631 products for which the Bureau of the Census does not publish individual statistics.

(2) Although most census product designations differ from economic commodities in the sense that they are more inclusive, it was considered desirable to make certain combinations of census products in order that they would more nearly approximate an economic commodity. Identical products classified separately by the census on the basis of the industry classification of the establishment in which they were produced are treated as one product in this study. Sausage made in the meat-packing industry and sausage made in the sausage industry, for example, are here considered as one product. Identical products classified by the Bureau of the Census on the basis of the technology employed in production are also treated as one product in this study. Sulfuric acid made by the chamber process and sulfuric acid made by the contact process, for example, are here considered as one product.

It should be noted that the tabulations of the number of "products" manufactured by the largest 50 companies includes a small number of items which would not be considered as "products" by the manufac-

<sup>1</sup> For a detailed comparison of the concepts of a census product and an economic commodity, see pt. V of this report, "The Concentration of Production in Manufacturing", appendix A.

turers. These are combinations of unspecified products reported under the item "all other," scrap and salable refuse, receipts for contract work, and receipts for electric energy sold. The inclusion of these items as products distorts somewhat the actual number of products, or economic commodities, manufactured by a company. In terms of value, however, they are relatively unimportant.

#### *Value of Product.*

The census definition of value of product was used in this study. The company value of each product is the aggregate value of the company's production of that product irrespective of the number of establishments in which it was made or the industry classifications of the establishments. The United States total value of each product is likewise the aggregate dollar value of each product irrespective of the industry classifications of the establishments in which it was produced.

The company's total value of all products is the aggregate value of all products manufactured by the company. It should be noted here that there exists some duplication in the computation of the total value of products for some companies. This is due to the fact that the company figures represent aggregates of the activities of the various establishments. No value was entered for products made and consumed in the same plant but values were entered for products made for interplant transfer. Insofar as a company was vertically integrated and one establishment manufactured a product for transfer to a second establishment, the value of the transferred product would be entered twice in the calculation of the company's total production. For example, a steel company might have had three establishments, one engaged in the manufacture of pig iron, one in steel ingots, and one in structural shapes. Each of these products would be counted separately although the pig iron might have been transferred to the second establishment for conversion into steel ingots, and the steel ingots transferred to the third plant where they eventuated as structural shapes. The value of the structural shapes in such a case would represent the cumulative efforts of all the establishments and the inclusion of the value of pig iron reported for the first establishment and the value of the steel ingots reported for the second establishment would constitute duplication. Since the operations of these vertically integrated concerns seldom mesh completely from one stage to another, that is since products at the various stages are bought and sold outside the concern, this does not impose a very serious limitation on the findings of the study.

It should be noted, however, that the number of products manufactured by a company may exceed the number of products sold by a company. This study is concerned with the manufacturing activities of each company. If a company manufactures steel rods from which wire is drawn and also manufactures the finished product wire, it appears in this study as manufacturing two products although it may sell only the final product.

#### *Concentration Percentage.*

The concentration percentage of a product is the ratio of a company's value output of that product to the total domestic value output of the product.

APPENDIX B

BASIC DATA FOR EACH OF THE LARGEST 50 MANUFACTURING COMPANIES IN THE UNITED STATES, 1937

COMPANY A

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	11.2	6.5	55.....	0.1	6.4
2.....	10.1	45.8	56.....	.1	20.5
3.....	10.0	22.5	57.....	.1	46.1
4.....	8.7	92.5	58.....	.1	42.6
5.....	7.4	30.8	59.....	.1	12.0
6.....	6.6	40.6	60.....	.1	32.8
7.....	4.5	17.6	61.....	.1	18.6
8.....	4.3	35.3	62.....	.1	25.1
9.....	3.8	23.5	63.....	.1	44.2
10.....	3.0	14.4	64.....	.1	4.4
11.....	2.8	46.1	65.....	.1	54.5
12.....	1.6	8.3	66.....	.1	100.0
13.....	1.6	3.1	67.....	.1	2.4
14.....	1.4	22.6	68.....	.1	2.4
15.....	1.2	47.4	69.....	.1	12.6
16.....	1.1	41.4	70.....	.1	8.1
17.....	1.1	19.5	71.....	.1	.5
18.....	.9	5.6	72.....	.1	1.9
19.....	.9	4.8	73.....	.1	13.6
20.....	.8	66.7	74.....	.1	.3
21.....	.8	41.1	75.....	.1	.2
22.....	.8	20.5	76.....	.1	6.0
23.....	.8	26.7	77.....	.1	1.2
24.....	.8	6.6	78.....	.1	6.6
25.....	.7	16.0	79.....	.1	7.7
26.....	.6	30.0	80.....	(2)	4.6
27.....	.6	47.5	81.....	(2)	18.4
28.....	.6	42.7	82.....	(2)	3.4
29.....	.6	8.2	83.....	(2)	1.1
30.....	.6	45.2	84.....	(2)	34.6
31.....	.5	21.6	85.....	(2)	18.5
32.....	.5	.3	86.....	(2)	11.8
33.....	.5	7.6	87.....	(2)	3.6
34.....	.4	22.8	88.....	(2)	(2)
35.....	.4	25.6	89.....	(2)	92.3
36.....	.4	4.0	90.....	(2)	6.8
37.....	.4	58.0	91.....	(2)	21.3
38.....	.4	89.9	92.....	(2)	63.8
39.....	.4	100.0	93.....	(2)	95.4
40.....	.4	5.3	94.....	(2)	(2)
41.....	.4	9.2	95.....	(2)	89.0
42.....	.3	54.9	96.....	(2)	99.4
43.....	.3	31.0	97.....	(2)	1.7
44.....	.3	.4	98.....	(2)	5.7
45.....	.2	30.4	99.....	(2)	1.1
46.....	.2	60.8	100.....	(2)	.5
47.....	.2	13.6	101.....	(2)	.4
48.....	.2	17.9	102.....	(2)	(2)
49.....	.2	1.3	103.....	(2)	7.1
50.....	.2	15.2	104.....	(2)	.5
51.....	.2	14.8	105.....	(2)	.2
52.....	.2	26.2	106.....	(2)	13.6
53.....	.2	74.7	107.....	(2)	.3
54.....	.2	5.4	108.....	(2)	20.6

Total number of Census of Manufactures products.....	108
Total number of Census of Manufactures industries into which the products are classified.....	15
Total number of establishments.....	61
Total number of Census of Manufactures industries into which the establishments are classified.....	7

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY B

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	39.1	79.4	18.....	0.6	42.1
2.....	16.9	86.5	19.....	.6	99.6
3.....	7.0	49.7	20.....	.3	75.6
4.....	5.7	36.3	21.....	.2	65.2
5.....	5.0	66.0	22.....	.2	59.0
6.....	3.9	35.7	23.....	.2	100.0
7.....	3.2	100.0	24.....	.1	3.0
8.....	3.0	100.0	25.....	.1	11.1
9.....	2.5	86.4	26.....	(?)	9.7
10.....	2.2	89.9	27.....	(?)	.1
11.....	1.8	43.8	28.....	(?)	.1
12.....	1.7	72.3	29.....	(?)	3.7
13.....	1.7	17.8	30.....	(?)	1.0
14.....	1.4	43.3	31.....	(?)	53.2
15.....	1.3	100.0	32.....	(?)	4.1
16.....	.7	29.8	33.....	(?)	100.0
17.....	.6	6.8			

Total number of Census of Manufactures products.....	33
Total number of Census of Manufactures industries into which the products are classified.....	8
Total number of establishments.....	19
Total number of Census of Manufactures industries into which the establishments are classified.....	4

## COMPANY C

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	45.6	49.2	15.....	0.1	0.7
2.....	32.9	45.9	16.....	.1	.2
3.....	7.3	75.9	17.....	.1	5.0
4.....	5.5	71.6	18.....	.1	1.3
5.....	2.4	26.8	19.....	.1	2.3
6.....	2.4	24.4	20.....	.1	1.0
7.....	1.0	4.3	21.....	.1	8.2
8.....	.5	.5	22.....	(?)	.9
9.....	.5	77.3	23.....	(?)	.7
10.....	.4	5.2	24.....	(?)	.6
11.....	.3	1.5	25.....	(?)	.2
12.....	.2	3.1	26.....	(?)	(?)
13.....	.2	3.6	27.....	(?)	(?)
14.....	.1	.2	28.....	(?)	(?)

Total number of Census of Manufactures products.....	28
Total number of Census of Manufactures industries into which the products are classified.....	11
Total number of establishments.....	56
Total number of Census of Manufactures industries into which the establishments are classified.....	10

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY D

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	31.4	13.8	31.....	0.2	15.9
2.....	14.1	12.6	32.....	.2	2.6
3.....	8.2	1.5	33.....	.2	.9
4.....	6.4	89.6	34.....	.2	.5
5.....	5.8	42.5	35.....	.1	4.0
6.....	4.8	7.7	36.....	.1	3.4
7.....	3.6	11.1	37.....	.1	3.3
8.....	3.1	17.3	38.....	.1	1.8
9.....	2.3	7.3	39.....	.1	1.8
10.....	2.2	10.6	40.....	.1	.9
11.....	1.7	.9	41.....	.1	.8
12.....	1.6	2.4	42.....	.1	.8
13.....	1.4	10.9	43.....	.1	.7
14.....	1.3	1.9	44.....	.1	.6
15.....	1.3	1.6	45.....	.1	.2
16.....	1.2	.6	46.....	.1	( <sup>2</sup> )
17.....	1.0	.5	47.....	( <sup>2</sup> )	1.1
18.....	.9	1.0	48.....	( <sup>2</sup> )	.8
19.....	.8	4.0	49.....	( <sup>2</sup> )	.1
20.....	.7	1.1	50.....	( <sup>2</sup> )	.8
21.....	.6	8.6	51.....	( <sup>2</sup> )	( <sup>3</sup> )
22.....	.6	2.1	52.....	( <sup>2</sup> )	.1
23.....	.5	2.4	53.....	( <sup>2</sup> )	.1
24.....	.5	.5	54.....	( <sup>2</sup> )	( <sup>2</sup> )
25.....	.5	.4	55.....	( <sup>2</sup> )	.2
26.....	.3	5.9	56.....	( <sup>2</sup> )	.1
27.....	.3	5.4	57.....	( <sup>2</sup> )	( <sup>4</sup> )
28.....	.3	2.3	58.....	( <sup>2</sup> )	.1
29.....	.3	1.4	59.....	( <sup>2</sup> )	.1
30.....	.3	.4	60.....	( <sup>2</sup> )	.2

Total number of Census of Manufactures products.....	60
Total number of Census of Manufactures industries into which the products are classified.....	10
Total number of establishments.....	47
Total number of Census of Manufactures industries into which the establishments are classified.....	5

## COMPANY E

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	22.3	60.8	19.....	0.4	8.2
2.....	17.5	60.4	20.....	.3	21.0
3.....	17.4	51.0	21.....	.3	68.5
4.....	12.2	55.7	22.....	.2	40.0
5.....	6.5	69.1	23.....	.1	.2
6.....	5.6	75.4	24.....	( <sup>2</sup> )	( <sup>3</sup> )
7.....	5.4	75.5	25.....	( <sup>2</sup> )	.5
8.....	2.5	59.3	26.....	( <sup>2</sup> )	.4
9.....	2.4	33.8	27.....	( <sup>2</sup> )	3.5
10.....	1.6	24.6	28.....	( <sup>2</sup> )	1.5
11.....	1.1	21.0	29.....	( <sup>2</sup> )	7.4
12.....	.7	44.9	30.....	( <sup>2</sup> )	4.1
13.....	.7	21.0	31.....	( <sup>2</sup> )	3.4
14.....	.6	4.7	32.....	( <sup>2</sup> )	4.9
15.....	.5	20.9	33.....	( <sup>2</sup> )	1.9
16.....	.5	2.7	34.....	( <sup>2</sup> )	7.6
17.....	.4	53.6	35.....	( <sup>2</sup> )	14.0
18.....	.4	27.4			

Total number of Census of Manufactures products.....	35
Total number of Census of Manufactures industries into which the products are classified.....	8
Total number of establishments.....	26
Total number of Census of Manufactures industries into which the establishments are classified.....	6

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY F

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	78.5	30.1	16.....	0.1	21.0
2.....	10.6	16.1	17.....	.1	10.4
3.....	6.2	41.5	18.....	.1	5.7
4.....	.8	1.0	19.....	( <sup>2</sup> )	6.8
5.....	.6	6.4	20.....	( <sup>2</sup> )	6.8
6.....	.5	35.2	21.....	( <sup>2</sup> )	7.2
7.....	.5	30.1	22.....	( <sup>2</sup> )	4.8
8.....	.3	36.9	23.....	( <sup>2</sup> )	21.4
9.....	.3	27.2	24.....	( <sup>2</sup> )	.2
10.....	.3	5.1	25.....	( <sup>2</sup> )	5.9
11.....	.3	4.9	26.....	( <sup>2</sup> )	4.5
12.....	.3	.2	27.....	( <sup>2</sup> )	3.7
13.....	.2	48.7	28.....	( <sup>2</sup> )	( <sup>2</sup> )
14.....	.2	16.7	29.....	( <sup>2</sup> )	.1
15.....	.1	21.5			

Total number of Census of Manufactures products.....	29
Total number of Census of Manufactures industries into which the products are classified.....	5
Total number of establishments.....	28
Total number of Census of Manufactures industries into which the establishments are classified.....	5

## COMPANY G

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	80.5	22.9	15.....	( <sup>2</sup> )	0.2
2.....	7.7	16.5	16.....	( <sup>2</sup> )	.1
3.....	6.9	10.4	17.....	( <sup>2</sup> )	( <sup>2</sup> )
4.....	2.3	60.0	18.....	( <sup>2</sup> )	.1
5.....	.7	3.3	19.....	( <sup>2</sup> )	.1
6.....	.6	1.4	20.....	( <sup>2</sup> )	( <sup>2</sup> )
7.....	.3	2.3	21.....	( <sup>2</sup> )	( <sup>2</sup> )
8.....	.2	1.2	22.....	( <sup>2</sup> )	( <sup>2</sup> )
9.....	.2	11.5	23.....	( <sup>2</sup> )	20.5
10.....	.2	.8	24.....	( <sup>2</sup> )	10.5
11.....	.2	8.5	25.....	( <sup>2</sup> )	84.8
12.....	.1	.8	26.....	( <sup>2</sup> )	2.0
13.....	( <sup>2</sup> )	2.8	27.....	( <sup>2</sup> )	100.0
14.....	( <sup>2</sup> )	3.8			

Total number of Census of Manufactures products.....	27
Total number of Census of Manufactures industries into which the products are classified.....	9
Total number of establishments.....	17
Total number of Census of Manufactures industries into which the establishments are classified.....	8

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY H

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	15.0	28.2	51	0.1	3.7
2	10.4	21.1	52	.1	5.3
3	7.6	35.0	53	.1	2.7
4	7.3	60.1	54	.1	2.6
5	6.4	23.2	55	.1	2.6
6	4.2	10.1	56	.1	2.5
7	3.8	37.9	57	.1	2.5
8	3.3	65.2	58	.1	2.1
9	3.2	26.7	59	.1	1.8
10	3.2	16.0	60	.1	1.2
11	2.9	24.5	61	.1	1.1
12	2.6	26.7	62	.1	.8
13	2.6	24.9	63	.1	.3
14	2.4	32.9	64	.1	.1
15	2.4	39.3	65	.1	.1
16	2.1	6.6	66	(2)	.1
17	1.8	32.4	67	(2)	1.0
18	1.7	16.0	68	(2)	.1
19	1.6	11.7	69	(2)	(2)
20	1.5	25.1	70	(2)	.3
21	1.4	31.0	71	(2)	1.6
22	1.4	13.6	72	(2)	2.0
23	1.1	25.6	73	(2)	1.6
24	1.0	8.3	74	(2)	.1
25	.8	18.2	75	(2)	.1
26	.7	19.0	76	(2)	4.6
27	.5	5.2	77	(2)	2.4
28	.4	.4	78	(2)	.1
29	.4	4.9	79	(2)	(2)
30	.4	46.5	80	(2)	.1
31	.4	37.3	81	(2)	.9
32	.4	14.0	82	(2)	.3
33	.4	5.3	83	(2)	.7
34	.3	14.5	84	(2)	(2)
35	.3	.4	85	(2)	.1
36	.3	12.3	86	(2)	.7
37	.3	11.4	87	(2)	24.4
38	.2	3.3	88	(2)	1.5
39	.2	6.5	89	(2)	1.2
40	.2	8.3	90	(2)	.1
41	.2	21.1	91	(2)	.4
42	.2	34.3	92	(2)	1.6
43	.2	6.8	93	(2)	.1
44	.2	1.0	94	(2)	(2)
45	.1	100.0	95	(2)	3.2
46	.1	84.0	96	(2)	100.0
47	.1	40.4	97	(2)	6.2
48	.1	6.0	98	(2)	.6
49	.1	13.0	99	(2)	9.4
50	.1	6.8	100	(2)	.7

Total number of Census of Manufactures products ..... 100

Total number of Census of Manufactures industries into which the products are classified ..... 27

Total number of establishments ..... 40

Total number of Census of Manufactures industries into which the establishments are classified ..... 15

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY I

Census of Manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	21.7	20.4	73.....	0.2	10.6
2.....	9.7	15.6	74.....	.1	1.9
3.....	5.4	15.4	75.....	.1	1.1
4.....	4.6	23.9	76.....	.1	4.2
5.....	4.4	24.5	77.....	.1	17.4
6.....	3.4	17.9	78.....	.1	10.1
7.....	3.3	20.9	79.....	.1	27.6
8.....	2.7	23.9	80.....	.1	28.7
9.....	2.6	25.4	81.....	.1	46.2
10.....	2.6	3.2	82.....	.1	4.3
11.....	2.2	8.9	83.....	.1	1.1
12.....	2.0	23.2	84.....	.1	1.3
13.....	1.9	23.4	85.....	.1	7.5
14.....	1.7	17.8	86.....	.1	.3
15.....	1.7	13.9	87.....	.1	2.0
16.....	1.4	26.0	88.....	.1	20.2
17.....	1.3	7.4	89.....	.1	4.0
18.....	1.3	6.8	90.....	.1	8.5
19.....	1.3	16.3	91.....	.1	10.4
20.....	1.1	19.0	92.....	.1	5.7
21.....	.9	25.5	93.....	.1	6.9
22.....	.9	63.3	94.....	.1	18.3
23.....	.9	22.2	95.....	.1	2.5
24.....	.8	4.1	96.....	.1	3.6
25.....	.8	25.7	97.....	.1	2.5
26.....	.7	6.5	98.....	.1	.7
27.....	.7	18.7	99.....	.1	5.0
28.....	.7	3.7	100.....	.1	13.2
29.....	.6	14.3	101.....	.1	6.4
30.....	.6	16.0	102.....	.1	13.8
31.....	.6	30.5	103.....	.1	7.2
32.....	.6	19.6	104.....	.1	31.3
33.....	.5	30.0	105.....	.1	32.9
34.....	.5	5.3	106.....	.1	11.7
35.....	.4	15.9	107.....	.1	5.6
36.....	.4	10.4	108.....	.1	6.1
37.....	.4	10.1	109.....	.1	10.2
38.....	.4	2.2	110.....	.1	11.4
39.....	.4	19.8	111.....	(2)	.6
40.....	.3	9.8	112.....	(2)	1.5
41.....	.3	2.7	113.....	(2)	22.5
42.....	.3	5.4	114.....	(2)	100.0
43.....	.3	17.0	115.....	(2)	1.4
44.....	.3	19.8	116.....	(2)	11.4
45.....	.3	3.1	117.....	(2)	6.8
46.....	.3	1.5	118.....	(2)	5.3
47.....	.3	7.4	119.....	(2)	6.5
48.....	.3	3.0	120.....	(2)	1.5
49.....	.3	19.6	121.....	(2)	4.1
50.....	.3	15.8	122.....	(2)	.5
51.....	.3	11.8	123.....	(2)	12.6
52.....	.3	15.3	124.....	(2)	2.6
53.....	.3	5.8	125.....	(2)	.2
54.....	.2	21.6	126.....	(2)	1.1
55.....	.2	26.3	127.....	(2)	(2)
56.....	.2	20.7	128.....	(2)	15.4
57.....	.2	85.8	129.....	(2)	3.0
58.....	.2	25.0	130.....	(2)	8.1
59.....	.2	23.0	131.....	(2)	.1
60.....	.2	7.8	132.....	(2)	.8
61.....	.2	8.8	133.....	(2)	1.4
62.....	.2	13.3	134.....	(2)	.1
63.....	.2	1.8	135.....	(2)	1.5
64.....	.2	10.9	136.....	(2)	1.5
65.....	.2	62.7	137.....	(2)	2.4
66.....	.2	9.0	138.....	(2)	.2
67.....	.2	33.1	139.....	(2)	(2)
68.....	.2	2.1	140.....	(2)	2.8
69.....	.2	10.7	141.....	(2)	(2)
70.....	.2	19.2	142.....	(2)	2.6
71.....	.2	11.9	143.....	(2)	(2)
72.....	.2	2.4	144.....	(2)	(2)

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY I—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
145	(2)	.0.3	172	(2)	0.5
146	(2)	13.9	173	(2)	.1
147	(2)	.7	174	(2)	12.6
148	(2)	2.8	175	(2)	.9
149	(2)	.1	176	(2)	3.0
150	(2)	.8	177	(2)	9.4
151	(2)	(2)	178	(2)	8.1
152	(2)	(2)	179	(2)	.1
153	(2)	(2)	180	(2)	19.8
154	(2)	(2)	181	(2)	1.7
155	(2)	.8	182	(2)	29.7
156	(2)	.6	183	(2)	7.3
157	(2)	.7	184	(2)	19.2
158	(2)	7.5	185	(2)	.6
159	(2)	41.0	186	(2)	2.0
160	(2)	11.7	187	(2)	12.5
161	(2)	5.0	188	(2)	2.2
162	(2)	1.8	189	(2)	.4
163	(2)	.3	190	(2)	.3
164	(2)	2.9	191	(2)	.4
165	(2)	1.8	192	(2)	.1
166	(2)	32.4	193	(2)	3.2
167	(2)	4.6	194	(2)	(2)
168	(2)	5.3	195	(2)	.1
169	(2)	.9	196	(2)	1.0
170	(2)	.8	197	(2)	(2)
171	(2)	.6			

Total number of Census of Manufactures products..... 197  
 Total number of Census of Manufactures industries into which the products are classified..... 37  
 Total number of establishments..... 330  
 Total number of Census of Manufactures industries into which the establishments are classified..... 25

COMPANY J

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	15.4	13.9	32	0.7	5.2
2	7.3	17.8	33	.7	8.7
3	6.5	33.6	34	.7	17.5
4	5.3	12.2	35	.7	27.1
5	4.7	10.6	36	.7	4.7
6	4.0	10.6	37	.7	8.0
7	3.9	17.1	38	.6	7.4
8	3.1	13.5	39	.6	9.5
9	2.7	23.9	40	.6	10.8
10	2.6	6.1	41	.5	32.1
11	2.2	23.9	42	.4	11.2
12	2.0	9.5	43	.4	9.8
13	1.7	12.6	44	.4	3.9
14	1.6	23.9	45	.4	28.9
15	1.5	24.3	46	.4	39.5
16	1.5	17.4	47	.4	13.9
17	1.5	23.6	48	.4	20.4
18	1.3	9.8	49	.4	8.4
19	1.3	19.5	50	.3	7.5
20	1.2	18.2	51	.3	6.2
21	1.2	7.8	52	.3	9.1
22	1.2	35.1	53	.3	3.6
23	1.1	8.2	54	.3	.8
24	1.1	67.8	55	.3	9.1
25	1.1	9.4	56	.2	30.5
26	1.0	6.2	57	.2	32.4
27	1.0	11.6	58	.2	1.9
28	.9	14.8	59	.2	30.5
29	.9	11.9	60	.2	16.7
30	.8	5.3	61	.2	59.6
31	.8	20.8	62	.2	11.4

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY J—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
63	0.2	7.0	100	(?)	(?)
64	.2	1.7	101	(?)	32.0
65	.2	4.9	102	(?)	3.4
66	.2	13.4	103	(?)	7.4
67	.2	37.0	104	(?)	2.2
68	.2	17.7	105	(?)	2.8
69	.2	7.4	106	(?)	.5
70	.2	8.1	107	(?)	8.1
71	.2	2.6	108	(?)	2.0
72	.2	5.3	109	(?)	2.1
73	.1	9.2	110	(?)	26.5
74	.1	8.7	111	(?)	(?)
75	.1	4.0	112	(?)	.2
76	.1	9.4	113	(?)	.3
77	.1	44.8	114	(?)	.8
78	.1	100.0	115	(?)	.5
79	.1	15.3	116	(?)	7.8
80	.1	9.6	117	(?)	2.7
81	.1	3.0	118	(?)	1.6
82	.1	20.2	119	(?)	.6
83	.1	13.8	120	(?)	.7
84	.1	45.1	121	(?)	.8
85	.1	.8	122	(?)	.9
86	.1	4.6	123	(?)	.1
87	.1	11.2	124	(?)	(?)
88	.1	2.0	125	(?)	17.8
89	.1	32.2	126	(?)	24.4
90	.1	24.0	127	(?)	1.0
91	.1	72.8	128	(?)	6.4
92	.1	3.9	129	(?)	4.7
93	.1	1.0	130	(?)	.6
94	.1	8.2	131	(?)	1.6
95	.1	11.2	132	(?)	.8
96	.1	6.6	133	(?)	10.0
97	.1	1.4	134	(?)	.2
98	.1	2.0	135	(?)	(?)
99	.1	11.3	136	(?)	.3

Total number of Census of Manufactures products	136
Total number of Census of Manufactures industries into which the products are classified	17
Total number of establishments	55
Total number of Census of Manufactures industries into which the establishments are classified	8

<sup>2</sup> Less than 1/10 of 1 percent.

## COMPANY K

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	37.6	29.5	8	0.1	100.0
2	32.3	27.4	9	.1	16.0
3	23.5	16.2	10	.1	10.6
4	4.5	9.6	11	.1	44.1
5	.9	7.5	12	(?)	15.3
6	.6	20.2	13	(?)	.2
7	.2	100.0	14	(?)	(?)

Total number of Census of Manufactures products	14
Total number of Census of Manufactures industries into which the products are classified	2
Total number of establishments	10
Total number of Census of Manufactures industries into which the establishments are classified	2

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY L

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	43.3	33.3	6.....	0.5	9.6
2.....	25.2	19.7	7.....	.2	9.3
3.....	25.0	28.5	8.....	.1	46.8
4.....	2.9	17.9	9.....	.1	9.8
5.....	2.7	17.1	10.....	(?)	9.3

Total number of Census of Manufactures products.....	10
Total number of Census of Manufactures industries into which the products are classified.....	4
Total number of establishments.....	14
Total number of Census of Manufactures industries into which the establishments are classified.....	3

COMPANY M

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	56.7	5.9	22.....	(?)	0.7
2.....	11.5	14.0	23.....	(?)	.4
3.....	8.8	4.7	24.....	(?)	(?)
4.....	6.7	8.1	25.....	(?)	.3
5.....	6.5	7.8	26.....	(?)	.3
6.....	2.9	12.5	27.....	(?)	.2
7.....	1.5	2.1	28.....	(?)	.2
8.....	1.4	19.3	29.....	(?)	.2
9.....	.9	6.8	30.....	(?)	(?)
10.....	.6	18.7	31.....	(?)	.1
11.....	.6	4.8	32.....	(?)	.1
12.....	.5	4.1	33.....	(?)	.1
13.....	.3	1.7	34.....	(?)	.1
14.....	.2	.9	35.....	(?)	(?)
15.....	.2	2.7	36.....	(?)	(?)
16.....	.2	2.0	37.....	(?)	(?)
17.....	.2	4.2	38.....	(?)	(?)
18.....	.1	1.1	39.....	(?)	(?)
19.....	.1	.4	40.....	(?)	(?)
20.....	.1	.2	41.....	(?)	(?)
21.....	(?)	.6	42.....	(?)	(?)

Total number of Census of Manufactures products.....	42
Total number of Census of Manufactures industries into which the products are classified.....	4
Total number of establishments.....	13
Total number of Census of Manufactures industries into which the establishments are classified.....	3

COMPANY N

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	48.3	38.3	12.....	0.4	0.3
2.....	19.8	20.6	13.....	.2	.6
3.....	18.6	10.1	14.....	.2	.5
4.....	4.0	29.3	15.....	.1	.2
5.....	2.7	30.4	16.....	.1	.6
6.....	1.9	18.6	17.....	(?)	(?)
7.....	1.5	15.2	18.....	(?)	9.5
8.....	.9	7.8	19.....	(?)	.1
9.....	.5	24.2	20.....	(?)	(?)
10.....	.4	4.1	21.....	(?)	.5
11.....	.4	8.9	22.....	(?)	(?)

Total number of Census of Manufactures products.....	22
Total number of Census of Manufactures industries into which the products are classified.....	11
Total number of establishments.....	46
Total number of Census of Manufactures industries into which the establishments are classified.....	6

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY O

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	29.1	7.3	49.....	0.1	0.6
2.....	10.1	4.3	50.....	.1	.4
3.....	7.4	10.3	51.....	.1	26.8
4.....	5.8	4.4	52.....	.1	7.9
5.....	3.9	6.6	53.....	.1	.1
6.....	3.7	8.6	54.....	.1	34.2
7.....	3.1	4.7	55.....	.1	7.1
8.....	2.9	4.1	56.....	.1	4.3
9.....	2.3	7.2	57.....	.1	6.9
10.....	2.2	7.4	58.....	.1	3.0
11.....	2.1	2.4	59.....	(2)	.1
12.....	1.8	12.0	60.....	(2)	.4
13.....	1.8	2.8	61.....	(2)	.4
14.....	1.8	4.9	62.....	(2)	.2
15.....	1.7	.5	63.....	(2)	.1
16.....	1.7	14.4	64.....	(2)	.5
17.....	1.5	91.3	65.....	(2)	.2
18.....	1.4	40.5	66.....	(2)	(2)
19.....	1.4	30.0	67.....	(2)	.2
20.....	1.1	5.0	68.....	(2)	.1
21.....	1.1	16.9	69.....	(2)	.4
22.....	.9	2.2	70.....	(2)	(2)
23.....	.7	1.0	71.....	(2)	.4
24.....	.7	1.0	72.....	(2)	(2)
25.....	.7	15.6	73.....	(2)	.2
26.....	.7	5.4	74.....	(2)	.2
27.....	.6	2.7	75.....	(2)	3.4
28.....	.5	8.4	76.....	(2)	1.0
29.....	.5	6.8	77.....	(2)	1.3
30.....	.5	2.7	78.....	(2)	.4
31.....	.5	27.1	79.....	(2)	.5
32.....	.5	25.4	80.....	(2)	4.2
33.....	.4	1.9	81.....	(2)	25.8
34.....	.4	6.2	82.....	(2)	.1
35.....	.4	5.2	83.....	(2)	6.0
36.....	.3	.8	84.....	(2)	(2)
37.....	.3	.9	85.....	(2)	.3
38.....	.3	5.0	86.....	(2)	.6
39.....	.3	7.5	87.....	(2)	.1
40.....	.3	10.3	88.....	(2)	.1
41.....	.3	2.4	89.....	(2)	.1
42.....	.3	.9	90.....	(2)	1.1
43.....	.2	1.2	91.....	(2)	2.9
44.....	.2	7.1	92.....	(2)	.9
45.....	.2	5.8	93.....	(2)	.1
46.....	.2	6.1	94.....	(2)	(2)
47.....	.1	1.0	95.....	(2)	4.9
48.....	.1	3.1	96.....	(2)	7.6

Total number of Census of Manufactures products.....	96
Total number of Census of Manufactures industries into which the products are classified.....	22
Total number of establishments.....	56
Total number of Census of Manufactures industries into which the establishments are classified.....	11

## COMPANY P

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	8.8	67.8	9.....	2.5	18.9
2.....	7.3	75.5	10.....	2.0	47.0
3.....	6.0	19.6	11.....	2.0	78.8
4.....	5.3	28.2	12.....	1.8	66.9
5.....	3.4	32.9	13.....	1.8	33.3
6.....	3.2	41.3	14.....	1.6	14.8
7.....	3.0	46.0	15.....	1.4	31.2
8.....	2.8	33.7	16.....	1.3	49.3

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY P—Continued

Census of Manu- factures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manu- factures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
17	1.2	100.0	90	0.2	22.0
18	1.1	28.9	91	.2	100.0
19	1.0	41.9	92	.2	62.4
20	1.0	100.0	93	.2	100.0
21	1.0	25.2	94	.2	100.0
22	1.0	4.1	95	.2	15.2
23	.9	100.0	96	.2	1.9
24	.9	64.2	97	.2	32.4
25	.9	77.6	98	.2	18.5
26	.9	14.9	99	.2	13.1
27	.9	30.3	100	.2	7.1
28	.9	50.6	101	.2	26.1
29	.9	23.7	102	.2	35.1
30	.8	3.6	103	.2	61.6
31	.8	18.1	104	.2	100.0
32	.8	12.3	105	.1	100.0
33	.8	3.7	106	.1	1.3
34	.8	16.9	107	.1	.6
35	.7	9.7	108	.1	21.9
36	.7	30.2	109	.1	10.5
37	.7	13.7	110	.1	24.6
38	.7	30.7	111	.1	32.7
39	.6	25.7	112	.1	42.1
40	.6	58.8	113	.1	20.2
41	.6	53.2	114	.1	30.9
42	.6	41.3	115	.1	35.0
43	.6	30.9	116	.1	53.2
44	.6	30.9	117	.1	68.0
45	.6	21.8	118	.1	93.6
46	.6	23.6	119	.1	59.4
47	.5	7.9	120	.1	91.7
48	.5	6	121	.1	38.7
49	.5	1.7	122	.1	100.0
50	.5	45.4	123	.1	100.0
51	.5	18.6	124	.1	.6
52	.5	4.6	125	.1	32.4
53	.4	53.9	126	.1	24.9
54	.4	39.9	127	.1	9.3
55	.4	4.2	128	.1	16.0
56	.4	5.8	129	.1	56.5
57	.4	21.5	130	.1	13.5
58	.4	24.7	131	.1	9.5
59	.4	38.1	132	.1	20.3
60	.4	24.4	133	.1	38.8
61	.3	27.6	134	.1	1.7
62	.3	38.1	135	.1	4.7
63	.3	24.4	136	.1	1.5
64	.3	10.3	137	.1	5.9
65	.3	34.0	138	.1	7.4
66	.3	7.5	139	.1	23.3
67	.3	12.1	140	.1	10.3
68	.3	16.5	141	.1	2.8
69	.3	41.7	142	.1	14.8
70	.3	100.0	143	.1	8.8
71	.3	2.6	144	.1	2.7
72	.3	6.9	145	.1	8.4
73	.3	31.6	146	.1	16.4
74	.3	7.8	147	.1	16.3
75	.3	19.9	148	.1	18.2
76	.3	16.9	149	.1	100.0
77	.3	15.3	150	(2)	
78	.2	.9	151	(2)	(2) 76.9
79	.2	45.8	152	(2)	22.0
80	.2	13.7	153	(2)	100.0
81	.2	33.0	154	(2)	29.4
82	.2	54.0	155	(2)	55.2
83	.2	99.2	156	(2)	6.2
84	.2	73.7	157	(2)	93.5
85	.2	27.8	158	(2)	.3
86	.2	77.8	159	(2)	19.8
87	.2	42.5	160	(2)	40.1
88	.2	37.6	161	(2)	4.2
89	.2	21.1	162	(2)	63.0

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY P—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
163.....	(2)	10.6	222.....	(2)	13.7
164.....	(2)	19.9	223.....	(2)	3.2
165.....	(2)	38.5	224.....	(2)	3.6
166.....	(2)	53.7	225.....	(2)	2.1
167.....	(2)	55.5	226.....	(2)	8.2
168.....	(2)	(2)	227.....	(2)	10.9
169.....	(2)	7.8	228.....	(2)	23.5
170.....	(2)	10.8	229.....	(2)	7.4
171.....	(2)	24.4	230.....	(2)	1.1
172.....	(2)	34.9	231.....	(2)	(2)
173.....	(2)	.3	232.....	(2)	18.1
174.....	(2)	39.8	233.....	(2)	12.6
175.....	(2)	4.3	234.....	(2)	10.3
176.....	(2)	27.1	235.....	(2)	44.7
177.....	(2)	11.8	236.....	(2)	41.3
178.....	(2)	22.7	237.....	(2)	6.5
179.....	(2)	36.2	238.....	(2)	2.8
180.....	(2)	2.0	239.....	(2)	1.6
181.....	(2)	13.9	240.....	(2)	3.0
182.....	(2)	4.8	241.....	(2)	2.6
183.....	(2)	2.7	242.....	(2)	.5
184.....	(2)	4.3	243.....	(2)	2.8
185.....	(2)	1.9	244.....	(2)	.1
186.....	(2)	100.0	245.....	(2)	3.6
187.....	(2)	45.5	246.....	(2)	(2)
188.....	(2)	61.7	247.....	(2)	5.8
189.....	(2)	83.5	248.....	(2)	8.5
190.....	(2)	2.2	249.....	(2)	1.7
191.....	(2)	100.0	250.....	(2)	2.9
192.....	(2)	100.0	251.....	(2)	(2)
193.....	(2)	100.0	252.....	(2)	1.1
194.....	(2)	7.0	253.....	(2)	3.4
195.....	(2)	2.3	254.....	(2)	9.4
196.....	(2)	55.6	255.....	(2)	15.0
197.....	(2)	80.1	256.....	(2)	3.5
198.....	(2)	87.1	257.....	(2)	.9
199.....	(2)	1.4	258.....	(2)	1.4
200.....	(2)	.4	259.....	(2)	16.2
201.....	(2)	2.4	260.....	(2)	2.4
202.....	(2)	4.1	261.....	(2)	1.1
203.....	(2)	.3	262.....	(2)	2.2
204.....	(2)	15.3	263.....	(2)	9.1
205.....	(2)	100.0	264.....	(2)	.8
206.....	(2)	1.2	265.....	(2)	2.4
207.....	(2)	31.8	266.....	(2)	3.1
208.....	(2)	20.9	267.....	(2)	14.7
209.....	(2)	7.3	268.....	(2)	.1
210.....	(2)	1.3	269.....	(2)	.2
211.....	(2)	33.2	270.....	(2)	.1
212.....	(2)	.6	271.....	(2)	(2)
213.....	(2)	.2	272.....	(2)	.6
214.....	(2)	.2	273.....	(2)	6.0
215.....	(2)	73.8	274.....	(2)	2.2
216.....	(2)	8.6	275.....	(2)	(2)
217.....	(2)	.7	276.....	(2)	9.3
218.....	(2)	7.7	277.....	(2)	1.4
219.....	(2)	2.6	278.....	(2)	.4
220.....	(2)	7.5	279.....	(2)	100.0
221.....	(2)	2.8			

Total number of Census of Manufactures Products.....	279
Total number of Census of Manufactures industries into which the products are classified.....	30
Total number of establishments.....	80
Total number of Census of Manufactures industries into which the establishments are classified.....	17

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY Q

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	11.2	78.5	40.....	0.3	4.7
2.....	9.7	84.1	41.....	.3	43.5
3.....	6.9	60.7	42.....	.3	68.2
4.....	6.0	70.7	43.....	.2	.1
5.....	5.9	98.7	44.....	.2	( <sup>2</sup> )
6.....	5.4	62.3	45.....	.2	10.3
7.....	4.1	76.6	46.....	.2	12.7
8.....	3.9	99.8	47.....	.2	3.5
9.....	3.7	3.8	48.....	.2	1.8
10.....	3.6	92.8	49.....	.2	14.3
11.....	3.5	33.5	50.....	.2	6.0
12.....	2.9	30.8	51.....	.2	43.6
13.....	2.8	70.2	52.....	.1	1.2
14.....	2.7	84.3	53.....	.1	.5
15.....	2.0	4.8	54.....	.1	5.5
16.....	1.9	65.2	55.....	.1	27.3
17.....	1.8	79.1	56.....	.1	5.9
18.....	1.8	4.4	57.....	.1	7.8
19.....	1.6	81.6	58.....	.1	49.1
20.....	1.6	43.7	59.....	.1	.7
21.....	1.5	16.5	60.....	( <sup>2</sup> )	8.5
22.....	1.4	32.0	61.....	( <sup>2</sup> )	28.8
23.....	1.3	23.4	62.....	( <sup>2</sup> )	( <sup>2</sup> )
24.....	1.3	15.8	63.....	( <sup>2</sup> )	11.6
25.....	.8	75.3	64.....	( <sup>2</sup> )	11.6
26.....	.7	25.2	65.....	( <sup>2</sup> )	.1
27.....	.7	7.0	66.....	( <sup>2</sup> )	( <sup>2</sup> )
28.....	.7	59.5	67.....	( <sup>2</sup> )	.3
29.....	.7	4.0	68.....	( <sup>2</sup> )	( <sup>2</sup> )
30.....	.6	24.5	69.....	( <sup>2</sup> )	.2
31.....	.5	6.3	70.....	( <sup>2</sup> )	.2
32.....	.5	11.4	71.....	( <sup>2</sup> )	.3
33.....	.5	11.5	72.....	( <sup>2</sup> )	( <sup>2</sup> )
34.....	.5	14.8	73.....	( <sup>2</sup> )	1.0
35.....	.4	43.8	74.....	( <sup>2</sup> )	2.2
36.....	.4	19.0	75.....	( <sup>2</sup> )	3.5
37.....	.4	52.7	76.....	( <sup>2</sup> )	1.5
38.....	.3	27.2	77.....	( <sup>2</sup> )	.5
39.....	.3	5.9			

Total number of Census of Manufactures products.....	77
Total number of Census of Manufactures industries into which the products are classified.....	17
Total number of establishments.....	14
Total number of Census of Manufactures industries into which the establishments are classified.....	9

## COMPANY R

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	33.5	29.3	17.....	0.7	15.0
2.....	13.9	17.7	18.....	.6	27.4
3.....	11.6	9.9	19.....	.6	13.1
4.....	5.2	66.2	20.....	.5	13.8
5.....	5.0	34.7	21.....	.5	20.1
6.....	3.7	25.7	22.....	.5	7.0
7.....	2.3	28.5	23.....	.4	24.1
8.....	2.2	18.9	24.....	.4	4.2
9.....	1.6	16.7	25.....	.4	13.2
10.....	1.5	19.5	26.....	.4	2.2
11.....	1.2	4.3	27.....	.4	44.2
12.....	.9	48.8	28.....	.4	64.2
13.....	.9	17.2	29.....	.3	7.0
14.....	.8	1.2	30.....	.3	4.1
15.....	.8	3.3	31.....	.3	15.5
16.....	.7	2.6	32.....	.3	12.8

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY R—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
33	0.3	14.1	89	(2)	5.5
34	.2	.6	90	(2)	1.4
35	.2	18.9	91	(2)	2.4
36	.2	5.3	92	(2)	4.0
37	.2	3.2	93	(2)	.1
38	.2	57.0	94	(2)	1.3
39	.2	10.8	95	(2)	.1
40	.2	.9	96	(2)	(2)
41	.2	69.0	97	(2)	(2)
42	.1	.1	98	(2)	1.8
43	.1	2.2	99	(2)	.8
44	.1	2.7	100	(2)	1.3
45	.1	5.6	101	(2)	11.7
46	.1	.4	102	(2)	2.8
47	.1	.6	103	(2)	.4
48	.1	3.3	104	(2)	.1
49	.1	16.8	105	(2)	(2)
50	.1	2.4	106	(2)	8.5
51	.1	8.5	107	(2)	46.9
52	.1	1.5	108	(2)	.1
53	.1	1.0	109	(2)	.8
54	.1	32.8	110	(2)	3.3
55	.1	4.5	111	(2)	(2)
56	.1	25.7	112	(2)	.7
57	(2)	.1	113	(2)	1.0
58	(2)	.2	114	(2)	4.5
59	(2)	(2)	115	(2)	(2)
60	(2)	1.9	116	(2)	.4
61	(2)	.1	117	(2)	.8
62	(2)	1.7	118	(2)	.9
63	(2)	.1	119	(2)	.8
64	(2)	.1	120	(2)	6.6
65	(2)	13.6	121	(2)	.1
66	(2)	(2)	122	(2)	.1
67	(2)	6.9	123	(2)	(2)
68	(2)	(2)	124	(2)	(2)
69	(2)	.9	125	(2)	(2)
70	(2)	1.7	126	(2)	.4
71	(2)	(2)	127	(2)	1.2
72	(2)	.5	128	(2)	.1
73	(2)	.5	129	(2)	(2)
74	(2)	.1	130	(2)	.7
75	(2)	1.0	131	(2)	3.0
76	(2)	1.7	132	(2)	2.4
77	(2)	.1	133	(2)	35.0
78	(2)	.7	134	(2)	.5
79	(2)	.1	135	(2)	4.4
80	(2)	.3	136	(2)	.5
81	(2)	.3	137	(2)	.4
82	(2)	2.9	138	(2)	.8
83	(2)	.2	139	(2)	1.0
84	(2)	.5	140	(2)	2.3
85	(2)	6.9	141	(2)	2.8
86	(2)	83.6	142	(2)	18.2
87	(2)	.3	143	(2)	13.2
88	(2)	.7			

Total number of Census of Manufactures products..... 143

Total number of Census of Manufactures industries into which the products are classified..... 39

Total number of establishments..... 49

Total number of Census of Manufactures industries into which the establishments are classified..... 22

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY S

Census of Manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	8.4	64.7	73.....	0.4	15.7
2.....	5.2	24.7	74.....	.4	24.9
3.....	4.2	20.4	75.....	.3	28.7
4.....	3.7	36.9	76.....	.3	93.4
5.....	3.4	38.3	77.....	.3	24.2
6.....	3.2	17.2	78.....	.3	45.1
7.....	2.6	50.1	79.....	.3	39.5
8.....	2.3	24.0	80.....	.3	67.3
9.....	2.3	47.6	81.....	.3	41.0
10.....	2.3	46.3	82.....	.3	87.8
11.....	2.2	48.0	83.....	.3	64.6
12.....	1.9	36.0	84.....	.3	13.3
13.....	1.9	15.6	85.....	.3	25.0
14.....	1.8	40.1	86.....	.3	7.2
15.....	1.4	49.1	87.....	.3	14.2
16.....	1.2	39.1	88.....	.3	9.6
17.....	1.2	51.0	89.....	.3	28.7
18.....	1.1	47.7	90.....	.3	8.0
19.....	1.1	37.4	91.....	.3	41.4
20.....	1.1	28.8	92.....	.2	5.9
21.....	1.1	57.0	93.....	.2	89.7
22.....	1.0	23.3	94.....	.2	25.6
23.....	.9	22.5	95.....	.2	46.3
24.....	.9	48.3	96.....	.2	50.0
25.....	.8	60.0	97.....	.2	15.5
26.....	.8	58.4	98.....	.2	28.2
27.....	.8	3.7	99.....	.2	22.4
28.....	.7	20.0	100.....	.2	94.4
29.....	.7	58.2	101.....	.2	77.4
30.....	.7	52.5	102.....	.2	23.9
31.....	.7	52.8	103.....	.2	14.6
32.....	.7	60.3	104.....	.2	7.2
33.....	.7	3.3	105.....	.2	30.7
34.....	.7	6.1	106.....	.2	37.2
35.....	.7	1.1	107.....	.2	29.5
36.....	.6	45.4	108.....	.2	47.8
37.....	.6	26.1	109.....	.2	51.1
38.....	.6	25.3	110.....	.2	42.2
39.....	.6	47.0	111.....	.2	38.0
40.....	.6	14.6	112.....	.2	14.8
41.....	.6	49.6	113.....	.2	7.4
42.....	.6	58.3	114.....	.2	6.4
43.....	.6	17.9	115.....	.2	16.1
44.....	.6	14.6	116.....	.2	50.1
45.....	.6	8.9	117.....	.2	28.7
46.....	.5	11.5	118.....	.2	6.3
47.....	.5	44.8	119.....	.2	8.3
48.....	.5	60.8	120.....	.1	33.1
49.....	.5	61.4	121.....	.1	15.9
50.....	.5	95.4	122.....	.1	8.0
51.....	.5	89.6	123.....	.1	4.8
52.....	.5	28.5	124.....	.1	8.0
53.....	.5	39.8	125.....	.1	27.9
54.....	.5	66.3	126.....	.1	86.0
55.....	.5	26.0	127.....	.1	76.6
56.....	.5	14.6	128.....	.1	31.0
57.....	.5	23.5	129.....	.1	33.4
58.....	.4	.4	130.....	.1	36.0
59.....	.4	1.1	131.....	.1	51.2
60.....	.4	76.3	132.....	.1	78.3
61.....	.4	.7	133.....	.1	23.7
62.....	.4	53.2	134.....	.1	51.4
63.....	.4	78.7	135.....	.1	5.7
64.....	.4	41.9	136.....	.1	4.5
65.....	.4	37.1	137.....	.1	15.8
66.....	.4	44.9	138.....	.1	36.4
67.....	.4	74.3	139.....	.1	22.4
68.....	.4	91.8	140.....	.1	21.2
69.....	.4	31.4	141.....	.1	94.4
70.....	.4	25.2	142.....	.1	6.0
71.....	.4	20.8	143.....	.1	5.3
72.....	.4	45.5	144.....	.1	10.4

The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY S—Continued

Census of manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
145.....	0.1	54.3	217.....	(2)	6.2
146.....	.1	22.0	218.....	(2)	26.0
147.....	.1	42.8	219.....	(2)	15.5
148.....	.1	61.0	220.....	(2)	44.4
149.....	.1	19.6	221.....	(2)	9.8
150.....	.1	77.9	222.....	(2)	51.9
151.....	.1	87.3	223.....	(2)	39.0
152.....	.1	10.3	224.....	(2)	50.5
153.....	.1	9.7	225.....	(2)	13.3
154.....	.1	2.5	226.....	(2)	34.6
155.....	.1	64.1	227.....	(2)	4.8
156.....	.1	77.9	228.....	(2)	11.7
157.....	.1	.5	229.....	(2)	24.7
158.....	.1	76.9	230.....	(2)	33.4
159.....	.1	51.7	231.....	(2)	12.5
160.....	.1	17.3	232.....	(2)	25.0
161.....	.1	20.9	233.....	(2)	10.5
162.....	.1	11.5	234.....	(2)	44.5
163.....	.1	19.8	235.....	(2)	2.2
164.....	.1	24.7	236.....	(2)	28.9
165.....	.1	18.8	237.....	(2)	13.8
166.....	.1	17.1	238.....	(2)	4.3
167.....	.1	28.4	239.....	(2)	12.3
168.....	.1	1.2	240.....	(2)	10.9
169.....	.1	14.8	241.....	(2)	9.1
170.....	.1	8.3	242.....	(2)	20.8
171.....	.1	10.5	243.....	(2)	6.6
172.....	.1	9.3	244.....	(2)	1.5
173.....	.1	15.3	245.....	(2)	2.7
174.....	.1	15.9	246.....	(2)	27.7
175.....	.1	.8	247.....	(2)	40.4
176.....	.1	4.8	248.....	(2)	47.1
177.....	(2)	.2	249.....	(2)	15.3
178.....	(2)	.3	250.....	(2)	84.2
179.....	(2)	.1	251.....	(2)	21.9
180.....	(2)	.1	252.....	(2)	.8
181.....	(2)	.1	253.....	(2)	5.2
182.....	(2)	.1	254.....	(2)	10.9
183.....	(2)	.3	255.....	(2)	14.0
184.....	(2)	2.4	256.....	(2)	17.2
185.....	(2)	(2)	257.....	(2)	51.5
186.....	(2)	.1	258.....	(2)	25.0
187.....	(2)	1.3	259.....	(2)	16.2
188.....	(2)	5.3	260.....	(2)	6.2
189.....	(2)	14.3	261.....	(2)	2.2
190.....	(2)	22.1	262.....	(2)	4.5
191.....	(2)	3.8	263.....	(2)	7.0
192.....	(2)	1.3	264.....	(2)	26.9
193.....	(2)	.6	265.....	(2)	1.9
194.....	(2)	5.1	266.....	(2)	5.0
195.....	(2)	8.8	267.....	(2)	5.4
196.....	(2)	61.3	268.....	(2)	17.4
197.....	(2)	100.0	269.....	(2)	9.1
198.....	(2)	66.5	270.....	(2)	.5
199.....	(2)	35.7	271.....	(2)	6.5
200.....	(2)	19.6	272.....	(2)	1.5
201.....	(2)	25.2	273.....	(2)	4.3
202.....	(2)	8.6	274.....	(2)	6.1
203.....	(2)	3.5	275.....	(2)	.5
204.....	(2)	13.6	276.....	(2)	.2
205.....	(2)	67.0	277.....	(2)	4.4
206.....	(2)	9.1	278.....	(2)	3.6
207.....	(2)	9.0	279.....	(2)	1.0
208.....	(2)	.1	280.....	(2)	1.4
209.....	(2)	10.0	281.....	(2)	3.6
210.....	(2)	3.7	282.....	(2)	6.7
211.....	(2)	9.3	283.....	(2)	19.4
212.....	(2)	7.3	284.....	(2)	.5
213.....	(2)	1.0	285.....	(2)	2.0
214.....	(2)	15.4	286.....	(2)	1.7
215.....	(2)	10.6	287.....	(2)	21.5
216.....	(2)	2.8	288.....	(2)	3.7

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States 1937—Continued

## COMPANY S—Continued

Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
289.....	(2)	.7	296.....	(2)	3.2
290.....	(2)	4.8	297.....	(2)	10.0
291.....	(2)	1.8	298.....	(2)	5.1
292.....	(2)	14.5	299.....	(2)	23.1
293.....	(2)	4.5	300.....	(2)	26.6
294.....	(2)	4.1	301.....	(2)	2.8
295.....	(2)	.6	302.....	(2)	5.6

Total number of Census of Manufactures products.....	302
Total number of Census of Manufactures industries into which the products are classified.....	28
Total number of establishments.....	63
Total number of Census of Manufactures industries into which the establishments are classified.....	14

## COMPANY T

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	61.0	15.1	13.....	0.1	0.3
2.....	13.1	15.9	14.....	.1	2.5
3.....	9.1	4.1	15.....	.1	1.8
4.....	3.0	10.5	16.....	.1	5.5
5.....	2.9	3.1	17.....	(2)	.7
6.....	2.8	22.5	18.....	(2)	6.9
7.....	2.7	9.9	19.....	(2)	.4
8.....	2.1	5.5	20.....	(2)	3.7
9.....	1.2	21.0	21.....	(2)	.2
10.....	1.1	22.9	22.....	(2)	6.2
11.....	.3	3.1	23.....	(2)	(2)
12.....	.3	1.5	24.....	(2)	.2

Total number of Census of Manufactures products.....	24
Total number of Census of Manufactures industries into which the products are classified.....	5
Total number of establishments.....	25
Total number of Census of Manufactures industries into which the establishments are classified.....	4

## COMPANY U

Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	21.4	44.2	21.....	0.6	59.0
2.....	18.3	37.1	22.....	.6	99.3
3.....	8.2	24.7	23.....	.5	39.5
4.....	8.0	77.3	24.....	.5	17.6
5.....	5.8	64.6	25.....	.5	89.0
6.....	4.8	57.8	26.....	.5	49.3
7.....	2.5	40.6	27.....	.5	54.9
8.....	2.4	39.5	28.....	.4	10.3
9.....	2.1	56.8	29.....	.4	45.8
10.....	1.6	46.7	30.....	.4	48.7
11.....	1.3	79.8	31.....	.4	14.6
12.....	1.2	47.2	32.....	.4	38.4
13.....	1.2	24.7	33.....	.4	85.7
14.....	1.1	25.8	34.....	.4	13.6
15.....	1.0	7.7	35.....	.4	70.9
16.....	1.0	15.6	36.....	.4	16.2
17.....	.9	29.3	37.....	.4	19.7
18.....	.9	25.9	38.....	.4	77.5
19.....	.7	11.9	39.....	.3	49.1
20.....	.6	29.8	40.....	.3	25.7

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY U—Continued

Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
41.....	0.3	26.8	103.....	(2)	20.5
42.....	.3	6.8	104.....	(2)	6.0
43.....	.3	40.0	105.....	(2)	27.7
44.....	.3	27.4	106.....	(2)	9.3
45.....	.2	15.2	107.....	(2)	.9
46.....	.2	28.9	108.....	(2)	8.6
47.....	.2	52.3	109.....	(2)	5.3
48.....	.2	33.7	110.....	(2)	3.4
49.....	.2	11.5	111.....	(2)	.8
50.....	.2	24.7	112.....	(2)	2.4
51.....	.2	21.5	113.....	(2)	.1
52.....	.2	59.5	114.....	(2)	.4
53.....	.2	22.9	115.....	(2)	1.9
54.....	.2	20.0	116.....	(2)	66.3
55.....	.2	23.3	117.....	(2)	.3
56.....	.1	.7	118.....	(2)	10.9
57.....	.1	15.2	119.....	(2)	1.1
58.....	.1	38.6	120.....	(2)	7.4
59.....	.1	45.1	121.....	(2)	23.4
60.....	.1	3.6	122.....	(2)	.6
61.....	.1	26.3	123.....	(2)	16.8
62.....	.1	63.6	124.....	(2)	.5
63.....	.1	2.5	125.....	(2)	.8
64.....	.1	27.5	126.....	(2)	.3
65.....	.1	54.7	127.....	(2)	.5
66.....	.1	36.1	128.....	(2)	22.3
67.....	.1	32.6	129.....	(2)	39.3
68.....	.1	4.9	130.....	(2)	53.8
69.....	.1	32.2	131.....	(2)	19.2
70.....	.1	27.3	132.....	(2)	27.1
71.....	.1	32.9	133.....	(2)	9.9
72.....	.1	38.2	134.....	(2)	27.9
73.....	.1	26.0	135.....	(2)	.8
74.....	.1	55.1	136.....	(2)	16.5
75.....	.1	7.6	137.....	(2)	1.2
76.....	.1	50.0	138.....	(2)	69.4
77.....	.1	60.4	139.....	(2)	4.3
78.....	.1	38.2	140.....	(2)	.8
79.....	.1	2.6	141.....	(2)	.2
80.....	.1	36.6	142.....	(2)	3.5
81.....	.1	28.0	143.....	(2)	41.7
82.....	.1	35.7	144.....	(2)	55.9
83.....	.1	64.0	145.....	(2)	38.7
84.....	(2)	.7	146.....	(2)	27.9
85.....	(2)	.1	147.....	(2)	.1
86.....	(2)	4.9	148.....	(2)	7.6
87.....	(2)	(2)	149.....	(2)	2.6
88.....	(2)	3.3	150.....	(2)	33.7
89.....	(2)	1.7	151.....	(2)	3.5
90.....	(2)	5.9	152.....	(2)	7.7
91.....	(2)	2.9	153.....	(2)	3.7
92.....	(2)	2.1	154.....	(2)	1.3
93.....	(2)	(2)	155.....	(2)	1.6
94.....	(2)	.2	156.....	(2)	.1
95.....	(2)	19.9	157.....	(2)	7.3
96.....	(2)	.4	158.....	(2)	3.0
97.....	(2)	.2	159.....	(2)	30.5
98.....	(2)	.5	160.....	(2)	3.2
99.....	(2)	86.9	161.....	(2)	1.7
100.....	(2)	17.1	162.....	(2)	.7
101.....	(2)	4.7	163.....	(2)	.8
102.....	(2)	3.6			

Total number of Census of Manufactures products.....	163
Total number of Census of Manufactures industries into which the products are classified.....	31
Total number of establishments.....	86
Total number of Census of Manufactures industries into which the establishments are classified.....	15

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY V

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	28.3	15.3	38.....	0.4	3.7
2.....	13.9	12.1	39.....	.4	3.9
3.....	8.2	39.8	40.....	.4	27.7
4.....	5.9	14.4	41.....	.4	2.8
5.....	4.5	16.4	42.....	.3	13.9
6.....	2.3	15.6	43.....	.3	8.9
7.....	2.1	24.8	44.....	.3	10.5
8.....	1.9	22.9	45.....	.3	3.8
9.....	1.6	11.2	46.....	.3	6.1
10.....	1.6	49.1	47.....	.2	1.1
11.....	1.5	15.6	48.....	.2	.9
12.....	1.4	26.8	49.....	.2	2.6
13.....	1.4	14.5	50.....	.2	11.6
14.....	1.3	22.8	51.....	.2	9.5
15.....	1.2	69.9	52.....	.2	4.1
16.....	1.1	33.9	53.....	.2	3.0
17.....	1.1	9.7	54.....	.2	14.7
18.....	1.1	17.5	55.....	.2	34.7
19.....	1.0	15.8	56.....	.2	56.1
20.....	1.0	21.6	57.....	.2	31.5
21.....	1.0	27.6	58.....	.1	.5
22.....	.9	17.7	59.....	.1	8.2
23.....	.9	13.8	60.....	.1	5.6
24.....	.8	15.8	61.....	.1	3.0
25.....	.7	27.7	62.....	.1	36.7
26.....	.7	32.7	63.....	.1	1.2
27.....	.7	14.1	64.....	.1	9.5
28.....	.7	18.8	65.....	.1	3.8
29.....	.6	23.0	66.....	.1	22.8
30.....	.6	10.3	67.....	(2)	1.8
31.....	.6	16.3	68.....	(2)	
32.....	.6	7.1	69.....	(2)	.1
33.....	.6	22.9	70.....	(2)	.5
34.....	.5	21.7	71.....	(2)	12.4
35.....	.5	14.6	72.....	(2)	1.1
36.....	.5	44.3	73.....	(2)	4.8
37.....	.5	45.5	74.....	(2)	35.6

Total number of Census of Manufactures products..... 74

Total number of Census of Manufactures industries into which the products are classified..... 6

Total number of establishments..... 8

Total number of Census of Manufactures industries into which the establishments are classified..... 6

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY W

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	37.4	23.1	30.....	0.2	16.0
2.....	24.6	24.6	31.....	.2	25.7
3.....	9.8	36.3	32.....	.2	100.0
4.....	8.4	23.6	33.....	.2	1.5
5.....	3.1	95.7	34.....	.2	7.5
6.....	1.8	14.8	35.....	.1	2.0
7.....	1.5	13.9	36.....	.1	5.6
8.....	1.4	10.8	37.....	.1	5.7
9.....	1.2	13.9	38.....	.1	1.1
10.....	.9	3.8	39.....	.1	33.5
11.....	.9	19.4	40.....	.1	17.9
12.....	.7	15.7	41.....	( <sup>2</sup> )	3.7
13.....	.7	10.7	42.....	( <sup>2</sup> )	3.4
14.....	.6	12.5	43.....	( <sup>2</sup> )	42.2
15.....	.6	28.8	44.....	( <sup>2</sup> )	22.4
16.....	.5	21.1	45.....	( <sup>2</sup> )	100.0
17.....	.5	5.5	46.....	( <sup>2</sup> )	36.2
18.....	.4	6.6	47.....	( <sup>2</sup> )	7.5
19.....	.4	7.5	48.....	( <sup>2</sup> )	.1
20.....	.4	11.9	49.....	( <sup>2</sup> )	3.4
21.....	.4	22.5	50.....	( <sup>2</sup> )	.4
22.....	.4	20.3	51.....	( <sup>2</sup> )	4.2
23.....	.3	9.5	52.....	( <sup>2</sup> )	( <sup>2</sup> )
24.....	.3	26.0	53.....	( <sup>2</sup> )	.7
25.....	.3	29.3	54.....	( <sup>2</sup> )	81.7
26.....	.3	2.5	55.....	( <sup>2</sup> )	.1
27.....	.2	1.4	56.....	( <sup>2</sup> )	3.3
28.....	.2	7.7	57.....	( <sup>2</sup> )	( <sup>2</sup> )
29.....	.2	3.3	58.....	( <sup>2</sup> )	.2

Total number of Census of Manufactures products.....	58
Total number of Census of Manufactures industries into which the products are classified.....	7
Total number of establishments.....	14
Total number of Census of Manufactures industries into which the establishments are classified.....	4

## COMPANY X

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	57.7	6.9	13.....	0.3	0.4
2.....	15.2	9.4	14.....	.2	4.1
3.....	8.4	11.8	15.....	.2	5.5
4.....	6.4	10.0	16.....	.1	2.4
5.....	5.0	6.9	17.....	.1	5.6
6.....	2.3	12.9	18.....	.1	3.9
7.....	1.1	5.3	19.....	( <sup>2</sup> )	.6
8.....	.9	1.4	20.....	( <sup>2</sup> )	.7
9.....	.7	5.9	21.....	( <sup>2</sup> )	1.1
10.....	.5	6.1	22.....	( <sup>2</sup> )	.1
11.....	.5	10.3	23.....	( <sup>2</sup> )	1.1
12.....	.3	2.8	24.....	( <sup>2</sup> )	.2

Total number of Census of Manufactures products.....	24
Total number of Census of Manufactures industries into which the products are classified.....	4
Total number of establishments.....	10
Total number of Census of Manufactures industries into which the establishments are classified.....	3

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY Y

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	33.8	16.1	5.....	1.4	2.4
2.....	35.2	8.4	6.....	.3	.5
3.....	20.2	11.7	7.....	.3	1.2
4.....	8.7	6.9	8.....	.1	( <sup>2</sup> )

Total number of Census of Manufactures products.....	8
Total number of Census of Manufactures industries into which the products are classified.....	4
Total number of establishments.....	24
Total number of Census of Manufactures industries into which the establishments are classified.....	2

## COMPANY Z

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	18.5	29.6	35.....	0.2	2.2
2.....	17.0	51.6	36.....	.2	8.3
3.....	13.1	28.6	37.....	.2	4.2
4.....	10.7	42.9	38.....	.1	1.8
5.....	6.3	26.8	39.....	.1	2.1
6.....	4.8	69.2	40.....	.1	.1
7.....	4.7	6.8	41.....	.1	1.2
8.....	4.6	2.0	42.....	.1	2.5
9.....	3.5	1.9	43.....	.1	.5
10.....	1.8	67.3	44.....	.1	1.9
11.....	1.5	60.4	45.....	.1	2.8
12.....	1.1	1.5	46.....	( <sup>2</sup> )	1.6
13.....	1.1	7.1	47.....	( <sup>2</sup> )	1.2
14.....	.9	63.7	48.....	( <sup>2</sup> )	1.1
15.....	.8	85.5	49.....	( <sup>2</sup> )	1.7
16.....	.8	3.2	50.....	( <sup>2</sup> )	( <sup>2</sup> )
17.....	.7	3.2	51.....	( <sup>2</sup> )	( <sup>2</sup> )
18.....	.7	1.0	52.....	( <sup>2</sup> )	.9
19.....	.7	15.7	53.....	( <sup>2</sup> )	.1
20.....	.6	6.0	54.....	( <sup>2</sup> )	.2
21.....	.6	14.1	55.....	( <sup>2</sup> )	1.3
22.....	.5	4.7	56.....	( <sup>2</sup> )	1.2
23.....	.5	2.5	57.....	( <sup>2</sup> )	( <sup>2</sup> )
24.....	.4	8.2	58.....	( <sup>2</sup> )	.3
25.....	.4	2.3	59.....	( <sup>2</sup> )	57.4
26.....	.3	1.6	60.....	( <sup>2</sup> )	.1
27.....	.3	31.1	61.....	( <sup>2</sup> )	.3
28.....	.3	1.5	62.....	( <sup>2</sup> )	( <sup>2</sup> )
29.....	.3	33.9	63.....	( <sup>2</sup> )	.3
30.....	.3	21.3	64.....	( <sup>2</sup> )	2.3
31.....	.2	3.9	65.....	( <sup>2</sup> )	5.7
32.....	.2	.8	66.....	( <sup>2</sup> )	4.2
33.....	.2	3.7	67.....	( <sup>2</sup> )	2.9
34.....	.2	1.1			

Total number of Census of Manufactures products.....	67
Total number of Census of Manufactures industries into which the products are classified.....	16
Total number of establishments.....	19
Total number of Census of Manufactures industries into which the establishments are classified.....	9

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate these are product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AA

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	14.3	10.9	40.....	0.3	2.6
2.....	12.0	17.7	41.....	.3	1.8
3.....	9.0	41.2	42.....	.2	2.8
4.....	6.4	17.5	43.....	.2	2.4
5.....	5.9	7.2	44.....	.2	9.1
6.....	5.8	10.1	45.....	.2	13.6
7.....	5.3	11.4	46.....	.2	10.0
8.....	3.8	22.6	47.....	.2	5.8
9.....	3.6	56.0	48.....	.2	2.0
10.....	3.6	5.5	49.....	.2	.4
11.....	2.7	31.7	50.....	.1	.3
12.....	2.0	26.6	51.....	.1	3.8
13.....	2.0	28.4	52.....	.1	85.2
14.....	1.6	52.5	53.....	.1	5.0
15.....	1.5	15.0	54.....	.1	1.7
16.....	1.5	27.4	55.....	.1	3.5
17.....	1.2	23.7	56.....	.1	.7
18.....	1.2	8.6	57.....	.1	45.0
19.....	1.1	4.4	58.....	.1	3.8
20.....	1.0	28.0	59.....	.1	7.0
21.....	1.0	40.9	60.....	.1	.9
22.....	1.0	16.5	61.....	.1	1.8
23.....	.9	8.0	62.....	.1	1.0
24.....	.8	10.7	63.....	.1	1.2
25.....	.8	29.3	64.....	(2)	1.5
26.....	.8	12.0	65.....	(2)	.5
27.....	.6	.7	66.....	(2)	.3
28.....	.6	8.2	67.....	(2)	.1
29.....	.5	10.3	68.....	(2)	.6
30.....	.5	22.1	69.....	(2)	22.8
31.....	.4	.1	70.....	(2)	1.7
32.....	.4	20.4	71.....	(2)	.4
33.....	.4	42.6	72.....	(2)	1.8
34.....	.4	27.4	73.....	(2)	.4
35.....	.4	5.6	74.....	(2)	3.0
36.....	.3	1.6	75.....	(2)	.5
37.....	.3	59.4	76.....	(2)	.6
38.....	.3	68.9	77.....	(2)	.1
39.....	.3	15.6	78.....	(2)	(2)

Total number of Census of Manufactures products..... 78

Total number of Census of Manufactures industries into which the products are classified..... 11

Total number of establishments..... 64

Total number of Census of Manufactures industries into which the establishments are classified..... 11

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AB

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	20.7	5.7	36.....	0.4	3.6
2.....	7.3	10.5	37.....	.4	9.3
3.....	6.6	4.7	38.....	.4	3.8
4.....	5.2	10.2	39.....	.3	1.6
5.....	4.7	12.5	40.....	.3	.7
6.....	4.7	3.5	41.....	.2	1.3
7.....	4.6	3.4	42.....	.2	8.6
8.....	4.4	3.1	43.....	.2	3.3
9.....	3.8	2.5	44.....	.1	.8
10.....	3.1	10.1	45.....	.1	1.5
11.....	2.9	3.8	46.....	.1	.3
12.....	2.5	9.9	47.....	.1	.2
13.....	2.4	3.2	48.....	.1	.4
14.....	2.4	38.4	49.....	.1	19.6
15.....	2.3	3.7	50.....	.1	.4
16.....	2.3	8.1	51.....	.1	4.7
17.....	2.0	4.2	52.....	.1	3.4
18.....	1.6	3.6	53.....	.1	4.6
19.....	1.3	6.0	54.....	.1	.7
20.....	1.2	4.4	55.....	(?)	.7
21.....	1.1	2.6	56.....	(?)	.1
22.....	1.1	5.5	57.....	(?)	1.2
23.....	1.0	8.0	58.....	(?)	1.7
24.....	.9	18.0	59.....	(?)	.3
25.....	.8	8.1	60.....	(?)	.1
26.....	.8	3.9	61.....	(?)	25.3
27.....	.8	3.3	62.....	(?)	.1
28.....	.6	6.4	63.....	(?)	.8
29.....	.6	4.7	64.....	(?)	.4
30.....	.5	3.9	65.....	(?)	3.6
31.....	.5	14.7	66.....	(?)	.1
32.....	.5	3.3	67.....	(?)	1.1
33.....	.5	3.5	68.....	(?)	1.6
34.....	.4	2.8	69.....	(?)	.3
35.....	.4	2.2	70.....	(?)	.7

Total number of Census of Manufactures products.....	70
Total number of Census of Manufactures industries into which the products are classified.....	9
Total number of establishments.....	8
Total number of Census of Manufactures industries into which the establishments are classified.....	4

## COMPANY AC

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	83.4	23.5	5.....	0.5	25.9
2.....	9.7	20.6	6.....	.1	.2
3.....	4.5	35.5	7.....	.1	3.0
4.....	1.7	19.2	8.....	(?)	.1

Total number of Census of Manufactures products.....	8
Total number of Census of Manufactures industries into which the products are classified.....	4
Total number of establishments.....	7
Total number of Census of Manufactures industries into which the establishments are classified.....	3

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AD

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	31.6	3.1	17.....	0.3	5.1
2.....	14.6	1.4	18.....	.2	.3
3.....	11.4	15.1	19.....	.2	7.6
4.....	10.5	12.2	20.....	.2	3.2
5.....	10.2	5.4	21.....	.2	9.1
6.....	5.6	2.6	22.....	.2	.9
7.....	2.4	31.4	23.....	.2	1.0
8.....	2.3	49.3	24.....	.1	.6
9.....	2.0	12.5	25.....	.1	4.5
10.....	2.0	.3	26.....	(?)	.9
11.....	1.6	7.7	27.....	(?)	1.2
12.....	1.4	11.7	28.....	(?)	(?)
13.....	1.0	2.6	29.....	(?)	6.4
14.....	.8	15.5	30.....	(?)	.6
15.....	.5	5.4	31.....	(?)	.1
16.....	.4	9.2	32.....	(?)	2.4

Total number of Census of Manufactures products.....	32
Total number of Census of Manufactures industries into which the products are classified.....	6
Total number of establishments.....	7
Total number of Census of Manufactures industries into which the establishments are classified.....	5

## COMPANY AE

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	26.1	16.8	41.....	0.1	61.3
2.....	18.9	63.1	42.....	.1	.3
3.....	10.5	3.0	43.....	.1	1.8
4.....	6.7	46.5	44.....	.1	.1
5.....	5.4	22.0	45.....	.1	10.3
6.....	4.7	9.7	46.....	.1	.1
7.....	4.6	69.4	47.....	.1	.2
8.....	3.7	4.6	48.....	(?)	.1
9.....	2.5	19.4	49.....	(?)	.2
10.....	2.1	88.2	50.....	(?)	35.4
11.....	2.0	11.4	51.....	(?)	1.9
12.....	1.4	9.4	52.....	(?)	.9
13.....	1.1	4.6	53.....	(?)	5.7
14.....	1.0	15.0	54.....	(?)	2.0
15.....	.7	6.6	55.....	(?)	.2
16.....	.6	11.6	56.....	(?)	(?)
17.....	.6	20.1	57.....	(?)	3.0
18.....	.6	10.1	58.....	(?)	.2
19.....	.6	5.3	59.....	(?)	10.5
20.....	.5	45.7	60.....	(?)	1.8
21.....	.5	8.6	61.....	(?)	.1
22.....	.5	.5	62.....	(?)	(?)
23.....	.4	22.8	63.....	(?)	.1
24.....	.4	6.9	64.....	(?)	2.7
25.....	.4	8.0	65.....	(?)	.2
26.....	.3	6.6	66.....	(?)	94.2
27.....	.3	10.7	67.....	(?)	22.3
28.....	.3	19.7	68.....	(?)	6.7
29.....	.3	9.8	69.....	(?)	(?)
30.....	.3	.1	70.....	(?)	(?)
31.....	.2	11.5	71.....	(?)	(?)
32.....	.2	1.7	72.....	(?)	.2
33.....	.2	22.7	73.....	(?)	.1
34.....	.1	.1	74.....	(?)	(?)
35.....	.1	4.7	75.....	(?)	.1
36.....	.1	5.5	76.....	(?)	4.2
37.....	.1	1.6	77.....	(?)	17.6
38.....	.1	3.1	78.....	(?)	2.6
39.....	.1	52.1	79.....	(?)	(?)
40.....	.1	20.5			

Total number of Census of Manufactures products.....	79
Total number of Census of Manufactures industries into which the products are classified.....	18
Total number of establishments.....	373
Total number of Census of Manufactures industries into which the establishments are classified.....	12

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY AF

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	18.8	12.5	19	0.5	1.2
2	17.0	21.3	20	.4	1.2
3	14.6	3.8	21	.3	2.1
4	10.8	6.7	22	.3	2.4
5	8.3	26.7	23	.3	1.4
6	5.9	22.2	24	.2	2.1
7	4.5	10.2	25	.2	.1
8	4.5	3.2	26	.2	.3
9	3.0	6.9	27	.2	9.8
10	2.4	15.7	28	.1	1.7
11	1.6	23.3	29	.1	1.5
12	1.2	.8	30	.1	16.6
13	.9	9.0	31	.1	2.7
14	.7	5.2	32	.1	.5
15	.7	1.1	33	.1	2.9
16	.7	2.0	34	(2)	
17	.6	2.7	35	(2)	.2
18	.6	7.6			

Total number of Census of Manufactures products..... 35  
 Total number of Census of Manufactures industries into which the products are classified..... 9  
 Total number of establishments..... 8  
 Total number of Census of Manufactures industries into which the establishments are classified..... 3

COMPANY AG

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	24.8	42.8	30	0.2	1.3
2	20.0	19.3	31	.1	1.5
3	8.3	12.4	32	.1	1.3
4	6.0	6.8	33	.1	2.8
5	5.9	5.3	34	.1	.5
6	4.7	18.5	35	.1	.8
7	4.3	19.9	36	(2)	(2)
8	3.8	15.4	37	(2)	(2)
9	2.7	99.3	38	(2)	(2)
10	2.4	27.3	39	(2)	3.9
11	2.1	19.4	40	(2)	63.6
12	1.9	15.2	41	(2)	(2)
13	1.9	6.9	42	(2)	10.6
14	1.3	56.5	43	(2)	.4
15	1.3	6.3	44	(2)	.2
16	1.3	13.8	45	(2)	1.7
17	.9	7.5	46	(2)	.1
18	.8	9.2	47	(2)	.2
19	.7	5.7	48	(2)	.8
20	.6	6.9	49	(2)	1.9
21	.6	58.1	50	(2)	.7
22	.5	3.2	51	(2)	1.0
23	.5	28.5	52	(2)	.5
24	.5	3.4	53	(2)	.1
25	.4	7.9	54	(2)	.1
26	.3	3.1	55	(2)	(2)
27	.3	12.2	56	(2)	5.2
28	.3	6.6	57	(2)	(2)
29	.2	24.8			

Total number of Census of Manufactures products..... 57  
 Total number of Census of Manufactures industries into which the products are classified..... 7  
 Total number of establishments..... 11  
 Total number of Census of Manufactures industries into which the establishments are classified..... 4

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY AH

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	24.6	32.1	26.....	0.2	7.1
2.....	14.7	36.6	27.....	.2	1.5
3.....	12.4	75.3	28.....	.2	2.5
4.....	7.3	10.1	29.....	.2	6.1
5.....	6.9	41.7	30.....	.2	8.5
6.....	6.1	16.7	31.....	.1	7.3
7.....	3.9	10.9	32.....	.1	6.7
8.....	3.7	9.6	33.....	.1	20.8
9.....	3.7	19.2	34.....	.1	21.6
10.....	2.8	28.1	35.....	.1	30.0
11.....	2.2	27.8	36.....	.1	7.7
12.....	1.9	11.2	37.....	.1	8.3
13.....	1.2	25.2	38.....	.1	4.3
14.....	1.2	20.7	39.....	.1	19.7
15.....	.7	4.1	40.....	(2)	(2)
16.....	.7	5.5	41.....	(2)	(2)
17.....	.6	2.3	42.....	(2)	.7
18.....	.6	9.3	43.....	(2)	.2
19.....	.5	16.3	44.....	(2)	.6
20.....	.5	4.3	45.....	(2)	.1
21.....	.5	47.0	46.....	(2)	5.0
22.....	.5	15.2	47.....	(2)	(2)
23.....	.4	10.7	48.....	(2)	.3
24.....	.3	15.6	49.....	(2)	(2)
25.....	.2	10.2	50.....	(2)	1.2

Total number of Census of Manufactures products.....	50
Total number of Census of Manufactures industries into which the products are classified.....	11
Total number of establishments.....	33
Total number of Census of Manufactures industries into which the establishments are classified.....	6

## COMPANY AI

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	13.1	7.0	31.....	0.6	8.3
2.....	10.8	15.6	32.....	.6	4.3
3.....	5.8	8.2	33.....	.5	7.6
4.....	5.8	7.3	34.....	.5	15.4
5.....	5.4	27.3	35.....	.5	5.0
6.....	4.7	6.4	36.....	.5	9.9
7.....	4.4	20.4	37.....	.5	2.1
8.....	4.3	18.6	38.....	.4	16.5
9.....	3.5	26.3	39.....	.4	7.8
10.....	3.4	4.6	40.....	.4	43.0
11.....	3.4	31.0	41.....	.4	1.4
12.....	2.7	10.1	42.....	.4	5.6
13.....	1.9	5.0	43.....	.4	37.4
14.....	1.8	7.3	44.....	.4	27.3
15.....	1.8	23.7	45.....	.4	1.4
16.....	1.7	8.0	46.....	.3	19.8
17.....	1.2	27.9	47.....	.3	6.8
18.....	1.2	7.3	48.....	.3	5.3
19.....	1.1	7.7	49.....	.3	7.7
20.....	1.1	10.0	50.....	.3	13.8
21.....	1.0	16.4	51.....	.3	8.2
22.....	1.0	9.2	52.....	.3	1.9
23.....	.9	6.8	53.....	.2	3.0
24.....	.9	6.0	54.....	.2	2.4
25.....	.8	2.1	55.....	.2	2.2
26.....	.8	5.0	56.....	.2	2.0
27.....	.8	7.9	57.....	.2	6.5
28.....	.7	10.1	58.....	.2	2.4
29.....	.6	2.8	59.....	.2	.9
30.....	.6	3.5	60.....	.2	13.6

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY AI—Continued

Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
61	.1	2.0	83	(2)	13.1
62	.1	2.6	84	(2)	(2)
63	.1	6.9	85	(2)	1.6
64	.1	2.9	86	(2)	2.4
65	.1	10.3	87	(2)	(2)
66	.1	2.2	88	(2)	91.7
67	.1	6.7	89	(2)	6.6
68	.1	36.5	90	(2)	1.3
69	.1	5.4	91	(2)	.8
70	.1	2.4	92	(2)	1.1
71	.1	5.9	93	(2)	1.1
72	.1	4.5	94	(2)	.3
73	.1	2.2	95	(2)	2.5
74	.1	3.1	96	(2)	4.5
75	.1	11.5	97	(2)	.2
76	.1	1.6	98	(2)	.9
77	.1	.1	99	(2)	.3
78	.1	2.6	100	(2)	1.2
79	.1	.6	101	(2)	.1
80	.1	8.5	102	(2)	.1
81	(2)	4.3	103	(2)	(2)
82	(2)	2.0			

Total number of Census of Manufactures products..... 103  
 Total number of Census of Manufactures industries into which the products are classified..... 53  
 Total number of establishments..... 21  
 Total number of Census of Manufactures industries into which the establishments are classified..... 8

COMPANY AJ

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	84.6	28.9	4	0.2	12.1
2	10.4	26.9	5	.1	1.0
3	4.7	44.7	6	(2)	.2

Total number of Census of Manufactures products..... 6  
 Total number of Census of Manufactures industries into which the products are classified..... 3  
 Total number of establishments..... 7  
 Total number of Census of Manufactures industries into which the establishments are classified..... 2

COMPANY AK

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	59.6	6.6	18	0.2	2.1
2	10.9	14.4	19	.2	2.6
3	10.6	6.1	20	.2	.6
4	4.3	5.6	21	.1	21.5
5	3.6	4.7	22	.1	6.1
6	3.1	4.6	23	.1	.3
7	.9	8.9	24	.1	14.9
8	.9	4.2	25	.1	1.6
9	.8	8.2	26	(2)	.1
10	.7	12.9	27	(2)	.2
11	.6	3.2	28	(2)	.4
12	.6	19.3	29	(2)	2.0
13	.6	11.2	30	(2)	.2
14	.5	26.7	31	(2)	.2
15	.5	98.1	32	(2)	.6
16	.4	15.3	33	(2)	(2)
17	.3	2.0	34	(2)	.2

Total number of Census of Manufactures products..... 34  
 Total number of Census of Manufactures industries into which the products are classified..... 6  
 Total number of establishments..... 16  
 Total number of Census of Manufactures industries into which the establishments are classified..... 3

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AL

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	49.1	7.4	22	0.2	0.4
2	11.8	9.2	23	.1	.5
3	10.8	21.2	24	.1	4.4
4	5.4	9.7	25	.1	1.9
5	5.2	9.2	26	.1	.2
6	4.7	9.3	27	.1	.6
7	4.1	7.3	28	.1	.5
8	1.2	14 <sup>0</sup>	29	.1	.3
9	1.0	10.4	30	.1	4.3
10	.9	10.7	31	.1	5.0
11	.8	15.8	32	.1	2.9
12	.6	4.3	33	( <sup>2</sup> )	.1
13	.5	7.3	34	( <sup>2</sup> )	( <sup>2</sup> )
14	.5	18.6	35	( <sup>2</sup> )	.7
15	.5	8.1	36	( <sup>2</sup> )	.3
16	.4	1.1	37	( <sup>2</sup> )	( <sup>2</sup> )
17	.3	1.8	38	( <sup>2</sup> )	( <sup>2</sup> )
18	.3	2.1	39	( <sup>2</sup> )	.1
19	.3	14.9	40	( <sup>2</sup> )	1.8
20	.2	1.8	41	( <sup>2</sup> )	.1
21	.2	1.6	42	( <sup>2</sup> )	2.2

Total number of Census of Manufactures products.....	42
Total number of Census of Manufactures industries into which the products are classified.....	6
Total number of establishments.....	26
Total number of Census of Manufactures industries into which the establishments are classified.....	5

## COMPANY AM

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	61.6	8.7	16	0.2	5.6
2	7.2	5.3	17	.2	13.0
3	5.7	9.5	18	.2	7.4
4	5.2	9.5	19	.2	6.3
5	4.0	7.4	20	.2	3.0
6	2.9	4.8	21	.2	10.6
7	2.2	13.3	22	.2	32.7
8	2.2	14.5	23	.1	.6
9	1.8	22.4	24	.1	1.8
10	1.3	98.6	25	.1	.1
11	1.2	18.7	26	( <sup>2</sup> )	( <sup>2</sup> )
12	1.0	1.7	27	( <sup>2</sup> )	.1
13	1.0	10.5	28	( <sup>2</sup> )	4.4
14	.5	19.8	29	( <sup>2</sup> )	.2
15	.5	23.9	30	( <sup>2</sup> )	( <sup>2</sup> )

Total number of Census of Manufactures products.....	30
Total number of Census of Manufactures industries into which the products are classified.....	8
Total number of establishments.....	15
Total number of Census of Manufactures industries into which the establishments are classified.....	4

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AN

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	41.7	10.3	41	0.1	17.3
2	11.3	14.4	42	.1	1.2
3	7.2	20.5	43	.1	.6
4	6.4	18.6	44	.1	3.8
5	6.2	20.0	45	.1	12.7
6	4.7	13.7	46	.1	11.8
7	2.7	8.7	47	(?)	(?)
8	2.5	28.5	48	(?)	.6
9	2.3	25.5	49	(?)	(?)
10	1.9	35.3	50	(?)	.7
11	1.9	19.3	51	(?)	.1
12	1.3	18.1	52	(?)	.1
13	1.2	87.3	53	(?)	.9
14	1.1	20.3	54	(?)	.1
15	.7	4.6	55	(?)	.2
16	.7	14.7	56	(?)	.1
17	.6	9.9	57	(?)	.1
18	.5	24.7	58	(?)	(?)
19	.5	1.4	59	(?)	.5
20	.4	14.0	60	(?)	.4
21	.4	7.5	61	(?)	(?)
22	.3	24.2	62	(?)	.2
23	.3	.4	63	(?)	(?)
24	.3	23.3	64	(?)	.7
25	.3	4.4	65	(?)	.2
26	.2	37.1	66	(?)	1.6
27	.2	.7	67	(?)	46.3
28	.2	4.7	68	(?)	.3
29	.2	8.4	69	(?)	16.5
30	.2	20.9	70	(?)	2.8
31	.1	13.3	71	(?)	3.6
32	.1	4.1	72	(?)	10.6
33	.1	36.7	73	(?)	.8
34	.1	.8	74	(?)	2.9
35	.1	2.4	75	(?)	5.3
36	.1	.6	76	(?)	.3
37	.1	.8	77	(?)	.5
38	.1	3.5	78	(?)	1.8
39	.1	49.1	79	(?)	.2
40	.1	10.4	80	(?)	.2

Total number of Census of Manufactures products.....	80
Total number of Census of Manufactures industries into which the products are classified.....	22
Total number of establishments.....	27
Total number of Census of Manufactures industries into which the establishments are classified.....	13

## COMPANY AO

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	17.3	21.9	16	1.5	23.3
2	9.6	20.8	17	1.5	56.9
3	8.3	64.2	18	1.4	19.0
4	5.1	19.4	19	1.3	16.1
5	4.5	31.9	20	1.2	38.0
6	4.1	37.3	21	1.1	16.4
7	2.9	20.3	22	.8	25.4
8	2.9	24.9	23	.8	5.6
9	2.7	45.2	24	.8	5.8
10	2.6	4.3	25	.6	15.3
11	2.6	14.7	26	.6	40.2
12	2.5	58.1	27	.6	27.5
13	2.1	25.3	28	.5	10.8
14	1.9	13.2	29	.5	3.5
15	1.6	20.2	30	.5	3.3

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AO—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
31	0.5	62.1	103	0.1	8.7
32	.5	21.9	104	.1	1.5
33	.5	12.8	105	.1	2.5
34	.4	12.2	106	.1	1.4
35	.4	17.1	107	.1	.8
36	.4	4.5	108	.1	16.4
37	.4	20.8	109	.1	6.8
38	.4	44.7	110	.1	18.4
39	.4	34.9	111	.1	4.8
40	.4	6.0	112	.1	13.7
41	.4	4.0	113	.1	12.0
42	.4	9.0	114	(?)	1.6
43	.3	11.6	115	(?)	.9
44	.3	6.1	116	(?)	1.2
45	.3	26.7	117	(?)	4.8
46	.3	43.8	118	(?)	3.7
47	.3	21.9	119	(?)	42.4
48	.3	43.4	120	(?)	5.7
49	.3	17.9	121	(?)	.3
50	.3	6.0	122	(?)	1.3
51	.3	28.5	123	(?)	6.2
52	.2	13.2	124	(?)	7.6
53	.2	6.1	125	(?)	.6
54	.2	6.8	126	(?)	4.0
55	.2	.9	127	(?)	1.9
56	.2	6.3	128	(?)	4.2
57	.2	17.6	129	(?)	4.8
58	.2	4.0	130	(?)	4.7
59	.2	12.2	131	(?)	15.1
60	.2	8.2	132	(?)	.7
61	.2	6.9	133	(?)	2.2
62	.2	13.6	134	(?)	.5
63	.2	11.0	135	(?)	20.8
64	.2	2.3	136	(?)	8.3
65	.2	15.9	137	(?)	5.1
66	.2	36.6	138	(?)	36.9
67	.1	3.4	139	(?)	.8
68	.1	2.6	140	(?)	.1
69	.1	1.8	141	(?)	.3
70	.1	11.1	142	(?)	.9
71	.1	14.8	143	(?)	4.8
72	.1	7.0	144	(?)	4.4
73	.1	1.9	145	(?)	4.0
74	.1	2.4	146	(?)	5.9
75	.1	13.6	147	(?)	1.1
76	.1	7.0	148	(?)	2.5
77	.1	5.6	149	(?)	1.3
78	.1	3.1	150	(?)	.5
79	.1	43.2	151	(?)	1.8
80	.1	3.4	152	(?)	6.9
81	.1	3.0	153	(?)	.1
82	.1	19.4	154	(?)	6.3
83	.1	3.8	155	(?)	.5
84	.1	4.3	156	(?)	.9
85	.1	.8	157	(?)	.1
86	.1	4.7	158	(?)	.1
87	.1	2.9	159	(?)	4.5
88	.1	29.9	160	(?)	.1
89	.1	23.1	161	(?)	.1
90	.1	15.1	162	(?)	.1
91	.1	32.0	163	(?)	1.4
92	.1	16.2	164	(?)	.1
93	.1	14.9	165	(?)	1.8
94	.1	6.1	166	(?)	.3
95	.1	74.8	167	(?)	.8
96	.1	2.7	168	(?)	(?)
97	.1	10.6	169	(?)	(?)
98	.1	25.7	170	(?)	2.4
99	.1	9.1	171	(?)	9.9
100	.1	15.1	172	(?)	1.0
101	.1	15.8	173	(?)	3.9
102	.1	6.2	174	(?)	25.3

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States  
1937—Continued

COMPANY AO—Continued

Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
175	(?)	54.8	213	(?)	1.8
176	(?)	1.4	214	(?)	.7
177	(?)	2.3	215	(?)	1.6
178	(?)	.6	216	(?)	.5
179	(?)	.7	217	(?)	.4
180	(?)	.1	218	(?)	34.5
181	(?)	.7	219	(?)	1.0
182	(?)	1.3	220	(?)	2.1
183	(?)	25.0	221	(?)	7.7
184	(?)	33.7	222	(?)	10.2
185	(?)	13.2	223	(?)	.1
186	(?)	25.6	224	(?)	3.8
187	(?)	13.1	225	(?)	1.8
188	(?)	.1	226	(?)	10.2
189	(?)	(?)	227	(?)	.1
190	(?)	17.2	228	(?)	4.1
191	(?)	11.6	229	(?)	1.3
192	(?)	15.5	230	(?)	1.5
193	(?)	4.4	231	(?)	2.3
194	(?)	4.8	232	(?)	.6
195	(?)	10.1	233	(?)	3.6
196	(?)	8.8	234	(?)	6.3
197	(?)	.2	235	(?)	(?)
198	(?)	28.3	236	(?)	3.4
199	(?)	2.3	237	(?)	.9
200	(?)	.3	238	(?)	9.4
201	(?)	.3	239	(?)	.5
202	(?)	1.3	240	(?)	.1
203	(?)	.1	241	(?)	32.6
204	(?)	1.4	242	(?)	11.1
205	(?)	.5	243	(?)	3.5
206	(?)	.8	244	(?)	17.2
207	(?)	.1	245	(?)	.3
208	(?)	.2	246	(?)	3.0
209	(?)	2.2	247	(?)	6.9
210	(?)	2.2	248	(?)	(?)
211	(?)	3.1	249	(?)	4.6
212	(?)	12.0	250	(?)	.7

Total number of Census of Manufactures products.....	250
Total number of Census of Manufactures industries into which the products are classified.....	26
Total number of establishments.....	497
Total number of Census of Manufactures industries into which the establishments are classified.....	17

COMPANY AP

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	59.5	9.4	18	0.3	0.9
2	8.3	6.8	19	.2	14.2
3	6.2	45.9	20	.2	1.9
4	5.4	10.1	21	.2	11.9
5	5.3	10.8	22	.2	2.5
6	2.9	19.3	23	.1	6.7
7	2.1	15.3	24	.1	1.1
8	1.8	3.7	25	.1	3.1
9	1.6	3.3	26	(?)	.5
10	1.4	25.1	27	(?)	(?)
11	1.3	2.4	28	(?)	.6
12	.8	68.8	29	(?)	.1
13	.7	9.3	30	(?)	.1
14	.4	48.9	31	(?)	1.1
15	.3	53.9	32	(?)	(?)
16	.3	1.1	33	(?)	.1
17	.3	6.1			

Total number of Census of Manufactures products.....	33
Total number of Census of Manufactures industries into which the products are classified.....	5
Total number of establishments.....	23
Total number of Census of Manufactures industries into which the establishments are classified.....	2

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AQ

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	9.6	43.3	37.....	0.4	84.3
2.....	8.7	51.1	38.....	.4	14.9
3.....	7.7	71.1	39.....	.4	25.7
4.....	7.5	82.8	40.....	.4	44.0
5.....	6.2	38.5	41.....	.4	38.1
6.....	5.7	96.3	42.....	.4	98.7
7.....	5.0	91.4	43.....	.3	22.1
8.....	4.0	45.7	44.....	.3	73.8
9.....	3.3	100.0	45.....	.3	8.4
10.....	3.1	73.9	46.....	.3	.4
11.....	3.0	7.6	47.....	.2	47.3
12.....	3.0	1.4	48.....	.2	100.0
13.....	2.8	54.9	49.....	.2	1.5
14.....	2.5	3.5	50.....	.2	49.4
15.....	2.2	42.0	51.....	.1	35.8
16.....	2.0	12.3	52.....	.1	40.5
17.....	1.9	11.3	53.....	.1	8.6
18.....	1.6	35.6	54.....	.1	6.7
19.....	1.5	64.7	55.....	.1	7.3
20.....	1.4	88.7	56.....	.1	1.8
21.....	1.4	5.1	57.....	(2)	.1
22.....	1.2	46.6	58.....	(2)	.2
23.....	1.1	23.5	59.....	(2)	9.1
24.....	1.1	19.2	60.....	(2)	42.0
25.....	.9	24.9	61.....	(2)	5.4
26.....	.9	41.8	62.....	(2)	6.1
27.....	.8	100.0	63.....	(2)	.1
28.....	.7	29.5	64.....	(2)	5.8
29.....	.6	32.4	65.....	(2)	.8
30.....	.6	.7	66.....	(2)	.9
31.....	.6	7.3	67.....	(2)	16.1
32.....	.5	19.7	68.....	(2)	.7
33.....	.5	9.9	69.....	(2)	(2)
34.....	.5	2.0	70.....	(2)	.6
35.....	.5	19.6	71.....	(2)	4.5
36.....	.4	8.2	72.....	(2)	.8

Total number of Census of Manufactures products..... 72

Total number of Census of Manufactures industries into which the products are classified..... 10

Total number of establishments..... 146

Total number of Census of Manufactures industries into which the establishments are classified..... 8

## COMPANY AR

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	30.0	22.6	20.....	0.9	46.4
2.....	15.8	19.3	21.....	.9	16.8
3.....	6.4	22.0	22.....	.8	42.0
4.....	5.4	36.6	23.....	.8	13.7
5.....	2.8	48.2	24.....	.7	39.1
6.....	2.7	45.6	25.....	.7	45.1
7.....	2.0	49.3	26.....	.7	14.7
8.....	1.9	13.4	27.....	.7	40.8
9.....	1.8	26.2	28.....	.6	25.4
10.....	1.6	42.6	29.....	.6	11.6
11.....	1.5	6.1	30.....	.5	3.8
12.....	1.4	65.3	31.....	.5	7.0
13.....	1.2	34.2	32.....	.5	13.3
14.....	1.2	52.7	33.....	.5	24.6
15.....	1.2	6.4	34.....	.5	13.7
16.....	1.1	11.0	35.....	.5	4.2
17.....	1.1	18.8	36.....	.5	9.5
18.....	1.0	22.7	37.....	.4	4.3
19.....	1.0	4.4	38.....	.4	5.5

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY AR—Continued

Census of manufactures products <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of manufactures products <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
39	0.4	10.3	78	(2)	(2)
40	.4	52.0	79	(2)	1.2
41	.4	2.3	80	(2)	.5
42	.3	18.1	81	(2)	.2
43	.3	4.8	82	(2)	.6
44	.3	8.0	83	(2)	1.3
45	.3	12.0	84	(2)	.2
46	.3	63.4	85	(2)	.1
47	.3	5.8	86	(2)	3.0
48	.3	44.6	87	(2)	1.1
49	.3	46.8	88	(2)	.1
50	.2	.9	89	(2)	.2
51	.2	14.3	90	(2)	5.1
52	.2	26.4	91	(2)	1.3
53	.2	7.4	92	(2)	3.8
54	.2	6.6	93	(2)	.3
55	.2	11.2	94	(2)	3.5
56	.2	2.0	95	(2)	4.7
57	.2	4.7	96	(2)	5.9
58	.1	5.6	97	(2)	4.0
59	.1	.9	98	(2)	.7
60	.1	2.7	99	(2)	3.0
61	.1	.3	100	(2)	7.1
62	.1	3.1	101	(2)	4.5
63	.1	74.2	102	(2)	17.7
64	.1	4.1	103	(2)	1.2
65	.1	3.2	104	(2)	.7
66	.1	15.3	105	(2)	.1
67	.1	14.2	106	(2)	.4
68	.1	3.7	107	(2)	(2)
69	.1	24.1	108	(2)	(2)
70	.1	1.9	109	(2)	14.5
71	.1	.6	110	(2)	7.9
72	.1	.6	111	(2)	2.2
73	.1	.9	112	(2)	.1
74	.1	22.5	113	(2)	.5
75	.1	.7	114	(2)	14.9
76	.1	1.9	115	(2)	.7
77	.1	64.8	116	(2)	.5

Total number of Census of Manufactures products..... 116  
 Total number of Census of Manufactures industries into which the products are classified..... 18  
 Total number of establishments..... 23  
 Total number of Census of Manufactures industries into which the establishments are classified.... 13

COMPANY AS

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1	16.8	38.9	16	1.4	27.3
2	9.5	58.5	17	1.3	11.1
3	5.6	32.9	18	1.1	37.2
4	4.5	28.1	19	1.0	41.2
5	4.2	24.4	20	1.0	11.1
6	3.9	21.2	21	.9	30.0
7	3.8	50.5	22	.9	39.5
8	3.5	39.0	23	.9	10.5
9	3.5	41.7	24	.8	16.9
10	3.2	60.7	25	.8	13.5
11	2.2	44.0	26	.7	26.4
12	2.0	54.1	27	.7	38.6
13	2.0	53.8	28	.6	41.3
14	2.0	34.2	29	.6	23.8
15	1.4	41.6	30	.6	24.2

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States  
1937—Continued

## COMPANY AS—Continued

Census of Manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufac- tures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
31.....	0.6	36.0	103.....	0.1	34.1
32.....	.6	10.4	104.....	.1	24.5
33.....	.5	33.5	105.....	.1	27.8
34.....	.5	35.0	106.....	.1	9.1
35.....	.5	13.8	107.....	.1	18.8
36.....	.5	32.9	108.....	.1	16.7
37.....	.5	25.5	109.....	.1	30.4
38.....	.5	19.4	110.....	.1	4.0
39.....	.5	12.1	111.....	.1	2.2
40.....	.5	23.0	112.....	(2)	.3
41.....	.5	12.1	113.....	(2)	.1
42.....	.4	33.3	114.....	(2)	50.6
43.....	.4	3.3	115.....	(2)	8.2
44.....	.4	34.5	116.....	(2)	1.6
45.....	.4	41.0	117.....	(2)	1.2
46.....	.4	10.3	118.....	(2)	.8
47.....	.4	9.4	119.....	(2)	(2)
48.....	.4	33.6	120.....	(2)	2.0
49.....	.3	16.5	121.....	(2)	1.7
50.....	.3	29.0	122.....	(2)	31.4
51.....	.3	17.9	123.....	(2)	1.0
52.....	.3	16.8	124.....	(2)	100.0
53.....	.3	20.9	125.....	(2)	55.9
54.....	.3	44.2	126.....	(2)	.3
55.....	.3	11.0	127.....	(2)	2.6
56.....	.3	50.6	128.....	(2)	.1
57.....	.3	9.4	129.....	(2)	2.3
58.....	.3	20.2	130.....	(2)	(2)
59.....	.3	44.3	131.....	(2)	36.0
60.....	.3	33.2	132.....	(2)	98.2
61.....	.3	8.5	133.....	(2)	4.7
62.....	.3	23.2	134.....	(2)	50.0
63.....	.3	69.3	135.....	(2)	43.7
64.....	.2	74.9	136.....	(2)	75.2
65.....	.2	39.0	137.....	(2)	.6
66.....	.2	26.1	138.....	(2)	.1
67.....	.2	76.4	139.....	(2)	.2
68.....	.2	43.2	140.....	(2)	2.2
69.....	.2	35.9	141.....	(2)	4.6
70.....	.2	5.9	142.....	(2)	.3
71.....	.2	33.3	143.....	(2)	.8
72.....	.2	14.8	144.....	(2)	8.5
73.....	.2	6.9	145.....	(2)	44.7
74.....	.1	5.8	146.....	(2)	6.8
75.....	.1	7.8	147.....	(2)	3.2
76.....	.1	24.1	148.....	(2)	12.0
77.....	.1	32.6	149.....	(2)	2.4
78.....	.1	51.8	150.....	(2)	1.0
79.....	.1	2.2	151.....	(2)	7.8
80.....	.1	11.0	152.....	(2)	46.2
81.....	.1	1.4	153.....	(2)	3.9
82.....	.1	46.7	154.....	(2)	72.4
83.....	.1	32.3	155.....	(2)	20.8
84.....	.1	8.5	156.....	(2)	1.3
85.....	.1	12.7	157.....	(2)	.3
86.....	.1	10.9	158.....	(2)	4.0
87.....	.1	38.6	159.....	(2)	4.4
88.....	.1	34.1	160.....	(2)	3.1
89.....	.1	8.6	161.....	(2)	2.6
90.....	.1	28.8	162.....	(2)	(2)
91.....	.1	55.2	163.....	(2)	.1
92.....	.1	44.8	164.....	(2)	6.0
93.....	.1	30.5	165.....	(2)	92.0
94.....	.1	19.5	166.....	(2)	34.9
95.....	.1	2.1	167.....	(2)	.7
96.....	.1	39.3	168.....	(2)	(2)
97.....	.1	35.2	169.....	(2)	13.2
98.....	.1	18.1	170.....	(2)	6.8
99.....	.1	13.2	171.....	(2)	3.9
100.....	.1	5.5	172.....	(2)	2.8
101.....	.1	2.5	173.....	(2)	1.6
102.....	.1	17.6	174.....	(2)	1.5

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY AS—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
175.....	(2)	0.7	188.....	(2)	9.6
176.....	(2)	(2)	189.....	(2)	.5
177.....	(2)	.3	190.....	(2)	(2)
178.....	(2)	(2)	191.....	(2)	22.0
179.....	(2)	.1	192.....	(2)	.1
180.....	(2)	3.7	193.....	(2)	.1
181.....	(2)	20.1	194.....	(2)	5.8
182.....	(2)	6.4	195.....	(2)	4.5
183.....	(2)	.5	196.....	(2)	10.7
184.....	(2)	.3	197.....	(2)	.1
185.....	(2)	10.1	198.....	(2)	63.3
186.....	(2)	3.2	199.....	(2)	.5
187.....	(2)	.7			

Total number of Census of Manufactures products..... 199  
 Total number of Census of Manufactures industries into which the products are classified..... 28  
 Total number of establishments..... 133  
 Total number of Census of Manufactures industries into which the establishments are classified..... 19

COMPANY AT

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	52.8	87.4	29.....	0.1	5.8
2.....	10.2	18.4	30.....	.1	1.6
3.....	9.1	88.4	31.....	.1	53.0
4.....	3.4	64.6	32.....	.1	27.8
5.....	3.3	6.5	33.....	.1	1.3
6.....	2.6	94.5	34.....	.1	9.1
7.....	2.2	32.8	35.....	.1	4.6
8.....	1.9	18.1	36.....	.1	14.6
9.....	1.8	24.1	37.....	.1	26.9
10.....	1.6	7.7	38.....	.1	35.9
11.....	1.6	11.0	39.....	.1	45.5
12.....	1.3	6.9	40.....	(2)	.2
13.....	.9	89.0	41.....	(2)	20.1
14.....	.8	10.4	42.....	(2)	(2)
15.....	.7	7.5	43.....	(2)	.8
16.....	.6	99.6	44.....	(2)	.6
17.....	.6	13.7	45.....	(2)	(2)
18.....	.5	22.0	46.....	(2)	.1
19.....	.4	2.7	47.....	(2)	1.5
20.....	.4	1.5	48.....	(2)	27.1
21.....	.4	8.8	49.....	(2)	11.0
22.....	.3	4.5	50.....	(2)	2.5
23.....	.3	29.5	51.....	(2)	23.4
24.....	.3	2.8	52.....	(2)	57.9
25.....	.2	3.6	53.....	(2)	(2)
26.....	.2	24.2	54.....	(2)	8.8
27.....	.2	9.8	55.....	(2)	24.1
28.....	.2	3.0			

Total number of Census of Manufactures products..... 55  
 Total number of Census of Manufactures industries into which the products are classified..... 7  
 Total number of establishments..... 32  
 Total number of Census of Manufactures industries into which the establishments are classified..... 4

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AU

Census of Manu- factures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manu- factures products <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	11.4	45.7	73.....	0.3	44.4
2.....	6.8	32.1	74.....	.3	1.5
3.....	6.2	22.7	75.....	.3	8.9
4.....	5.1	11.1	76.....	.2	11.3
5.....	4.3	47.2	77.....	.2	14.9
6.....	3.7	61.9	78.....	.2	8.3
7.....	3.2	32.4	79.....	.2	2.6
8.....	3.1	16.7	80.....	.2	15.4
9.....	3.1	28.1	81.....	.2	17.5
10.....	3.0	29.0	82.....	.2	7.7
11.....	1.8	33.2	83.....	.2	13.9
12.....	1.6	25.5	84.....	.2	17.3
13.....	1.5	30.6	85.....	.2	15.6
14.....	1.2	13.0	86.....	.2	7.6
15.....	1.2	76.4	87.....	.2	10.5
16.....	1.2	47.4	88.....	.2	22.8
17.....	1.0	9.4	89.....	.2	4.8
18.....	1.0	56.3	90.....	.2	.8
19.....	.9	15.5	91.....	.2	10.4
20.....	.9	33.0	92.....	.2	3.0
21.....	.8	18.4	93.....	.2	.8
22.....	.8	10.9	94.....	.1	14.9
23.....	.8	18.3	95.....	.1	15.6
24.....	.8	80.3	96.....	.1	9.4
25.....	.8	19.0	97.....	.1	20.4
26.....	.8	30.6	98.....	.1	4.0
27.....	.8	25.6	99.....	.1	7.0
28.....	.8	17.9	100.....	.1	14.5
29.....	.7	25.6	101.....	.1	64.1
30.....	.7	38.6	102.....	.1	100.0
31.....	.7	19.1	103.....	.1	41.5
32.....	.7	28.0	104.....	.1	45.9
33.....	.6	5.6	105.....	.1	22.8
34.....	.6	24.4	106.....	.1	34.9
35.....	.6	56.4	107.....	.1	3.8
36.....	.6	12.4	108.....	.1	3.9
37.....	.6	86.4	109.....	.1	20.0
38.....	.6	23.2	110.....	.1	6.2
39.....	.6	38.9	111.....	.1	7.9
40.....	.6	5.2	112.....	.1	5.3
41.....	.5	6.5	113.....	.1	6.5
42.....	.5	8.3	114.....	.1	11.9
43.....	.5	16.6	115.....	.1	7.7
44.....	.5	34.9	116.....	.1	31.2
45.....	.5	19.4	117.....	.1	4.3
46.....	.5	13.6	118.....	.1	4.0
47.....	.5	61.4	119.....	.1	15.9
48.....	.5	23.0	120.....	.1	17.0
49.....	.5	7.0	121.....	.1	.7
50.....	.5	20.5	122.....	.1	24.2
51.....	.5	66.2	123.....	.1	6.0
52.....	.4	16.4	124.....	.1	8.4
53.....	.4	78.8	125.....	.1	6.5
54.....	.4	44.5	126.....	.1	6.4
55.....	.4	17.3	127.....	.1	3.7
56.....	.4	13.6	128.....	.1	5.9
57.....	.4	20.6	129.....	.1	10.4
58.....	.4	14.4	130.....	.1	7.9
59.....	.4	28.6	131.....	.1	30.0
60.....	.3	19.0	132.....	.1	9.6
61.....	.3	14.5	133.....	.1	10.4
62.....	.3	12.5	134.....	.1	32.7
63.....	.3	7.3	135.....	.1	14.6
64.....	.3	24.5	136.....	.1	69.0
65.....	.3	19.6	137.....	.1	4.8
66.....	.3	100.0	138.....	.1	3.0
67.....	.3	36.2	139.....	.1	10.8
68.....	.3	18.4	140.....	.1	2.6
69.....	.3	1.7	141.....	.1	5.7
70.....	.3	30.5	142.....	.1	10.6
71.....	.3	33.9	143.....	.1	4.3
72.....	.3	32.6	144.....	.1	12.9

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

COMPANY AU—Continued

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
145	0.1	2.4	186	(2)	2.4
146	.1	.1	187	(2)	1.7
147	.1	22.6	188	(2)	1.0
148	.1	.4	189	(2)	2.2
149	.1	5.5	190	(2)	4.1
150	.1	9.4	191	(2)	3.1
151	.1	19.4	192	(2)	14.6
152	(2)	(2)	193	(2)	6.3
153	(2)	17.1	194	(2)	.8
154	(2)	8.9	195	(2)	9.8
155	(2)	2.1	196	(2)	13.8
156	(2)	9.5	197	(2)	4.2
157	(2)	88.4	198	(2)	(2)
158	(2)	9.5	199	(2)	.6
159	(2)	77.4	200	(2)	3.9
160	(2)	.1	201	(2)	3.8
161	(2)	.1	202	(2)	5.3
162	(2)	3.2	203	(2)	7.8
163	(2)	2.6	204	(2)	23.0
164	(2)	3.6	205	(2)	14.1
165	(2)	11.9	206	(2)	2.5
166	(2)	5.9	207	(2)	3.3
167	(2)	46.0	208	(2)	13.5
168	(2)	12.8	209	(2)	8.8
169	(2)	3.8	210	(2)	26.7
170	(2)	9.2	211	(2)	39.7
171	(2)	8.5	212	(2)	11.4
172	(2)	1.0	213	(2)	1.4
173	(2)	18.2	214	(2)	.7
174	(2)	1.1	215	(2)	5.2
175	(2)	6.6	216	(2)	6.9
176	(2)	1.3	217	(2)	.8
177	(2)	5.6	218	(2)	.2
178	(2)	1.2	219	(2)	2.9
179	(2)	1.3	220	(2)	4.6
180	(2)	2.1	221	(2)	.2
181	(2)	1.1	222	(2)	2.4
182	(2)	.4	223	(2)	6.8
183	(2)	8.9	224	(2)	1.2
184	(2)	13.7	225	(2)	9.4
185	(2)	11.8			

Total number of Census of Manufactures products.....	225
Total number of Census of Manufactures industries into which the products are classified.....	10
Total number of establishments.....	58
Total number of Census of Manufacturers industries into which the establishments are classified.....	8

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States, 1937—Continued

## COMPANY AV

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	12.2	5.4	40.....	0.3	1.9
2.....	11.9	2.2	41.....	.3	2.2
3.....	11.7	5.5	42.....	.2	1.3
4.....	6.8	6.1	43.....	.2	1.1
5.....	6.6	6.8	44.....	.2	.2
6.....	6.1	6.4	45.....	.2	.3
7.....	5.8	15.4	46.....	.2	.9
8.....	3.1	4.5	47.....	.2	5.2
9.....	2.9	1.4	48.....	.2	1.4
10.....	2.7	7.6	49.....	.2	3.7
11.....	2.5	7.8	50.....	.1	3.7
12.....	2.2	10.5	51.....	.1	.4
13.....	2.0	3.1	52.....	.1	.2
14.....	1.9	3.1	53.....	.1	3.4
15.....	1.9	23.9	54.....	.1	4.0
16.....	1.5	3.7	55.....	.1	1.8
17.....	1.4	3.1	56.....	.1	2.2
18.....	1.4	6.4	57.....	.1	1.0
19.....	1.3	12.3	58.....	(2)	.1
20.....	1.1	.5	59.....	(2)	5.3
21.....	1.0	9.9	60.....	(2)	.1
22.....	0.9	2.1	61.....	(2)	(2)
23.....	.8	1.3	62.....	(2)	3.6
24.....	.8	14.8	63.....	(2)	(2)
25.....	.6	1.5	64.....	(2)	(2)
26.....	.6	22.2	65.....	(2)	3.9
27.....	.6	11.8	66.....	(2)	.9
28.....	.5	2.4	67.....	(2)	.7
29.....	.5	2.7	68.....	(2)	.2
30.....	.5	2.8	69.....	(2)	2.5
31.....	.5	8.1	70.....	(2)	.7
32.....	.4	.9	71.....	(2)	.4
33.....	.4	8.5	72.....	(2)	2.8
34.....	.4	2.3	73.....	(2)	5.5
35.....	.3	2.4	74.....	(2)	.1
36.....	.3	4.7	75.....	(2)	.5
37.....	.3	18.3	76.....	(2)	.4
38.....	.3	3.5	77.....	(2)	(2)
39.....	.3	.4			

Total number of Census of Manufactures products.....	77
Total number of Census of Manufactures industries into which the products are classified.....	17
Total number of establishments.....	18
Total number of Census of Manufactures industries into which the establishments are classified.....	9

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY AW

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	26.6	8.6	63.....	0.1	6.6
2.....	8.4	4.7	64.....	.1	3.7
3.....	6.3	7.0	65.....	.1	9.1
4.....	4.7	8.4	66.....	.1	8.6
5.....	4.7	9.1	67.....	.1	1.0
6.....	3.7	7.4	68.....	.1	.1
7.....	3.2	7.0	69.....	.1	8.9
8.....	3.1	5.6	70.....	.1	11.0
9.....	2.6	7.8	71.....	.1	.9
10.....	2.5	9.9	72.....	.1	3.2
11.....	2.4	10.2	73.....	.1	.5
12.....	2.4	4.2	74.....	.1	1.1
13.....	2.4	8.5	75.....	.1	.3
14.....	1.9	.8	76.....	.1	3.7
15.....	1.9	6.1	77.....	.1	2.6
16.....	1.4	8.7	78.....	.1	27.9
17.....	1.3	1.9	79.....	.1	16.4
18.....	1.3	4.3	80.....	.1	22.1
19.....	1.1	11.2	81.....	.1	47.9
20.....	1.0	1.7	82.....	.1	3.3
21.....	0.9	9.2	83.....	.1	1.5
22.....	.8	5.0	84.....	(2)	.3
23.....	.7	21.6	85.....	(2)	1.6
24.....	.6	2.0	86.....	(2)	.2
25.....	.6	7.1	87.....	(2)	2.1
26.....	.6	2.1	88.....	(2)	2.2
27.....	.6	5.2	89.....	(2)	.1
28.....	.6	29.5	90.....	(2)	.7
29.....	.6	22.0	91.....	(2)	2.4
30.....	.5	5.4	92.....	(2)	1.7
31.....	.5	11.6	93.....	(2)	1.3
32.....	.5	2.8	94.....	(2)	1.7
33.....	.5	6.9	95.....	(2)	(2)
34.....	.5	15.7	96.....	(2)	.3
35.....	.4	99.8	97.....	(2)	.3
36.....	.4	7.4	98.....	(2)	.1
37.....	.4	1.5	99.....	(2)	.1
38.....	.4	16.3	100.....	(2)	.5
39.....	.3	4.9	101.....	(2)	.8
40.....	.3	3.1	102.....	(2)	3.5
41.....	.3	5.2	103.....	(2)	.4
42.....	.3	10.0	104.....	(2)	1.0
43.....	.3	5.8	105.....	(2)	1.3
44.....	.3	23.4	106.....	(2)	.1
45.....	.3	9.2	107.....	(2)	1.9
46.....	.3	3.7	108.....	(2)	.1
47.....	.2	11.1	109.....	(2)	.5
48.....	.2	.6	110.....	(2)	(2)
49.....	.2	11.6	111.....	(2)	2.1
50.....	.2	2.4	112.....	(2)	46.2
51.....	.2	.8	113.....	(2)	10.8
52.....	.2	12.1	114.....	(2)	14.3
53.....	.2	45.4	115.....	(2)	30.3
54.....	.2	23.5	116.....	(2)	29.8
55.....	.1	1.2	117.....	(2)	29.8
56.....	.1	2.5	118.....	(2)	8.7
57.....	.1	.5	119.....	(2)	2.2
58.....	.1	10.7	120.....	(2)	1.1
59.....	.1	16.4	121.....	(2)	18.9
60.....	.1	1.3	122.....	(2)	.3
61.....	.1	4.5	123.....	(2)	.9
62.....	.1	(2)	124.....	(2)	2.6

Total number of Census of Manufactures products.....	124
Total number of Census of Manufactures industries into which the products are classified.....	25
Total number of establishments.....	57
Total number of Census of Manufactures industries into which the establishments are classified.....	16

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than  $\frac{1}{10}$  of 1 percent.

Basic data for each of the largest 50 manufacturing companies in the United States,  
1937—Continued

## COMPANY AX

Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product	Census of Manufactures product <sup>1</sup>	Percentage of company total value of product	Percentage of United States total value of product
1.....	19.8	6.1	38.....	0.3	0.6
2.....	9.1	14.6	39.....	.3	.8
3.....	8.7	7.1	40.....	.2	8.5
4.....	7.7	11.3	41.....	.2	2.9
5.....	6.5	4.7	42.....	.2	.5
6.....	5.9	4.6	43.....	.2	17.4
7.....	5.3	11.5	44.....	.2	1.6
8.....	4.9	3.8	45.....	.1	5.1
9.....	3.9	3.3	46.....	.1	.5
10.....	2.7	21.3	47.....	.1	4.6
11.....	2.4	9.6	48.....	.1	4.1
12.....	1.9	10.4	49.....	.1	5.6
13.....	1.7	4.5	50.....	.1	4.6
14.....	1.6	6.2	51.....	.1	1.2
15.....	1.5	14.1	52.....	.1	2.2
16.....	1.4	6.3	53.....	.1	2.9
17.....	1.3	2.6	54.....	.1	1.4
18.....	1.0	8.9	55.....	.1	3.3
19.....	1.0	4.5	56.....	.1	.3
20.....	0.9	1.4	57.....	.1	.6
21.....	.9	17.5	58.....	(2)	.1
22.....	.8	2.1	59.....	(2)	2.7
23.....	.7	5.5	60.....	(2)	.2
24.....	.6	1.3	61.....	(2)	1.2
25.....	.5	4.4	62.....	(2)	.5
26.....	.5	1.3	63.....	(2)	9.1
27.....	.4	4.1	64.....	(2)	.2
28.....	.4	.8	65.....	(2)	5.2
29.....	.4	2.3	66.....	(2)	.5
30.....	.4	1.6	67.....	(2)	.2
31.....	.4	1.8	68.....	(2)	.2
32.....	.4	15.3	69.....	(2)	.2
33.....	.3	3.2	70.....	(2)	9.2
34.....	.3	.7	71.....	(2)	(1)
35.....	.3	1.8	72.....	(2)	.9
36.....	.3	1.0	73.....	(2)	.1
37.....	.3	2.2	74.....	(2)	.1

Total number of Census of Manufactures products.....	74
Total number of Census of Manufactures industries into which the products are classified.....	13
Total number of establishments.....	17
Total number of Census of Manufactures industries into which the establishments are classified.....	7

<sup>1</sup> The products have been listed in order of their importance to the company. The same number does not indicate the same product in the listings for the various companies.

<sup>2</sup> Less than 1/10 of 1 percent.

## APPENDIX C

### SUMMARY TABLES

TABLE 1C.—*Importance of the largest 100 and the largest 200 manufacturing companies, 1937*

Measures of importance	All manu- facturing	Largest 100 companies		Largest 200 companies	
		Amount	Percent of all manu- facturing	Amount	Percent of all manu- facturing
Number of concerns.....	146,720	100	0.1	200	0.1
Number of establishments.....	166,794	4,057	2.4	5,411	3.2
<b>Wage earners:</b>					
Average number for the year.....	8,569,231	1,780,951	20.8	2,255,725	26.3
Wages paid (thousands of dollars).....	10,112,883	2,688,482	26.6	3,318,147	32.8
<b>Salaried employees:</b>					
Average number for the year.....	1,217,171	234,912	19.3	300,474	24.7
Salaries paid (thousands of dollars).....	2,716,866	525,861	19.4	667,565	24.6
Value of products (thousands of dollars).....	60,712,872	20,845,673	34.3	24,886,973	41.0
Cost of materials, fuels, energy, etc. (thou- sands of dollars).....	35,539,333	14,302,891	40.2	16,567,159	46.6
Value added by manufacture (thousands of dollars).....	25,173,539	6,542,782	26.0	8,139,814	32.3
Approximate value of products of the 100th and the 200th company (thousands of dollars).....	-----	61,000	-----	29,000	-----





TABLE 3C.—Distribution of the number of products manufactured by the largest 50 companies according to the percent of the company's total value of products accounted for by each product, 1937—Continued

Percent of company's total value of product	Company																				Total	Per-cent					
	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT			AU	AV	AW	AX	
Less than 0.1.....	15	16	1	7	32	2	22	11	23	1	9	10	5	34	137	8	16	39	88	16	74	20	41	17	1,472	36.1	
0.1 to 0.5.....	35	25	3	11	28	15	14	21	48	2	12	20	12	29	86	12	25	48	79	22	111	30	54	33	1,590	38.9	
0.6 to 1.0.....	9	7	—	2	6	6	5	4	12	—	7	4	2	3	6	2	7	12	14	5	24	7	10	7	339	8.3	
1.1 to 2.0.....	8	6	1	4	3	2	5	3	8	—	—	1	3	5	8	4	9	11	7	5	6	8	6	6	242	5.9	
2.1 to 3.0.....	1	6	—	2	2	2	3	2	1	—	—	—	3	3	7	2	5	2	1	2	1	4	5	2	113	2.8	
3.1 to 4.0.....	3	2	—	2	1	—	1	3	3	—	2	—	1	3	—	—	5	2	5	2	4	1	3	1	65	1.6	
4.1 to 5.0.....	—	4	1	—	2	2	2	—	—	—	1	2	—	1	2	—	1	2	2	—	1	—	—	—	113	2.8	
5.1 to 6.0.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	1.1	
6.1 to 7.0.....	3	1	—	1	1	1	2	2	3	—	1	2	2	2	1	2	1	1	1	—	1	1	2	1	2	43	1.1
7.1 to 8.0.....	1	1	—	—	—	—	—	1	—	—	—	—	1	1	1	1	1	1	—	—	2	3	—	—	30	0.7	
8.1 to 9.0.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	0.4	
9.1 to 9.9.....	1	—	—	—	—	1	1	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	18	0.4	
Total less than 10.0 per-cent.....	76	69	7	27	76	31	55	47	101	4	31	39	29	78	249	32	72	114	198	53	224	74	123	73	3,984	97.5	
10.0 to 19.9.....	2	—	—	4	2	4	2	2	2	1	2	2	1	1	1	—	—	1	1	1	1	3	—	1	58	1.4	
20.0 to 29.9.....	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	0.4	
30.0 to 39.9.....	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	0.3	
40.0 to 49.9.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	0.1	
50.0 to 59.9.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	0.1	
60.0 to 69.9.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	0.1	
70.0 to 79.9.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0.1	
80.0 to 89.9.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	0.1	
Total.....	78	70	8	32	79	35	57	50	103	6	34	42	30	80	250	33	72	116	199	55	225	77	124	74	4,085	100.0	

1 Less than 1/10 of 1 percent.

TABLE 4C.—Percentage contribution (cumulative) of individual products to the total value of products of each of the largest 50 manufacturing companies, 1937<sup>1</sup>

Num-ber of prod-ucts	Company																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	11.2	39.1	45.6	31.4	22.3	78.5	80.5	15.0	21.7	15.4	37.6	43.3	56.7	48.3	29.1	8.8	11.2	33.5	8.4	61.0	21.4	28.3	37.4	57.7	33.8	18.5
2	21.3	56.0	78.5	45.5	39.8	89.1	88.2	25.4	31.4	22.7	69.9	68.5	68.2	68.1	39.2	16.1	20.9	47.4	13.6	74.1	39.7	42.2	62.0	72.9	69.0	35.5
3	31.0	63.0	85.8	53.7	57.2	95.3	95.1	33.0	36.8	29.2	93.4	93.5	77.0	86.7	46.6	27.4	27.8	59.0	17.8	83.2	47.9	50.4	71.8	81.3	89.2	48.6
4	40.0	68.7	91.3	60.1	69.4	97.4	97.4	40.3	41.4	34.5	97.9	96.4	83.7	90.7	52.4	22.4	33.5	64.2	21.5	86.2	55.9	56.3	80.2	87.7	97.9	59.3
5	47.4	73.7	93.7	65.9	75.9	96.7	98.1	46.7	45.8	39.2	98.8	99.1	90.2	93.4	56.3	30.8	39.3	69.2	24.9	89.1	61.7	60.8	83.3	92.7	99.3	65.6
6	54.0	77.6	93.1	70.7	81.5	97.2	98.7	50.9	49.2	43.2	99.4	99.6	93.1	95.3	60.0	34.0	45.1	72.9	28.1	91.9	66.5	63.1	85.1	95.0	99.6	70.4
7	58.5	80.8	97.1	74.3	86.9	97.7	99.0	54.7	52.5	47.1	99.7	99.9	94.6	96.8	63.1	37.0	49.2	80.7	30.7	94.6	69.0	65.2	86.6	96.1	99.9	75.1
8	62.8	83.8	97.6	77.4	89.4	98.3	99.2	58.0	55.2	50.2	99.7	99.9	96.0	97.7	66.0	39.8	53.1	77.4	33.0	96.7	71.4	66.7	88.0	97.0	100.0	79.7
9	66.6	86.3	98.1	79.7	91.8	98.6	99.4	61.2	57.8	52.9	99.8	(2)	97.5	98.6	68.3	42.3	56.8	79.0	35.3	97.9	73.5	68.7	89.2	97.7	.....	83.2
10	69.4	88.3	98.3	81.9	93.4	98.9	99.6	64.4	60.4	55.5	99.9	(2)	97.5	98.6	70.5	44.3	60.4	80.0	37.6	99.0	75.1	70.3	90.1	98.2	.....	85.0
11	72.4	90.3	98.8	83.6	94.5	99.6	99.8	67.3	62.6	57.7	.....	(4)	98.6	99.4	72.6	46.3	63.9	81.7	39.8	99.3	76.4	71.8	91.7	99.0	.....	86.5
12	74.0	92.0	99.0	85.2	95.2	99.2	99.9	69.9	64.6	59.7	.....	(4)	98.9	99.6	76.2	48.1	66.8	82.6	41.7	99.0	77.6	73.2	91.7	99.0	.....	87.6
13	75.6	93.7	99.2	86.6	95.9	99.4	(15)	72.5	66.5	61.4	.....	(4)	99.3	99.6	78.0	51.5	72.3	84.3	43.4	99.8	78.8	74.6	92.4	99.3	.....	88.7
14	77.0	95.1	99.3	87.9	96.5	99.6	(15)	74.9	68.2	63.0	.....	(4)	99.3	99.9	79.7	52.9	74.3	85.1	46.8	99.9	79.9	75.9	93.0	99.5	.....	89.6
15	78.2	96.4	99.4	89.2	97.0	99.7	(15)	77.3	69.9	64.5	.....	(4)	99.5	99.9	81.4	54.2	76.2	85.8	48.0	99.9	81.9	78.2	94.1	99.8	.....	90.4
16	79.3	97.1	99.5	90.4	97.5	99.8	(15)	79.4	71.3	66.5	.....	(4)	99.5	99.9	82.9	55.4	78.0	87.1	49.2	99.9	82.8	79.3	94.6	99.9	.....	91.2
17	80.4	97.7	99.6	91.4	97.9	99.9	(15)	81.2	72.6	67.0	.....	(4)	99.7	99.9	84.3	56.5	79.8	87.1	50.3	(9)	83.7	80.4	95.0	99.9	.....	91.9
18	81.3	98.3	99.7	92.3	98.3	99.8	(12)	82.9	73.9	68.8	.....	(4)	99.8	99.9	85.7	57.5	81.4	87.7	51.4	(9)	83.7	81.4	95.4	(7)	.....	92.6
19	82.2	98.9	99.8	93.1	98.7	99.9	(12)	84.5	75.2	70.1	.....	(4)	99.8	99.9	86.8	58.5	83.0	88.2	52.5	(9)	84.4	80.4	95.4	(7)	.....	93.3
20	83.0	99.2	99.9	93.8	99.0	99.9	(12)	86.0	76.3	71.3	.....	(4)	99.9	99.9	87.9	59.5	85.0	88.2	52.5	(9)	85.0	82.4	95.8	(7)	.....	93.9
21	83.8	99.4	(8)	94.4	99.3	99.9	(12)	87.4	77.2	72.5	.....	(4)	99.9	99.9	88.8	60.5	85.9	88.7	53.6	(9)	85.6	84.3	96.2	(7)	.....	94.5
22	84.6	99.6	(8)	95.5	99.6	99.9	(12)	88.8	78.1	73.7	.....	(4)	99.9	99.9	89.9	61.3	87.2	89.0	54.6	(9)	86.2	84.3	96.6	(7)	.....	95.0
23	85.4	99.8	(8)	96.6	99.6	99.9	(12)	89.9	79.0	74.8	.....	(4)	99.9	99.9	90.2	62.3	88.5	90.0	55.5	(9)	86.7	85.0	96.9	(7)	.....	95.5
24	86.2	99.9	(8)	97.7	99.7	99.9	(12)	90.9	79.8	75.9	.....	(4)	99.9	99.9	90.9	63.2	89.3	90.4	57.2	(9)	87.2	86.0	97.2	(7)	.....	95.9
25	86.9	99.9	(8)	98.8	99.8	99.9	(12)	91.7	80.6	77.0	.....	(4)	99.9	99.9	91.6	64.1	90.0	90.8	58.0	(9)	87.7	86.7	97.5	(7)	.....	96.3
26	87.5	99.9	(8)	99.6	99.8	99.9	(12)	92.4	81.3	78.0	.....	(4)	99.9	99.9	91.6	64.1	90.0	90.8	58.0	(9)	88.2	87.4	97.8	(7)	.....	96.9
27	88.1	99.9	(8)	99.7	99.9	99.9	(12)	92.9	82.0	79.0	.....	(4)	99.9	99.9	92.7	65.0	91.4	91.2	58.8	(9)	88.7	88.1	98.0	(7)	.....	97.2
28	88.7	99.9	(8)	99.7	99.9	99.9	(12)	93.3	82.7	79.9	.....	(4)	99.9	99.9	92.7	65.0	91.4	91.2	58.8	(9)	89.1	88.5	98.2	(7)	.....	97.9
29	89.3	99.9	(8)	99.7	99.9	99.9	(12)	93.7	83.3	80.8	.....	(4)	99.9	99.9	93.2	66.8	92.1	91.9	60.2	(9)	89.5	89.4	98.4	(7)	.....	97.8
30	89.9	99.9	(8)	99.7	99.9	99.9	(12)	94.1	83.9	81.6	.....	(4)	99.9	99.9	93.7	67.6	92.7	92.2	60.9	(9)	89.9	90.0	98.6	(7)	.....	97.8
31	90.4	99.9	(8)	99.7	99.9	99.9	(12)	94.5	84.5	82.4	.....	(4)	99.9	99.9	94.2	68.4	93.2	92.8	61.6	(9)	90.3	90.6	98.8	(7)	.....	98.0
32	90.9	99.9	(8)	99.7	99.9	99.9	(12)	94.9	85.1	83.1	.....	(4)	99.9	99.9	94.7	69.2	93.7	92.8	62.3	(9)	90.7	91.2	99.0	(7)	.....	98.2
33	91.4	99.9	(8)	99.7	99.9	99.9	(12)	95.3	85.6	83.8	.....	(4)	99.9	99.9	95.1	70.0	94.2	93.1	63.0	(9)	91.1	91.8	99.2	(7)	.....	98.4
34	91.8	99.9	(8)	99.7	99.9	99.9	(12)	95.6	86.1	84.5	.....	(4)	99.9	99.9	95.1	70.0	94.2	93.1	63.0	(9)	91.5	92.3	99.4	(7)	.....	98.6
35	92.2	99.9	(8)	99.7	99.9	99.9	(12)	95.9	86.5	85.2	.....	(4)	99.9	99.9	95.9	71.5	95.1	93.5	64.4	(9)	91.0	92.8	99.5	(7)	.....	98.8
36	92.6	99.9	(8)	99.7	99.9	99.9	(12)	96.2	86.9	85.6	.....	(4)	99.9	99.9	96.2	72.2	95.5	93.7	65.0	(9)	92.3	93.3	99.6	(7)	.....	99.0
37	93.0	99.9	(8)	99.7	99.9	99.9	(12)	96.5	87.3	86.6	.....	(4)	99.9	99.9	96.5	72.9	95.9	93.9	65.6	(9)	92.7	93.8	99.7	(7)	.....	99.2

<sup>1</sup> Products were arranged in order of their value contribution to the company output and then cumulated. The figures in parentheses indicate the number of products which make up the balance of each company's total value of products.

TABLE 4C.—Percentage contribution (cumulative) of individual products to the total value of products of each of the largest 50 manufacturing companies, 1937—(continued)

Number of products	Company																										
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
38	93.4			99.2			96.7	87.7	87.2						96.8	73.6	96.2	94.1	66.2		93.1	94.2	99.8			99.3	
39	93.8			99.3			96.9	88.4	87.8						97.1	74.2	96.5	94.3	66.8		93.4	94.6	99.9			99.4	
40	94.2			99.4			97.1	88.4	88.4						97.4	74.8	96.8	94.3	67.4		93.7	95.0				99.5	
41	94.6			99.5			97.3	88.7	88.9						97.7	75.4	97.1	94.7	68.0		94.0	95.4	(19)			99.6	
42	94.9			99.6			97.5	89.0	89.3						98.0	76.0	97.4	94.8	68.6		94.3	96.0				99.7	
43	95.2			99.7			97.7	89.3	89.7						98.2	76.6	97.6	94.9	69.2		94.9	96.3				99.8	
44	95.5			99.8			97.9	89.6	90.1						98.4	77.2	97.8	95.0	69.8		95.3	96.6				99.9	
45	95.9			99.9			98.0	89.9	90.5						98.6	77.8	98.0	95.1	70.4		95.6	96.9					
46	96.3						98.1	90.2	90.9						98.8	78.4	98.2	95.2	70.9		95.3	97.1					
47	96.3			(15)			98.2	90.5	91.3						99.0	78.9	98.4	95.3	71.4		95.5	97.3					
48	96.3						98.3	90.8	91.7						99.0	79.4	98.6	95.4	71.9		95.7	97.5					
49	96.5						98.4	91.1	92.1						99.1	79.9	98.8	95.5	72.4		95.9	97.7					
50	96.7						98.5	91.4	92.4						99.2	80.4	99.0	95.6	72.9		96.1	97.9					
51	96.9						98.6	91.7	92.7						99.3	80.9	99.2	95.7	73.4		96.3	97.9					
52	97.1						98.7	92.0	93.0						99.4	81.4	99.3	95.8	73.9		96.5	98.1					
53	97.3						98.8	92.3	93.3						99.5	81.8	99.4	95.9	74.4		96.7	98.3					
54	97.5						98.9	92.5	93.6						99.6	82.2	99.5	96.0	74.9		96.9	98.5					
55	97.6						99.0	92.7	93.9						99.7	82.6	99.6	96.1	75.4		97.1	98.7					
56	97.7						99.1	92.9	94.1						99.8	83.0	99.7	96.2	75.9		97.2	98.9					
57	97.8						99.2	93.1	94.3						99.9	83.4	99.8	96.3	76.4		97.3	99.1					
58	97.9						99.3	93.3	94.5						99.9	83.8	99.9	(87)	76.8		97.4	99.2					
59	98.0						99.4	93.5	94.7						(39)	84.2	99.9		77.2		97.5	99.3					
60	98.1						99.4	93.7	94.9						99.9	84.6	(19)		77.6		97.6	99.4					
61	98.2						99.5	93.9	95.1						99.9	84.9			78.0		97.7	99.5					
62	98.3						99.7	94.1	95.3						99.9	85.2			78.4		97.8	99.6					
63	98.4						99.8	94.3	95.5						99.9	85.5			78.8		97.9	99.7					
64	98.5						99.9	94.5	95.7						99.9	85.8			79.2		98.0	99.8					
65	98.6						99.9	94.7	95.9						99.9	86.1			79.6		98.1	99.9					
66	98.7						(36)	94.9	96.1						99.9	86.4			80.0		98.2						
67	98.8						95.1	96.3	96.3						99.9	86.7			80.4		98.3	(9)					
68	98.9						95.3	96.5	96.5						99.9	87.0			80.8		98.4						
69	99.0						95.5	96.7	96.7						99.9	87.3			81.2		98.5						
70	99.1						95.7	96.9	96.9						99.9	87.6			81.6		98.6						
71	99.2						95.9	97.1	97.1						99.9	87.9			82.0		98.7						
72	99.3						96.1	97.3	97.3						99.9	88.2			82.4		98.8						
73	99.4						96.3	97.4	97.4						99.9	88.5			82.8		98.9						
74	99.5						96.4	97.5	97.5						99.9	88.8			83.2		99.0						
75	99.6						96.5	97.6	97.6						99.9	89.1			83.5		99.1						
76	99.7						96.6	97.7	97.7						99.9	89.4			83.8		99.2						
77	99.8						96.7	97.8	97.8						99.9	89.7			84.1		99.3						
78	99.9						96.8	97.9	97.9						99.9	89.9			84.4		99.4						



TABLE 4C.—Percentage contribution (cumulative) of individual products to the total value of products of each of the largest 50 manufacturing companies, 1937—Continued

Number of products	Company—Con. 'nued																							
	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX
1	14.3	20.7	83.4	31.6	26.1	18.8	24.8	24.6	13.1	81.6	59.6	49.1	61.6	41.7	17.3	59.5	9.6	30.0	16.8	52.8	11.4	12.2	26.6	19.8
2	29.3	28.0	93.1	46.2	45.0	35.8	44.8	39.3	23.9	95.0	70.5	60.9	68.8	53.0	26.9	67.8	18.3	45.8	26.3	63.0	18.2	24.1	35.0	28.9
3	35.3	34.6	97.6	57.6	53.5	51.7	51.7	29.7	29.7	99.7	81.1	71.7	74.5	60.2	52.2	74.0	26.0	52.2	31.9	72.1	24.4	35.8	41.3	37.6
4	41.7	39.8	99.3	68.1	62.2	61.2	59.1	59.0	35.5	99.9	85.4	77.1	79.7	66.6	40.3	74.0	33.5	49.5	36.4	75.8	29.5	42.6	46.0	45.3
5	47.6	44.5	99.8	78.3	67.6	69.5	63.0	63.9	40.9	(2)	89.0	82.3	83.7	72.8	44.8	84.7	39.7	60.4	40.6	78.5	33.8	49.2	50.7	51.8
6	53.4	49.2	99.9	83.9	72.3	73.4	69.7	72.0	43.6	(2)	92.1	87.0	86.6	77.5	48.9	87.6	45.4	63.1	44.5	81.4	37.5	55.3	54.4	57.7
7	58.7	53.8	(2)	86.3	76.9	79.9	74.0	73.9	50.0	(2)	93.0	91.1	88.8	80.2	51.7	89.7	50.4	65.1	48.3	83.6	40.7	61.1	57.6	63.0
8	62.5	58.2	(2)	88.6	80.6	84.4	77.8	79.6	54.3	(2)	94.7	93.3	92.8	85.0	51.7	91.5	54.4	67.0	51.8	85.5	43.8	64.2	60.7	67.9
9	66.1	62.0	(2)	90.6	83.1	87.4	80.5	83.3	57.8	(2)	95.4	94.2	94.1	86.9	60.7	93.1	57.7	68.8	53.3	88.3	46.9	67.3	60.7	71.8
10	69.7	65.1	(2)	92.6	85.2	89.8	82.9	86.1	61.2	(2)	96.0	95.0	95.3	88.8	70.4	95.8	60.8	70.4	58.5	86.9	49.9	69.8	63.8	74.5
11	72.4	68.0	(2)	94.2	87.2	91.4	85.0	88.3	64.6	(2)	96.6	95.6	96.3	90.1	86.9	96.6	63.8	71.9	60.7	90.5	51.7	72.3	68.2	78.8
12	74.4	70.5	(2)	95.6	88.6	92.6	86.9	90.2	67.3	(2)	97.3	96.1	97.3	91.3	88.8	97.3	69.6	74.5	64.7	92.7	51.8	76.5	73.0	80.5
13	76.4	72.9	(2)	97.4	90.7	93.5	88.8	91.4	69.2	(2)	97.7	96.6	97.8	92.4	90.1	97.7	72.1	75.7	66.7	93.5	56.0	78.4	74.9	82.1
14	78.0	75.3	(2)	97.4	90.7	94.0	91.4	93.3	72.8	(2)	98.2	97.1	98.3	93.8	93.8	98.0	74.3	76.9	68.1	94.2	57.2	80.3	76.8	83.6
15	79.5	77.6	(2)	98.3	91.4	95.6	92.7	94.0	74.5	(2)	98.6	97.5	98.5	93.8	93.8	98.3	76.3	78.0	69.5	94.8	58.4	81.8	78.2	85.0
16	81.0	79.9	(2)	98.3	92.0	96.2	93.6	94.6	73.7	(2)	98.9	97.8	98.7	94.4	94.4	98.9	79.2	79.1	70.8	95.9	60.4	84.6	80.8	87.3
17	82.2	81.9	(2)	98.6	92.6	96.2	93.6	94.6	76.9	(2)	99.1	98.1	98.9	94.9	94.9	99.1	81.3	81.1	72.9	96.7	61.2	87.0	82.9	89.2
18	83.4	83.5	(2)	98.8	93.2	96.8	94.4	95.2	78.0	(2)	99.3	98.4	99.1	95.4	95.4	99.3	82.7	82.0	73.9	98.7	62.3	88.0	83.8	90.1
19	84.5	84.8	(2)	99.0	93.8	97.3	95.1	95.7	80.1	(2)	99.5	98.8	99.5	96.2	96.2	99.5	84.1	83.9	75.9	99.6	63.7	88.9	84.6	90.9
20	85.5	86.0	(2)	99.2	94.3	97.7	95.7	96.2	79.1	(2)	99.6	98.6	99.5	96.5	96.5	99.6	86.4	84.5	76.6	97.7	64.6	83.7	83.3	91.6
21	86.5	87.1	(2)	99.4	94.8	98.3	96.8	97.2	81.1	(2)	99.7	99.0	99.7	96.8	96.8	99.7	87.5	85.2	77.4	98.0	65.4	90.5	86.5	92.2
22	87.5	88.2	(2)	99.6	95.3	98.6	97.3	97.6	82.0	(2)	99.8	99.1	99.8	97.1	97.1	99.9	88.4	85.9	78.2	98.4	66.2	91.7	86.5	93.2
23	88.4	89.2	(2)	99.8	95.7	98.6	97.8	97.9	82.9	(2)	99.9	99.9	99.9	97.9	97.9	(9)	89.3	86.6	78.9	98.4	67.0	92.7	87.1	93.6
24	89.2	90.0	(2)	99.9	96.1	98.8	97.8	97.9	83.7	(2)	(10)	99.3	(6)	97.4	97.4	(9)	89.3	86.6	79.6	98.4	67.8	92.3	87.7	93.6
25	90.0	90.9	(2)	(8)	96.8	99.2	98.5	98.3	84.5	(2)	(10)	99.3	(6)	97.6	97.6	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
26	90.8	91.7	(2)	97.1	97.1	99.4	98.8	98.5	85.3	(2)	(10)	99.5	(6)	97.8	97.8	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
27	91.4	92.5	(2)	97.1	97.1	99.5	99.3	98.7	86.0	(2)	(10)	99.6	(6)	98.0	98.0	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
28	92.0	93.1	(2)	97.7	97.7	99.6	99.3	98.9	80.6	(2)	(10)	99.7	(6)	98.2	98.2	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
29	92.5	93.7	(2)	98.2	98.2	99.7	99.3	98.9	81.2	(2)	(10)	99.8	(6)	98.4	98.4	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
30	93.0	94.2	(2)	98.2	98.2	99.8	99.6	99.2	82.0	(2)	(10)	99.9	(6)	98.5	98.5	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
31	93.4	94.7	(2)	98.4	98.4	99.8	99.7	99.3	82.8	(2)	(10)	99.9	(6)	98.5	98.5	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
32	93.8	95.2	(2)	98.4	98.4	99.9	99.7	99.3	83.9	(2)	(10)	99.9	(6)	98.6	98.6	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
33	94.2	95.7	(2)	98.6	98.6	(3)	99.9	99.5	84.9	(2)	(10)	99.9	(6)	98.6	98.6	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
34	94.6	96.1	(2)	98.6	98.6	(3)	99.9	99.5	85.0	(2)	(10)	99.9	(6)	98.6	98.6	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
35	95.0	96.5	(2)	98.8	98.8	(3)	99.9	99.6	85.9	(2)	(10)	99.9	(6)	98.8	98.8	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
36	95.3	96.9	(2)	98.8	98.8	(3)	99.9	99.6	86.7	(2)	(10)	99.9	(6)	98.8	98.8	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
37	95.6	97.3	(2)	99.0	99.0	(3)	99.9	99.8	89.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
38	95.9	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
39	96.2	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
40	96.5	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
41	96.8	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
42	97.1	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
43	97.4	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
44	97.7	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
45	98.0	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
46	98.3	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
47	98.6	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
48	98.9	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
49	99.2	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6
50	99.5	97.3	(2)	99.0	99.0	(3)	99.9	99.8	90.9	(2)	(10)	99.9	(6)	99.1	99.1	(9)	89.3	86.6	78.9	98.4	67.8	92.3	87.7	93.6

38	97.7	99.1	91.3	87.9	95.8	92.8	85.6	99.8	75.0	96.7	93.0	97.4
39	98.0	99.2	90.2	88.3	96.2	93.2	86.1	99.9	75.6	97.0	93.3	97.7
40	98.3	99.3	90.4	88.7	96.5	93.5	86.6	(16)	76.2	97.3	93.6	97.9
41	98.5	99.4	90.5	89.1	96.7	93.7	87.1		76.7	97.6	93.9	98.1
42	98.7	99.5	90.6	89.5	96.8	93.8	87.5		77.2	97.8	94.2	98.3
43	98.9	99.6	90.7	89.8	96.9	93.9	87.9		77.7	98.0	94.5	98.5
44	99.0	99.7	90.8	90.1	97.0	94.0	88.3		78.2	98.2	94.8	98.7
45	99.1	99.8	90.9	90.4	97.1	94.1	88.7		78.7	98.4	95.1	98.8
46	99.2	99.9	91.0	90.7	97.2	94.2	89.1		79.2	98.6	95.4	98.9
47	99.3	(35)	91.1	91.0	97.3	94.3	89.5		79.7	98.8	95.6	99.0
48	99.4		91.2	91.3	97.4	94.4	89.9		80.2	99.0	95.8	99.1
49	99.5		91.3	91.6	97.5	94.5	90.2		80.7	99.2	96.0	99.2
50	99.6		91.4	91.9	97.6	94.6	90.5		81.2	99.4	96.2	99.3
51	99.7		91.5	92.2	97.7	94.7	90.8		81.7	99.6	96.4	99.4
52	99.8		91.6	92.4	97.8	94.8	91.1		82.1	99.8	96.6	99.5
53	99.9		91.7	92.6	97.9	94.9	91.4		82.5	99.9	96.8	99.6
54	(17)		91.8	92.8	98.0	95.0	91.7		82.9	99.9	97.0	99.7
55			91.9	93.0	98.1	95.1	92.0		83.3	99.8	97.1	99.8
56			92.0	93.2	98.2	95.2	92.3		83.7	99.9	97.2	99.9
57			92.1	93.4	98.3	95.3	92.6	(17)	84.1	(21)	97.3	(18)
58			92.2	93.6	98.4	95.4	92.9		84.5	97.4	97.4	
59			92.3	93.8	98.5	95.5	93.2		84.9	97.5	97.5	
60			92.4	94.0	98.6	95.6	93.5		85.2	97.6	97.6	
61			92.5	94.2	98.7	95.7	93.8		85.5	97.7	97.7	
62			92.6	94.4	98.8	95.8	94.1		85.8	97.8	97.8	
63			92.7	94.6	98.9	95.9	94.3		86.1	97.9	97.9	
64			92.8	94.8	99.0	96.0	94.5		86.4	98.0	98.0	
65			92.9	94.9	99.1	96.1	94.7		86.7	98.1	98.1	
66			93.0	95.0	99.2	96.2	94.9		87.0	98.2	98.2	
67			93.1	95.2	99.3	96.3	95.1		87.3	98.3	98.3	
68			93.2	95.4	99.4	96.4	95.3		87.6	98.4	98.4	
69			93.3	95.5	99.5	96.5	95.5		87.9	98.5	98.5	
70			93.4	95.6	99.6	96.6	95.7		88.2	98.6	98.6	
71			93.5	95.7	99.7	96.7	95.9		88.5	98.7	98.7	
72			93.6	95.8	99.8	96.8	96.1		88.8	98.8	98.8	
73			93.7	95.9	99.9	96.9	96.3		89.1	98.9	98.9	
74			93.8	96.0	99.9	97.0	96.5		89.4	99.0	99.0	
75			93.9	96.1	99.9	97.1	96.7		89.7	99.1	99.1	
76			94.0	96.2	99.9	97.2	96.9		89.9	99.2	99.2	
77			94.1	96.3	99.9	97.3	97.1		90.1	99.3	99.3	
78			94.2	96.4	(40)	97.4	97.2		90.3	99.4	99.4	
79			94.3	96.5		97.5	97.3		90.5	99.5	99.5	
80			94.4	96.6		97.6	97.4		90.7	99.6	99.6	
81			94.5	96.7		97.7	97.5		90.9	99.7	99.7	
82			94.6	96.8		97.8	97.6		91.1	99.8	99.8	
83			94.7	96.9		97.9	97.7		91.3	99.9	99.9	
84			94.8	97.0		98.0	97.8		91.5	97.4	97.4	(41)
85			94.9	97.1		98.1	97.9		91.7	97.5	97.5	
86			95.0	97.2		98.2	98.0		91.9	97.6	97.6	
87			95.1	97.3		98.3	98.1		92.1	97.7	97.7	











TABLE 7C.—Percentage distribution of the value of products of the largest 50 manufacturing companies by United States concentration classes, 1937

Company	Concentration classes																			
	5.0 and less		5.1 to 10.0		10.1 to 15.0		15.1 to 20.0		20.1 to 25.0		25.1 to 30.0		30.1 to 35.0		35.1 to 40.0		40.1 to 45.0		45.1 to 50.0	
	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent	Per- cent	Cu- mulative per- cent
A	4.7	4.7	17.1	21.8	3.7	25.5	6.8	32.3	17.0	49.3	2.1	51.4	8.0	59.4	4.3	63.7	9.3	73.0	15.4	88.4
B	2.7	2.7	1.0	3.7	.1	3.7	1.7	2.5	2.5	2.5	2.7	3.2	3.2	3.2	0.6	12.8	3.8	16.6	7.0	23.6
C	23.4	23.4	8.3	31.7	52.8	84.5	3.3	37.8	2.4	6.1	2.4	8.5	8.5	8.5	.2	8.7	5.8	8.7	78.0	86.7
D	1.2	1.2	.4	1.6	.1	1.6	1.6	1.6	4.2	5.8	.4	6.2	2.4	8.0	.2	8.8	5.7	9.5	8.5	9.5
E	1.4	1.4	1.0	2.4	1	2.5	10.8	13.3	2	13.5	.3	13.8	79.0	92.8	.8	93.6	6.2	99.8	99.8	100.0
F	2.1	2.1	2.2	2.3	7.1	9.4	7.7	17.1	80.6	97.7	23.4	68.7	13.4	82.1	6.6	88.7	(1)	88.8	.4	89.2
G	2.8	2.8	5.0	7.8	8.6	16.4	6.4	22.8	22.5	45.3	6.0	97.6	1.0	98.6	1.8	98.1	.1	98.2	.1	98.3
H	7.7	7.7	8.6	16.3	5.1	21.4	27.2	48.6	42.4	91.0	1.1	88.6	7.7	96.3	1.8	98.1	.1	98.2	.1	98.3
I	3.2	3.2	17.7	20.9	39.3	60.2	16.4	76.6	10.9	87.5	1.1	88.6	7.7	96.3	1.8	98.1	.1	98.2	.1	98.3
J	(1)	(1)	5.4	5.4	.1	5.5	23.6	29.1	.6	29.7	69.9	99.6	43.3	99.9		99.9	.1	99.9	.1	100.0
K	(1)	(1)	8	8	.8	8	30.8	31.6	31.6	31.6	25.0	56.6	43.3	99.9		99.9	.1	99.9	.1	100.0
L	12.8	12.8	70.8	83.6	14.4	98.0	2.0	100.0	20.3	45.0	4.0	49.0	2.7	51.7	48.3	100.0	1.4	98.5	1.4	98.5
M	1.4	1.4	1.3	2.7	18.6	21.3	3.4	24.7	20.3	45.0	2.7	49.0	2.7	51.7	48.3	100.0	1.4	98.5	1.4	98.5
N	36.6	36.6	44.7	81.3	11.4	92.7	1.8	94.5	94.5	94.5	2.5	97.0	2.5	97.1	97.1	97.1	5.4	61.6	7.0	68.6
O	4.8	4.8	2.5	7.3	6.0	13.3	13.1	26.4	4.2	30.6	9.2	39.8	14.7	54.5	1.7	56.2	2.5	30.2	.1	30.3
P	9.6	9.6	2.0	11.6	2.1	13.7	3.2	16.9	1.9	18.8	1.1	19.9	7.8	27.7		27.7	2.5	30.2	.1	30.3
Q	10.0	10.0	12.8	22.8	3.0	25.8	20.7	46.5	9	47.4	40.2	87.6	5.1	92.7		92.7	4.0	60.3	13.3	73.6
R	4.1	4.1	4.2	8.3	3.7	12.0	8.1	20.1	16.9	37.0	5.3	42.3	.9	43.2	13.1	56.3	24.0	69.1	4.6	73.7
S	12.9	12.9	4.9	17.8	3.0	20.8	74.1	94.9	5.1	100.0	22.1	5	5	22.7	22.5	45.1	24.0	69.1	4.6	73.7
T	5	5	1.4	1.9	2.1	4.0	2.8	6.8	10.2	17.0	5.1	22.1	5	22.7	22.5	45.1	24.0	69.1	4.6	73.7
U	2.9	2.9	2.9	5.7	26.5	32.2	41.7	73.9	8.1	82.0	3.5	85.5	2.2	87.6	8.3	96.0	5	96.5	2.1	98.6
V	2.0	2.0	2.2	4.2	7.6	11.8	1.9	13.7	71.7	85.4	1.4	86.8	.1	86.9	9.8	96.7	(1)	96.7		96.7
W	1.9	1.9	86.9	88.8	11.2	100.0														
X	2.1	2.1	43.9	46.0	20.2	66.2	33.8	100.0	3	24.0	37.9	61.9	6	62.5	62.5	62.5	10.7	73.2		73.2
Y	15.4	15.4	7.0	22.4	6	23.0	7	23.7	3	24.0	37.9	61.9	6	62.5	62.5	62.5	10.7	73.2		73.2
Z	4.9	4.9	13.3	18.2	29.4	47.6	19.7	67.3	5.9	73.2	7.7	80.9	2.7	83.6	83.6	83.6	10.5	94.1		94.1
AA	44.9	44.9	38.2	83.1	13.5	96.6	1.0	97.6	97.6	97.6	.5	98.5	2.4	100.0	2.4	100.0	2.3	97.7	2.3	100.0
AB	44.2	44.2																		
AC	13.4	13.4	69.2	82.6	13.9	83.1	12.2	95.3	6.7	95.3	2.4	97.7	67.0	97.7	(1)	97.7	67.0	97.7	2.3	100.0
AD	55.8	55.8	9.4	26.6	4.8	31.4	28.9	60.3	6.7	67.0	8.3	100.0	2.9	70.6	70.6	70.6	24.8	95.4		95.4
AE	17.2	17.2	16.2	18.2	23.3	64.7	2.5	67.2	24.5	91.7	2.9	70.6	6.3	80.2	80.2	80.2	6.9	87.1		87.1
AF	25.2	25.2	41.4	46.8	9.9	30.7	36.8	67.5	2.2	67.7	2.9	70.6	6.3	80.2	80.2	80.2	6.9	87.1		87.1
AG	2.0	2.0	16.8	20.8	18.2	33.2	11.2	33.2	1.4	34.6	6.3	40.9	24.6	65.5	14.7	80.2	6.9	87.1		87.1
AH	2.3	2.3	6.0	8.3	13.7	22.0	11.2	33.2	1.4	34.6	6.3	40.9	24.6	65.5	14.7	80.2	6.9	87.1		87.1



TABLE 7C.—Percentage distribution of the value of products of the largest 50 manufacturing companies by United States concentration classes, 1937—Continued

Concentration classes—Continued

Company	50.1 to 55.0		55.1 to 60.0		60.1 to 65.0		65.1 to 70.0		70.1 to 75.0		75.1 to 80.0		80.1 to 85.0		85.1 to 90.0		90.1 to 95.0		95.1 to 100.0			
	Per- cent	Cu- mula- tive per- cent	Per- cent	Cu- mula- tive per- cent																		
A	0.4	88.8	0.4	89.2	0.2	89.4	0.8	90.2	0.2	90.4	39.4	90.4	70.1	90.4	0.4	90.8	8.7	99.5	0.5	100.0		
B	(1)	23.6	.2	23.8	5.7	29.3	5.2	29.0	1.7	30.7	7.3	70.1	70.1	70.1	21.6	91.7	8.7	91.7	8.3	100.0		
C		86.7		86.7	33.6	93.6	33.6	93.6	6.0	92.7	7.3	100.0	100.0	100.0	6.4	100.0						
D		93.6		93.6	40.2	82.2	6.8	89.0	89.0	89.0	11.0	100.0	100.0	100.0								
E	17.8	27.3	14.7	42.0																		
F		97.7	2.3	100.0																		
G		89.2		89.2	7.3	96.5	3.3	99.8	99.8	99.8	0.1	99.9	99.9	99.9								
H		98.7		98.7	1.1	99.8	1.2	99.7	99.8	99.8		99.8	99.8	99.8	.2	100.0						
I		98.3	.2	98.5																		
J		99.7		99.7																		
K		99.7		99.7																		
L																						
M																						
N																						
O		98.5		98.5																		
P	2.7	71.3	.8	72.1	10.1	82.2	1.9	84.1	.2	84.3	10.7	95.0	95.0	95.0			1.5	100.0				
Q	.4	30.7	.7	31.4	12.3	43.7	2.2	45.9	8.8	54.7	17.9	72.6	72.6	72.6					.2	95.2	4.8	
R		94.0	.2	94.2	.4	94.6	5.4	100.0														
S	6.4	80.0	4.0	84.0	10.6	94.6	.8	95.4	.4	95.8	1.5	97.3	97.3	97.3	1.2	98.5	1.0	99.5	.5	100.0		
T		74.4	7.8	82.2	6.1	88.3		88.3	.4	88.7	9.7	98.4	98.4	98.4	.9	99.3	.1	99.4	.6	100.0		
U		98.6	.2	98.8																		
V		96.7		96.7																		
W																						
X																						
Y																						
Z	17.0	90.2		90.2	2.4	92.6	6.6	99.2														
AA	1.6	95.7	3.9	99.6			.3	99.9														
AB																						
AC																						
AD																						
AE	.1	74.3		74.3	19.0	93.3	4.6	97.9														

See footnote at end of table.



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