CHAPTER 5

FACTORY PRODUCTION

(Covering that part of the private Manufacturing Industry included in the totals presented by the United States Census of 1914.)

§ 5a. Importance of the Industry

This field covered in 1900 more than 90 per cent [1] of the entire manufacturing industry,[2] and in 1914 the operations carried on therein increased by nearly ten billions of dollars, the value of the materials worked upon. This, then, is a division of the first magnitude, and it is highly important that all estimates therefor be made with the highest practicable degree of accuracy.

Fortunately, statistics of manufacture of different types are abundant. While it is, of course, impossible to obtain an analysis from year to year of the data for the United States as a whole, it seems feasible to make a fairly close estimate of the value of the total output of the factories of the nation for each year since 1909.

§ 5b. The Gross Value of the Products

The distinction between the gross value of the output and the net value product of the manufacturing industry is both theoretically sharp and practically important. The gross value consists merely of the summation of the values of the respective outputs of all the different factories. This evidently includes a great amount of duplication, for one factory ordinarily works on the materials turned out by another plant. The net value product, on the other hand, is the added value resulting from the services of persons and material things employed in the manufacturing industry.

The plan adopted for estimating the gross annual value of the output is as follows:—

1. Forty-four indicators have been selected, each believed to represent fairly well the course of production in some particular branch of the manufacturing industry. Except in two cases, only those indicators have been used for which annual figures are available for each year from 1909 to

[1] Compare with the Census of Manufactures for 1900, Volume 7, Part I, page xxxvii.
[2] The hand trades are included in the general field of manufacturing but are not enumerated by the Census.

1918 inclusive. In these two instances, adjustments have been made for the years for which information is lacking.

2. Every indicator has been reduced to the form of an index number based upon the output for 1909.

3. Each index number has been multiplied by a weight representing the value of the output in 1914 in the field which the indicator represents. By summating the products and dividing by the sum of the weights, an average index number has been obtained for each year. These average index numbers presumably portray with reasonable accuracy the changes in production taking place from year to year in the manufacturing field.

While the indicators chosen seem to give a correct picture of the cyclical fluctuations in manufacturing, their trend diverges slightly from that indicated by the Censuses of 1909, 1914, and 1919—in other words, the rate of growth of the manufacturing industry of the country as a whole seems to be a trifle greater than the rate of growth of the sample industries chosen. While the divergence is so small as to be relatively unimportant, the accuracy can presumably be improved by making the trend conform to that indicated by the Census figures. This aim has been accomplished in the following manner:—

The respective ratios of the Census figures to the estimated indices have been ascertained for 1909, 1914, and 1919, and these ratios have been considered the determining points of a smooth curve. A ratio has been read from this smooth curve for each year from 1909 to 1918. The estimated average indices for the various years have been multiplied by the corresponding ratios, and the products thus obtained are believed to represent close approximations to the gross values, on the Census basis, of manufactured products turned out for the various years. The operations described are indicated in Table 5B.

In the computation of the average index of output mentioned in paragraph 3, the indicators listed in Table 5A were used with the weights there stated. The general source of the information is cited in each case.

In some instances, the quantity rather than the value of the product is given in the report cited. In such cases, the quantity has been multiplied by the best obtainable price figure for the same year, and the product thus derived has been used to represent the fluctuations in the average value of the gross output. The citations in Table 5A show the origin of both price and quantity data when both are used. Volume and page references have not been given because it seems unnecessary to burden this report with such a mass of detail.

Each field of manufacture has been weighted in proportion to the gross "Value of Products" as shown in the Abstract of the Census of Manufactures for 1914. This general weight has been apportioned among the

TABLE 5A

THE SOURCES OF INFORMATION, THE INDICATORS USED, AND THE WEIGHTS ASSIGNED IN COMPUTING AN AVERAGE INDEX OF GROSS OUTPUT

Source of Information	Weight	Indicator
FOOD AND KINDRED PRODUCTS.		VALUE OF
Yearbook of U. S. Department of Agriculture.	675	Animal Products.
Chase, Stephen, *Production of Meat in U. S.*; Food Administration, Bureau of Animal Industry Reports; *Yearbooks* of Department of Agriculture; and *Statistical Abstract of U. S.*	1,293	Meat Produced.
Statistical Abstract of U. S.	770	Sugar Consumed.
Statistical Abstract of U. S.	193	Coffee Consumed.
Statistical Abstract of U. S.	48	Crude Chocolate Imported.
Statistical Abstract of U. S.	1,639	Wheat Retained for Consumption.
Statistical Abstract of U. S. and *Yearbook* of Dept. of Agriculture.	289	Butter Receipts at five large cities.
TEXTILES AND THEIR PRODUCTS. *Statistical Abstract of U. S.*	444	Unmanufactured Silk Imported.
Statistical Abstract of U. S.	1,434	Cotton Manufactures.
Statistical Abstract of U. S. and *Bulletin 200*, U. S. Bureau of Labor.	649	Woolen Manufactures.
Massachusetts *Statistics of Manufactures.*	444	Men's Clothing Manufactured in Massachusetts.
Massachusetts *Statistics of Manufactures.*	444	Women's Clothing Manufactured in Massachusetts.
IRON AND STEEL AND THEIR PRODUCTS. *Statistical Report* of American Iron & Steel Institute.	3,223	Pig Iron Consumed plus Crude Steel and Finished Rolled Products produced.
LUMBER AND ITS REMANUFACTURES. U. S. Census, *Statistical Abstract of U. S.*; *Bulletins 673* and *768* of Department of Agriculture.	1,184	Lumber Product of All Mills.
U. S. Census	256	Lumber not Used in Building.
Massachusetts *Statistics of Manufactures.*	160	Furniture Produced in Massachusetts.

TABLE 5A—*Continued*

Source of Information	Weight	Indicator
LEATHER AND ITS FINISHED PRODUCTS.		VALUE OF
Massachusetts *Statistics of Manufactures.*	575	Boots and Shoes Produced in Mass.
Massachusetts *Statistics of Manufactures.*	298	Leather Produced in Massachusetts.
Massachusetts *Statistics of Manufactures.*	155	Cut Stock and Findings Produced in Mass.
Massachusetts *Statistics of Manufactures.*	77	Belting Leather Produced in Massachusetts.
PAPER AND PRINTING.		
Mass. *Statistics of Manufactures.*	99	Paper Boxes Produced.
Mass. *Statistics of Manufactures.*	15	Envelopes Produced.
Mass. *Statistics of Manufactures.*	204	Paper and Wood Pulp.
Mass. *Statistics of Manufactures.*	44	Miscellaneous Paper Goods.
Mass. *Statistics of Manufactures.*	525	Newspaper and Periodical Publishing.
Annual Report of South Carolina Commissioner of Agriculture; Commerce & Industries.	146	Printing & Publishing.
Bulletin 758, Department of Agriculture; U. S. Census Bulletins on *Forest Products; Statistical Abstract of U. S.*	423	Pulp Wood Consumption of U. S.
LIQUORS AND BEVERAGES.		
Statistical Abstract of U. S.	23	Domestic Wine Consumed.
Statistical Abstract of U. S.	509	Fermented Liquors Produced.
Statistical Abstract of U. S.	124	Whiskey Produced.
Statistical Abstract of U. S.	116	Commercial Alcohol Produced.
CHEMICALS, STONE, CLAY, AND GLASS.		
Statistical Abstract of U. S.	1,778	Mineral Products other than Coal and Metals.
Statistical Abstract of U. S.	262	Alcohol Produced.
Statistical Abstract of U. S.	157	Sulphuric Acid Produced.
Statistical Abstract of U. S.	261	Cottonseed Oil and Cake Produced.
Moody's *Analyses of Investments*, 1919.	157	Gross Revenues, Dupont Powder Company.

TABLE 5A—*Continued*

Source of Information	Weight	Indicator
METALS OTHER THAN IRON. *Statistical Abstract of U. S.*	1,417	VALUE OF Metallic Products other than Pig Iron.
TOBACCO MANUFACTURES. *Statistical Abstract of U. S.* and *Yearbook*, Dept. of Agriculture.	490	Estimated Value of Tobacco Manufactures.
VEHICLES FOR LAND TRANSPORTATION. National Auto. Chamber of Commerce,—*Facts & Figures of the Automobile Industry Manual of Statistics*, 1918.	238	Gross Earnings American Car & Foundry Company.
Poor's *Manual of Industrials*; Moody's *Analyses of Investments.*	10	Gross Sales. Brill & Company.
RAILROAD REPAIR SHOPS. Interstate Commerce Commission. *Statistics of Railways.*	553	Total Maintenance of Railroad Equipment.
PRIVATE SHIPBUILDING. Mass. *Statistics of Manufactures.*	186	Shipbuilding in Massachusetts.
PAVING MATERIALS. Geological Survey—*Mineral Resources of U. S.*	36	Asphalt Produced in the U. S.

various indicators in accordance with the share of the total industry that appears to be best typified by the indicator in question. Thus, the manufacturing of "Food and Kindred Products" is given a weight of 4,817 because products of that type in the United States in 1914 were valued at that many millions of dollars. This entire weight is divided among seven indicators. Although the seven indicators combined manifestly represent directly but a fraction of the food manufacturing field, the sum of their weights is, nevertheless, made to total 4,817, so that each of the great divisions of manufacturing may be represented in proportion to its importance in making up the average index.

There is ground for contending that the weighting should be based upon the "Value Added by Manufacture" rather than upon the "Value of Products." Since, however, the available indicators nearly all represent the gross value of output, and since an index of gross output is the end in view, it has been decided to use this gross value as a basis of weighting. Obviously, no two investigators would choose weights according to exactly the same standard but, as Bowley demonstrates in his *Elements of Statistics*, when the number of variables to be averaged is rather large, the exact size

of the weights is a matter of secondary importance. It seems probable, therefore, that the weights chosen answer the purpose sufficiently well.

Evidently many of the criteria used measure the output of the manufacturing industry only indirectly. For example, the value of meat produced is used to measure the magnitude of the slaughtering and meat packing industry; the amount of coffee imported indicates the extent of coffee roasting and grinding; and the imports of raw silks give an index of the activity of the silk factories. It is doubtful if direct records of meat packing, coffee grinding, and silk weaving would give much more representative indices of the value of the output. Their superiority would presumably be but slight at best.

The final steps in the computation of the index of gross output for the Continental United States are shown in Table 5B.

TABLE 5B

THE ESTIMATED GROSS VALUE OF THE GOODS TURNED OUT BY FACTORIES COVERED BY THE PRINCIPAL REPORT OF THE CENSUS OF 1914

For the Continental United States

A	B	C	D	E	F
Date	Indices of annual output computed from forty-four indicators[d]	Value of gross output as shown by the census (Millions)	Ratio of census output to estimated index of output C ÷ B	Estimated ratio of actual output to indices of output (Hundreds)	Estimated value of gross output (Millions) B × E
1909....	100.0	$20,672[b]	206,721	2067[c]	$20,672[b]
1910....	105.0			2072[a]	21,770
1911....	102.5			2078[a]	21,300
1912....	115.2			2088[a]	24,050
1913....	123.2			2095[a]	25,810
1914....	115.0	24,246[b]	210,830	2108[c]	24,246[b]
1915....	133.7			2126[a]	28,430
1916....	202.8			2149[a]	43,580
1917....	261.7			2181[a]	57,080
1918....	284.2			2217[a]	63,000
1919....	278.1	62,588[e]	225,100	2251[c]	62,588[e]

[a] Interpolated along a smooth curve.
[b] *Abstract of United States Census of Manufactures*, 1914, p. 16.
[c] See Column D.
[d] For list of indicators, see Table 5A.
[e] Preliminary bulletin of *Census of Manufactures* for 1919, May 24, 1921.

The representative character of the average index computed from the forty-four indicators is reasonably well established by the entries in Column D, which show that the ratios of the Census totals to the index are nearly the same in 1909 and 1914 and not greatly different in 1919. If

they were fairly reliable criteria for that ten-year period, there is every reason to suppose that they are equally dependable for the intervening years. It seems safe to assume, therefore, that the figures presented in Column F show rather accurately for each year the gross value of the output of that part of the manufacturing industry of the United States covered by the quinquennial Census.

§ 5c. The Division of the Net Value Product in the Census Years

Since, for reasons previously stated, the size of the gross output does not measure accurately the productiveness of the manufacturing industry itself, this last quantity must be arrived at by ascertaining the increase in value brought about by the operations of manufacture. This increase in value is eventually divided among the entrepreneurs, employees, and outside investors in the industry.

From the Census, it seems possible to estimate, with a moderate degree of accuracy, the shares of each of the classes just mentioned. The share of the entrepreneurs is assumed to equal the value of the gross product less all expenses and an allowance for depreciation. The Census Bureau has made no estimates of the depreciation occurring in the factories of the country. Some writers contend that a depreciation allowance has no basis of fact; in other words, that it is a mere bookkeeping device used to conceal accumulated profits. According to this point of view, manufacturing plants do not depreciate but, as a rule, continually improve in quality, owing to the replacement of obsolete machinery by modern equipment, and hence, not only should there be no depreciation account, but large sums that have been charged to repairs ought to have been carried to surplus. Opponents of this view may admit the physical improvement of the plant but nevertheless believe that depreciation accounts are necessary to cover the large losses which occur through bad investments.

A little consideration will force one to the conclusion that this issue resolves itself into the question as to whether surplus accounts as reported are too large or too small. Since manufacturing concerns usually make depreciation allowances in their accounts before computing their annual surpluses, and since the surpluses arrived at by their accounting systems seem, on the average, to be correctly reported,[1] it follows that corresponding depreciation allowances should be applied to the Census figures in order to obtain the correct amounts for profits.

In order to obtain a reasonable basis for estimating depreciation, the allowances for this purpose made by a large number of manufacturing corporations (as reported in Moody's *Manual*) were summated for 1914, and the sums were compared with the aggregate total nominal investment

[1] For discussion of this point see § 1g of this volume.

in the selected concerns. The depreciation allowance amounted in 1914 to 2.927 per cent. A separate estimate for 1909 was not calculated for the

TABLE 5C

THE APPROXIMATE DISTRIBUTION OF THE VALUE PRODUCT OF THAT PART OF THE MANUFACTURING INDUSTRY INCLUDED BY THE CENSUS BUREAU IN THE TOTALS FOR 1909 AND 1914

Item	Millions of dollars			
	Census of			
	1909		1914	
Value of Gross Output		$20,672[a]		$24,246[b]
Expenses:				
Services:				
Salaries	$ 939[a]		$ 1,288[b]	
Wages	3,427[a]		4,078[b]	
Interest Paid to Banks	52[h]		47[h]	
Materials	12,143[a]		14,368[b]	
Miscellaneous	1,946[a]		2,344[f]	
Depreciation	539[c]		667[d]	
Total Expenses		19,046		22,792
Share of Entrepreneurs and Interest on Funded Debt		$ 1,626		$ 1,454
Distribution of Value of Product:				
Share of Employees:				
Wages and Salaries	$4,366[a]		$5,366[b]	
Payments to Workers for Contract Work[e]	44[g]		50[b]	
Total Share of Employees		$4,410		$5,416
Share of Entrepreneurs and Other Investors:				
Gross Profits and Bond Interest	1,626		1,454	
Rent of Factories	107[g]		140[b]	
Other Rent and Royalties	106[i]		141[i]	
Total		1,839		1,735
Total Value Product of Manufacturing Industry		$ 6,249		$ 7,151

[a] *Abstract of the U. S. Census* for 1910, p. 438.
[b] *Abstract of the U. S. Census of Manufactures*, 1914, pp. 516–519.
[c] 2.927 per cent of the capital of $18,428,270,000.
[d] 2.927 per cent of the capital of $22,790,979,937.
[e] One-fourth of amount paid for contract work.
[f] Includes $1,563,000,000 estimated "Other Miscellaneous" expenses not recorded by the Census of 1914. Missing item assumed to constitute same ratio to other expenses as in 1909, namely 7.63 per cent; total expenses reported by 1914 Census equal $20,515,000,000.
[g] *U. S. Census of Manufactures* for 1910, Vol. VIII, pp. 518–520.
[h] Estimated from a study of the reports (recorded in Moody's *Manual*) of sixty-one representative manufacturing corporations.
[i] Arbitrarily assumed that other rents and royalties paid to private parties are just as large as the reported rent of factories.

reason that it was felt that, at that date, the custom of reporting depreciation in the published accounts had not developed sufficiently to make the data reliable. For this reason, the same percentage was used for 1909 as for 1914, and in each case, 2.927 per cent of the total capitalization, as reported by the Census, has been deducted from gross receipts as a depreciation allowance.

It is evident that the entries in Table 5C are not exact but are subject to a considerable degree of error. The depreciation allowance, as has already been explained, is only an approximation. The assumption that 25 per cent of the payments for contract work are virtually wages has been made after going through the list of industries given in the 1914 Census and selecting those like the clothing industry in which the payments are presumably made for work done at home by members of the working class. Such a rough method of estimate is perhaps amply good when one considers the relatively small size of the items involved. Nevertheless, an appreciable amount of error is likely to creep in at this point.

The items for rent and royalties are included in the items making up the value product ascribed to the industry on the assumption that these payments are made to property owners not represented in any other section of this estimate. It has been assumed, for example, that few of the buildings leased for factory purposes are owned by other manufacturing concerns. Concrete evidence along this line is lacking; hence, guesses are substituted. The size of the item entitled "Other Rents and Royalties" in 1914, is also unknown and the figure inserted may be far from the truth. The doubtful items just discussed are not large enough to make any considerable relative change in the product, even if the errors in these minor items are a maximum and all in the same direction. Such errors might, however, vitiate to some extent the accuracy of the figures purporting to show the divisions of the net product between employees and other claimants. As a matter of fact, the errors probably cancel each other to some extent; hence, it is hoped that, for the Census years, the apportionment of the value product between employees and the other claimants thereto is exact enough to answer the needs of most students of the subject. Census figures exist, however, only for three years in the period. What changes took place between those dates?

§ 5d. Mode of Estimating the Net Value Product for Intercensal Years

Data upon which one can base estimates as to the changes occurring from year to year in the apportionment of the value product between the different classes of claimants are by no means abundant. Iowa issues statistics concerning its manufacturing industries, but only biennially. Since that State is devoted primarily to agriculture and only incidentally

to manufacturing, and since half the years are missing, its reports have not been utilized. South Carolina and Pennsylvania publish annual reports. In both of these States, a considerable share of the smaller establishments apparently did not report in the earlier years. Nevertheless, the data from these States are valuable, since South Carolina well represents the extensive textile business of the South, while Pennsylvania stands for the iron and steel industry, the products of which played such an important part in the recent war. It is Massachusetts, however, which furnishes the most complete and probably the most accurate statistics of manufactures compiled by any State in the Union. Unfortunately, its manufactures, while extremely varied, consist to a disproportionate degree of shoes and textiles, the latter being already represented by the South Carolina data. In order, therefore, to secure the maximum advantage from the existence of such a useful body of data, it was deemed best to re-weight the Massachusetts figures in a manner which makes the different industries for that State have the same relative rank as the like industries in the nation as a whole. The actual process used is as follows:—

Those Massachusetts industries have been chosen which best represent the given field of production. All the items in the data for the specified Massachusetts industry have been multiplied by the ratio of the 1914 value of the output in the United States to the value of the output in the chosen Massachusetts industry in the same year. The sums of the resulting products are thus made comparable in size to the corresponding aggregates for the country as a whole. The totals obtained in this way from the Massachusetts data show the relative changes that would have occurred from year to year in the gross value of output, in the stock of materials used, and in the amount of wages paid during the year, if each of these items in each of the great fields of the manufacturing industry in the United States as a whole had changed at the same rate as did the corresponding fields in Massachusetts.

Owing to the less detailed nature of the information from Pennsylvania and South Carolina, it was not deemed worth while to re-weight the figures for those states in the same manner. For the reasons just stated, in those instances in which the figures for the three States have been combined, the Massachusetts figures have been weighted somewhat more heavily than the relative size of its manufacturing industries would apparently warrant. In this manner, indices and ratios have been derived which have been used as a basis for estimating figures for intercensal years.

§ 5e. The Share of the Employees

In attempting to estimate the amount paid to employees in the form of salaries and wages the assumption has been made that variations in the

TABLE 5D

AN ESTIMATE OF THE TOTAL OF WAGES AND SALARIES PAID BY THAT PART OF THE MANUFACTURING FIELD COVERED BY THE CENSUS OF 1914 IN ITS PRINCIPAL REPORT

(For the Continental United States)

A	B	C	D	E	F	G	H	I	J
	Ratio to gross value of output in manufactures of								
Calendar year	Wages and salaries in Pa.	Wages in S. C.[d]	Wages in Mass.[e]	Weighted average of preceding $\frac{10B+C+15D}{26}$	Wages and salaries in the U. S.	Ratio of F to E	Ratio of wages and salaries to gross output in the U. S. G × E	Gross value of output of factories of United States[j] (Millions)	Wages and salaries paid by factories of U. S. (Millions) H × I
1909.....	.1936[a]	.1881	.2020	.1982	.2112[f]	1.066[h]	.2112	$20,672	$ 4,366
1910.....	.2114[a]	.1643	.2041	.2054		1.071[i]	.2200	21,770	4,790
1911.....	.2162[a]	.1660	.2073	.2091		1.079[i]	.2256	21,300	4,805
1912.....	.2082[a]	.1852	.2010	.2032		1.087[i]	.2208	24,050	5,310
1913.....	.2165[b]	.1728	.2044	.2078		1.098[i]	.2282	25,810	5,890
1914.....	.2051[b]	.1825	.1989	.2007	.2213[g]	1.103[h]	.2213	24,246	5,366
1915.....	.1892[b]	.1963	.1976	.1943		1.066[i]	.2072	28,430	5,892
1916.....	.1552[c]	.1646	.1910	.1762		1.099[i]	.1937	43,580	8,442
1917.....	.1543[c]	.1438	.1798	.1686		1.094[i]	.1845	57,080	10,530
1918.....	.1837[c]	.1369	.1819	.1809		1.089[i]	.1970	63,000	12,410
1919.....							.2121[k]	62,588[k]	13,273[k]

[a] *Annual Reports* of Secretary of Internal Affairs of Pennsylvania, Part III.
[b] *Annual Reports* of Commissioner of Labor and Industry, Pennsylvania, Part I.
[c] *Report on Productive Industries*, Pennsylvania Department of Internal Affairs.
[d] South Carolina *Yearbooks*, and *Annual Reports* of the Commissioner of Agriculture, Commerce, and Industries, Labor Division.
[e] *Statistics of Manufactures* of Massachusetts.
[f] *U. S. Census of Manufactures*, 1910, Volume VIII, p. 518.
[g] *Abstract of Statistics of Manufactures* for 1914, pp. 29 and 516.
[h] Computed by division.
[i] Interpolated along a smooth curve.
[j] See Table 5B.
[k] Calculated from the preliminary reports of the *Census of Manufactures* for 1919.

ratio of wage payments to gross value of output are satisfactory as criteria to be used in interpolation. Only preliminary figures for the 1919 Census are as yet available. When this Census is complete, it will be possible to secure a slightly higher degree of accuracy in all estimates after 1914, but it is believed that the present indices for these last few years are approximately correct. The procedure is recorded in Table 5D.

Work done at home under the contract system, a procedure frequently followed in the clothing industry for example, is often akin to piece work in a factory. The contractors in such instances, furnish no property of moment and are virtually wage earners. As previously stated, the basic estimates as to the extent of such work are very crude. Table 5E is constructed on the principle that contract work has formed a very slowly but steadily varying ratio to payments for wages and salaries. Since the amounts dealt with are relatively very small, errors in the results are of little consequence.

TABLE 5E

AN ESTIMATE OF THE TOTAL SHARE OF THE EMPLOYEES IN THE NET VALUE PRODUCT OF THAT PART OF THE MANUFACTURING FIELD COVERED BY THE CENSUS OF 1914

A	B	C	D	E
Year	Estimated total of wages and salaries[a] (Millions)	Estimated payments for labor done under contract (Millions) (One-fourth of census items)	Estimated ratio of all payments for labor to sum of wages and salaries $\frac{B+C}{B}$	Estimated sum of all payments for labor (Millions) $B \times D$
1909	$ 4,366	$44.7[b]	1.0102[d]	$ 4,410
1910	4,790		1.0100[e]	4,838
1911	4,805		1.0097[e]	4,852
1912	5,310		1.0096[e]	5,361
1913	5,890		1.0095[e]	5,946
1914	5,366	49.7[c]	1.0093[d]	5,416
1915	5,892		1.0090[e]	5,945
1916	8,442		1.0089[e]	8,517
1917	10,530		1.0086[e]	10,621
1918	12,410		1.0085[e]	12,515
1919	13,273		1.0083[e]	13,383

[a] See Table 5D.
[b] *U. S. Census of Manufactures*, 1910, Vol. VIII, pp. 518–519.
[c] *Abstract of the Census of Manufactures*, 1914, pp. 516–517.
[d] Computed.
[e] Interpolated along a curve.

A complete estimate would include in Table 5E payments made to employees as pensions or as damages for injuries suffered. However, no information is at hand concerning these amounts, and, since they are not large enough to be of serious moment, no adjustments have been made for these missing quantities.

In order to estimate the average amount of money received by an employee as wages or salaries during each year, it is necessary first to calculate the number of employees attached to the industry. The estimates of this number have been made in accordance with the principles laid down in Sec. 2d. Tables 5F and 5G set forth the conclusions derived.

TABLE 5F

THE ESTIMATED NUMBER OF EMPLOYEES ENGAGED IN THAT PART OF THE MANUFACTURING FIELD INCLUDED IN THE PRINCIPAL TABLES OF THE 1914 CENSUS

A	B	C	D	E	F	G
Calendar year	Number employed as shown by census	Index of number employed in factories of various states[b]	Ratio of B to C	Estimated number actually at work (Thousands) C × D	Estimated fraction of employees attached to industry actually at work[e]	Estimated number of employees attached to industry (Thousands) E ÷ F
1909	7,405,313[a]	969	7,642[c]	7,405	.958	7,730
1910		955	7,717[d]	7,370	.944	7,810
1911		964	7,780[d]	7,500	.941	7,970
1912		1,009	7,859[d]	7,930	.968	8,190
1913		1,007	7,944[d]	8,000	.949	8,430
1914	8,000,554[a]	1,000	8,001[c]	8,001	.910	8,790
1915		982	8,139[d]	7,993	.878	9,102
1916		1,140	8,296[d]	9,457	.969	9,757
1917		1,203	8,429[d]	10,140	.975	10,395
1918		1,220	8,590[d]	10,480	.961	10,905
1919	10,374,000[f]	1,188	8,732[c]	10,374	.934	11,017

[a] *Abstract of Census of Manufactures*, 1914, p. 428.
[b] Estimates for Massachusetts, South Carolina, New York, Pennsylvania, and Wisconsin for years after 1914. For years 1909 to 1912, only Massachusetts and South Carolina furnished reports.
[c] Computed by division.
[d] Interpolated along a smooth curve.
[e] See Section 2d for method of estimate.
[f] Preliminary estimate by Mr. E. F. Hartley, Statistician for the U. S. Census of Manufactures.

From Table 5G, it appears that the economic welfare of the employees in this line of production has improved quite decidedly since 1914. It is also a fact of interest that the average number of employees increased rather rapidly between 1915 and 1918.

TABLE 5G

THE ESTIMATED AVERAGE COMPENSATION RECEIVED BY THE EMPLOYEES ATTACHED TO THAT PART OF THE MANUFACTURING FIELD INCLUDED IN THE PRINCIPAL TABLES OF THE 1914 CENSUS

A	B	C	D	E	F
Calendar year	Total compensation for labor[a] (Millions)	Estimated number of employees attached to industry[b] (Thousands)	Average annual compensation per employee B ÷ C	Index of prices of goods consumed by manual and clerical workers[c]	Purchasing power of average annual compensation at prices of 1913 D ÷ E
1909 ...	$ 4,410	7,730	$ 571	.955	$597
1910 ...	4,838	7,810	620	.978	634
1911 ...	4,852	7,970	609	.984	619
1912 ...	5,361	8,190	655	.994	659
1913 ...	5,946	8,430	705	1.00	705
1914 ...	5,416	8,790	616	1.01	610
1915 ...	5,945	9,102	653	1.03	634
1916 ...	8,517	9,757	873	1.10	794
1917 ...	10,621	10,395	1,022	1.29	792
1918 ...	12,515	10,905	1,148	1.58	726

[a] See Table 5E.
[b] See Table 5F.
[c] See Table 2C.

§ 5f. The Share of the Entrepreneurs and Other Property Owners

The first item dealt with in the share of the propertied classes is the relatively unimportant one of rents and royalties paid to private parties for leased property. The assumption that the net amounts were two-thirds [1] of the totals reported by the Census as being paid for the rent of factories gives an estimate for 1909 of $71,050,000, and for 1914 of $93,800,000. It seems reasonable that rents and royalties should vary in proportion to the number of employees and the general rent level. No figures for business rents are available; hence, it has been necessary to fall back on the index of residence rents compiled by the United States Bureau of Labor Statistics. Since it was a period of nearly stationary prices, it is assumed that rents remained unchanged from 1909 to 1913.

Table 5H shows the rough estimates of rent paid arrived at by the application of these decidedly tenuous assumptions.

It is much more difficult to estimate correctly the share of the net value product going to the entrepreneurs and investors than it is to find the amount going to labor. Table 5C indicates that if we include business savings as part of the income of the entrepreneurs that they and the bond-

[1] Assumed that one-third of the gross rent goes to pay for taxes, repairs, and maintenance.

TABLE 5H

A ROUGH ESTIMATE OF THE PAYMENTS MADE TO PRIVATE INDIVIDUALS IN THE FORM OF RENTS AND ROYALTIES BY THE MANUFACTURING INDUSTRIES COVERED BY THE MAIN REPORT OF THE CENSUS OF 1914

(For the Continental United States)

A	B	C	D	E	F	G
Year	Rent paid to individuals for the use of factories (Thousands)	Thousands of employees attached to industry[c]	Index of residence rents	Composite index C × D	Ratio of B to E	Estimated total rents and royalties paid (Millions) $\frac{E \times F}{1{,}000}$
1909	$71,050[a]	7,730	1.00[d]	7,730	9.18[f]	$ 71
1910		7,810	1.00[d]	7,810	9.48[g]	74
1911		7,970	1.00[d]	7,970	9.79[g]	78
1912		8,190	1.00[d]	8,190	9.89[g]	81
1913		8,430	1.00[e]	8,430	10.44[g]	88
1914	93,800[b]	8,790	1.00[e]	8,790	10.69[f]	94
1915		9,102	1.01[e]	9,193	10.66[g]	98
1916		9,757	1.02[e]	9,952	11.05[g]	110
1917		10,395	1.01[e]	10,499	11.33[g]	119
1918		10,905	1.05[e]	11,450	11.96[g]	137

[a] *U. S. Census of Manufactures* for 1910, Vol. VIII, p. 129; estimated that two-thirds of rent was paid to individuals.

[b] *Abstract of Census of Manufactures* of U. S. in 1914, p. 517; estimated that two-thirds of rent was paid to individuals.

[c] See Table 5F.

[d] No data; therefore assumed.

[e] U. S. Bureau of Labor Statistics, *Monthly Labor Review*, various numbers in 1920–1921.

[f] Computed by division.

[g] Interpolated along a straight line.

holders together received $1,626,600,000 in 1909 and $1,454,000,000, in 1914. In 1918, the first year in which the Income Tax Bureau presents for manufacturing corporations figures answering our needs, these corporations showed, after paying taxes, net earnings of $2,422,074,926. If we estimate the interest on the funded debt as being 80 per cent of all interest paid, it constitutes an addition of about $430,500,000, making a total of approximately $2,852,575,000.[1] By means of a smooth curve based upon the fractions for 1904, 1909, and 1914, it is estimated that, in 1918, corporations produced 84.7 per cent of all value added by the factories in this field. If we divide by 0.847, we arrive at a figure of about $3,366,000,000, as representing the share going in 1918 to both private and corporate entre-

[1] U. S. Bureau of Internal Revenue *Statistics of Income*, 1918, p. 16.

preneurs and to holders of the funded debt. The gross output of the factories, in this year, has been estimated at $61,040,000,000.[1] If this figure is correct, the ratio of the share of the classes mentioned to the gross value of output is about 0.0551.

TABLE 5I

RETURNS TO ENTREPRENEURS AND HOLDERS OF THE FUNDED DEBT IN THAT PART OF THE MANUFACTURING FIELD COVERED BY THE MAIN REPORT OF THE CENSUS OF 1914 INTERPOLATED UPON THE BASIS OF THE AVERAGE NET EARNINGS OF SIXTY-SIX TYPICAL MANUFACTURING CORPORATIONS

(In the Continental United States)

A	B	C	D	E
Year	Returns to entrepreneurs and holders of the funded debt (Millions)	Index representing net earnings plus bond interest of 66 typical corporations [b]	Ratio of B to C (Millions)	First approximation to the share of entrepreneurs and private creditors in the value product (Millions) C × D
1909	$1,626 [a]	100.0	16.26 [c]	$1,626
1910		118.7	15.40 [d]	1,828
1911		90.7	14.70 [d]	1,333
1912		117.4	14.16 [d]	1,663
1913		132.5	13.80 [d]	1,829
1914	1,454 [a]	106.4	13.67 [c]	1,454
1915		131.2	13.79 [d]	1,810
1916		253.9	14.00 [d]	3,555
1917		304.9	14.43 [d]	4,399
1918	3,366 [e]	228.6	14.72 [c]	3,366

[a] See Table 5C.
[b] Computed from data in Poor's and Moody's *Manuals of Statistics*. Corporations were classified according to size and both totals and a set of indices were obtained for each group. The index series here given is composed of the respective medians for the specified years of the indices for the various groups.
[c] Computed by division.
[d] Interpolated along a smooth curve.
[e] For origin of this figure, see text.

The difference between the items in the second and third columns of Table 5J casts suspicion upon the accuracy of the Census figures. Why should a group of typical corporations show from 11 to 13 per cent of their gross output going to profits when the Census data for the same years indicate only 6 to 8 per cent for the same? Most of the discrepancy presumably arises from the fact that the gross output as reported by the Census contains much more duplication than does that reported by corporations. The Census is taken factory by factory, each plant stating the value

[1] See Table 5B.

TABLE 5J

RETURNS TO ENTREPRENEURS AND HOLDERS OF THE FUNDED DEBT IN THAT PART OF THE MANUFACTURING FIELD COVERED BY THE TOTALS FOR THE CENSUS OF 1914 INTERPOLATED UPON THE BASIS OF THE AVERAGE RATIO OF EARNINGS[a] TO GROSS OUTPUT IN THE CASE OF 31 TYPICAL CORPORATIONS

A	B	C	D	E	F	G
Year	Ratio of share of entrepreneurs and bondholders to gross value of output		Ratio of B to C	Estimated ratio of share of entrepreneurs and bondholders to gross output C × D	Estimated gross output *f* (Millions)	Second approximation to the share of entrepreneurs and holders of funded debt (Millions) E × F
	According to U. S. Government figures	As shown by corporate reports[c]				
1909	.0787[b]	.133	.592[d]	.0787	$20,672	$1,626
1910		.145	.589[e]	.0854	21,770	1,859
1911		.121	.585[e]	.0708	21,300	1,507
1912		.135	.567[e]	.0765	24,050	1,839
1913		.143	.557[e]	.0797	25,810	2,056
1914	.0600[b]	.109	.550[d]	.0600	24,246	1,454
1915		.124	.527[e]	.0654	28,430	1,860
1916		.182	.503[e]	.0916	43,580	3,994
1917		.162	.480[e]	.0778	57,080	4,444
1918	.0534[g]	.117	.456[d]	.0534	63,000	3,366

[a] Earnings equal total of bond interest, dividends, and amount carried to surplus.
[b] See Table 5C for figures from which ratios are derived.
[c] The ratio was computed from reports in Poor's and Moody's *Manuals* for each corporation for each year. The median of the ratios for each year was ascertained and is here recorded.
[d] Computed by division.
[e] Interpolated along a smooth curve.
[f] See Table 5B.
[g] For derivation, see text.

of its output. The large corporations of today, are highly integrated. Thus, a steel company, in reporting its gross sales, does not duplicate the value of the gross outputs of the iron mines, blast furnaces, etc., operated as separate units. But, though the values of outputs of subsidiary plants are not combined to give a grand total of output, the net earnings of all the parts of a corporation may be totaled to arrive at the reported net earnings. The following example may serve to illustrate the situation. Holding Company A operates a series of four factories. Plant 2 uses the output of Plant 1; Plant 3 takes the output of Plant 2; and Plant 4 is the only one selling any final product to outsiders.

From the following table, a computation by the Census method would show the ratio of profit to gross value of output to be $\frac{6}{57}$ or .105.

Plant	Operating expenses	Gross value of output	Profits
1	9	10	1
2	11	12	1
3	14	16	2
4	17	19	2
Total	51	57	6

In the report of Corporation A, however, the gross sales would be reported as only the amount sold to outsiders from the finishing plant, No. 4, or 19; while the net profit would still be reckoned as 6. This would give a ratio of $\frac{6}{19}$ or .316, approximately three times that indicated by the Census method.

There is no way of knowing whether the discrepancy between the ratios derived from the Census and from corporation reports does or does not arise wholly from this difference in accounting, but it is not improbable that this is the chief cause for the dissimilarity of the ratios.

In Tables 5I and 5J, there are derived two distinct estimates of the share in the income from manufacturing going to the entrepreneurs and holders of the funded debt. An average of these two estimates, equal weight being given to each, appears in Column B of Table 5K. This table also shows the distribution of the share of the entrepreneurs and holders of the funded debt, divided into three parts, these parts being estimated from the annual reports of forty-six typical corporations.

The evidence in Table 5K indicates that, as might be expected, the funded debt has consumed a relatively fixed quantity of the net earnings while distributed profits and savings have varied greatly. A better picture of the significant facts is shown in Table 5L in which the nominal amounts have been converted into purchasing power at the prices of 1913. The reasons for choosing the particular price indices used for converting purposes are as follows: stockholders in factories probably possess about the same average income as stockholders in general, and the income tax reports indicate that, in 1919, about as much in dividends went to persons with income above $40,000 per annum as to all below that figure; therefore the $25,000 average expenditure seems a reasonable criterion. Surpluses of manufacturing concerns normally are put into new plant; hence an index of construction costs appears to be the logical correcting factor to apply to business savings in this field.

TABLE 5K

THE ESTIMATED AMOUNTS OF THE EARNINGS GOING TO INTEREST ON FUNDED DEBT, SAVINGS, AND PROFITS WITHDRAWN FROM THE BUSINESS IN THE ENTIRE FIELD OF MANUFACTURING COVERED IN THE PRINCIPAL TABLES OF THE 1914 CENSUS

A	B	C	D	E	F	G	H	I	J
				Distribution of earnings of 46 typical manufacturing corporations[b] (Millions)			Estimated distribution of earnings for entire manufacturing field (Millions)		
Calendar year	Final estimate of the share of entrepreneurs and holders of the funded debt[a] (Millions)	Net earnings plus bond interest of 46 typical mfg. corporations[b] (Millions)	Ratio of B to C	Interest on funded debt	Corporate savings	Dividends	Interest on funded debt D × E	Savings by business units D × F	Distributed to proprietors or stockholders D × G
1909	$1,626	$326	4.988	$66.16	$102.64	$157.18	$330	$ 512	$ 784
1910	1,843	365	5.050	68.71	118.62	177.83	347	599	898
1911	1,420	310	4.581	70.51	60.24	179.23	323	276	821
1912	1,751	361	4.850	71.96	108.24	181.23	349	525	879
1913	1,942	410	4.736	79.60	121.41	209.25	377	575	991
1914	1,454	310	4.690	81.66	29.21	199.14	383	137	934
1915	1,835	453	4.051	80.97	182.43	190.32	328	739	771
1916	3,774	944	3.997	79.95	580.43	284.73	319	2,320	1,138
1917	4,421	980	4.511	82.24	469.07	383.51	371	2,116	1,730
1918	3,366	754	4.464	92.07	319.00	342.96	411	1,424	1,531

[a] Average of estimates in Column E, Table 5I and Column G, Table 5J.

[b] Data collected from Poor's and Moody's *Manuals of Corporation Statistics*. In order to prevent the U. S. Steel Corporation from dominating the sample, the earnings of the other corporations have been multiplied by three before adding its earnings.

TABLE 5L

THE PURCHASING POWER OF THE BUSINESS SAVINGS AND RETURNS TO INVESTORS IN THAT PART OF THE MANUFACTURING FIELD COVERED BY THE PRINCIPAL TABLES OF THE 1914 CENSUS

A	B	C	D	E	F	G	H	I	J
	Estimated disbursements to entrepreneurs and other property owners						Business savings		
Calendar year	Millions of Dollars				Index of prices of goods consumed by wealthy [d]	Purchasing power at prices of 1913 (Millions) E ÷ F	Millions of dollars [e]	Index of construction costs [f]	Purchasing power at prices of 1913 H ÷ I
	Rents and royalties [a]	Interest on funded debt [b]	Distributed profits [c]	Total B+C+D					
1909	$ 71	$330	$ 784	$1,185	.973	$1,218	$ 512	.927	$ 552
1910	74	347	898	1,319	.988	1,335	599	.953	629
1911	78	323	821	1,222	.995	1,228	276	.945	292
1912	81	349	879	1,309	1.000	1,309	525	.983	534
1913	88	377	991	1,455	1.000	1,455	575	1.000	575
1914	94	383	934	1,410	1.010	1,396	137	.960	143
1915	98	328	771	1,197	.996	1,202	739	.992	745
1916	110	319	1,138	1,567	1.074	1,459	2,320	1.194	1,943
1917	119	371	1,730	2,220	1.198	1,853	2,116	1.473	1,435
1918	137	411	1,531	2,078	1.364	1,523	1,424	1.499	950

[a] See Table 5H.
[b] See Table 5K, Column H.
[c] See Table 5K, Column J.
[d] Derivation described in Sec. 2C; applies to families spending in 1919 $25,000 annually for consumption goods.
[e] See Table 5K, Column I.
[f] Composite index based on U. S. Bureau of Labor Statistics data; building labor wages per hour weighted 3, metals and metal products weighted 2, and lumber and building materials weighted 1.

Table 5L indicates that the purchasing power of the actual disbursements to the propertied classes has shown a somewhat upward tendency throughout the decade and that the savings made by the business enterprises in this field increased to very unusual proportions during the years 1916 to 1917 and remained moderately high even in 1918.

§ 5g. The Fraction of the Net Value Product Paid Out as Wages or Salaries

Table 5M measures the fraction of the net value product of the industry going to the employees.

TABLE 5M

THE ESTIMATED NET VALUE PRODUCT AND THE SHARE THEREOF GOING TO THE EMPLOYEES

For that Part of the Manufacturing Industry Included in the Principal Tables of the 1914 Census

A	B	C	D	E	F
Calendar year	Amounts distributed to entrepreneurs and other property owners[a] (Millions)	Business savings[a] (Millions)	Compensation paid to employees[b] (Millions)	Total net value product (Millions) B + C + D	Per cent of net value product going to the employees D ÷ E
1909	$1,185	$ 512	$ 4,410	$ 6,107	72.2
1910	1,319	599	4,838	6,756	71.6
1911	1,222	276	4,852	6,350	76.4
1912	1,309	525	5,361	7,195	74.5
1913	1,455	575	5,946	7,976	74.5
1914	1,410	137	5,416	6,964	77.8
1915	1,197	739	5,945	7,881	75.4
1916	1,567	2,320	8,517	12,403	68.7
1917	2,220	2,116	10,621	14,957	71.0
1918	2,078	1,424	12,515	16,018	78.1

[a] See Table 5L, Column E.
[b] See Table 5E, Column E.

The last column of Table 5M makes it clear that the employees have been receiving from two-thirds to three-fourths of the net value product of manufacturing. While their relative share was low in 1916 and 1917, it reached a higher limit in 1918 than at any previous time in the decade. Questions concerning changes in the efficiency of the employees cannot be answered without further research.