Volume Title: Migration and Business Cycles

Volume Author/Editor: Harry Jerome

Volume Publisher: NBER

Volume ISBN: 0-87014-008-6

Volume URL: http://www.nber.org/books/jero26-1

Publication Date: 1926

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Chapter URL: http://www.nber.org/chapters/c5267

Chapter pages in book: (p. 54 - 76)

CHAPTER III

EMPLOYMENT OPPORTUNITIES FOR IMMIGRANTS

The Significance of a Measure of Employment Opportunity.

With the passing of the era of abundant and fertile free land, industrial employment rather than agricultural opportunity has been the lodestone attracting the foreign worker to our shores. Particularly within the last three or four decades the typical immigrant has been a prospective wage earner seeking employment in factory, mine, or construction camp.

Data concerning fluctuations in the employment of wage earners are, accordingly, particularly pertinent to our study. The cycle of employment is the aspect of the business cycle which is of direct meaning to the immigrant. It is the most tangible measure of the conditions affecting his economic welfare; and hence it affords the obvious and logical basis for appraising the influence upon migration of fluctuations in economic opportunities and the celerity with which immigration and emigration currents respond to such changes.

The Ideal Measure.

The ideal index of employment, for our purpose, would cover all of those occupations in which immigrants engage in large numbers and would indicate, not merely the variations in the number of workers employed, but also the extent of part-time and over-time employment.

Not only that, but to give a complete picture of the relative economic opportunity afforded the immigrant, our ideal index would be adjusted to variations in real wage rates, that is, in money rates reduced to terms of comparable purchasing power by allowance for changes in the prices of those articles which comprise the budget of the immigrant worker. In short, such an index would make allowance for both the volume of employment and the real rate of compensation and thus measure changes in the real earnings in the immigrant industries.

An index of employment portraying the condition of employment for the unskilled laborer would be particularly valuable, for it is

the concensus of opinion of commentators on employment conditions that this class bears the chief brunt of cyclical and seasonal variations in employment, and furthermore, it is the immigrant who makes up a large part of the unskilled labor group.

For much of our analysis, monthly, or at least quarterly, rather than annual data are essential. Annual data serve well to give indications of general tendencies, but the picture which may be drawn with them is necessarily only in broad outline and permits symptomatic details to be obscured. For example, with only annual data, it becomes impossible to determine, with any reasonable degree of precision, whether the immigrant tide slackens in premonition of an impending industrial slump, or, on the contrary, begins to ebb only after employment has been on the decline for several months.

Lastly, if we could have an equally comprehensive index of fluctuations of economic opportunities in the country from which immigrants come, we should feel excellently equipped for the task before us.

The data actually available do not make possible the construction of such an ideal index as that just outlined, but, nevertheless, afford, in our judgment, a basis for reasonably accurate conclusions, particularly when reinforced by other indices of industrial activity.

Types of Employment Statistics.

The principal sources of information concerning employment conditions in the United States are of four types: (1) *indirect evidences of employment conditions* as found in statistics of production and such even less direct indices of employment opportunities as are afforded by prices, clearings, and other indicators of business activity; (2) records of the *average number of wage earners employed* during the month, or the number employed on a given day, as shown by payroll data; (3) statistics of the *percentage of trade union members unemployed*; and (4) *employment office statistics*, giving the ratio of applicants to jobs. All four of these types have been utilized in the subsequent analysis, although the primary index of factory employment by months, for the period beginning with 1889, has been constructed from statistics of the average number employed, supplemented for a portion of the period by trade union statistics of unemployment.

ANNUAL STATISTICS OF INDUSTRIAL CONDITIONS

To obtain a picture of the major features of changes in employment conditions, let us first turn our attention to the fluctuations in various series of annual data which serve as more or less satisfactory indicators of conditions in the several industries in which immigrants find employment.

For this purpose we have used the following series: for factory employment, an index of estimated average number employed, 1890 to 1922; for coal mining, the number of tons of anthracite and bituminous coal, respectively, produced each year from 1870 to 1922; for construction, the annual increase in the operated mileage of railroads from 1891 to 1916 and an index of the estimated annual total value of construction from 1902 to 1920; for railway maintenance, the average number of trackmen employed from 1889 to 1914; and for general industrial and business conditions, several series, including the value of imports of merchandise 1870 to 1923, pig iron production 1870 to 1923, the clearings index computed by the Federal Reserve Bank of New York for 1876 to 1923, wholesale prices 1870 to 1922, and Professor E. E. Day's index of manufacture 1899 to 1923.

For convenience in comparison, these series have been charted in two groups, on pages 59 and 62, one group consisting of those series which refer to calendar years (Tables 12-A and 12-B and Chart 6); and the other group, those series which refer to fiscal years ending June 30th (Tables 13-A and 13-B and Chart 7).

The Calendar Year Group.

The annual production of pig iron, bituminous coal, and anthracite coal, respectively, an index of the physical volume of manufacturing, an index of the estimated total value of construction, the number of railway trackmen employed, and an index of wholesale prices comprise the calendar year group. Pig iron is discussed more fully at subsequent points in this chapter. A few words concerning the reason for choice of some of the other series are pertinent.

Railway Employment.

Large numbers of immigrants are employed in the maintenance of railway track and roadbeds, and, consequently, we have included in our evidences of employment conditions a curve showing the

fluctuations in the numbers of railway trackmen, other than section foremen, on June 30th of each year from 1889 to 1914.

Coal Mining.

The United States Geological Survey has published statistics of the movement of men employed and of days worked in anthracite and bituminous mining, respectively, for the years 1890 to 1921, and statistics of the production of coal are available from 1870 to date. Based upon a careful study of the returns filed with them, the Survey reaches the conclusion that the figures of the average number employed represent "not the average number of men actually working at any one time, nor the aggregate number of men who have worked at any time during the year, nor the absolute average number on the payrolls, but rather the number of men commonly dependent on the mine for employment." Hence, by multiplying the average number of men employed in each year by the average number of days worked, we obtain a figure which affords a better index of employment conditions in the mines than the average number of employed. To illustrate, the reported average number of men employed in bituminous mines is even greater in the depression year of 1908 than in 1907, but the number of days worked was but 193 as compared with 223 in 1907.

The resulting estimate of employment was compared with the statistics of bituminous coal production, which are available for a longer period, and the two series were found to agree so closely that the longer, or production series, has been used for an indicator of probable conditions of employment in the bituminous coal industry. In like manner, the production of anthracite coal is used as an approximate index of employment in that phase of mining.

Construction.

Especially valuable for our purposes would be a comprehensive index of the number of men, particularly of common laborers, employed upon new construction—buildings, sewers, railways, and streets and highways—but unfortunately no such index is available. Fragmentary evidence is furnished by statistics of building permits, miles of railroad constructed, and building contracts awarded, but none of these series is both comprehensive enough and available over a sufficiently long period to afford an adequate index of employment conditions over the period in which we wish to study the relations of migration and employment. Statistics of the miles of

railroad constructed, partly on a calendar year and partly on a fiscal year basis, are available throughout the period covered by Charts 6 and 7 (1870-1923); but the best of the construction indices, the volume of building covered by contracts awarded, is available only beginning in 1910 and has changed somewhat in scope during this period. However, an estimate of the annual total value of construction is given in Chart 6 as a rough index of employment conditions in the construction industry.

The Fiscal Year Group.

To aid in the identification of boom and depression periods when data applying to fiscal years ending June 30th are considered, we have used annual statistics of the number of miles of railroad constructed, imports of merchandise, the estimated average daily production of pig iron, the estimated average number employed in factories, and an index of business conditions compiled by Mr. Carl Snyder, of the Federal Reserve Bank of New York.

The curve for factory employment represents an estimate based primarily upon data more fully described later in this chapter in connection with monthly estimates of employment. This curve presumably underestimates somewhat the size of the fluctuations in factory employment, in that it gives no consideration to part-time employment and, also, particularly in the earlier years, is based primarily upon data for Massachusetts, in which State industrial conditions were probably relatively stable.

The mileage of railroad constructed is significant because it reflects general industrial conditions and because immigrant laborers in large numbers have been employed as laborers in such construction.

Method of Interpreting the Accompanying Charts (6 and 7).

The several series discussed in the above paragraphs are plotted in Charts 6 and 7, which are so-called "ratio charts," or charts with the vertical scale so proportioned that equal percentage declines between any two years are represented by equal vertical declines on the curves involved. If one curve declines ten per cent in 1900, and another series ten per cent in 1900 and also in 1904, in each of these three cases the vertical drop on the chart would be the same. In like manner, equal percentage increases are represented by equal vertical rises in the respective curves. Hence, despite the fact that the series are expressed in widely different units, it is possible, by

inspection of these charts, to approximate with the eye the relative change in different years or in the several curves for any one year.

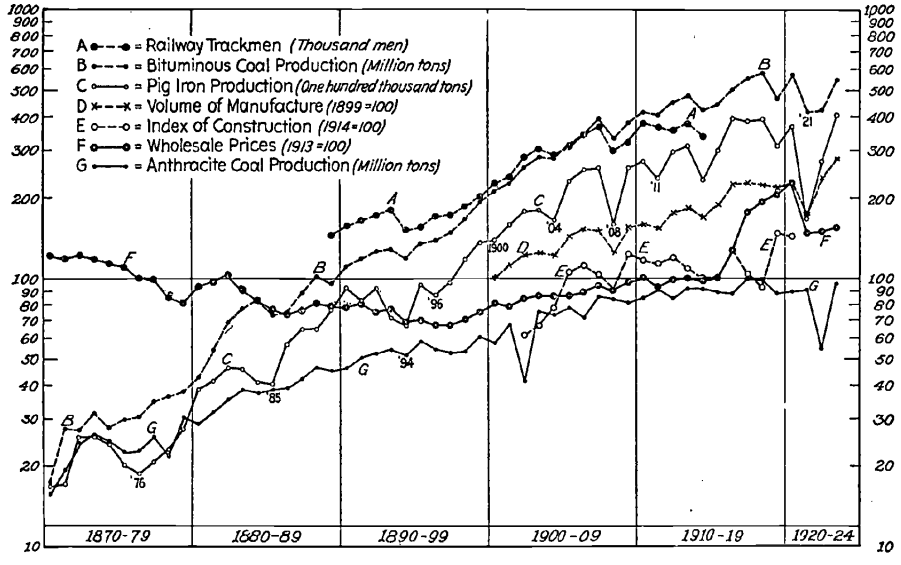
Depression Years.

When examining the fluctuations in migration, we shall have frequent occasion to refer to the depression years in industry. These years of depression may be quite satisfactorily identified for preliminary comparisons by examination of Charts 6 and 7, on

CHART 6

INDICES OF ECONOMIC CONDITIONS, BY CALENDAR YEARS: 1870-1923.

Ratio scale



•Numerical data in Tables 12-A and 12-B.

pages 59 and 62, which show the relative fluctuations in the annual statistics. With the exception of the clearings index of business, the data plotted in these charts have not been corrected for the growth element, hence a mild depression tendency may be evidenced merely by a slackening in the rate of increase rather than by a decided downward slope of the curve. The fluctuations in the production of pig iron, when they are reasonably well supported by

the other series, have been taken as the primary determinants of which years should be designated as depression years.

Calendar Years.

From Chart 6, page 59, in which calendar year totals are plotted, we note that in the period since 1870 the slack years appear to be

TABLE 12-A—INDICES OF ECONOMIC CONDITIONS, BY CALENDAR YEARS, 1870-1923

YEAR	PRODUCTION (MILLION TONS)			WHOLESALE PRICES[c] 1913 = 100	YEAR	PRODUCTION (MILLION TONS)			WHOLESALE PRICES[c] 1913 = 100
	PIG IRON[a]	BITUMINOUS COAL[b]	ANTHRACITE COAL[b]			PIG IRON[a]	BITUMINOUS COAL[b]	ANTHRACITE COAL[b]	
1870	1.67	17.4	15.7	122	1900	13.79	212.3	57.4	81
1871	1.71	27.5	19.3	118	1901	15.88	225.8	67.5	79
1872	2.55	27.2	24.2	123	1902	17.82	260.2	41.4	84
1873	2.56	31.4	26.2	118	1903	18.01	282.7	74.6	86
1874	2.40	27.8	24.8	114	1904	16.50	278.7	73.2	86
1875	2.02	29.9	22.5	110	1905	22.99	315.1	77.7	86
1876	1.87	30.5	22.8	100	1906	25.31	342.9	71.3	89
1877	2.07	34.8	25.7	99	1907	25.78	394.8	85.6	94
1878	2.30	36.2	21.7	85	1908	15.94	332.6	83.3	90
1879	2.74	37.9	30.2	81	1909	25.80	379.7	81.1	97
1880	3.84	42.8	28.6	94	1910	27.30	417.1	84.5	101
1881	4.14	54.0	31.9	97	1911	23.65	405.9	90.5	93
1882	4.62	68.4	35.1	103	1912	29.73	450.1	84.4	99
1883	4.60	77.3	38.5	91	1913	30.97	478.4	91.5	100
1884	4.10	83.0	37.2	83	1914	23.33	422.7	90.8	98
1885	4.04	72.8	38.3	77	1915	29.92	442.6	89.0	101
1886	5.68	74.6	39.0	74	1916	39.43	502.5	87.6	127
1887	6.42	88.6	42.1	76	1917	38.62	551.8	99.6	177
1888	6.49	102.0	46.6	81	1918	39.05	579.4	98.8	194
1889	7.60	95.7	45.5	79	1919	31.02	465.9	88.1	206
1890	9.20	111.3	46.5	78	1920	36.93	568.7	89.6	226
1891	8.28	117.9	50.7	80	1921	16.69	415.9	90.5	147
1892	9.16	126.9	52.5	75	1922	27.22	422.3[a]	54.7[a]	149
1893	7.12	128.4	54.0	77	1923	40.36	545.4[a]	95.4[a]	154
1894	6.66	118.8	51.9	69					
1895	9.45	135.1	58.0	70					
1896	8.62	137.6	54.3	67					
1897	9.65	147.6	52.6	67					
1898	11.77	166.6	53.4	70					
1899	13.62	193.3	60.4	75					

[a] *Statistical Abstract of the United States*, 1923, pp. 264-265, 272.
[b] United States Geological Survey, *Coal in 1919, 1920 and 1921*, p. 482.
[c] Based, prior to 1891, upon the index number compiled by Joseph L. Snider, "Wholesale Prices in the United States, 1866-91", in the Review of Economic Statistics, April, 1924, pp. 93-118, especially p. 112, converted to 1913 base; for 1891 to 1923, upon the index number of the United States Bureau of Labor Statistics, *Bulletin 335*, p. 9, and *Survey of Current Business*, Feb., 1923, p. 135.

as follows: first, a slump in the late seventies, the exact year differing in the several series; then 1885, 1888 (slight), 1893 and 1894, 1896 or 1897, 1902 in anthracite coal, due to strikes, 1904, 1908 (severe), 1911 (relatively mild), 1914 and to a lesser extent 1915 and 1919, 1921 (severe), and 1922. Further indication of the depression characteristic of these years is found in Chart 8 on a subsequent

page, in which are plotted pig iron production and a composite index of economic conditions, with their trends eliminated.

TABLE 12-B.—INDICES OF ECONOMIC CONDITIONS, BY CALENDAR YEARS: 1889-1923

YEAR	VOLUME OF MANUFACTURE 1899=100[a]	VALUE OF CONSTRUCTION[b] 1914=100	RAILWAY TRACKMEN (THOUSANDS)[c]	YEAR	VOLUME OF MANUFACTURE 1899=100	VALUE OF CONSTRUCTION 1914=100	RAILWAY TRACKMEN (THOUSANDS)
1889	...	....	145	1910	159	116.6	379
1890	...	....	157	1911	153	112.8	363
1891	...	....	164	1912	177	119.2	357
1892	...	....	172	1913	184	109.4	377
1893	...	....	180	1914	169	100.0	337
1894	...	....	151				
1895	...	....	155	1915	189	101.5	...
1896	...	....	170	1916	225	127.6	...
1897	...	....	172	1917	227	103.7	...
1898	...	....	184	1918	223	92.2	...
1899	...	....	202	1919	218	147.0	...
1900	101	....	227	1920	227	143.3	...
1901	112	....	239	1921	174	.....	...
1902	122	61.8	281	1922	238	.....	...
1903	124	66.7	301	1923	277	.....	...
1904	122	77.3	289				
1905	143	106.3	311				
1906	152	112.0	344				
1907	151	103.2	367				
1908	126	90.5	299				
1909	155	123.6	321				

[a]Professor E. E. Day's index of the physical volume of production in manufacture, unadjusted for secular trend, *Review of Economic Statistics*, July, 1924, p. 200.

[b]An estimate compiled by Dr. W. I. King, and based, prior to 1909, chiefly upon building permits in selected cities for which continuous records are available; subsequent to 1908 this index also includes estimates based on construction by the Federal Government and by railways.

[c]Compiled from Interstate Commerce Commission, *Statistics of Railways in the United States*. Includes "trackmen other than section foremen"; as of June 30th of each year.

Fiscal Years.

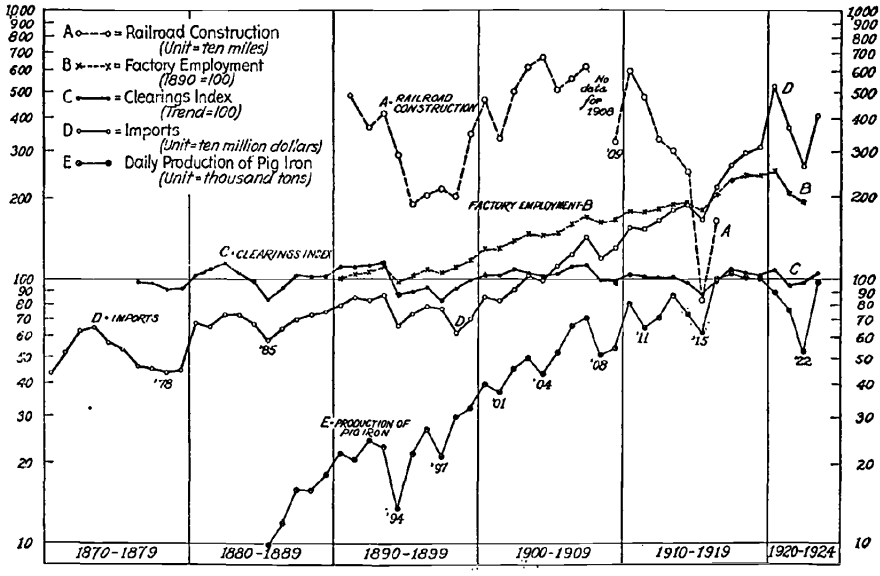
In many instances migration data are available by fiscal years ending June 30th rather than by calendar years. Consequently, it is desirable to note what fiscal years are marked by depression conditions. In Chart 7 are given five series which are available on the fiscal year basis. The shift to the fiscal year basis does not make much change in the years which stand out as depression years. For the data compiled on the fiscal year basis we find that the relatively low years include the late seventies, 1885, 1894, 1897

(1898 for imports), 1901 (slight), 1904, 1908 (and 1909, also, for clearings), 1914 and 1915, 1919, and 1921 and 1922.

CHART 7

INDICES OF ECONOMIC CONDITIONS, BY FISCAL YEARS: 1870-1923.*

Ratio Scale



*Numerical data in Tables 13-A and 13-B.

Pig Iron Production and a Composite Index of Business Cycles. Pig iron is basic to many manufacturing industries and to much construction work, and, in the form of machinery or other products of iron and steel, is supplementary to practically all industrial activities, hence fluctuations in the production of pig iron ordinarily bear a close relation to the volume of industrial activity. This relationship has been frequently noted in previous statistical studies of economic conditions. For example, Professor E. E. Day, in his construction of an index of manufacturing, compares annual statistics of pig iron production with his index and finds a striking similarity in the fluctuations of the two series.[1] Because of this

[1] *Review of Economic Statistics*, 1920, p. 367, "The correspondence of pig-iron production with manufacture, when both are adjusted for secular trend, is extraordinary. The correlation coefficient is .97." (Based upon the period 1899-1919).

close association between pig iron and industrial activity, we have made frequent use of pig iron production in comparisons with migratory fluctuations in this and other countries, partly because direct employment figures are not available and partly because it is

TABLE 13-A.—INDICES OF ECONOMIC CONDITIONS, BY FISCAL YEARS ENDING JUNE 30TH: 1870-1923

YEAR	MERCHANDISE IMPORTS[a] (MILLION DOLLARS)	CLEARINGS INDEX OF BUSINESS (TREND = 100)[b]	DAILY PIG IRON PRODUCTION[c] (THOUSAND TONS)	YEAR	MERCHANDISE IMPORTS[a] (MILLION DOLLARS)	CLEARINGS INDEX OF BUSINESS (TREND = 100)[b]	DAILY PIG IRON PRODUCTION (THOUSAND TONS)
1870	436.0	....	....	1900	849.9	102.9	39.9
1871	520.2	....	....	1901	823.2	102.8	37.1
1872	626.6	....	....	1902	903.3	108.4	45.4
1873	642.1	....	....	1903	1025.7	106.2	50.0
1874	567.4	....	....	1904	991.1	102.7	43.6
1875	533.0	....	....	1905	1117.5	104.9	52.6
1876	460.7	96.9	....	1906	1226.6	111.9	65.5
1877	451.3	96.1	....	1907	1434.4	112.2	70.6
1878	437.1	91.4	....	1908	1194.3	99.0	51.4
1879	445.8	90.4	....	1909	1311.9	98.0	54.3
1880	668.0	102.8	....	1910	1556.9	103.9	80.3
1881	642.7	107.9	....	1911	1527.2	100.6	64.6
1882	724.6	114.4	....	1912	1653.3	100.4	70.4
1883	723.2	105.6	....	1913	1813.0	100.8	87.3
1884	667.7	98.0	....	1914	1893.9	96.6	73.3
1885	577.5	83.8	9.9	1915	1674.2	88.0	62.3
1886	635.4	92.1	11.9	1916	2197.9	97.9	101.1
1887	692.3	103.3	15.6	1917	2659.4	108.2	106.0
1888	724.0	101.7	15.8	1918	2945.7	105.6	101.6
1889	745.1	103.4	18.1	1919	3095.7	103.5	100.1
1890	789.3	110.1	21.8	1920	5238.4	107.7	89.4
1891	844.9	111.2	20.7	1921	3654.5	94.3	75.8
1892	827.4	111.7	24.4	1922	2608.1	96.3	52.6
1893	866.4	115.0	23.2	1923	4068.6	105.1	97.8
1894	655.0	86.9	13.6				
1895	732.0	89.3	21.7				
1896	779.7	92.3	27.2				
1897	764.7	82.7	21.3				
1898	616.0	91.7	30.0				
1899	697.1	98.4	32.5				

[a]U. S. Bureau of Foreign and Domestic Commerce, *Monthly Summary of Commerce and Finance.*
[b]An average of monthly figures of an index of business conditions based upon clearings outside New York, corrected for trend, compiled by Mr. Carl Snyder, Federal Reserve Bank, New York, *Journal of the American Statistical Association*, September, 1924, p. 335.
[c]Annual averages computed from monthly data published in the *Iron Age*, and based prior to October, 1902, upon the number of furnaces in blast and thereafter upon monthly statistics of pig iron produced.

not improbable that pig iron, related as it is to other industries as well as manufacturing, may be an index of employment opportunities for immigrants at least as significant as the ordinary index of numbers employed in factories, which at best does not make adequate allowance for part-time employment.

TABLE 13-B.—INDICES OF ECONOMIC CONDITIONS, BY FISCAL YEARS ENDING JUNE 30TH: 1890-1922

YEAR	NUMBER EMPLOYED IN FACTORIES[a] (1890=100)	MILES OF RAILROAD[b] CONSTRUCTED	YEAR	NUMBER EMPLOYED IN FACTORIES (1890=100)	MILES OF RAILROAD CONSTRUCTED
1890	100.0	.....	1910	177.7	5,908
1891	103.5	4,844	1911	176.9	4,740
1892	107.0	3,656	1912	181.2	3,301
1893	112.4	4,143	1913	189.5	3,003
1894	97.3	2,899	1914	190.3	2,511
1895	102.7	1,895	1915	180.4	831
1896	108.6	2,053	1916	208.3	1,653
1897	105.9	2,163	1917	233.9	....
1898	110.5	2,026	1918	243.3	....
1899	117.5	3,466	1919	242.2	....
1900	128.2	4,628	1920	253.0	....
1901	129.3	3,324	1921	208.1	....
1902	138.2	4,965	1922	192.7	....
1903	146.8	6,169			
1904	145.7	6,690			
1905	148.4	5,084			
1906	160.2	5,565			
1907	170.2	6,188			
1908	162.6	....			
1909	165.9	3,238			

[a]An estimate for the United States, based upon Census of Manufactures statistics for census years and on interpolations in intervening years with the aid of State employment and unemployment statistics.
[b]*Statistical Abstract of the United States.* In 1908 and the subsequent years, these data exclude switching and terminal companies hence are not strictly comparable with those for the years prior to 1908.

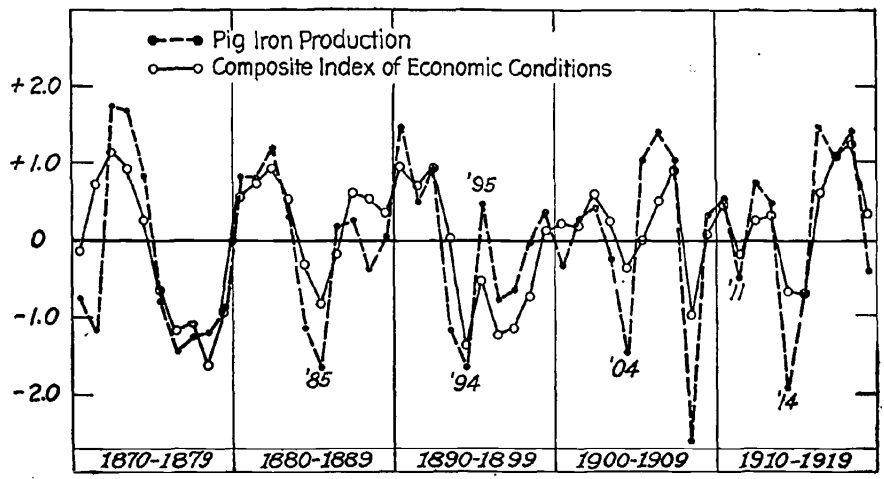
To indicate the extent to which the fluctuations in pig iron production are similar to those of other indices of economic conditions, there is given in Chart 8 a comparison between pig iron production and a composite index of business conditions, both expressed as deviations from computed trends. This composite index is one computed by Professor W. F. Ogburn and Dorothy S. Thomas, using nine economic series, namely: wholesale prices (1870-1913), commercial failures (1870-1920), bituminous coal production

(1870-1920), pig iron production (1870-1920), railroad freight ton mileage (1882-1920), bank clearings outside New York (1881-1915), employment in Massachusetts (1889-1920), railroad mileage constructed (1870-1888), and imports (1870-1888).[2]

CHART 8

CYCLES IN ECONOMIC CONDITIONS IN THE UNITED STATES: 1870-1919.[a]

Unit = one standard deviation



[a]The numerical data for pig iron are in Table 14. For source of the "Composite Index," see accompanying text.

It will be noted that all major cycles and most of the minor fluctuations are common to the two curves, that there is no lag of sufficient extent to be obvious in these annual data, and that only in a few years are changes in the two series opposite in direction. It appears that, on the whole, no marked differences in results will arise whether pig iron production or such a composite index as that plotted in Chart 8 is used in analyzing annual cycles in economic conditions.

[2]"The Influence of the Business Cycle on Certain Social Conditions," *Journal of the American Statistical Association*, September, 1922, p. 327.

TABLE 14.—CYCLES OF PIG IRON PRODUCTION, BY CALENDAR YEARS: 1860-1919*

Percentage deviations from a seven-year moving average, expressed in multiples of their standard deviation (12.68 per cent)

YEAR	PIG IRON PRODUCTION	YEAR	PIG IRON PRODUCTION	YEAR	PIG IRON PRODUCTION
1860	+0.97	1880	+0.82	1900	—0.32
1861	—1.23	1881	+0.80	1901	+0.28
1862	—0.99	1882	+1.20	1902	+0.41
1863	—0.20	1883	+0.29	1903	—0.25
1864	+0.65	1884	—1.15	1904	—1.48
1865	—1.62	1885	—1.67	1905	+1.03
1866	+0.09	1886	+0.17	1906	+1.40
1867	—0.02	1887	+0.25	1907	+1.03
1868	+0.13	1888	—0.38	1908	—2.61
1869	+0.28	1889	+0.06	1909	+0.32
1870	—0.78	1890	+1.47	1910	+0.53
1871	—1.17	1891	+0.50	1911	—0.50
1872	+1.74	1892	+0.91	1912	+0.72
1873	+1.68	1893	—1.16	1913	+0.48
1874	+0.84	1894	—1.65	1914	—1.92
1875	—0.80	1895	+0.47	1915	—0.74
1876	—1.43	1896	—0.77	1916	+1.48
1877	—1.27	1897	—0.64	1917	+1.06
1878	—1.20	1898	—0.03	1918	+1.42
1879	—0.88	1899	+0.36	1919	—0.41

*Computed from data given in Table 12-A for 1870-1919.

INDEXES OF EMPLOYMENT BY MONTHS

We have previously noted the desirability of a monthly index of employment conditions. For the quarter century preceding the Great War it has been possible to build up by the synthesis of somewhat fragmentary series, an index of factory employment. This index has been supplemented by an index of monthly changes in pig iron production. Charts of the cyclical movements in these two series are given in Chapter V. The methods of compilation are set forth in the subsequent pages of this chapter.

The Census of Manufactures.

The United States Census of Manufactures furnishes a virtually complete census of the number of wage earners employed in factories, by months, for the years 1899, 1904, 1914, 1919, and 1921. In taking the census of manufactures in 1899 workers in the hand

and neighborhood industries were included, but in the subsequent censuses only factory workers were counted, hence in order to make the 1899 figures comparable with those for the later years, it was necessary to adjust them to exclude, as far as practicable, the number of workers in hand and neighborhood industries.

Other Available Monthly Statistics.

Although varying in their comprehensiveness and throughout a portion of the period lacking in strict continuity, monthly statistics of the average number of wage earners in Massachusetts factories are available for the period 1889 to 1922.[3] For the years 1889 to 1906, inclusive, a census of manufactures was taken annually, and included the number of wage earners employed by the reporting concerns, by months, over a period of two years. The fraction of the total represented by the reporting factories varied from year to year, but, due to the fact that each annual report covers two years, it is possible to splice the reports together to produce a consecutive index.

Beginning with 1907 the annual Massachusetts Census of Manufactures is intended to be a substantially complete enumeration rather than a mere sample, and each census covers only twelve months instead of tweny-four as previously. An examination of the data indicates that for the first years following this change in method the census did not approach a complete enumeration with equal consistency; and adjustments, more completely indicated below, have been made to make the series approximately homogeneous.

Somewhat similar statistics of wage earners employed are available for New Jersey. Two special inquiries afford some evidence of employment conditions in the State from June, 1893, to May, 1895, and an annual survey of factory wage workers, by months, covers the period from 1895 to 1919, inclusive.[4] The fraction represented by the firms reporting has not been invariable and the samples do not overlap in the way that the Massachusetts statistics did prior to 1907, so that splicing estimates have been necessary in utilizing the New Jersey statistics.

Quarterly statistics of the percentage of trade union members unemployed in Massachusetts are available beginning with 1908,

[3]The results of the 1923 Census of Manufactures were not available in time for use in this study.

[4]See Table 16 on a later page in this chapter.

and have been used in supplemental studies, but have not been incorporated in the major index of employment conditions.

Similar statistics, however, for trade union unemployment in New York State, by months, have been utilized in widening the scope of our employment index during the years 1904-1914.

An index of factory employment in New York State is available beginning in June, 1914, and in the following year the United States Bureau of Labor Statistics began an index of factory employment. In the post-war period still more complete data are available. The Federal Reserve Board has consolidated various series into an index of industrial employment for the years 1919 to 1923, and has also published an "index of the labor market" showing the fluctuations in the ratio of applicants to jobs in the operations of the public employment offices during the period January, 1919, to December, 1923.[5]

Previous Studies in Employment Fluctuations.

Several economists have utilized the series described above, together with supplementary information, in the construction of more or less comprehensive estimates of the course of employment and unemployment. Mr. Hornell Hart made an estimate of the volume of unemployment by months during the period 1902 to 1917, inclusive;[6] Mr. Ralph D. Hurlin, of the Staff of the Russell Sage Foundation utilized the Massachusetts data in constructing a picture of "Three Decades of Employment Fluctuations";[7] and Professor William A. Berridge, in a series of valuable studies presented in the *Review of Economic Statistics* and elsewhere,[8] has analyzed the cyclical fluctuations in employment from 1903 to date.

As employment is the primary measure of immigrant opportunity used in this study, and as it is desirable to carry our comparisons through as long a period as possible, it has seemed advisable to prepare an index especially for our purposes rather than to rely

[5] *Federal Reserve Bulletin*, Dec., 1923 (index of industrial employment); and Feb., 1924 ("labor market" index).

[6] Hornell Hart, *Fluctuations in Unemployment in Cities of the United States, 1902-1917*, Studies from the Helen S. Trounstine Foundation, Vol. 1, No. 2, pp. 47-59.

[7] Ralph D. Hurlin, "Massachusetts Employment in Factories," *Annalist*, Oct. 24, 1921, pp. 387-388.

[8] Cf. articles in the *Journal of the American Statistical Association*, March, 1922, pp. 42-55, and June, 1922, pp. 227-240; the *Review of Economic Statistics*, January, 1922, pp. 1-56; the *Federal Reserve Bulletin*, December 1923, pp. 1272-1279, and February, 1924, pp. 83-87; also his volume entitled *Cycles of Unemployment in the United States, 1903-1922*.

solely upon any of the available series or analytic studies. However, these valuable pioneer studies have been utilized in some of the subsequent comparisons, and have afforded many suggestions for the preparation of our special employment index.

Index of Factory Employment, by Months, 1889-1923.

The index of employment opportunity which is most extensively used in the subsequent chapters is an *Index of Factory Employment*, representing an estimate obtained by the synthesis of some of the employment and unemployment series mentioned in above paragraphs. This index covers the period from January 1, 1889, to December, 1923, by months. For 1889 to 1894 the estimate is based upon Massachusetts data; for 1895 to 1903, on statistics for Massachusetts and New Jersey; for 1904 to 1919, New York is added; and for the years subsequent to 1919, the New Jersey series ceases to be available and the index rests upon data for New York and Massachusetts alone. For the period subsequent to 1914 other employment series are available and are used to corroborate the evidence presented by the *Index of Factory Employment.* The methods used in welding the available fragmentary data into a continuous comparable index may be briefly summarized as follows:

1. The Census of Manufactures' statistics of wage earners employed in factories in the years 1899, 1904, 1909, 1914, 1919, and 1921, were adjusted for known variations in their comprehensiveness, in order to make them as comparable as possible throughout the entire period.
2. Estimates, by months, of the number employed in factories in each of the three States—Massachusetts, New Jersey, and New York—were made by using the Census data for the given State as basing points and interpolating between Census years by means of indexes constructed from the available employment and unemployment (inverted) data for the given State.
3. The separate State estimates of numbers employed were then added together to get a consolidated estimate for the groups, and from this estimate an index, with the average for 1914 = 100, was computed, due allowance being made for the changes in 1895, 1904, and 1920 in the number of States included

The monthly figures for this *Index of Factory Employment,* in terms of percentages of the 1914 average, are given in Table IV in the Appendix, for the convenience of investigators who may wish

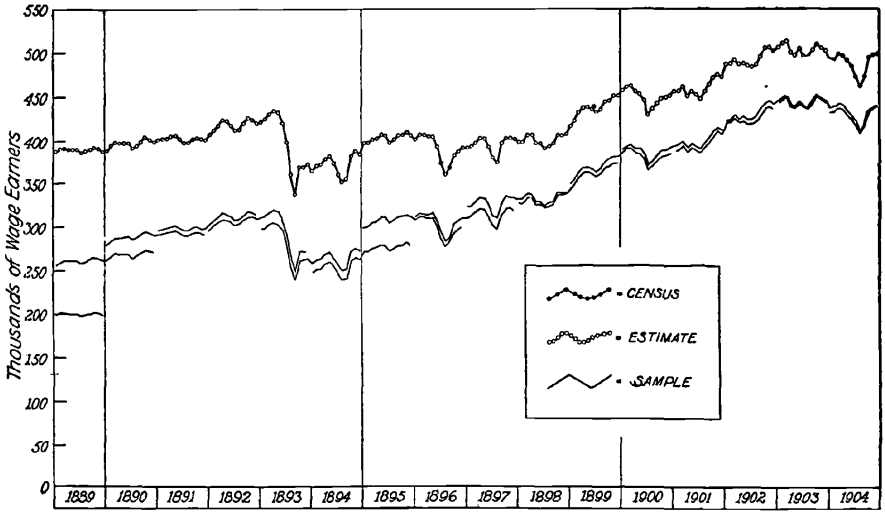
to make use of them. More details of its construction are given in the following paragraphs.

The Estimate for Massachusetts.[9]

An examination of Chart 9 will aid in following the process used in constructing the estimate of factory employment in Massachusetts. The fragments of curves in the lower part of the chart

CHART 9

ILLUSTRATION OF METHOD OF ESTIMATING FACTORY EMPLOYMENT IN MASSACHUSETTS*



*See explanation in accompanying text.

represent the unadjusted data for numbers employed in identical establishments. Each fragment is twenty-four months long and, for the second twelve months, runs substantially parallel to the succeeding fragment. The upper curve on the chart represents the revised estimate of factory employment in Massachusetts obtained by (1) splicing the fragments together at the December points which are common to two fragments, and (2) raising the resulting index to make it consistent with the complete enumeration of the Census years.

The black circle for 1899 represents the Census average for that

[9]See Table 15.

year adjusted for the exclusion of hand and neighborhood industries. Adjusted figures by months were not obtainable. For 1904, and all subsequent Census years, the Census monthly data represented by

TABLE 15.—ESTIMATES OF FACTORY EMPLOYMENT IN MASSACHUSETTS, BY MONTHS, 1889-1922[a]

Thousands of persons

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1889	388	391	391	390	390	390	386	388	390	393	391	388
1890	389	395	399	398	398	398	392	395	400	405	402	400
1891	402	403	404	406	407	403	399	399	403	404	403	402
1892	408	413	418	425	424	418	413	414	421	426	425	421
1893	423	426	432	435	434	421	399	360	337	368	368	371
1894	364	370	371	378	381	373	360	352	355	382	388	384
1895	398	398	402	403	407	406	398	402	406	407	410	406
1896	402	406	406	405	405	393	373	360	367	382	387	391
1897	391	393	398	403	403	393	380	374	397	404	404	402
1898	399	399	406	406	397	397	391	394	397	407	407	408
1899	417	424	433	438	439	436	433	436	445	446	451	451
1900	458	462	463	456	454	446	430	437	444	449	450	452
1901	456	457	462	451	457	453	449	456	465	473	476	474
1902	488	489	493	488	489	486	485	487	496	506	507	503
1903	507	511	514	501	498	505	497	496	504	510	506	503
1904	493	493	499	497	492	485	473	463	474	495	497	499
1905	511	518	524	525	524	520	517	523	532	531	534	536
1906	549	552	556	555	554	550	546	549	555	563	570	570
1907	579	589	595	590	586	584	575	580	584	586	574	545
1908	533	527	523	514	510	513	510	518	544	563	563	561
1909	566	573	580	577	576	576	573	581	595	602	604	613
1910	624	628	628	622	616	601	587	594	597	606	614	614
1911	612	614	619	612	600	592	587	593	605	615	620	620
1912	612	608	621	617	620	620	612	614	626	638	645	646
1913	640	642	641	630	617	611	595	607	617	622	625	622
1914	627	629	634	628	619	612	596	589	589	591	587	580
1915	584	592	600	598	595	597	596	608	619	639	651	659
1916	677	687	698	697	692	689	686	688	689	702	719	725
1917	727	734	738	721	710	706	696	693	704	716	731	737
1918	723	728	741	735	734	734	730	724	717	701	720	708
1919	696	677	681	679	689	705	716	727	736	742	752	766
1920	757	749	756	748	739	720	697	684	669	657	611	558
1921	533[a]	559	574	578	584	585	578	584	596	598	598	596
1922	593	604	603	585	584	588	589	603	629	649	662	662

[a]Computed, by methods described in the accompanying text, from statistics of manufactures, by months, published annually in *Public Document No. 36* by the Massachusetts Bureau of Statistics of Labor for the years 1886 to 1907, by the Bureau of Statistics for 1908 to 1918, and by the Department of Labor and Industries subsequent to 1919. For the years 1904, 1909, 1914, 1919, and 1921 the above estimates are the U. S. Census of Manufactures' statistics for Massachusetts.

A portion of the original data from which the above estimates were computed are republished in *Bulletin 310* of the U. S. Bureau of Labor Statistics.

the solid black dots are used. For each intercensal period any discrepancy which appears between the index and the Census is prorated over the intervening months so that the final curve shows no sudden changes at the junctures with the Census years.

After 1907, as previously noted, the annual censuses do not overlap, and it becomes necessary to estimate the December-to-January change.

December-to-January Interpolations.

Beginning in 1907, as we have noted, the Massachusetts Census of Industries was designed to be virtually a complete census. However, on plotting the data, it became apparent that in some years, particularly in those immediately after the abandonment of the former method of making each census cover twenty-four months, in order to make the series reasonably continuous, it would be necessary to substitute for the December-to-January change which is indicated by the raw data, an estimated percentage change. This was done for the December-to-January change of 1906-07, 1907-08, 1908-09, 1909-10, 1913-14, 1914-15, and 1918-19. For the other years since 1907, it was judged, upon the basis of a comparison of the raw data, that no adjustments were necessary.

The principle upon which these interpolations were made is that the best clew to the joint effect of the seasonal and cyclical influences is found in the typical relation in the past of the December-to-January change to the changes in contiguous months. Two estimates were made for each year in question. For one, the median ratio in the years 1889-1906 between the November-to-December and the December-to-January movements was found and this ratio assumed to hold in the years for which the actual December-to-January movement was not known. A similar estimate was made for the relation of the December-to-January change to the January-to-February change. The two estimates were then averaged for the final estimate.

For 1923 the estimate is based upon the index of employment in Massachusetts, recently inaugurated by the Massachusetts Bureau of Statistics. The final result of the Massachusetts computation is an estimate of the average number of wage earners employed in factories with a product of $500 or more, from 1889 to 1923 by months.

The Estimate for New Jersey.[10]

A similar estimate was constructed for New Jersey. Inasmuch as the New Jersey data are based, particularly in the early years,

TABLE 16.—ESTIMATES OF FACTORY EMPLOYMENT IN NEW JERSEY, BY MONTHS: 1893-1919[a]

Thousands of persons

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1893	...	...	...	...	...	196	178	160	155	155	152	148
1894	143	143	147	152	153	151	150	152	156	160	165	162
1895	163	164	171	175	172	169	167	171	175	179	178	178
1896	176	177	177	177	173	169	162	161	169	172	170	173
1897	173	179	181	184	183	180	173	175	188	190	185	184
1898	183	186	191	192	192	191	184	186	193	196	195	195
1899	199	203	208	212	215	218	210	215	222	224	222	221
1900	225	226	230	232	232	228	219	220	224	227	225	225
1901	227	231	235	237	238	236	231	233	239	245	245	244
1902	251	254	258	263	262	257	252	257	265	271	270	269
1903	267	268	274	273	273	270	262	262	266	269	265	262
1904	259	262	267	269	268	264	258	264	272	273	269	267
1905	274	277	284	289	287	286	280	282	290	294	296	294
1906	300	304	310	315	315	315	307	311	317	322	322	321
1907	328	329	335	334	340	337	327	329	334	336	323	303
1908	296	295	296	297	293	292	286	294	302	311	312	310
1909	313	313	318	322	322	322	318	324	335	342	343	343
1910	343	347	354	355	354	352	340	347	352	358	360	357
1911	350	352	356	358	354	352	344	350	354	358	359	355
1912	359	363	367	367	372	370	365	372	379	381	386	385
1913	384	385	378	375	371	369	376	385	390	392	393	386
1914	376	378	381	384	383	379	371	367	372	373	362	356
1915	356	363	372	379	386	393	400	408	418	431	440	446
1916	446	453	465	470	473	477	478	478	486	492	499	501
1917	496	500	504	499	498	497	495	498	506	513	519	519
1918	518	524	533	539	546	551	560	558	560	549	538	530
1919	505	485	482	490	496	503	511	517	519	528	530	538

[a]For 1895 to 1919, the above estimates were computed, by methods described in the accompanying text, from the U. S. Census of Manufactures' statistics of numbers employed in New Jersey factories for the years 1904, 1909, 1914, and 1919, supplemented by statistics of employment in reporting factories published annually by the New Jersey Bureau of Statistics of Labor and Industries for the years prior to 1914, and by the Bureau of Industrial Statistics of New Jersey for 1914 to 1919. The estimates prior to 1895 are based chiefly on fragmentary data contained in two special "panic inquiries" covering the periods from June, 1893, to May, 1894, and June, 1894, to May, 1895, respectively, and were not used in computing the index of manufacturing given in Table IV, in the appendix.

upon a sample representing each year a varying proportion of the total, it was necessary to make an estimate of the December-to-January movement. For the years 1889-1909 the known or estimated change in Massachusetts was used. For the years 1909-

[10]See Table 16.

1914 the changes as shown by the raw data were accepted; for 1914-1919, the New Jersey data are given the same movement as exhibited by the industrially-akin State of New York.

The Estimate for New York.[11]

In making the estimates of the average number employed in New York factories, which cover the period 1904 to 1922, inclusive, the interpolations between Census data were made for the years 1905-

TABLE 17.—ESTIMATES OF FACTORY EMPLOYMENT IN NEW YORK STATE, BY MONTHS: 1904-1922[a]

Thousands of persons

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1904	817	839	857	862	849	836	829	853	892	905	888	856
1905	858	872	871	899	904	902	911	920	897	917	922	930
1906	923	909	916	915	924	951	967	967	956	951	962	936
1907	963	952	963	958	946	966	990	983	942	804	801	740
1908	710	690	694	669	687	719	848	909	837	874	893	912
1909	945	971	992	989	984	981	977	999	1041	1063	1060	1045
1910	1068	1068	1039	1037	1040	1047	1073	1073	1068	1053	1049	1022
1911	1037	1059	1058	1060	1038	1060	1081	1082	1082	1082	1052	1007
1912	1046	1085	1077	1079	1050	1032	1038	1101	1107	1101	1064	1032
1913	1083	1096	1071	1069	1062	1070	1074	1076	1088	1081	1059	1023
1914	1056[a]	1078	1095	1084	1067	1053	1034	1037	1067	1073	1035	1015
1915	1014	1034	1033	1042	1061	1071	1059	1048	1099	1109	1150	1170
1916	1169	1199	1198	1238	1216	1215	1204	1213	1254	1253	1284	1304
1917	1291	1290	1310	1288	1276	1265	1253	1231	1251	1271	1280	1289
1918	1277	1297	1307	1295	1294	1293	1313	1280	1278	1225	1255	1244
1919	1179	1182	1188	1195	1187	1192	1228	1261	1273	1260	1282	1311
1920	1318	1305	1333	1319	1295	1283	1279	1245	1231	1207	1130	1042
1921	966[a]	998	1018	1014	992	985	985	999	1028	1040	1027	1003
1922	982	1014	1025	1014	1025	1035	1035	1067	1088	1119	1140	1161

[a]The above estimates were computed, by methods described in the accompanying text, from the U.S. Census of Manufactures' statistics of numbers employed in New York factories for the years 1904, 1909 1914, 1919, and 1921, with interpolations for the intervening years computed from data on unemployment among trade union members for the years 1905 to 1913, and from data on employment in representative factories from 1915 to 1922, published by the New York State Department of Labor.

1908 and 1910-1913, inclusive, upon the basis of the trade union statistics of unemployment; and for the subsequent years upon the index of factory employment published by the New York State Department of Labor.

In utilizing the trade union figures, an index of unemployment in the factory trades, weighted by the numbers in each trade, was

[11]See Table 17.

computed. For the years 1909-1914, this index exhibited fluctuations considerably more violent than exhibited by the same series in 1904-1908 or by the census data in 1909 and 1914. Consequently, in order to get a consecutive series on a reasonably homogeneous basis, the fluctuations of the trade union unemployment data were scaled down in the ratio which they bore in 1914 to the fluctuations shown by the Census.

Monthly Production of Pig Iron.

For evidence supplementary to that afforded by our index of factory employment by months, we have used monthly statistics of pig iron production. The original figures were adjusted for seasonal variation by a method designed to make allowance for the tendency of the typical seasonal variation to change over a long period of years. The method used is developed by Dr. W. I. King in an article published in the *Journal of the American Statistical Association.*[12] His data, seasonally corrected, were used for the years 1905 to 1914, and together with figures obtained by similar methods for the years 1884 to 1904, were corrected for a computed trend based upon a seven-year moving average smoothed to eliminate minor irregularities. Small fluctuations were then ironed out by taking a three-month moving average of the indices obtained by correction for trend and seasonal variation. The results appear in Chart 14 in Chapter V.

The Numerical Volume of Employment and Unemployment.

Information concerning the actual number of workers represented by fluctuations in employment or unemployment is scant. We have made use, however, of two studies of this nature. The first, covering unemployment in non-agricultural occupations during the years 1902 to 1917, by months, was made by Professor Hornell Hart.[13] The method used, as described by Professor Hart, was to ascertain for each year and month the total number of persons normally occupied in non-agricultural pursuits, and to subtract from these normal supply figures the estimated "connected demand" for labor. This "connected demand" for labor was determined "by a synthesis of widely scattered information on employment fluctuations," chiefly from various Federal and State statistical publica-

[12]"An Improved Method for Measuring the Seasonal Factor," September, 1924.
[13]Hornell Hart, *Fluctuations in Unemployment in Cities of the United States, 1902 to 1917*, Studies from the Helen S. Trounstine Foundation, Volume 1, Number 2.

tions. Owing to the fragmentary nature of the data available, there is necessarily a considerable margin of error in these estimates, and hence the comparisons made with their aid must be interpreted as giving roughly approximate rather than closely accurate results.

A second estimate of the actual numbers represented by fluctuations in employment is found in the study made by Dr. W. I. King for the 1921 depression period and described more fully in Volume V of the publications of the National Bureau of Economic Research, *Employment Hours and Earnings in Prosperity and Depression, 1920-1922*. Based upon returns from a large number of employers in various lines of industry, estimates were made of the changes in numbers employed from the first quarter of 1920 to the first quarter of 1922, inclusive. From these estimates, which are given by industries, we have selected, in Chapter VI, those industries which are most significant from the point of view of employment opportunities for immigrants and made comparisons with the number of immigrants and emigrants during the period covered by the estimates.

CHAPTER SUMMARY

The direct and indirect indices of employment conditions to be utilized in the following chapters include (1) for the entire period over which immigration statistics are available, the annual statistics of imports of merchandise; (2) for the decades between the Civil War and 1890, annual statistics of pig iron production and quarterly statistics of imports of merchandise; (3) for the period beginning in 1890, estimates of factory employment and of pig iron production, by months, and (4) particularly in the post-war years, various short-period indices of employment conditions, the description of some of which is deferred to the chapters in which they are used.

In this chapter we have noted the nature of the major series of statistics of economic conditions to be used, made some comparisons between these indices and other evidences of economic activity, and indicated the methods used in putting these employment data into convenient form for statistical comparisons. The subsequent chapters are devoted chiefly to the analysis of fluctuations in immigration with the aid of the employment indexes to which attention has been directed in this chapter.