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Volume Title: Employment Opportunities in Manufacturing Industries of the United States

Volume Author/Editor: Frederick C. Mills

Volume Publisher: UMI

Volume URL: <http://www.nber.org/books/mill38-1>

Publication Date: 1938

Chapter Title: Employment Opportunities in Manufacturing Industries of the United States

Chapter Author: Frederick C. Mills

Chapter URL: <http://www.nber.org/chapters/c3985>

Chapter pages in book: (p. 1 - 15)

National Bureau of Economic Research

BULLETIN 70

SEPTEMBER 25, 1938

1819 BROADWAY, NEW YORK

A NON-PROFIT MEMBERSHIP CORPORATION FOR IMPARTIAL STUDIES IN ECONOMIC AND SOCIAL SCIENCE

Employment Opportunities in Manufacturing Industries of the United States

FREDERICK C. MILLS

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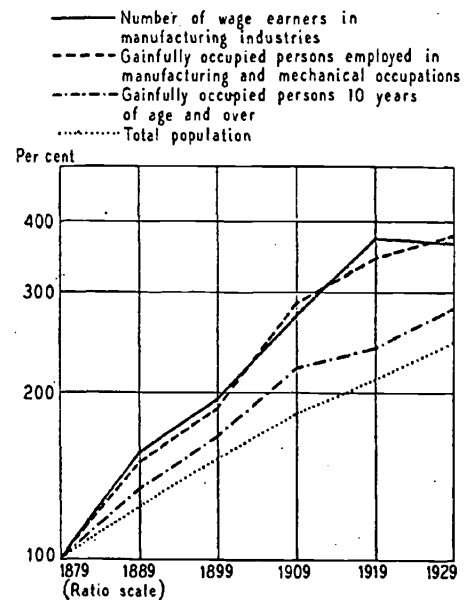
The record of the economic development of the United States, up to 1919, shows a steady increase in the proportion of the population engaged in manufacturing industries. From the first settlement of this country extractive industries engaged a large part of the working population, but with diversification of our economic activities processes of fabrication steadily advanced in importance. More manufactured goods were consumed, export markets expanded, and production grew correspondingly. Employment opportunities were multiplied with this expansion. Manufacturing provided occupations for a growing proportion of a rapidly increasing population.

Changes in employment in manufacturing industries, and in manufacturing and mechanical occupations combined, are indicated in Table 1 and in Figure I. The steady growth of employment in manufacturing industries, relatively to total employment and to the total population, reached a peak in 1919. The drop from 1919 to 1929, a drop the more significant because it paralleled a notable expansion in manufacturing production, constituted at least a temporary reversal of a century-old movement. Although exceptional conditions prevailing in 1919 may have influenced the record of the immediate post-War period, detailed statistics of the last two decades appear to confirm the conclusion that the shift was due to deep-seated causes that may be expected to exert a continuing influence on our economic development.

This change is of clear importance in an industrial country in which approximately one-fifth of all gainfully occupied persons have found employment in manufacturing industries. The tendencies that have prevailed in recent years and the circumstances that may have contributed to the decline in employment opportunities in manufacturing call for investigation, if we are to understand the present situation. Our first concern is with changes in the volume of employ-

Figure I

Changes in Employment in Manufacturing Industries and in Manufacturing and Mechanical Occupations, in Relation to the Growth of the Population and the Total Number of Gainfully Occupied Persons in the United States, 1879-1929



ment and with related developments during the three decades from 1899 to 1929. When this background has been sketched in, changes in more recent years may be analyzed in greater detail.

I

CHANGES IN THE NUMBER OF WAGE EARNERS AND SALARIED WORKERS IN AMERICAN MANUFACTURING INDUSTRIES, 1899-1929

The steady advance in manufacturing employment to 1919, the drop during the recession that followed and the rise thereafter to a new peak in 1929 (a peak below the 1919

Table 3
Average Normal Working Hours and Total Employment of Wage Earners in Manufacturing Industries, 1899-1929

YEAR	WAGE EARNERS		AVERAGE NORMAL HOURS WORKED PER WEEK ¹		TOTAL EMPLOYMENT IN MAN HOURS PER WEEK (estimated)		TOTAL POPULATION
	Absolute (in thousands)	Relative	Absolute	Relative	Absolute (in millions)	Relative	Relative
1899	4,713	100.0	59.1	100.0	278.5	100.0	100.0
1904	5,468	116.0	57.7	97.6	315.5	113.2	113.2
1909	6,615	140.4	56.8	96.1	375.7	134.9	121.0
1914	7,024	149.0	55.2	93.4	387.7	139.2	121.0
1919	9,000 ²	191.9	52.3	88.5	470.7 ²	169.8	139.1
1921	6,947	148.1	50.7	85.8	352.2	127.1	139.1
1923	8,778	187.2	51.0	86.3	447.7	161.6	161.6
1925	8,384	178.8	50.3	85.1	421.7	152.2	161.6
1927	8,350	178.0	50.3	85.1	420.0	151.5	161.6
1929	8,839	188.5	50.6	85.6	447.3	161.4	161.6
Percentage change, 1919-29		-1.8		-3.3		-4.9	+16.2

¹ For the period 1899-1925 this series is taken from Paul H. Douglas, *Real Wages in the United States, 1890-1926* (Houghton Mifflin Co., 1930), p. 116; the 1929 figure is computed from Census of Manufactures data; the 1927 figure is obtained by interpolation based on actual hours worked per week, as estimated by the National Industrial Conference Board.

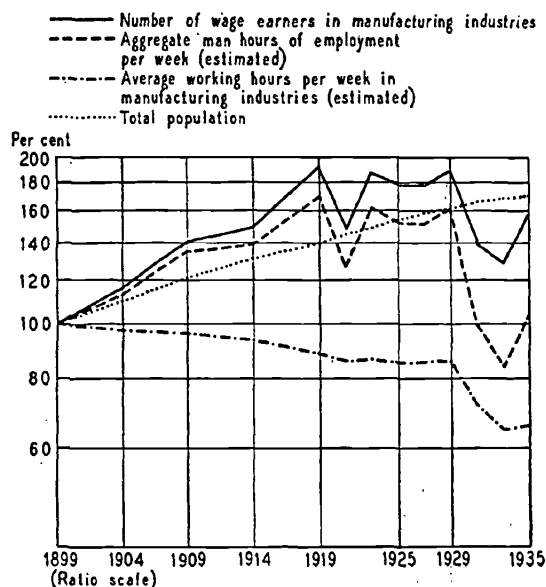
² Beginning with 1919 this series excludes wage earners in establishments with products valued at less than \$5,000. Wage earners excluded in 1919 numbered 46,000. The series of relatives is adjusted for this change.

taking account of changes in 'normal' working hours¹ we may secure fairly satisfactory estimates of the total volume of employment, measured in man hours (Table 3 and Figure II).

Peak employment came in 1919, with volume about 69 per cent greater than in 1899. This peak was not reattained during the decade that followed; employment in 1929 was approximately 5 per cent less than in 1919.² In the prosperous years 1923, 1925, and 1929, however, the volume of manufacturing production materially exceeded that of 1919. But over this period man-power was not the major instrument in expanding output. Even in the bulge of industrial prosperity of the 1920's there were signs of the

tendency, so pronounced in more recent years, toward a lessening of employment opportunities in manufacturing industries. These changes in manufacturing employment are the more pronounced when compared with the total population of the country. From 1899 to 1919 the rate of increase in total number of man hours worked in manufacturing industries was materially greater than the rate of growth of population. But from 1919 to 1929, when population increased 16 per cent (17 millions in absolute terms), the total employment of wage earners in manufacturing plants declined 5 per cent. If the discrepancy be-

Figure II
Growth of Total Population and Employment Changes in Manufacturing Industries of the United States, 1899-1935



¹ Actual working hours may vary from 'normal' hours because of over-time and part-time employment. Seasonal variations in the working week would be expected to cancel out within the year, and would not affect the annual averages here given. Variations due to cyclical influences, or to other non-seasonal vicissitudes of business, would not in general be thus offset within the year. For this reason the 'normal' hours cited in Table 3 may be above actual working hours in some years, below in others. The general trend over the thirty-year period, however, would not be materially affected by these variations.

² The computation of total employment with reference to normal or nominal working hours possibly understates slightly the actual changes over the period covered in Table 3. The National Industrial Conference Board has estimated the actual changes in hours worked per week in manufacturing industries, modifying Douglas' nominal hours correspondingly (*Conference Board Bulletin*, February 25, 1937). The modified series shows a drop from 1899 to 1919 of 11.4 per cent in average actual hours worked per week; from 1899 to 1929 the drop is estimated at 15 per cent. Relatives measuring changes in total employment (man hours per week), on the 1899 base, become 170.0 for 1919, 160.2 for 1929, when computed from the modified data of average weekly hours. These differ but slightly from the figures in Table 3.

tween these two figures had been due solely to a secular decline in hours per week associated with full employment, no contraction in employment opportunities would be indicated. This was not the case, however. Volume of manufacturing employment, even when corrected for changes in normal hours, failed to advance with population after 1919. Important economic readjustments were necessitated by the change in the relations between these two series.³

The explanation of this notable shift is to be found, in

³ We have noted that the year 1919 was in some respects exceptional. War-time demands had been heavy on manufacturing industries. At the close of the War there was a hasty shift back to production for civilian purposes, particularly the production of consumer goods. However, the record of the intervening years supports the above interpretation of the movements of the period 1919-29. From 1923 to 1929 manufacturing production increased some 18 per cent; the number of employed wage earners, in the sample to which these production figures relate, declined 3 per cent; total man hours declined 4 per cent. If expansions in output serve to offset advancing productivity, as was roughly true from 1923 to 1929, the problem of readjustment involves the inter-industrial transference of labor, within manufacturing as a whole, and the allocation to non-manufacturing industries of the man-power coming on the market each year as a result of population growth. In periods of declining output or of less rapid increase in production the problem takes a more acute form.

part, in fundamental technical changes that have speeded up the process of mechanization. We know that technical improvements of almost infinite variety have occurred in processes of fabrication. We may roughly estimate the importance of these improvements by measuring over-all changes in industrial productivity, but in their detail they elude our instruments of reckoning. In less degree, probably, explanation of the changed conditions in manufacturing is to be found in other internal shifts in the structure of manufacturing—changes in the character of products turned out, in the relative importance of different industries, in the part played by capital equipment in manufacturing operations.

In defining the background of the changes during recent disturbed years, certain of these movements may be briefly traced. Our first concern is with changes in productivity (see Table 4 and Figure III). The story told by the measurements in Table 4, which relate to a sample of manufacturing industries, not to the total, may be followed most readily in terms of the figures defining percentage changes by decades. Total output advanced more than 50 per cent in the first of the three decades covered, slightly less than 50 per cent in the second, and 42 per cent in the third. The

Table 4
Productivity per Wage Earner and per Man Hour in Manufacturing Industries, 1899-1929
(estimates based upon study of a sample of Census industries¹)

YEAR	PRODUCTION	WAGE EARNERS	EMPLOYMENT IN MAN HOURS	PRODUCTIVITY PER		ALL EMPLOYEES (WAGE EARNERS AND SALARIED WORKERS)	PRODUCTIVITY PER EMPLOYEE, INCL. SALARIED WORKERS
				Wage earner	Man hour		
1899	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1904	120.2	108.1	105.5	111.2	113.9	109.9	109.4
1909	154.5	130.0	124.9	118.8	123.7	135.3	114.2
1914	176.3	136.1	127.1	129.5	138.7	143.7	122.7
1919	228.3	167.8	148.5	136.1	153.7	180.6	126.4
1921	184.2	134.3	115.2	137.2	159.9	145.2	126.9
1923	274.7	174.5	150.6	157.4	182.4	187.0	146.9
1925	281.2	165.4	140.8	170.0	199.7	178.1	157.9
1927	287.9	162.6	138.4	177.1	208.0	176.0	163.6
1929	323.9	168.5	144.2	192.2	224.6	182.0	178.0
<i>Percentage change</i>							
1899-1909	+54	+30	+25	+19	+24	+35	+14
1909-1919	+48	+29	+19	+15	+24	+33	+11
1919-1929	+42	+0.4	-3	+41	+46	+1	+41

¹ The following figures indicate the relative size of the sample in 1929:

	SAMPLE	CENSUS	SAMPLE AS PERCENTAGE OF TOTAL CENSUS
Number of wage earners (in thousands)	4,289	8,839	48.5
Value of product (in millions)	\$36,836	\$70,435	52.3
Value added (in millions)	\$14,126	\$31,885	44.3

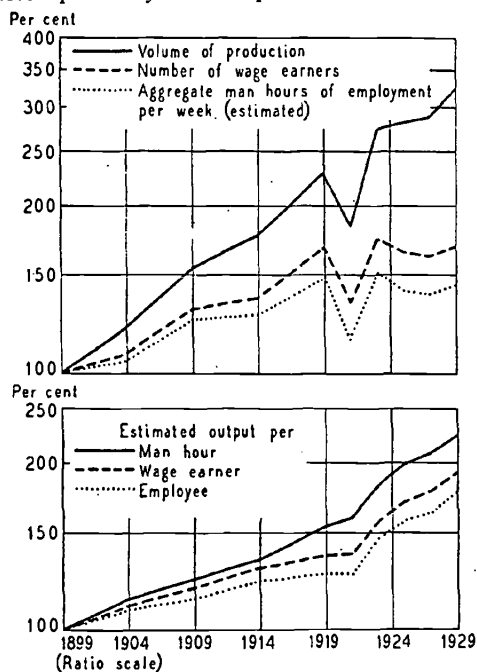
Corresponding percentages for 1899, in the order given above, are 32.5, 36.9, 28.1.

The index of manufacturing production in Table 4 is an index of physical output derived from Census of Manufactures data. Weights are based on value added in manufacture. Details concerning the method of construction and the data employed are given in *Economic Tendencies in the United States* (National Bureau of Economic Research, 1932), Ch. I, V, VI, and Ap. IV. Minor modifications have been made in subsequent revisions of the index.

Figure III

Production, Employment, and Productivity in Manufacturing Industries of the United States, 1899-1929

(based upon study of a sample of Census industries)



growth in each decade was substantial.⁴ Employment in manufacturing industries advanced materially during the first two decades. This is true whether employment is measured in terms of wage earners employed, total man hours worked, or total employees. The advance in employment was less than in output, for productivity was growing, but there was no appreciable falling off in the rate of growth in employment opportunities from the first decade to the second.

The record of changes in production and productivity 'The moderate decline in the rate of increase, from decade to decade, is probably a reflection of the limitations of the sample, rather than evidence of a true check to the rate of advance in total output. In the nature of things a sample is limited to a relatively fixed group of industries. New industries coming into being during the period covered by a given study are generally excluded, if comparable measurements for the whole period are sought. In the present case some account has been taken of new industries, by splicing figures defining Census-to-Census changes, but it cannot be said that the full diversification of manufacturing activities between 1899 and 1929 is reflected in the series presented in Table 4.

Comparison of Tables 2, 3, and 4 reveals that employment advanced more rapidly in all manufacturing industries than in the industries included in the sample on which the entries in Table 4 are based. It is certain that total production increased more rapidly than is indicated by the production series in Table 4.

Our chief purpose in Table 4, however, is to define changes in productivity. Measurements of such changes are probably not materially affected by the limitations attaching to the present sample.

from 1919 to 1929 explains, in some degree, the decline in employment opportunities already noted. Total production continued to expand; employment did not. But industrial productivity made a tremendous advance. In the sample of manufacturing industries here included, a sample covering almost one-half of all manufacturing industries in 1929, output per employee increased 41 per cent from 1919 to 1929; output per wage earner advanced equally; output per man hour increased 46 per cent. The complex of causes that underlie these changes in productivity played an important part in the changing employment situation in manufacturing industries.⁵

This does not mean that we shall find a simple inverse relationship between changes in productivity and in employment, in the records of manufacturing operations. Pro-

⁵ 'Productivity' as here used in the sense of average output per employee or per man hour is of course not to be confused with the 'specific productivity' of economic theory.

Table 5

Changes in Employment, Production, and Productivity, 1914-1929
Major Groups of Manufacturing Industries

(estimates based upon study of a sample of Census industries¹)

INDUSTRIAL GROUP	PERCENTAGE CHANGES FROM 1914 TO 1929		
	Volume of production	No. of wage earners	Estimated output per wage earner
All industries	+84	+24	+48
Goods for human consumption	+78	+23	+44
Capital equipment goods, excl. construction materials	+143	+45	+67
Construction materials	+55	+12	+38
Foods	+55	+19	+29
Non-foods	+91	+24	+53
Durable goods	+111	+30	+62
Semi-durable goods	+62	+18	+38
Perishable goods	+71	+71	+36

¹ The actual numbers of wage earners employed in 1929 in industries within the several major groups here named are given below, in thousands:

	SAMPLE AS PERCENTAGE OF TOTAL CENSUS		
	SAMPLE	CENSUS	
Goods for human consumption	3,175	4,900	64.8
Capital equipment goods, excl. construction materials	469	2,132	22.0
Construction materials	591	1,021	57.9
Foods	662		
Non-foods	3,627		
Durable goods	1,437	4,357	33.0
Semi-durable goods	1,908	2,427	78.6
Perishable goods	890	2,055	45.9
Total	4,289	8,839	48.5

Employees in some of the minor groups have been excluded from certain of the categories set up above. For this reason, the totals do not in all cases equal the sums of the group figures.

ductivity may advance with advancing production and increasing employment; it may advance when production is being maintained at a constant level, and employment is declining. Behind the records of employment and output lie cost factors, price policies, conditions of demand, and other elements affecting the activities of manufacturing industries.

Changes in the employment of wage earners, in output, and in productivity for important classes of manufacturing industries during 1914-29 are defined by the entries in Table 5. Within this period previous employment trends were apparently reversed; the more detailed record should be studied with this fact in mind.⁶ In the first division of industries we find rather wide differences in the degrees of change in employment between 1914 and 1929. Industries producing capital equipment showed the greatest increase in number of wage earners employed. The gains were materially smaller for industries producing construction materials and goods for human consumption. But it was precisely in the first group that output per worker and total output had increased most rapidly. Conditions not here measured (e.g., favorable market conditions) may be assumed to have facilitated concurrent gains in productivity, total output, and employment. The important point to note is that enhanced productivity did not mean reduced employment. The other classifications showed somewhat the same results, though in less pronounced form. Where productivity advanced most, output and employment showed the greatest increases. This is true of non-foods, in one division, of durable goods, in another.⁷

II

EMPLOYMENT DURING RECESSION AND RECOVERY,
1927-1935

In the preceding review of changes in employment and related factors in the manufacturing industries of the United States we have noted certain modifications of tendencies that had characterized the industrial development of the nineteenth century. Notably, employment in manu-

⁶ The year 1914 is here employed as base, rather than 1919, because of the influence of the War-time expansion on conditions in the later year.

⁷ The following table throws light on the relation between changes in productivity and changes in employment, between 1914 and 1929:

	INDUSTRIES IN WHICH THE NUMBER OF EMPLOYED WAGE EARNERS		TOTAL
	Increased	Decreased	
Industries in which output per wage earner			
Increased	31	22	53
Decreased	0	1	1
Total	31	23	54

Employment increased in 31 of the 53 industries in which productivity advanced between 1914 and 1929, decreased in the one industry (the manufacture of organs) that was marked by declining productivity.

facturing industries, which had provided opportunities for millions of immigrants and new generations of native-born workers, was ceasing to grow with an expanding population, was even contracting during an era of exceptional industrial prosperity. The forces of the recession that began in 1929 were loosed upon a manufacturing system in which these movements had been proceeding for a decade or more. During this recession some of the secular shifts that were slowly modifying the character of manufacturing operations were accentuated, while quite new factors worked changes of their own. In this disturbed time the structure of manufacturing production was under great pressure. Employment conditions, character of demand, and technical methods were modified. Our present concern is with changes in employment, and with related circumstances, during these years of economic strain. In tracing certain of these changes it seems well to include the two years prior to the beginning of the recession.

The general picture of changes in employment in manufacturing industries during this period is given in Table 6 and in Figure II. An advance from 1927 to 1929 of slightly less than 6 per cent in the number of manufacturing employees was followed by drastic reductions over the four succeeding years. The number of wage earners employed was reduced, from 1929 to 1933, by 2,783,000, about 31 per cent of the 1929 working force. (In the last previous major recession, from 1919 to 1921, employed wage earners had declined 2,053,000 in number, or 23 per cent.) By 1935 the situation had been improved by the employment

Table 6
Changes in Numbers Employed in Manufacturing Industries,
1927-1935
(data relate to all manufacturing industries covered by the
Census of Manufactures¹)

YEAR	WAGE EARNERS		SALARIED EMPLOYEES		TOTAL EMPLOYEES	
	Absolute (in thousands)	Relative	Absolute (in thousands)	Relative	Absolute (in thousands)	Relative
1927	8,350	100.0	1,301	100.0	9,651	100.0
1929	8,839	105.9	1,359	104.5	10,198	105.7
1931	6,507	78.1	(²)	(²)
1933	6,056	72.7	(²)	(²)
1935	7,379	88.5	1,076	82.7	8,455	87.7
<i>Change</i>						
1929-33	-2,783	-31.5				
1933-35	+1,323	+21.7				
1929-35	-1,460	-16.5	-283	-20.9	-1,743	-17.0

¹ The absolute figures given above for different years are not strictly comparable. After 1929 the Bureau of the Census excluded motion pictures and poultry killing from the category 'manufacturing industries'; light repair work in steam railroad shops was similarly excluded after 1933. The magnitudes involved in these shifts are, relatively, quite small.

² Complete data on salaried employees were not collected in 1931 and 1933.

of 1,323,000 more workers than in 1933, but there remained a net loss from 1929 of 1,460,000 persons. The total decrease in the number of employees between 1929 and 1935, counting salaried employees as well as wage earners, was 1,743,000.

Here, as in dealing with the record of employment changes in an earlier period, we must take account of changes in the length of the average work week. Such changes were of particular importance during certain stages of the depression and recovery and, indeed, their effects persisted in the form of a materially shortened work week in industry in general. In tracing these movements we deal with the employment of wage earners alone (Table 7 and Figure II).

Table 7

Average Actual Working Hours and Total Employment of Wage Earners in Manufacturing Industries, 1927-1935

YEAR	WAGE EARNERS (in thousands)		AVERAGE ACTUAL HOURS WORKED PER WEEK ¹		TOTAL EMPLOYMENT IN MAN HOURS PER WEEK (estimated) (in millions)	
	Absolute	Relative	Absolute	Relative	Absolute	Relative
1927	8,350	100.0	47.7	100.0	398.3	100.0
1929	8,839	105.9	48.3	101.3	426.9	107.2
1931	6,507	77.9	40.4	84.7	262.9	66.0
1933	6,056	72.5	36.4	76.3	220.4	55.3
1935	7,379	88.4	37.2	78.0	274.5	68.9
<i>Change</i>						
1929-33		-31.5		-24.7		-48.4
1933-35		+21.7		+2.2		+24.6
1929-35		-16.5		-23.0		-35.7

¹ The measurements of average actual hours worked per week are those of the National Industrial Conference Board (see *Conference Board Bulletin*, February 25, 1937). This is the only continuous series going back to 1927. The National Industrial Conference Board sample includes establishments selected from 25 industries; these 25 industries covered 48 per cent of all wage earners in 1929. A similar series compiled by the U.S. Bureau of Labor Statistics for the period since 1933 shows a slightly higher value for 1933 (37.9), a slightly lower value for 1935 (36.6). Use of the Bureau of Labor Statistics series would give total employment figures, in man hours, showing an advance of 17.5 per cent between 1933 and 1935, as against the gain of 24.6 per cent given in Table 7.

From 1927 to 1929 there was a slight increase in the length of the average work week, a more considerable increase in the number of employed wage earners. The four succeeding years brought a drop of 25 per cent in working hours per week, from 48.3 to 36.4, paralleling the decline of 31 per cent in the number of wage earners employed. The result was a drop of 48 per cent in total man hours worked per week in American manufacturing industries. This represented a loss, in absolute terms, of approximately 206 million working hours per week. The effective volume of employment in manufacturing industries was reduced approximately one-half. From 1933 to 1935 there was a gain of some 54 million man hours per week, reflecting,

primarily, an increase in the number of employed workers. The number of hours worked per week changed but slightly.

The net changes from 1929 to 1935 are perhaps of chief interest, in considering the outlook for the future. While manufacturing output declined about 13 per cent, the number of salaried workers was reduced 20 per cent, and the number of wage earners 16 per cent. In number, wage earners declined 1,460,000. Total employment of wage earners fell approximately 152 million man hours per week, or about 36 per cent. Of this drop, slightly less than one-half represented the reduction in number of wage earners, while slightly more than one-half represented the reduction in the working hours of employed wage earners.

Part of the failure of employment to recover to the 1929

Table 8

Productivity per Man Hour in Manufacturing Industries, 1929-1935

	(estimates based upon study of a sample of Census industries)			
	1929	1931	1933	1935
Production ¹ (relative)	100.0	75.2	69.7	87.4
Total employment of wage earners in man hours (relative)	100.0	67.1	59.0	68.7
Estimated output per man hour (relative)	100.0	112.1	118.1	127.2

¹ This index of manufacturing production is computed from biennial Census data. We should note that these measurements indicate a decline in manufacturing activity considerably less severe than that shown by the index of the Board of Governors of the Federal Reserve System, given below:

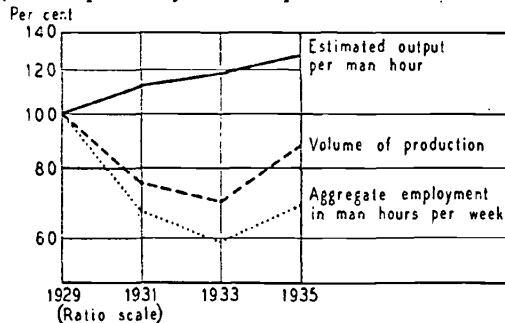
	1929	1931	1933	1935
Index of manufacturing production	100.0	67.2	63.0	75.6

The observed difference between the two indices reflects, primarily, a difference in coverage. The Federal Reserve index, computed monthly, includes output records for the basic industries, which are the ones suffering the most severe losses in a depression. The more comprehensive index based on Census data is rendered relatively stable by the inclusion of a greater variety of industries.

However, employment losses for the sample to which the production index relates appear to have been smaller than those for all Census industries. An index of production estimated from the more comprehensive employment figures is 81.7 for 1935, on the 1929 base.

level was due, of course, to the failure of manufacturing production to regain the pre-recession level. Many industries remained, in 1935, at depression levels of activity. Some part of the reduction in employment reflected an advance in industrial productivity that enabled a smaller working force to produce a given volume of output. We should attempt to distinguish between these two elements. Measures of output per man hour are needed for this purpose. Table 8 and Figure IV present comparable measurements of changes in production and employment, and provide estimates of productivity changes. (These figures relate to the sample of manufacturing industries previously referred to; it will be noted that the employment loss in

Figure IV
Production, Employment, and Productivity in Manufacturing
Industries of the United States, 1929-1935
(based upon study of a sample of Census industries)



this sample from 1929 to 1935 was less than that shown by Table 7, which relates to all manufacturing industries.) These measurements indicate a gain of 27 per cent in output per man hour, from 1929 to 1935.

From these records we derive the following estimates of employment changes between 1929 and 1935. The estimates relate to all manufacturing industries, the assumption being made that changes in volume of production, average hours worked, and productivity per man hour in all industries paralleled the changes in the sample we have been able to study in detail.

ALL MANUFACTURING INDUSTRIES	
Estimated reduction between 1929 and 1935 in aggregate number of man hours per week:	
Worked by wage earners in manufacturing plants	152,425,000
Required to produce the 1929 volume of physical output	91,292,000
Required to produce the 1935 volume of physical output	74,664,000

These figures, and those previously presented, lead to the following conclusions concerning the employment changes in American manufacturing industries between 1929 and 1935.

- 1) The number of employed wage earners declined 1,460,000. This represents a loss of 16.5 per cent of the number employed in 1929. In addition, the number of salaried employees declined 283,000.
- 2) The aggregate number of man hours worked per week by wage earners declined 152,425,000. This represents a loss of 35.7 per cent of total manufacturing employment in 1929, measured in man hours per week.
- 3) The decline in aggregate man hours per week, which is a true measure of the loss in actual employment, represents the labor of 3,156,000 men, working 48.3 hours per week (the 1929 average). The actual reduction in men employed was 1,460,000. The reduction in the length of the working week accounts, arithmetically, for the difference of 1,696,000.⁹

⁹ Since many other factors and relations are involved, it would be wrong to conclude that if the 1929 working week of 48.3 hours had been retained, 1,696,000 more men would necessarily have been displaced between 1929 and 1935.

4) Because of advancing productivity in manufacturing industries there was a decline, between 1929 and 1935, of approximately 91,292,000 in the number of man hours per week required to produce the volume of manufactured goods turned out in 1929. This may be thought of as a *potential* consequence of the advance in productivity between 1929 and 1935, since it represents the loss in employment that would have been suffered had the 1929 level of output been restored in 1935, with man hour output equal to that actually prevailing in 1935.⁹

5) There was a decline between 1929 and 1935 of approximately 74,664,000 in the number of man hours per week required to produce the volume of manufactured goods turned out in 1935. This figure represents 49.0 per cent of the total decline of employment (in man hours) between 1929 and 1935. Without going into the causal relations involved, this may be taken to measure the loss of employment directly associated with rising productivity, with reference to the level of output actually prevailing in 1935.

6) If the 1929 level of production had prevailed in 1935, at the rate of man hour output recorded in 1935, some 336 million man hours would have sufficed to produce the goods turned out by 427 million man hours in 1929. With a working week of 48.3 hours (that of 1929), this would have meant the employment of 6,957,000 workers, 1,882,000 less than in 1929.¹⁰ This is a measure of the potential loss in employment as a result of advancing productivity, when no account is taken of changes in hours of work or in demand.

7) If the 1929 level of production had prevailed in 1935, at the rate of man hour output recorded in 1935, and with the 1935 working week of 37.2 hours, some 9,022,000 workers would have been employed. This figure exceeds by almost 200,000 the number of workers employed in manufacturing industries in 1929. In terms of the number of persons that could be employed, the reduction in working hours per week between 1929 and 1935 more than counterbalanced the loss of employment that might have resulted from rising productivity, if the sole effect of productivity gains had been the displacement of workers.

⁹ It is impossible, of course, to say what the rate of output per man hour would have been in 1935 if the volume of manufacturing production had equaled that of 1929. Output per man hour is not independent of the level of output. If one may judge from the experience of other periods of revival, higher productivity is to be expected as the level of output advances after a depression. (See, for example, the productivity measurements for 1921 and 1923, and those for 1927 and 1929, in Table 4.) If we are justified in assuming that greater output per man hour would have been associated with a higher level of production in 1935, the above estimate of potential reduction in employment is conservative. The present purpose, however, is not to present a definitive figure, but to obtain some idea of the relative magnitudes involved.

¹⁰ Some part of the advance in the rate of man hour output between 1929 and 1935 may have been due to the shortening of the average working week by 11.1 hours. To the extent that this was true, the estimates in this paragraph would be altered, since there is an implicit assumption that man-hour productivity would have been the same with a working week of 48.3 hours as with one of 37.2 hours.

The record of employment changes from 1929 to 1935 is complicated by the interplay of three major factors. A decline in output accounted for a substantial part of the net loss; enhanced productivity contributed to the lessened demand for workers; a sharp reduction in the average length of the working week affected the incidence of unemployment resulting from decreased activity and increased productivity. Although the failure of important manufacturing industries to regain their pre-recession level of output was an important element of the 1935 employment situation, it is clear that the employment tendencies discernible during 1919-29 persisted after 1929. The wants of consumers of manufactured goods could be met, on the established level, with a steadily declining quantity of human labor. Labor time was being released as a result of steady advances in productivity. Whether this time was to be used for the production of a greater quantity of manufactured goods or for the production of goods and services of other types, or was to be utilized as leisure by the working population was dependent on considerations beyond our immediate concern.

To understand recent employment changes we must go beyond the general measurements for all manufacturing industries. We proceed in the next section to an examination of shifts in important industrial groups.

III

CHANGES IN EMPLOYMENT BY INDUSTRIAL GROUPS, 1927-1935

Manufacturing industries are classified under 15 heads by the Bureau of the Census. The nature of some of the employment shifts of recent years is revealed by a survey of the changes in these several broad divisions. In Table 9 these movements are shown in relative terms. The absolute importance of each group is indicated by the entries giving

the total number of wage earners in the industries in each group in 1927. Employment losses from 1929 to 1933 in these industrial groups range from 9.7 per cent for industries fabricating food products to 51.1 per cent for industries producing machinery. If we arrange the groups according to the degree of change from 1929 to 1933¹ there is a clear progression from the industries producing perishable and semi-durable goods for human consumption to the heavy, equipment-producing industries. By 1935 employment in industries manufacturing foods and paper products was above the 1929 level, and chemicals and textiles had substantially reattained that level. But employment in the fabrication of forest products was still 33 per cent below 1929, and employment conditions in other important heavy industries were only slightly better.

We pass to measurements relating to classifications of manufacturing industries based on the uses and relative durability of their products. As is well known, the declines in production and employment during the stages of sharp recession between 1929 and 1933 were more pronounced among capital goods than among goods intended for consumption, among durable goods than among perishable and semi-durable goods. The changes among these groups from 1929 to 1933 may be studied, in Table 10, with reference to the questions that now concern us.

The absolute decline from 1929 to 1933 in the number of wage earners employed in manufacturing industries approached 2,800,000 (approximately half of this loss had been made up by 1935). Of the four groups represented

¹In order of change in volume of employment during the recession, we have: foods, leather products, textiles, chemicals, paper and products, tobacco manufactures, products of petroleum and coal, printing and publishing, rubber products, iron and steel, non-ferrous metals, stone, clay, and glass, transportation equipment, forest products, machinery.

Table 9
Employment of Wage Earners by Industrial Groups, 1927-1935
Census Groups¹

CENSUS GROUPS	1927 Absolute (in thousands)	1927-1935					PERCENTAGE CHANGE		
		1927	1929	1931	1933	1935	1929- 1933	1929- 1935	1933- 1935
Foods	665	100.0	110.9	95.5	100.1	119.9	-9.7	+8.1	+19.8
Tobacco manufactures	369	100.0	89.8	77.2	67.5	70.0	-24.8	-22.0	+3.0
Textiles	1,694	100.0	100.8	83.9	87.0	99.4	-13.7	-1.4	+14.3
Forest products	855	100.0	101.4	59.6	53.1	67.7	-47.6	-33.2	+27.5
Paper and products	224	100.0	104.0	86.7	87.5	105.0	-15.9	+1.0	+20.0
Printing and publishing	329	100.0	108.9	96.4	80.4	93.2	-26.2	-14.4	+15.9
Chemicals	252	100.0	110.7	91.4	94.2	109.6	-14.9	-1.0	+16.3
Products of petroleum and coal	142	100.0	103.9	84.8	78.0	82.0	-24.9	-21.1	+5.1
Rubber products	142	100.0	105.0	69.9	74.8	80.8	-28.8	-23.0	+8.0
Leather and products	316	100.0	100.8	86.3	89.2	98.3	-11.5	-2.5	+10.2
Stone, clay, and glass products	350	100.0	93.8	63.7	49.4	66.6	-47.3	-29.0	+34.8
Iron and steel products	835	100.0	105.5	71.6	66.4	87.8	-37.1	-16.8	+32.2
Non-ferrous metals	273	100.0	115.4	76.6	69.0	95.1	-40.2	-17.5	+38.0
Machinery	893	100.0	123.3	77.7	60.3	88.8	-51.1	-28.0	+47.3
Transportation equipment	495	100.0	117.9	75.5	62.1	97.2	-47.3	-17.6	+56.5

¹SOURCE: *Biennial Census of Manufactures, 1933*, p. 40; *1935*, p. 42.

Table 10
Employment of Wage Earners, 1929-1935
Major Groups of Manufacturing Industries

INDUSTRIAL GROUP	WAGE EARNERS (in thousands)			ABSOLUTE CHANGE (in thousands)			RELATIVE CHANGE			GROUP AS PERCENTAGE OF TOTAL		
				1929- 1933	1933- 1935	1929- 1935	1929- 1933	1933- 1935	1929- 1935	1929	1933	1935
				1929	1933	1935	1933	1935	1935	1929	1933	1935
Goods for human consumption ¹	4900	3826	4583	-1074	+757	-317	-21.9	+19.8	-6.5	55	63	62
Capital equipment goods, excl. construction materials ²	2132	1146	1443	-986	+297	-689	-46.3	+25.9	-32.3	24	19	20
Construction materials ³	1021	517	675	-504	+158	-346	-49.3	+30.6	-33.9	12	9	9
Producers' supplies ⁴	786	567	678	-219	+111	-108	-27.9	+19.6	-13.7	9	9	9
Durable goods ⁵	4357	2356	3111	-2001	+755	-1246	-45.9	+32.0	-28.6	49	39	42
Semi-durable goods ⁶	2427	2064	2361	-363	+297	-66	-15.0	+14.4	-2.7	28	34	32
Perishable goods ⁷	2055	1636	1907	-419	+271	-148	-20.4	+16.6	-7.2	23	27	26
Total	8839	6056	7379	-2783	+1323	-1460	-31.5	+21.8	-16.5	100	100	100

¹ Goods intended for human consumption in the form in which sold, or after further processing. Examples: foods, clothing.

² Durable goods intended for use in the production of other goods. Examples: agricultural implements, machine tools.

³ Goods used in industrial or residential construction. Examples: cement, lumber.

⁴ Non-durable commodities used in productive processes in manufacturing or other industries. Examples: coke, twine.

⁵ Goods with a useful life covering two years or more. Examples: iron and steel, carpets.

⁶ Goods not used up in a single act of consumption, but with a useful life covering less than two years. Examples: rubber, clothing.

⁷ Goods used up in a single act of consumption. Examples: foods, manufactured gas.

in the first classification, industries producing goods for human consumption contributed most heavily to this total. Relatively, however, the employment losses of this group (22 per cent of the 1929 total) were less than those of industries producing capital equipment and construction goods (which suffered declines of 46 and 49 per cent, respectively). A substantial part of the employment losses of the consumption goods group had been made up by 1935, but employment in industries producing capital equipment and construction materials remained about one-third below the 1929 volume. Of the net loss of 1,460,000 positions in manufacturing industries between 1929 and 1935, about 317,000 may be attributed to employment declines in industries producing consumption goods, while the losses in

the other three categories amount to 1,143,000. Yet in 1929 something less than 4,000,000 out of 8,800,000 wage earners in manufacturing had been employed in these other categories. Not only were employment declines heaviest in the non-consumption goods industries; they were out of all proportion to the relative importance of these industries in the economy as a whole. Deficiencies of employment in 1935 were greatest among industries producing capital goods, construction goods, and producers' supplies. Immediate wants were being satisfied, but the instruments of roundabout production that maintain the efficiency of productive effort were being turned out in greatly reduced volume.

The three classes based on the second principle of classi-

Table 11
Average Actual Working Hours and Total Employment of Wage Earners, 1929-1935
Major Groups of Manufacturing Industries

(estimates based upon study of a sample of Census industries)

INDUSTRIAL GROUP	ESTIMATED AVERAGE ACTUAL HOURS WORKED PER WEEK ¹		ESTIMATED AGGREGATE MAN HOURS PER WEEK (in thousands)		CHANGES, 1929-1935	
	1929	1935	1929	1935	Absolute (in thousands)	Relative (per cent)
	Goods for human consumption	47.4	36.6	232,260	167,738	-64,522
Capital equipment goods, excl. construction materials	49.3	37.0	105,108	53,391	-51,717	-49.2
Construction materials	48.9	37.2	49,927	25,110	-24,817	-49.7
Durable goods	48.7	37.2	212,186	115,729	-96,457	-45.5
Semi-durable goods	47.0	35.7	114,069	84,288	-29,781	-26.1
Perishable goods	48.6	38.5	99,873	73,419	-26,454	-26.5
Total	48.3	37.2	426,924	274,499	-152,425	-35.7

¹ Average actual hours per week per wage earner for subgroups are based on National Industrial Conference Board data for 25 manufacturing industries, weighted by number of wage earners employed, as given by the Census of Manufactures. The total is that of the National Industrial Conference Board. Discrepancies between the sum of the subgroups and the total are due to differences in weighting and to the omission, from the classification based on use, of the subgroup 'Producers' fuels'.

fication reflect similar inequalities. Industries producing durable goods suffered most heavily in the initial decline. Although their gains from 1933 to 1935 were greatest, their net employment losses from 1929 to 1935 remained far greater, both absolutely and relatively, than those of industries producing semi-durable and perishable goods.

When we take account of changes in aggregate working hours per week we obtain a truer picture of the actual industrial changes brought by the events of 1929-35. The best available estimates, by groups, are given in Table 11. The aggregate loss of working time comes to approximately 36 per cent, as against the 16.5 per cent decline in number of wage earners employed. The absolute contributions of the different industrial groups to this total are different from those given in Table 10, as are also the relative changes in the various groups. Of the first three categories, industries producing consumption goods made the largest contribution to the net employment loss, with a decline of 64,522,000 man hours a week, or 27.8 per cent of the 1929 volume of employment in this group. Because of the large number of workers in this group (4,900,000 in 1929) the decline in the average length of the working week brought a substantial reduction in aggregate hours worked. Among industries producing capital goods and construction goods the employment declines were smaller, in absolute terms, but much higher relatively. In each case employment in aggregate man hours per week was reduced approximately one-half between 1929 and 1935.

Among the other groups durable goods suffered the greatest losses, both absolutely and relatively. But the declines in employment in industries producing semi-durable and perishable goods were not inconsiderable. It is notable that in none of the six groups in Table 11 was the loss in actual volume of employment between 1929 and 1935 less than 25 per cent.

These changes in employment are to be interpreted with reference to productivity changes. The measurements in Table 12 are based upon the sample of manufacturing industries previously referred to. They apply with some reservations, therefore, to manufacturing industries as a whole.²² The productivity gains, by groups, vary widely. The greatest gains occurred among goods destined for human consumption, in one classification, semi-durable and perishable goods in the other. These are the groups in which production in 1935 exceeded or fell only slightly below the 1929 level. High output is conducive to gains in productivity. Declines in output may stimulate more effective internal organization and the installation of better equipment, but the full gains are usually not reached until a high level of production is attained.

²² The coverage of the sample is indicated by the footnote to Table 5.

It is notable, too, that employment, whether measured in man hours or in number of wage earners employed, has suffered smaller losses among consumption goods, in which productivity advanced substantially, than among capital goods and construction materials, in which the gain in productivity was smaller. These relations, however, call for more extended investigation.

We turn now from the sample returns to estimates relating to all manufacturing industries, seeking to determine the bearing of productivity advances on the actual and potential declines in employment.

The entries in Tables 10 and 11 indicate the magnitude of the actual employment losses between 1929 and 1935. In manufacturing industries as a whole they amounted to 152,425,000 man hours, and to 1,460,000 individual wage earners. A considerable portion of each of these losses reflects an actual decline in production, rather than an en-

Table 12
Relative Changes in Employment, Production, and Productivity,
1929-1935

INDUSTRIAL GROUP	PERCENTAGE CHANGE FROM 1929 TO 1935			
	Volume of production	No. of wage earners	Estimated no. of man hours	Estimated output per man hour
Goods for human consumption	-3.6	-3.3	-27.8	+33.5
Capital equipment goods, excl. construction materials	-32.4	-14.1	-40.9	+14.4
Construction materials	-39.3	-29.8	-44.9	+10.2
Durable goods	-31.8	-21.0	-41.9	+17.4
Semi-durable goods	+1.2	-1.8	-28.2	+40.7
Perishable goods	-4.1	-1.3	-22.9	+24.4
All industries	-12.6	-8.2	-31.3	+27.2

¹ The changes from 1929 to 1935 in the estimated number of man hours given in Table 12, for the industries in the sample, may be compared with the estimated changes in all manufacturing industries, which are given below:

Goods for human consumption	-27.8
Capital equipment goods, excl. construction materials	-49.2
Construction materials	-49.7
Durable goods	-45.5
Semi-durable goods	-26.1
Perishable goods	-26.5

In general, the employment losses in the industries included in the sample were smaller than those in corresponding groups among all manufacturing industries. The excluded industries, among which are those making less standardized products not readily enumerated in physical units, suffered more severe declines. The greatest deficiency in the sample probably lies in the inadequate coverage of industries producing highly fabricated specialized articles of capital equipment. The productivity measurement for capital goods, as given in Table 12, probably overstates the actual gain. The same error may be present, in less degree, in the measurement relating to durable goods.

during change in the labor requirements of manufacturing industries. In Table 13 we take account of this factor, comparing with the actual employment figures for 1929 estimates of the number of workers and man hours required in 1935 to produce the volume of goods manufactured in 1929 and in 1935.

For all manufacturing industries the 1929 output, which required some 427 million man hours of effort in 1929, could have been produced in 1935 by approximately 336 million man hours.²³ The estimated decline of 91 million man hours represents potential displacement, the labor loss that would have occurred had the 1929 volume of output prevailed in 1935, with the 1935 level of industrial efficiency. The 1935 volume of output, which actually required 274 million man hours of labor per week, would have required 349 million man hours per week had the level of industrial efficiency been equal to that of 1929. The loss of some 75 million man hours of employment is the (arithmetic) equivalent of the advance in productivity between 1929 and 1935.

The measurements in column (4) for the several industrial groups indicate the magnitude of the potential employment losses by important classes of industry as a result of the productivity advances between 1929 and 1935. Production at the 1929 level of output is assumed. The entries for the first three industrial categories indicate that industries producing goods for human consumption would have contributed most heavily to the total employment loss, under the conditions assumed. This group accounted for a large part of total employment in 1929, and its productiv-

²³ The reader should note the assumption that output per man hour at the higher level of output (i.e., a level equal to that of 1929) would have been the same as that actually prevailing in 1935.

ity advance between 1929 and 1935 was sharp. The contributions of the capital goods and construction groups were relatively much smaller. The measurements for the second set of industrial groups indicate that the contributions to unemployment would have been greatest among industries producing semi-durable goods. A notable advance in productivity occurred in these industries from 1929 to 1935.

The figures in column (5) of Table 13 define, similarly, the changes between 1929 and 1935 in the number of man hours of work per week required to produce the 1935 volume of manufacturing production. These measurements are of considerable interest, for they enable us to estimate, for each industrial group, the relative importance of changes in productivity as a factor contributing to the shifts in volume of employment between 1929 and 1935. Among goods for human consumption, for which output in 1935 was only some 4 per cent below the 1929 level, the decline from 1929 to 1935 in the amount of labor required to produce the 1935 physical output amounted to about 56 million man hours per week.

In a complex situation, affected by many circumstances, we are not justified in attributing a causal role solely to one factor, such as a change in productivity. However, it is illuminating to express, as a percentage of the actual employment loss in each category, the change in aggregate employment that is apparently attributable to productivity changes. These percentages are given in column (6) of Table 13. For industries producing human consumption goods the loss that may be attributed to advancing productivity constituted some 87 per cent of the total employment loss. (In 1935 production in these industries amounted to about 96 per cent of the 1929 volume.) The correspond-

Table 13

Aggregate Man Hours Worked per Week in American Manufacturing Industries, 1929; with Changes from 1929 to 1935 in Total Labor Required to Produce Stated Quantities of Goods

Major Groups of Manufacturing Industries

(estimates based upon study of a sample of Census industries)

INDUSTRIAL GROUP	AGGREGATE MAN HOURS, 1929	ACTUAL DECLINE, 1929-35, IN AGGREGATE MAN HOURS (in thousands)	CHANGE, 1929-35, IN NO. OF MAN HOURS REQUIRED TO PRODUCE 1929 VOLUME OF OUTPUT ¹	CHANGE, 1929-35, IN NO. OF MAN HOURS REQUIRED TO PRODUCE 1935 VOLUME OF OUTPUT ¹	COL. (5) AS PER- CENTAGE OF COL. (3)
			(4)	(5)	(6)
(1)	(2)	(3)	(4)	(5)	(6)
Goods for human consumption	232,260	-64,522	-58,282	-56,192	87.1
Capital equipment, excl. construction materials	105,108	-51,717	-13,230	-7,688	14.9
Construction materials	49,927	-24,817	-5,621	-2,561	10.3
Durable goods	212,186	-96,457	-31,348	-20,137	20.9
Semi-durable goods	114,069	-29,781	-33,112	-34,474	115.8
Perishable goods	99,873	-26,454	-19,589	-17,914	67.7
Total	426,924	-152,425	-91,292 ²	-74,664 ²	49.0

¹ The variable factor responsible for the changes noted is output per man hour.

² Because of the omission of data for certain industries, the total is not equal to the sum of the items above it.

ing percentages for industries producing capital equipment and construction materials were 15 and 10. Productivity changes could have accounted for only a small proportion of the employment losses in the latter two groups. The failure of production to regain 1929 levels was a far more important factor in both cases.

Similarly, the consequences of productivity changes were a minor factor (some 21 per cent of the total) in the employment losses among industries producing durable goods; for perishable goods it was more important (68 per cent); the 1935 output of semi-durable goods (e.g., knit goods, woolen and worsted goods, leather products) actually exceeded that of 1929, so the reduction in employment attributable to productivity gains actually exceeded the total decline.

IV SUMMARY

Of the actual employment decline, in man hours, in manufacturing industries between 1929 and 1935, slightly less than half appears to be attributable to changes in industrial productivity; the remainder is apparently attributable to the decline in production. Reduced activity was a major factor in the employment losses in industries producing durable goods, mainly capital equipment and construction materials. The influence of enhanced productivity was relatively more important among industries producing perishable and semi-durable goods, in which output had been better maintained.

The persistence of reduced industrial activity, and the complex market conditions that underlie this reduction are, in a causal sense, more important than increased man hour productivity, as factors in the employment decline since 1929. Yet, it is of no small significance that in 1935 only 336 million man hours would have been required to produce a volume of goods requiring 427 million man hours in 1929. In eight years there was a net reduction of some 91 million man hours of labor in the aggregate effort required to maintain the 1929 volume of output. This reduction represented a great enhancement of man's power to wring from the earth the means of existence and the material bases of comfort.

This gain may be realized in various ways. More goods, which mean a higher standard of living, represent one possible product of this advance. The records indicate that if the gain were to be utilized in this form, the aggregate volume of goods available annually for consumption and for use in further production might have been increased, by

¹⁴The figure in Table 8 is 27.2. This is a maximum. The actual gain in productivity undoubtedly fell short of this figure, which is based upon computations relating, in the main, to direct labor. When technical changes lead to the displacement of direct labor,

1935, by an amount approaching 20 or 25 per cent," with a working force equal to that of 1929. This represents a substantial potential gain in the national standard of living.

An alternative mode of utilizing the gain involves a reduction in working hours, with increased leisure. The 8,839,000 workers in manufacturing industries in 1929 could, in 1935, have produced the 1929 output with a work week 10.3 hours shorter than in 1929. The 1929 work week averaged 48.3 hours; the reduction justified by advancing productivity, if all the gain were to be realized in the form of leisure, would have meant a work week of 38.0 hours. The actual work week in 1935 averaged 37.2 hours. The program of shorter hours represented, in effect, the allocation to leisure, or enforced idleness, of all the gains of advancing productivity, plus something more.

The most recent year for which comprehensive records of manufacturing operations are available is 1935. Statistics for selected establishments indicate a substantial increase in production and employment between 1935 and 1937, with a subsequent drop that carried manufacturing activity in the first half of 1938 well below the level of 1935. Accordingly, the description of the situation in 1935, somewhat darkened, may be taken to apply to that existing in the early summer of 1938. The work week was some two hours shorter than in 1935, output was 12 to 15 per cent lower, and employment (measured in man hours) was about 10 per cent less. Population had grown, as it had during the entire period of the depression, and the difficulty of finding employment was, by so much, accentuated. Reduced activity, therefore, aggravated by the steady pressure of new entrants to the labor market, rendered the 1938 problem of adaptation to the conditions of production and employment in manufacturing industries somewhat more serious than that of 1935.

Certain aspects only of this problem have been here presented. Price and wage policies are phases of it. Its long term solution entails a choice between a larger physical output and shorter working hours. Something of a re-direction of productive resources, particularly the annual additions to the working population, may be necessitated by the cumulative technical improvements that have been steadily increasing industrial productivity. This re-direction, which may mean the reversal of a movement into manufacturing and mechanical occupations that has grown steadily during the whole course of our national history, is perhaps at the heart of the problem. It involves issues transcending manufacturing industries alone.

they usually involve additional indirect labor in the capital goods and service industries. There may be cases, too, of direct transference of distributive and other functions from manufacturing to non-manufacturing enterprises.

HARRY JEROME, 1886-1938

With deep regret the National Bureau announces the death of Professor Harry Jerome of the University of Wisconsin, one of its Directors by University Appointment.

Dr. Jerome's first connection with the National Bureau was as a member of its research staff which he joined in 1923. Out of his work with us grew, first, his book called *Migration and Business Cycles*; second, a series of field studies intended to determine more accurately than had been done how changes in machinery or industrial processes affect the demand for labor; third, *Mechanization in Industry*, which gives the results of this field work; and finally participation in the National Research Project upon mechanization, productivity of labor, and labor displacement in selected manufacturing industries.

To all members of the staff and to his fellow Directors Dr. Jerome endeared himself by his considerate ways, his readiness to cooperate, his wisdom as an adviser, and his deft humor.

COMMODITY FLOW AND CAPITAL FORMATION

(500 pp., 77 tables, 8¼ x 11¾, \$5)

This report by Simon Kuznets was distributed to subscribers in June. It stems from a five-year investigation of available data relating to the production and distribution of durable and non-durable commodities. Some results were summarized in *National Income and Capital Formation, 1919-1935*. Covering the period, 1919-35, Volume I of *Commodity Flow and Capital Formation* contains not only final summary estimates but also a wealth of details of interest to business men, marketing experts, and professional economists. For the first time, the nation's commodity output and its flow through the various distributive channels have been exhaustively analyzed. Complete basic data on the production of manufactured commodities, on changes in business inventories, on the volume of construction, and on the movement of distributive margins are included, together with critical comments about their derivation and their reliability.

REVIEWS OF NATIONAL BUREAU PUBLICATIONS

National Income and Capital Formation, 1919-1935, by Simon Kuznets (8¼ by 11¾, 86 pp., \$1.50)

The Nation, March 26, 1938:

"In this valuable piece of research Mr. Kuznets defines the product of the nation's economic activity, estimates its volume in the years since the war, indicates the contributions to it of the different parts of the economic system, shows how its monetary equivalent was distributed and how it was utilized. Of especial importance among the facts he has brought to light are those relating to capital formation

—that is, the net addition to our stock of capital goods. This, he shows, formed on the average a relatively small share of the net product but one that fluctuated violently over the period. Those who see in the uneven flow of capital a main source of dislocation in the economic system and argue for the necessity of long-term planning will find here useful statistical support. The book calls attention to another kindred cause of instability by making a distinction between gross national product and net national income. The difference between these totals represents the extent to which durable capital goods are used up, or, in accounting terms, depreciation and depletion. Over the period 1919-35 the annual volume of this capital consumption averaged some nine billion dollars, or roughly one-eighth of the gross product. The degree to which financial provision for such depreciation was not translated into physical provision is worth further investigation by diagnosticians of the erratic tempo of our economic machine."

Journal of the Royal Statistical Society, Vol. CI, Part III, 1938:

"It is impossible to withhold the most whole-hearted admiration from this book, which must rank as one of the foremost empirical works of our time. It is a short book which has been based on a staggering number of investigations, computations and estimates. Yet one can only marvel at the dexterity and economy of the arrangement, and the lucidity of the presentation. In the text itself the general economist will find that account of national product which will be most useful to him, arranged in such a way that the results are clear and can be easily applied to broad economic investigations. The detailed figures and certain information for special application by students are compactly presented in the appendices."

Studies in Income and Wealth, by the Conference on Research in National Income and Wealth, Volume I (348 pp., \$2.50)

American Economic Review, June 1938:

"The Conference on Research in National Income and Wealth comprises representatives of seven universities, nine research divisions of the federal government, and various other organizations. Its purpose has been to bring about an exchange of information among the workers in its field, to promote agreement upon the most appropriate concepts and terminologies to be used, and to stimulate research on a cooperative basis. This volume presents the results of the Conference's attempt to clarify concepts, unify terminology, and improve procedure; the statistical estimates it contains are presented mainly for the purpose of illustration, and there is little discussion of available statistical sources. As such it is not a book for the use of the average student of economics, but will be required reading for all those interested in the field which it covers."

The papers that will comprise Volume II are to be sent to the printer by the end of the month. The price of Volume II will be \$3. The two volumes will be sold together for \$5.

Bond Yields, Interest Rates, and Stock Prices, by Frederick R. Macaulay (586 pp., 32 charts, of which 6 are enlarged and tipped in on rag paper; 33 tables, \$5)

The Times, London, Literary Supplement, July 23, 1938:

"The original object of Dr. Macaulay's studies was a review of 'the course of interest rates and bond yields in the United States over a long period with a view to ascertaining what statistical relation these rates and yields bear to one another, to the prices of stocks and commodities, to the physical and monetary volume of trade, and to credit and banking activities'. This object has been achieved with complete success, and the tables and charts in which this valuable book abounds will prove a source of almost endless pleasure for statisticians and students of economic history in general and of the trade cycle in particular. Dr. Macaulay has, however, done much more than collect and arrange a vast mass of statistics.

In striving to interpret the movements which his figures illustrate and measure he has contributed something new and valuable to the theory of the trade cycle, which is explained as a failure on the part of society to foresee and adapt itself to the future. The science of forecasting business conditions, though full of difficulty, is not utterly sterile, but mankind should aim at moulding the future rather than at attempting merely to forecast it. 'The hope of the world', Dr. Macaulay declares, 'lies in truly social, as opposed to merely individualistic, economic planning.' Dr. Wesley C. Mitchell, to whom the book is dedicated, supplies a preface praising Dr. Macaulay's impressive achievement with which no intelligent reader will fail to agree."

Journal of the Royal Statistical Society, Vol. CI, Part III, 1938:

"This immense volume is number 33 of the publications of the National Bureau, and unmistakably lives up to the high reputation of that series for research into facts. Its size is largely accounted for by the wealth of statistical data which Dr. Macaulay has accumulated. The text, which is liberally illustrated by excellent charts, only covers some 235 pages, though to this may be added another 45 pages of appendices not devoted to figures.

After an interesting introduction largely dealing with the scientific method in economics, the author plunges into a detailed discussion of the concept of long-term interest rates. This is useful because it is a subject that tends to be neglected by economists, who, in the nature of things, do not come very closely into touch with the problems of bond valuation. In this chapter Dr. Macaulay makes clear what he means by the yield of a bond, and develops the concepts of the 'duration' of a bond and the 'implicit' rates of interest related to the issue price of a new bond of a given nominal rate. . . .

. . . It is an empirical work of the first importance in a field remarkable for inattention to details of fact. In clarity it rivals Dr. Macaulay's earlier technical handbook on the smoothing of time series, and the appendices contain information of the greatest importance to students of the general fluctuations in trade."

Readers are reminded of the announcement in the May 28 *Bulletin* that the first chapter of Dr. Macaulay's volume, together with Dr. Mitchell's Preface, have been reprinted in a booklet (35 cents). Dr. Macaulay is now conducting the investigation into short selling being made by the Twentieth Century Fund at the request of the New York Stock Exchange.

