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Volume Author/Editor: Wesley C. Mitchell, Willford I. King, Frederick R. Macaulay, and Oswald W. Knauth

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Chapter Author: Wesley Clair Mitchell, Wilford Isbell King, Frederick R. Macaulay

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CHAPTER 2

THE SIZE OF THE NATIONAL INCOME

I. THE TWO ESTIMATES OF THE NATIONAL INCOME COMPARED

Table 1 shows the final figures for the National Income given by the Estimate by Sources of Production and the Estimate by Incomes Received.

Certainly the agreement between the two estimates, made as they were independently of each other, is remarkable. The average National Income in the nine years covered by both series works out at 40.2 billions in the Estimate by Sources of Production and at 39.7 billions in the Estimate by Incomes Received. Even the maximum difference of 6.9 per cent. in 1913 is small for work in this field, and in two years, 1911 and 1917, the two estimates happen to agree to the nearest hundreds of millions. On the per capita basis, the maximum difference is but $24 per annum. Indeed, the only difference of note concerns the rate at which the National Income has increased. The increase from 1910 to 1918 is 90 per cent. in one case and 98 per cent. in the other.

TABLE 1

THE TWO ESTIMATES OF THE NATIONAL INCOME

1909-1919

Year	Estimate by Sources of Production	Estimate by Incomes Received	Differences between the two estimates		Population of the United States on June 30th[1]	Income per Capita	
			First greater (+) or less (—) than the Second.	First greater (+) or less (—) than the Second.		Estimate by Sources of Production	Estimate by Incomes Received
	Billions	Billions	Billions	Per Cent.	Millions of Persons		
1909	$28.8				90.37	$318	
1910	31.8	$31.1	$+ .7	+2.3	92.23	344	$337
1911	31.2	31.2	0.0	0.0	93.81	332	333
1912	33.6	32.4	+1.2	+3.7	95.34	352	340
1913	35.6	33.3	+2.3	+6.9	97.28	366	342
1914	33.9	32.5	+1.4	+4.3	99.19	342	328
1915	36.1	35.9	+ .2	+ .6	100.43	360	357
1916	45.4	45.5	— .1	— .2	101.72	446	447
1917	53.9	53.9	0.0	0.0	103.06	523	523
1918	60.4	61.7	—1.3	—2.1	104.18	579	592
1919		66.0			104.85		629

[1] Mr. King's estimate for intercensal years based on the censuses of 1910 and 1920, yearly birth and death rates, and net immigration.

The charts which follow bring out the chief features of Table 1 in graphic form.

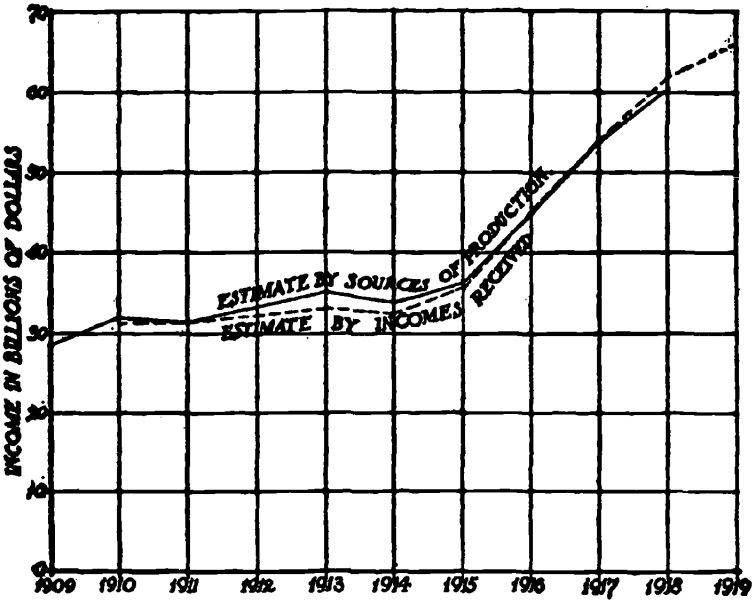
Needless to say, the sudden acceleration during

CHART 1.

THE TWO ESTIMATES OF THE NATIONAL INCOME. 1909-1919.

Based upon Table 1.

For elimination of the increase due to the rise of prices, see Chart 14.



the war in the rate at which the National Income increased was due mainly to the rise of prices—a factor in the situation which will call for careful consideration after the two estimates have been analyzed more closely.

Chart 3, showing the percentage change in the National Income according to the two estimates, is based upon the average amount of the income

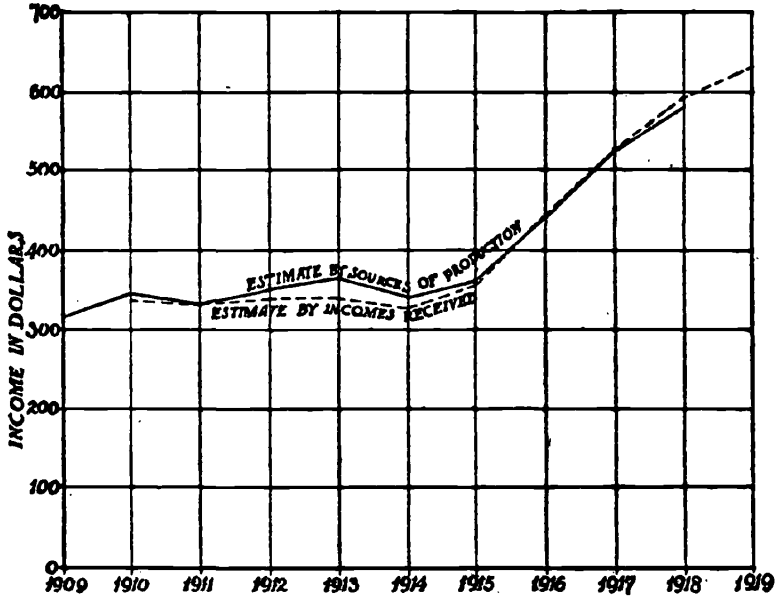
CHART 2.

PER CAPITA INCOME ACCORDING TO THE TWO ESTIMATES.

1909-1919.

Based upon Table 1.

For elimination of the increase due to the rise of prices, see Chart 16.



as shown by each of the estimates in the whole period common to both, because that base affords a fairer comparison than would percentages based upon the results for any single year.

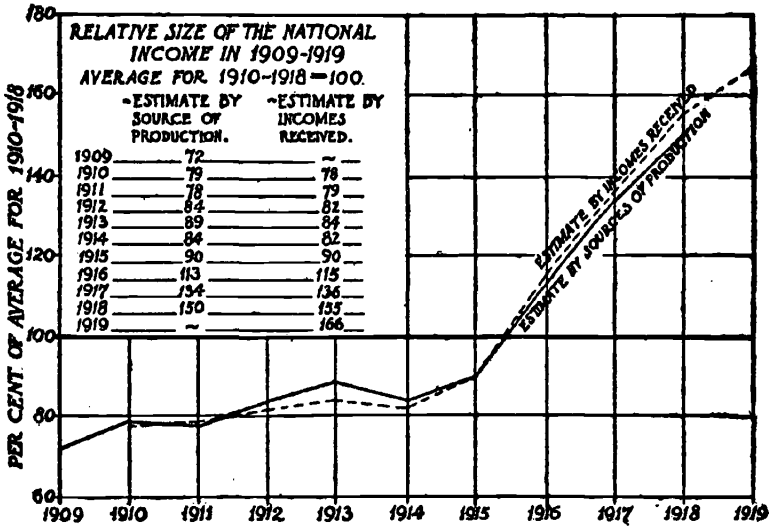
CHART 3.

RELATIVE FLUCTUATIONS IN THE NATIONAL INCOME, ACCORDING TO THE TWO ESTIMATES.

1909-1919.

Based upon Table 1.

For elimination of the increase due to the rise of prices, see Chart 15.



II. ANALYSIS OF THE ESTIMATE BY SOURCES OF PRODUCTION

The major parts entering into the Estimate by Sources of Production are presented in Table 2. These parts and their subdivisions, shown in detail in Volume II, are determined quite as much by the condition of the data as by the choice of the investigator. The statistics of agricultural production come mainly from the Bureau of the

Census and the Department of Agriculture. Those concerning mineral production are drawn mainly from the Geological Survey. Factory production is estimated on the basis of the quinquennial censuses of manufactures. All these sources are fairly satisfactory, though many ingenious shifts must be resorted to in bridging the gaps between years for which substantially complete data can be had. For most of the hand trades, on the contrary, no census has been taken since 1899, and the best estimates that can be made of their value products[1] in recent years are subject to a wide margin of error. The Interstate Commerce Commission's reports, combined with special census bulletins, again provide a good basis for treating the various branches of transportation, except shipping by water, on which the statistical information is unsystematic and even contradictory in part. Bank statistics are fair, and the financial statistics for states and cities compiled at frequent intervals by the Census, together with the United States Departmental reports, make possible a tolerable approximation to the value product of all branches of government. The last section of the Estimate, "Unclassified industries and miscel-

[1] The "value product" of an industry is the market value added by that industry to the materials, supplies, and services which it obtains from other sources.

Table

ANALYSIS OF THE ESTIMATE

In Millions

	1909	1910	1911	1912	1913
I. Agriculture	$4,686	$5,728	$5,368	$5,286	$5,887
II. Mineral Production	904	964	993	1,106	1,191
III. Manufacturing					
A. Factories	6,107	6,756	6,350	7,195	7,976
B. Construction	1,959	1,806	1,734	1,885	1,669
C. Other Hand Trades	656	715	750	800	852
IV. Transportation					
A. Railway, Pullman, Express, Switching and Terminal Companies	1,948	2,119	2,182	2,283	2,271
B. Street Railway, Electric Light and Power, Telegraph and Telephone Companies	614	667	711	763	806
C. Transportation by Water	208	243	226	253	258
V. Banking	434	504	516	521	509
VI. Government	1,440	1,542	1,622	1,716	1,829
VII. Unclassified Industries and Miscellaneous Income	9,824	10,722	10,786	11,796	12,332
Total	28,775	31,766	31,188	33,554	35,580

In Percentages of

	1909	1910	1911	1912	1913
I. Agriculture	16.29	18.03	17.21	15.76	16.54
II. Mineral Production	3.14	3.04	3.18	3.30	3.35
III. Manufacturing					
A. Factories	21.23	21.27	20.36	21.44	22.42
B. Construction	6.81	5.69	5.56	5.62	4.69
C. Other Hand Trades	2.28	2.25	2.41	2.38	2.39
IV. Transportation					
A. Railway, Pullman, Express, Switching and Terminal Companies	6.75	6.67	6.84	6.65	6.38
B. Street Railway, Electric Light and Power, Telegraph and Telephone Companies	2.13	2.10	2.28	2.27	2.27
C. Transportation by Water	.72	.76	.72	.76	.73
V. Banking	1.51	1.59	1.65	1.55	1.43
VI. Government	5.00	4.85	5.20	5.11	5.14
VII. Unclassified Industries and Miscellaneous Income	34.14	33.75	34.59	35.16	34.66
Total	100.00	100.00	100.00	100.00	100.00

8

BY SOURCES OF PRODUCTION

of Dollars

1914	1915	1916	1917	1918	
$6,040	$6,376	$7,249	$9,720	$12,682	I. Agriculture
1,039	1,133	1,541	1,853	2,013	II. Mineral Production
					III. Manufacturing
6,964	7,881	12,404	14,957	16,018	A. Factories
1,413	1,413	1,647	1,267	1,280	B. Construction
879	913	1,054	1,334	1,704	C. Other Hand Trades
					IV. Transportation
2,105	2,288	2,699	3,093	3,684	A. Railway, Pullman, Express, Switching and Terminal Companies
829	860	949	1,024	1,042	B. Street Railway, Electric Light and Power, Telegraph and Telephone Companies
286	280	379	442	506	C. Transportation by Water
515	532	604	661	767	V. Banking
1,941	2,066	2,207	3,023	5,352	VI. Government
					VII. Unclassified Industries and Miscellaneous Income
11,975	12,367	14,685	16,506	15,318	
33,936	36,109	45,418	53,860	60,366	Total

the Total Income

1914	1915	1916	1917	1918	
17.80	17.66	15.96	18.05	21.01	I. Agriculture
3.06	3.14	3.39	3.44	3.33	II. Mineral Production
					III. Manufacturing
20.52	21.82	27.31	27.77	26.53	A. Factories
4.16	3.91	3.63	2.35	2.12	B. Construction
2.59	2.53	2.32	2.48	2.82	C. Other Hand Trades
					IV. Transportation
6.20	6.34	5.94	5.74	6.10	A. Railway, Pullman, Express, Switching and Terminal Companies
2.44	2.38	2.09	1.90	1.73	B. Street Railway, Electric Light and Power, Telegraph and Telephone Companies
.70	.78	.83	.78	.84	C. Transportation by Water
1.52	1.47	1.33	1.23	1.27	V. Banking
5.72	5.72	4.86	5.61	8.87	VI. Government
					VII. Unclassified Industries and Miscellaneous Income
35.29	34.25	32.34	30.65	25.38	
100.00	100.00	100.00	100.00	100.00	Total

laneous income," is the least satisfactory. The largest single item is the value product of wholesale and retail merchants. Less is known concerning the volume of business transacted by merchants, and the values that they add to the goods they distribute, than about any other important part of the nation's business.

There are two ways of estimating the value product that should be credited to any industry. The most satisfactory way, and the way followed when the data permit, is to start with the aggregate selling value of the industry's output and subtract the total cost of all goods which the industry in hand buys from other industries separately represented in the estimate. For example, raw materials, fuel or power, current supplies of various sorts, interest on bank loans, dividend or interest payments to corporations, freight charges, and taxes are generally deducted because in most cases they can be credited to other heads. Further deductions are made for depreciation and obsolescence, in order that the income may be reckoned net. What is left constitutes the value product of the industry in hand. This value product is paid out to employees as wages, salaries, pensions, or compensation for injuries; to landlords as rent; to individual creditors as interest

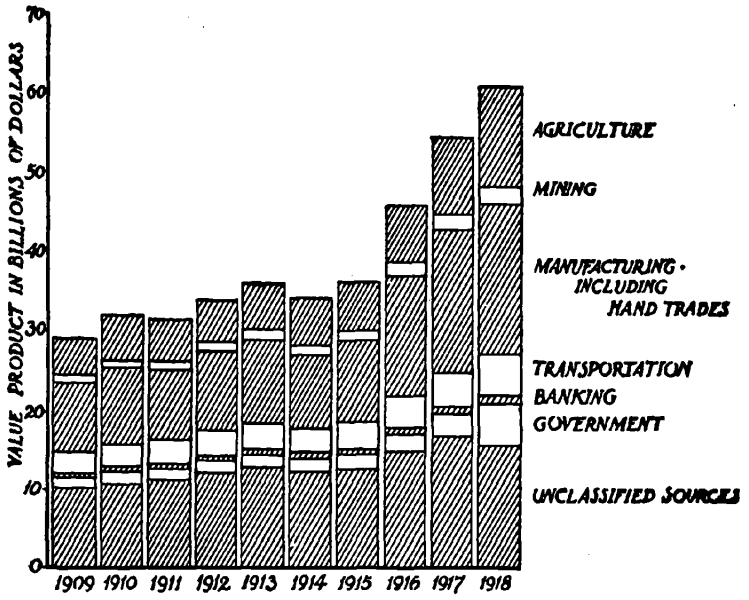
on bonds or mortgage loans; to owners as profits or dividends; and any remainder is kept in the business as additional working capital. The second way of estimating value product (a method

CHART 4.

CONTRIBUTIONS TO THE NATIONAL INCOME MADE BY THE VARIOUS INDUSTRIES.

1909-1918.

Based upon Table 2.



necessarily used in most cases because of the nature of the data available) is based on this division of the proceeds. Where one can get satisfactory data for estimating total payments to employees, landlords, bond or mortgage holders, stockholders

or partners, and surpluses, one can add up these items and take the total as an approximate figure for the value product.

In using the results which Mr. King has been able to reach in one or the other of these ways, one must discriminate between the items which have a moderate and those which have a wide margin of error. The probable degree of error in each item is discussed in Volume II.

The lower half of Table 2 indicates that among the great branches of production, manufacturing holds first place—certainly if the value product of the hand trades, which include construction work, is combined with that of factories. On the average of the decade, this source is credited with producing 30 per cent. of the National Income. Agriculture comes next with rather more than a sixth of the total; and then, in a lower range come merchandising and transportation, each with a product about half as large as that of agriculture. Of course, the product credited to Government increased rapidly during the war, so that by 1918 its percentage of the total was almost equal to that of transportation. The contributions of mining and banking belong in a lower order of magnitude; mines provide less than a thirtieth and banks less than a fiftieth of the total value product.

TABLE 3

PERCENTAGES OF THE NATIONAL INCOME CONTRIBUTED BY THE VARIOUS INDUSTRIES

1909-1918

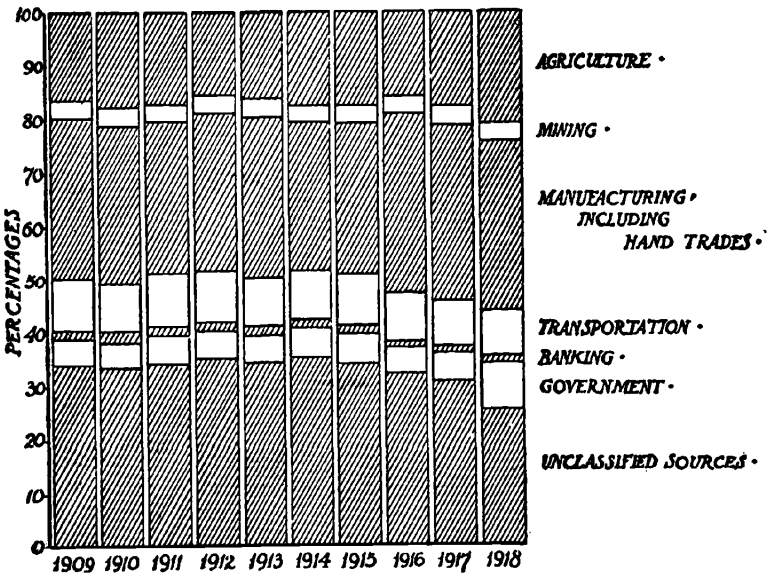
Year	Agriculture	Mineral Production	Manufacturing, Including Hand Trades	Transportation	Banking	Government	Unclassified Industries and Miscellaneous Income	All Industries
1909	16.29	3.14	30.32	9.60	1.51	5.00	34.14	100.00
1910	18.03	3.04	29.21	9.53	1.59	4.85	33.75	100.00
1911	17.21	3.18	28.33	9.84	1.65	5.20	34.59	100.00
1912	15.76	3.30	29.44	9.68	1.55	5.11	35.16	100.00
1913	16.54	3.35	29.50	9.38	1.43	5.14	34.66	100.00
1914	17.80	3.06	27.27	9.34	1.52	5.72	35.29	100.00
1915	17.66	3.14	28.26	9.50	1.47	5.72	34.25	100.00
1916	15.96	3.39	33.26	8.86	1.33	4.86	32.34	100.00
1917	18.05	3.44	32.60	8.42	1.23	5.61	30.65	100.00
1918	21.01	3.33	31.47	8.67	1.27	8.87	25.38	100.00
Average 1909 to 1918	17.43	3.24	29.97	9.28	1.45	5.61	33.02	100.00

CHART 5.

PERCENTAGES OF THE NATIONAL INCOME CONTRIBUTED BY THE VARIOUS INDUSTRIES.

1909-1918.

Based upon Table 3.



These rough rankings (except in the case of merchandising) are justified by the summary figures of Table 3 and illustrated by Charts 4 and 5.[1]

Table 3 suggests a further set of observations

[1] For the very rough figures concerning the value product of retail and wholesale merchants, see Mr. King's discussion in Volume II. It may be well to add that the percentages given in the text throw little light on the not infrequent assertion that "it costs as much to sell goods as to make them." For the selling work done by farmers, manufacturers, mining companies, railways, and the like is here credited as part of the value product of these branches of business.

concerning the change in the value products of the several industries from year to year. A simpler approach to the problem, however, is provided by Table 4, which takes the value product of each industry in 1913 as 100 and expresses its output in other years by proportional figures. As between the beginning of the period and 1918, government shows much the most rapid growth—for 1918 saw the vast expansion of federal activities caused by the war. Agriculture ranks next. Then in order come manufacturing, mining, transportation and banking. The miscellaneous group comes last mainly because, besides merchandising, it contains considerable items in which the increase was relatively small, for example, the value product of the professions like medicine and law which are practised by men not attached to any industry, the rental value of homes occupied by their owners, an allowance for interest on consumption goods owned by families, and the like.

These figures, be it recalled once more, purport to show changes in the values added by the several industries to what they buy, not changes in the gross value of products. Of course they are affected not only by the growth in the physical scale of operations, but also by fluctuations in the prices which each industry had to pay for what it bought

TABLE 4

RELATIVE FLUCTUATIONS IN THE VALUE PRODUCTS OF THE VARIOUS INDUSTRIES

1909-1918

Value Product from Each Source in 1913 = 100

Year	Agriculture	Mining	Manufacturing, including Hand Trades	Transportation	Banking	Government	Unclassified Sources
1909	80	76	88	88	85	79	80
1910	97	81	88	91	99	84	87
1911	91	88	84	92	101	89	87
1912	90	93	94	97	102	94	96
1913	100	100	100	100	100	100	100
1914	103	87	88	95	101	106	97
1915	108	95	97	103	105	113	100
1916	123	129	144	121	119	121	119
1917	165	156	167	136	130	165	134
1918	215	169	181	157	151	293	124

from other industries, as well as by the prices at which it could sell. The relative fluctuations of these three factors were widely different in different industries, and these dissimilar fluctuations go far to explain the net results shown in the tables. In Table 2, for example, one can trace the restrictions imposed as a war measure upon ordinary building operations in the figures for the hand trades in 1917-1918. Again, in Table 3, the public regulation of rates is largely responsible for the decline of the relative value of the contribution to the National Income made by the transportation group in the later years covered by the table. Once more, the high prices of farm products had much to do with the sudden increase in agriculture's share in the National Income in the war years.

Table 4 and its accompanying charts also throw light on the correspondence between the value produced by different industries and the course of business cycles. Mineral production, manufactur-

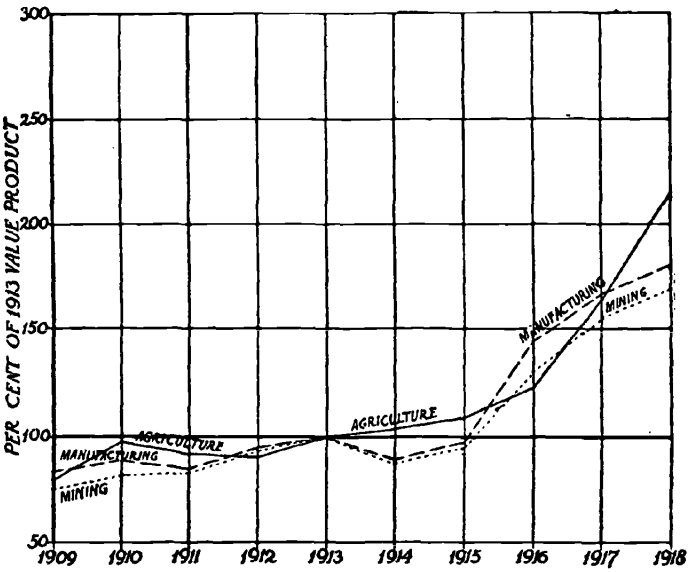
CHART 6.

RELATIVE FLUCTUATIONS IN THE VALUE PRODUCTS OF AGRICULTURE, MINING, AND MANUFACTURING.

1909-1918.

Value Product from each Source in 1913 = 100.

Based upon Table 4.



ing and transportation all show markedly the effect of the severe depression of 1914. Agriculture, on the contrary, in which the weather counts at least as much as business conditions, turned out a larger value product in that year than in any

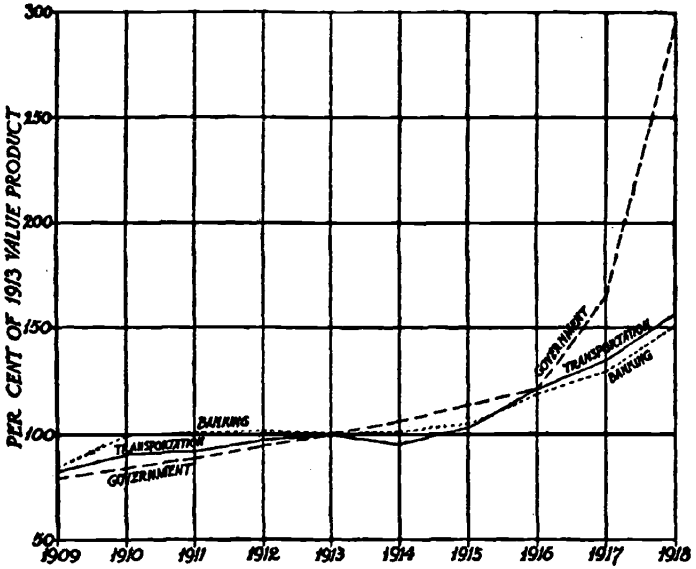
of its predecessors. On the other hand, agriculture shows a drop in 1912 when mining, manufacturing and transportation made considerable gains. Government is even less affected by busi-

CHART 7.

RELATIVE FLUCTUATIONS IN THE VALUE PRODUCTS OF TRANSPORTATION, BANKING, AND GOVERNMENT. 1909-1918.

Value Product from each Source in 1913 = 100.

Based upon Table 4.



ness cycles than farming. It is the only source of production shown by the table in which every year, good, bad, or indifferent, marks an increase over the year before. The post-war years, however, will doubtless show declines from the war peak.

III. ANALYSIS OF THE ESTIMATE BY INCOMES RECEIVED

The form of the Estimate by Incomes Received, like that of the Estimate by Sources of Production, was determined primarily by the data that had to be used.

This estimate gives first the aggregate incomes received by persons having more than $2,000 per year, because since 1917 the income tax has required returns from all such persons whether married or single. These official statistics are basic, but they require various adjustments. (1). The income tax returns for 1913-16, when the exemption limit was $3,000, must be increased to include incomes between two and three thousand. (2). A rather conjectural backward extension of the series must be made to cover 1910-12, when there was no income tax. (3). Allowance must be made for under-reporting and—a much larger factor—for non-reporting of taxable incomes. (4). Tax-exempt income, consisting of interest on certain classes of bonds, salaries of state officials, the rental value of homes occupied by their owners, and the food and fuel consumed directly by the farmers who produce it must be added.

Taken together, these items run into large fig-

ures. The elaborate details of these estimates are explained by Mr. Knauth in the second volume. Here it must suffice to contrast the aggregate income which his estimate gives with that reported by the Internal Revenue Bureau in successive years. The narrowing margin between the two series is due not only to the reduction of the exemption limit in 1917, but also to increased efficiency in tax administration. Even in 1919, however, the margin remains considerable.

	Aggregate Personal Incomes over $2,000 in the Estimate by Incomes Received	Aggregate Net Personal Incomes Reported by the Internal Revenue Bureau above the limits stated in next column	Lower Income Limits of the Official Figures quoted
1913.....	$10.2 billions	$ 3.9 billions	$3,000
1914.....	9.9 "	4.0 "	3,000
1915.....	11.4 "	4.6 "	3,000
1916.....	15.6 "	6.3 "	3,000
1917.....	20.9 "	11.2 "	2,000
1918.....	23.2 "	13.7 "	2,000
1919.....	25.2 "	17.0 "	2,000

The second section of the estimate, dealing with incomes less than $2,000 per year, is made from a wide variety of sources. The number of these incomes is estimated on the basis of the number of persons having gainful occupations according to the censuses of 1910 and 1920, after subtracting persons having more than $2,000 per year. Average annual earnings for all the important occupations were then estimated from records of wages,

salaries, family budgets, and special investigations of certain professions such as teaching and the ministry. Such material is abundant, though unsystematic, and affords many opportunities for checking one source against another. The final results are the sums of the products obtained by multiplying estimated numbers in different occupations by estimated annual earnings.

Farmers were treated apart as a single group, at first without any attention to the $2,000 line, because most of the available data are in the form of aggregates or averages. These figures come from the Department of Agriculture and from special investigations of farmers' incomes made at the agricultural colleges. Mr. Knauth has devised three independent methods of arriving at a total for each year and the three yield similar results. Finally, his figures were critically examined by the most competent authorities in this difficult field.

Tax-exempt income includes not only interest on tax-exempt bonds, which can be approximated rather closely, but also the rental value of homes occupied by their owners, and the salaries of state officials receiving more than $2,000 per year. The farm products consumed by the families that produce them are included in the separate estimate of

farmers' incomes. The rental value is a very rough figure, but does not bulk large in the total National Income.

Last comes corporate surplus. After a study of the facts, Mr. Knauth concluded that at least 80 to 90 per cent of this item represents net income retained by corporations and used for the extension or safeguarding of business. Of course 1916 and 1917 were years of exceptionally large profits, and it is probable that the estimates of the National Income for 1920 and 1921, when they come to be made, will show heavy losses by many of the corporations which accumulated large surpluses during the war. Corporation-tax data, supplemented by the financial reports of corporations published in handbooks like Moody's Manual, afford a fair basis for ascertaining the yearly magnitude of this item, variable as it is. No similar estimate is included for partnerships or business enterprises owned by a single individual, because partners and individuals are required to report their full profits to the income-tax authorities—if their incomes rise above $2,000—whether they have drawn the money out of their business or not.

In studying the result of all this work as summarized in Table 5, the reader will note that Mr.

Knauth's estimate of the incomes received by farmers runs on a distinctly lower level than Mr. King's estimate of the value produced by agriculture. For the nine years common to both estimates, Mr. Knauth gets an average income of about 5.5 billions for farmers out of an average of 39.7 billions for all incomes, or about 13.9 per cent. of the whole. Mr. King, on the other hand, obtains an average value product for agriculture of about 7.1 billions, or approximately 17.7 per cent. of his estimate of the average National Income (40.2 billions). But this difference is about what it should be and confirms the substantial accuracy of the two investigations; for the value product of agriculture contains important items which are costs, not income, to farmers—namely, money wages, board and lodging of agricultural laborers, interest on farm mortgages, and rents of farms cultivated by tenants. When these items are subtracted from Mr. King's figure for the value product of agriculture, the remainders agree substantially with Mr. Knauth's figures for the income of farmers. Moreover, there is shown a more rapid increase of farmers' incomes than of farm value products, for, like most classes of men doing business on their own account, farmers profited by the war-time rise of

prices at the expense of employees, landlords, and lenders. Agricultural wages, rents, and interest on mortgage loans rose during 1917 and 1918 at a rapid rate, but not at a rate so rapid as that of the increase in the selling prices of agricultural products.

It is not worth while to analyze elaborately the results shown by Table 5 for incomes over and under $2,000; for the omission of farmers makes both of these groups incomplete. In discussing the distribution of incomes in section II of chap-

TABLE

ANALYSIS OF THE ESTIMATE

(In Billions

Personal Incomes.	1910	1911	1912
Tax-Exempt Income	$ .8	$ .8	$ .8
Over $2,000 per year except farmers	8.8	8.6	8.8
Under $2,000 per year except farmers	16.3	17.2	17.9
Farmers	4.0	3.7	4.0
Total	$29.9	$30.3	$31.5
Corporate Surplus	1.2	.9	.9
Total National Income	$31.1	$31.2	$32.4

(In Percentages

Personal Incomes.	1910	1911	1912
Tax-Exempt Income	2.57	2.56	2.47
Over $2,000 per year except farmers	28.29	27.57	27.16
Under $2,000 per year except farmers	52.42	55.13	55.25
Farmers	12.86	11.86	12.34
Total	96.14	97.12	97.22
Corporate Surplus	3.86	2.88	2.78
Total National Income	100.00	100.00	100.00

ter 3, we shall divide the farmers in the same way as the rest of the population, and so get more significant figures. It is sufficient here to point out that the fluctuations in the relative size of these two classes are very considerable. Income under $2,000 varies from about 45% of the National Income in 1917 to 56% in 1914. Income over $2,000, on the contrary, varies from over 29% of the total in 1916 and 1917 to less than 27% in 1914 and 1918. Two sets of changes have combined to produce these curious results. (1). Busi-

5

BY INCOMES RECEIVED

of Dollars)

1913	1914	1915	1916	1917	1918	1919
$ .8	$ .8	$ .9	$ .9	$ 1.0	$ 1.2	$ 1.4
9.0	8.7	10.0	13.5	16.0	16.2	17.5
18.3	18.3	18.7	21.4	24.7	32.1	34.9
4.2	4.2	4.7	5.8	8.8	10.5	10.9
$32.3	$32.0	$34.3	$41.6	$50.5	$60.0	$64.7
1.0	.5	1.6	3.9	3.4	1.7	1.3
$33.3	$32.5	$35.9	$45.5	$53.9	$61.7	$66.0

of Total Income)

1913	1914	1915	1916	1917	1918	1919
2.40	2.46	2.51	1.98	1.85	1.94	2.12
27.03	26.77	27.85	29.67	29.68	26.26	26.51
54.96	56.31	52.09	47.03	45.83	52.03	52.88
12.61	12.92	13.09	12.75	16.33	17.02	16.52
97.00	98.46	95.54	91.43	93.69	97.25	98.03
3.00	1.54	4.46	8.57	6.31	2.75	1.97
100.00	100.00	100.00	100.00	100.00	100.00	100.00

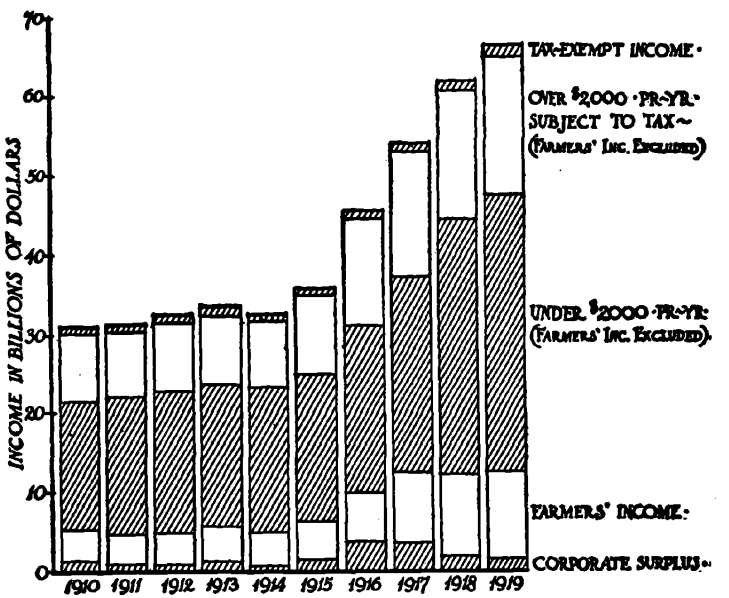
ness depression cuts down profits and therefore the larger incomes (in which profits and dividends are a large fraction) more severely than it cuts down wages and salaries (which make the bulk of

CHART 8.

THE FIVE SECTIONS OF THE NATIONAL INCOME ACCORDING TO THE ESTIMATE BY INCOMES RECEIVED.

1910-1919.

Based upon Table 5.



the lower incomes). A sudden increase of business prosperity has the opposite effect. But when prosperity continues for some time, profit margins are narrowed by the gradual advance of wages and salaries. (2). This advance of wages

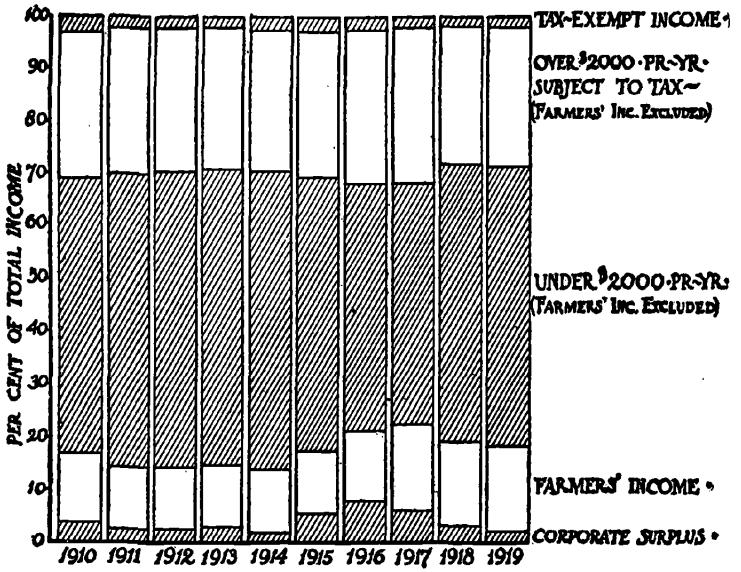
and salaries increases the amount of income in the "under-$2,000" group, until the advances have carried many wage and salary earners above the $2,000 line. When that happens, the percentage

CHART 9.

PERCENTAGE DIVISION OF THE NATIONAL INCOME ACCORDING TO THE ESTIMATE BY INCOMES RECEIVED.

1910-1919.

Based upon Table 5.



of total income in the lower group declines sharply. These two factors—the effect of business conditions upon profits and upon incomes from personal service in the neighborhood of $2,000 per year—may in a given year either reinforce or

counteract each other. Hence, the peculiar results.

Tax-exempt income from securities, home ownership and state salaries, is at all times a minor item, averaging 2.26% of the total. It was increased of course in 1917 and 1918 by the issue

TABLE 6

RELATIVE FLUCTUATIONS IN THE ITEMS INCLUDED IN THE ESTIMATE BY INCOMES RECEIVED

1910-1919

(Income in 1913 = 100)

Year	Personal Income					Corporate Surplus	Total National Income
	Over $2,000 per year excluding farmers	Under $2,000 per year excluding farmers	Farmers[1]	Tax-exempt income	Total personal income		
1910	98	89	95	100	93	120	93
1911	96	94	88	100	94	90	94
1912	98	98	95	100	98	90	97
1913	100	100	100	100	100	100	100
1914	97	100	100	100	99	50	98
1915	111	102	112	112	106	160	108
1916	150	117	138	112	129	390	137
1917	178	135	210	125	156	340	162
1918	180	175	250	150	186	170	185
1919	194	191	260	175	200	130	198

of war loans exempt from taxation in whole or in part, by the rise in rental values, and by the stimulus which exemption from high income taxes gave to the purchase of homes by families of means. Yet, if Mr. Knauth's data are trust-

[1] Mr. Gray Silver, a Director of the Bureau, remarks:

The income received by a farmer arises from his own services and those of the housewife for which an estimate has been made, and from work performed by unpaid members of his family. In certain years, when help is scarce (1918, 1919, 1920), this is the reserve drawn upon to maintain the needed agricultural production. This help therefore increases the farmer's share of the national income in these years beyond what it would have been had he paid for the services rendered by his family at commercial rates.

worthy, this increase was less rapid than the increase in the larger items of the estimate. Hence, the tax-exempt income of persons receiving a total income over $2,000 per year constituted a smaller

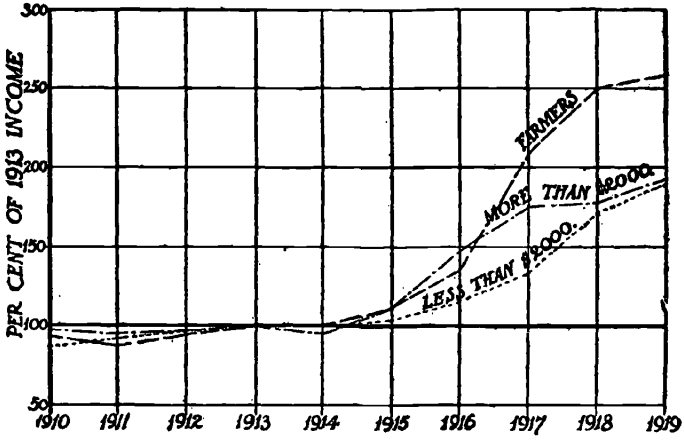
CHART 10.

RELATIVE FLUCTUATIONS IN THE AGGREGATE INCOMES OF FARMERS AND OF ALL OTHER PERSONS SUBDIVIDED ACCORDING TO WHETHER THEY RECEIVE MORE OR LESS THAN $2,000 PER YEAR.

1910-1919.

Aggregate Income Received by Each Group in 1913 = 100.

Based upon Table 6.



proportion of total income in 1919 than in the years before the war. Once more it should be noted that farmers, with their large tax-exempt incomes from home-ownership and food and fuel produced by themselves, are not included in these figures.

Corporate surplus is by far the most variable type of income, fluctuating through an even wider range than the profits of which it is part. How much more variable it is than personal income

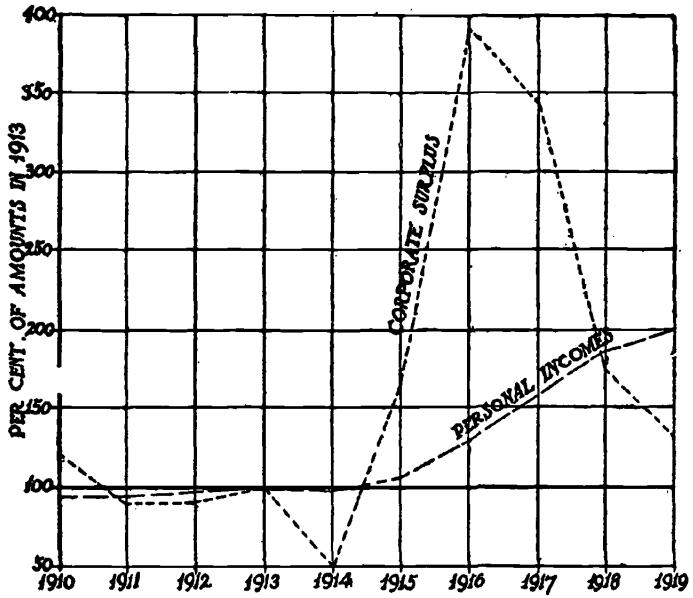
CHART 11.

RELATIVE FLUCTUATIONS IN AGGREGATE PERSONAL INCOMES AND IN CORPORATE SURPLUS.

1910-1919.

Amounts in 1913 = 100.

Based upon Table 6.



is shown by Table 6 and Chart 11. In years when profits are low, American corporations often reduce their dividend rates, but they are reluctant to reduce dividends as sharply as profits have

fallen. On the other hand, when profits are uncommonly high, they seldom disburse the whole of their increased gains. In addition to the policy of stabilizing dividends, American corporations like to follow the conservative financial policy of obtaining a part of the capital required by expansion of business from current earnings, instead of raising the whole amount by new security issues, and their capital needs grow faster in active than in dull years. The period covered by the present study includes one year of extreme depression, 1914, and one year of extraordinary profits, 1916. Even in the first of these years, corporate surplus amounted to $526,000,000; but in 1916 it rose to $3,866,000,000—over seven times the amount in 1914. In 1917, also, corporate surplus was large; but the rising costs of doing business, and war taxes had begun to eat into profits, a process that continued in 1918 and 1919, reducing the surpluses of the latter years to less than two billions each.

The preceding analysis of the elements of which the two Estimates of the National Income are composed raises in concrete form certain theoretical issues that must next be faced. Are the differences between the two estimates due wholly to

imperfections of the data and to the personal equations of the investigators? Or are there differences of principle between an estimate based upon values produced and one based upon incomes received? To answer these questions, we must consider what elements of income enter into each estimate.

IV. WHAT THESE ESTIMATES COUNT AS NATIONAL INCOME

The fundamental concept of the National Income which underlies the Estimate by Sources of Production is the same as that underlying the Estimate by Incomes Received. In both estimates the National Income is taken to consist of the commodities and services produced by the people of the country or obtained from abroad for their use, with the omission of goods for which no price is commonly paid, for example the services of housewives. Agricultural produce consumed by the families that produce it, mainly food and firewood, is included, and so also is the rental value of homes occupied by their owners. Finally, income is reckoned on a net basis, that is, negative income, maintenance and depreciation charges are deducted, but not "extensions and betterments."

Though defined thus as an aggregate of commodities and services, the magnitude of the National Income is stated in dollars—of necessity. The Estimate by Sources of Production aims to show the money value of the goods contributed to the aggregate by every productive agency. This money value is derived from the selling prices of the goods. But selling prices constitute income to some one and are paid out as wages, interest, rent and profits, or retained as undistributed income in some business. That holds true in the end even when money from sales is spent immediately for the purchase of new commodities. Hence it seems that an estimate of the incomes received by all individuals, plus the undistributed incomes of business enterprises, should produce the same figures as the Estimate by Sources of Production, were the data complete and correct on all heads.[1]

This conclusion would be valid if the statistics of individual and of undistributed business incomes included without omissions or duplications the money value of just those goods which we reckon in the National Income. But statistics of individual and undivided business incomes are not

[1] The reader may be reminded, once more, that in many industries the Estimate by Sources of Production itself was made by adding wages, interest, profits, etc.

compiled on that basis. For example, an advance in the selling prices of town lots, farm lands or other property does not represent an increase in National Income as above defined, unless it results from improving the property. But such an advance does enable owners to increase their personal incomes by making profitable sales. Nor is it easy to think of their gains as offset by corresponding losses inflicted on the buyers. On the other hand, a drop in these prices would not mean a loss of National Income, though it would occasion income losses to many owners, uncompensated by equivalent increase of income to those who purchase. So far as such gains and losses get into our data for individual incomes and corporate surpluses, then, the Estimte by Incomes Received differs in scope from the Estimate by Sources of Production.

But the present estimates are protected from a large discrepancy on this score by the imperfections of the available data and by the technicalities of the income-tax law. It seems certain, for example, that most of the farmers who sold land at the high prices of 1918-19 failed to report their profits for taxation, perhaps telling their consciences that those profits were not income but increase of capital. Doubtless, thousands of owners

of other kinds of property did likewise. Further, in a period of rapidly advancing prices, the taxpayer has a strong incentive not to sell property that has risen in value. He also has a strong incentive to make loss-taking sales of property that has depreciated in value. It is notorious that the latter practice has been indulged in on a grand scale, especially since the armistice was signed. So it happens that the "Profits from sales of real estate, stocks, bonds, etc.," reported to the Internal Revenue Bureau make but a minor item in their tables of total net income—less than 3 per cent. in 1917 and less than 2 per cent. in 1918. Moreover it may well be that these moderate profits are nearly offset or more than offset by losses on similar sales which are included under "General Deductions."[1] Finally, part of the increase in the selling values of property arises from improvements, and this part does represent

[1] The pertinent figures as given in Statistics of Income, 1917 (pp. 36-39) and 1918 (pp. 42, 43), are as follows:

	Total income	General deductions	Net income	Profits from sales of real estate, stocks, bonds, etc.
	Millions of dollars	Millions of dollars	Millions of dollars	Millions of dollars
1917	$12,077	$886	$11,191	$318
1918	17,746	1,821	15,925	291

No similar figures for earlier years have been published and the tables for 1919 are not yet completed.

National Income. As matters stand, then, we should probably make the Estimate by Incomes Received worse rather than better if we introduced any deduction for profits arising from changes in the capital value of property.

A second doubt about the comparability of the two estimates centers in the treatment of corporate surplus. Mr. Knauth has found evidence that the 80 to 90 per cent. of the reported surplus which he includes in the Estimate by Incomes Received is real income devoted to the extension of business in the same way as money raised by new security issues. The margin not thus included probably represents some cases of poor accounting, but mainly the accumulation of a reserve to meet unforeseen contingencies, which may fairly be regarded as one of the costs which most long-lived enterprises have to meet.

The difficult problem is whether this item should be added to individual incomes. Do not stockholders manage to turn corporation profits that are not distributed into individual income? Certainly they often do so by selling their stocks at values enhanced by the additions made to surplus out of earnings. And if all stockholders followed this practice, or even if they reported their incomes on the basis of accruals, this item would be

counted twice in the Estimate by Incomes Received as here made.

But if what has just been said about current practice in reporting income for taxation is valid, the extent of double counting at least in 1917-18, must be slight—some fraction of the small percentage of total net income reported as "Profits from sales of real estate, stocks, bonds, etc." The high rates of taxation in these years, especially the high rates of super-tax, made it financially desirable not to "realize" income which could be tacitly saved by merely holding the securities on which it was accumulating. This motive was by no means so strong in 1913-16, and there may well be relatively more double counting of income in these years. The amounts of surplus involved, however, were not great before 1916, and since the corporate surplus set aside in any given year is not likely to be "realized" to a large extent by stockholders within that same year, the process of turning the enormous corporate surplus of 1916 into individual income was checked by the high tax rate of 1917. Further, there is reason to believe that the corporate surpluses reported in our tables for 1916 and 1917, huge as they are, understate the undistributed incomes of corporations. The extraordinary profits that were being made in

those years, the uncertainty how long the war demand would last and what conditions peace would bring, combined with the excess-profits tax to make the financial managers of corporations charge off enormous sums for depreciation, special reserves, and other items which can be treated as costs and concerning whose proper size there is wide latitude for judgment. That profits thus concealed were heavily drawn upon to meet the post-war readjustments of 1919 and the inventory losses of 1920-21 of course does not mean that these profits were not real income in 1916-18. It means simply that this income was paid into a suspense account from which losses of income were met in later years.

In view of all these considerations, for our period, the Estimate by Incomes Received probably gives a better approximation to the aggregate size of the National Income when corporate surpluses are added to individual incomes than when they are not. Under different conditions—say the repeal of the super-taxes or the requirement that all individual incomes should be reported on the basis of accruals—the opposite conclusion might be justified.

The treatment in the two estimates of taxes and

of the contribution made by the government to the National Income raises another doubt.

In the Estimate by Incomes Received we have not deducted taxes from personal incomes as reported in the sources. But income-tax payers are permitted to deduct taxes other than inheritance taxes, federal income taxes, and special assessments for the improvement of real estate in arriving at the net income which figures in our estimates. What these deductions amount to is not stated. Corporation taxes, moreover, are deducted from corporation receipts in arriving at our estimate of corporate surplus. On the other hand, incomes paid by the federal, state and local governments to their employees and creditors are included in this estimate, whether they are paid from the proceeds of taxes or loans or from other receipts.

In the Estimate by Sources of Production most of the data concerning the value products of industry come into our hands with taxes already deducted; and to preserve uniformity, we have deducted taxes in the cases where we had the option. As an offset, the value products of the federal, state and local governments have been estimated and included in our totals on substan-

tially the same basis as the value products of privately-managed enterprises.

These procedures were not chosen by us but forced upon us by the condition of the data. However, it is worth while to consider what course we should like to adopt in treating taxes and the government's contribution to the National Income, if the data gave us a perfectly free hand, for that is the best way of judging whether the procedures forced upon us have made our results too high or too low.

Take first the Estimate by Incomes Received. Here it is clear that incomes paid to individuals by governments should count on the same basis as other incomes. Ought we not, then, to deduct from personal incomes the amounts which governments collect as taxes and redistribute as wages, salaries, pensions, rents, and interest—provided we could get at the facts? No, at least not so far as those who receive incomes from governments are contributing direct services of corresponding value which form part of the National Income. This is the answer dictated by our fundamental criterion of what constitutes National Income. And its justification is plain. When, for example, a city taxes its inhabitants to pay school teachers, the people presumably get value received for their

money, and there is no more reason why we should deduct school taxes from individual incomes than why we should deduct the fees paid by the rest of the community to physicians.

The difficult questions of theory and fact come in when we ask whether government expenditures, taken item by item in any given year, really represent services of corresponding value contributed in that year to the National Income. For example, granted that war expenditures represent National Income produced in the years of the conflict, does interest paid in later years on war debts represent services contributed in these later years to the National Income, or does it represent simply a redistribution of the National Income among the citizens—taking money from tax-payers and giving it to bond-holders? Into this delicate field of inquiry we do not enter. Hence we are not sure whether in taking the reports of individual incomes as we find them, with some taxes deducted and others not, we are making the Estimate by Incomes Received too large or too small.

A somewhat more definite conclusion can be reached about the Estimate by Sources of Production, because all reported business taxes have been deducted in reckoning the value product of

industries. Is this deduction in all cases desirable?

What we are seeking here is the aggregate money value of all commodities and services contributed to the National Income year after year by all productive agencies, including governments. Suppose that we start by estimating the value product of government, and then face the tax problem as it crops up in estimating the value products of privately-managed industries.

The taxes that a factory pays are its contribution toward the cost of the services rendered by governments just as the freight it pays is its contribution toward the cost of the services rendered by railways. Is there any difference between taxes and freight charges that justifies us in treating the two items differently when we are estimating the value product of the factory? The freight bill is a charge for specific service received, its amount depends upon the extent of that service, and the payment is one of the costs of manufacturing which with other costs is charged into the selling prices of the goods from which we estimate the factory's value product. If, then, we credit the freight to the value product of the railways, we must deduct it from the selling prices of the factory's output in getting what the

factory itself contributes to the National Income. If we did not make this deduction we should be counting the freight twice in our estimate, once explicitly under the caption "railways," and once tacitly under the caption "manufactures."

Now some taxes are levied in such a way as to put them for present purposes into the same position as freight charges. A cigar maker, a theater, a sleeping-car company, a manufacturer of cosmetics, all pay special taxes which they add to the prices of their products and later pay over to a Collector of Internal Revenue, just as definitely as a brick-yard adds freight charges to the price of brick and pays them over to a railway. By imposing these taxes the government does not add to the commodities and services which the tax-paying enterprises contribute to the National Income—indeed, the tax usually reduces the quantity of goods sold while increasing their aggregate selling value. If, now, we credit to government whatever service it provides out of the receipts from these taxes, we must deduct the taxes from the value products of the industries concerned. Otherwise we shall imply that the tax increased the value products of the industries concerned and also added to the value product of government. What the tax yielded would be counted twice.

Next take the precisely opposite case—a tax which the payer cannot add even in part to the selling prices of his products. Suppose that a given establishment pays no tax this year, and has a value product of $100,000, of which profits form $10,000. Next year this establishment turns out the same physical product at the same expense and sells it at the same price, but pays a tax of $1,000, which the government uses to employ an additional school teacher. Profits are cut down by this tax, but the establishment's contribution to the National Income is not diminished in physical quantity or in commercial value. Why then should we reduce our estimate of the establishment's value product by deducting the tax?

Yet, is not the tax counted twice if we do not deduct it? Our establishment is credited with its old value product; and part of this value product, by passing through the government's hands, has become an additional value product—education. Does not this imply that the government can increase the National Income at will by imposing taxes that cannot be shifted to consumers? This objection loses its plausibility when we ask what would have become of the $1,000 if the government had not taken it. If the establishment had kept the money in the business and bought new office

equipment, the makers of desks and waste baskets would have shown a larger value product than they show when the tax is collected and spent on schooling. Or if the tax money had been paid out in dividends and spent by the stockholders on clothing, gasoline, theaters and traveling, then the industries that cater to these demands would have shown larger value products. The imposition of the tax does not increase or decrease the size of the National Income; it changes merely the proportions among the items which enter into the aggregate.[1]

But this theoretical decision, that taxes which are added to selling prices should, and that taxes which are not added should not, be deducted from the value products of the industries taxed, does not solve the statistical problems involved in the Estimate by Sources of Production; for we don't know definitely what parts of the taxes imposed on business enterprises are shifted and what parts are not. There is wide difference of opinion, for example, concerning the extent to which the excess-profits taxes have been added to the selling prices. This is another intricate problem into which we do not enter. The one conclusion we do

[1] A slightly different way of viewing the relation of taxes to industry is presented by Mr. King in Vol. II, Chap. 5.

draw is that in deducting taxes in all cases from the value products of industries our Estimate by Sources of Production errs on the side of understating the National Income.

No systematic deduction from the National Income is made in our estimates to cover depletion of natural resources. Doubtless this item is of considerable size as well as of peculiar interest. Part of the National Income annually consumed at present is won by exploiting forests, mines and soils whose gradual exhaustion threatens to reduce the National Income of future years. Present income, however, is not reduced by possible future lack except in so far as depletion of natural resources affects present methods of accounting; and such influences are reflected in the statistics on which our Estimates of value products are based. Of course there is inconsistency between careful provision for maintaining the efficiency of industrial equipment and carelessness about the depletion of forests, mineral deposits and soils. But this is an inconsistency of practice, which a faithful report upon current facts concerning income may note, but cannot alter. Depletion is allowed as a deduction in computing taxable net income, and in the case of lumber, mining, and oil companies we have competent author-

ity for believing that since 1916 at least, the deductions made exceed, rather than understate, the actual amount of depletion. This opinion is based on the effects of the higher rates of taxation, and the fact that audits of returns have in many cases increased the reported taxable income. But careful accounting on this head is far from universal among corporations in extractive industries, and it is almost non-existent among those farmers who are "robbing the soil." As in other cases, few of the data are in such shape that we can get from them just what we wish.

Following common practice once more, we do not count as part of the National Income anything for which a price is commonly not paid. On this score we omit several of the most important factors in social well-being, above all the services of housewives to their families. Two awkward results follow from the exclusion. (1) Comparisons are thrown askew between communities or classes which differ widely in the proportion of women who work at home and women who work for wages. "For example, if we suppose that in one country one million wives remain at home and one million women work in industry, and there are no domestic servants, the total 'income' will differ from that of a country where half the 'wives' work

in industry and half the other women are domestic servants in the homes of the absent wives, despite the fact that the total 'work' being done is the same in both cases."[1] (2) As decade by decade housewives buy more commodities and services which their mothers produced at home and themselves seek outside employment at a money wage, the range of goods not commonly paid for in money gradually shrinks. Hence figures such as we get for the National Income in successive years tend to exaggerate the increase in ecomonic welfare. This exaggeration is probably slight within most periods as short as that covered here. It may have been appreciable, however, during the recent war, because of the special inducements then held out to women to enter money-making employment.

Statistically this is much the largest of the items concerning whose proper treatment there is serious doubt. Dr. A. M. Edwards, one of the best authorities on occupation statistics, estimates that in 1910 there were perhaps 18,000,000 American women, 16 years of age and over, engaged in housework in their own homes without monetary remuneration. If the proportion of such house-

[1] Sir Josiah Stamp, "The Wealth and Income of the Chief Powers," *Journal of the Royal Statistical Society*, July, 1919, pp. 447, 448.

wives to the total population remained constant, their number had increased to 20,700,000 by January 1, 1920. How much was their contribution to the National Income worth, on the average? As much as the average pay of domestic servants? Somewhat more? Perhaps $500 per annum before the war, and more than that after servants' wages rose? We do not know. But to indicate the order of magnitude involved we show in Table 7

TABLE 7

CONJECTURAL ESTIMATE OF THE MONEY VALUE OF HOUSEWIVES' SERVICES ON THE ASSUMPTION THAT SUCH SERVICES WERE WORTH $500 PER ANNUM ON THE AVERAGE IN 1909 AND ROSE IN VALUE WITH THE ADVANCE IN WAGES[1]

Year	Estimated Number of Housewives	Assumed Average Value of Housewives' Services	Conjectural Total Value of Housewives' Services
	In Millions	In Dollars	Billions of Dollars
1909	17.7	$500	$ 8.85
1910	18.0	500	9.00
1911	18.4	500	9.20
1912	18.7	525	9.82
1913	19.0	525	9.98
1914	19.4	525	10.19
1915	19.7	550	10.84
1916	19.9	600	11.94
1917	20.2	650	14.30
1918	20.4	750	15.30
1919	20.5	900	18.45

[1] The number of housewives is based on Dr. Edward's rough approximation for 1910, on the assumption that this number varied as the total population, and on Mr. King's estimate of the total population in inter-censal years. The assumed average value of their services corresponds with Mr. Knauth's estimate of the average incomes of persons engaged in "Domestic and Personal Service"—a group that includes many other occupations besides female domestics.

what the aggregate value contributed to the National Income by this group of workers would amount to if we credited them with an average production of $500 in 1909 and raised this figure with the advance of wages.

These figures are of the sort that anyone can alter to suit himself. Anyone who so desires can add some such magnitudes as those given in the last column to the National Income as reported in the Estimate by Sources of Production or in the Estimate by Incomes Received.

V. FINAL ESTIMATE OF THE SIZE OF THE NATIONAL INCOME

Understanding the term in the sense explained in the preceding section, we can now use our two estimates to make a final set of results showing the most probable size of the National Income and the margin of error to which these figures are subject. In so doing ought we simply to "split the difference" between the two estimates, or is one more reliable than the other?

To answer this question, Mr. King went over the Estimate by Sources of Production item by item and made a conjectural estimate of the probable error of each in millions of dollars; that is, he gets for each item a range within which

he thought the truth was equally likely to lie or not to lie. Mr. Knauth did the same with the Estimate by Incomes Received. Finally, the probable error of the aggregates for each year was computed in the usual manner by squaring these estimated errors, adding the squares and extracting the square root of the sum. This figure was then expressed as a percentage of the total National Income. This process gives the correct probable error of the total on the assumptions (1) that the probable errors assigned to the individual items are valid, and (2) that the errors of these items are not correlated with each other—in other words, that there is no more tendency for an over-estimate in one item to be accompanied by over-estimates in other items than for it to be accompanied by under-estimates; and (3) that the errors would tend to be distributed in a "normal" manner. Regarding the validity of the first assumption, we have no objective basis for judging whether either investigator overrated or underrated the accuracy of his approximations. Regarding the second assumption we are inclined to believe that there is a slight positive correlation among some of the errors. If so, the "probable errors" of the National Income as computed by the standard formula are rather too low. To get a contrasting

figure, we have gone to the opposite extreme and supposed that the errors in each estimate all run in the same direction, so that there is no canceling of errors in the totals. That is, we have added the estimated "probable errors" assigned to the several items and reduced the sums to percentages of the National Income.

One other explanation: Mr. Knauth's data for estimating incomes over $2,000 have improved in marked degree since 1910, first because of the imposition of the income tax in 1913; second because the administration of the tax grew more efficient as experience accumulated; third because the tax exemption limit was reduced in 1917 from $3,000 to $2,000; and finally because an "intensive drive" was begun in 1918 to increase the reporting of small taxable incomes. Certain of his other data also varied in quantity or quality from year to year, these variations in part counteracting the fairly steady improvement in the income tax figures. No such marked change has occurred in the character of Mr. King's data for sources of production. He believes that his totals are somewhat better in 1909 and 1914 than in other years because census data are more abundant then, as they presently will be for 1919. Another good year is 1916, be-

cause it affords the base for estimating profits in unclassified industries. But these differences are not great and definite enough to make profitable a year-by-year estimate of probable errors. Hence, Mr. King has computed the errors of the Estimate by Sources of Production only for 1918, which is not one of his strongest years, while Mr. Knauth has made the computation for each year separately.

Table 8 gives the figures thus arrived at. In 1918, there is little to choose between the probable errors yielded by the standard formula. They are

TABLE 8

MARGINS OF ERROR IN THE TWO ESTIMATES OF THE NATIONAL INCOME [EXPRESSED AS PERCENTAGES OF THE TOTALS]

1910-1918

(See text for explanation)

Year	Estimate by Sources of Production		Estimate by Incomes Received	
	Square roots of sums of squares of estimated probable errors in individual items	Sums of the estimated probable errors in the individual items	Square roots of sums of squares of estimated probable errors in individual items	Sums of the estimated probable errors in the individual items
1910			3.8%	6.6%
1911			4.0%	6.9%
1912			3.9%	6.8%
1913			3.9%	6.8%
1914			4.0%	6.9%
1915			3.5%	6.3%
1916			3.0%	5.3%
1917			2.8%	4.9%
1918	2.1%	8.5%	2.5%	4.5%

remarkably low in both estimates, yet perhaps not smaller than the 2.1 per cent. difference between the two totals in this year prepares one to find. Indeed a glance back at Table 1 reminds us that the two series have differed by more than 2.5 per cent. only in 1912, 1913, and 1914, and that the maximum difference is 6.9 per cent. in 1913.

In making our final estimate of the most probable size of the National Income, we shall not indulge in statistical finesse, but shall simply split the difference between the two estimates. Table 9 shows the results reached in this way. We think

TABLE 9

FINAL ESTIMATE OF THE NATIONAL INCOME AND THE LIMITS WITHIN WHICH THE TRUE VALUES PROBABLY FALL

1909-1918

(For Explanations, See Text)

(In Billions of Dollars)

Year	Ten per cent. less than the final estimate	Five per cent. less than the final estimate	**Final estimate of the National Income**	Five per cent. more than the final estimate	Ten per cent. more than the final estimate
1909	$25.9	$27.4	**$28.8**	$30.2	$31.7
1910	28.3	29.8	**31.4**	33.0	34.5
1911	28.1	29.6	**31.2**	32.8	34.3
1912	29.7	31.4	**33.0**	34.6	36.3
1913	31.0	32.7	**34.4**	36.1	37.8
1914	29.9	31.5	**33.2**	34.9	36.5
1915	32.4	34.2	**36.0**	37.8	39.6
1916	40.9	43.1	**45.4**	47.7	49.9
1917	48.5	51.2	**53.9**	56.6	59.3
1918	54.9	57.9	**61.0**	64.1	67.1

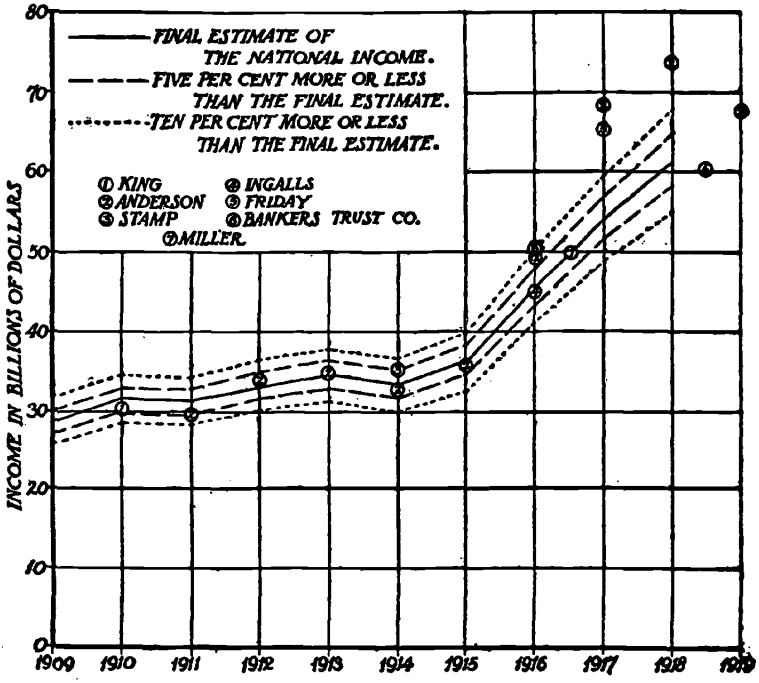
we are conservative in believing that these figures are probably accurate within 5 per cent., and we think it unlikely that the error in any year exceeds

CHART 12.

THE FINAL ESTIMATE OF THE NATIONAL INCOME AND ESTIMATES BY OTHER INVESTIGATORS.

1909-1919.

Based upon Tables 9 and 10.



the 10 per cent. margins shown in the outside columns.

With these results, it is interesting to compare the Estimates of the National Income that have

TABLE 10

COMPARISON OF ESTIMATES OF THE NATIONAL INCOME MADE BY DIFFERENT INVESTIGATORS[1]

1909-1918

(In Billions of Dollars)

Year	National Bureau of Economic Research			Anderson	Stamp	Ingalls	Friday	Bankers' Trust Company	Miller
	—10%	Final Estimate	+10%						
1909	$25.9	$28.8	$31.7						
1910	28.3	31.4	34.5	30.5					
1911	28.1	31.2	34.3	29.6					
1912	29.7	33.0	36.3	33.8					
1913	31.0	34.4	37.8	34.8					
1914	29.9	33.2	36.5	32.6	$35.3				
1915	32.4	36.0	39.6	35.4					
1916	40.9	45.4	49.9	49.2		$44.9		$50.0	
1916-17	(44.7)	(49.6)	(54.6)						$49.7
1917	48.5	53.9	59.3	68.6			$65.5		
1918	54.9	61.0	67.1	73.4					
1918-19								60.1	
1919				67.7					

[1] Dr. B. M. Anderson, Jr., extended Mr. King's estimate for 1910 (*Wealth and Income of the People of the United States*, 1915, p. 129) to cover 1911-16 by supposing the National Income to vary as an index made from railway gross earnings and prices. In 1917-19, he thought railway earnings less representative than in earlier years, and brought into his index various data for the amount of commodities produced or exchanged. For his results, see *New York Times Annalist*, Jan. 3, 1921, p. 9.

Sir Josiah Stamp's estimate for 1913 is also made by extending Mr. King's figure for 1910. See *Journal of the Royal Statistical Society*, July, 1919, p. 491.

Mr. W. R. Ingalls based his estimate for 1916 partly upon Mr. King's work, but used much fresh material. See *New York Times Annalist*, September 13, 1920, p. 323.

Professor David Friday's estimate also goes back to Mr. King's work, but includes a survey of additional data. See *Journal of Political Economy*, December, 1918, p. 956.

Dr. A. C. Miller's estimate for the year 1916-17 is cited in Professor Friday's article.

If the conjectural estimate of the value of housewives' services for which no money payment is made (see Table 7 above) be included, the "final estimate" of the National Income becomes:

	(Billions of Dollars)
1909	37.6
1910	40.4
1911	40.4
1912	42.8
1913	44.4
1914	43.4
1915	46.8
1916	57.3
1917	68.2
1918	76.3

TABLE 11

FINAL ESTIMATE OF THE NATIONAL INCOME PER CAPITA AND THE LIMITS WITHIN WHICH THE TRUE VALUES PROBABLY FALL

1909-1918

Year	Population on June 30 (Millions)	Ten per cent. less than the final estimate	Five per cent. less than the final estimate	Final estimate of the National Income per capita	Five per cent. more than the final estimate	Ten per cent. more than the final estimate
			(In Dollars per Annum)			
1909	90.37	$287	$303	$319	$335	$351
1910	92.23	306	323	340	357	374
1911	93.81	300	316	333	350	366
1912	95.34	311	329	346	363	381
1913	97.28	319	336	354	372	389
1914	99.19	302	318	335	352	368
1915	100.43	322	340	358	376	394
1916	101.72	401	424	446	468	491
1917	103.06	471	497	523	549	575
1918	104.18	527	557	586	615	645

been made by other investigators for various years in our period. All the other estimates fall within 10 per cent. of our final estimates, except Professor Friday's estimate for 1917 and Dr. Anderson's estimates for 1917 and 1918.

Another interesting supplement to Table 9 is a reduction of the National Income to income per capita. The population figures used in this table are estimates for June 30th of the intercensal years made by Mr. King from census returns, vital statistics, and immigration records.

Once more, the reminder may be entered that Tables 9 and 10 and the charts drawn from them show income in dollars or billions of dollars, and that most of the apparent increase of income in the

war years is a monetary illusion. The next task is to see how much of the increase is left if we reduce our estimates to hypothetical dollars of constant purchasing power.

VI. THE NATIONAL INCOME REDUCED TO PRE-WAR VALUES

To determine the best method of "deflating" our estimates of the National Income is a difficult problem. It will not do simply to divide the aggregate figures by such a series as the Bureau of Labor Statistics index number of prices at wholesale, because the great bulk of income is spent by families on retail purchases. Nor will it do to divide our aggregates by the same Bureau's index number of the cost of living, because these figures are made expressly to represent changes in this cost to families of small means, and our figures profess to represent all families. Some more elaborate method is necessary, and it is desirable to safeguard the results by using more than one method. Hence we have broken up both estimates into parts and applied appropriate index numbers to each part separately.

In making the Estimate by Sources of Production Mr. King subdivided the net product of

each industry into (1) sums paid to employees, (2) sums paid out in interest, dividends, rents, royalties, and profits, and (3) income not paid out but kept in the business. The first of these sums he "deflated" by using the Bureau of Labor Statistics index number of cost of living. For "deflating" the second sum, he used a new index number designed to show fluctuations in the living expenses of families having expenditures for consumption goods of $5,000 to $25,000 per year. To the third item, he applied an index number of construction costs. Since the details of this computation, as given in Volume II, are rather elaborate and since in another section, we shall present his statistics of the share of employees in the National Income, it will suffice here to give merely his final results. (See Table 13).

Mr. Knauth's method of "deflating" the Estimate by Incomes Received was somewhat different. He made a very rough estimate of the amounts of income "saved" each year by persons having incomes less than $2,000, and a similar estimate for persons having more than that amount. Of course, these "savings" are really spent. The two great objects on which savings were spent in 1914-1919 were new industrial equipment of all sorts, including houses, and the war. Accordingly,

the total savings, including those made by business enterprises, were divided, again very roughly, between those two uses. Thus Mr. Knauth converted his estimate of the National Income into an estimate of National Expenditures subdivided under four heads: (1) personal and family expenditures of people having incomes less than $2,000 per year; (2) similar expenditures of people having incomes above $2,000; (3) expenditures on construction of houses and industrial equipment; and (4) expenditures on the war. An index number was used for each of these headings as follows: (1) for incomes over $2,000, an index number computed by the Bureau; (2) for incomes under $2,000, the cost-of-living index number of the Bureau of Labor Statistics; (3) for construction,

TABLE 12

THE NATIONAL INCOME AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913, ACCORDING TO THE ESTIMATE BY INCOMES RECEIVED

Year	National Income (Billion dollars)	Weighted Index Number of Prices	Purchasing Power at Price Level of 1913 (Billion dollars)
1910	$31.1	97.8	$31.8
1911	31.2	98.5	31.7
1912	32.4	99.4	32.6
1913	33.3	100.0	33.3
1914	32.5	100.6	32.3
1915	35.9	102.5	35.0
1916	45.5	113.4	40.1
1917	53.9	136.1	39.6
1918	61.7	160.8	38.4
1919	66.0	176.8	37.3

an index number computed by the Statistical Division of The American Telephone and Telegraph Company; (4) for war expenditures, an index number based on the War Industries Board's His-

TABLE 13

THE NATIONAL INCOME AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913

1909-1919

In Billions of Dollars

Year	National Income			Purchasing Power at Price Level of 1913		
	Estimate by Sources of Production	Estimate by Incomes Received	Final Estimate	Estimate by Sources of Production	Estimate by Incomes Received	Final Estimate
1909	$28.8		$28.8	$30.1		$30.1
1910	31.8	$31.1	31.4	32.5	$31.8	32.2
1911	31.2	31.2	31.2	31.7	31.7	31.7
1912	33.6	32.4	33.0	33.7	32.6	33.2
1913	35.6	33.3	34.4	35.6	33.3	34.4
1914	33.9	32.5	33.2	33.6	32.3	33.0
1915	36.1	35.9	36.0	35.3	35.0	35.2
1916	45.4	45.5	45.4	41.3	40.1	40.7
1917	53.9	53.9	53.9	41.9	39.6	40.8
1918	60.4	61.7	61.0	39.1	38.4	38.8
1919		66.0			37.3	
	Relative Fluctuations: 1913 = 100					
1909	81		84	85		88
1910	89	93	91	91	95	94
1911	88	94	91	89	95	92
1912	94	97	96	95	98	97
1913	100	100	100	100	100	100
1914	95	98	97	94	97	96
1915	101	108	105	99	105	102
1916	128	137	132	116	120	118
1917	151	162	157	118	119	119
1918	170	185	177	110	115	113
1919		198			112	

tory of Prices 1913-1918. These four series, appropriately weighted, were combined to make a final index number, which was applied to the aggregate National Income. The results are shown in Table 12.

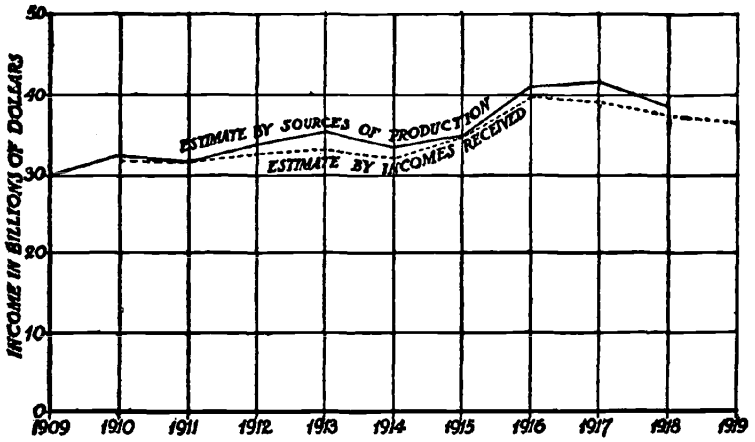
When these results are put beside Mr. King's, the two series are found once more to be in close agreement; how close is shown by Table 13 and Chart 13. Perhaps the most important discrep-

CHART 13.

THE TWO ESTIMATES OF THE PURCHASING POWER OF THE NATIONAL INCOME AT THE PRICE LEVEL OF 1913.

1909-1919.

Based upon Table 13.



ancy concerns the year when the National Income, considered not as a sum of money values, but as an aggregate of commodities and services which current money income would buy, reached its maximum. One estimate puts the maximum in 1916, the other in 1917. The final estimate, made by splitting the difference between Mr.

King's and Mr. Knauth's figures, gives the palm to 1917 by a slight margin.

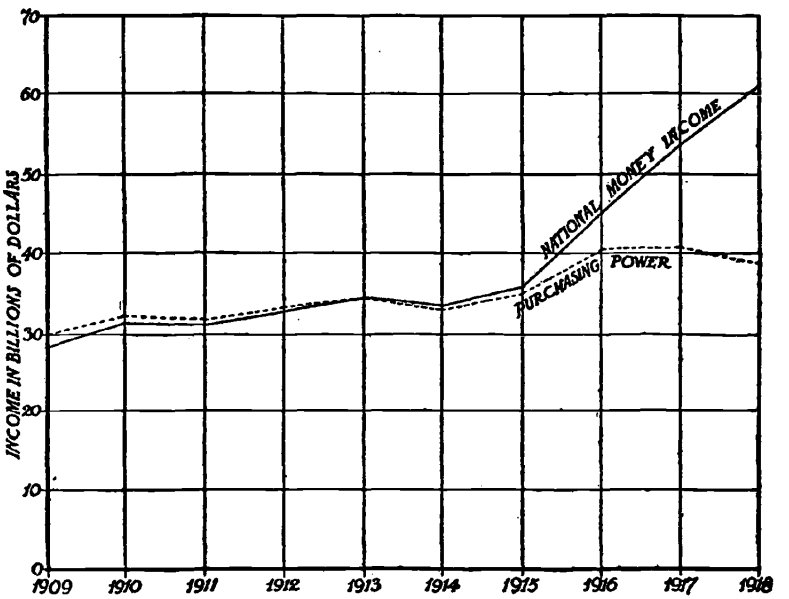
Both estimates make it clear that all of the ex-

CHART 14.

THE FINAL ESTIMATE OF THE NATIONAL INCOME AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913.

1909-1918.

Based upon Table 13.



traordinary gains in money income after the United States entered the war were due to fluctuations in prices. For even according to the Estimate by Sources of Production, the gain registered in 1917 over 1916 was by no means extraor-

dinary—not comparable for example with the gain made in 1912 over 1911. The conclusion to which the figures point is that large increases in

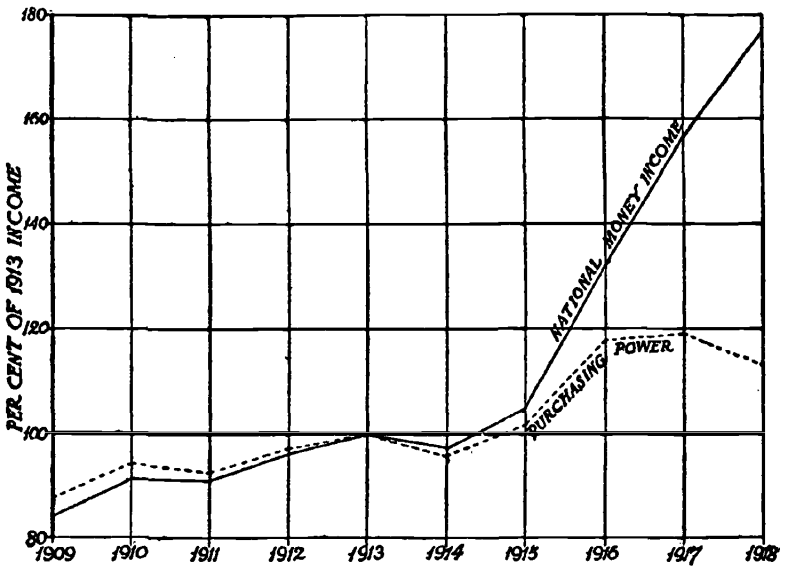
CHART 15.

RELATIVE FLUCTUATIONS IN THE FINAL ESTIMATE OF THE NATIONAL INCOME AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913.

1909-1918.

Amounts in 1913 = 100.

Based upon Table 13.



real National Income, if we may use that term to mean the serviceable goods available for use by the population, are due either to a marked improvement in the harvests, or to a marked increase in industrial activity, or to both of these changes

occurring simultaneously. From the dull year 1911 to the busy year 1912, and still more from the exceedingly depressed year 1914 to the exceedingly active year 1916, the gain is great. But once people are nearly all employed and

TABLE 14

THE FINAL ESTIMATE OF THE NATIONAL INCOME PER CAPITA AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913

1909-1918

Year	Population in Millions	National Income		Purchasing Power at Price Level of 1913	
		Income in Billion Dollars	Per Capita Income in Dollars	Income in Billion Dollars	Per Capita Income in Dollars
1909	90.37	$28.8	$319	$30.1	$333
1910	92.23	31.4	340	32.2	349
1911	93.81	31.2	333	31.7	338
1912	95.34	33.0	346	33.2	348
1913	97.28	34.4	354	34.4	354
1914	99.19	33.2	335	33.0	333
1915	100.43	36.0	358	35.2	350
1916	101.72	45.4	446	40.7	400
1917	103.06	53.9	523	40.8	396
1918	104.18	61.0	586	38.8	372
		Relative Fluctuations: 1913 = 100			
1909	93	84	90	88	94
1910	95	91	96	94	99
1911	96	91	94	92	95
1912	98	96	98	97	98
1913	100	100	100	100	100
1914	102	97	95	96	94
1915	103	105	101	102	99
1916	105	132	126	118	113
1917	106	157	148	119	112
1918	107	177	166	113	105

the factories and workshops, the mines and railways, the ships and shops are used at full capacity, further increases of output slow down to the rate made possible by current increase of population, development of natural resources, construction of new equipment, and

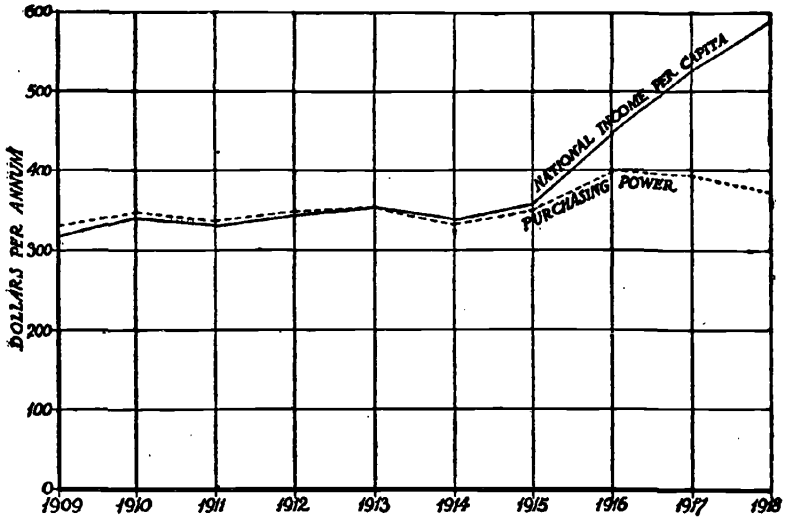
improvement in methods. And when a large number of the most effective workers are withdrawn from industry, as they were in 1918, it is difficult if not impossible to prevent production in

CHART 16.

THE FINAL ESTIMATE OF THE INCOME PER CAPITA AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913.

1909-1918.

Based upon Table 14.



physical terms from falling off, however large a money premium is offered for intense effort.

In some respects, the per capita figures of Table 14 are more significant than the national aggregates of Table 13. These per capita figures of course increase at a slower rate in good years,

and fall off at a faster rate in bad years than do the aggregates from which they are computed. When the data are cast into this shape, the decline

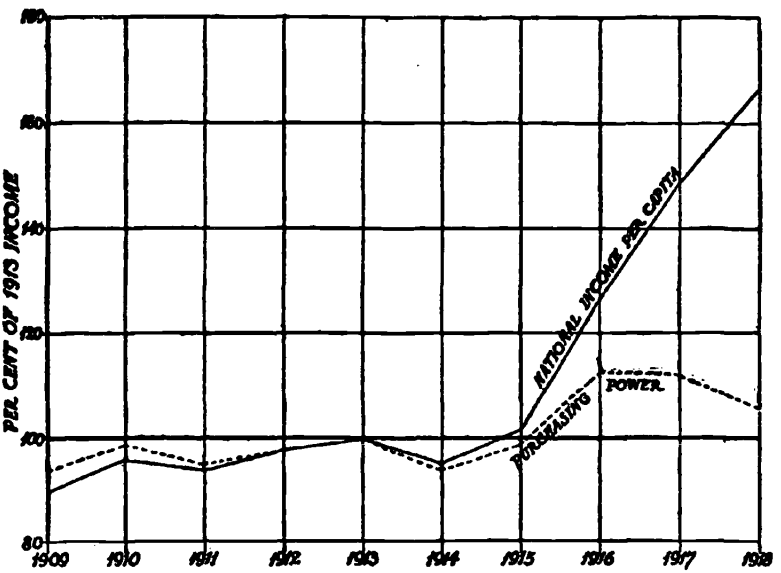
CHART 17.

RELATIVE FLUCTUATIONS IN THE FINAL ESTIMATE OF THE INCOME PER CAPITA AND ITS PURCHASING POWER AT THE PRICE LEVEL OF 1913.

1909-1918.

Amounts in 1913 = 100.

Based upon Table 14.



in real National Income during American participation in the war becomes rather marked. The economic prosperity of 1919 was an illusion so far as current production of serviceable goods is concerned.

It is interesting to compare these new figures for National Income in money of constant purchasing power with the index numbers of the physical volume of production which have re-

TABLE 15

COMPARISON OF THE FLUCTUATIONS IN THE FINAL ESTIMATE OF THE PURCHASING POWER OF THE NATIONAL INCOME AT THE PRICE LEVEL OF 1913 WITH FOUR INDEX NUMBERS OF THE PHYSICAL VOLUME OF PRODUCTION

1909-1919

Amounts in 1913 = 100

Year	Relative Purchasing Power of the National Income at the Price Level of 1913			Index Numbers of Physical Volume of Production, Compiled by			
	Estimate by Sources of Production	Estimate by Incomes Received	Final Estimate	E. E. Day (1)	W. W. Stewart (2)	Carl Snyder (3)	W. I. King (4)
1909	85						
1910	91	95	94	93	95	91	89
1911	89	95	92	89	92	90	88
1912	95	98	97	102	105	97	95
1913	100	100	100	100	100	100	100
1914	94	97	96	98	100	97	96
1915	99	105	102	105	111	104	106
1916	116	120	118	111	116	118	126
1917	118	119	119	114	123	125	119
1918	110	115	113	113	124	129	113
1919		112		107	119	116	110

(1) *Review of Economic Statistics*, Harvard University Committee on Economic Research, Vol. 3, No. 1, January, 1921, p. 20. Weighted according to values in 1909. Includes 90 Farm Products, 10 Minerals and 88 Products of Manufactures.

(2) *American Economic Review*, March, 1921. Includes 91 products.

(3) These figures have not been published. Include 87 commodities.

(4) *Bankers' Statistics Corporation*, Special Service, Vol. 2, No. 12, August 24, 1920.

cently been made by four statisticians working independently of each other. It will be seen from Table 15 that the two estimates of the National Income in money of constant purchasing power fluctuate in closer harmony with each other than

do any two of the index numbers of physical volume of production. And from Chart 18, it appears clearly that these two estimates, or rather

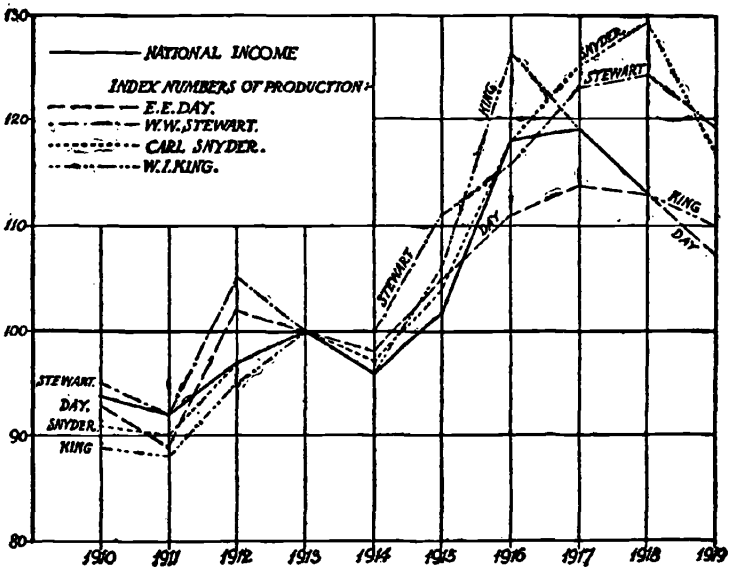
CHART 18.

COMPARISON OF THE FLUCTUATIONS IN THE FINAL ESTIMATE OF THE PURCHASING POWER OF THE NATIONAL INCOME AT THE PRICE LEVEL OF 1913, WITH FOUR INDEX NUMBERS OF THE PHYSICAL VOLUME OF PRODUCTION.

1910-1919.

Amounts in 1913 = 100.

Based upon Table 15.



the "final estimate" made from them, pursues an intermediate course through the field covered by the fluctuations of the physical-production index numbers. This comparison affords a further

indication that our results are substantially trustworthy.

VII. TOTAL AND PER CAPITA INCOME IN DIFFERENT COUNTRIES

In 1919, Sir Josiah Stamp, one of the highest British authorities on income statistics, made a careful survey of all recent investigations into the wealth and income of the chief powers, and assembled his results in a summary table published in the *Journal of the Royal Statistical Society*.[1] He used the year 1914 as base, because that year "at the outbreak of war, represents the latest date for which satisfactory statistics are generally available," and he graded the estimates for the several countries according to his estimate of their approximate accuracy.

This work makes it easy to compare our final estimate of the National Income of the United States in 1914 with the best estimates for other countries. In reproducing Sir Josiah Stamp's table, we have made but three changes. (1) Pounds sterling are converted into dollars at their pre-war value. (2) The new estimate for the United States made by this Bureau is substituted for Sir Josiah's continuation of Mr. King's 1910

[1] See the issue for July, 1919, Vol. LXXXII, pp. 441-507. The table is on p. 491.

figure. (3) This new American figure is put in Grade I instead of Grade II. Concerning Mr. King's former figure, Sir Josiah Stamp remarked, "As the estimate stands, unchecked by any taxation data, it is in the second grade, but after the lapse of a few years, such statistics should be available from the recently instituted income tax as to make a much closer estimate possible."[1] We think that time has come.

The British estimate was made by Professor A. L. Bowley with a free use of materials drawn from Sir Josiah Stamp's *British Incomes.* It rests primarily upon income-tax returns, which include all incomes above £160 ($800) per year, and upon census data regarding wages and number of persons following gainful occupations. This estimate Sir Josiah regards "as perhaps the most accurate available for any country." The source of the German estimate is *Deutschland's Volkswohlstand,* 1888-1913, by Dr. Helfferich, director of the Deutsche Bank. Dr. Helfferich used the Prussian income-tax data—which include incomes as low as 900 marks ($225),—supplemented by estimates for evasion, which he puts at 10 per cent., and incomes of untaxed individuals

[1] See *Journal of the Royal Statistical Society* for July, 1919, Vol. LXXXII, p. 462.

whom he credits with an average of 750 marks ($188), per year. These Prussian figures he applies to the whole German Empire and gets a total which Sir Josiah Stamp thinks may be 6 per cent. too high or 9 per cent. too low. The French authority is René Pupin, *La Richesse de la France devant la Guerre*, 1916. Lacking income-tax data, M. Pupin made an estimate by sources of production. The main sources he distinguished are property in real estate, buildings, securities and banks, "the effort" of people employed in various industries, and "capital and labor" engaged in farming, business and the liberal professions. His results are supposed to be subject to an error of more than 10 but less than 20 per cent. Italian statistics of income are very weak. The figure used here is a current guess adopted by Professor E. L. Bogart in his book on *The Direct Costs of the Present War*, and is thought liable to an error which may exceed 40 per cent. The Austro-Hungarian estimate is another guess adopted in default of better figures by Professor Bogart. For Spain a rough approximation has been made by André Barthe from such data as he could collect concerning income from property, wages, salaries, and profits. The Australian figures are taken from the War Census of 1915, when all persons over 18 years of age were

required to report the amount of their property and incomes,—an undertaking which constitutes "perhaps the most thorough and complete attempt that has yet been made to ascertain national wealth." The Canadian figure rests on a "guess" made by Sir Robert Giffen in 1903 and may well be far from the truth. Finally, Sir Josiah Stamp himself made the Japanese estimate from income-tax returns, plus a large allowance for evasion, and an average income of about $120 per year for the 8,500,000 families belonging to the "lower classes."

From this review, it will be seen that the United States is the only country for which estimates have been made on the basis both of sources of production and of incomes received. It is true that the American income-tax figures are less satisfactory than the British or Prussian, because of their relatively high exemption limit—$3,000 for married people in 1914 as against $800 in the United Kingdom and $225 in Prussia—and because the administration of the law certainly had not then and probably has not yet attained as high a degree of efficiency as in countries where similar taxes have been long in operation. For example, in 1911 the number of persons assessed under the income tax in Great Britain was estimated (the

complicated scheme of schedules makes impossible an accurate determination) at 5.7 per cent. of all persons having gainful occupations;[1] in the United States the corresponding figures for 1913, 1914 and 1915 were none of them quite one per

TABLE 16

SUMMARY SHOWING THE ESTIMATED NATIONAL AND PER CAPITA INCOME OF VARIOUS COUNTRIES AT THE OUTBREAK OF WAR IN 1914, AND THE APPROXIMATE ACCURACY OF THE RESPECTIVE ESTIMATES

Adapted from the Summary by Sir Josiah Stamp, *Journal of the Royal Statistical Society*, July, 1919

Country	Estimates based upon the work of	Approximate Accuracy; Grade [a]	National Income, Millions of Dollars	Per Capita Income, Dollars
United States	National Bureau of Economic Research	I	$33,200	$335
United Kingdom	Bowley, Stamp	I	10,950	243
Germany	Helfferich	I	10,460	146
France	Pupin	II	7,300	185
Italy		IV	3,890	112
Austria-Hungary		IV	5,350	102
Spain	Barthe	IV	1,120	54
Australia	Official, Knibbs	I	1,260	263
Canada	Giffen	IV	1,460	195
Japan	Stamp	III	1,580	29

I. Estimate is not likely to be inaccurate to a greater extent than 10 per cent.
" II. Estimate is not likely to be inaccurate to a greater extent than 20 per cent.
" III. Estimate is not likely to be inaccurate to a greater extent than 30 per cent.
" IV. Estimate may be inaccurate to a greater extent than 40 per cent.

cent. Still the remarkable agreement between the Bureau's two American estimates made independently of each other gives one considerable confidence in their approximate accuracy even in 1914. It may be added that, since then, the American income-tax data have become relatively more

[1] Compare A. L. Bowley, *The Division of the Product of Industry* (1919), pp. 10, 11.

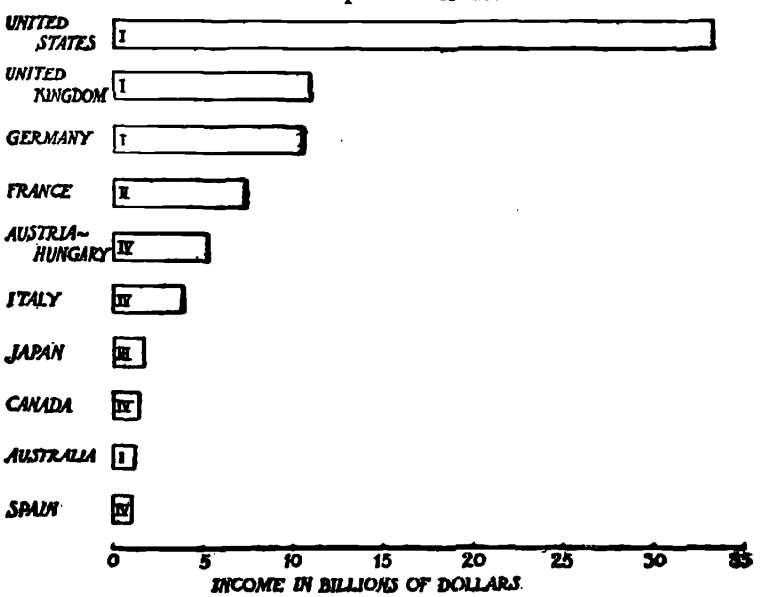
inclusive than were the British data before the war. By 1918, the reduction in the exemption limit, the increase in money incomes, and improve-

CHART 19.

THE ESTIMATED NATIONAL INCOME OF VARIOUS COUNTRIES IN 1914.

Approximate accuracy of estimates indicated by grade numbers I to IV.

Based upon Table 16.



ments in administration had raised the number of persons reporting incomes over $2,000 to more than 7 per cent. of all persons gainfully employed.[1]

[1] If the returns between one and two thousand dollars be counted in, nearly 11 per cent. of all personal incomes are included in the Internal Revenue Bureau's tables. But these statistics for the lowest income class have little value for estimating National Income, because they are limited to single persons, and married people who do not live together.

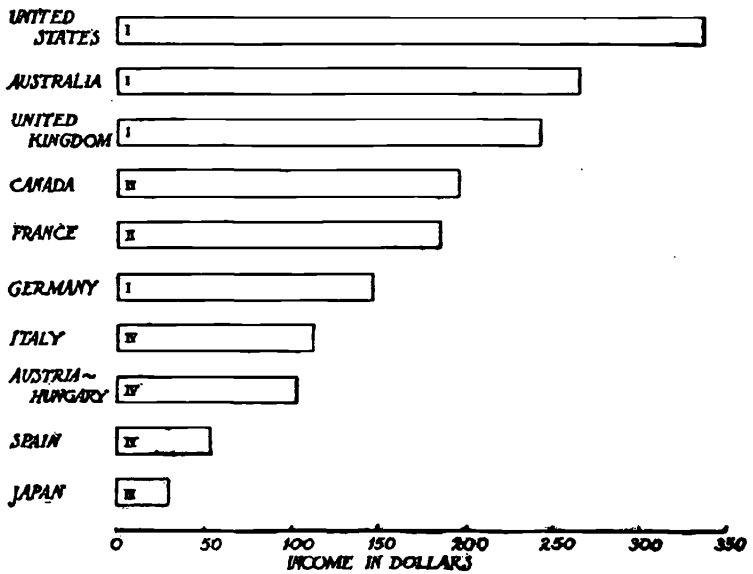
Concerning the facts brought out by these international comparisons, nothing need be added to Sir Josiah Stamp's brief commentary: "I may

CHART 20.

THE ESTIMATED INCOME PER CAPITA OF VARIOUS COUNTRIES IN 1914.

Approximate accuracy of estimates indicated by grade numbers I to IV.

Based upon Table 16.



perhaps remark," he said, "that the generally higher level of pre-war prices in America (which is reflected in the per capita average) cannot discount the immense absolute lead of the States in real wealth, or the rapidity of its increase. The

difference between the United Kingdom and Germany is not so considerable as other writers have suggested, and the effects of the well-known thrift of the French nation are apparent. The Japanese are making immense strides, but over 60 per cent. of their population are engaged in agriculture, and live on an amount per head which would be impossible in Europe—indeed, a comparison with this leading Eastern nation's figures brings out" the fundamental difficulty of comparing the incomes of peoples whose scales of value are radically unlike.[1]

[1] *Journal of the Royal Statistical Society*, July, 1919, p. 490.