Chapter Title: Preliminary Studies

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CHAPTER 2

PRELIMINARY STUDIES

§ 2a. An Estimate of the Population of the United States for the Intercensal Years

In the course of the present investigation, it has been found essential to have a reasonably accurate estimate of the population of the United States for each of the intercensal years. The method of interpolation used in obtaining the estimates presented in the Statistical Abstract of the United States consists in taking one-tenth of the arithmetic increase since the preceding Census and adding this amount to the Census figure to find the population for the next year; similarly the population for each of the succeeding years is calculated by adding this same number to the estimate for the year previous. This process is a straight line extrapolation and has nothing but simplicity to commend it, for, when applied, errors of considerable size gradually accumulate as changing conditions affect population growth. For example, the Census shows a population on January 1, 1920, nearly two millions less than that given by following the method just described. Is there a more accurate way of estimating the population in advance of the Census? If so, what is it? In the hope of answering these questions, the following study has been made.

For recent years, the Census Bureau has compiled figures showing the birth rate and the death rate for the registration area and this registration area has been steadily growing larger until it now appears to be fairly representative of the country as a whole. The Commissioner of Immigration presents annual statistics showing the number of aliens admitted and departed. It seemed to the Staff of this Bureau that these figures might readily be used as a basis for estimating the population, year by year. This view was later endorsed by officials of the United States Census Bureau.

The mode of procedure followed has been relatively simple. The birth rate and the death rate are given for the calendar year while immigration is reported for the fiscal year. By aid of smoothed curves, the birth and death rates have been estimated for the fiscal years and the excess of the birth rate over the death rate has been calculated. The population for June 30, 1910, has been estimated according to the method employed in the Statistical Abstract. The estimated excess of the birth rate over the

14

death rate has been applied to this population to find the increase due to the excess of births over deaths during the fiscal year ending June 30, 1911. This amount plus the excess of immigration over emigration has been added to the population estimate for June 30, 1910, and the resulting sum has been assumed to be the population for June 30, 1911. This number has been taken as a new base and the process has been repeated for the next year—and so on up to the Census of 1920. The estimate thus arrived at for January 1, 1920, is in error by approximately half a million, or only about one-fourth of the corresponding error resulting from the method of estimate used in the Statistical Abstract. It has been assumed that the error was equally distributed among all intercensal years and, by correcting in accordance with this assumption, a revised preliminary estimate of the population for each year has been secured.

Since the Census estimates of birth and death rates for the various years are based upon population estimates which are considerably too high for the last years of the decade, it seems probable that these reported birth and death rates are both somewhat too low for the period just mentioned. Following this assumption, these rates have been increased in the same ratio that the Census estimate of population bears to the revised preliminary estimate made according to the procedure described above. These revised rates have been applied to the revised preliminary estimates of population and the products have been taken as the net additions to the population arising from the excess of births over deaths. By use of these increments and those due to the excess of immigration over emigration, the population has been again built up year by year on the basis of the 1910 Census. The estimate obtained in this manner for January 1, 1920, differs by only 414,000 from the Census count at that date.

This difference has been apportioned equally among the various years of the decade giving as a final estimate the figures shown in the accompanying table.

TABLE 2A

AN ESTIMATE OF THE POPULATION OF THE UNITED STATES FOR THE INTERCENSAL YEARS

Date	Estimated number per thousand inhabitants				Estimated thousands added during the fiscal year c to the population of the U. S. by excess of		Estimated population of the Continental U. S. (Thousands)	
	Calendar year		Excess of births over deaths					
	Births f	Deaths h	Calendar year	Fiscal year a,e	Births over deaths f	Immigration over emigration k	June 30 l	Jan. 1 m
1909	26.2g	14.4	11.8	12.0	1.078	544	90,370 (91,972d)	89,557
1910	25.8g	15.0	10.8	11.3	1,033	818	92,229	91,340
1911	25.6g	14.2	11.4	11.1	1,033	512	93,811	(91,972d)
1912	25.4g	13.9	11.5	11.5	1.088	402	95,338	93,070
1913	25.2g	14.1	11.1	11.3	1.088	815	97,278	94,600
1914	25.0g	13.6	11.4	11.3	1.110	769	99,194	96,290
1915	24.9	13.5	11.4	11.5	1.147	50	100,428	98,310
1916	24.8	14.0	10.8	11.2	1.131	126	101,722	99,870
1917	24.6	14.2	10.4	10.6	1.084	216	103,059	101,080
1918	24.4	17.7	6.7	10.3	1.067	19	104,182	102,410
1919	24.2	12.9i	11.3	5.8	607	21	104,847	103,660
1920				14.6b	771b	71b	106,357	104,310
								105,709s

a Corrected to account for adjustments in population used as a base: quantities read from a curve.
b This is an estimate for the last half of 1919 only.
c Ending June 30 of the given year.
d Census count for April 15, 1910.
e Census count for January 1, 1920.
f Census Bureau. *Birth Statistics for the Birth Registration Area of the United States.*
g Estimated from a smoothed curve produced.
h *Statistical Abstract of U. S.* for 1919, p. 80.
i Preliminary estimate by Census Bureau.
j Rates in preceding column times the population calculated by the preliminary method described in the text.
k From *Statistical Abstracts of the U. S.*
l For mode of derivation, see text.
m Derived from the immediately preceding column by aid of a smoothed curve.

It is true that it would be impossible to obtain results of the degree of accuracy here presented were it not for the existence of a Census count at each extremity of the period studied. Nevertheless, by following practically the same method, omitting only the adjustments used to make the data conform to the Census of 1920, it appears that the estimate for January 1, 1920, would be in error by only about 495,000.

It is not improbable that even this degree of error might be reduced somewhat if one used monthly instead of annual figures for immigration and the rates for births and deaths. Doubtless other refinements might be introduced. However, the residual error after applying the simple method just presented is unimportant for most practical purposes. It seems, therefore, that this plan of estimating the population of the United States for intercensal years is well worthy of the consideration of statisticians.

An interesting by-product of this study is the light thrown upon the ultimate apparent effect of the influenza epidemic of 1918 upon the population of the country. The fatality caused by the disease was so great

that the population on January 1, 1919, was but little larger than on June 30, 1918. This fact is not at all surprising, but the remarkable feature is that the death rate during 1919 was so much reduced (despite the extensive recurrence of influenza in that year) that the population on January 1, 1920, was probably little if any less than it would have been had the influenza epidemic not occurred.

These figures lead one to inquire whether influenza ought not to be regarded principally as a hastener rather than as a primary cause of the death of its victims. The only other reasonable explanations of the great fall in the death rate for 1919 would seem to be that influenza had a beneficent effect in stimulating the health of the survivors or that some unknown cause greatly interfered with the action of deadly diseases in 1919. Neither of these latter assumptions seems as probable as the hypothesis suggested in the original query.

§ 2b. An Index of the Prices of Consumption Goods Used by Manual and Clerical Workers' Families

Data showing the average annual money wages or annual book income received by any class of workers have little meaning unless such wages or income are compared with the changes in the average prices of the goods usually bought by such workers. The recent wide variations in the price level have made this fact evident even to the most casual observer. It is, therefore, essential that a reliable index of prices paid for commodities consumed by the working classes be at hand.

Recently, the United States Bureau of Labor has published such an index number covering the years 1913 to date, but it has presented none for the years 1909 to 1912. The index number worked out by the National Bureau of Economic Research is the result of an attempt to fill in this gap. Unfortunately, complete data are not available for all fields; hence it has been necessary to use estimates of doubtful value in place of actual figures for certain items. For example, no figures showing the trend of house rents for the earlier half of the decade have been discovered. Other missing items are, fortunately, mostly those of very minor importance.

In constructing the price index, the classification made by the United States Bureau of Labor has been followed closely, all commodities being divided into six general classes:—namely, Food, Clothing, House Furnishings, Housing, Fuel and Light, and Miscellaneous. In the case of each group, the index has been constructed to cover the period 1909-1919, the year 1914 being used as the base year. In deriving the index number herewith presented, recourse has been had to two apparently distinct but actually related methods of computation; first, the comparison of aggregates of actual prices based upon the estimated quantities used in the base year;

second, the weighted arithmetic average of relatives, the weights used being likewise the quantities assumed to have been used in the base year. Since the same base year and the same weights have been used, the two methods necessarily give identical results—as can easily be demonstrated by simple arithmetic.

The reason for varying the method lies in the fact that the original data were partly in the form of actual prices and partly in terms of relative numbers only. In the case of fuel and light, for example, the Bureau of Labor reports furnish relative numbers from 1909 to 1914 and actual prices from 1914 to date. Under such circumstances, convenience dictated the use of the particular method of computation that involved least labor. In the main, the procedure was as follows: Aggregates of prices were computed for the sub-groups; these aggregates were reduced to relative numbers; and these relatives were then weighted and combined to give the final index.

FOOD.

For the food group, the index number constructed by the Bureau of Labor and published in the *Monthly Labor Review* each month seems to be entirely satisfactory and hence has been used. In recent years, that index number is based upon the year 1913. For our purposes, it has been necessary to adjust it to the common 1914 base. This has been done by dividing each annual index by the index number given for 1914 and multiplying the results by 100.

CLOTHING.

The articles of clothing included in this group, and the weights used are based upon the list given by the Bureau of Labor in the *Monthly Labor Review* for November, 1919, pp. 2 to 14—a list showing the actual apportionment of expenditures for clothing by working families of Northern and Southern Cities. Since it is not easy to find quotations of clothing prices which are comparable from year to year, it was decided to have recourse to figures quoted by some mail order house, for by use of the catalogue, it is possible to identify with a fair degree of accuracy the same article in different years. Sears, Roebuck & Company were kind enough to place a series of their catalogues at our disposal. From these were selected forty-three articles of men's clothing and forty-four articles of women's wear, which seemed to be practically identical in quality throughout the decade under consideration. The price of each article was then multiplied by the average number of units purchased per family per year, as shown by the Bureau of Labor study above mentioned. As the figures are given for Northern and Southern cities separately, an average weight

for the country was made by weighting the Northern cities two and the Southern cities one, the larger weighting being given to the North because that section is so much more populous.

A total value for each article having been thus calculated, the values for the various articles were next summated in order to obtain an aggregate value for all articles in the given year. The aggregate value for 1914 was then taken as a base and called 100, and indices for other years were derived by a comparison of the relative sizes of the aggregate values.

HOUSE FURNISHINGS.

As in the case of clothing, the weighting system is based upon a list published by the Bureau of Labor [1] showing the average annual expenditure by working families in the cities of the United States for various articles of furniture and the number of each item of furniture purchased each year by the average family. As in the case of clothing, the prices have been taken from the annual [2] catalogues of Sears, Roebuck & Company. The method of computation used is identical with that already described for clothing.

FUEL AND LIGHT.

In working up an average index of prices of fuel and light, it was possible to get satisfactory quotations for coal (anthracite and bituminous), manufactured gas, and electricity.

The prices on January 15th and July 15th of each year from 1914 to 1919 for coal in ton lots for household use are published in the *Monthly Labor Review*.[3] Separate quotations are given for bituminous coal and two kinds of anthracite, namely, stove and chestnut. The actual prices for the years 1914 to 1919 were reduced to relatives on the 1914 base. Relative prices for each of the three items had already been computed by the Bureau of Labor Statistics for the years 1909–1914,[4] and were simply transcribed as quoted.

The mean of the relatives for stove and chestnut coal was used as representative for anthracite. The relative numbers for anthracite and for bituminous coal were then weighted by the respective annual costs per average family in the year 1919 for the two varieties of coal as shown by figures published in the *Monthly Labor Review*.[5]

Manufactured Gas: The average net price per 1000 cubic feet of gas

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[1] *Monthly Labor Review*, Jan. 1920, pp. 27–34.
[2] Clothng prices were taken from the spring catalogue issued Jan. 1st, and furniture prices from the autumn catalogue issued Sept. 1. The indices for each group have been adjusted to the middle of the year before computing the average price index for all commodities.
[3] *Monthly Labor Review*, March, 1920, p. 63.
[4] *Statistical Abstract of the U. S.*, 1915. p. 531. table 300.
[5] *Monthly Labor Review*, Sept. 1920, pp. 92–99.

was computed by taking quotations of the price of gas from a number of widely distributed cities [1] and getting the average of these quotations. These averages were reduced to relatives on the 1914 base. The annual cost of gas per average family per year was ascertained from the Bureau of Labor Statistics report [2] and the relative prices of gas were weighted by this figure.

Electricity: Estimates of the average price per kilowatt hour of electricity used in residences in New York City were obtained from the New York Edison Company, and these were reduced to relative prices on the 1914 base. As in the case of coal and gas the average cost per family per year was derived from information published in the *Monthly Labor Review* [2] and the relative prices of electricity were weighted by this figure. The sum of the weighted relatives for these various items making up the fuel and light group, was divided by the sum of the weights used and the resulting figure was taken as the index for this group.

HOUSING

In their recent investigation into the cost of living, the National Industrial Conference Board made a study of changes in the cost of Shelter [3] during the period 1914–1919, using 1914 as the base year. The results of this study are charted in their report, and from this chart have been read the index numbers used in making up our average index.

Careful search has failed to bring to light any information whatever concerning the course of house rents before 1914. As the years 1909 to 1914 were characterized by a relatively stable level of prices, it has seemed best to assume that house rents remained unchanged during this interval and hence to use 100 as the index for each year.

MISCELLANEOUS EXPENDITURES.

In constructing the index number for the miscellaneous group, again the weights were based upon the information given in the *Monthly Labor Review*. [4]   After much difficulty, approximate price quotations were secured for thirteen items of this list, namely, railway passenger fares, telephone rates, street car fares, automobile repairs, automobile tires, gasoline, moving picture tickets, newspapers, magazines, college tuition, [5] room and board at college, [5] hotel rates for lodging, [5] and retail prices of tobacco, and these items were assumed to be fairly representative of the miscellaneous group.

[1] *Statistical Abstract of the U. S.*, 1917, p. 559; 1919, p. 576.
[2] *Monthly Labor Review*, Sept. 1920, pp. 92–99.
[3] National Industrial Conference Board, *Research Report*, No. 28, May, 1920.
[4] Nov. 1919, pp. 15–19.
[5] These items are of minor importance and hence are weighted lightly.

The actual prices of each article were reduced to relatives on the base 1914. The relatives were then weighted by the average cost per family for each item as shown by the Bureau of Labor study for 1919. The sum of the products for each year was divided by the sum of the weights for the same year in order to arrive at the index number for that year.

AVERAGE INDEX FOR ALL EXPENDITURES FOR CONSUMPTION GOODS.

The average indices for the separate groups having been obtained for the various years by the methods above described, the next step was to combine them into an index representing the entire expenditures for consumption goods. This combination was effected by multiplying the indices by weights representing, for 22 cities in the United States in which the United States Bureau of Labor Statistics conducted investigations in 1919, the per cent of all expenditures, devoted to each class of items.[1] The actual numbers used as weights are as follows:

ITEM OF EXPENDITURE	PER CENT OF TOTAL EXPENDITURE
All purposes	100.0
Food	38.2
Clothing	16.6
Housing	13.4
Fuel and Light	5.3
House Furnishings	5.1
Miscellaneous	21.3

The sum of the products for each year was divided by the sum of the weights for the same year to obtain the average index for that year. The final results of the study are presented in the accompanying table.

The fact that the indices from 1914 to 1919 correspond so closely to those computed by the Bureau of Labor Statistics makes it appear probable that the indices for the years 1909 to 1913 are also not far from the truth. The only important reason for suspecting any greater margin of error in the earlier years is the absence of rent data for that period. However, it is improbable that there were variations in this relatively small item sufficiently great to vitiate materially the average indices for the whole group. It seems safe, therefore, to use the figures presented as a representative index of the average prices of those consumption goods purchased by the working classes of our population during the different years of the decade under consideration.

[1] *Monthly Labor Review*, October, 1920, p. 65.

TABLE 2B

A COMPARISON OF THE VARIOUS INDICES PURPORTING TO SHOW AVERAGE CHANGES IN THE PRICES OF CONSUMPTION GOODS BOUGHT BY THE MANUAL AND CLERICAL WORKERS OF THE CONTINENTAL UNITED STATES

Indices

Year	All Consumption Goods			Food			Clothing			Housing		
	N.B.E.R.[h]	B. of L.[dg]	N.I.C.B.[a]	N.B.E.R.[hdg]	B. of L.[de]	N.I.C.B.[a]	N.B.E.R.[h]	B. of L.[ef]	N.I.C.B.[a]	N.B.E.R.[hh]	B. of L.[eh]	N.B.C.I.[a]
1909	93.2			87.2	87.2		91.6			100 f		
1910	95.5			91.2	91.2		95.1			100 f		
1911	96.0			90.2	90.2		96.9			100 f		
1912	97.1			96.1	96.1		96.5			100 f		
1913	97.7	99.0		98.0	98.0		97.0	99		100 f	100	
1914	100.0	100.0	100.0	100.0	100.0	100	100.0	100	100	100	100	100
1915	99.2	102.0	100.5	99.0	99.0	100	104.4	102	103	100	101	100
1916	108.4	108.9	108.7	111.8	111.8	111	117.2	111	120	101.5	102	101.5
1917	129.0	127.7	131.3	143.1	143.1	146	143.8	133	143	105	101	105
1918	150.0	156.5	152.2	164.7	164.7	162	178.3	179	177	115	105	115
1919		175.2	172.2	182.3	182.3	190		214	200	128	114	128
1920		214.0	204.5			219		286	266	158	135	158

Year	Fuel and Light			House Furnishings			Miscellaneous		
	N.B.E.R.[h]	B. of L.[de]	N.I.C.B.[a]	N.B.E.R.[h]	B. of L.[de]	N.I.C.B.[a]	N.B.E.R.[h]	B. of L.[de]	N.I.C.B.[ba]
1909	98.6			83.4			102.4		
1910	98.7			87.9			102.0		
1911	98.5			89.2			104.6		
1912	98.2			92.0			99.1		
1913	102.7	99		93.2	97	Included under Miscellaneous	96.3	99	
1914	100.0	100	100	100.0	100		100.0	100	100
1915	97.9	100	102	100.8	104		95.6	103	100
1916	99.3	103	104	116.5	116		100.5	108	104
1917	111.6	116	126	131.7	135		111.5	125	117
1918	119.8	136	135	158.4	178		128.4	151	150
1919	131.4	145	142		221			171	163
1920		171	166		287			198	185

a National Industrial Conference Board; *Changes in the Cost of Living, July 1914–July, 1920*, p. 27. Data for July of each year.
b Includes House Furnishings.
c Average for year adjusted to base 1914.
d United States Bureau of Labor. Data from *Monthly Labor Review*.
e Adjusted by aid of curve to middle of year and base 1914. Data from *Monthly Labor Review*, October, 1920, p. 65.
f Assumed.
g For middle of year; adjusted to base 1914; *Monthly Labor Review*, June, 1920, p. 79, and October, 1920, p. 65.
h National Bureau of Economic Research; indices computed for middle of year.

Since the facilities of the United States Bureau of Labor Statistics are so much more extensive than any at the command of this Bureau, it seems fair to assume that their index number is the better one to follow for the period actually covered, and hence, in the practical application of the index number for the purpose of reducing the book income of the working classes to terms of purchasing power, the index number shown in Table 2C is the one which will actually be used. This is simply the Bureau of Labor Statistics index carried backward to 1909 by assuming that, for the earlier years, it varies in the same ratio as the index for all consumption goods shown in the first column of Table 2B.

TABLE 2C

A COMPOSITE INDEX NUMBER SHOWING THE AVERAGE PRICES OF
CONSUMPTION GOODS USED BY MANUAL AND CLERICAL WORKERS,
THE INDEX BEING BASED UPON INVESTIGATIONS BY THE UNITED
STATES BUREAU OF LABOR AND THE NATIONAL BUREAU OF ECO-
NOMIC RESEARCH

Middle of Year	Index of Average Retail Prices Base 1913
1909	95.5 a
1910	97.8 a
1911	98.4 a
1912	99.4 a
1913	100. b
1914	101. b
1915	103. b
1916	110. b
1917	129. b
1918	158. b
1919	177.3 c
1920	216.5 c

a National Bureau of Economic Research: derived from Table 2B.
b U. S. Bureau of Labor, *Monthly Labor Review*, June, 1920, p. 79.
c U. S. Bureau of Labor, *Monthly Labor Review*, October, 1920, p. 65.

The more complete data are presented in the hope that they may be of assistance to other workers in this field.

§ 2c. Price Indices of Consumption Goods Used by the Well-to-do Classes

Many studies have been made of the changes that have occurred in the prices of consumption goods bought by the "working people," but this Bureau has not succeeded in discovering any index showing variations in the prices of those commodities consumed by the wealthier classes. Yet,

in any study of the changes in the relative welfare of the different sections of the population, it is, of course, imperative that such an index be available, especially in times of rapidly shifting price levels when quantities shown in terms of money value are almost meaningless. With the hope of filling the gap in the available statistics along this line, the computation of an index of the above mentioned type was undertaken.

It was found that the most feasible form of procedure was first to obtain relative prices for a number of specific classes of commodities and then to compute therefrom a weighted arithmetic average index number, using as constant weights the relative expenditures in a given year for each class of articles. The first problem, then, was to estimate the proportion of expenditures going for each purpose.

Recently, the Federal Reserve Board made a study of the apportionment of income made by its employees. The relative distribution there shown differs somewhat from that known to exist for wage workers. It therefore seemed reasonable to suppose that the apportionment of their expenditures by persons having still higher incomes would diverge still more widely from that of the wage earners. With a view to obtaining a little more light on the question, a number of persons of means were requested by the present investigator to state their views as to the respective shares of income which were, in general, spent by families having total expenditures solely for consumption goods amounting to $5,000, $10,000, $20,000, and $50,000, for

1. Food for themselves and servants.
2. Clothing.
3. Fuel and light.
4. Housing, including an estimated rent for a residence occupied by the owner.
5. Money wages of servants.
6. Automobiles and yachts, including maintenance and depreciation.
7. All other purposes.

Only about a dozen of the replies received were in a form which answered the requirements. However, from even this limited number, it is possible to discern, as total expenditures change, certain rather definite trends in the percentages of income spent for the specified purposes. From these indications, curves were plotted for each of the various groups, and such adjustments were made as were necessary to bring the totals to unity. The final estimates appear in Table 2D.

TABLE 2D

AN ESTIMATE OF THE PERCENTAGES OF TOTAL EXPENDITURES FOR CONSUMPTION GOODS MADE FOR THE PURPOSES SPECIFIED

Estimate based on Study by Federal Reserve Board of Expenditures of Its Employees and upon Replies to a Few Questionnaires Submitted by this Bureau

Total expenditures annually for consumption goods	Total of per cents	Food for family, guests and servants	Housing, including rent of homes owned	Fuel and light	Automobiles, yachts and their maintenance	Wages of servants	Clothing	Miscellaneous, including house furnishings
$ 5,000	100.0	27.2	18.0	3.3	9.2	4.5	14.3	23.5
10,000	100.0	19.2	18.3	3.2	9.8	9.5	11.9	28.1
15,000	100.0	15.8	18.6	3.0	10.0	11.5	10.3	30.8
20,000	100.0	13.7	18.9	2.8	10.0	12.3	9.3	33.0
25,000	100.0	12.0	19.2	2.6	10.0	12.7	8.7	34.8
30,000	100.0	10.4	19.5	2.4	10.0	12.9	8.1	36.7
35,000	100.0	9.1	19.8	2.2	10.0	13.1	7.6	38.2
40,000	100.0	7.9	20.1	2.1	10.0	13.3	7.1	39.5
45,000	100.0	6.9	20.4	1.9	10.0	13.5	6.7	40.6
50,000	100.0	6.1	20.7	1.8	10.0	13.7	6.4	41.3

Were the weights the most vital factor in determining the trend of the prices under consideration, it would be sheer folly to trust an estimate based upon such scanty data as those upon which the tables just presented rest. However, it is a well-known fact that prices of different classes of commodities do not move in entirely independent paths but fluctuate in somewhat similar ways at the same time. Since this is true, it follows that even a large change in the weights is likely to produce no radical effect upon the average index. Hence, if the above estimates are even approximately correct, there is no reason for believing that they will not serve well enough as weights for the purpose intended.

Our particular needs require an index applicable to groups of persons who receive incomes from property. The industries of transportation, manufacturing, and mining are largely operated by corporations and the owners receive their income therefrom mainly in the form of dividends or bond interest. It appears from the *Statistics of Income* for 1917, published by the Bureau of Internal Revenue, that the median net income of those receiving corporate dividends is around $25,000. Since that date, prices and incomes have increased materially, and it appears probable that today a family of the same social class would receive enough more income to enable them to spend $25,000 for consumption goods in addition to what savings they would make. For these particular industries, it seems best, therefore, in computing an index for the purpose of reducing the money income of the propertied classes to a basis of constant purchasing power, to use the

weights indicated in Table 2D as applicable to the $25,000 class. When, however, certain other industries are considered, it is evident that the average entrepreneur does not have an income in any way approximating that of the average owner of the stock of the corporations controlling the highly organized fields. Nevertheless, these people may be sufficiently wealthy to cause their expenditures to differ materially in their distribution from those of the working classes. For the propertied classes deriving their livelihood from such industries, it seems probable that the weights based upon average expenditures of $5,000 per annum are more appropriate. The relative prices shown in Table 2E have therefore been multiplied by the weights representing the $5,000 class, and the weighted average index thus derived is shown in Table 2G.

The division of expenditures shown in Table 2D is not carried far enough to furnish an appropriate weight for each of the relative prices actually available. It has been necessary, therefore, to subdivide some of the original groups of commodities in order to arrive at the weights used in Tables 2E and 2F. This process of subdivision has perforce been based upon rough estimates, as no accurate information on the subject has been discovered.

Price data are available only for certain classes of expenditures, hence these classes have necessarily been used as typical of all articles or services purchased. The price estimates have been collected from a variety of sources and have been computed with considerable care except in the case of a few relatively unimportant items. In one or two items such as, for example, automobile repairing, the estimates are only moderately accurate, but they are the best obtainable.

For the groups entitled "Food," "Clothing," "House Furnishings," "Fuel and Light," and "Housing," the same indices have been used that were computed for the same groups of goods used by the laboring classes. It is, of course, true that the articles purchased by the wealthy in the way of clothing, housing, and house furnishings, are of a very different quality than are those used by the poorer classes. No reason is apparent, however, why the higher priced articles should on the average, vary in a fashion much different from that characteristic of the cheaper goods. In the absence of any definite knowledge concerning this matter, and in view of the paucity of data, it was felt that it would be a useless expenditure of effort to attempt to make the indices specified fit more closely the prices of goods bought by the wealthier classes only.

The data upon which several of the price indices for the minor groups are based are too heterogeneous and irregular to give one great confidence in their accuracy.

For the reasons just stated, it is clear that the final average index must

TABLE 2E

THE DERIVATION OF AN INDEX SHOWING THE VARIATIONS IN THE AVERAGE PRICES OF CONSUMPTION GOODS PURCHASED BY FAMILIES OF THE CLASS SPENDING $25,000 THEREON IN 1919

Relative price based on that in 1914 equalling 100.0

Weights	100.0	15.0	10.9	8.0	3.2	23.9	15.8	2.0	0.1	0.5	2.5	2.5	2.5	5.0
Year	Weighted average index; Base 1913	Food a	Clothing b	House furnishings b	Fuel and light c	Housing	Servants' wages f	Passenger fares g	Telephone rates h	Street car fares i	Automobile repairs j	Automobile tires k	Gasoline l	Automobiles m
1909	97.3	87.2	90.7	82.3	98.6	100.0 d	94.5	97.4	107.1	97.9	156.5	82.4	105.7	119.0
1910	98.8	91.2	95.0	88.1	98.7	100.0 d	94.8	98.5	105.6	98.5	153.6	90.3	98.6	115.4
1911	99.5	90.2	98.4	88.3	98.5	100.0 d	95.0	99.7	104.1	98.9	171.9	97.3	96.4	110.5
1912	100.0	96.1	98.8	91.4	98.2	100.0 d	96.7	100.6	102.6	99.4	118.0	131.5	102.1	103.7
1913	100.0	98.0	97.0	92.4	102.7	100.0 d	97.6	100.6	101.5	99.6	95.7	109.1	120.0	103.8
1914	101.0	100.0	100.0	100.0	100.0	100.0 e	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1915	99.6	99.0	102.7	98.8	97.9	100.0 e	105.1	100.6	99.0	100.4	75.0	74.3	85.7	89.6
1916	107.4	111.8	111.0	118.1	99.3	101.9 e	109.7	103.1	98.4	100.8	44.9	79.2	171.4	85.0
1917	119.8	143.1	128.9	132.4	111.6	105.0 e	118.6	105.3	97.4	101.3	51.8	98.8	171.4	89.4
1918	136.4	164.7	162.3	160.9	119.8	117.5 e	126.5	121.7	96.9	101.6	60.6	116.6	172.1	94.8
1919	162.8	182.3	200.5	184.3	131.4	129.3 e	141.8	151.2	107.1	101.9	67.8	270.8	175.0	106.7

a U. S. Monthly Labor Review, August, 1920, pp. 51–53.

b Computed from quotations from the catalogues of Sears, Roebuck & Co. Weights based on Bureau of Labor Statistics study in the Monthly Labor Review, November, 1919, pp. 2–14, and January, 1920, pp. 27–34.

c Based on data in the Statistical Abstract of the U. S., 1915, p. 531, the U. S. Monthly Labor Review, March, 1920, p. 63, and reports of the N. Y. City Edison Co. Include bituminous and anthracite coal, electricity and gas.

d No information for these years.

e Taken from Research Report No. 28 of the National Industrial Conference Board, May, 1920.

f A weighted average of the wages of Laundry Workers, Watchmen, Cooks and Housemaids, Janitors, Chauffeurs, Matrons, and Stewards; data from U. S. Bureau of Labor Statistics, U. S. and State Civil Service reports, newspapers, etc.

g Quoted in The Financial Review; adjusted to calendar years.

h Based upon rough estimates made by Colonel M. C. Rorty of the American Telephone & Telegraph Co.

i Interpolated, by aid of a smooth curve, between the figures given in the United States Census of Street and Electric Railways for 1907, 1912, and 1917.

TABLE 2E—*Continued*

THE DERIVATION OF AN INDEX SHOWING THE VARIATIONS IN THE AVERAGE PRICES OF CONSUMPTION GOODS PURCHASED BY FAMILIES OF THE CLASS SPENDING $25,000 THEREON IN 1919

Weights	0.5	0.1	0.1	0.4	1.4	3.0	1.1	1.5	100.0
Year	Moving pictures n	News-papers o	Maga-zines o	College tuition p	College room and board p	Hotel rates q	Tobacco r	Theaters s	Weighted average index; Base 1914
1909	50.0	99.4	111.9	100.0	100.0	100.0	100.5	90.0	96.4
1910	50.0	99.4	111.9	100.0	100.0	100.0	99.7	100.0	97.9
1911	50.0	98.5	113.8	100.0	100.0	100.0	99.8	100.0	98.5
1912	50.0	98.5	121.9	100.0	100.0	100.0	99.8	100.0	99.1
1913	50.0	101.2	118.8	100.0	100.0	100.0	99.6	100.0	99.1
1914	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1915	100.0	99.5	100.6	100.0	100.0	100.0	101.6	100.0	98.7
1916	150.0	99.5	100.6	100.0	100.0	100.0	103.6	100.0	106.4
1917	200.0	104.5	100.0	120.0	105.8	120.0	120.4	100.0	118.6
1918	250.0	115.4	100.0	120.0	116.4	140.0	163.5	119.0	135.0
1919	250.0	122.6	115.7	130.9	124.7	175.0	181.6	150.0	161.2

j Estimated as average repair cost per car—according to special study.
k From *History of Prices During the War* edited by Wesley C. Mitchell for the War Industries Board and from advertisements of tires in the *Motor Age*.
l Computed from wholesale prices given in *Dun's Review* and the *Statistical Abstract of the U. S.*; retail prices not available.
m An index of the prices of large pleasure cars computed from the data given in the annual *Handbooks of Automobiles* published by the National Automobile Chamber of Commerce. Same sizes of cars compared for all years.
n Could not locate accurate data; roughly estimated.
o Computed from prices in N. W. Ayer's *Annual Directory*.
p Calculated from figures in annual catalogues of leading American colleges and universities.
q Based upon rates quoted in the annual hotel directories for the United States.
r Information for earlier years derived from U. S. Bureau of Labor Statistics, *Bulletin 181*, p. 235; War Industries Board, Bulletin on *Tobacco and Tobacco Products*; and the *Yearbook* of U. S. Department of Agriculture; and for later years from information furnished by the American Tobacco Co. The earlier indices are based on wholesale prices, no retail quotations being discovered.
s Estimated from newspaper advertisements and from information furnished by Mr. McBride of the McBride Ticket Agency of New York City.

be regarded as but a crude approximation to the truth. It seems to be established, however, that the prices of commodities bought by the wealthier classes did not rise quite as sharply during 1917, 1918, and 1919 as did the prices of those articles consumed by the poorer fraction of our population. It is believed that the indices shown in Table 2E will at least serve somewhat better in reducing the money income of the wealthy to terms of purchasing power than would the Bureau of Labor Statistics index of the "cost of living" of the working classes and distinctly better than would any index of wholesale prices. Of course neither of the latter types of indices have been devised for this purpose, and hence cannot be expected to give satisfactory results if thus misapplied.

The tables on pp. 28 to 31 summarize the results obtained.

<div align="center">TABLE 2F</div>

WEIGHTS USED IN COMPUTING THE INDEX OF PRICES OF COMMODITIES CONSUMED BY PERSONS SPENDING $5,000 ANNUALLY FOR CONSUMPTION GOODS

Automobiles	4.0
Automobile Repairs	2.1
Automobile Tires	2.0
Clothing	15.8
College Room and Board	1.1
College Tuition	0.4
Food	30.0
Fuel and Light	3.6
Gasoline	2.0
House Furnishings	6.1
Housing	19.9
Hotel Bills	0.7
Magazines	0.3
Moving Picture Shows	1.2
Newspapers	0.4
Railway Passenger Fares	2.2
Servants' Wages	5.0
Street Car Fares	0.8
Telephones	0.6
Theatre Seats	0.9
Tobacco	0.9
Total	100.0

<div align="center">TABLE 2G</div>

A COMPARISON OF THE ESTIMATED INDICES OF THE AVERAGE PRICES OF CONSUMPTION GOODS USED BY DIFFERENT CLASSES OF THE POPULATION OF THE CONTINENTAL UNITED STATES

Middle of the Year	Indices [c] of Prices of Consumption Goods Used by		
	Manual and clerical workers' families [a]	Families spending $5,000 per annum on consumption goods	Families spending $25,000 per annum on consumption goods [b]
1909.........	.955	.956	.973
1910.........	.978	.977	.988
1911.........	.984	.984	.995
1912.........	.994	.999	1.000
1913.........	1.00	1.000	1.000
1914.........	1.01	1.013	1.010
1915.........	1.03	1.002	.996
1916.........	1.10	1.088	1.074
1917.........	1.29	1.252	1.198
1918.........	1.58	1.448	1.364
1919.........	1.773	1.669	1.628
1920.........	2.165		

[a] See Table 2C; indices divided by 100.
[b] See Table 2E; indices divided by index shown there for 1913.
[c] Prices of 1913 = 1.000

§ 2d. An Estimate of the Industrial Distribution of the Gainfully Employed Persons in the Continental United States

I. THE TOTAL

The total number of gainfully employed in the United States as reported by the Census of Occupations includes a large number of farmers' wives and children who do a certain amount of agricultural work on the home farm.

Nearly all members of farmers' families do some work on the home farm or in the house and how many of them should be regarded as "gainfully employed" is hard to say. The proportion so reported has varied from one census to the next with the wording of the instructions and from one district to another at every census with the interpretation put upon their instructions by different enumerators. Hence the figures for farmers' wives and children at work on the home farm have no consistent meaning, and this item in the classification of occupations has been excluded from all the following estimates.

The ratio of the number of remaining male workers to the total population has been calculated for each Census year and the curve obtained by

plotting these figures has been carried forward from 1910 to 1918, an allowance being made for the practical cessation of immigration during the war years and for the addition in 1918 of a considerable number of school boys to the list of gainfully employed. By using the ratios obtained from this curve as multipliers, products have been obtained which probably approximate the numbers of males gainfully employed in each year.

For a few industries, it has been possible to obtain annual ratios of the number of females to the number of male employees. These ratios have been adjusted to conform to the Census ratios for all industries in the Census years. In the intervening years the numbers of male workers have been multiplied by the adjusted ratios in order to obtain an estimate for each year of the number of females working for gain. The addition of the estimated number of females to the number of males, of course, gives the figures for the total number of persons gainfully employed.

This number is evidently composed of entrepreneurs [1] and employees. The procedure adopted has been to estimate the number of the former and subtract it from the total in order to obtain the number working for wages or salaries. The final results appear in the three top lines of Table 2J.

II. ENTREPRENEURS

Any estimate of the number of entrepreneurs in the various industrial fields must be based primarily upon the reports of the United States Census since State Reports seldom throw any light upon the matter. The Census classifies the gainfully employed only by occupations but these figures have been used as the basis of careful though necessarily somewhat inaccurate estimates of the number of entrepreneurs in each industry. In most instances, the occupation of an entrepreneur indicates the industrial field to which he is to be assigned, hence the occupational classification is reasonably satisfactory for the purpose at hand. For a number of important industries such as mining, manufacturing, and agriculture, the reports for the separate industries record the number of entrepreneurs in each. The estimates for the other industrial fields have been based upon the Census of Occupations. The estimates thus made for the various occupations have been added to obtain the probable numbers engaged in all occupations in the Census years. The respective ratios of the number of entrepreneurs to the total population have been plotted for the various Census years and the curve thus obtained has been projected to 1920. By applying the ratios read from this projected curve to the estimated

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[1] The word "entrepreneur" is used in the customary sense—namely, as a person conducting a business at his own risk. Lawyers, peddlers, merchants, farmers, and independent manufacturers are typical entrepreneurs. Managerial employees are not included under this term.

populations for the other years, products have been obtained which are believed to represent with some approach to the truth the total number of entrepreneurs in each of the intercensal years. The estimates for the years since 1910 have been strengthened by the figures in the Censuses of Manufactures for 1914 and 1919, in the Censuses of the Electrical Industries for 1912 and 1917, and in the Census of Agriculture for 1919. Since the Census of Occupations for 1920 has not yet been published, it has been necessary to assume that the apportionment of the remaining number of entrepreneurs among the other industries has remained relatively the same as in 1909.

TABLE 2H

AN ESTIMATE OF THE NUMBER OF ENTREPRENEURS NORMALLY OCCUPIED IN THE PRINCIPAL INDUSTRIAL FIELDS

Industry	Thousands Attached to the Industry in the Year											
	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
All industries . . .	9,550	9,617	9,648	9,679	9,710	9,743	9,746	9,737	9,752	9,757	9,760	9,758
Agriculture......	6,330	6,362	6,376	6,388	6,400	6,410	6,418	6,425	6,432	6,438	6,443	6,448
Mining..........	35	34	33	32	31	30	29	29	28	27	26	26
Laundry.........	16	20	25	30	34	34	34	35	36	36	36	37
Construction....	175	174	170	170	165	155	145	135	130	120	130	120
Hand trades.....	228	230	231	233	235	237	239	239	244	244	254	263
Factory.........	273	272	270	268	252	263	260	256	253	250	246	242
Transportation..	29	29	29	29	29	28	28	28	28	28	28	28
Banking.........	4	4	4	4	4	4	4	4	4	4	4	4
Unclassified industries.....	2,460	2,492	2,510	2,525	2,560	2,582	2,589	2,586	2,597	2,610	2,593	2,590

III. EMPLOYEES

In estimating the number of employees in a given industry, it is necessary to distinguish sharply between the number of persons actually at work in the field and the number of persons attached to the industry. At all times, some of the persons normally making their living by any given line of effort are not at their usual tasks. Fortunately for the accuracy of our computations, the fraction of all employees not at work is usually too small to affect the results materially, but, in times of business depression, the percentage may run very high and the effects then become of great moment.

It is usually necessary to determine average annual earnings by dividing the total of wages paid by the total number of employees attached to the industry. It is sometimes only possible to estimate the average number of employees actually working in a given field by dividing the total wage bill by a reported average wage for the period. Evidently then, the questions of wage rates and numbers of persons employed are so closely interlocked that both must be studied together if an intelligent view of the entire situation is to be obtained.

For each of several important fields of industry, the Census Bureau and the Interstate Commerce Commission state the average [1] number of persons employed and the total amount paid to those persons in salaries and wages. At first thought, it might seem that the division of the amount paid by the average number of employees would show the actual amount paid each employee. A little computation will, however, make it clear that the quotient actually represents approximately the average wage received by an employee who worked constantly during the period designated by his employer as "full time."

This rule is necessarily modified somewhat by the existence of fractional days of work and by overtime. If, for example, John Jones works in the forenoon and Wm. Smith in the afternoon of a given day, the chances are that both will appear on the payroll and hence will be counted as two men. If each received $2.00 for his work, only $4.00 is paid out. But $4.00 divided between 2 men gives only $2.00 each which is only half the full-time daily wage.

The only large industry in which the fractional day seems to be common enough to be of serious import is that of coal mining. In this field fractional time seems to be almost the rule; hence the average wage for miners obtained by dividing the total wage bill by the reported average number of workers gives a quotient representing the average wage for a day much shorter than the nominal full-time day in the mines.

In most industries, the error due to the presence of workers employed for fractional days is probably offset almost entirely by the fact that many of the men work longer than the standard number of hours. If, for example, Richard Roe puts in three hours overtime and makes $6.00 instead of the regular $4.00 per day, he is still counted as one man and hence the quotient is distinctly larger than the normal full-time daily wage.

The result obtained, therefore, by dividing the recorded amounts paid by the recorded number of workers usually represents the average amount received by a worker who appeared for work every regular work day but who missed the average number of fractional days and who put in the average amount of overtime. Since in most industries, as just stated, the amount of overtime probably about balances the time lost through absences of a part of a day, the hypothetical average employee just referred to probably earns in the long run approximately the same amount [2] as the one who puts in the nominal full-time day. Nevertheless, owing to the nature of the data at hand, it follows that whenever a difference exists, it is the hypothetical average employee rather than the one conforming

[1] The Census computes the average number by adding together the totals actually reported for the 15th day of each month and dividing by twelve the sum thus obtained.
[2] In busy times, he would put in overtime and earn more: in slack times the reverse would be true

to the standard length of working day announced by the employer, who must, for the purposes of this investigation, be considered a full-time worker.

It is evident, on the basis of the definition just stated, that although a minority of employees will earn more than the full-time wage because they miss fewer than the average number of fractional days or because they put in over-time, far greater numbers will earn less than the full-time wage because there will be many days when, on account of sickness, desire for leisure, personal business matter, or lack of available work, their names will not appear on the payroll. It follows then that the average wage, as shown by the quotient obtained by dividing the amount paid by the average number of employees, is, as a rule, distinctly larger than the average received by the employees who normally obtain a livelihood by working in the given industry.

From the point of view of production costs, the directly computed average, (which represents full-time earnings,) may be satisfactory, but it certainly will not answer if the aim is to picture the average labor income of the employees. In a year when many of the workers are idle for two or three months, there will occur a striking diminution in the total demand for necessities or customary luxuries even though the figures show that the average full-time wage has undergone no decline.[1] A necessary prerequisite, therefore, to measuring the income from wages received by the average person who normally is employed in an industry is the computation for each year of a fraction representing the ratio of the number of days actually worked by the average employee to the number of days put in by the hypothetical "full-time" worker.

The computation of such a fraction or ratio is fraught with great difficulties, for practically no extensive data exist which show with any degree of reliability the amount of unemployment in the various industries for any year, to say nothing of the fact that there are available no records comparing the various years of the decade which we are studying.

The United States Census Bureau attempted in 1890 and again in 1900 to secure information in this connection, but the method used had two serious defects: First, inquiry was made as to the number of months or parts of months unemployed, and since it is an obvious fact that thousands of persons are absent from work during many days of the year, yet seldom consecutively for any considerable fraction of a month, it appears certain that many of those recorded as full-time workers were really unemployed for an aggregate of time not at all negligible; second, the period covered

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[1] If, for example, the Census wage total is divided by the Census average number employed the resulting quotients will show no decline as long as wage rates remain constant, even if half the workers are unemployed.

by the inquiry was a whole year, and experience demonstrates that the ordinary informant's memory is too poor to enable him to give much information, even for himself, to say nothing of other members of the family, concerning brief periods of unemployment occurring several months before. Under these circumstances, it seems safe to use the Census figures only as relative and not as absolute measures of unemployment.

The basic data upon which all the estimates are superimposed are the records of the number of workers employed in Massachusetts factories.[1] At first thought, it seems absurd to place such a large superstructure upon such a narrow foundation, but a careful study of such other employment records as are available indicates that variations in Massachusetts employment are distinctly typical of those in manufacturing throughout the United States and that these cyclical fluctuations in employment in manufacturing are similar in a large measure to those characterizing conditions in other industrial fields. The Massachusetts records have been compiled for many years and have all the earmarks of statistical accuracy, two characteristics which make them unique in this field as far as the United States is concerned.

The fundamental assumption in the present study is that workers do not tend to shift rapidly from one branch of industry to another. If this assumption is true it follows that a curve representing the number of employees depending for a living upon a great industry like manufacturing will show no sharp breaks or irregularities. A further hypothesis which accords with the views of Mr. Hornell Hart as expressed in his monograph on "Fluctuations in Unemployment in Cities of the United States" is that in times when wages in any line of enterprise are very high, that industry may attract to itself a number of persons not normally working for wages; for example, school boys and girls, women and girls normally performing only household duties, and casual independent workers such as agents, peddlers, shop keepers and mechanics. The addition of such persons tends to produce bumps on the curve representing the total number of employees attached to all industries, a curve which would otherwise be nearly smooth. For example, during 1917 and 1918, the aggregate number of persons receiving salaries and wages was doubtless noticeably increased by the addition of boys who left school to join the army and of women and girls who, for patriotic reasons, sought employment which they believed would help win the war.

The Census Bureau in 1890 and also 1900 enumerated on the basis of family statements the number of persons who were unemployed in the

[1] It is impossible to calculate from these figures the absolute numbers unemployed for we do not know how many have found work outside the manufacturing field. The data are then useful only as measures of relative employment.

preceding year and classified the unemployment into the periods one to three months, four to six months, and seven to twelve months. The ratio of the per cent of the workers in each industry unemployed for each of these periods to the per cent of Massachusetts factory workers shown by the Census to be unemployed for the same length of time was computed by this Bureau. For each industry, six ratios were thus obtained, three for each of the two Censuses. The six ratios were then averaged and these averages were recorded.

The next step was to multiply the actual per cent of unemployment in Massachusetts factories as estimated from the State *Statistics of Manufactures* for the various years by the average ratios just described. The resulting products were the preliminary estimates of the per cents of unemployment in each of the different industries in the various years of the decade. The remainders obtained by subtracting each of these per cents from 100 were assumed to represent the ratio of the number of those actually at work to the number of persons attached to the industry—that is, normally making their living in this field of endeavor.

The records most commonly available show the average number actually working in a specified industry. The procedure followed here is to divide these average numbers by the tentative ratios just mentioned in order to obtain a preliminary estimate of the number of employees attached to each of the respective industries. Since it has been assumed that the number attached to any large industry as a rule varies slowly and regularly, the original figures have been plotted as historigrams and these curves have been smoothed. From the smooth curves thus obtained, numbers have been read which are assumed to represent approximately the number of employees attached to each industry in each year. The resulting numbers and the ratios derived by dividing the number actually at work by the estimated number attached to the industry are shown in Tables 2I, 2J, and 2K.

After the numbers of employees had been computed for each of the industries in which records are available, these numbers were summated for each of the various years. The total number of employees had already been calculated by a method described on a previous page. It was, then, only necessary to subtract the total number of employees in the recorded industries from the total number in all industries in order to arrive at the estimated number in the unclassified industries, an estimate shown in the next to the last line of Table 2J. This step completed the classification of the gainfully employed in so far as necessary for this study.

TABLE 2I

AN ESTIMATE OF THE AVERAGE NUMBER OF EMPLOYEES ACTUALLY AT WORK IN CERTAIN OF THE PRINCIPAL INDUSTRIAL FIELDS OF THE CONTINENTAL UNITED STATES

Industry	Thousands at Work in the Year									
	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
Laundry	140	155	159	169	185	175	173	179	168	155
Construction	1,516	1,456	1,368	1,459	1,538	1,116	1,054	1,147	1,000	726
Hand trades a	389	395	411	409	408	476	471	428	487	558
Factory b	7,405	7,370	7,500	7,930	8,000	8,001	7,993	9,457	10,140	10,480
Steam railway c	1,641	1,742	1,750	1,818	1,815	1,605	1,575	1,744	1,834	1,937
Pullman	14	15	15	15	21	20	19	20	19	19
Express	57	62	64	68	68	64	64	72	84	88
Transportation by water	208	212	216	224	230	225	232	237	239	254
Street railways	252	266	274	282	284	278	276	292	295	292
Telephone	143	159	180	194	214	215	208	247	263	278
Telegraph	31	33	35	38	39	39	41	46	52	56

a Includes automobile repairing, blacksmithing, tailoring, dressmaking, millinery, shoe repairing, custom grist and saw mills, and other similar minor industries.
b Includes lumbering and gas manufacture. c Includes switching and terminal companies.

TABLE 2J

AN ESTIMATE OF THE TOTAL NUMBER OF GAINFULLY EMPLOYED g AND OF THE AVERAGE NUMBER OF EMPLOYEES ATTACHED TO EACH OF THE PRINCIPAL INDUSTRIES OF THE CONTINENTAL UNITED STATES

Industry	Thousands of employees in the year									
	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
Total Gainfully Employed g	33,910	34,858	35,581	36,282	37,101	37,252	37,522	38,101	38,681	39,981
Total Entrepren'rs f	9,550	9,617	9,648	9,679	9,710	9,743	9,746	9,737	9,752	9,757
Total Employees g	24,360	25,241	25,933	26,603	27,391	27,509	27,776	28,364	28,929	30,224
Employees by Industries. Agriculture e	2,376	2,379	2,388	2,390	2,394	2,393	2,382	2,373	2,288	2,121
Mining	1,073	1,106	1,132	1,150	1,159	1,163	1,163	1,154	1,141	1,108
Laundry	150	161	172	181	194	193	190	185	174	161
Construction	1,585	1,600	1,619	1,617	1,608	1,427	1,292	1,194	1,026	757
Hand trades a	410	421	425	432	446	487	490	481	495	572
Factory c	7,730	7,810	7,970	8,190	8,430	8,790	9,102	9,757	10,395	10,995
Commercial electric light & power	55	61	67	73	79	84	89	94	98	102
Steam railway b	1,705	1,775	1,818	1,834	1,836	1,838	1,840	1,842	1,856	1,958
Pullman	14	15	16	16	21	22	23	21	20	19
Express	59	63	66	69	71	72	73	76	85	89
Transportation by water	224	231	239	243	248	250	252	253	256	275
Street railway	260	272	282	289	293	295	297	298	299	300
Telephone	150	163	185	205	218	226	230	242	267	285
Telegraph	32	34	37	40	41	42	44	47	53	58
Banking	150	154	162	168	173	178	180	183	186	193
Unclassified industries & professions	6,823	7,376	7,685	7,980	8,397	8,183	8,175	8,122	7,600	6,194
Government d	1,565	1,620	1,671	1,727	1,785	1,866	1,955	2,037	2,691	5,129

a Includes automobile repairing, blacksmithing, tailoring, dressmaking, millinery, shoe repairing, custom grist and saw mills, and other similar minor industries.
b Includes switching and terminal companies.
c Includes lumbering and gas manufacture.
d Federal, state, and local, including the army and navy, public schools and government owned industries.
e Includes stock raising, market gardening, etc. f See Table 2H.
g Members of the family assisting their parents on the home farms are not included among the gainfully employed for purposes of this study.

TABLE 2K

AN ESTIMATE OF THE RATIO OF THE AVERAGE NUMBER OF EMPLOYEES AT WORK TO THE AVERAGE NUMBER OF EMPLOYEES ATTACHED TO EACH OF CERTAIN LEADING INDUSTRIAL FIELDS IN THE CONTINENTAL UNITED STATES

Industry	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918
Automobile repair	.962	.980	.932	.944	.927	.975	.978	.939	.973	.980
Laundry	.955	.963	.924	.931	.958	.905	.911	.966	.971	.970
Construction	.957	.910	.845	.902	.956	.782	.816	.960	.975	.959
Other hand trades [a]	.947	.931	.974	.947	.912	.978	.957	.873	.918	.975
Factory [b]	.958	.944	.941	.968	.949	.910	.878	.969	.975	.961
Steam railway [c]	.962	.981	.963	.990	.988	.873	.856	.947	.988	.989
Pullman	.962	.982	.969	.953	.979	.935	.904	.975	.979	.984
Express	.963	.985	.963	.985	.968	.887	.869	.948	.989	.989
Transportation by water	.927	.917	.906	.919	.930	.899	.922	.936	.934	.925
Street railways	.968	.977	.970	.978	.971	.943	.929	.982	.986	.977
Telephones	.957	.974	.970	.949	.983	.952	.904	.980	.982	.975
Telegraphs	.964	.964	.967	.968	.950	.943	.933	.975	.979	.971

[a] Includes blacksmithing, tailoring, dressmaking, millinery, shoe repairing, custom grist and saw mills, and other similar minor industries.
[b] Includes lumbering and gas manufacture.
[c] Includes switching and terminal companies.