Volume Title: Recent Economic Changes in the United States, Volumes 1 and 2

Volume Author/Editor: Committee on Recent Economic Changes of the President's Conference on Unemployment

Volume Publisher: NBER

Volume ISBN: 0-87014-012-4

Volume URL: http://www.nber.org/books/comm29-1

Publication Date: 1929

Chapter Title: Industry: Part 3 - The Changing Structure of Industry

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Chapter URL: http://www.nber.org/chapters/c4955

Chapter pages in book: (p. 167 - 218)

PART 3.—THE CHANGING STRUCTURE OF INDUSTRY

By Willard L. Thorp

I. RECENT TRENDS IN THE SCALE OF PRODUCTION

Scale of Production in Terms of Wage Earners.—The reduction from ten years to five, and then from five to two, in the interval between the taking of succeeding censuses of manufactures has given us excellent material concerning the scale of production. All census data are given in terms of establishments.[1] From these records, it is possible to measure the trends in size of establishments in three ways: by wage earners, by horse power, and by value of products. Taking the simplest measure of all, the arithmetic average of all establishments reporting, these criteria are recorded by the Bureau of the Census as shown in Table 1.

Table 1.—Average Size of All Establishments Reported in the Census of Manufactures, 1914–1927[a]

Census year	Wage earners per establishment		Horse power per establishment		Value of products per establishment	
	Actual	Relative	Actual	Relative	Actual	Relative
1914	39.0	100	126.2	100	$135,080	100
1919	42.1	108	137.1	109	288,990	214
1921	35.5	91	[b]	[b]	222,072	164
1923	44.8	115	169.0	134	308,101	228
1925	44.7	115	191.0	151	334,669	248
1927	43.5	112	203.4	163	[c]325,990	241

[a] In order to make the figures comparable, data for establishments producing products under $5,000 have been eliminated for the years 1914 and 1919, with the exception of horse power, for which data are not available to make the correction. The data for establishments engaged in automobile repairing and those for purchased power other than electric have been omitted from the figures for 1919 and 1914, no such data having been tabulated at censuses subsequent to 1919; and the data for coffee roasting and spice grinding have been omitted from the figures for 1923 and prior years, no such data having been tabulated in 1925.

[b] Not collected by the Bureau of the Census.

[c] The value of products is made comparable with that for earlier years by combining paper and wood pulp into a single industry.

[1] In definition, the Bureau of the Census states: "As a rule the term 'establishment' signifies a single plant or factory. In some cases, however, it refers to two or more plants operated under a common ownership and located in the same city, or in the same State but in different municipalities or unincorporated places having fewer than 10,000 inhabitants. On the other hand, separate reports are occasionally obtained for different industries carried on in the same plant, in which event a single plant is counted as two or more establishments."

These figures indicate a slight advance in the number of wage earners per establishment, a considerable advance in horse power, and a more than doubling in the value of products per establishment.

The record for value of products per establishment is a somewhat misleading criterion of size. It reflects not only the increase in the quantity of output, but also the changes in the prices of commodities. If prices doubled, one would expect the value of products per establishment to double, but this could not be taken as a significant change in the scale of production. The figure for value of products may be taken as an indirect indication that the physical output per establishment has increased, because the value of products has increased much more than any of the indexes of prices from 1914 to 1925.[2]

But averages, while helpful, are not always dependable. The Census Bureau subdivides manufacturing establishments into groups according to the average number of wage earners employed. This tabulation was omitted from the Census of 1925, but the record for earlier years is shown in Table 2. To one not familiar with these figures, perhaps the most amazing fact is the number of small establishments in modern industry. To this array, one interested in small establish-

TABLE 2.—DISTRIBUTION OF ESTABLISHMENTS EMPLOYING SIX OR MORE WAGE EARNERS, BY NUMBER OF WAGE EARNERS PER ESTABLISHMENT, 1914-1923[a]

Wage earners	Number of establishments			
	1914	1919	1921	1923
6 to 20	53,954	54,317	53,771	54,609
21 to 50	22,879	25,176	23,898	25,212
51 to 100	11,070	12,370	11,047	12,346
101 to 250	8,465	10,054	8,532	10,023
251 to 500	3,108	3,596	2,916	3,835
501 to 1,000	1,348	1,749	1,241	1,784
Over 1,000	648	1,021	645	963

[a] It is assumed that, by omitting all establishments with less than six wage earners, the fact that the censuses of 1914 and 1919 included establishments whose products were valued at less than $5,000, whereas the later censuses did not, may be disregarded.

ments should add those which employed less than six wage earners and were excluded from the tabulation above, amounting in 1923 to nearly 90,000 establishments. That the number of establishments in the United States averaging 1,000 wage earners is less than 1,000, is contrary to the usual impression of the United States as a country of enormous factories and mass production. The small establishment shows no

[2] The index of wholesale prices published by the United States Bureau of Labor Statistics, recomputed to a 1914 base, is: 1914, 100; 1919, 210; 1921, 150; 1923, 157; 1925, 162.

tendency to disappear, despite the large concerns. But the data giving merely the number of establishments do not fairly indicate the importance of the larger plants. The 6,582 establishments employing more than 250 wage earners in 1923 represented less than 4 per cent of all establishments, yet they employed four and a half million wage earners, or slightly more than one-half.

A careful scrutiny of the distributions, group by group, indicates that there is some increase in the numbers in the larger-size groups when compared with the prewar distribution. To be sure, 1914 was not a good business year, but 1921 was much worse, and its distribution is almost identical with that of seven years before.

The trend since 1923 can be determined from Table 3, which shows the distribution of establishments grouped according to the value of products for 1923 and 1925. The trend of prices has been sufficiently stable during the period so that it can be disregarded, with reservations. The figures for earlier years are not given because the violence of the price changes makes them misleading.

TABLE 3.—DISTRIBUTION OF ESTABLISHMENTS, BY VALUE OF PRODUCTS PER ESTABLISHMENT, 1923 AND 1925

Value of products	Number of establishments	
	1923	1925
$5,000 to $20,000	61,881	55,876
20,000 to 100,000	72,139	68,951
100,000 to 500,000	41,818	42,209
500,000 to 1,000,000	9,494	9,771
Over $1,000,000	10,248	10,583

The decline in number of establishments whose value of products is less than $100,000, and the increase in the larger establishments, is apparent. It is evident that the number of large establishments, using the volume of business as an indicator, is slowly increasing.

While the above facts show that industrial establishments are operating on a somewhat larger scale, they do not show whether industries are so doing. It is conceivable that every plant in the country might be decreasing its scale of production yet industry as a whole be advancing. For example, although the average size of establishments engaged in automobile manufacture has decreased since 1919, the increasing importance of the industry, coupled with the fact that in size it is still far above the average for all industry, tends to raise the average for industry in general during the period.

For the purpose of examining the behavior of the various separate industries, the data for the censuses of 1914, 1919, 1921, 1923, and 1925

were regrouped so that 321 consistent industrial groups were created. A small number of establishments were omitted where entirely new classifications had been made in such a way that no combinations could include them in a consistent industry group. The records for establishments producing under $5,000 of product were eliminated from the 1914 and 1919 figures, except in the case of horse power. However, the amount of horse power in these small establishments is estimated to be so small as to be negligible.

Among these 321 industries, the average number of wage earners per establishment in 1925 ranged from 1.2 in the cheese industry, to 1,086.9 in the rubber boot and shoe industry. Seven industries averaged over 500 workers per establishment, and 70 over 100. The average of the various industries, in which each industry is regarded as of equal significance, was 86.2 wage earners. The median industry employed but 39.8 workers.

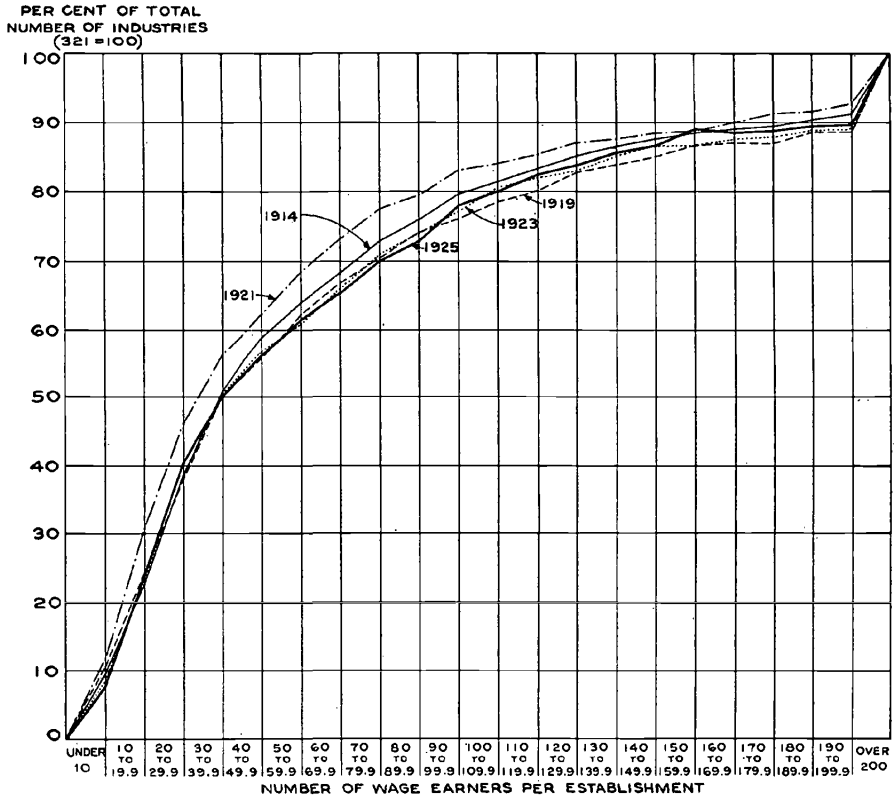
The above figures for 1925 do not vary greatly from those for the other years studied. In each instance, the bulk of the industries are in the small-size groups, but a sufficient number operated on a large scale to make the arithmetic average at least twice the median. The concentration in the smaller groups is depicted by the following charts of frequency distributions. A few industries with more than 200 wage earners per establishment are not included.

The industries are so concentrated in the smaller-size groups that it is impossible to determine what the tendencies actually are.[3] The same data as given in Chart 1, but grouped according to a logarithmic scale, appear in Chart 2.

It is evident that there has been a marked reduction in the number of industries included in the smallest groups, and a tendency to concentrate about the group centering at 20 workers per establishment. The mode, which was clearly in the 25–40 group in 1919, has moved back to the 16–25 group. While there is a slight tendency to form a secondary peak centering about 100 workers per establishment, the surprising thing about the distributions is the actual decrease in the number of industries in the larger groups. There has been a decline in those industries averaging more than 100 wage earners per establishment from 77 in 1919, to 73 in 1923, and 70 in 1925. The trend depicted, therefore, is not one of general advance, or general decline, but of the extremes moving in toward the middle, tending to center about 20 and about 100 workers per establishment.

[3] A clearer picture of the trend is obtained when the distributions are made on a logarithmic basis. Furthermore, it is probably true that these data, like so much other economic material, tend to vary in terms of equal percentage changes rather than in absolute terms. Certainly, an increase in the scale of production from 5 to 10 wage earners is much more significant and extraordinary than an increase from 250 to 255.

CHART 1.—DISTRIBUTION OF 321 INDUSTRIES ACCORDING TO AVERAGE NUMBER OF WAGE EARNERS

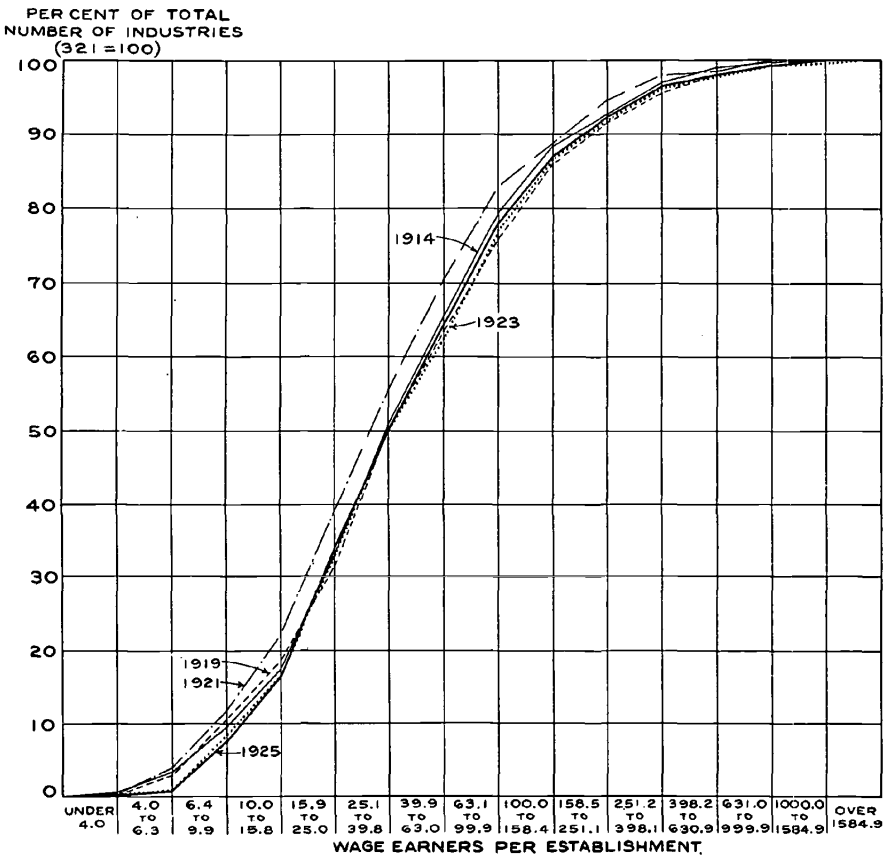


Not only do the frequency distributions fail to show any marked trend toward the increasing adoption by old industries of large-scale production, but the simpler averages indicate much the same thing. These are given in Table 4.

TABLE 4.—AVERAGE SIZE OF 321 INDUSTRIES, BY NUMBER OF WAGE EARNERS EMPLOYED, VARIOUS AVERAGES, 1914–1925

	1914	1919	1921	1923	1925
Actual numbers for each industry:					
Arithmetic mean	81.7	94.4	71.0	91.1	86.2
Median	38.3	38.8	34.0	38.7	39.8
Geometric mean	42.1	44.4	36.1	44.5	43.1
Fixed base relatives for each industry (1914 = 100):					
Arithmetic mean	100	115	93	113	112
Median	100	104	86	105	100
Geometric mean	100	107	87	106	105

CHART 2.—DISTRIBUTION OF 321 INDUSTRIES ACCORDING TO NUMBER OF WAGE EARNERS



The variations from year to year are explained by the fact that 1914 and 1921 were dull years, and that 1919, 1923, and 1925 were active years. It is interesting to note that 1925 represents a definite decline from 1923 by every measure but one. The geometric means, which are unquestionably the most reliable in this instance, depict 1919 and 1923 as the peak years. Certainly, there is no general trend upward. In fact, comparing 1925 with 1914, there were 155 industries which recorded an increase in the average number of wage earners employed per establishment, 157 which recorded a decrease in the average number of wage earners, and 9 which reported no change in the scale of production.

Not only has the central measure of the frequency distribution shown little change during the period, but also the industries within the distribution have tended to keep much the same general position. There are, of course, certain industries which have increased their scale of production tremendously. The eighteen industries which have at least doubled

their average number of wage earners per establishment between 1914 and 1925 are shown in Table 5.

TABLE 5.—EIGHTEEN INDUSTRIES REPORTING THE LARGEST INCREASE IN THE NUMBER OF WAGE EARNERS PER ESTABLISHMENT, 1914–1925

Industry	Number of wage earners per establishment	
	1914	1925
Aircraft and parts	14.0	61.4
Corn syrup, corn oil, and starch	53.6	216.4
Asbestos products	41.2	125.1
Engines and waterwheels	78.8	232.3
Gold, silver, and platinum, reducing	6.9	19.4
Motor-vehicle bodies and parts	62.2	168.2
Pens, fountain and stylographic	25.5	58.1
Washing machines, etc	33.2	86.3
Motor vehicles	274.3	665.8
Optical goods	30.4	73.9
Carbon black	9.5	21.8
Musical instruments	20.3	45.6
Roofing materials	28.6	59.4
Printing materials	6.1	12.5
Carriages and wagons	15.6	31.8
Babbitt metal, white metal, etc	10.8	21.9
Baking powder, yeast, etc	29.4	59.8
Fire extinguishers, chemical	16.1	32.4

The list in Table 5 includes but few industries which one ordinarily regards as having undergone marked transformation in recent years. In some cases, as in aircraft, the industry has recorded expansion in all respects, with the number of establishments nearly trebling, and the number of wage earners multiplying 16 times. On the other hand, the corn syrup industry, second on the list, gained its position by a reduction in the number of establishments by approximately one-third, coincident with a slight increase in the total number of wage earners.

The tendency toward concentration about the average is evident in this material, also. If all the industries examined were arranged according to the scale of production in 1914, those listed in Table 5 as recording the greatest gains would appear in the array as follows: Lowest quarter, 8; second quarter, 5; third quarter, 4; highest quarter, 2. In other words, the advances are being made in those industries which are at the lower end of the scale rather than those which are already operating under conditions of large-scale production.

On the other hand, there are other industries which have reported a marked decline in their scale of production during this same period. Table 6 presents the 15 industries whose scale of production was reduced by 40 per cent or more between 1914 and 1925.

TABLE 6.—FIFTEEN INDUSTRIES REPORTING THE GREATEST DECLINE IN NUMBER OF WAGE EARNERS PER ESTABLISHMENT, 1914–1925

Industry	Number of wage earners per establishment	
	1914	1925
Grindstones, pulpstones, etc	68.2	21.6
Phonographs	521.2	165.7
Whips	34.8	11.4
Galvanizing and other coating	37.4	14.0
Engraving, wood	12.2	5.3
Nets and seines	95.5	42.2
Watch materials	42.4	20.0
Corsets	162.1	78.5
Carriage materials	33.0	17.2
Feathers, plumes, etc	23.0	12.7
Watch cases	140.3	77.3
Lapidary work	13.0	7.1
Condensed milk	31.7	17.7
Wooden goods	41.0	22.9
Silk manufactures, finished	134.3	76.8

Most of these 15 industries have suffered from a loss of market. The tendency has been for the establishments to persist, operating on a greatly reduced basis, with the result that they report a decrease in the number of wage earners. It is interesting to note that the declines are more prevalent among the larger-scale industries than were the advances. But in general, the internal changes have not been marked. Of the 321 industries studied, the change in size of establishment between 1914 and 1925 was less than 20 per cent in 159 cases, and less than 40 per cent in 251 industries.[4] There are few instances of industrial collapse, such as steel shipbuilding after the war, but even there, the scale of production remained large in the few establishments which survived.

It is interesting to observe how little the industries leading in scale of production have changed. The same five industries are found at the top in 1925 which were there in 1914. The changes among the leading ten industries during the period are presented on page 175.

Most of the industries are on the list for obvious reasons—because of the size of the product, as the locomotive industry; the complexity of the product, as watches and motor vehicles; or the complexity of the process, as steel rolling mills, rubber products, and copper smelting. Perhaps most interesting are two new entrants to the list in recent years, wool carpets and floor oilcloth. Both are industries in which the products have been greatly developed within the last few years, and which are now made on a large scale.

[4] The coefficients of rank correlation are: 1914–1919, +.946; 1919–1921, +.975; 1921–1923, +.980; and 1923–1925, +.986. If the industries were in identical rank, the coefficient would be +1.0; if completely reversed, −1.0.

1914	1919	1921	1923	1925
Watches.	Locomotives.	Boots and shoes, rubber.	Locomotives.	Boots and shoes, rubber.
Locomotives.	Boots and shoes, rubber.	Sugar refining, cane.	Boots and shoes, rubber.	Watches.
Boots and shoes, rubber.	Sugar refining, cane.	Locomotives.	Steel rolling mills.	Steel rolling mills.
Sugar refining, cane.	Watches.	Watches.	Sugar refining, cane.	Locomotives.
Steel rolling mills.	Steel rolling mills.	Steel rolling mills.	Smelting, copper.	Sugar refining, cane.
Phonographs.	Motor vehicles.	Cars, electric and steam.	Motor vehicles.	Motor vehicles.
Cars, electric and steam.	Ammunition.	Screws, wood.	Watches.	Smelting, copper.
Smelting, copper.	Cars, electric and steam.	Motor vehicles.	Cars, electric and steam.	Carpets, wool.
Sewing machines.	Sewing machines.	Pencils.	Oilcloth, floor.	Oilcloth, floor.
Ammunition.	Firearms.	Sewing machines.	Carpets, wool.	Screws, wood.

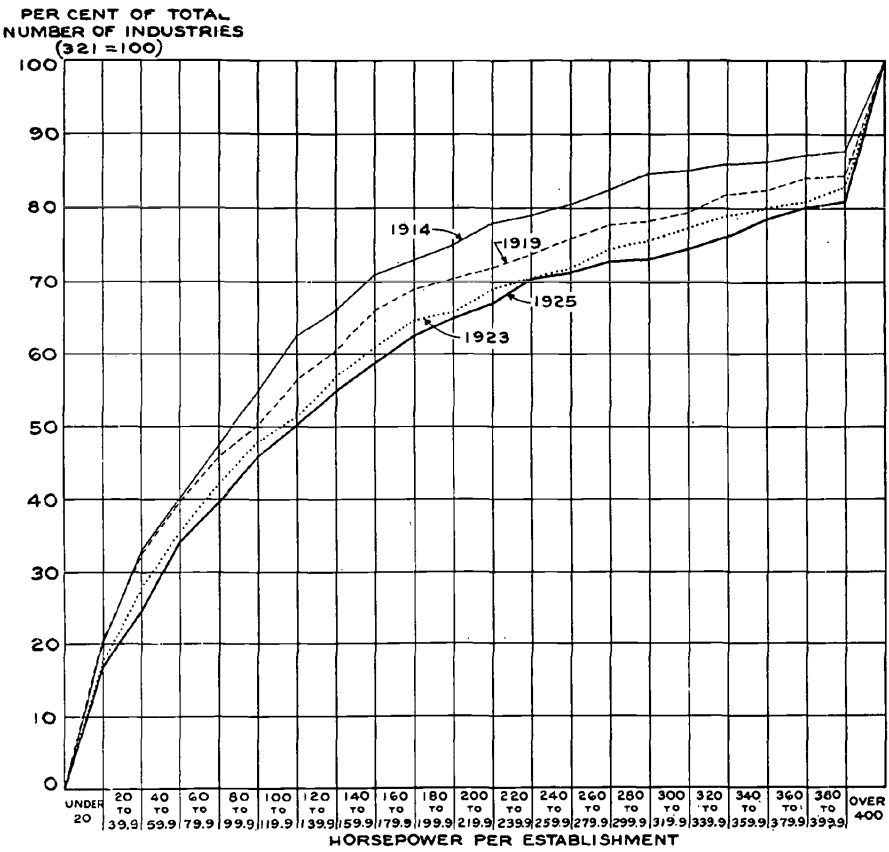
A similar list of industries producing on a smaller scale would note certain industries regularly in that position—cheese, artificial limbs, butter, beverages, and flour milling, while wood engraving and mucilage have recently joined them. Although it appears on the list of smallest-scale operations, the flour milling industry in 1923 had one establishment employing over 1,000 wage earners.

Scale of Production in Terms of Horse Power.—The record for horse power per establishment offers a much clearer picture of growth. The census figures refer to the total rated horse-power capacity of engines, motors, and other prime movers. Motors run by power generated within the establishment are excluded as involving duplication, since the power producer which runs the generator is already included. Because the figures refer to total rated capacity, they are considerably larger than if they were the amount of power in actual daily use.[5]

[5] Further qualifications in the use of the horse-power figures have been suggested by LeVerne Beales, chief statistician for manufactures in the Census Bureau. The marked reduction in steam engines and increase in steam turbines during the period 1919 to 1925, results in an apparent reduction in horse power. The lower efficiency of the steam engine, and the belt system which usually accompanies it, when compared with the steam turbine used to drive an electric generator, is so considerable that the rated horse power necessary to do the same work is greater in the first than in the second case. As a second consideration, there is the fact that the greatest gain in prime movers during the period was made by electric motors driven by purchased current. When driven by current produced within the plant, the horse power of the engine driving the generator is of course the prime mover. But it often happens that a generating power of 500 horse power is found in a concern having electric motors rated at perhaps 1,000 horse power. The difference is due to the fact that many motors are idle or not run at capacity continually. The prime mover is recorded as 500 horse power. If this company changes to rented power, the prime mover record will be 1,000 horse power, or the rated capacity of the electric motors.

As one might expect, the range of power capacity among the industries is tremendous. The hairwork industry, with 87 establishments, reports but 13 horse power in total, or less than 0.15 per establishment. At the other extreme is the copper smelting industry with 26 establishments and a total of 326,509 horse power, or 12,558 horse power per establishment.

CHART 3.—DISTRIBUTION OF 321 INDUSTRIES ACCORDING TO AVERAGE HORSE POWER PER ESTABLISHMENT



The distribution of the 321 industries, according to horse power per establishment, is depicted in Chart 3. The industries reporting over 400 horse power per establishment are excluded from the chart. The concentration at the left of each distribution is similar to that observed in the distributions based on the average number of wage earners per establishment. The distribution on a logarithmic basis, Chart 4, very clearly depicts the trend. The smaller groups are all decreasing in the number of industries which they include, while the larger groups are gaining.

The average values for the industries emphasize the steadiness and degree of the advance. That this tendency is general, is indicated by

the fact that in 1925 five-sixths of the industries showed increased horse power over 1914.

CHART 4.—DISTRIBUTION OF INDUSTRIES ACCORDING TO AVERAGE HORSE POWER PER ESTABLISHMENT

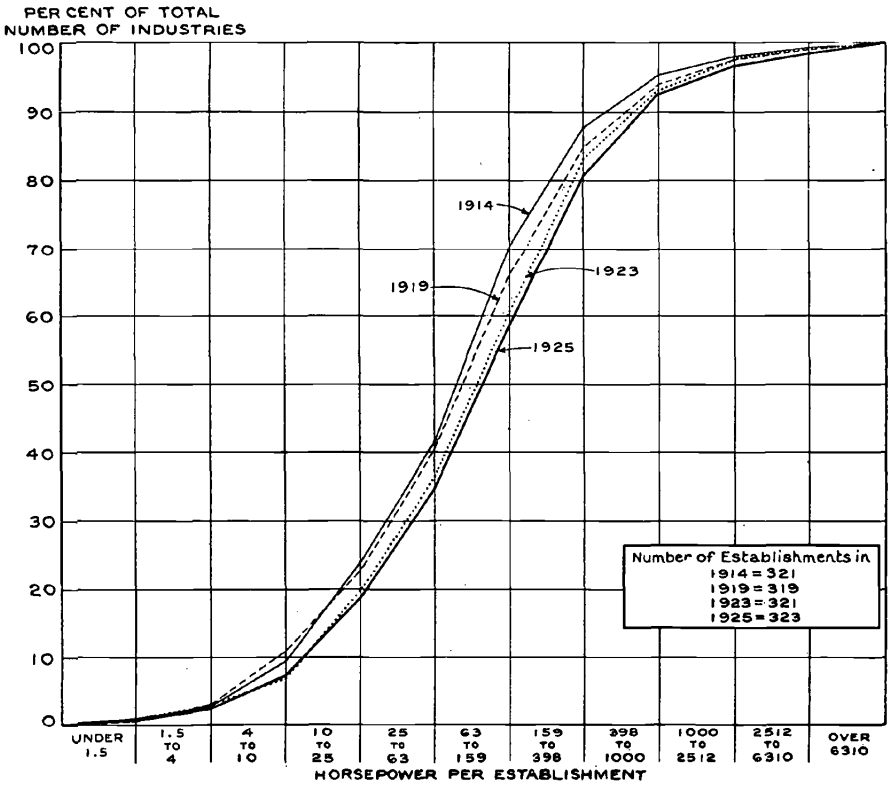


TABLE 7.—AVERAGE SIZE OF 321 INDUSTRIES IN TERMS OF HORSE-POWER CAPACITY PER ESTABLISHMENT, 1914–1925

	1914	1919	1923	1925
Arithmetic mean	254.3	325.3	385.0	429.6
Median	87.5	97.6	113.4	118.7
Geometric mean	74.0	79.8	98.8	107.7

There is much more stability in the list of industries ranked by horse power than by wage earners. Whereas workers can be easily added or subtracted, and the employer is not committing himself to any long-time arrangement in employing them, machinery can be much less easily adjusted. Once purchased, it remains and must be used. As a result, the addition of machinery is a step to be taken with great

deliberation, and, once taken, must be followed through. It is interesting to note how little the ranking of the leading ten industries is subject to variation. The following presentation shows the leading ten industries ranked according to horse power per establishment:

1914	1919	1923	1925
Iron and steel, blast furnaces.	Smelting, copper.	Smelting, copper.	Smelting, copper.
Iron and steel, rolling mills.	Iron and steel, blast furnaces.	Iron and steel, blast furnaces.	Iron and steel, blast furnaces.
Smelting, copper.	Iron and steel, rolling mills.	Iron and steel, rolling mills.	Iron and steel, rolling mills.
Cement.	Locomotives.	Cement.	Locomotives.
Locomotives.	Cement.	Locomotives.	Cement.
Sugar refining, cane.	Sugar refining, cane.	Sugar refining, cane.	Sugar refining, cane.
Paper and wood pulp.	Paper and wood pulp.	Paper and wood pulp.	Paper and wood pulp.
Wire.	Smelting, lead.	Boots and shoes, rubber.	Smelting, zinc.
Smelting, lead.	Boots and shoes, rubber.	Corn syrup.	Smelting, lead.
Cotton goods.	Smelting, zinc.	Smelting, lead.	Boots and shoes, rubber.

Every instance is an industry of elaborate technical process and vast machinery. The lists in 1919 and 1925 are identical, except for a change in the order in the last three places.

Certain industries which appear on this list were included in the list for largest size in terms of wage earners. Five were included among the 10 largest in terms of wage earners, two were in the second 10, two were in the third 10, and paper and wood pulp, farthest down the list, ranked forty-third with over 160 wage earners per establishment. A further examination of other industries indicates that there is a close relationship between the number of wage earners and the amount of horse power in the various industries.[6]

Not only does a relationship exist, but the two tend to change together. And this change is not, as is often stated, an advance in horse power and a resulting decline in workers. The facts show that increases in horse power and increases in wage earners usually go together. While individual plants and individual industries may run counter to

[6] The rectilinear coefficient of correlation, based on the logarithms of the data, gave the following results:

Year	Coefficient	Regression line
1914	+.72	Log WE = .526 Log HP + .635
1919	+.78	Log WE = .543 Log HP + .554
1925	+.74	Log WE = .501 Log HP + .643

The coefficient is sufficiently high, especially since it is based on 321 items, to be accepted as demonstrating an existing relationship between these two items.

this tendency, the record, as presented by the selected 321 industries, is clear. It is summarized in Table 8.[7]

TABLE 8.—DISTRIBUTION OF 302 MANUFACTURING INDUSTRIES ACCORDING TO CHANGES IN WAGE EARNERS AND HORSE POWER PER ESTABLISHMENT, 1923–1925

Per cent change in wage earners per establishment	Per cent change in horse power per establishment					
	Decrease		Increase			
	20 to 40 per cent	0 to 20 per cent	0 to 20 per cent	20 to 40 per cent	40 to 60 per cent	60 to 80 per cent
Decrease:						
20 to 40 per cent	4	12	8	1	...	...
0 to 20 per cent	8	49	66	15	7	...
Increase:						
0 to 20 per cent	5	12	54	25	5	7
20 to 40 per cent	...	2	5	10	1	1
40 to 60 per cent	...	1	2	1	...	1

If one keeps in mind the fact that horse power is gaining on the average much more than wage earners, Table 8 can be accepted as a clear demonstration of the interrelation between the two devices which have been used to measure size. There are cases where horse power is gaining and wage earners are declining, and there are cases where the number of wage earners is increasing and horse power is declining. But the central tendency is for a parallel development.

II. RECENT TRENDS IN THE SCALE OF OPERATION

The story of the structure of modern industry is not completed by discussing the scale of production. In 1919, the records of the Census Bureau indicated that more than 20,000 establishments, at the very least, were not independent enterprises, but were parts of larger organizations which included other manufacturing establishments. It was estimated that these establishments employed at least one-third of the wage earners engaged in manufacturing and produced an even greater percentage of the total product.[8]

There are no official data that describe adequately these combinations among the producing units. The methods by which several concerns may be brought under a single centralized control may be so hidden that no amount of investigation among current sources will disclose the actual situation. The Federal Trade Commission has struggled to unravel the complexities in some few isolated cases—the meat packers, the bakers, and the public utilities in particular. But we

[7] Nineteen industries, with variations exceeding the limits stated, are not included.

[8] Willard L. Thorp, *The Integration of Industrial Operation.* Census Monograph No. 3. Washington, 1924, p. 104.

cannot generalize for industry as a whole from these few samples. Studies have been made of capitalization, but the difference between the total capitalization, as stated on the balance sheet, and the actual size of the enterprise may be so great as to render this material meaningless for our purpose.

The Size of Corporations.—The records of the Bureau of Internal Revenue, collected in connection with the income tax, have some bearing on this point. If industry were becoming more concentrated, one might expect an increasing number of concerns falling in the larger income groups. On the other hand, income-tax returns are notoriously subject to manipulation. The changes in rates from time to time have tended to increase or decrease the incentive toward evasion.[9] Finally, reports may be rendered by subsidiary corporations as though they were independent. Despite these hazards, it seems desirable to present the following table, giving the number of corporations reporting a net income of $100,000 or more for the years 1918 and 1920 to 1926 by eight major industrial groups. Data for individuals and partnerships could not be separated into these industrial groups, but it is probably safe to say that nearly all large enterprises are to-day conducted under the corporate form of organization. The data in Table 9 have significance

TABLE 9.—NUMBER OF CORPORATIONS REPORTING NET INCOME IN EXCESS OF $100,000, 1918 and 1920 TO 1926

	1918	1920	1921	1922	1923	1924	1925	1926
Agriculture	80	91	40	67	92	73	84	80
Mining	605	1,039	309	492	436	328	451	495
Manufacturing	5,592	5,137	2,456	4,585	5,339	4,248	4,948	4,765
Construction	135	132	77	157	172	194	276	277
Transportation and public utilities	583	597	544	684	777	738	789	818
Trade	1,551	1,377	777	1,442	1,804	1,496	1,743	1,543
Public service	80	207	149	232	277	285	351	406
Finance	742	1,072	938	1,155	1,244	1,447	2,055	1,913
Not defined	266	85	40	50	65	37	42	3
Total	9,634	9,737	5,330	8,864	10,206	8,846	10,739	10,300

for many economic problems. One might note, for example, the severity of the 1921 depression in reducing the number reporting in mining, manufacturing, and trade, while affecting but little the transportation and public utilities and finance groups. But for the immediate purpose, the significant conclusions are the relative importance of the various industrial groups and the groups which appear to be increasing most

[9] The rates by which corporation incomes were taxed were: 1918, 12 per, cent; 1919–1921, 10 per cent; 1922–1924, 12½ per cent; 1925, 13 per cent; 1926–27, 13½ per cent.

rapidly. Manufacturing appears to contain approximately one-half of these large enterprises, with finance second, and trade third. But the number included in manufacturing has not been gaining in recent years, while trade records a slight increase and finance companies have more than doubled in number during the period. The outstanding gain has been made in the smaller group called public service, which includes the electric light and power companies. The 1927 records are not yet available, but preliminary returns indicate a further decline in the grand total for the year.

In the case of manufacturing, it is possible to subdivide these corporations into eleven industrial groups. Their records follow.

TABLE 10.—NUMBER OF CORPORATIONS ENGAGED IN MANUFACTURING REPORTING NET INCOME IN EXCESS OF $100,000, BY INDUSTRIAL GROUPS, 1918 AND 1920 TO 1926

	1918	1920	1921	1922	1923	1924	1925	1926
Food products	695	401	358	496	540	591	566	567
Textiles	1,275	793	562	907	909	559	723	571
Leather	187	122	97	162	120	107	118	123
Rubber	73	35	3	50	45	49	70	50
Lumber	354	687	144	478	616	381	424	369
Paper	199	346	89	157	210	174	202	197
Printing and publishing	114	279	198	247	252	252	292	320
Chemicals	428	346	203	430	376	378	479	504
Stone, clay, and glass	135	234	136	215	330	247	250	257
Metal	1,666	1,377	437	936	1,354	1,236	1,550	1,508
All other	466	517	229	507	587	274	274	299
Total	5,592	5,137	2,456	4,585	5,339	4,248	4,948	4,765

The various branches of manufacturing industry have not fared alike during the period. Of the eleven groups, five reached their high point in 1918, two in 1920, two in 1923, and two in 1926. Chemicals and printing and publishing were the only industries to record their peak in 1926. However, the number reporting in the metals group increased steadily from 1921 to 1925, and now represents nearly one-third of the concerns included. These large concerns do not appear to be unduly concentrated in any particular field, but are widely scattered through the various groups.

Mergers.—There has been so much talk recently of mergers and consolidations, of "the era of consolidation,"[10] that some evaluation of the movement becomes imperative.[11] On the assumption that the major-

[10] See Paul Mazur, *American Prosperity*, 1928.

[11] "It is inevitable that the business of the country shall be done by very large companies which reach back to the source, and, taking the raw material, carry it through the necessary processes to the finished state." Henry Ford and Samuel Crowther, *Today and Tomorrow*, 1926.

ity of these events receive public notice, we have gone to the records of corporate and industrial news. From various sources, over 16,000 items were clipped relating to changes in the control of concerns.[12] These have been carefully studied to obtain the figures which follow.

Many consolidations have taken place in fields other than manufacturing and mining, to which the tabulation was limited. Numerous reports indicated a decided tendency toward vertical integration in the motion-picture industry, where theaters have been grouped in chains, which have in turn come under the control of the film distributor, and finally of the film producer.[13] There was also a marked tendency toward the building up of chains of retail stores, and the combining of these chains into larger chains. The tabulation does not include the merging of control of department stores or hotels, though there were a number of important consolidations in these fields. Furthermore, there are many instances of the extension of corporate control beyond the boundaries of the United States, but they have all been disregarded. In the field of railroads, important mergers have been attempted, but the Interstate Commerce Commission, endeavoring to obey the instructions of the Transportation Act of 1920, has greatly hampered and even checked such developments. In the field of banking, the annual report of the Federal Reserve Board reports steady increase in mergers and consolidations. The number of mergers affecting capital resources of member banks (*Annual Report*, Federal Reserve Board, 1927, p. 31) are as shown in the following statement:

1919	80	1924	124
1920	77	1925	120
1921	104	1926	154
1922	125	1927[14]	259
1923	120		

The number of banks affected is, of course, considerably greater than this number of mergers.

In tabulating the material, certain difficulties arose.[15] The criterion used was "Has there been any concentration of control?" "Are fewer

[12] The chief source was the elaborate clipping collection published in the Standard Daily Trade Service.

[13] "Perhaps 5,000 of the total 20,000 motion-picture houses in this country are now owned or operated by the large producers and distributors." J. Homer Platten, "Motion Pictures—A New Public Utility," *The Bankers Magazine*, October, 1926.

[14] The number of mergers in 1927 was undoubtedly affected by the amendment to the Federal Reserve Act of February 25, 1927, which permitted the direct consolidation of state banks and national banks with trust companies.

[15] Concerning the tabulation of mergers and acquisitions in the mining and manufacturing field, no pretense is made that the record here given is complete. Many consolidations may never have reached the public press or the trade journals. Many transfers of control doubtless have been kept secret. However, there is no reason to

concerns independent as the result of the event?" In the case of mergers, the facts are clear. Several concerns have passed into the hands of a new corporation organized for the purpose. But the record of acquisitions is not as simple. In many cases, it was clearly the same in significance as a merger—with the difference that one of the original companies persisted. The difficulty of definition appeared in the instances in which one company purchased the plant and assets of another because the other was going out of business, anyway. Many acquisitions were made at receivers' sales. An attempt was made to eliminate all such acquisitions, but in some instances the material at hand was too scanty to indicate the facts. The results of the tabulation are given in Table 11.

It is unfortunate that no measure of mergers and acquisitions can be obtained other than the number of concerns involved. Certain of the instances involve the largest industrial enterprises in the country, while others refer to small and local manufacturing establishments. In at least three months, indicated by a footnote in the table, the figures, on the basis given, are distorted because mergers were consummated involving a large number of small concerns.

Not too much confidence can be placed in the timing of these records of mergers. The date at which announcement reaches the public is often far behind the date of actual merging. On the other hand, many mergers are reported as completed when the stockholders' vote has not yet been taken. However, taking the timing, as given, to be approximately correct, it is important to note two things. First, the marked increase in mergers and in the number of concerns involved in mergers in the last three years. The net number of concerns disappearing, which is perhaps the most useful criterion of the movement, has risen since 1922. The number of acquisitions has not increased as rapidly as the number of actual mergers. Second, the marked cyclical fluctuation of the data. The consolidation movement appears to be most active in periods of prosperity, and to show a marked decline during depression. That the excitement of 1920 included an extraordinary number of

believe that journalists are more astute at one time than at another, nor that business men are more secretive, and so we can assume, with some justification, that the records will indicate the trend if not the absolute amount of the movement. A number of instances were included where control passed through the acquisition of voting power. Mergers of subsidiaries, a rather common occurrence, were not included, since they do not represent any real change in control. Nor was the formation of new subsidiaries, a very active practice during the period, included as a merger. Furthermore, mergers and consolidation involving foreign concerns were not included, though there were many such in the records. There were many mergers proposed which were never consummated. The clippings would often indicate the original plan, later the directors' action, later the stockholders' vote, and finally the plan put into effect. The number of concerns which entered into this process, but never reached the last stage, is enormous. Merger talk without consummation was particularly evident in the years 1926 and 1927.

TABLE 11.—MERGERS AND ACQUISITIONS IN MANUFACTURING AND MINING, BY QUARTERS, 1919–1928

Quarter	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Number of mergers recorded									
First	12	44	25	20	18	23	26	41	40	44
Second	21	38	23	17	15	20	31	30	58	67
Third	34	49	16	15	11	28	26	36	56	49
Fourth	18	42	25	12	23	22	34	31	44	55
Annual total[a]	89	173	89	67	67	95	121	139	207	221
	Number of concerns merged									
First	44	135	[b]163	59	62	61	89	[b]242	116	138
Second	59	112	85	45	44	59	76	[b]151	211	234
Third	98	116	43	62	29	75	70	107	167	137
Fourth	83	111	82	47	83	62	84	93	152	158
Annual total[a]	292	474	373	220	218	263	333	597	678	687
	Number of concerns acquired									
First	25	118	46	47	40	72	61	85	85	103
Second	44	112	37	25	38	32	59	115	94	148
Third	83	121	53	35	26	40	83	100	109	154
Fourth	60	97	65	41	45	45	125	84	105	158
Annual total[a]	235	459	203	156	160	200	342	398	399	572
	Net number of concerns disappearing[c]									
First	57	209	[b]184	86	84	110	124	[b]286	161	197
Second	82	186	99	53	67	71	104	[b]236	247	315
Third	147	188	80	82	44	87	127	171	220	242
Fourth	125	166	122	76	105	85	175	146	213	261
Annual total[a]	438	760	487	309	311	368	554	856	870	1,038

[a] Annual totals are larger than the sum of theq uarterly figures, because they include a small number of events which could not be more definitely placed within the year.

[b] Includes one merger of more than 60 concerns.

[c] Number of concerns merged plus number of concerns acquired less number of new corporations formed.

mergers and acquisitions is indicated by the data. The peak was reached in the first quarter of 1920 in the net number of concerns disappearing. The recovery did not come until somewhat after the general revival, 1923 being but slightly above 1922. The net number of concerns disappearing increased rapidly in the last quarter of 1923 and first

quarter of 1924, but then, in sympathy with general business, declined during the rest of 1924. Since that time, the movement has grown by leaps and bounds. The record of mergers and acquisitions, by industries, is given in Table 12.[16]

It is evident that styles change in mergers and acquisitions as in everything else. The oil group was greatly in evidence in 1920, but has since passed from the picture, while the foodstuffs group has increased steadily. The year 1928 saw a surprising increase in mergers in the textile and chemical industries. The greatest tendency to consolidation at present, however, is in the foodstuffs group, as independent dairies, cheese factories, and bakeries are absorbed by the leading companies. However, the iron, steel, and machinery group has clearly the supremacy. It has accounted for about one-fifth of all mergers and acquisitions in mining and manufacturing since 1919.

The trend is clearly upward. The number of mergers is increasing steadily. The movement is not limited to a small number of industries, but is general. The motto has been accepted "In union there is strength," and consolidation is proposed as the remedy for all evils. An example of this trust in the merger, as a way out, is that of two California oil companies who planned to merge and, in fact, announced the plan early in 1927, but were both in the hands of a receiver before the merger was completed. On the other hand, many of the mergers represent a realignment of industry which should result in cheaper and more efficient production.

The most conspicuous trend toward consolidation in recent years has been in the field of public utilities. The development of holding companies with vast networks of subsidiaries has received considerable publicity and at least two investigations by the Senate of the United States. Probably the whole story cannot be learned, even by such practiced investigators. However, the general trend is evident from a tabulation made from the files of the *Electrical World*.[17] This trade paper collects and publishes news concerning the industry, and for the last three years has published each year in an early issue a list of the mergers and acquisitions of the previous year. These annual tabulations have

[16] The groups are very comprehensive. Oil includes both petroleum mining and refining. Iron and steel includes the manufacture of products which are chiefly iron, such as farm implements, machinery, etc. Nonferrous includes smelting and refining, as well as the manufacture of products from nonferrous metals such as brass and bronze, and also clay products. Textiles includes rugs and felt hats, as well as dyeing and finishing textile products. Motor vehicles includes the manufacture of automobile parts, except tires. Chemicals includes paint and varnish, perfume, etc. In cases where concerns in two groups merge, the one which apparently dominates is used for classification.

[17] This source was suggested in a speech made by Hon. Thomas J. Walsh in the Senate of the United States, February 28, 1927.

TABLE 12.—MERGERS AND ACQUISITIONS IN MANUFACTURING AND MINING, BY INDUSTRIES, 1919–1928

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	Total
	Number of mergers recorded										
Oil	15	35	16	11	9	9	8	7	7	7	124
Coal	4	7	6	5	8	11	5	5	3	4	58
Iron and steel	24	42	9	15	13	27	25	23	57	35	270
Nonferrous	6	6	12	5	5	6	15	25	22	19	121
Textiles	4	8	8	6	6	9	7	11	9	36	104
Motor vehicles	8	12	7	5	5	4	9	6	5	6	67
Chemicals	1	5	4	3	3	6	2	8	8	19	59
Foodstuffs	8	16	9	5	8	7	13	14	25	23	128
Lumber and paper	3	10	8	4	1	2	6	12	25	20	91
Other	16	32	10	8	9	14	31	28	46	52	246
Total	89	173	89	67	67	95	121	139	207	221	1,268
	Number of concerns merged										
Oil	40	98	49	34	35	28	16	20	22	20	362
Coal	25	26	28	25	25	31	12	24	12	10	218
Iron and steel	56	108	21	38	33	78	57	54	158	87	690
Nonferrous	21	20	30	14	17	13	38	[a]249	79	57	538
Textiles	12	19	19	18	15	24	26	28	30	93	284
Motor vehicles	16	33	16	25	13	9	20	13	16	15	176
Chemicals	2	26	14	6	9	14	11	32	23	56	193
Foodstuffs	28	38	54	15	37	26	50	47	114	128	537
Lumber and paper	8	21	[b]122	12	3	7	14	40	72	52	351
Other	84	85	20	33	31	33	89	90	152	169	786
Total	292	474	373	220	218	263	333	597	678	687	4,135
	Number of concerns acquired										
Oil	34	86	47	29	24	15	43	68	21	36	403
Coal	3	18	7	2	5	6	13	5	11	8	78
Iron and steel	50	110	48	39	44	48	70	80	100	85	674
Nonferrous	10	36	17	14	10	16	35	47	35	39	259
Textiles	21	27	15	5	10	18	26	24	20	55	221
Motor vehicles	23	37	19	13	15	8	19	15	14	28	191
Chemicals	8	23	9	18	6	9	14	16	19	40	162
Foodstuffs	30	26	9	14	12	36	43	50	67	139	426
Lumber and paper	9	26	9	4	6	12	9	21	30	33	159
Other	47	70	23	18	28	32	70	72	82	109	551
Total	235	459	203	156	160	200	342	398	399	572	3,114
	Number of concerns disappearing										
Oil	59	149	80	52	50	34	51	81	36	49	641
Coal	24	37	29	22	22	26	20	24	20	14	238
Iron and steel	82	176	60	62	64	99	102	111	201	137	1,094
Nonferrous	25	50	35	23	22	23	58	[a]271	92	77	676
Textiles	29	38	26	17	19	33	45	41	41	112	401
Motor vehicles	31	58	28	33	23	13	30	22	25	37	300
Chemicals	9	44	19	21	12	17	23	40	34	77	296
Foodstuffs	50	48	54	24	41	55	80	83	156	244	835
Lumber and paper	14	37	[b]123	12	8	17	17	49	77	65	419
Other	115	123	33	43	50	51	128	134	188	226	1,091
Total	438	760	487	309	311	368	554	856	870	1,038	5,991

[a] Includes two mergers of over 60 concerns.

[b] Includes one merger of over 60 concerns.

been used for the last four years, and, prior to that time, the various weekly issues have been combed for information concerning the disappearance of companies through their merging or being acquired by other companies. The results of this investigation appear in Table 13.

TABLE 13.—MERGERS AND ACQUISITIONS IN THE FIELD OF PUBLIC UTILITIES, 1919–1928

Quarter	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Number of companies disappearing									
First	3	1	11	27	118	171	70	325	214	245
Second	8	8	9	47	76	139	94	261	308	189
Third	9	5	29	86	121	157	112	253	153	151
Fourth	2	1	25	125	106	108	99	186	221	...
Annual total[a]	22	15	74	285	426	580	402	1,029	911	...

[a] Includes cases with month not known: 1923, 5; 1924, 5; 1925, 27; 1926, 4; 1927, 15; 1928, 17.

During the early part of the period, although there were few actual acquisitions, there were a number of interconnections formed whereby neighboring companies pooled their facilities. But the movement toward centralization began in the last half of 1921. Except for a slight setback in the last quarter of 1924 which lasted through 1925, the tendency continued at an increasing rate. In 1926, the astounding number of 1,029 concerns merged or were acquired by other companies. In the third quarter of 1927, the activity subsided somewhat, possibly from fear of the threatening investigation by the Government, and also from the increasing scarcity of raw material to be acquired or with which one could merge.

Of the concerns acquired in 1926, 201 were plants which had been operating under municipal ownership, and in 1927, 182 municipalities sold their utilities to private concerns.

Under	$10,000	22
$10,000 to	$50,000	72
$50,000 to	$100,000	34
$100,000 to	$250,000	40
$250,000 to	$500,000	22
$500,000 to	$1,000,000	18
$1,000,000 to	$2,000,000	21
$2,000,000 to	$5,000,000	19
$5,000,000 to	$10,000,000	13
$10,000,000 to	$20,000,000	15
$20,000,000 to	$50,000,000	18
$50,000,000 to	$100,000,000	8
Over	$100,000,000	2
Total		304

Some indication of the size of the concerns involved in these transactions is afforded by the record of about three-fourths of the companies in 1925 according to their capitalization. The foregoing statement shows the number of companies merged or purchased, grouped according to capitalization in 1925. That the mergers are not entirely among the small concerns, is indicated by the foregoing statement, and by the fact that 54 of the mergers in 1927 were mergers of holding companies, taken over by other larger companies.

III. THE SCALE OF PRODUCTION AND COSTS

In attempting to determine the significance of recent trends in the structure of industry, one might adopt numerous criteria. These range from the effect of large production and large-scale management upon invention and originality, to the possible influence upon market price. For the purpose of this study, it has seemed wise to confine the investigation to two strictly economic criteria. The first is the effect upon cost of production, discussed in this section, and the second is the effect of concentration upon the stability of our economic life.

The advantages of large-scale production are presented in too many other sources to make valuable any detailed discussion of them at this point. But it is important to point out the often neglected truth that in large sections of industry, most efficient production is necessarily on a small scale. Some of the general types of industry in which small-scale production is required are:

1. Industries in which products cannot be standardized and establishments which make products to suit the differing tastes of consumers. Such industries produce tailored suits, high-grade furniture, art goods and finely bound books.

2. Industries producing for a small market, such as those manufacturing artists' materials and nets and seines.

3. Industries in which the local market is small and whose product has a high transportation cost. In the manufacture of artificial-stone products, or bricks, the activity can seldom be on a large scale because of the limited local market and the high cost of transportation.

4. Industries in which the material used is widely scattered and cannot be concentrated because of high transportation cost or perishability. Cheese factories and cider mills may be included in this class.

5. Industries in which skilled labor is the chief element, such as engraving and job printing, whose products are really services rather than commodities.[18]

One may recognize these special cases in which small-scale production is necessary, but still hold to the belief that, in general, large-scale production is more economical. There are unquestionably many potential

[18] Willard L. Thorp, *The Integration of Industrial Operation*, p. 89.

economies present in large-scale production and large-scale operation. On the other hand, there is the increased burden of administrative machinery, control, and supervision. If these potential economies prove to be real net economies, the larger concerns should report lower costs and higher profits.

Costs of plants arranged according to size have been recently reported by the Federal Trade Commission,[19] for the baking industry. Since this field is one in which consolidations have been numerous, it is particularly significant for our study. Cost figures were obtained by the Commission and reduced to a per pound basis. The data presented in Table 14 refer to plants doing an exclusively wholesale business, thus eliminating those which carry on a house-to-house business as well. The results are for 628 plants during the period 1922 to 1925.

TABLE 14.—COSTS, IN CENTS PER POUND, OF BREAD FOR EXCLUSIVELY WHOLESALE BAKING PLANTS, BY SIZE GROUPS, 1922–1925

Production, pounds per year	Ingredients cost	Manufacturing expense	Selling and delivery expense	General and administrative expense	Total cost	Cost excluding ingredients
Under 5,000,000	3.25	1.87	1.60	0.36	7.08	3.83
5,000,000 to 10,000,000	3.20	1.79	1.67	0.27	6.94	3.73
10,000,000 to 15,000,000	3.12	1.65	1.58	0.24	6.59	3.47
15,000,000 to 20,000,000	3.11	1.55	1.49	0.21	6.37	3.26
20,000,000 to 25,000,000	3.21	1.58	1.48	0.22	6.49	3.28
25,000,000 to 30,000,000	3.28	1.59	1.50	0.16	6.53	3.25
30,000,000 to 35,000,000	3.20	1.59	1.62	0.16	6.56	3.37
Over 35,000,000	3.33	1.96	1.56	0.15	7.00	3.67

The cost excluding ingredients is a better criterion than total cost. In the first place, different kinds of bread require different ingredients, and no distinction has been made between types. Secondly, the largest bakeries tend to be in the East, at the greatest distance from the flour milling centers, resulting in additional apparent cost of ingredients. From these data, the Federal Trade Commission draws the conclusion that "costs are on the whole lower for the larger than for the smaller-sized plants. There is some indication that plants of a size a little below the largest may be somewhat lower in cost." However, the results for the largest-size group are probably conditioned less by the size of the plants than by the difference in the costs of the Ward Baking Corporation, the General Baking Corporation, and the Continental Baking Corporation, which dominate the groups above 15 million pounds. In general, their costs appear to be higher, although within the organizations the largest plants

[19] United States Federal Trade Commission, *Competition and Profits in Bread and Flour* (70th Cong. 1st Sess., Sen. Doc. No. 90). Washington, 1928.

of Ward and General have the lowest cost, while, for the Continental Baking Corporation, the records indicate the lowest cost in the 15 to 20 million pound group.

Cost records have also become available recently for the merchant blast furnace industry. In reporting its investigation into this industry, the Bureau of Labor Statistics says:

> Furnace performance is determined by other factors than mere size of stack. It seems clear that stacks of medium size have a distinct advantage as a smelter over the extremely large stack. No matter how efficiently the large stacks are run, they cannot turn out pig iron proportionately to their size in comparison with efficiently operated stacks having a volume of 12,000 to 18,000 cubic feet . . . Large furnaces and hard driving necessarily go together. Increased stack size beyond a certain limit appears to make possible greater output only at the expense of good control of materials.[20]

The records for bakeries and blast furnaces are not presented as significant in themselves. There may be considerable doubt concerning the nature of the samples studied and the method used. But the important matter is that both confirm the well-established principle that, at any given time and with any given stage of the industrial arts, there appears to be a size of plant which is most efficient. Technical improvements, changed relationship between the cost of capital and of labor, and altered markets may all serve to change this figure. Certainly the records in the preceding pages concerning the scale of production indicate tremendous increases in the size of plant during the last few years. Probably our technical advance has pushed the point of diminishing returns farther up the scale, but the fact still remains that such a point exists.

IV. THE SCALE OF OPERATION AND COSTS

While the above records are extremely significant for the analysis of large-scale production, they do not indicate the gains which consolidation may yield.[21] To answer this question, the records for the baking industry

[20] United States Bureau of Labor Statistics, *Productivity of Labor in Merchant Blast Furnaces*. Bulletin No. 474. Washington, 1928.

[21] An examination by Prof. A. S. Dewing of the results of the consolidation period of about 1900 (*Quarterly Journal of Economics*, Vol. 36, p. 84) indicates that, for thirty-five consolidations formed prior to 1904, the earnings of the constituent independent companies for the year prior to the consolidation exceeded the earnings of the following year by 18 per cent, and exceeded the results of the tenth year after consolidation by 22 per cent. Dewing summarizes this to say, "In brief, the earnings of the separate plants before consolidation were greater than the earnings of the same plants after consolidation."

Various studies made by the Federal Trade Commission examine costs and earnings during the period 1913–1922. Of sixteen industries, in but four was the rate of return on investment in the largest concerns up to the general average for the industry, while in ten instances, the group of smallest concerns, reported earnings above the average.

are tabulated according to whether the plant is a single, lone enterprise, or is a member of a multiple group.

TABLE 15.—COMPARATIVE COSTS, IN CENTS PER POUND, EXCLUDING INGREDIENTS FOR EXCLUSIVELY WHOLESALE PLANTS OF SINGLE AND MULTIPLE PLANT COMPANIES, BY SIZE GROUPS, 1922–1925

Production, pounds per year	Single	Multiple
Under 5,000,000	3.58	3.97
5,000,000 to 10,000,000	3.79	3.69
10,000,000 to 15,000,000	3.48	3.47
15,000,000 to 20,000,000	3.72	3.20
20,000,000 to 25,000,000	3.14	3.30
25,000,000 to 30,000,000	3.10	3.30

In analyzing the data, the Federal Commission says, "Plants of multiple-plant companies have lower ingredient costs and general and administrative expense, whereas the single-plant companies have lower manufacturing and selling and delivery costs." And as a final conclusion, it says, "from these figures, there is but little to indicate that the result of combining the plants of wholesale baking companies into a single organization is a lower cost per pound of bread produced."

The second inquiry relates to flour milling, an activity which has been under the scrutiny of the Federal Trade Commission for some time. The report mentioned above brings the record up through the year 1924. The records are in terms of capital investment and net income.[22] By size groups, the results for 90 companies for 1923 and 1924 are shown in Table 16. As a result of this investigation, the Federal Trade Com-

TABLE 16.—RATE OF RETURN ON CAPITAL INVESTED FOR 90 FLOUR MILLING COMPANIES, BY AMOUNT OF INVESTMENT AND PRODUCTION, 1923 AND 1924 COMBINED

Classed by amount of investment	Rate of return	Classed by amount of production	Rate of return
	Per cent	*Barrels*	*Per cent*
Under $250,000	6.6	Under 125,000	6.8
$250,000 to $500,000	8.9	125,000–250,000	5.2
$500,000 to $1,000,000	9.9	250,000–500,000	9.4
$1,000,000 to $2,000,000	4.2	500,000–1,000,000	7.8
Over $2,000,000	7.0	Over 1,000,000	7.1

mission states that "companies of medium size show slightly higher rates of profit than either the larger or the smaller companies." That

[22] Capital investment is the sum of capital stock, surplus, nonoperating reserves, and borrowed money less outside investments. Net income is the net return before deducting bond interest and Federal taxes plus interest paid on borrowed money less income from outside investments.

this is not a new development, but has persisted for some time, is indicated by the records for 47 milling companies since 1919.

TABLE 17.—RATE OF RETURN ON CAPITAL INVESTMENT FOR 47 FLOUR MILLING COMPANIES, GROUPED BY QUANTITY OF PRODUCTION BY YEARS, 1919–1924

Production group	1919	1920	1921	1922	1923	1924
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Under 125,000 barrels	15.4	7.8	−3.2	9.3	4.3	7.0
125,000 to 250,000 barrels	14.0	9.1	−3.4	8.0	4.7	3.0
250,000 to 500,000 barrels	18.0	21.1	5.4	12.9	12.8	11.6
500,000 to 1,000,000 barrels	11.0	18.3	−7.6	8.4	3.3	7.7
Over 1,000,000 barrels	13.7	16.2	7.8	8.6	8.5	6.7

In every year but one, and that was 1921, the middle-sized group reported the highest rate of return. In that year the largest companies were at the top. In other years the largest companies were second once, third twice, and fourth twice.

A survey of the petroleum industry made by the Federal Trade Commission[23] throws a faint ray of light on the problem. The report is based upon data collected directly from the companies by the Commission. For our purpose, the most significant material is that pertaining to the profits of companies according to their size. They are grouped according to amount of capital investment. Briefly, this capital investment is the total credited to stockholders plus long-term borrowings minus outside investments. It represents, as closely as can be obtained from the accounts, the investment of capital in the petroleum activities of the company. To correspond to the figures for investment, reports concerning net income were obtained from the companies.[24] The results shown in Table 18 pertain to companies engaged solely in crude petroleum production.

During the entire period, and each year singly, the size group, $5,000,000 to $25,000,000, reported the highest return. For the period of four

[23] United States Federal Trade Commission, *Petroleum Industry Prices, Profits, and Competition* (70th Cong., 1st Sess., Sen. Doc. No. 61) Washington, 1928.

[24] The capital stock plus surplus plus nonoperating reserves is called "company investment" by the Federal Trade Commission. To this are added long-term borrowings and advances from associated and affiliated companies minus outside investments, such as stocks and bonds of other companies, United States Government bonds, etc. A further correction was made for surplus arising out of discovery of new wells, where the fair market value of the property is disproportionate to the cost. Discovery value was omitted from the figure for investment. The net income was obtained by adding to income before payment of bond interest and Federal taxes, the interest paid on long-term borrowings, including amortization, and deducting income from outside investments. In certain cases, surplus adjustments were made to cover such items as fire losses, and profit or loss on sale of salvaged equipment. Furthermore, the depletion charges against value were omitted from costs.

TABLE 18.—PER CENT RETURN ON CAPITAL INVESTMENT FOR COMPANIES ENGAGED SOLELY IN CRUDE PETROLEUM PRODUCTION, BY SIZE GROUPS, 1922–1926

Investment group	1922	1923	1924	1925	1926[a]
Number of companies	77	84	90	90	51
	Per cent				
Under $1,000,000	1.6	8.3	14.3	13.4	5.3
$1,000,000 to $5,000,000	6.6	4.3	7.1	16.4	16.7
$5,000,000 to $25,000,000	10.7	23.2	24.4	51.9	19.1
Over $25,000,000	3.7	3.7	7.8	15.5	18.2

[a] First six months on an annual basis.

full years, 1922–1925, the largest companies show the lowest average rate of return. However, it is perhaps important to note the steady advance made by this group, so that for the first half of 1926 it challenged the smaller concerns for leadership.

A parallel study for companies engaged in refining is less conclusive because of the fact that many companies were engaged in producing and marketing as well. Using the same definitions of net capital investment

TABLE 19.—PER CENT RETURN ON CAPITAL INVESTMENT FOR COMPANIES ENGAGED IN PETROLEUM REFINING, BY SIZE GROUPS, 1922–1926

Investment group	1922	1923	1924	1925	1926[a]
Number of companies	58	60	63	63	54
	Per cent				
Under $1,000,000	7.4	−14.2	−6.3	3.5	13.0
$1,000,000 to $5,000,000	15.2	12.3	11.0	5.7	10.5
$5,000,000 to $25,000,000	11.7	3.5	9.8	11.5	7.5
$25,000,000 to $100,000,000	9.7	3.6	6.8	10.6	11.7
Over $100,000,000	9.8	6.7	8.6	11.3	13.2

[a] First six months on an annual basis.

and net income, the reports by size groups are shown in Table 19. The results are less clear than those for producing companies. For the four years, 1922–1925, the most profitable group on the average is next to the smallest in size, while the least profitable is the smallest group. The largest companies occupy a position exactly in the middle. The figures for the first six months of 1926 are so different from those of the earlier years that either it was an extraordinary period or the data are insufficient. The largest companies are the most prosperous, while the middle group, the leaders in the previous year, drop to last place.

This collection of data may be used to throw light on still another problem, that of integration, *i.e.*, expansion into fields whose process either precedes or follows that already performed. The results for companies subdivided according to degree of integration are shown in

TABLE 20.—PER CENT RETURN ON CAPITAL INVESTMENT FOR COMPANIES IN PETROLEUM INDUSTRY, BY DEGREE OF INTEGRATION, 1922–1926

Activity	1922	1923	1924	1925	1926[a]
Producing	5.9	7.5	9.7	18.6	17.9
Refining	13.5	−1.5	−0.1	5.5	8.1
Producing and refining	18.5	2.0	4.9	9.3	11.8
Refining and marketing	11.6	9.8	12.0	12.6	14.9
Producing, refining, and marketing	8.8	4.7	7.3	10.8	12.1

[a] First six months on an annual basis.

Table 20. On the basis of these data, the companies may be ranked over the period in order of return on investment as follows: 1. Refining and marketing. 2. Producing. 3. Producing and refining. 4. Producing, refining, and marketing. 5. Refining.

No figures are available for companies engaged solely in marketing. The importance of the element of distribution is clearly seen. Refining, an activity which, when carried on alone, is the least productive of profits of the activities examined, moves to the top when coupled with marketing activities. If combined with producing activities, it is less successful, while the most fully integrated companies occupy middle ground. For the last 18 months, however, the producing companies have been in the lead. While, from the refiner's point of view, integration is highly desirable, it would not appear to have a favorable effect on the fortunes of producing companies. However, extension into the marketing field is evidently a great aid to profits.

While the above data for wholesale baking, flour milling, and the various branches of the petroleum industries, are by no means conclusive for industry as a whole, all are fields in which consolidations have been numerous, and in which the records, as given by the Federal Trade Commission, do not show significant net economies of large-scale operation.

V. SIZE AND THE VOLUME OF BUSINESS

According to the above results, the large concerns should not be faring any too well in the search for markets.[25] Economic analysis has usually predicated success upon ability to produce at low cost.

In order to determine whether or not the larger concerns have been faring successfully in various industries, a special tabulation (Table 21)

[25] There are some indications that, in industries which have been dominated by a single concern, almost to the extent of monopoly, the large concern has failed to maintain its position. Instances of this, cited by Watkins (*Quarterly Journal of Economics*, November, 1928) are the steel, sugar, paper, glass, and oil industries.

was made from the manufacturing schedules gathered by the Bureau of the Census in 1923 and 1925.[26] As far as was convenient, industries were selected in which the concern and establishment were identical. All cases in which establishments reported in both years were segregated. They were then grouped according to size in 1923, and geometric averages were made of the relative changes between 1923 and 1925. The figures given are, therefore, averages of the movement of each group when every concern in the group is given equal weight.

TABLE 21.—CHANGES IN VALUE OF PRODUCTS AND AVERAGE NUMBER OF WAGE EARNERS EMPLOYED FOR IDENTICAL ESTABLISHMENTS IN NINE INDUSTRIES, BY SIZE OF ESTABLISHMENT, 1923–1925

Industry	Value of products			Wage earners		
	Large	Middle	Small	Large	Middle	Small
	Geometric average of relatives (1923 = 100)					
Belting, other than leather and rubber	105.9	[a]	[b]60.9	100.4	[a]	56.3
Carpets and rugs, wool	90.6	81.4	90.8	89.7	87.0	97.8
Clocks, etc	98.77	98.75	134.7	94.3	101.0	99.1
Firearms	81.4	75.9	113.3	58.9	70.2	92.1
Hats, wool felt	94.7	88.3	101.3	92.8	104.7	105.1
Locomotives, excluding railroad repair shops	26.5	[a]	74.5	38.9	[a]	80.3
Matches	110.7	99.1	88.0	99.9	86.4	64.9
Pencils, lead	111.0	102.9	67.5	90.7	100.3	59.1
Pens, fountain and stylographic	90.5	83.8	[c]134.4	93.3	71.7	[c]100.7

[a] Establishments divided into only two groups.

[b] For comparison with figure for wage earners, 55.6 should be used, one more establishment being included in the tabulation of value of products than in wage earners.

[c] Includes one establishment whose value of products increased over 4,000 per cent and wage earners over 1,100 per cent. If eliminated, averages for remaining establishments in the group are 102.3 and 83.4.

The tabulation is not sufficiently comprehensive to be conclusive, but it is certainly provocative. The marked differences among the size groups warn against careless generalization about an industry, while the variations among the industries studied warn against talking of industry as a whole. The belting, match, and lead pencil industries are cases in which large-scale production is clearly tending to dominate. The small concerns are not keeping their share of the business done. In the six other industries, the smaller concerns have fared better than either of the other groups. However, there is an unfortunate bias created by the nature of the data which operates in favor of the smallest establishments. The tabulation includes only those establishments which reported in both census years. A large concern, if unsuccessful,

[26] The computations were made by the author and no responsibility for the results may be attributed to the Bureau of the Census.

will reduce its scale of operation; a small company in the same condition will go out of business and become ineligible for the tabulation. So, while all successful small concerns are included, a smaller proportion of the less fortunate ones are included than is the case with the other size groups.

The bias mentioned above does not affect the record of the middle and large groups in any serious way. Consequently, it is a highly significant fact that in eight of the nine industries, locomotives being the exception, the large concerns have gained more than the middle-sized establishments. The locomotive industry is perhaps a special case, since the large companies manufacture standard railroad equipment, while the small concerns tend to make specialized products, such as mining locomotives.

This tendency for the large concerns to gain more than the middle group is emphasized by further tabulations for two industries where the "large" group may be subdivided into "very large" and "large" concerns. The average change in value of products is shown in the following statement:

	Very Large	Large
Carpets and rugs	99.0	88.1
Pens, fountain	126.6	67.1

In both instances, the success of the very large companies is marked.

A certain similarity appears between the changes in value of products and wage earners. In general, an increase in value of products has a parallel relative increase in wage earners. However, while the large companies had gained more than the middle-sized in value of products in eight of the nine industries, they have increased their wage earners by a greater amount in but four of the nine. In other words, the large concerns have often gained in value of products without corresponding relative gains in wage earners. A possible explanation for this phenomenon is that the introduction of machinery has proceeded more rapidly in the large plants than in the middle-sized group.

Stock Price Data.—As a further approach to the problem, an attempt was made to determine the movement of stock prices for concerns within four industries grouped according to size. One must at once admit that the fluctuations of security prices are quite inexplicable, that countless factors influence their behavior, and that any discussion of this topic must be bound so tightly by assumptions as to bring it near to strangulation. But let us assume that the advance in security prices of a group of concerns within an industry, relative to the other concerns in the industry, indicates that that group is making more of a success of its business than the other concerns. It may indicate only that the investors believe this to be true. But in these days of investment services and brokerage house statisticians, there may well be some slight basis of fact for these

CHART 5.—INDEXES OF STOCK PRICES FOR CONCERNS IN THE RAILROAD EQUIPMENT INDUSTRY, BY SIZE GROUPS, QUARTERLY, 1918–1927

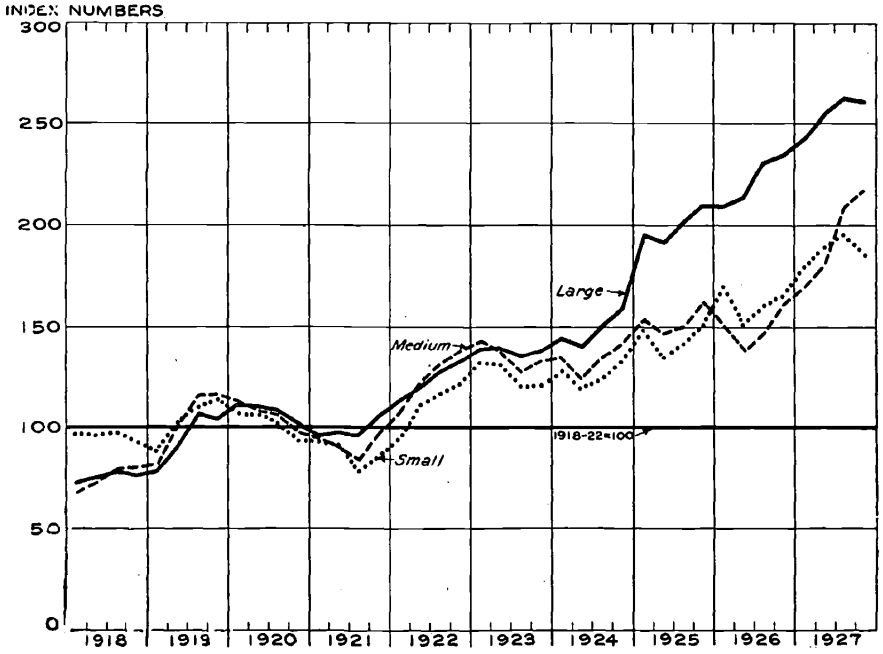


CHART 6.—INDEXES OF STOCK PRICES FOR CONCERNS IN THE IRON AND STEEL INDUSTRY, BY SIZE GROUPS, QUARTERLY, 1918–1927

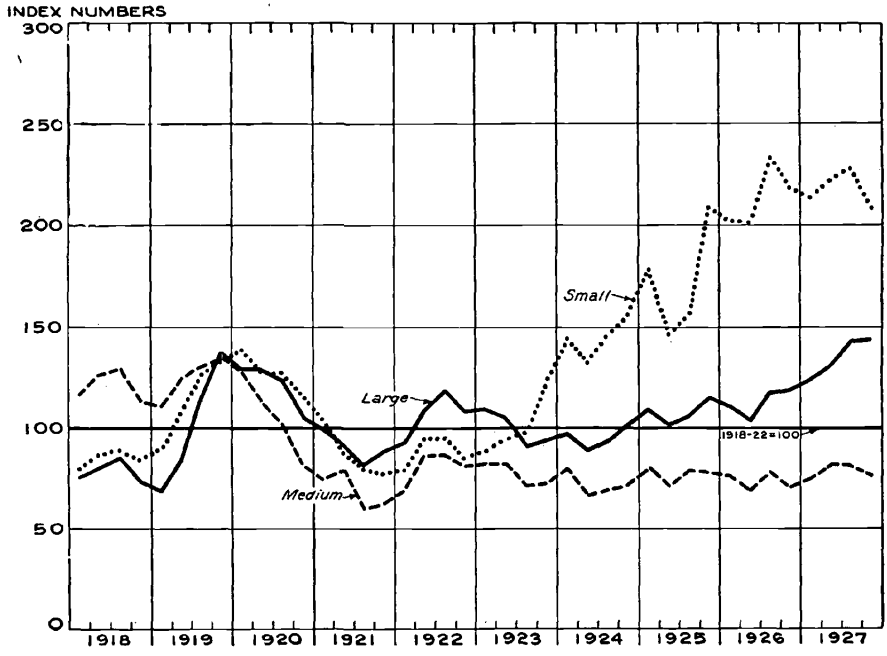


CHART 7.—INDEXES OF STOCK PRICES FOR CONCERNS IN THE NON-FERROUS METALS INDUSTRY, BY SIZE GROUPS, QUARTERLY, 1918–1928

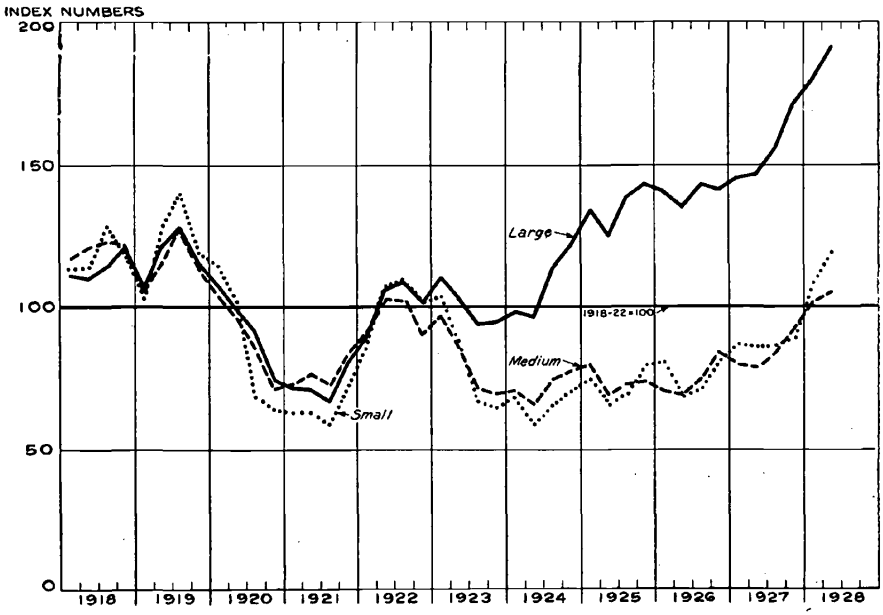
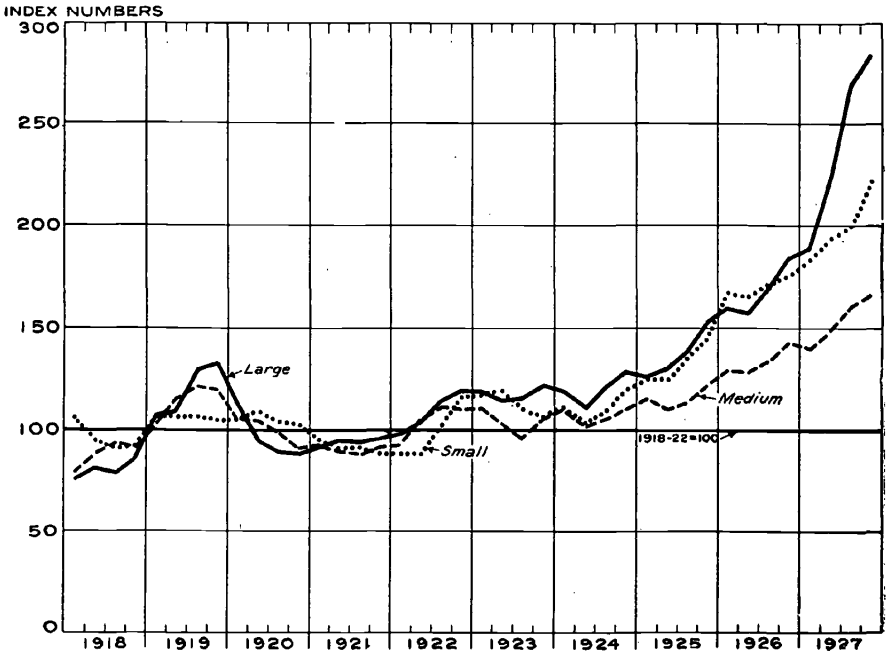


CHART 8.—INDEXES OF STOCK PRICES FOR CONCERNS IN THE TOBACCO INDUSTRY, BY SIZE GROUPS, QUARTERLY, 1918–1927



opinions. At any rate, the indexes have been constructed for four industries, and are presented in Charts 5, 6, 7, and 8.[27]

Except for the iron and steel industry, the various groups appear to move similarly until about the end of 1922. Then, the various size groups begin to separate. In the case of the railroad equipment group and the nonferrous metals, the large concerns rapidly pull away from the medium and small concerns, which remain fairly close together. In the tobacco industry, the small concerns keep pace with the large until the middle of 1926, but then the rapid advance in the large concerns leaves the small ones well behind. In the iron and steel industry, the small concerns are well above the other two groups, the medium-sized concerns having dropped below in 1921 and never having recovered. In summary, the large concerns are well in advance in three instances, and second in one. The medium concerns are definitely at the bottom in two cases and similar to the small concerns in two. They are the sufferers. Less extensive examination of other industries indicates much the same situation to be true, that the concerns just below the large companies are not enjoying the stock market advance of their leaders.

What does this situation mean? It may have any one of several explanations. It may indicate that the large concerns are finding the economies which the Federal Trade Commission figures for several years ago did not disclose at that time. It may indicate that the large concerns, because of modern methods and conditions of selling and distribution, are taking a larger and larger share of the nation's business, as was indicated by the record of individual establishments given above. This may be even at a higher cost than their competitors. Or finally, it may indicate that the same dogma, which expresses itself so often in mergers and consolidations—the belief in the universal advantages of size and

[27] These indexes were constructed by Albert Abrahamson, instructor of economics, Bowdoin College. The data were obtained from the Standard Statistics Co., which placed its files at the disposal of the investigator and assisted in every way. R. B. Brownlee, of the Research Department of that company, gave much valuable advice.

The indexes are based upon records for all those concerns for which sufficient quotations were available during the period. For nine-tenths of the cases, quotations for the close of each week were used; the remaining being half the averages of monthly high and low and half of bid and asked. Corrections were made for stock dividends, rights, etc. Quarterly averages were computed from these quotations. These averages were then expressed in link relatives. The average of the median two or three link relatives was used to form a chained index, corrected so that 1918–1922 equaled 100. The size group was determined by examining the total market value of stock outstanding for the period 1918–1922.

The use of link relatives, which are customarily scorned in constructing index numbers, has definite merit in this case. In the first place, it permits the addition and subtraction of concerns with ease; secondly, it does not carry over, as a permanent part of the computation, any sharp shift upward due to financing, etc. The use of medians is important in that it tends to eliminate the extreme movements in single securities due to the unexplained forces in the stock market.

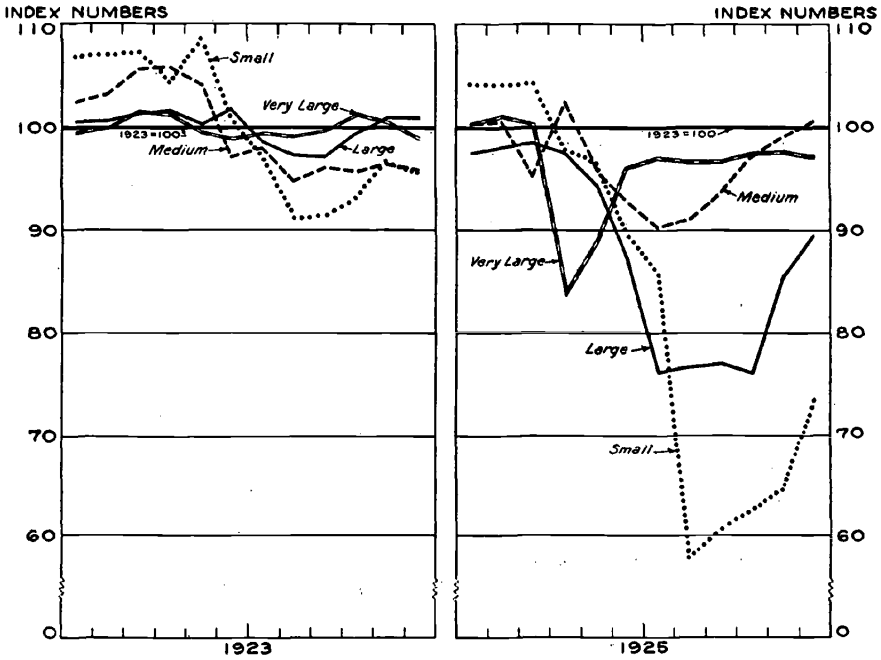
large-scale production—is thus expressing itself in the valuation of corporation securities.

VI. SIZE AND STABILITY

Business fluctuations are usually subdivided into four general categories: secular, cyclical, seasonal, and random variations. Of these four, material is available concerning the effect of increased concentration of industry upon two, the random and the cyclical fluctuations.

Random Fluctuations.—A special tabulation (Table 22) was made of three industries covered by the Census of Manufactures for the years

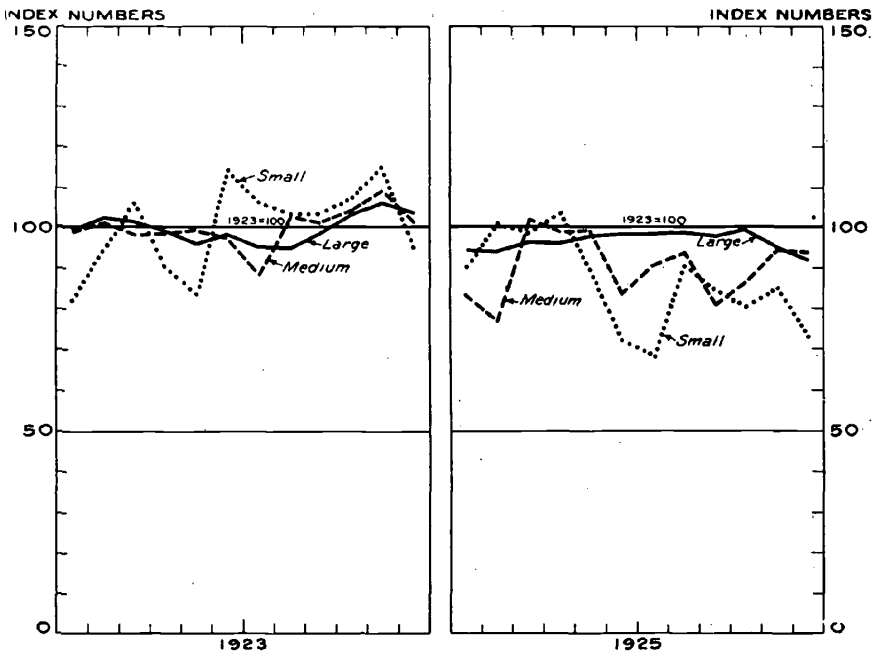
CHART 9.—INDEX NUMBERS OF WAGE EARNERS EMPLOYED BY MONTHS FOR IDENTICAL ESTABLISHMENTS IN THE CARPET AND RUG, WOOL AND OTHER THAN RAG, INDUSTRY, BY SIZE GROUPS, 1923, 1925



1923 and 1925. Establishments were selected which reported in both censuses. They were grouped into three or four size groups, and the monthly employment was calculated for each group. These were reduced to index numbers with 1923 equaling 100. The results are depicted in Charts 9, 10, and 11. It is evident that in the carpet and rug, and in the match industry, the large concerns are more stable from month to month. The medium-sized concerns show wider fluctuations, and the small show the most extreme variations. It must be remembered that these variations are compared on a percentage basis, so that an increase in a small concern from 8 to 12 workers is the equivalent of one

in a large concern from 1,000 to 1,500 wage earners. In the wool-felt hat industry, the seasonal fluctuations dominate the situation, and all size groups move through much the same seasonal fluctuations. The period covered is not one with any pronounced cyclical change, and these fluctuations must be regarded not as the behavior of these size groups throughout a major swing of a cycle, but as the ordinary chance fluctuations which continue at all times, the random variations. In Table 22 are shown the average number of points by which the various size

CHART 10.—INDEX NUMBERS OF WAGE EARNERS EMPLOYED BY MONTHS FOR IDENTICAL ESTABLISHMENTS IN THE MATCH INDUSTRY, BY SIZE GROUPS, 1923 AND 1925



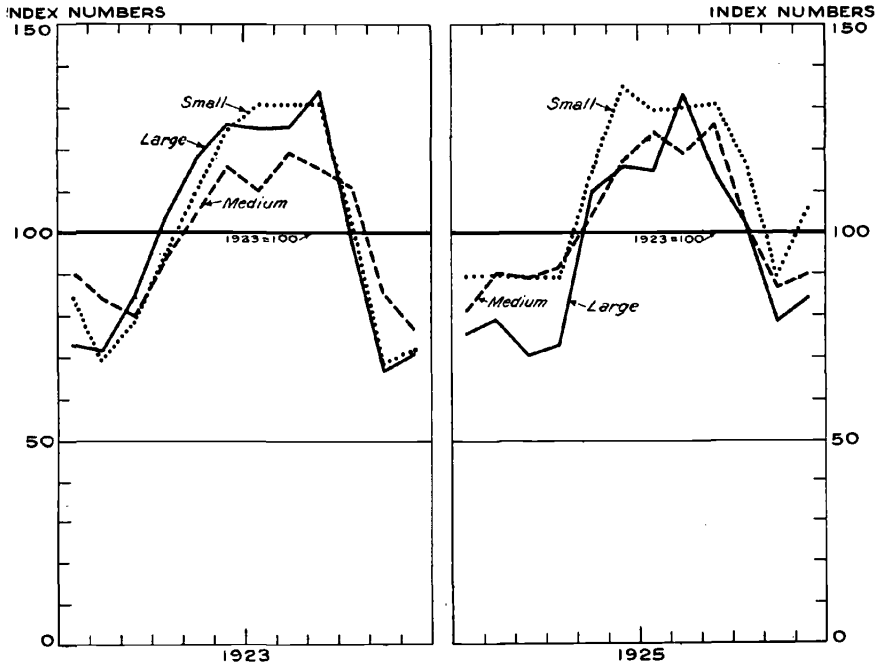
groups in the three industries varied from month to month—the average of the differences between succeeding months without regard to size.

TABLE 22.—AVERAGE MONTH-TO-MONTH CHANGE IN INDEX NUMBERS OF EMPLOYMENT FOR THREE INDUSTRIES, BY SIZE OF ESTABLISHMENT, 1923 AND 1925

Industry	Very large	Large	Medium	Small
Carpets and rugs, wool	1.4	2.3	2.5	4.3
Matches	...	2.0	5.9	10.2
Wool-felt hats	...	12.4	8.7	11.8

The records of the Federal Trade Commission throw considerable light on these random fluctuations. Most cases cover the war years, and

CHART 11.—INDEX NUMBERS OF WAGE EARNERS EMPLOYED BY MONTHS FOR IDENTICAL ESTABLISHMENTS IN THE WOOL-FELT INDUSTRY, BY SIZE GROUPS, 1923 AND 1925



cannot be regarded as subject to any marked cyclical fluctuations. In nearly all instances the variation in rate of return from year to year is greater among the small concerns. As an example, the record of the coke industry for the years 1915–1918 is given in Table 23.[28]

TABLE 23.—RATE OF RETURN ON INVESTMENT OF BEEHIVE COKE COMPANIES IN WESTERN PENNSYLVANIA, BY SIZE GROUPS, 1915–1918

Investment	Rate of return					Average deviation	Per cent deviation
	1915	1916	1917	1918	Average		
Over $5,000,000	5.7	11.9	24.3	18.3	15.0	6.2	41
$1,000,000 to $5,000,000	2.2	7.5	23.0	17.8	12.6	7.8	62
Under $1,000,000	7.9	16.6	57.3	69.8	37.9	25.6	68

The changes from year to year are not only largest in actual amount for the small concerns, but also greatest when expressed as percentages of the average. In order to demonstrate that this condition is not the

[28] United States Federal Trade Commission, *War-Time Profits and Costs of the Steel Industry*. Washington, 1925.

result of selecting an instance in which the greatest profits were earned by the small companies, the record of the canned-milk industry is given in Table 24, an industry in which the highest return was recorded in the next to largest group.[29] In this case, as well, the widest fluctuations appear in the smaller size groups.

TABLE 24.—RATE OF RETURN ON INVESTMENT OF CANNED-MILK COMPANIES, BY SIZE GROUPS, 1915–1918

Volume of sales	1915	1916	1917	1918	Average	Average deviation	Per cent deviation
Over $5,000,000	11.4	18.1	19.4	8.9	14.4	4.3	30
$1,000,000 to $5,000,000	23.8	30.6	30.6	12.0	24.2	6.4	26
$250,000 to $1,000,000	2.2	16.8	17.3	4.5	10.2	6.8	67
Under $250,000	−5.4	8.2	15.8	2.7	5.3	6.7	126

By the law of averages, there seems every reason for expecting a small concern to suffer wider fluctuations in its operation than a large concern. But it may furthermore be expected that the large concern will maintain steadier operation than an equivalent number of small concerns. The various small concerns will compensate for each other's fluctuations to some extent, but the large concern will have the advantage in being better able to plan ahead, to study its market, and to take advantage of regional differences in business conditions. Furthermore, while the various fluctuations of the small concerns may compensate for each other statistically, they do not do so economically. In each case the concern is required to maintain machinery and equipment sufficient to meet its maximum demand. The result is a total capacity greater than the single large company will find necessary. Finally, the wider fluctuations in the individual small companies will result in continual hiring and discharging of labor. Other small companies may stand ready to hire the man who has just been discharged, but unless a number of small companies are located in the same community, operation by small companies will tend to keep a larger number of men unemployed than when large companies dominate the industry.

Cyclical Fluctuations.—The Bureau of the Census destroyed the schedules for years prior to 1923, so that it was not possible to include the year 1921 in a study of industrial changes according to the size of concerns. An attempt was made to examine the relation between stability and the scale of production by correlating the various industries in terms of their average scale of production, and the degree to which their value of production in 1921 fell below the average of 1919 and 1923.

[29] United States Federal Trade Commission, *Report on Milk and Milk Products*. Washington, 1921, p. 44.

No relationship was indicated. The industries which suffered most heavily were neither predominantly large-scale nor small-scale. Furthermore, the severity of the depression in the various industries was not related to the average number of workers per establishment, the horse power per establishment, or the percentage which wages bore to total expenses. If any such relationship exists, it must be in terms of the relative severity with which the depression attacks the various concerns within an industry rather than in determining the effect upon one industry as distinct from another.

The material which bears most directly on this problem, appears in *Employment Hours and Earnings in Prosperity and Depression,* by Dr. Willford I. King, National Bureau of Economic Research Publication Number 5. Reports of employment were collected from approximately 850 enterprises. The results of this inquiry are given in Table 25.

TABLE 25.—THE VOLUME OF EMPLOYMENT AT THE PEAK AND TROUGH FOR FACTORIES, 1920–1922

Employees per concern	Total number on payrolls reporting	Estimated hours actually worked (in millions)		
		Peak	Trough	Per cent decline
0 to 20	2,672	901	827	8.21
20 to 100	16,902	1,171	946	19.21
Over 100	562,305	5,327	3,273	38.56

These figures, while not based upon a large enough sample to be conclusive, are as yet unchallenged. They demonstrate that in terms of employment, cyclical fluctuations are most severe among large concerns.

However, these results do not appear consistent with the indexes of stock prices, depicted in Charts 5 and 9. In two of these industries, the securities of the large companies showed much less decline in 1921 than the other groups. In the other two the three groups move together. Furthermore, there are at least two investigations by the Federal Trade Commission which present data for earnings over this significant period. The first record is for slightly over 100 flour milling companies. The average rate of profit on the investment as determined by the Federal Trade Commission is given in Table 26.[30] There can be no question but that, in the above industry, the large concerns weathered the depression of 1921 more successfully, from a financial point of view, than did

[30] United States Federal Trade Commission, *Report on the Wheat Flour Milling Industry.* Washington, 1924, p. 37.

the small concerns. The same result appears in the figures which the Federal Trade Commission has published for the furniture industry.[31]

TABLE 26.—AVERAGE RATE OF RETURN IN THE FLOUR MILLING INDUSTRY, 1919–1922

Investment group	1919	1920	1921	1922
Over $2,000,000	13.7	15.8	2.0	11.5
$1,000,000 to $2,000,000	16.8	14.1	− .7	5.9
$500,000 to $1,000,000	18.4	15.7	−3.1	12.0
$250,000 to $500,000	15.5	10.6	.7	10.0
Under $250,000	18.5	.8	−9.4	6.5

TABLE 27.—AVERAGE RATE OF RETURN IN THE FURNITURE INDUSTRY, 1920–21

Investment group	Number of companies	1920	1921
Over $500,000	34	27.2	11.2
$300,000 to $500,000	44	29.0	7.6
$100,000 to $300,000	168	28.5	6.4
Under $100,000	53	31.4	6.1

At first glance, the employment data and the earnings data appear to be contradictory. With regard to employment, the figures indicate that the larger concerns recorded the greater fluctuations; with regard to earnings, the larger concerns appear the more stable. The antagonism of these two generalizations may be due to the inadequacy of the data on which they are based. This is a matter which the future may be able to correct. But the generalizations may not be a contradiction. They may be explainable in terms of differing business policy.

For example, the manufacture of pig iron is an enterprise which has come definitely under the domination of large-scale operation. In recent years there has been a marked reduction in pig iron price fluctuations. According to Dr. Blackett, this change was particularly apparent about 1907,[32] which was the first time that the new large companies faced a severe industrial depression. According to Dr. Berglund,[33] even wider fluctuations occurred prior to 1900, when the United States Steel Corporation was formed. This reduced fluctuation in prices finds no corresponding reduction in production. Never before was there a decline in output so marked as that of 1921, and the reduction in output

[31] United States Federal Trade Commission, *Report on the House Furnishings Industries*. Vol. 1, p. 67, Washington, 1923.

[32] O. W. Blackett, "Some Price Determining Factors in the Iron Industry," *Review of Economic Statistics*, Vol. 7, p. 203.

[33] Abraham Berglund, "The United States Steel Corporation and Price Stabilization," *Quarterly Journal of Economics*, Vol. 38, p. 1.

in the minor recession of 1924 to less than one-half that of the corresponding months in the previous year, is approximately equal to that of such earlier depressions as 1908 and 1894. The records indicate a trend toward production cycles rather than price cycles. In fact, the policy of price stabilization was openly avowed by the United States Steel Corporation in 1921–22. It is, therefore, by means of reducing production, which was reflected in the employment figures, that the larger corporations are able to record less reduction in earnings than do the small corporations, which follow a different policy.

From the point of view of the industry concerned, the policy of price maintenance probably tends to prevent speculation, and to that extent, tends to create some degree of actual stabilization. But from the point of view of those persons who advocate higher interest rates, or higher wage rates, or, in general, higher costs during the expansion, as a method of preventing overdevelopment, the undue expansion of other industries may even be stimulated by stable prices of such basic raw materials as iron and steel. Nor will the maintenance of high prices during depression prove a helpful factor in terminating depression. Furthermore, the transfer of incidence of the cycle from prices to production spells less regular employment for workers.

VII. THE GEOGRAPHICAL STRUCTURE OF INDUSTRY[34]

Migration among Areas.—Everyone has heard of the migration of the cotton textile industry southward, the boot and shoe industry westward, and the soft coal industry out of Pennsylvania. We are less familiar with the more general problem of the movement of manufacturing industry as a whole. We think of certain areas of the United States as manufacturing areas, certain others as agricultural, and certain others as mining centers. But in all three, instances of migration are evident. The history of Nevada is a story of mining rush and mining ebb; the recent record of Georgia shows an amazing turn away from cotton growing. But it is in manufacturing, not as tied to its original location by natural resources as are the other two, that one would expect the greatest mobility.

A direct comparison of manufacturing activity among the states loses much of its significance when one realizes that differences in area and density of population may determine the ranking rather than the degree of manufacturing. New York, with its 1,066,202 wage earners, is actually less dominated by manufacturing than Rhode Island, with but 120,346 manufacturing workers. In New York State, of the total number engaged in agriculture, manufacture, and mining in 1919, 83.1 per cent were in manufacturing, while 95.3 per cent were so engaged in

[34] The bulk of the statistical material in this section was selected by William Harrison Carter, Jr., instructor of economics, Amherst College.

TABLE 28.—CHANGE IN PERCENTAGE OF WAGE EARNERS ENGAGED IN MANUFACTURE, AGRICULTURE, AND MINING, BY STATES

State	Per cent which total number engaged in manufacture is of total in agriculture, manufacture, and mining, 1919	Per cent change in average number of wage earners engaged in manufacture	
		1914–1925	1923–1925
Maine	61.5	92.0	88.6
New Hampshire	77.6	85.1	88.5
Vermont	46.3	86.2	89.5
Massachusetts	94.0	98.0	88.7
Rhode Island	95.3	106.9	89.4
Connecticut	90.2	107.7	92.1
New York	83.1	102.4	92.8
New Jersey	90.7	115.0	95.0
Pennsylvania	68.0	109.4	91.3
Ohio	68.1	134.2	96.9
Indiana	50.8	144.8	96.5
Illinois	63.6	124.4	96.5
Michigan	64.3	192.4	102.4
Wisconsin	51.8	129.1	99.9
Minnesota	32.2	110.9	97.0
Iowa	23.8	123.1	96.6
Missouri	37.6	131.5	99.6
North Dakota	4.8	109.7	91.8
South Dakota	7.1	155.5	100.1
Nebraska	20.8	112.9	87.5
Kansas	23.5	116.8	91.1
Delaware	65.4	95.4	89.6
Maryland	63.3	90.2	97.8
District of Columbia	94.7	111.7	99.7
Virginia	31.2	115.6	100.6
West Virginia	29.0	116.4	94.2
North Carolina	27.1	139.4	104.9
South Carolina	17.1	143.1	103.4
Georgia	18.9	142.5	102.7
Florida	42.8	123.1	101.9
Kentucky	16.0	126.4	99.9
Tennessee	21.6	154.8	101.3
Alabama	18.5	156.0	106.4
Mississippi	11.5	125.1	101.6
Arkansas	12.5	110.8	98.8
Louisiana	28.3	115.1	93.2
Oklahoma	9.8	166.4	103.8
Texas	13.9	147.7	104.6
Montana	17.3	110.6	92.7
Idaho	18.9	182.7	96.6
Wyoming	18.4	227.1	84.3
Colorado	27.6	120.6	102.9
New Mexico	9.7	130.4	84.8
Arizona	16.5	134.4	101.3
Utah	30.1	112.6	101.2
Nevada	21.1	73.9	79.4
Washington	58.7	160.1	95.0
Oregon	46.1	213.5	95.3
California	51.4	182.6	101.7

Rhode Island. The changes which have taken place in recent years do not necessarily represent the actual movement of a firm from one locality

to another. In fact, it more often is the result of the closing down of some concern in one place, and the opening of a new concern elsewhere. Furthermore, there has been a marked tendency recently toward the establishment of branch plants to feed certain areas. Finally, new industries develop, which do not necessarily settle in the old areas. All these changes result in a net migration of industry.

The growth of the various sections of the country is evidenced by the data from the census of manufactures shown in Table 29. The out-

TABLE 29.—DEVELOPMENT OF THE SECTIONS OF THE COUNTRY, 1925, ACCORDING TO VARIOUS INDEXES, 1914 EQUALS 100[a]

Area	Number of establishments	Number of wage earners	Primary horse power	Value of products	Value added by manufacture
United States	104.8	120.9	160.7	261.2	274.3
New England	101.1	99.2	140.3	211.8	233.5
Middle Atlantic	99.3	107.2	150.7	238.1	262.0
East North Central	107.2	141.3	186.3	293.0	304.1
West North Central	102.8	122.3	150.2	235.7	244.6
South Atlantic	98.1	121.6	152.4	274.0	299.7
East South Central	106.1	143.0	139.6	263.8	252.2
West South Central	111.7	129.8	136.5	322.4	307.1
Mountain	110.6	127.7	165.0	242.7	222.4
Pacific	139.1	179.9	207.7	327.9	344.1

[a] The original Census data for 1914 were corrected to exclude establishments having a product of less than $5,000, except in the case of horse power, where data are not available to make the correction. The figures for 1914 include "Coffee and spice, roasting and grinding" and "Automobile repairing," for which data were not collected in 1925.

standing facts in this material are the extraordinary advance of the Pacific states, the gain by the East North Central division, and the failure of the New England states, and, to some extent, the Middle Atlantic section, to keep pace with the rest of the country.

TABLE 30.—DEVELOPMENT OF THE SECTIONS OF THE COUNTRY, 1925, ACCORDING TO VARIOUS INDEXES, 1923 EQUALS 100

Area	Number of establishments	Number of wage earners	Primary horse power	Value of products	Value added by manufacture
United States	95.8	95.6	108.2	104.1	103.6
New England	95.4	89.5	101.8	96.3	94.0
Middle Atlantic	89.5	92.5	105.0	98.7	101.5
East North Central	97.8	98.2	111.4	107.1	108.2
West North Central	98.5	96.7	109.2	111.0	104.7
South Atlantic	97.6	100.9	109.9	107.4	110.4
East South Central	108.1	102.6	110.6	107.0	107.7
West South Central	100.2	99.5	103.9	122.8	115.9
Mountain	97.4	96.9	106.1	109.8	103.5
Pacific	105.0	99.0	120.5	107.3	101.2

A similar comparison is presented in Table 30 comparing 1925 with 1923. It does not seem possible that such a short period could see any considerable change in the relative importance of the various sections of the country, but the different trends are clearly shown. This more recent material brings out a new development, the rapid growth of the South as a manufacturing area. The three southern divisions lead in the rate of increase both in number of wage earners employed and the total value added by manufacture.

The trends which are indicated by the tables for divisions are more clearly presented in Table 28 for the individual states.

A significant factor in this migration among localities is the comparatively recent development of branch plant operation. As a means of keeping transportation costs low, and of giving rapid service for dealers who require rush delivery, the branch plant represents an accepted form of expansion to-day. A study made by the United States Chamber of Commerce for the year 1927 gives in Table 31 the facts concerning the establishment of new branch plants during that year.

TABLE 31.—COMPARATIVE LOCATION OF HEADQUARTERS AND BRANCH PLANTS CONSTRUCTED IN 1927

Location of branch	Location of headquarters									
	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	Total
New England	6	6	2	..	..	..	..	..	..	14
Middle Atlantic	2	23	3	1	3	..	..	..	..	32
East North Central	1	6	22	1	..	1	..	1	4	36
West North Central	1	3	3	14	..	..	2	1	1	25
South Atlantic	1	14	4	3	8	2	..	..	..	32
East South Central	..	1	3	..	1	2	..	..	..	7
West South Central	..	..	1	3	1	2	6	..	..	13
Mountain	..	..	1	..	..	..	..	5	2	8
Pacific	2	18	19	2	1	..	..	..	13	55
Total	13	71	58	24	14	7	8	7	20	222

More than one-half of these branches are located beyond the boundaries of the division in which the headquarters office is located. About three out of every five headquarters offices are located in the Middle Atlantic and East North Central divisions. The largest number of branches with headquarters outside the division are in the Pacific states, with the South Atlantic second.

The same study by the United States Chamber of Commerce gives information concerning the size of these new branches which are established. They are by no means small-scale establishments, as the following

statement of number and distribution of new branch plants according to number of wage earners, 1927, indicates:

1 to 5 wage earners	17
6 to 10 wage earners	33
10 to 25 wage earners	53
26 to 50 wage earners	40
51 to 100 wage earners	34
Over 100 wage earners	41

The material concerning the establishment of new branch plants is in accord with the tendencies depicted in the more general data for geographical migration of industry. There is a trend leading to the more equal distribution of manufacturing activity throughout the country. The old areas have lost their supremacy, and the greatest gains are being made by those states in which manufacturing has not been relatively important.

Location as between City and Country.—Quite as important as the shift of industry geographically is the movement from city to country. The Department of Agriculture has made us familiar with the migration of farmers from country to city; we know less of the movement which has carried manufacturing into the country. Between 1919 and 1925, while the 25 largest cities in the country lost 326,800 wage earners, about 12 per cent of the average number employed, the rural area (all area not included in communities having a population of 10,000 inhabitants) gained 55,204 wage earners. Nor is this decrease limited to the larger cities. Cities between 100,000 and 250,000 population lost even more heavily, 14 per cent of their wage earners; communities between 25,000 and 100,000 lost 11 per cent, and those between 10,000 and 25,000 lost 8 per cent of their wage earners.

In the studies which have been presented in the quinquennial censuses concerning this problem, the communities have been classed at each census according to their size at the time. Consequently, the gradual increase in size of communities resulted in apparent increase in urban concentration and decrease in the rural areas. For this study, the communities have been grouped according to their size on January 1, 1920. It should be further noted that high land costs and the incidence of taxation have resulted in many plants locating themselves just outside the city boundary. The real importance of many cities can be properly ascertained only by combining with the establishments actually located in the city all the neighboring manufacturing establishments identified or closely associated with its industrial development. The difficulties in the way of such tabulation are many. The Census Bureau has adopted the practice of using metropolitan areas for certain of the larger cities, in the attempt to eliminate this difficulty somewhat. Table 32 presents the facts of the urban-rural movement for the various geo-

TABLE 32.—DISTRIBUTION OF WAGE EARNERS BY GEOGRAPHICAL DIVISIONS, ACCORDING TO SIZE OF COMMUNITIES, 1919–1925[a]

Size of community	Number of communities	1919		1925		Per cent change 1919 to 1925
		Number of wage earners	Per cent of total	Number of wage earners	Per cent of total	
UNITED STATES						
Total	...	9,050,829	....	8,380,674	....	− 7.4
Over 250,000	25	2,763,494	30.5	2,436,694	29.1	−11.8
100,000–250,000	43	1,016,388	11.2	873,813	10.4	−14.1
25,000–100,000	215	1,637,786	18.1	1,461,653	17.4	−10.8
10,000–25,000	456	954,600	10.5	874,749	10.5	− 7.8
Remainder	...	2,678,561	29.7	2,733,765	32.6	+ 2.1
NORTH EAST						
Total	...	1,348,190	....	1,122,216	....	−16.7
Over 250,000	1	88,529	6.6	77,334	6.9	−12.6
100,000–250,000	10	341,237	25.3	273,233	24.3	−20.0
25,000–100,000	35	367,440	27.3	302,436	26.9	−18.2
10,000–25,000	67	225,366	16.7	194,584	17.1	−15.1
Remainder	...	325,618	24.2	277,629	24.7	−14.8
MIDDLE ATLANTIC						
Total	...	2,862,484	....	2,491,039	....	−13.0
Over 250,000	7	1,262,289	44.1	1,067,004	42.8	−15.5
100,000–250,000	8	197,198	6.9	163,983	6.6	−16.8
25,000–100,000	48	427,909	15.0	369,911	14.9	−13.6
10,000–25,000	110	270,261	9.4	249,699	10.0	− 7.6
Remainder	...	704,927	24.6	640,442	25.7	− 9.2
EAST NORTH CENTRAL						
Total	...	2,388,970	....	2,342,799	....	− 1.9
Over 250,000	6	931,161	39.0	858,587	36.6	− 7.8
100,000–250,000	6	207,716	8.7	188,380	8.0	− 9.3
25,000–100,000	61	517,142	21.6	486,869	20.8	− 5.9
10,000–25,000	101	244,827	10.2	224,468	9.6	− 8.4
Remainder	...	488,124	20.4	584,495	24.9	+19.8
WEST NORTH CENTRAL						
Total	...	494,255	....	452,820	....	− 8.4
Over 250,000	3	167,692	33.9	162,328	35.8	− 3.2
100,000–250,000	4	73,719	14.9	61,271	13.5	−17.4
25,000–100,000	14	63,636	12.9	56,597	12.5	−11.1
10,000–25,000	48	54,286	11.0	51,892	11.5	− 4.4
Remainder	...	134,922	27.3	120,732	26.7	−10.4
SOUTH ATLANTIC						
Total	...	808,864	....	838,834	....	+ 3.7
Over 250,000	2	107,950	13.4	95,550	11.4	−11.5
100,000–250,000	4	63,878	7.9	55,323	6.6	−13.5
25,000,000–100,000	21	136,376	16.8	125,100	15.0	− 8.3
10,000–25,000	35	64,485	8.0	68,259	8.2	+ 5.9
Remainder	...	436,175	54.0	494,602	59.0	+13.4
EAST SOUTH CENTRAL						
Total	...	324,762	....	355,578	....	+ 9.5
100,000–250,000	4	69,636	21.5	74,263	20.8	+ 6.6
25,000–100,000	7	41,251	12.7	43,801	12.3	+ 6.2
10,000–25,000	22	33,154	10.2	34,879	9.8	+ 5.2
Remainder	...	180,721	55.6	202,635	57.1	+12.1
WEST SOUTH CENTRAL						
Total	...	282,312	....	264,990	....	− 6.1
Over 250,000	1	26,535	9.4	22,118	8.3	−16.6
100,000–250,000	4	28,695	10.2	30,827	11.6	− 7.4
25,000–100,000	12	25,570	9.0	24,861	9.4	− 2.5
10,000–25,000	36	22,939	8.2	21,087	7.9	− 8.0
Remainder	...	178,573	63.2	166,097	62.6	− 7.0
MOUNTAIN						
Total	...	107,759	....	100,374	....	− 6.9
Over 250,000	1	16,514	15.3	15,077	15.0	− 8.7
100,000–250,000	1	6,309	5.8	4,898	5.0	−22.2
25,000–100,000	5	7,393	6.8	5,460	5.5	−25.7
10,000–25,000	16	13,039	12.1	9,294	9.3	−29.0
Remainder	...	64,504	60.0	65,645	65.2	+ 2.0
PACIFIC						
Total	...	432,963	....	415,024	....	+10.4
Over 250,000	4	162,824	37.6	138,696	33.5	+18.0
100,000–250,000	2	28,000	6.5	21,635	5.2	− 8.5
25,000–100,000	12	51,069	11.8	46,618	11.3	+18.5
10,000–25,000	21	26,073	6.0	23,587	5.7	−22.5
Remainder	...	164,997	38.1	184,488	44.4	+13.8

[a] The Bureau of the Census provided data for many cities in 1919 where material could not be published by them. In some few cases for 1925, it has been necessary to make estimates, but they were always for small cities and cannot seriously affect the figures here given. The data are corrected for establishments with products under $5,000 but not for the change in the "coffee roasting" and "automobile repairing" industries, both of which are included in 1919 and not in 1925.

graphical divisions in the country. As might be expected, it has not been uniform. The urban loss is, of course, greatest in amount in those sections where the cities are located, the Middle Atlantic and East North Central districts. The rural gain is most remarkable in the East North Central division. The South Atlantic and the Pacific divisions also show increased manufacturing activity in the rural areas.

Further light on this problem is shed by the data collected by the Chamber of Commerce of the United States concerning plants which moved from one locality to another during 1927. It is possible to subdivide 228 instances according to the population of the community which they left, and the population of the community to which they went. These data are summarized in Table 33.

TABLE 33.—DISTRIBUTION OF PLANTS REMOVED IN 1927, ACCORDING TO THE POPULATION OF THE COMMUNITY LEFT AND THE COMMUNITY ENTERED

Population of community entered	Population of community left								
	Under 10,000	10,000 to 25,000	25,000 to 50,000	50,000 to 100,000	100,000 to 200,000	200,000 to 300,000	300,000 to 500,000	Over 500,000	Total
Under 10,000	12	6	3	2	1	..	2	18	44
10,000 to 25,000	12	4	1	2	5	2	2	12	40
25,000 to 50,000	5	2	4	1	..	2	2	19	35
50,000 to 100,000	6	1	4	2	1	..	5	10	29
100,000 to 200,000	4	3	1	6	3	..	..	21	38
200,000 to 300,000	4	..	..	..	2	..	..	4	10
300,000 to 500,000	2	..	..	1	..	2	..	4	9
Over 500,000	1	4	1	4	4	1	2	6	23
Total	46	20	14	18	16	7	13	94	228

There are 30 cases where the plant remained in the same population group; but there are 72 in which it went to a larger community and 126 in which it sought a smaller community. The only group to report a serious net loss is that of cities over 500,000, while the gains were made chiefly in the cities under 200,000. The results correspond with those already indicated by the census data.

The advantages which the small town can offer are, usually, low taxes, low real estate values, less freight congestion, and above all, lower labor cost. On the other hand, the obstacles are the forces of inertia, the material concentration, and the requisites essential for large-scale production. It appears that at present the first list of forces is stronger.

There are certain conspicuous differences between manufacturing industry in the large cities and in the smaller groups. First, there is a difference in the matter of size. In 1919, the only year for which proper figures are available, it was clear that the cities of over 250,000 population

had more than their due share of establishments employing 6 to 50 wage earners, that the cities having a population between 100,000 and 250,000 had more than their share of the larger establishments, and the rest of the country was in advance of its relative position in the very small establishments. The details of this situation appear in Table 34.

TABLE 34.—SIZE OF ESTABLISHMENTS, BY SIZE OF COMMUNITIES, 1919

Population group	Percentage distribution of establishments employing (wage earners)—									
	Total	None	1 to 5	6 to 20	21 to 50	51 to 100	101 to 250	251 to 500	501 to 1,000	Over 1,000
Over 250,000	31.7	32.8	26.9	39.6	40.2	34.5	29.2	28.0	29.2	25.7
100,000 to 250,000	7.0	6.5	5.8	7.9	8.9	9.8	9.2	9.1	12.0	14.8
Under 100,000	61.2	60.6	67.3	52.3	50.8	55.6	61.5	62.7	58.7	59.4

A similar calculation, based on the value of products, shows that the smallest establishments are in the section of the country not including communities of over 100,000 population, the cities over 250,000 are strongest in the establishments producing from $100,000 to $500,000 per year, and the middle group of cities is strongest in the largest establishments.

A further demonstration of the more recent tendencies in this connection can be obtained from the tabulation presented in Table 35 with certain additional material. The average number of wage earners per establishment in the various population groups is given in Table 35.

TABLE 35.—AVERAGE NUMBER OF WAGE EARNERS PER ESTABLISHMENT, BY SIZE OF COMMUNITY, 1919 AND 1925

Population of community	1919[a]	1925
Over 250,000	35.7	35.1
100,000 to 250,000	60.6	56.7
25,000 to 100,000	63.1	64.0
10,000 to 25,000	52.9	57.9
Remainder	31.0	42.3

[a] Corrected for establishments with product under $5,000, but not for "automobile repairing" or "coffee roasting," both of which were included in 1919 and not in 1925.

Not only are these data important as indicating the difference between urban and rural, but they also indicate the trend. There is evidence that the plants in the large cities are actually decreasing in size, while the establishments in the rural areas have grown remarkably in such a short period. This is a further sign of the tendency toward equalization of manufacturing throughout the country.

A further distinction between urban and rural manufacturing lies in the nature of the industries concerned. Of the 324 industries reported in the Census of Manufactures in 1925, 71 appear as one of the leading five industries, in terms of wage earners, in at least one of the 68 cities reporting over 100,000 population in 1921. Industries appearing in at least 5 cities and ranked according to the number of times they appear as one of the five leading industries in 68 cities, 1925, are shown in the following statement:

Foundry and machine shop	40	Boots and shoes	7
Steam railroad shop	39	Cigars and cigarettes	7
Printing and publishing	37	Motor vehicle parts	7
Bread and baking	18	Slaughtering and meat packing	7
Electrical machinery	15	Confectionery and ice cream	5
Motor vehicles	15	Furniture	5
Men's clothing	14	Machine tools	5
Knit goods	10	Planing mills	5
Steel works and rolling mills	9		

It is evident that the three industries which appear so often are important in every city, and that, in the absence of any other outstanding industry, they appear in the ranking. Among the general industrial groups of the census, the two which lead in urban activity are machinery and textiles.

Local Concentration of Industry.—Not only is manufacturing *in toto* becoming less concentrated in a particular section of the country, but industries are also tending to be less concentrated in certain favored spots. At once, one thinks of Fall River, Akron, Gloversville, Troy, Paterson, Detroit, and a host of other cities whose history is closely related to some one industry. While there are but few cases where the early center has actually lost the industry, in most cases its dominance has disappeared, owing to its failure to keep pace with the growth of the industry in other parts of the country. Although the slaughtering and meat packing industry in Chicago has more than doubled its value of products since 1899, the city fell from 35.6 per cent of the national total to 18.8 per cent during the period. Likewise Philadelphia more than doubled the number employed in making carpets and rugs, yet fell from 45.6 per cent of the nation's total to 27.8 per cent. In a mere handful of instances has any considerable concentration come about in recent years. In the jewelry industry, New York City has risen from 19.7 per cent in 1899 to 34.5 per cent in 1925 at the expense of Providence and Attleboro. Similarly, in the corset industry, New York City has advanced from 11.5 per cent to 27.5 at the expense of Bridgeport and New Haven, and in the hairwork industry, it advanced from 41 per cent to 76 per cent in 1925. These three instances stand alone on the records available. The trend is decidedly the other way. Furthermore, they represent not a gather-

ing of industry in one center from many scattered spots, but a transfer from one spot of concentration to another. From the point of view of Attleboro and Bridgeport, the instances represent a break in the concentration of industry.

A further demonstration of this breaking down of local concentration of industry was obtained from examining all cases for which continuous records were available since 1899 for communities which at some time produced at least 3 per cent of the national product in some industry. In this way, it was possible to obtain records for 105 instances of local concentration. The percentage which each community was of the national total was then computed for each census date, to determine whether it was gaining or losing in relative position. The following statement shows the distribution of 105 instances of local concentration according to the census date at which the community reached its highest percentage of the national total.

1899	32	1919	14
1904	21	1923	9
1909	15	1925	10
1914	4		

It is quite conclusive that one-half the cases examined reached their highest point by 1904, and that but 10 of the 105 were at their highest point when the recorded ended.

Thus, one further evidence of the gradual evening out of manufacture is offered. First, there was the development of backward areas and the decline of the highly developed areas; second, the development of rural sections and the decline of the city; and third, the breakdown of local concentration in the historical centers of specific industries. And it is probable that all these mean more efficient production. Certainly, they will cause considerable saving in freight hauling, less delay in shipping. Furthermore, it tends to destroy the dependence of areas upon single types of activity for livelihood. Diversification of industry means less violent depressions and less excited prosperities, since the various industries do not move in exact accord, and their average will tend to be more stable than single industries. The advantages of local concentration have long been sung, but the day of diversification has come. It should be a happier one for many communities.

Location in Terms of Freight Rates.—We have discussed the movement of industry about areas as though the map was the real criterion of distance in the mind of the business man. He is much more concerned about distance in terms of two other dimensions, time of communication and freight rates. For the first, the introduction of the long-distance telephone and airplane mail has lessened its importance. But the cost of hauling freight is still extremely significant. A reduction in freight

rates between Chicago and New York is just as significant as if all the industry of the Chicago district were moved eastward by that much.

As a matter of fact, the operation of the Panama Canal and the realignment of rates since the war have resulted in moving Chicago 336 cents away from the Pacific coast per ton of staple goods, while moving New York 224 cents nearer.[35] This situation offers a serious handicap to industry in the mid-west. Its market is reduced, while that of the Atlantic Coast States has been increased. The answer has just been made by the mid-west in the form of a new route for freight shipment. It appears in a freight tariff issued by the Illinois Central Railroad (I.C.C. No. A-10314). This offers to carry freight from points in Indiana to New Orleans, and to the Pacific Coast via the Panama Canal, over the Illinois Central Railroad and the Redwood Line (Inc.). The rates are so low that at least one large producer of steel is now shipping to the Pacific Coast by this route rather than by its own vessels on the Atlantic Coast. The opening of the new canal from Pittsburgh to the sea, via the Ohio and Mississippi Rivers, should be a further influence in giving the mid-west a more strategic position.

VIII. SUMMARY

When industries are measured according to the average number of wage earners per establishment, wide differences appear. There is no noticeable trend toward production on a larger scale. The tendency is rather for the extremes to move toward the middle, and points of concentration are appearing about 20 workers per establishment and 100 workers per establishment.

However, using horse power per establishment as the basis for measurement, the increase in the scale of production is evident. There has been a general and marked increase in horse power, and the development has by no means reached its culmination.

The implications of these two tendencies are significant in many respects. Plants can take on additional wage earners without the assistance of financial institutions, but large increases in machinery necessitate corresponding initial outlays. In addition to its interest for the investment banker, this increase in the capital structure has significance for the business cycle analyst. As long as the chief expense is labor cost, the manufacturer, by means of discharging employees, can reduce costs as his receipts are reduced. But with a large investment in machinery, his interest charges will continue whether he operates or not. From the point of view of the worker, it means that more and more of the actual labor is done by the machine, and we are coming more and more to merit the designation of the "machine age."

[35] E. S. Gregg and A. L. Cricher, *Great Lakes-to-Ocean Waterways*. Department of Commerce, Washington, 1927.

It is evident that there are many combinations among industrial units. According to income tax returns, one-half of the largest enterprises in the country are engaged in manufacturing. However, the numbers in this field are not increasing so rapidly as in trade, banking, and other types of economic endeavor.

The records of mergers in recent years indicate that it has been a general movement, rather than one confined to any particular industries. It has been greatest among public utilities, reaching its height there in 1926. In manufacturing industry, the tendency to merge appears to follow the business cycle, but the general trend has been upward since 1922.

The present mergers are unlike those of the great combination period at the end of the nineteenth century. In the earlier instances, the incentives were usually either the formation of a monopoly or profits of some promoter. The present mergers often appear to be quickly followed by new financing, thus implying that the desire for additional capital is an important motive. A further incentive, in certain industries, has come from modern marketing methods, in which the concern which is large enough to undertake national advertising has a definite advantage over its smaller rivals.

It has long been claimed that large-scale operation offered many potential economies. It is evident that the most efficient size at which an industrial plant may operate has increased greatly during recent years. However, as regards combinations among such plants, the facts are entirely inadequate. The few available do indicate that, as often as not, these potential economies are more than offset by real losses in efficiency.

Over against this fact is the probability that the large concerns are taking an increasing part of the nation's business. This is also reflected in the record of the stock market, in which three of the four industries studied recorded the greatest advances made by the securities of the larger companies. Again, we conclude that this larger share in the nation's business is not owing to ability to produce at a lower cost, but to greater success in the field of marketing. An interesting side light on this development is the present status of the Sherman and Clayton Acts, which tend to encourage combinations, since the merged companies can adopt a uniform marketing policy which would be illegal if undertaken as independents.

In the case of random or casual fluctuations, small enterprises record wider variations than large concerns. This appears to be true both of unemployment and of earnings.

In the case of cyclical fluctuations, the data indicate that large corporations are subject to wider fluctuations in production and employment than the smaller concerns, but that their earnings are more stable.

This seems to be the result of a more or less conscious policy to shut down the plant and accept the losses resulting from idleness rather than to offer their products at greatly reduced prices, thus accepting the loss on inventory, but maintaining operation. The general tendency is therefore toward production cycles rather than price cycles.

The movement of industry among the areas of the country has tended definitely toward a more equal distribution of manufacturing. The rapid industrial growth of the South and the decline of New England and the Middle Atlantic States illustrate this tendency.

Quite as important is the shift from city to country. The records indicate a definite decline in manufacturing activity in the larger cities, and an actual gain in the rural areas, particularly in the East North Central and South Atlantic divisions. There is a marked increase in size in these rural enterprises, which have heretofore always been much below the general average.

The third step in this tendency toward the more equal geographical distribution of industry, is the breaking down of local concentration in the historical centers of specific industries.