PART II

THE EXTENT OF CENTRAL-OFFICE OPERATION

VI.

THE SCOPE OF THE INQUIRY.

Definition.—A central office group exists when two or more industrial establishments are operated from a single central office.

The term "establishment" was defined exactly in Chapter III, the essence of the definition being that an industrial establishment is an enterprise within an industry and within a locality, and may consist of more than one plant, only providing a common set of books is kept. Consequently, a central-office group exists when a single central office operates enterprises in more than one locality or in more than one industry, or more than one plant within a locality and industry, providing those plants are sufficiently separate entities to keep separate books of account.

The central-office group is therefore a type of industrial combination; but industrial combinations may be combinations of factories, or corporate entities, etc., and they may be bound together by interlocking directorates, financial organization, or other methods. The central-office group is perhaps the simplest and most elementary form of combination—industrial establishments which are, by definition, units of operation bound together by a definite, tangible bond, a common central office.

Among the special studies undertaken by the census of 1900 was one concerning industrial combinations. The following definition was then employed:

"For the purpose of the census the rule has been adopted to consider no aggregation of mills an industrial combination unless it consists of a number of formerly independent mills which have been brought together into one company under a charter obtained for that purpose. We therefore exclude from this category many large establishments comprising a number of mills which have grown up, not by combination with other mills, but by the erection of new plants or the purchase of old ones." [1]

This special study was made for the sole purpose of showing the extent to which independent enterprises had come under central control. The definition was proper and adequate for this purpose.

Many different uses for the term "industrial combination" have been suggested. Some concern themselves with the manner in which the business organization was formed; others relate rather to the actual composition of the enterprise. The 1900

[1] Twelfth Census of the United States, 1900, Vol. VII, p. lxxv. This inquiry was never repeated.

census study was obviously one of the former type. It was a study based on the historical development of the enterprise. The data available for the study of central-office groups, however, are not applicable to the problem of the historical growth and development of enterprises. The original data give no information concerning the methods whereby the groups were formed. These data do provide material for the second type of inquiry—Of what do combinations consist? Part III of this monograph is devoted to the problem of the structure of central-office groups. If one is concerned with the relation of industrial combinations to various external conditions, such as price and freedom of competition, the exclusion of certain immense enterprises because they have not followed a prescribed method of development, although they may be exactly similar in nature to many which are included, results in misjudging the entire situation. In the problems dealt with in this study likewise it would obviously be unfair to exclude many large economic enterprises operating many establishments and active in many industries, because they have grown by internal expansion and purchase. The definition of industrial combinations and central-office groups here employed includes all enterprises, regardless of the method of development, which are operating two or more units of industrial activity.

Source of the data.—The central-office data are really a by-product of the administrative activity of the Census Bureau. The bureau has never undertaken to compile statistics of central-office groups or to enumerate them with the degree of thoroughness applied to data concerning manufacturing establishments.

The Census Bureau, when taking a census of manufactures, sends schedules by mail to all individuals or concerns which it believes eligible for enumeration.[2] In order to insure the sending of the census inquiries to the proper sources of information, the Census Bureau has maintained for some time a central-office file. Records are kept of all instances in which an establishment, or establishments, are operated from an office other than that at the plant itself. The census procedure makes possible some check on the accuracy of these records by requiring certain central offices to return, in addition to the schedules for their constituent plants, a supplementary schedule known as the "Administrative and General Office Schedule," which states the expenses of the central office. These facts are necessary in order

[2] Manufacturers who fail to return the schedules by mail are later canvassed in person by special agents.

that the expense of operating the central office may be properly distributed among the production costs of the constituent establishments.

In some cases separate offices are operated in connection with single establishments. In cases of this kind the establishment is generally located at some distance from any urban center, but has its office in some city. This condition prevails particularly among sawmills and plants producing clay products. By eliminating all cases in which but one plant is reported there remains perhaps the most nearly complete record in existence of one form of industrial combination, the central-office group. It is on the basis of these data that the present study is made.

In a few cases the activity of a single concern is carried on through more than one central office. An excellent example is that of one of the large railroad systems, which has divided its mileage, with a central office directing the operation of the repair shops, etc., in each of two divisions. Luckily this situation is quite unusual because of the advantages accruing from centralization in a single central office and the difficulties involved in harmonizing several operating agencies. It has been impossible to attempt any refinement of the data along this line, and the study must, therefore, remain one of individual central offices.

Records of the central-office group are obtained as a part of the census of manufactures, and, as such, deal only with this one section of industry, but certain information is also secured with regard to activity in mining. Mining is used broadly by the Census Bureau and includes quarrying and the operation of oil and natural-gas wells. Industrial combinations, however, are by no means limited to these fields but extend into other spheres of economic activity. Unfortunately, a lack of data makes impossible any considerable extension of this examination of central-office groups beyond manufacturing and mining activity.

Extent of central-office operation.—Making use, therefore, of this "mailing list" record of the Census Bureau, there were 5,838 central-office groups active during 1919. These 5,838 central offices operated 21,464 manufacturing establishments and 534 were also active in mining.

If automobile repair shops are excluded from the total number of manufacturing establishments reported for 1919, the establishments operated by central offices represent 7.8 per cent of the total number. In certain industries the proportion is much

higher than the general average, 78.1 per cent of all railroad repair shops being included.

The percentage of total number of establishments does not give a true indication of the importance of central-office groups in industrial activity. As a matter of fact, they are, in general, establishments above average size both in number of wage earners and in value of products.

In 1900 the Census Bureau, in its examination of industrial combinations,[3] studied 2,040 establishments, approximately 1 per cent of the total number recorded by the census. These combinations would have been eligible for inclusion among central-office groups in this study. Although they represented but 1 per cent of the entire number of establishments, they employed 8.4 per cent of all wage earners and produced 14.1 per cent of the total value of products. It can therefore be safely stated that the number of establishments decidedly understates the proportion of business activity carried on by central-office groups. It was shown in Part I, Chapter IV, that but 2.2 per cent of all establishments employed 53.5 per cent of all wage earners in manufacturing industries. Since the establishments in central-office groups are in general among the larger establishments within an industry, it is probable that more than one-third of all wage earners are found in the groups described in this study.

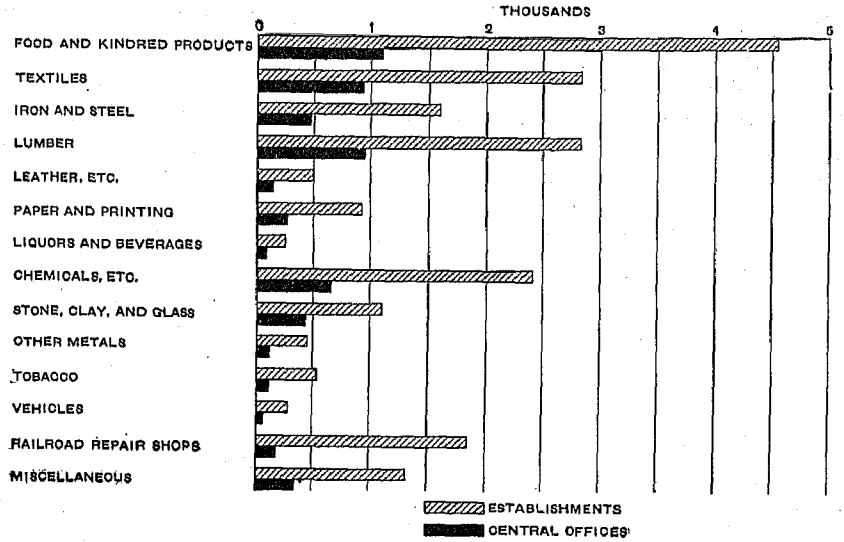
Types of industry represented.—Perhaps the problem that can best be investigated first is that dealing with the types of industry which these central offices represent. Are central-office groups peculiar to certain industry types, or is this form of organization a general one, found throughout all industry? To answer this question, Table 40 has been prepared and data are given graphically in Chart H. The table and chart divide the central offices into 14 industrial groups. Two cautions must be extended with regard to this classification.

In the first place, industry does not by any means fall naturally into industrial groupings. Certain groups, such as the textiles, appear to be easily defined, but even here problems such as the classification of artificial leather arise. The grouping into 14 general classes is that which the Census Bureau has gradually developed throughout its various censuses of manufactures. The basis of the grouping is either similarity of basic materials used, as in the cases of the "leather" and "iron and steel" groups, or of

[3] The Twelfth Census, 1900, contains the only investigation of industrial combination ever made by the Census Bureau. (See p. 101.)

similarity of products, as in the cases of the "vehicles for land transportation" group. The industries which defy other classification are placed in a "miscellaneous" category. A list of all miscellaneous industries discussed in this monograph is found in Appendix C.

CHART H.—CENTRAL OFFICES AND THE ESTABLISHMENTS WHICH THEY OPERATE, BY GENERAL GROUPS OF INDUSTRIES.



The second caution is that, even with an accurate industrial classification, many of the central offices are engaged in several lines of activity so dissimilar as to qualify them for admission to any one of several industrial groups. In such cases the combination has been classified according to the industrial group into which the greatest number of its establishments fall, the final product of the group being also kept in mind.[4] For example, in the case of a combination of coke and blast furnaces, the classification would be iron and steel, although coke alone would be classified with chemicals and allied products.

From an examination of Table 42 it is immediately apparent that the 5,838 central-office groups selected are by no means concentrated in any particular industrial group. The industrial group which has the smallest representation among the central-office combinations is that producing vehicles for land transportation, although 65 instances appear in this class. The greatest number of central-office groups occurs in the manufacture

[4] A classification based on number of wage earners or on value added by manufacture would doubtless be preferable in many respects, but the data necessary for such a classification have not been compiled.

of food and kindred products, where 1,094, or nearly one-fifth of the grand total are found. As might be expected, the distribution of the 21,464 establishments follows very closely, in most cases, that of the number of central offices. The exceedingly high average number of establishments per central office in the railroad repair-shop group, however, results in considerable difference between the proportions which this group represents among the total number of central offices and among the total number of establishments. The wide distribution of combinations among the various industrial groups is a fair indication of the fact that the central-office form of combination is not restricted to any particular type of industry but has developed throughout the entire industrial system.

TABLE 42.—CENTRAL OFFICES, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	CENTRAL OFFICES.		ESTABLISHMENTS.	
		Number.	Per cent distribution.	Number.	Per cent distribution.
	All industries	5,838	100.0	21,464	100.0
1	Food and kindred products	1,094	18.7	4,544	21.2
2	Textiles and their products	923	15.8	2,832	13.2
3	Iron and steel and their products	466	8.0	1,602	7.5
4	Lumber and its remanufactures	942	16.1	2,829	13.2
5	Leather and its finished products	145	2.5	495	2.3
6	Paper and printing	273	4.7	918	4.3
7	Liquors and beverages	87	1.5	268	1.2
8	Chemicals and allied products	629	10.8	2,409	11.2
9	Stone, clay, and glass products	434	7.4	1,100	5.1
10	Metals and metal products other than iron and steel	119	2.0	445	2.1
11	Tobacco manufactures	117	2.0	533	2.5
12	Vehicles for land transportation	65	1.1	287	1.3
13	Railroad repair shops	187	3.2	1,850	8.6
14	Miscellaneous industries	357	6.1	1,362	6.3

In order to determine the actual extent of central-office development in the various industrial groups, however, it is necessary to take into consideration the total number of establishments in each group. The fact that more establishments are found in central-office combinations in the lumber group than in the "chemicals and allied products" group is not an indication of the relative development of consolidated operation in these two industrial categories. Such a comparison to be properly made must also

take into consideration the number of establishments outside the central-office groups. In order to make such comparison possible, Table 43 has been prepared.

TABLE 43.—ESTABLISHMENTS IN CENTRAL-OFFICE COMBINATIONS, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	General group of industry.	Manufacturing establishments.				
		Number.			Per cent distribution.	
		Total.	In central-office combinations.		All manufacturing establishments.	Establishments in central-office combinations.
			Number.	Per cent of total.		
	All industries	[1] 290,105	21,464	[2] 7.4	100.0	100.0
1	Food and kindred products	61,312	4,544	7.4	21.1	21.2
2	Textiles and their products	28,552	2,832	9.9	9.8	13.2
3	Iron and steel and their products	20,120	1,602	8.0	6.9	7.5
4	Lumber and its remanufactures	39,955	2,829	7.1	13.8	13.2
5	Leather and its finished products	6,397	495	7.7	2.2	2.3
6	Paper and printing	36,403	918	2.5	12.6	4.3
7	Liquors and beverages	6,354	268	4.2	2.2	1.2
8	Chemicals and allied products	12,224	2,409	19.7	4.2	11.2
9	Stone, clay, and glass products	12,529	1,100	8.8	4.3	5.1
10	Metals and metal products other than iron and steel	10,667	445	4.2	3.7	2.1
11	Tobacco manufactures	10,291	533	5.2	3.5	2.5
12	Vehicles for land transportation	[1] 21,152	287	[3] 1.4	7.3	1.3
13	Railroad repair shops	2,368	1,850	78.1	0.8	8.6
14	Miscellaneous industries	21,781	1,362	6.3	7.5	6.3

[1] Includes 15,507 automobile repair shops, not included in central-office data.
[2] If correction for automobile repair shops be made, percentage becomes 7.8.
[3] If correction for automobile repair shops be made, percentage becomes 5.

From this table it appears that the extent of central-office development in the several groups is decidedly unequal. The greatest development is found in the railroad repair-shop group. This fact corresponds with the growth of the great railroad systems in the country, and the need for repair shops at regular intervals along their lines. It is not feasible to centralize this work in one plant, particularly in the longer railroads of the West. Usually railroad repair shops are placed at or near terminal points, and, since every railroad has at least two terminal points, it may be supposed that it will operate at least two repair shops.

An unusual proportion of establishments in central-office combinations is also found in the "chemicals and allied products" group. This may be explained as follows:

"For the same reason [power of massed capital] chemical industries are especially open to combination; in all countries they head the list, either absolutely as to the number of combinations or in the ratio of combined to uncombined output. The German and French chemical industries are entirely under combination. In England and Germany they head the list of combinations in number, in America in relative percentage of employees and output. The reason lies in the rapid changes of invention and quick deterioration of fixed plant.[5]

"Concentration and the consequent massing together of capital is possibly more easily justifiable in the chemical industry than in any other, for not only are great sums expended in research, but when new discoveries have been made further large capital sums are required to bring the new invention within reach of the consumers. Thus, for instance, the production of synthetic indigo was known long before it could be produced in a profit-yielding manner. The search after the new process of manufacture has swallowed enormous sums of money which financially weak houses could never have afforded to spend without any immediate prospect of profit." [6]

The other industrial groups which show a higher proportion of establishments in central-office combinations than the average are textiles; stone, clay, and glass products; iron and steel; leather products; and food and kindred products. The remaining groups all show a development of central-office operation less than the average. Because of the inclusion of automobile repair shops, which do not operate under central-office management in the total number of establishment in the industries producing vehicles for land transportation, the vehicle group shows the lowest percentage of central-office development, 1.5. A corrected figure, based on a total from which automobile repair shops are eliminated, is 5 per cent, which ranks the group above four others. The next lowest percentage appears for the paper and printing group. This industrial group is composed of 5 subdivisions—paper and wood pulp, manufactures of paper products, printing and publishing, industries related to printing and publishing, and wall paper. However, 89.2 per cent of the establishments are included in the single classification, printing and publishing. Within this class the greatest activity is job printing. It is, therefore, the

[5] Macgregor, Industrial Combinations, 1903, p. 30.
[6] Foreign Office Reports (English) for Germany, 3445, p. 76.

great number of small printing shops that keeps low the proportion of this group found in industrial combinations.

The 14 industrial groups which have been utilized in the above examination can be subdivided into industries. This more extensive classification is much simpler and less forced than is the case with the larger industrial groups. There are 358 industrial classifications employed by the Census Bureau. Many (98) of these industries, such as men's clothing, tools, and confectionery and ice cream, are themselves subdivided into smaller groups, so that it is possible to have 590 separate divisions. The 358 main divisions, however, customarily serve as the basis for discussion by industries. One of these industries, automobile repairing, has been discarded for the purposes of this study. Of the remaining 357 industries 322 are represented among the various central-office groups. The 35 not thus represented form 10.2 per cent of the total number. A mere reading of the names of these industries is sufficient to demonstrate the fact that they are of minor importance. In order to determine the significance of that portion of manufacturing industry not represented in this study, figures for number of establishments, number of wage earners, and total value of products are given in Appendix D. These 35 industries include only forty-seven hundredths of 1 per cent of the total number of establishments, thirty-four hundredths of 1 per cent of the total number of wage earners, and thirty hundredths of 1 per cent of the total value of products recorded by the census of manufactures. In other words, more than 99 per cent of manufacturing industry, measured by any of these three standards, is represented among the central-office groups included in this study.

Although the data available concerning central-office groups have been collected in connection with the census of manufactures, record has also been kept of the activity of these manufacturing central offices in the mining field (see Table 44). There is no factual material available concerning the extent of the activities of these groups in mining, but merely information as to the presence of activity and the nature of the product of the mines. As can be seen from the table, 534 central offices active in manufacturing are also active in mining, representing 9.1 per cent of all central-office groups. In four industry groups the proportions are sufficient to invite fuller discussion in a later chapter.

TABLE 44.—CENTRAL-OFFICE COMBINATIONS ENGAGED IN MINING: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	CENTRAL-OFFICE GROUPS.		
		Total number.	Active in mining.[1]	
			Number.	Per cent of total.
	All industries	5,838	534	9.1
1	Food and kindred products	1,094	7	0.6
2	Textiles and their products	923	1	0.1
3	Iron and steel and their products	466	69	14.8
4	Lumber and its remanufactures	942	12	1.3
6	Paper and printing	273	1	0.4
8	Chemicals and allied products	629	201	32.0
9	Stone, clay, and glass products	434	205	47.2
10	Metals and metal products other than iron and steel	119	24	20.2
13	Railroad repair shops	187	7	3.7
14	Miscellaneous industries	357	7	2.0

[1] Includes quarrying and operation of gas and oil wells.

The data introduced in this chapter justified two generalizations: First, that central-office organization is extensive; and, second, that central-office organization is not a phenomenon of certain industries but is found throughout all industry.

VII.

THE SIZE OF CENTRAL-OFFICE GROUPS.

The discussion of central-office organization in terms of its extent in industry is naturally supplemented by an examination of the activity of particular central-office combinations. Are these industrial combinations huge trusts, or merely instances in which two or more separate enterprises are carried on by the same person? As a matter of fact, the instances of central-office operation include cases of both types, but the great majority fall somewhere between these two extremes. It is important, both as a separate study and as a background for further investigation, that examination be made of the size of central-office groups.

The indices which the Census Bureau affords for the measurement of establishments have been discussed in Chapter III. What is the best unit for measuring the size of industrial combinations? A single establishment may have a larger value of product than a combination. A single establishment may employ more wage earners than a combination. The distinction lies not in these things, but rather in the fact that one is a single activity confined to a locality and an industry, and the other a combination of activities. The unit of size most significant in a study of industrial combinations is therefore the number of establishments in the combination, although other units of measurement would also have great value. The extent of the *combination* can only be measured in terms of the number of separate constituent units—and the number of establishments operated is therefore the first thing to be determined. Two concerns, each employing 10,000 wage earners, and one operating two and the other four establishments, are equal in respect to employment, but one is much more of a combination than the other since it combines twice as many separate activities.

The customary census usage of the term "establishment" makes this unit of measurement of even more significance. As stated before, unless the plants are in different localities, produce different major products, or keep separate books, they will not be classed as other than a single establishment, regardless of the number of single plants or factories concerned. Consequently,

when the measurement of size used is the number of establishments in the industrial combination it means measurement in terms of actual units of operation and excludes the expansion of a single concern by means of increased plant in some one locality.

Average size of central-office groups.—In Table 45 is given the average number of establishments per central office. One caution must be given before any comparisons are attempted. These figures are based solely upon manufacturing establishments. There have been included among the 5,838 central-office groups 292 instances in which the central-office group operated only one manufacturing establishment but was also active in mining. The cases in which mining activity was reported by the central office are discussed on page 115. At this point it is merely necessary to note this situation as a factor entering into the averages for all industries which entered into mining, and particularly as explanation of the low figure, 2.53, representing the number of establishments operated by the average central office in the stone, clay, and glass products group. In those groups, in which any considerable number of establishments operated mines—namely, stone, clay, and glass products, chemicals, metals and metal products other than iron and steel, and iron and steel—the average number of establishments must be kept clearly in mind as being the average number of manufacturing establishments operated. If each central-office group active in mining be considered as being one additional establishment, since mining represents at least one other activity the average number of establishments for the total number of central offices becomes 3.8. As a matter of fact, some of these central-office groups operate many mines in different localities.

As already mentioned, the fact that the railroad repair shops group, ranking ninth in number of central offices, is fourth in number of establishments, places it at the top in terms of average number of establishments operated. In the other groups, however, the figure does not vary greatly, ranging in the vicinity of three or four establishments per central office.

Size distribution of central-office groups.—For careful study a more comprehensive picture than that given by the average is necessary. In Table 46 the 5,838 central offices are distributed, by industrial groups, according to number of establishments operated. Comparison between the general groups of industries is presented graphically in Chart I.

TABLE 45.—AVERAGE NUMBER OF ESTABLISHMENTS PER CENTRAL OFFICE, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	Central offices.	Establishments.	Average number of establishments per central office.
	All industries	5,838	21,464	3.68
1	Food and kindred products	1,094	4,544	4.15
2	Textiles and their products	923	2,832	3.07
3	Iron and steel and their products	466	1,602	3.44
4	Lumber and its remanufactures	942	2,829	3.00
5	Leather and its finished products	145	495	3.41
6	Paper and printing	273	918	3.36
7	Liquors and beverages	87	268	3.08
8	Chemicals and allied products	629	2,409	3.83
9	Stone, clay, and glass products	434	1,100	2.53
10	Metals and metal products other than iron and steel	119	445	3.74
11	Tobacco manufactures	117	533	4.56
12	Vehicles for land transportation	65	287	4.42
13	Railroad repair shops	187	1,850	9.89
14	Miscellaneous industries	357	1,362	3.82

CHART I.—CENTRAL-OFFICE GROUPS ACCORDING TO NUMBER OF ESTABLISHMENTS OPERATED, BY GENERAL GROUPS OF INDUSTRIES.

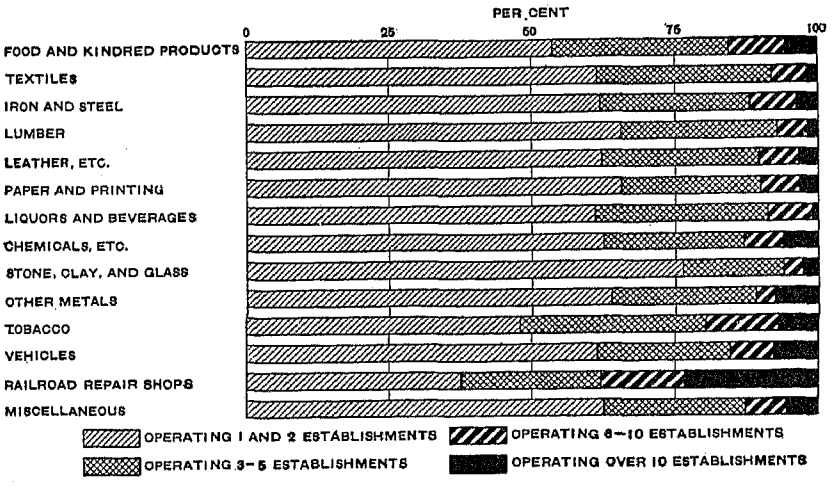


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TABLE 46.—DISTRIBUTION OF CENTRAL-OFFICE COMBINATIONS ACCORDING TO NUMBER OF ESTABLISHMENTS OPERATED, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	Number of central offices.	Number of establishments.	DISTRIBUTION OF CENTRAL OFFICES, BY NUMBER OF ESTABLISHMENTS OPERATED.						
				1 to 2	3 to 5	6 to 10	11 to 15	16 to 25	26 to 50	Over 50
		NUMBER.								
	All industries	5,838	21,464	3,576	1,573	424	116	84	47	18
1	Food and kindred products	1,094	4,544	588	338	108	27	18	11	4
2	Textiles and their products	923	2,832	569	280	57	10	5	1	1
3	Iron and steel and their products	466	1,602	289	121	38	11	4	3	.....
4	Lumber and its remanufactures	942	2,829	618	255	50	12	2	4	1
5	Leather and its finished products	145	495	90	40	10	2	1	2	.....
6	Paper and printing	273	918	179	66	19	3	5	1	.....
7	Liquors and beverages	87	268	53	26	7	1	.....	.....	.....
8	Chemicals and allied products	629	2,409	393	153	44	19	7	10	3
9	Stone, clay, and glass products	434	1,100	331	77	14	7	5	.....	.....
10	Metals and metal products other than iron and steel	119	445	76	30	4	6	2	.....	1
11	Tobacco manufactures	117	533	56	38	15	3	3	2	.....
12	Vehicles for land transportation	65	287	40	15	5	1	2	2	.....
13	Railroad repair shops	187	1,850	70	46	27	7	21	9	7
14	Miscellaneous industries	357	1,362	224	88	26	7	9	2	1
		PER CENT DISTRIBUTION.								
	All industries	100.0	.....	61.3	26.9	7.3	2.0	1.4	0.8	0.3
1	Food and kindred products	100.0	.....	53.7	30.9	9.9	2.5	1.6	1.0	0.4
2	Textiles and their products	100.0	.....	61.6	30.3	6.2	1.1	0.5	0.1	0.1
3	Iron and steel and their products	100.0	.....	62.0	26.0	8.2	2.4	0.9	0.6	.....
4	Lumber and its remanufactures	100.0	.....	65.6	27.1	5.3	1.3	0.2	0.4	0.1
5	Leather and its finished products	100.0	.....	62.1	27.6	6.9	1.4	0.7	1.4	.....
6	Paper and printing	100.0	.....	65.6	24.2	7.0	1.1	1.8	0.4	.....
7	Liquors and beverages	100.0	.....	61.0	29.9	8.0	1.1	.....	.....	.....
8	Chemicals and allied products	100.0	.....	62.5	24.3	7.0	3.0	1.1	1.6	0.5
9	Stone, clay, and glass products	100.0	.....	76.3	17.7	3.2	1.6	1.2	.....	.....
10	Metals and metal products other than iron and steel	100.0	.....	63.9	25.2	3.4	5.0	1.7	.....	0.8
11	Tobacco manufactures	100.0	.....	47.9	32.5	12.8	2.6	2.6	1.7	.....
12	Vehicles for land transportation	100.0	.....	61.5	23.1	7.7	1.5	3.1	3.1	.....
13	Railroad repair shops	100.0	.....	37.5	24.6	14.4	3.7	11.2	4.8	3.7
14	Miscellaneous industries	100.0	.....	62.7	24.6	7.3	2.0	2.5	0.6	0.3

As might be expected, the smaller central-office groups predominate. Over three-fifths of the cases included are those in which but one or two establishments are operated by the central office. Of the 3,576 central offices in this category 292 operate but one establishment each and are included because they are also engaged in mining. At the other extreme in size are two

central offices each of which operates more than 100 establishments—one in the food-products group and the other operating railway repair shops—and 10 central offices operating more than 60 establishments each. There is apparently no definite break in the distribution which might indicate a point above which central-office operation is not feasible. The distribution follows quite clearly a regular curve, having a very steep decline in the early stages, followed by a long and gradual decline when the larger groups are considered. The gradual decline is evidenced by the fact that the central offices operating more than 33 establishments are of 25 different sizes, no size having more than 3 central offices.

Certain of the industrial groups appear to be more favorable than others for the development of large central-office combinations. It would appear that there is a force limiting the size of central-office combinations in the stone, clay, and glass products group. The largest such combination found in this group operated 20 establishments and 94 per cent operated 5 or fewer establishments. The next greatest concentration of central offices operating 5 or fewer establishments was in the lumber group, where 92.7 per cent of all central offices fell within this category. In the liquors and beverages industry, the largest central office was one operating 13 establishments. At the other extreme, the railroad repair shops seem best adapted to large central-office operation, for nearly one-fourth of those under consideration operated more than 10 establishments each. Food, chemicals, and vehicles for land transportation also tend toward the operation of large numbers of establishments by single central offices.

Extension of activity into mining.—In most of the cases of mining activity the mines are operated in order to procure raw material for use in the concern's manufacturing establishments. To some extent, however, these mines are operated as sources of fuel and power. The term "mining activity" is here used in its broadest sense and includes quarrying, the operation of oil wells and natural gas wells, and the mining of mineral earths.

Table 47 shows the distribution of these cases among the various industrial groups. Mining activity appears to be concentrated almost entirely in four of them—iron and steel; chemicals and allied products; stone, clay, and glass products; and metals and metal products other than iron and steel. These four groups of industries include those in which the raw materials utilized are affected chiefly by the extraction of minerals or by the operation

of petroleum and natural gas wells. In the iron and steel industry the mining activity includes the production of iron ore, coal, limestone, dolomite, fluorspar, and various other flux materials. In the "chemicals and allied products" industry the mining of coal for coke manufacture, the operation of oil wells and natural-gas wells, and the mining of various mineral earths constitute the field of mining activity. In the stone, clay, and glass industries the mineral products extracted are clay, marble, cement, silica, gypsum, etc. The "metals and metal products other than iron and steel" group mines copper, lead, zinc, and various metals used in alloys.

TABLE 47.—DISTRIBUTION OF CENTRAL-OFFICE COMBINATIONS ACTIVE IN MINING, BY NUMBER OF MANUFACTURING ESTABLISHMENTS OPERATED, BY GENERAL GROUPS OF INDUSTRY: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	Number of central offices.	Number of manufacturing establishments.	DISTRIBUTION OF CENTRAL OFFICES BY NUMBER OF MANUFACTURING ESTABLISHMENTS OPERATED.						
				1 to 2	3 to 5	6 to 10	11 to 15	16 to 24	26 to 50	Over 40
		NUMBER.								
	All industries	534	1,972	385	79	33	12	13	8	4
1	Food and kindred products	7	69	3	.....	1	2	.....	1	.....
2	Textiles and their products	1	1	1	.....	.....	.....	.....	.....	.....
3	Iron and steel and their products	69	396	34	17	9	4	2	3	.....
4	Lumber and its remanufactures	12	23	9	3	.....	.....	.....	.....	.....
6	Paper and printing	1	16	.....	.....	.....	.....	1	.....	.....
8	Chemicals and allied products	201	633	154	28	10	2	2	3	2
9	Stone, clay, and glass products	205	469	164	27	8	2	4	.....	.....
10	Metals and metal products other than iron and steel	24	116	14	3	3	2	2	.....	.....
13	Railroad repair shops	7	152	2	1	2	.....	.....	.....	2
14	Miscellaneous industries	7	97	4	.....	.....	.....	2	1	.....
		PER CENT DISTRIBUTION.								
	All industries	100.0	.....	72.1	14.8	6.2	2.2	2.4	1.5	0.7
1	Food and kindred products	100.0	.....	42.9	.....	14.3	28.6	.....	14.3	.....
2	Textiles and their products	100.0	.....	100.0	.....	.....	.....	.....	.....	.....
3	Iron and steel and their products	100.0	.....	49.3	24.6	13.0	5.8	2.9	4.3	.....
4	Lumber and its remanufactures	100.0	.....	75.0	25.0	.....	.....	.....	.....	.....
6	Paper and printing	100.0	.....	.....	.....	.....	.....	100.0	.....	.....
8	Chemicals and allied products	100.0	.....	76.6	14.0	5.0	1.0	1.0	1.5	1.0
9	Stone, clay, and glass products	100.0	.....	80.0	13.2	3.9	1.0	2.0	.....	.....
10	Metals and metal products other than iron and steel	100.0	.....	58.3	12.5	12.5	8.3	8.3	.....	.....
13	Railroad repair shops	100.0	.....	28.6	14.3	28.6	.....	.....	.....	28.6
14	Miscellaneous industries	100.0	.....	57.1	.....	.....	.....	28.6	14.3	.....

A further examination of the central-office groups active in mining seems desirable. Knowing the industrial groups in which these concerns are classified, the question arises: Are they the larger or the smaller concerns within the groups? The material for this discussion is presented in Tables 46, 47, and 48.

The total number of central offices active in mining in all industries save iron and steel; chemicals; stone, clay, and glass; and metals other than iron and steel is too small to make their frequency distributions of any special significance. In these four industrial groups, however, the data are worthy of note. There is apparently a very sharp distinction between the metal industries and the nonmetal industries. Iron and steel and the other-metals group, which includes zinc, lead, copper, aluminum, etc., possess much larger central-office combinations active in mining than the nonmetal groups. For the two metal groups the average number of manufacturing establishments per central-office combination active in mining, is 5.5, as compared with an average of only 3.5 for all central-office combinations in these two groups; while the nonmetal groups—chemicals and allied products and stone, clay, and glass products—average but 2.7 manufacturing establishments per central office active in mining, as against an average of 3.3 for all central-office combinations in the two nonmetal groups. This situation is due in the main to the fact that 247 of the 406 concerns classified in the chemicals or the stone, clay, and glass group, and also engaged in mining, operate but one manufacturing establishment each. Of the 132 concerns in the chemicals group, which operate only 1 manufacturing establishment each and are also active in mining, approximately three-fourths manufacture coke in connection with coal mining. This condition is offset in some measure, however, by the fact that the chemicals group extends, on the other hand, well into the larger classifications, having two central-office combinations with 48 and 61 establishments, respectively.

In Table 48 is demonstrated the fact that activity in mining is, in general, undertaken to a much greater extent by the large than by the small central-office groups. If central offices operating but one establishment be eliminated, it then appears that, as the number of establishments per combination increases, greater proportions of central offices are found engaged in mining activity, the largest proportion, 22.2 per cent, being found among central-office groups operating over 50 establishments. These figures include the 10 industrial groups which have little mining activity.

If the four industrial groups which have extended to the greatest degree into this field be considered apart from the others, the same general law holds true, more than one-half of such concerns operating over 15 establishments being shown as engaged in mining. The small percentage for the concerns operating 11 to 15 establishments is due to decided irregularities in the frequency distribution for the chemical and the stone, clay, and glass groups.

TABLE 48.—COMPARISON OF SIZE DISTRIBUTIONS OF ALL CENTRAL-OFFICE COMBINATIONS AND OF CENTRAL-OFFICE COMBINATIONS ENGAGED IN MINING: 1919.

SIZE OF GROUP.	ALL MANUFACTURING INDUSTRIES.			FOUR SELECTED INDUSTRY GROUPS.[1]		
	Total number of central offices.	Central offices engaged in mining.		Total number of central offices.	Central offices engaged in mining.	
		Number.	Per cent of total.		Number.	Per cent of total.
Total	5,838	534	9.1	1,648	499	30.3
Operating 1 manufacturing establishment	292	292	100.0	277	277	100.0
Operating 2 manufacturing establishments	3,284	93	2.8	812	89	11.0
Operating 3 to 5 manufacturing establishments	1,583	79	5.0	381	75	19.7
Operating 6 to 10 manufacturing establishments	424	33	7.8	100	30	30.0
Operating 11 to 15 manufacturing establishments	116	12	10.3	43	10	23.3
Operating 16 to 25 manufacturing establishments	84	13	15.5	18	10	55.6
Operating 26 to 50 manufacturing establishments	47	8	17.0	13	6	46.2
Operating over 50 manufacturing establishments	18	4	22.2	4	2	50.0

[1] Comprises the following: Iron and steel and their products; chemicals and allied products; stone, clay, and glass products; metals and metal products other than iron and steel.

Extension of activity to foreign countries.—It is necessary to recognize one other limitation placed upon the data, namely, that they are derived from the United States census of manufactures. The Census Bureau takes no cognizance of industrial activity in countries other than the United States. Since industrial combinations are by no means arbitrarily restricted to activity within any one country, a study of operations in the United States is but a partial study of the total business of many combinations which may be called American.

There are five international relationships which may exist among the various activities of combinations which operate both in the United States and in other countries. These are as follows:

1. Manufacture in foreign countries for distribution in the United States.

2. Manufacture in the United States for distribution in foreign countries.

3. Manufacture in foreign countries from raw materials produced in the United States.

4. Manufacture in the United States from raw materials produced in foreign countries.

5. Parallel manufacture in United States and foreign countries.

Of these categories, the first two are not relevant to the problem under discussion. The distribution or operation of sales agencies has been disregarded in this study. In most instances, however, in which American industries engage in foreign trade, they have representatives in the foreign field who handle their product in connection with various other similar products, although in a few instances, such as the Standard Oil Co. of New Jersey, the International Harvester Co., the B. F. Goodrich Co., the Singer Manufacturing Co., and others, separate distributing and selling companies have been organized to merchandise their product in foreign countries.

The concerns which manufacture commodities in the United States and also are active in the production of their raw materials in other countries deserve special mention. In 1919 the total free and dutiable merchandise imported into the United States was distributed as follows:

	Value.	Per cent.
Crude materials for use in manufacturing	$1,674,541,857	42.89
Foodstuffs in crude condition, and food animals	545,300,441	13.97
Foodstuffs partly or wholly manufactured	555,808,185	14.23
Manufactures for further use in manufacturing	608,996,213	15.60
Manufactures ready for consumption	493,202,962	12.63
Miscellaneous	26,515,274	0.68
Total	3,904,364,932	100.00

The above figures indicate the extent of the importation of crude or partly manufactured materials for manufacture. For comparative purposes it is important to note that the *total* cost of materials used for manufactures in 1919 was $37,376,380,000. Although the total amount of material imported is given, there is no means of ascertaining to how great an extent the actual production of this material in the foreign country was carried on under the direction of American enterprise. Some indication of

this type of industrial activity can be obtained from the following examples: [1]

The Hershey Chocolate Co., manufacturers of chocolate, cocoa, and chewing gum, confine their manufacturing activities in this country to Hershey, Pa. In order to obtain the raw materials used, this company has expanded into Cuba, where it operates two sugar mills, 69 square miles of sugar plantations, and the railroads necessary for efficient production.

The International Harvester Co. operates, in Matanzas Province, Cuba, 3,000 acres of fiber plantations, the products of which are used in the company's twine mills in this country.

The United States Rubber Co., through its subsidiary company, the United States Rubber Plantation (Inc.), is said to own 93,000 acres of land in Sumatra, of which 44,227 acres have been cleared and planted with over 5,000,000 rubber trees.

The Anaconda Copper Co. has undertaken extensive operations in Brazil.

A somewhat different development is found in the case of companies operating in the United States and Mexico. The industries here concerned are those of metal mining and of petroleum refining. The Standard Oil Co. of New Jersey, through the Transcont de Petroleo S. A., Mexico, carries on extensive operations in Mexico, although most of its refining is done in the United States.

Another industry is represented in the activities of manufacturers in both Canada and the United States. The International Paper Co., for instance, operates plants in Maine, New Hampshire, Vermont, Massachusetts, and New York, while the greater part of the woodland which it controls is in Canada. This one company alone has the Canadian Government's license to cut timber on about 2,797,760 acres of woodland in Quebec and New Brunswick.

The instances cited above demonstrate at least the existence of activity on the part of American manufacturers in the production of raw materials abroad for use in their American factories. That foreign manufacturers procure much of their material from the United States is also doubtless true, especially commodities such as raw cotton and foodstuffs.

Concerning the operators who are manufacturing similar products in the United States and other countries, no definite information is available. Here, again, it is necessary to fall back upon single instances as indicative of the possibilities along these lines.

[1] The data used in this chapter concerning the activity of industrial concerns were obtained from Poor's Manual, 1920.

The largest group includes the international transportation companies. Of these the railroads which afford communication between Canada and the United States are perhaps the most important, since little oceanic transportation is done by American enterprises. Necessarily these railroads operate repair shops both in Canada and in the United States, which are classed by the Census Bureau as manufacturing establishments.

Practically all the companies which have been mentioned as falling in the other categories also manufacture similar productions in the United States and foreign countries. The Singer Manufacturing Co. operates plants outside the United States in St. Johns, Quebec; Kilbowie, near Glasgow, Scotland; Wittenberg, Prussia; and Podolsk, Russia. The Standard Oil Co. of New Jersey, in addition to operating distributing companies (which in many cases includes the operation of tank steamers) in Holland, France, Mexico, Denmark, Germany, Canada, Rumania, and Italy, operates manufacturing companies in Mexico and Rumania and two small refineries in France. The B. F. Goodrich Co. operates a factory in Colombes (Seine), France, and the United States Rubber Co. operates manufacturing establishments in Canada. The International Harvester Co. shows a broad development, controlling companies which own plants and conduct business in the United States, Canada, France, Germany, Russia, and Sweden, and distributing companies in Denmark, Norway, Switzerland, Belgium, Austria, New Zealand, Australia, Great Britain, and the Philippine Islands.

The Ford Motor Co., through affiliated companies, is producing Ford cars in foreign countries. The Ford Motor Co. of Canada (Ltd.), manufactures at Ford, Ontario; the Ford Motor Co. (England) (Ltd.), has its factory at Manchester; and the Ford Motor Co., Paris, France, has a branch at Bordeaux. There are also assembling and branch plants at Copenhagen, Denmark; Cadiz, Spain; Buenos Aires, Argentina; and Sao Paulo, Brazil.

The American Radiator Co. is another example of such international expansion, with plants and branches at Toronto and Brantford, Ontario; London and Hull, England; Paris and Dole, France; Milan and Brescia, Italy; Brussels; Berlin, Schoenebeck, and Neuss, Germany; and Vienna and Wiener Neustadt, Austria.

The various international tobacco companies should also be noted. The Tobacco Products Corp. is a combination of various companies having factories and depots in the United States,

Canada, Cairo, Smyrna, Athens, Cavalla, Samsoun, and Shanghai. The British-American Tobacco Co. (Ltd.), owns all or a majority of the stock in companies located in Denmark, Belgium, China, India, Ceylon, Egypt, South Africa, Jamaica, Canada, and the United States.

One other development must be mentioned, namely, the growth of international publishing houses. Examples of this kind are the Macmillan Co., which publishes in the United States, Canada, and England; and R. P. Putnam's Sons, Funk & Wagnalls Co., and D. Appleton & Co., publishing in the United States and Great Britain.

These instances should be sufficient to demonstrate the fact that American industry is expanding into foreign countries. It is interesting to note that in most of the cases cited the product is one which has been developed in this country and has then been taken abroad by the company which originally developed it. It is possible that economic enterprises will feel the restraints of national boundaries to a smaller and smaller degree, with the development of rapid communication and of world markets.

To summarize: The average central office operates a small number of establishments. There are, however, a considerable number of central-office groups operating many establishments. The size distribution indicates a wide scatter, and difference among the various industrial groups. Activity in mining is particularly evident in four industrial groups, and by the larger concerns within those groups. There is also to be noted an interesting extension of activity into foreign countries either to attain raw material or to manufacture products similar to those produced in the United States.

VIII.

INDUSTRIAL SPECIALIZATION OF CENTRAL-OFFICE GROUPS.

Beyond the problems of the number of establishments operated by central-office groups lies the problem of the variety of activities found among the establishments operated by a single central office. Has the development of specialization, so evident during the last century as a factor governing the activities of single plants, also extended to the central-office groups? This problem was at least introduced in the previous chapter in the discussion of the extension to the mining field of the activity of central offices whose primary interest is in manufacturing.

An examination of all the cases of central-office operation was made impossible by the incompleteness of many central-office records. The central offices which can not be considered represent, however, but a small proportion of the total number.

The schedules for the 1919 census of manufactures began to return to the bureau early in 1920. In the midst of the influx a change in method resulted in keeping a more detailed record of the cases involving central-office operation. It is therefore on the basis of all central offices whose reports came in after the date of this change in method and which had more than one establishment in operation in 1919 that the present study is made.[1] The number of central offices affording complete data was 4,813, and the number of establishments which they operated, 18,912, or more than 6.5 per cent of the total number of manufacturing establishments reported for the entire country. Since the total number of offices returning central-office schedules was 5,838, it is probably true that the data employed in this study give a fair representation of the central-office combinations in the country (see Table 49).

Although a survey dealing with every combination would have advantages in that it might then be possible to determine the absolute extent of different types of central-office operation, little has been lost by making use of the smaller number. Any larger number would unduly increase the amount of labor involved,

[1] The central-office records cover activity in both manufacturing and mining. There were a number of cases in which one manufacturing establishment, coupled with mining activity, was operated from a central office. These instances, 534 in all, were not eliminated with those separate offices which operated one establishment only, located in a different community.

whereas the group selected for study is sufficient in size to reveal the various types of industrial combination with considerable clarity and to make possible detailed comparisons between industries. Moreover, the larger and more complex combinations, because of their very size, required a longer interval than the smaller central offices before returning their more complicated census reports. Consequently, the method of selection employed, while eliminating the earlier returns, preserved for investigation practically all the larger and more complex combinations. Beyond this point no attempt has been made to refine the data or assist the analysis by either adding or discarding materials.

TABLE 49.—PROPORTION OF CENTRAL-OFFICE COMBINATIONS AVAILABLE FOR STUDY, BY INDUSTRY GROUPS: 1919.

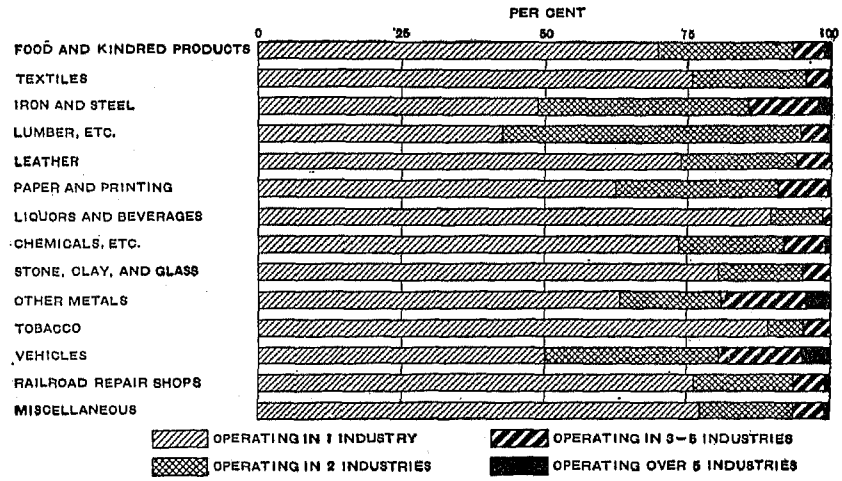
Group number.	GENERAL GROUP OF INDUSTRY.	CENTRAL OFFICES.			ESTABLISHMENTS.		
		Total.	Available for study.		Total.	Available for study.	
			Number.	Per cent of total.		Number.	Per cent of total.
	All industries	5,838	4,813	82.4	21,464	18,912	88.1
1	Food and kindred products	1,094	988	90.3	4,544	4,221	92.9
2	Textiles and their products	923	868	94.0	2,832	2,702	95.4
3	Iron and steel and their products	466	422	90.6	1,602	1,519	94.8
4	Lumber and its remanufactures	942	414	43.9	2,829	1,431	50.6
5	Leather and its finished products	145	133	91.7	495	469	94.7
6	Paper and printing	273	237	86.8	918	807	87.9
7	Liquors and beverages	87	77	88.5	268	245	91.4
8	Chemicals and allied products	629	557	88.6	2,409	2,261	93.9
9	Stone, clay, and glass products	434	346	79.7	1,100	981	89.2
10	Metals and metal products other than iron and steel	119	95	79.8	445	403	90.6
11	Tobacco manufactures	117	110	94.0	533	519	97.4
12	Vehicles for land transportation	65	62	95.4	287	281	97.9
13	Railroad repair shops	187	178	95.2	1,850	1,788	96.6
14	Miscellaneous industries	357	326	91.3	1,362	1,285	94.3

The problem of industrial specialization of central-office groups can best be dealt with by dividing it into two parts: First, in the field of manufacturing, how varied are the activities of the establishments in each central-office group? Second, to what extent and in what directions do industrial combinations reach beyond the fields of manufacturing activity?

I.—COMPLEXITY OF CENTRAL-OFFICE COMBINATIONS IN MANUFACTURING FIELD.

In dealing with this phase of the problem the classification of manufacturing activity into 358 industries has been used, although in a few cases the subdivisions within these industries have seemed to be of sufficient importance to warrant their use as well. Each establishment in each central-office combination has been classified according to its major product—i. e., its product of greatest value—and the central-office combinations have been classified according to the number of industries appearing, as shown by the major products of their establishments.

CHART J.—CENTRAL-OFFICE GROUPS ACCORDING TO NUMBER OF INDUSTRIES REPRESENTED AMONG MANUFACTURING ESTABLISHMENTS OPERATED, BY INDUSTRY GROUPS.



The frequency distributions for this type of analysis are given in Table 50 and graphically in Chart J. As appears from the table, over two-thirds, or 68.8 per cent, of the central-office combinations have all their manufacturing establishments engaged in a single line of industry. These 3,313 central offices are discussed separately in Chapter XII. Although much fewer in number, the remaining 31.2 per cent are those which, because they embrace two or more industries each, are of the greatest significance in indicating relationships present in the economic organization of industry.

Of the 10 most complex concerns, that is, showing the widest range of activities, 1 has establishments classified in 13 different industries, 3 have establishments in 12 industries each, 2 in 11

industries each, and 4 in 10 industries each. Less than 1 per cent of the entire number of central offices operate along lines so varied that their establishments are found in more than 5 industries.

TABLE 50.—DISTRIBUTION OF 4,813 CENTRAL-OFFICE COMBINATIONS, ACCORDING TO NUMBER OF MANUFACTURING INDUSTRIES REPRESENTED AMONG THE ESTABLISHMENTS OPERATED, BY INDUSTRY GROUPS: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	Total number of central offices.	DISTRIBUTION OF CENTRAL OFFICES BY NUMBER OF INDUSTRIES REPRESENTED AMONG ESTABLISHMENTS OPERATED.						
			1	2	3	4 to 5	6 to 7	8 to 9	10 and over.
		NUMBER.							
	All industries	4,813	3,313	1,158	205	95	24	8	10
1	Food and kindred products	988	689	233	35	19	7	3	2
2	Textiles and their products	868	659	173	26	8	.....	2	.....
3	Iron and steel and their products	422	206	155	36	15	9	.....	1
4	Lumber and its remanufactures	414	177	216	16	3	1	.....	1
5	Leather and its finished products	133	98	27	6	2	.....	.....	.....
6	Paper and printing	237	148	67	14	7	1	.....	.....
7	Liquors and beverages	77	69	7	1	.....	.....	.....	.....
8	Chemicals and allied products	557	411	102	25	15	2	.....	2
9	Stone, clay, and glass products	346	279	51	10	6	.....	.....	.....
10	Metals and metal products other than iron and steel	95	60	17	10	4	1	2	1
11	Tobacco manufactures	110	98	7	3	2	.....	.....	.....
12	Vehicles for land transportation	62	31	19	5	4	1	1	1
13	Railroad repair shops	178	136	31	6	4	.....	.....	1
14	Miscellaneous industries	326	252	53	12	6	2	.....	1
		PER CENT DISTRIBUTION.							
	All industries	100.0	68.8	24.1	4.2	2.0	0.5	0.2	0.2
1	Food and kindred products	100.0	69.7	23.6	3.5	1.9	0.7	0.3	0.2
2	Textiles and their products	100.0	75.9	19.9	3.0	0.9	.....	0.2	.....
3	Iron and steel and their products	100.0	48.8	36.7	8.5	3.6	2.1	.....	0.2
4	Lumber and its remanufactures	100.0	42.8	52.2	3.9	0.7	0.2	.....	0.2
5	Leather and its finished products	100.0	73.7	20.3	4.5	1.5	.....	.....	.....
6	Paper and printing	100.0	62.4	28.3	5.9	3.0	0.4	.....	.....
7	Liquors and beverages	100.0	89.6	9.1	1.3	.....	.....	.....	.....
8	Chemicals and allied products	100.0	73.8	18.3	4.5	2.7	0.4	.....	0.4
9	Stone, clay, and glass products	100.0	80.6	14.7	2.9	1.7	.....	.....	.....
10	Metals and metal products other than iron and steel	100.0	63.2	17.9	10.5	4.2	1.1	2.1	1.1
11	Tobacco manufactures	100.0	89.1	6.4	2.7	1.8	.....	.....	.....
12	Vehicles for land transportation	100.0	50.0	30.6	8.1	6.5	1.6	1.6	1.6
13	Railroad repair shops	100.0	76.4	17.4	3.4	2.2	.....	.....	0.6
14	Miscellaneous industries	100.0	77.3	16.3	3.7	1.8	0.6	.....	0.3

Although less than one-third of all central-office combinations operate more than one type of establishment, there are three of the

industrial groups in which half or more of the central offices operate in more than one line—lumber and its remanufactures, iron and steel and their products, and vehicles for land transportation. The widest distribution into the more complex combinations is found in the vehicle group.

The lumber group is of particular interest because of the fact that it alone, of all the industry groups, has more central offices operating establishments in two industrial classifications than in one. This is explained by the number of sawmills which appear in the central-office combinations with other establishments manufacturing lumber and timber products.

Special attention is called in Table 51 to the concerns which operate mines in connection with their other manufacturing activities. This really forms an additional type of enterprise carried on by the central-office group and should be accorded particular recognition because of the greater technical differences between the manufacturing and mining processes than between the different industries in the manufacturing field. As a matter of fact, the presence of each of these concerns in this table indicates that, if *all* activities were taken into account in Table 50, at least one additional type of activity would have to be added to these 409 central-office combinations. In many of these cases a considerable number of mines, and in some cases different types of mines, are operated by the same concern.

TABLE 51.—DISTRIBUTION OF 409 CENTRAL-OFFICE COMBINATIONS ACTIVE IN MINING, ACCORDING TO NUMBER OF MANUFACTURING INDUSTRIES REPRESENTED AMONG THE ESTABLISHMENTS OPERATED, BY INDUSTRY GROUPS: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	Total number of central offices.	DISTRIBUTION OF CENTRAL OFFICES BY NUMBER OF INDUSTRIES REPRESENTED AMONG ESTABLISHMENTS OPERATED.						
			1	2	3	4 to 5	6 to 7	8 to 9	10 and over.
	All industries, number	409	284	60	31	17	9	2	6
	Per cent distribution	100.0	69.4	14.7	7.6	4.2	2.2	0.5	1.5
1	Food and kindred products	6	4	1	.....	.....	.....	.....	1
2	Textiles and their products	1	1	.....	.....	.....	.....	.....	.....
3	Iron and steel and their products	60	13	21	11	7	7	.....	1
4	Lumber and its remanufactures	7	4	3	.....	.....	.....	.....	.....
6	Paper and printing	1	.....	.....	.....	.....	1	.....	.....
8	Chemicals and allied products	170	140	15	8	4	1	.....	2
9	Stone, clay, and glass products	137	112	17	5	3	.....	.....	.....
10	Metals and metal products other than iron and steel	15	5	2	4	1	.....	2	1
13	Railroad repair shops	6	2	1	2	1	.....	.....	.....
14	Miscellaneous industries	6	3	.....	1	1	.....	.....	1

The great bulk of the mining activity carried on by the 409 central offices covered by Table 51 is found in four industry groups—iron and steel and their products, other metals and their products, chemicals and allied products, and stone, clay, and glass products. Of these, the two metal groups appear to be more prone to operate varied types of manufacturing establishments in connection with mining than the two nonmetal groups. In the metal groups 77.9 per cent of the central offices operate more than one type of establishment, while only 17.9 per cent of the central offices in the nonmetal groups are active in two or more lines.

These data are supplemented by Table 52, which compares the central-office combinations engaged in mining with the entire aggregation of central-office combinations. The more complex combinations show the greater activity in mining. The total number of central-office combinations operating only one type of manufacturing establishments is not comparable with the other items because it includes certain combinations which operate one manufacturing establishment and which are also engaged in mining, while not including separate offices operating single manufacturing establishments not active in mining. If these cases are eliminated, the percentage for this group becomes 3.3, which makes the progression more evident. In general, the larger and more complex central-office combinations in manufacturing lines using mineral materials are those which show the greatest tendency toward extension into mining activity.

TABLE 52.—DISTRIBUTION OF CENTRAL OFFICES ACTIVE IN MINING IN COMPARISON WITH DISTRIBUTION OF TOTAL NUMBER OF CENTRAL OFFICES, BY NUMBER OF MANUFACTURING INDUSTRIES REPRESENTED AMONG ESTABLISHMENTS OPERATED: 1919.

NUMBER OF INDUSTRY.	Total number of central offices.	CENTRAL OFFICES ENGAGED IN MINING.[1]		NUMBER OF INDUSTRY.	Total number of central offices.	CENTRAL OFFICES ENGAGED IN MINING.[1]	
		Number.	Per cent of total.			Number.	Per cent of total.
Total	4,813	409	8.5	4 to 5 industries	95	17	17.9
1 industry	3,373	284	8.6	6 to 7 industries	24	9	37.5
2 industries	1,158	60	5.2	8 to 9 industries	8	2	25.0
3 industries	205	31	15.1	10 or more industries	10	6	60.0

[1] Includes quarrying and operation of gas and oil wells.

II.—ACTIVITIES OF CENTRAL-OFFICE COMBINATIONS IN NONMANUFACTURING FIELDS.

Having considered the activities of central-office combinations within the manufacturing field, it now remains to examine their activities in other fields of economic endeavor. On succeeding pages is given a very brief discussion of the various branches of economic activity which are not included in the census of manufactures. The problem in each case is to determine the actual amount of combination present and to examine the factors in the situation which might affect such an organization of industry.

Agriculture.—Developments following the line of industrial combination have but barely touched the province of agriculture. Those combinations which do exist are almost entirely combinations between producers of similar products and take the form either of trade associations or of cooperative societies. Such combinations rarely extend beyond the process of agricultural production. Organizations such as those of the fruit growers in southern California, the cotton planters in the South, and the onion growers in New England have been developed as a means of setting standards within the industry, as agencies to advertise the product and extend the market, as associations to improve shipping facilities, or, finally, as selling agencies; but it is an open question whether such organizations may be technically considered industrial combinations.

Between agriculture and manufacture, however, there appears to be a very definite line, seldom crossed. Although in certain industries contracts are entered into between the farmers and the manufacturer prior to the raising of the crop, cases are very rare in which the manufacturer who utilizes agricultural products raises his own raw material. The industry in which the connection between manufacturing and agriculture is perhaps most highly realized is the production of sugar. In the census of manufactures special schedules were required from operators in both the beet-sugar and cane-sugar industries, and the results are given in Tables 53 and 54.

As can readily be seen from Table 53, the activity of beet-sugar manufacturers in the field of agriculture is not very extensive. Such activity as exists is probably occasioned by the fact that the historic limitation on the manufacture of beet sugar has been the shortage of raw material.

According to the census of manufactures of 1905 (Part III, p. 449):

"The tendency among the factories is to contract for as much of the crop as possible among the independent farmers, encouraging them by giving practical instruction and advice as to planting and growing the beets rather than to have a large acreage of beets grown directly by the factory."

TABLE 53.—ACTIVITY OF BEET-SUGAR MILL OWNERS IN AGRICULTURE: 1909 TO 1919.

	AMOUNT.			PER CENT OF TOTAL.		
	1919	1914	1909	1919	1914	1909
Total acreage of beets planted	602, 555	532, 421	415, 964	100. 0	100. 0	100. 0
Grown by mill owners	39, 637	28, 266	29, 459	6. 6	5. 3	7. 1
Grown by tenants on land belonging to mill owners	15, 340	15, 397	18, 166	2. 5	2. 9	4. 4
Grown by independent farmers	547, 578	488, 758	368, 339	90. 9	91. 8	88. 5
Total quantity of beets treated (tons of 2,000 pounds)	5, 648, 552	5, 639, 103	3, 965, 356	100. 0	100. 0	100. 0
Grown by mill owners	222, 139	214, 923	266, 768	3. 9	3. 8	6. 7
Grown by tenants on land belonging to mill owners	114, 563	135, 537	163, 843	2. 0	2. 4	4. 1
Grown by independent farmers	5, 311, 850	5, 288, 643	3, 534, 745	94. 1	93. 8	89. 1

During the last decade there has been an actual decrease in the proportions which represent the activity of beet-sugar manufacturers in the field of agriculture. In several cases, however, the sugar manufacturers have entered fields which are essential or facilitate the entire process. One large beet-sugar concern has undertaken a number of irrigation projects, and has at least three principal irrigating canals in the region from which it draws its raw material. The operation of a narrow-gauge railroad is included in the activities of another large sugar enterprise.

The following table gives figures for the cane-sugar industry:

TABLE 54.—ACTIVITY OF CANE-SUGAR MILL OWNERS IN AGRICULTURE: 1919 AND 1914.

	AMOUNT.		PER CENT OF TOTAL.	
	1919	1914	1919	1914
Total cane crushed (tons of 2,000 pounds.)	3, 688, 002	3, 754, 820	100. 0	100. 0
Grown on plantations controlled by mill owners	1, 724, 435	1, 532, 575	46. 8	40. 8
Purchased	1, 922, 398	2, 166, 477	52. 1	57. 7
Treated on shares or contract	41, 169	55, 768	1. 1	1. 5

It must be remembered that the complete manufacture of cane sugar is regarded by the Census Bureau as being the result of activity in two industries, one the manufacture of sugar and sirup from cane, and the other sugar refining. The above figures deal solely with the manufacture of sugar and sirup from cane. That there should be such a close connection between the manufacturing process and agricultural activity is by no means strange. Before the Civil War practically every planter of cane had his own sugar mill, the number of such mills in 1849 in Louisiana alone being 1,490. The reduction in the number of mills has been brought about by various causes, among which are the following: Changes in labor conditions; development of more expensive machinery; improved methods of transporting cane to the mills, many factories now operating small railways for this purpose; and the advantages of large-scale production. Since it is necessary to crush the cane promptly after harvesting in order to prevent deterioration, the relationship between the manufacturing and agricultural processes is necessarily very intimate. Sugar refining, however, is by no means comparable to the other two sugar industries, being separated to a greater extent from the agricultural process. In fact, a major part of its raw material is imported from Cuba and Porto Rico.

In general, however, it is true that the manufacturer whose raw material is an agricultural product purchases this raw material in an open and usually highly developed market. The textile manufacturer, the meat packer, the flour manufacturer, and even the operator of a canning factory all purchase their materials from independent producers. The few efforts which have been made to step over this line, such as the attempt of the automobile tire manufacturers to raise their own Egyptian cotton in Arizona, have met with questionable success.

There are several reasons for the separate development of these two branches of industry. In the first place, agriculture up to the present time has not flourished when undertaken on a large scale. In a few isolated cases large farms have doubtless proven profitable, but the tendency made evident by census records is for the larger farms to be broken up, which affords a strong presumption that they are not proving profitable. This condition has been explained by Prof. C. Gide, University of Paris, as resulting from the fact that the principle of division of labor can not be applied in agriculture as it can in manufacturing activity.

In the second place, the manufacturer requires a definite amount of raw materials. He can not obtain the best utilization of his manufacturing resources if his supply fluctuates from year to year; but if he operated farms the return from them would be an uncertain quantity, and if his manufacturing activity were to remain steady presumably it would necessitate some market transactions on his part. This uncertainty of supply, occurring at the point in the process where assurance is most necessary, makes it a simpler and wiser method for him to purchase directly through the agricultural markets rather than to depend upon his own success in the agricultural field. To be sure, he could always supplement by market purchases, but he would never know his requirements until the crop was actually harvested, and would then be forced to purchase at what might be a very unfavorable price.

To the manufacturer who is concerned with entering agriculture, there is in the main but one consideration, and that is, Would it be profitable? On the other hand, to the man who is considering agriculture as his means of livelihood, there are certain other considerations which enter and which make the return from agriculture one that is satisfactory to him, whereas it does not meet the test of profitableness which the manufacturer applies. It is probable that from the viewpoint of the accountant, recording only in monetary units, most farms are operated, in the long run, at a loss. This loss is not evident, because the farmer fails to consider the fact that his return less his out-of-pocket costs constitutes not only his profit but also wages for his own personal efforts and interest on his investment. It has been estimated that if these intangible costs were included three of every four farms would report losses in operation. The intangible values, such as life in the country, independence, and freedom from unemployment, which accrue to the farmer can not be included by the accountant. If this be the situation, the manufacturer is able to purchase his raw materials at prices which represent, at the most, a meagre return on the investment, and in the majority of instances an actual loss. Since the actual marketing cost is low because of the high organization of agricultural-commodity markets, the manufacturer can naturally see little gain in entering the agricultural field.

Extractive industries.—Although manufacturing combinations have not extended into agriculture to any considerable extent, a different situation presents itself, when one examines the extractive

industries. Under this head must be included mining, the production of petroleum and natural gas, logging operations, and fisheries. Into all these fields the manufacturer has apparently felt free to expand. Although they bear the same relation to his general process that agriculture does—i. e., provide his raw material—the conditions which determine extension into these fields are very different from those given above as limiting agricultural expansion. Generally a saving is accomplished by large-scale production; the profits are at least as high as those in manufacturing; and the regulation of production in accordance with demand is not so difficult as in the case of agriculture. In these activities there is little dependence upon forces beyond the operator's control, such as is present in the relationship between agriculture and climate. There is no well-organized market, and the considerable selling cost can be eliminated by combination, a consequent reduction of the total expenses of operation.

The propinquity of operation is a factor of considerable importance. Since the bulk of the products of extractive industries is so large and transportation costs are so heavy, the establishments which perform the manufacturing processes are necessarily located in close proximity to the points where the raw materials are produced. Combination is made easy by such a situation.

The importance of the regulation of supply deserves especial attention. Expansion or contraction in both fields can be carried on in unison, and the surpluses or deficits which are apt to arise in poorly developed markets and which result in prices quite variant from the cost of production are eliminated.

Fortunately, the central office records include activity in mining and in petroleum and natural-gas fields, so that it has been possible to include in this study a factual investigation dealing with the combination of manufacturing establishments with these particular lines of economic activity (see p. 127).

In the lumber field there is very close connection between logging and manufacturing activities. By far the largest part of the total logging product goes to sawmills. Of the total quantity of timber used by sawmills as their principal material, an estimate based on returns from the lumber and timber products inquiry made by the Bureau of the Census for 1919 indicates that about 30 per cent was logged by concerns other than the sawmill operators. In other words, approximately 70 per cent of the logs used in sawmills were cut by the concerns which milled them.

The corresponding figure for the paper and wood-pulp industry is by no means as large. Fortunately, exact figures are available for this industry, showing the total amount of wood used in mills both in quantity and in cost (value) and the part of the total which was taken from timber camps owned by the manufacturing establishment. The following table gives these figures:

TABLE 55.—SOURCE OF WOOD UTILIZED IN MAKING WOOD PULP IN PULP MILLS AND IN PULP AND PAPER MILLS: 1919.

INDUSTRY.	QUANTITY (CORDS OF 128 CU. FT.).			COST (VALUE).		
	Total.	Taken from timber camps owned by establishments.		Total.	Taken from timber camps owned by establishments.	
		Amount.	Per cent of total.		Amount	Per cent of total.
Total	5,477,832	$1,151,369	21.0	$87,386,083	$19,446,857	22.3
Pulp mills	883,476	128,626	14.6	13,284,631	2,014,968	15.2
Pulp and paper mills	4,594,356	1,022,743	22.3	74,101,452	17,431,889	23.5

In general, therefore, one-fifth of the timber used in the paper and wood-pulp industry was cut by the manufacturer. A considerably greater proportion was cut by the concerns which operated pulp and paper mills than by those which manufactured pulp only. Since the largest concerns in this field manufacture paper as well as pulp, and the larger concerns are those which would naturally extend into the logging activity, this relationship is not strange. This separation between the logging industry and the paper and pulp industry is much greater than is generally realized. The system of contracting for the product of logging operations is apparently the method by which most manufacturers in this field procure their raw material.

Transportation.—Combinations between manufacturing and transportation systems seldom arise from initiative on the part of the manufacturer. The railroad system rarely serves any one activity or any one operator to such an extent that he finds it desirable to obtain operating control. It is seldom that the transportation is so extensive and so concentrated in one region or along one route that railroad operation can be of any considerable assistance to the individual manufacturer. Some cases, however, can be found, such as the railroads which run from ports on Lake Superior to the Missabe and Hibbing iron ranges, or the railroads operated in connection with sugar refineries. The

existence of each of these railroads is dependent entirely upon a single industry. The railroads which cater chiefly to one line of industrial activity, however, are few in number.

On the other hand, it more often happens that the railroads themselves enter into other fields. The extent of railroad control in the coal fields, especially anthracite, is particularly to be noticed. Manufacturing and mining developments increase the income of railroads, whereas railroad developments do not affect the income of manufacturing or mining concerns.

A maximum figure for the interest of railroad companies in other types of activity can be obtained by examining the Interstate Commerce Commission records and determining the investments in nonrailroad enterprises held by railroads. The figures, which are particularly pertinent, are taken from the condensed balance sheet as of December 31, 1919, for all Class I carriers and are as follows: [2]

Total assets	$23,431,379,410
Investments	20,290,453,766
Investments in road and equipment	15,135,257,524
Improvements in leased railway property	292,747,659
Sinking funds	23,234,652
Deposits in lieu of mortgaged property sold	5,587,491
Miscellaneous physical property	258,419,822
Investments in affiliated companies	3,893,645,277
Other investments	681,561,341

Immediately following the above statement, appears the following quotation from the same source:

"No attempt has been made to compile a consolidated balance sheet for the steam railroads as a whole, free of duplications, on account of intercorporate relationships. The stocks of certain carriers appear as 'Investments in affiliated companies' in the report of other carriers."

On the basis of these figures, therefore, one may assume that at least $681,561,341 is invested by railroad companies in other enterprises, and that the figure of $3,893,645,277, although made up largely of investments in other railroad companies, may represent to some extent activity in the manufacturing field. It would appear, therefore, that railroads have concerned themselves in a very tangible way with certain manufacturing projects. It is probably true, however, that the relationship remains chiefly a financial one, and that the manufacturing concern is allowed to direct its own operation in large measure.

[2] Annual Statistics of Railways, Interstate Commerce Commission, 1919, p. 75.

Some direct indication of combinations can be determined through an examination of the combinations in which railroad repair shops appear. Transportation by water is sometimes found in combination, especially with fish canning. The inclusion of ship-repair yards in the census of manufactures gives some indication of the presence of such activity in central-office combinations. Barges, canal routes, and ferries are sometimes found in industrial organizations. It should be noted that water and land transportation are very often carried on under the same management.

Electrical industries.—A separate census is taken every five years by the Bureau of the Census covering five distinct electrical industries, as follows: (1) Central electric light and power stations; (2) Electric railways; (3) Telephones; (4) Telegraphs; and (5) Municipal electric fire-alarm and police-patrol signaling systems.

To the extent that the electrical industries are operated by municipalities, they are not eligible for industrial combinations. This eliminates the last group entirely from consideration, and from the report of the 1917 census of electrical industries it appears that 35.4 per cent of the central electric light and power stations were operated by municipalities in that year.

According to the returns from 1919 census of manufactures, 23.6 per cent of the total primary horsepower used by industrial establishments was supplied by electric motors run by current generated in the same establishment. The report of the 1917 census of electrical industries estimated that there were "about 45,000 isolated plants in the United States operated solely in connection with industrial enterprises. To these should be added a large but indeterminate number of isolated plants operated by mines, stores, hotels, pleasure resorts, public buildings, and institutions of various sorts as schools, colleges, prisons, etc." [3]

According to the report on electric railways for 1917, of 943 operating companies 355, or 37.6 per cent, possessed power-plant equipment. It is, however, of significance to note that in 1912 the proportion was 50.7 per cent and in 1907, 61 per cent.

Building trades.—Since 1900 the census of manufactures has limited itself to factory production, excluding the building trades from its categories. Up to that time this group of industries had been included in the enumeration, but the difficulty of definition, together with the imperfection of the returns due to the subletting

[3] Census of Electrical Industries, 1917, p. 21.

of contracts in this particular field, resulted in its being withdrawn from census inquiry. Such industries as the making of brick, plaster, lime, tile, roofing paper, shingles, etc., still remain, however, as manufacturing enterprises.

No direct evidence on this subject is available, but, since the contractor requires such a variety of material, differing according to the specifications of the particular jobs on which he is engaged, it is greatly to be doubted that many of even the larger building contractors operate sawmills or brick kilns or quarry their building stone. Moreover, large operators in this field are comparatively few in number. It is probable, therefore, that the sum total of all operating relationships other than contractual, between the manufacturing group and the building trades proper, is very small. The introduction of structural steel into building operations has probably done more to strengthen these relationships than any other single development in the field of building construction.

Wholesale and retail trade.—The sphere of industry concerning which perhaps least is factually known is wholesale and retail trade. In many cases the manufacturing establishment and mercantile activity are so combined as to make the separation difficult; for example, in the ice-cream industry. There are a number of cases, however, in which the organization of stores and manufacturing establishments clearly forms an industrial combination. Every manufacturing establishment whose entire output is not directly contracted for must have some sort of selling organization and usually maintains a selling agency. A distinction must be made, however, between a selling agency and a wholesale-trade or retail-trade establishment. It is only when the organization includes such an establishment that it may be termed an industrial combination.

Although the chain grocery stores, for example, do not produce all the products which they sell, they maintain manufacturing establishments in various lines which they retail through their stores. One such group specializes in bluing, another in coffee roasting and grinding, etc.

The large department stores and the mail-order houses usually maintain manufacturing establishments which supplement their stock for trade. Connected with large mail-order houses appear stove factories, agricultural-implement plants, piano factories, etc.

Many retail bookstores are also engaged in book publishing. This usually has grown up as an expansion from the original retail industry. The fact that in the retail shop books published

by other publishers are for sale distinguishes it from a selling agency.

Combination between manufacturing and mercantile establishments is evidently made possible either when the mercantile establishment is one reaching a market sufficiently large to consume the product of a manufacturing establishment or when it is one dealing in a specialized product.

Miscellaneous.—Finally, there must be listed five other activities either not included in the census of manufactures or eliminated in this particular study. The hand and neighborhood trades, such as tailoring, carpentering, etc., are not recorded. Although perhaps of significance in other respects, their omission in a study of industrial combinations is of little importance. Likewise, the census ruling to disregard all concerns whose product during the census year was valued at less than $500 is of little significance. Such concerns do not enter into industrial combinations.

Three other activities which are recorded by the census of manufactures have been disregarded in the material collected for this study—automobile repair shops, power laundries, and dyeing and cleaning establishments. The data for power laundries and dyeing and cleaning establishments, although collected at the census of manufactures, are not included with the general manufactures data but are tabulated separately. Automobile repair shops were not included in this study because of the uncertainty surrounding the reports in that particular field. In cases where two establishments, one of them an automobile repair shop, were reported as operated by a central office, the automobile repair shop, usually merely the garage, with power equipment for repairs, belonging to the other establishment. Such combinations can not be fairly considered as involving two industries.

In the preceding pages the endeavor has been merely to indicate the problem of industrial combination between manufacturing establishments and those in other spheres of economic activity. With this larger problem clearly in mind, as a general background, the study from this point on confines itself strictly to the manufacturing and mining field. That such a limitation exists is by no means an unmitigated misfortune, but is offset by the possibilities for a more intensive study in a smaller field than would be the case if the entire economic realm were to be examined. It is likewise true that in no other field are industrial combinations so varied or so extensive as among manufacturing enterprises.

IX.

THE DISTANCE FACTOR.

Methods of transportation have developed to such a high degree at the present time that it is difficult to realize how recently this growth actually occurred. In 1850 there were only 8,571 miles of railways in operation in the United States, as compared with more than a quarter of a million miles at the present time. Between 1890 and 1919 the number of cars, other than passenger cars, in service has more than doubled, while during the same period of 29 years the number of tons of freight hauled increased from 640 millions to 2,043 millions, and the average length of haul per ton of freight from 122.2 miles to 178.2 miles. Such expansion has made itself felt throughout the entire economic system and is of particular significance in the development of industrial organization. Without adequate transportation facilities, industry can be carried on only for local markets from local materials.

The first data dealing with the problem of the limitations due to distance are introduced in Table 56. This table classifies the 314 central-office combinations operating 10 or more establishments in terms of the area within which the establishments are located. This is not a study of markets, for a concern manufacturing all its product in one town may sell throughout the entire country, but is rather a study of geographical distribution of the plants operated by central offices. Nearly two-fifths of these combinations have plants so scattered about the country that they can only be classified as national in scope. An additional third operate plants which fall within groups of States—New England, the South, etc. This necessitated rather arbitrary classification in some cases. Seventy-four central offices operated plants which are found in one State, or at most in two adjoining States.

More than one-half of all the central-office combinations active within single States are found in the food and kindred products industry. The combinations are located in 9 different States, but Wisconsin contains 8 of the 23 instances. The same development, but to a smaller degree, is found in New York State, where three such central offices are located. They are all central-office combinations manufacturing dairy products, chiefly cheese.

TABLE 56.—GEOGRAPHICAL DISTRIBUTION OF ESTABLISHMENTS OF 314 CENTRAL OFFICES OPERATING 10 OR MORE ESTABLISHMENTS: 1919.

Group number.	INDUSTRIAL GROUP.	Total.	DISTRIBUTION ACCORDING TO LOCATION OF ESTABLISHMENTS.			
			Within a single State.	Within two adjoining States.	Within a group of States.	National.
	Total	314	44	30	115	125
1	Food and kindred products	74	23	9	19	23
2	Textiles and their products	23	1	6	10	6
3	Iron and steel and their products	22	1	3	7	11
4	Lumber and its remanufactures	25	.....	3	10	12
5	Leather and its finished products	5	2	1	1	1
6	Paper and printing	12	.....	.....	4	8
7	Liquors and beverages	1	1	.....	.....	.....
8	Chemicals and allied products	44	4	1	12	27
9	Stone, clay, and glass products	13	1	.....	4	8
10	Metals and metal products other than iron and steel	9	1	.....	1	7
11	Tobacco manufactures	8	2	.....	2	4
12	Vehicles for land transportation	6	.....	.....	1	5
13	Railroad repair shops	46	3	3	37	3
14	Miscellaneous industries	26	5	4	7	10

The food and kindred products group also includes a number of central-office combinations active over large areas. This is to be explained chiefly by the perishability of food products. A large bakery enterprise, for example, can not ship from a central point to all its distributing centers because its product deteriorates too rapidly. The result is the development of a group or "system" of bakeries throughout the market area.

On the other hand, the chemical and allied products group has quite a different cause for the wide distribution of its plants. More central offices are national in the area of operation in the case of the chemical than in that of any other industrial group. This development is caused chiefly by the distribution of raw materials. In many cases the location of certain of the concern's activities is determined by the raw materials and that of others by the market, the process being begun at one point and completed at another.

These data certainly indicate the surprising extent to which the distance factor has been overcome, for industrial enterprises have distributed themselves with little apparent regard to the difficulties of distance. The causes for the concentration or distribu-

tion of activities throughout the country belong to another study, but would naturally include such elements as the proximity of raw materials, the proximity of markets, the proximity of power, labor distribution, capital distribution, legal regulation, momentum of an early start, etc.

Thus far this study has dealt only with the largest central-office combinations. In order to examine a more typical group special investigation has been made of the 792 central-office combinations operating 3, 4, and 5 similar establishments. The distances between the 2,776 establishments involved and the central offices were measured, and also the distances between the two establishments farthest apart in each group. This latter distance is called the "span" of the group. The combinations operating railroad repair shops were not included in the study of the distance factor.

Peculiar difficulties were encountered in measuring these distances. The official Government table of distances, compiled by the War Department, could not be used because it does not include the many small communities in which manufacturing establishments and central offices are located. Railroad mileage seemed perhaps the most significant measure, but the lack of both uniformity and centralization of such data, the possibility of using different competing routes and the development of truck transportation would make even such a measurement questionable. Since after all the problem is not one of absolute but of relative distances, it was finally decided to use straight-line measures made on a flat map. Even such measurements for the number of distances involved required considerable labor. Although they are not absolutely exact, they are sufficiently accurate for the purposes of this study. Measurements were made to the nearest 5 miles. Under this method the distance from New York to Chicago is 735 miles and from New York to San Francisco 2,660 miles. The War Department measures of these distances, based on railroad mileage, are 912 and 3,191 miles, respectively, or about 20 per cent greater.

The spans—greatest distance between establishments—for these 792 central-office combinations are given in Table 57 and graphically presented in Chart K. The greatest span was that of a firm engaged in fish canning and preserving, which operated an establishment in Eastport, Me., and another in East San Pedro, Calif., a distance of 2,880 miles. Since the central office was also in Eastport, this group also reported the greatest distance from central office to an establishment.

TABLE 57.—DISTRIBUTION OF 792 CENTRAL-OFFICE COMBINATIONS, EACH OPERATING THREE, FOUR, OR FIVE SIMILAR ESTABLISHMENTS, ACCORDING TO THE GREATEST DISTANCE BETWEEN ESTABLISHMENTS, BY GENERAL GROUPS OF INDUSTRIES: 1919.

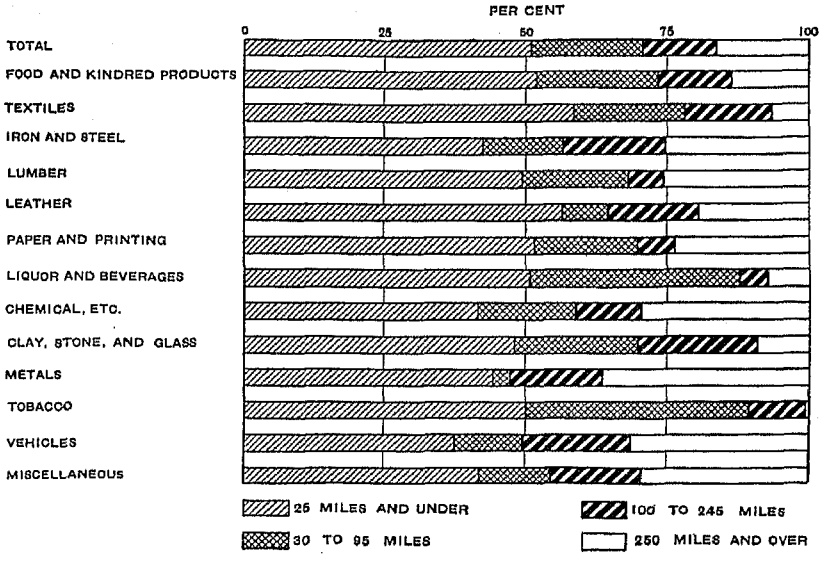
Group number.	INDUSTRY GROUP.	Number central-office group.	GREATEST DISTANCE BETWEEN ESTABLISHMENTS IN EACH CENTRAL-OFFICE COMBINATION.							
			5 miles and under.	10 to 25 miles.	30 to 95 miles.	100 to 245 miles.	250 to 495 miles.	500 to 995 miles.	1,000 to 2,495 miles.	2,500 miles and over.
		NUMBER.								
	Total	792	43	146	202	176	91	88	34	12
1	Food and kindred products	210	19	44	49	49	23	15	8	3
2	Textiles and their products	195	11	44	58	57	13	7	4	1
3	Iron and steel and their products	45	.....	2	9	7	8	13	5	1
4	Lumber and its remanufactures	44	2	11	12	6	4	6	3	.....
5	Leather and its finished products	26	1	7	4	6	5	3	.....	.....
6	Paper and printing	28	1	5	5	4	4	5	2	2
7	Liquors and beverages	22	1	1	15	3	1	1	.....	.....
8	Chemicals and allied products	79	2	14	15	8	13	17	7	3
9	Stone, clay, and glass products	32	1	4	10	10	5	1	.....	1
10	Metals and metal products other than iron and steel	11	.....	2	.....	1	2	4	1	1
11	Tobacco manufactures	35	3	5	17	8	2	.....	.....	.....
12	Vehicles for land transportation	5	.....	.....	.....	2	1	2	.....	.....
14	Miscellaneous industries	60	2	7	8	15	10	14	4	.....
		PER CENT DISTRIBUTION.								
	Per cent	100.0	5.4	18.4	25.5	22.2	11.5	11.1	4.3	1.5
1	Food and kindred products	100.0	9.0	21.0	23.3	23.3	11.0	7.1	3.8	1.4
2	Textiles and their products	100.0	5.6	22.6	29.7	29.2	6.7	3.6	2.1	0.5
3	Iron and steel and their products	100.0	.....	4.4	20.0	15.6	17.8	28.9	11.1	2.2
4	Lumber and its remanufactures	100.0	4.5	25.0	27.3	13.6	9.1	13.6	6.8	.....
5	Leather and its finished products	100.0	3.8	26.9	15.4	23.1	19.2	11.5	.....	.....
6	Paper and printing	100.0	3.6	17.9	17.9	14.3	14.3	17.9	7.1	7.1
7	Liquors and beverages	100.0	4.5	4.5	68.2	13.7	4.5	4.5	.....	.....
8	Chemicals and allied products	100.0	2.5	17.7	19.0	10.1	16.5	21.5	8.9	3.8
9	Stone, clay, and glass products	100.0	3.1	12.5	31.3	31.3	15.6	3.1	.....	3.1
10	Metals and metal products other than iron and steel	100.0	.....	18.2	.....	9.1	18.2	36.4	9.1	9.1
11	Tobacco manufactures	100.0	8.6	14.3	48.6	22.9	5.7	.....	.....	.....
12	Vehicles for land transportation	100.0	.....	.....	.....	40.0	20.0	40.0	.....	.....
14	Miscellaneous industries	100.0	3.3	11.7	13.3	25.0	16.7	23.3	6.7	.....

Considering the fact that these are the smaller central-office combinations, operating but three, four, and five establishments, the extent to which they are widely distributed geographically is most surprising. More than one-half of them have spans of more than 100 miles, while the arithmetical average is 272.89 miles.

That more than one-fourth of these central-office combinations should operate establishments which are more than 250 miles apart is a striking indication of the conquest of distance.

The cases which have a span of more than 1,000 miles are particularly interesting. Strangely enough, among these 46 cases, 35 industries are represented. In certain instances, such as sawmills, the cause is obviously the wide distribution of raw materials. Similar to this are such industries as fish canning, chemicals, and beet sugar; but another group shows the influence of the market factor. The geographical organization of the central-office combination classed as manufacturing cordials and flavors, having its

CHART K.—DISTRIBUTION OF 792 CENTRAL-OFFICE GROUPS ACCORDING TO THE GREATEST DISTANCES BETWEEN ESTABLISHMENTS, BY GENERAL GROUPS OF INDUSTRIES.



central office at Chicago and establishments in Chicago, New Orleans, Newark, N. J., and San Francisco, can be accounted for only in terms of convenience to market. The three central-office combinations engaged in printing whose establishments are widely distributed offer the same explanation, as well as the four central offices manufacturing clothing, whose span is more than 1,000 miles.

The difference found between industries is most interesting, the distributions being surprisingly similar to those found in the larger central-office combinations. The two metals industries—iron and

steel and other metals—stand out as having the largest spans, in each case the greatest number of central offices coming in the 500–995-mile group. The two industries most dependent on particular agricultural crops—liquors and beverages and tobacco—show the least sign of extension.

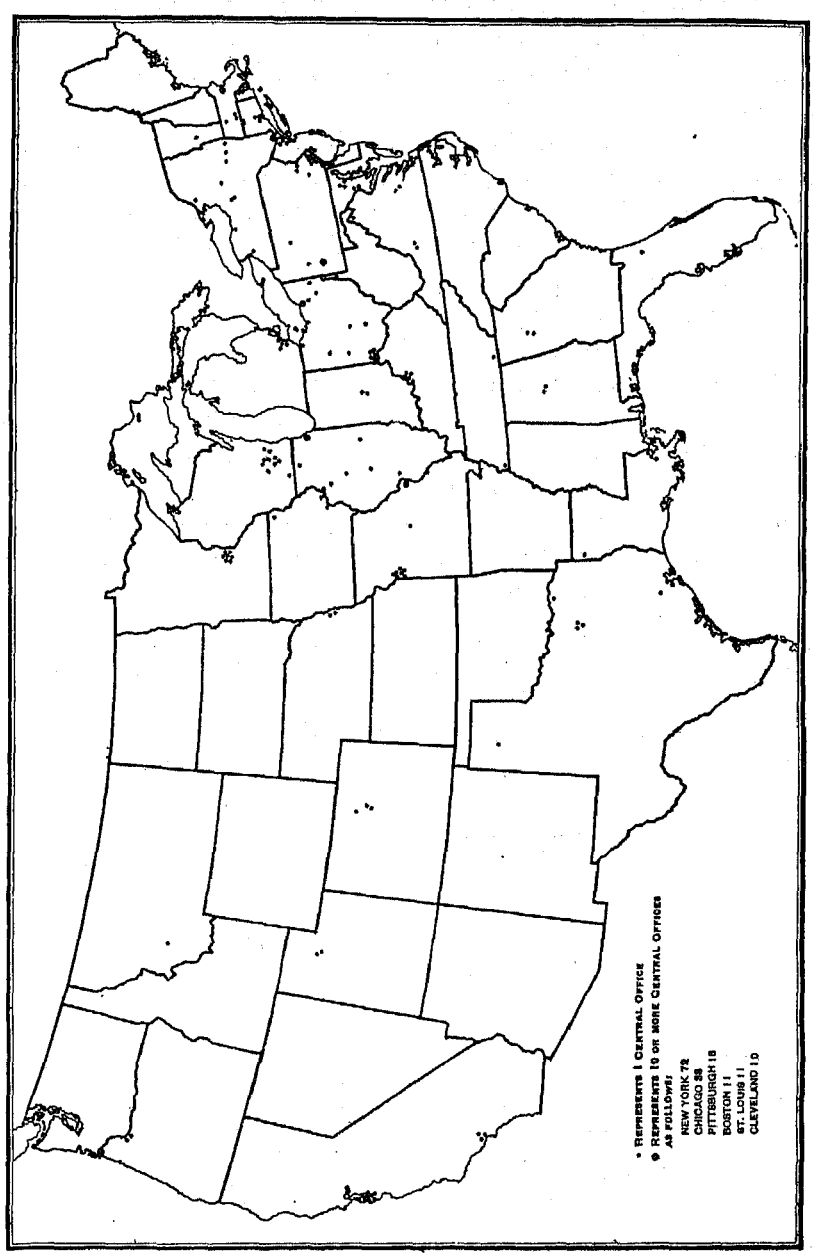
But the problem is one not solely of the relation of the establishments to one another, but also of the location of the establishments in respect to the central office, and the first phase of this problem is: Where are the central offices located?

In Table 58 is shown the size of cities in which the largest 314 central offices are located. This distribution is indicated graphically in Chart L. As might be expected, the concentration is in the larger cities, nearly three-fifths of the central offices being found in cities of over 500,000 population, and more than four-fifths in cities of over 100,000. None of the industries escape this tendency, although the butter and cheese combinations in the food and kindred products group give it 12 central offices, or nearly one-sixth of the total, in communities having fewer than 5,000 inhabitants.

TABLE 58.—DISTRIBUTION OF 314 CENTRAL OFFICES, EACH OPERATING 10 OR MORE ESTABLISHMENTS, BY POPULATION OF CITY IN WHICH LOCATED, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	GENERAL GROUP OF INDUSTRY.	Total number central offices.	POPULATION OF CITY IN WHICH CENTRAL OFFICE IS LOCATED.						
			Under 5,000	5,000 to 10,000	10,000 to 25,000	25,000 to 50,000	50,000 to 100,000	100,000 to 500,000	Over 500,000
	All industries	314	14	8	13	9	16	71	183
1	Food and kindred products	74	12	4	1	1	3	19	34
2	Textiles and their products	23	1	.....	2	.....	2	2	16
3	Iron and steel and their products	22	.....	1	.....	.....	2	4	15
4	Lumber and its remanufactures	25	.....	1	1	1	2	10	10
5	Leather and its finished products	5	.....	1	.....	.....	.....	.....	4
6	Paper and printing	12	.....	.....	1	.....	.....	5	6
7	Liquors and beverages	1	.....	.....	.....	.....	.....	.....	1
8	Chemicals and allied products	44	.....	.....	1	.....	2	9	32
9	Clay, stone, and glass products	13	1	.....	.....	.....	1	3	8
10	Metals and metal products other than iron and steel	9	.....	.....	.....	2	.....	.....	7
11	Tobacco manufactures	8	.....	.....	.....	1	.....	.....	7
14	Vehicles for land transportation	6	.....	.....	2	1	.....	.....	3
12	Railroad repair shops	46	.....	.....	4	1	2	13	26
13	Miscellaneous industries	26	.....	1	1	2	2	6	14

CHART L.—LOCATION OF 314 CENTRAL OFFICES OPERATING 10 OR MORE ESTABLISHMENTS.



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These 314 central offices are scattered among 96 different cities. Over one-fifth of the total are in New York City and over one-ninth in Chicago. Certain industries seem to have definite centers, such as chemicals in New York and iron and steel in Pittsburgh.

For the 792 central offices used to indicate the tendency present among the smaller central-office combinations the examination of the location of central offices has divided itself into three problems—the extent to which central offices are located in the same community with one of the establishments, the extent to which central offices are really central, and the extent to which they are found in large cities.

Table 59 indicates the extent to which central offices are located in the same community with one of the operating establishments. Nearly three-fourths of the central offices are so situated. Except in the cases of the chemicals and "other metals" groups, there is apparently no great variation among the different industries in the extent to which the location of establishments determines the location of a central office.

TABLE 59.—CENTRAL OFFICES OPERATING THREE, FOUR, OR FIVE SIMILAR ESTABLISHMENTS AND LOCATED IN SAME COMMUNITY AS ONE OF THE OPERATING ESTABLISHMENTS, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	INDUSTRY GROUP.	CENTRAL-OFFICE COMBINATIONS.		
		Total.	Operating establishment in same community as central office.	
			Number.	Per cent.
	Total	792	570	72.0
1	Food and kindred products	210	145	69.0
2	Textiles and their products	195	155	79.5
3	Iron and steel and their products	45	34	75.6
4	Lumber and its remanufactures	44	28	63.6
5	Leather and its finished products	26	19	73.1
6	Paper and printing	28	23	82.1
7	Liquors and beverages	22	18	81.8
8	Chemicals and allied products	79	41	51.9
9	Stone, clay, and glass products	32	23	71.9
10	Metals and metal products other than iron and steel	11	11	100.0
11	Tobacco manufactures	35	28	80.0
12	Vehicles for land transportation	5	4	80.0
14	Miscellaneous industries	60	41	68.3

It will be noted that 222 of the 792 central offices discussed are located apart from any of their establishments. At first thought it would seem probable that one of the causes of this situation might be the location of the central office at some central point, as a greater convenience for the direction of the establishments. The facts do not, in general, bear out such a hypothesis, however. It was possible to determine how many central offices were really central by comparing the span of the central-office combination with the greatest distance from any establishment to the central office. If the span—the distance between the two establishments farthest apart—be greater than the distance of any establishment from the central office, then the office has been termed "central."

TABLE 60.—CENTRAL OFFICES OPERATING THREE, FOUR, OR FIVE SIMILAR ESTABLISHMENTS AND LOCATED CENTRALLY BUT IN DIFFERENT CITIES FROM ESTABLISHMENTS OPERATED, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number.	INDUSTRY GROUP.	CENTRAL-OFFICE COMBINATIONS.		
		Total.	Having central office centrally located.[1]	
			Number.	Per cent.
	Total	222	71	32.0
1	Food and kindred products	65	22	33.8
2	Textiles and their products	40	6	15.0
3	Iron and steel and their products	11	9	81.8
4	Lumber and its remanufactures	16	4	25.0
5	Leather and its finished products	7	3	42.9
6	Paper and printing	5	1	20.0
7	Liquors and beverages	4	1	25.0
8	Chemicals and allied products	38	16	42.1
9	Stone, clay, and glass products	9	1	11.1
10	Metals and metal products other than iron and steel	.....	.....	.....
11	Tobacco manufactures	7	.....	.....
12	Vehicles for land transportation	1	.....	.....
14	Miscellaneous industries	19	8	42.1

[1] That is, so located that the distance from the central office to any establishment is less than the greatest distance between establishments.

This situation, recorded in Table 60, exists in the cases of only 71, or 32 per cent, of the 222 central-office combinations examined. From these data it is possible to draw the conclusion that the location of the central office so as to make it most convenient to the various establishments which it operates is not an important factor in the situation. The industries in which this condition is most apt to be present are those in which the establishments are

farthest apart. It is probable that the location of the central office is more likely to be determined by the market factor or by the fact that certain cities have been recognized centers for certain industries. There are, for example, instances of textile mills located in the South whose central offices are in Boston because Boston is the traditional center for that industry.

TABLE 61.—TWELVE CITIES WITH LARGEST NUMBERS OF CENTRAL OFFICES OPERATING THREE, FOUR, AND FIVE SIMILAR ESTABLISHMENTS: 1919.

CITY.	Total.	INDUSTRY GROUPS.												
		Food.	Textiles.	Iron and steel.	Lumber.	Leather.	Paper and printing.	Liquors.	Chemicals.	Stone, clay, glass.	Other metals.	Tobacco.	Vehicles.	Miscellaneous.
Total examined	792	210	195	45	44	26	28	22	79	32	11	35	5	60
Total in 12 cities	300	43	105	16	9	14	10	4	41	10	5	13	3	27
New York	139	11	71	4	2	3	7	2	14	1	3	6	.....	15
Philadelphia	39	3	18	.....	.....	4	.....	.....	6	2	.....	5	.....	1
Chicago	37	8	3	4	3	1	1	.....	8	2	1	.....	2	4
Boston	18	1	7	2	.....	5	1	.....	1	1	.....	.....	.....	.....
San Francisco	12	4	.....	1	1	1	.....	1	4	.....	.....	.....	.....	.....
Pittsburgh	11	.....	.....	1	.....	.....	.....	1	2	2	1	1	1	2
Cleveland	10	2	1	2	.....	.....	.....	.....	2	1	.....	.....	.....	2
Detroit	9	2	3	.....	.....	.....	.....	.....	1	.....	.....	1	.....	2
St. Louis	7	2	1	1	2	.....	1	.....	.....	.....	.....	.....	.....	.....
Buffalo	6	2	1	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....
New Orleans	6	4	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
Portland, Oreg	6	4	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1

But where are these 792 central offices located? They are scattered throughout the country in about 300 different communities. The more important centers are given in Table 61, where the central-office combinations in the 12 cities in which they are most concentrated are distributed by industry groups. There are several most interesting items for consideration. As would be expected, New York heads the list, as it did in the corresponding study of the largest 314 central-office combinations. Philadelphia, which ranked ninth in the distribution of the larger central-office combinations, appears in second place with reference to these smaller enterprises, although Chicago is a close third. Of the 314 larger central-office combinations 62.7 per cent were found in 12 cities, whereas of the 792 smaller ones, only

37.9 per cent are in 12 cities, but the most significant feature is the comparison according to industrial groups. Textiles, leather, chemicals, and vehicles for land transportation show the greatest tendency to locate in large cities. In the textile group somewhat more than half the central offices are found in the 12 cities. Similar or larger proportions are shown for the other three groups mentioned, but these, in total, represent little more than half the number of central offices reported by the textile industry. The rather wide distribution of the smaller central offices among cities indicates that the concentration in single centers is by no means as great in the case of such offices as in the case of the larger central-office combinations.

There is one other aspect of this problem which may be touched upon, and that is the extent to which the "absentee-operation" central offices are found in the larger cities. The data for such a study are given in Table 62. The 12 cities, in which were located 37.9 per cent of the 792 central offices under consideration, contained 61.3 per cent of the 222 central offices operating in communities in which they have no establishment. This percentage indicates some tendency, then, toward a concentration of such central offices in large cities. In the case of Boston only 1 of the 18 central offices located there operated a plant within the city, although in Cleveland 8 of 10 did so. Such a table is interesting chiefly as indicating the problem—the data not being sufficiently complete to attempt any actual determination of comparisions between cities.

TABLE 62.—EXTENT OF ABSENTEE OPERATION IN CENTRAL OFFICES OPERATING THREE, FOUR, AND FIVE SIMILAR ESTABLISHMENTS AND LOCATED IN LARGE CITIES: 1919.

CITY.	Total operating 3 to 5 similar establishments.	OPERATING ESTABLISHMENTS IN SAME COMMUNITY.		CITY.	Total operating 3 to 5 similar establishments.	OPERATING ESTABLISHMENTS IN SAME COMMUNITY.	
		Number.	Per cent.			Number.	Per cent.
Total examined	792	570	72.0	San Francisco	12	8	66.6
				Pittsburgh	11	3	27.3
Total in 12 cities	300	164	54.7	Cleveland	10	8	80.0
				Detroit	9	8	88.9
New York	139	74	53.2	St. Louis	7	5	71.4
Philadelphia	39	28	71.8	Buffalo	6	3	50.0
Chicago	37	21	56.8	New Orleans	6	2	33.3
Boston	18	1	5.5	Portland, Oreg	6	3	50.0

There still remains one important phase of the problem of distance as yet unexplored—the problem of the distance of establishments from the central offices. For this purpose the 2,776 establishments included in the 792 central-office combinations which have been previously discussed in this chapter were examined. Since these central-office combinations are all small, including only three, four, or five establishments, it is to be expected that the data derived from this sample, if not indicative of the typical establishments, would show less geographic distribution than a complete study. The data resulting from this examination are given in Table 63.

It can readily be seen that the distribution shows a very great concentration in the smaller distances and tails out very gradually to a maximum of 2,880 miles. The exceedingly great scatter of this distribution is indicated by the fact that the mode—the distance shown for the largest number of establishments—is at zero, the median at 25 miles, and the arithmetical average is 137.23 miles. It is interesting to note, in passing, that the arithmetical average is almost exactly one-half the arithmetical average of the spans of these same establishments grouped in central-office combinations. The concentration of nearly one-third in the same communities or adjoining communities is to be expected in the cases of these small central-office combinations. Slightly over one-half of these establishments come within the 25-mile radius. The other half are to be found scattered at distances which would have rendered any community of operation impossible a generation ago.

The facts shown in Table 63 are presented graphically in Chart M, which makes it easier to compare these distances by industries. Disregarding the miscellaneous group as being impossible of analysis in general terms, there are four industry groups in which there is least localization of central offices and establishments. These are the two metals groups, the chemicals and allied products group, and the vehicle for land transportation group. In the case of chemicals, this situation is due chiefly to the amount of absentee operation. In Table 59 the chemical group stood out as one in which the central offices were located without special regard to the location of establishments. In the other three groups the type of product, and particularly its weight and inconvenience of transportation, are perhaps the most important elements in the situation. In the case of iron and steel the industry classifica-

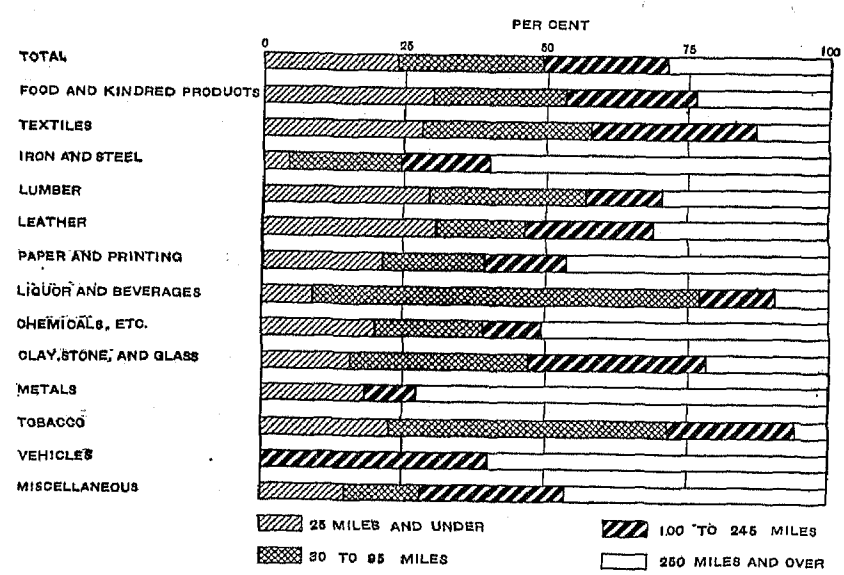
TABLE 63.—DISTRIBUTION OF 2,776 ESTABLISHMENTS OPERATED BY 792 CENTRAL OFFICES, EACH OPERATING THREE, FOUR, OR FIVE SIMILAR ESTABLISHMENTS, ACCORDING TO DISTANCE FROM CENTRAL OFFICE, BY GENERAL GROUPS OF INDUSTRIES: 1919.

Group number	INDUSTRY GROUP.	Total establishments.	DISTANCE FROM ESTABLISHMENTS TO CENTRAL OFFICE.								
			5 miles and under.		10 to 25 miles.	30 to 95 miles.	100 to 245 miles.	250 to 495 miles.	500 to 995 miles.	1,000 to 2,495 miles.	2,500 and over.
			Same community.	Different community.							
		NUMBER.									
	Total	2,776	648	215	543	556	376	216	159	56	7
1	Food and kindred products	761	173	59	161	168	97	53	36	12	2
2	Textiles and their products	660	174	72	141	129	102	21	16	5	.....
3	Iron and steel and their products	154	35	6	24	22	28	17	17	5	.....
4	Lumber and its remanufactures	154	31	14	31	29	13	19	11	6	.....
5	Leather and its finished products	94	27	7	19	8	15	10	8	.....	.....
6	Paper and printing	93	27	6	15	17	6	10	9	2	1
7	Liquors and beverages	83	20	4	18	31	4	2	4	.....	.....
8	Chemicals and allied products	285	45	21	53	49	34	37	28	16	2
9	Stone, clay, and glass products	110	23	3	27	24	23	8	1	.....	1
10	Metals and metal products other than iron and steel	36	12	1	3	1	6	8	4	.....	1
11	Tobacco manufactures	124	30	9	23	49	12	1	.....	.....	.....
12	Vehicles for land transportation	16	4	1	1	2	3	3	2	.....	.....
14	Miscellaneous industries	206	47	12	27	27	33	27	23	10	.....
		PER CENT DISTRIBUTION.									
	Total	100.0	23.3	7.7	19.6	20.0	13.5	7.8	5.7	2.0	0.3
1	Food and kindred products	100.0	22.7	7.8	21.2	22.1	12.7	7.0	4.7	1.6	0.3
2	Textiles and their products	100.0	26.4	10.9	21.4	19.5	15.5	3.2	2.4	0.8	.....
3	Iron and steel and their products	100.0	22.7	3.9	15.6	14.3	18.2	11.0	11.0	3.2	.....
4	Lumber and its remanufactures	100.0	20.1	9.1	20.1	18.8	8.5	12.3	7.1	3.9	.....
5	Leather and its finished products	100.0	28.7	7.4	20.2	8.5	16.0	10.6	8.5	.....	.....
6	Paper and printing	100.0	29.0	6.5	16.1	18.3	6.5	10.7	9.7	2.2	1.1
7	Liquors and beverages	100.0	24.1	4.8	21.7	37.3	4.8	2.4	4.8	.....	.....
8	Chemicals and allied products	100.0	15.8	7.4	18.6	17.2	11.9	13.0	9.8	5.6	0.7
9	Stone, clay, and glass products	100.0	20.9	2.7	24.5	21.8	20.9	7.3	0.9	.....	0.9
10	Metals and metal products other than iron and steel	100.0	33.3	2.8	8.3	2.8	16.7	22.2	11.1	.....	2.8
11	Tobacco manufactures	100.0	24.2	7.3	18.5	39.5	9.7	0.8	.....	.....	.....
12	Vehicles for land transportation	100.0	25.0	6.2	6.2	12.5	18.8	18.8	12.5	.....	.....
14	Miscellaneous industries	100.0	22.8	5.8	13.1	13.1	16.0	13.1	11.2	4.9	.....

tion of most of the concerns with widest geographical distribution is "foundry and machine-shop products." In such activity it apparently has proved most economical to distribute establishments rather widely.

Charts N, O, and P are presented to indicate the different types of distribution of establishments which appear about different industrial centers. As might be expected, New York City is the headquarters for establishments widely scattered about the country, yet concentrated to a great extent in New York, New Jersey, and Pennsylvania. The establishments operated from central

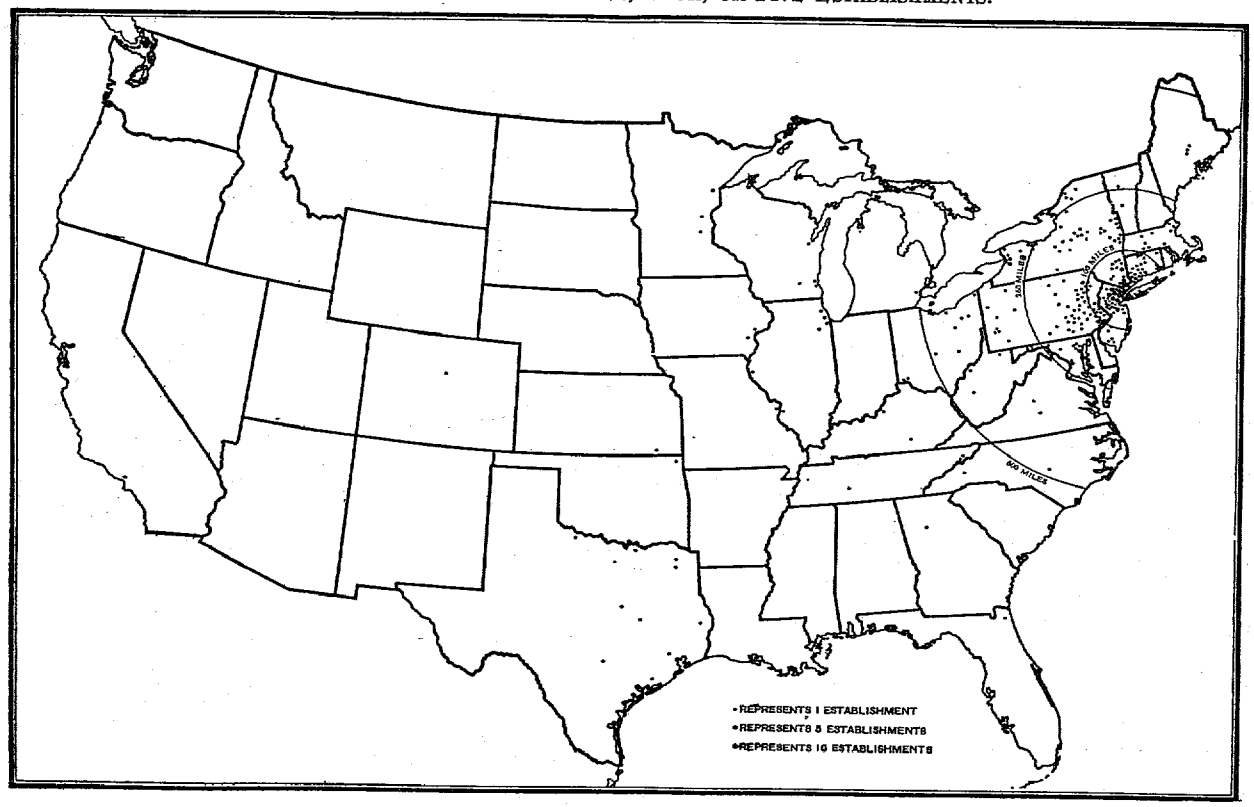
CHART M.—DISTRIBUTION OF 2,776 ESTABLISHMENTS ACCORDING TO DISTANCE FROM CENTRAL OFFICE, BY GENERAL GROUPS OF INDUSTRIES.



offices in Chicago have a very wide distribution, even greater than in the case of those operated from New York City. Philadelphia, on the other hand, is the headquarters for establishments located chiefly in the immediate vicinity.

This fragmentary discussion of the factor of distance serves to present one thesis—the conquest of distance as a limiting factor in the expansion of economic enterprise. Modern methods of communication have resulted in the development of a form of economic organization which is not limited to a single locality, but which can operate throughout an area as large as that of the United States itself.

CHART N.—LOCATION OF ESTABLISHMENTS IN 139 SIMPLE CENTRAL-OFFICE GROUPS HAVING CENTRAL OFFICES IN NEW YORK CITY AND OPERATING THREE, FOUR, OR FIVE ESTABLISHMENTS.



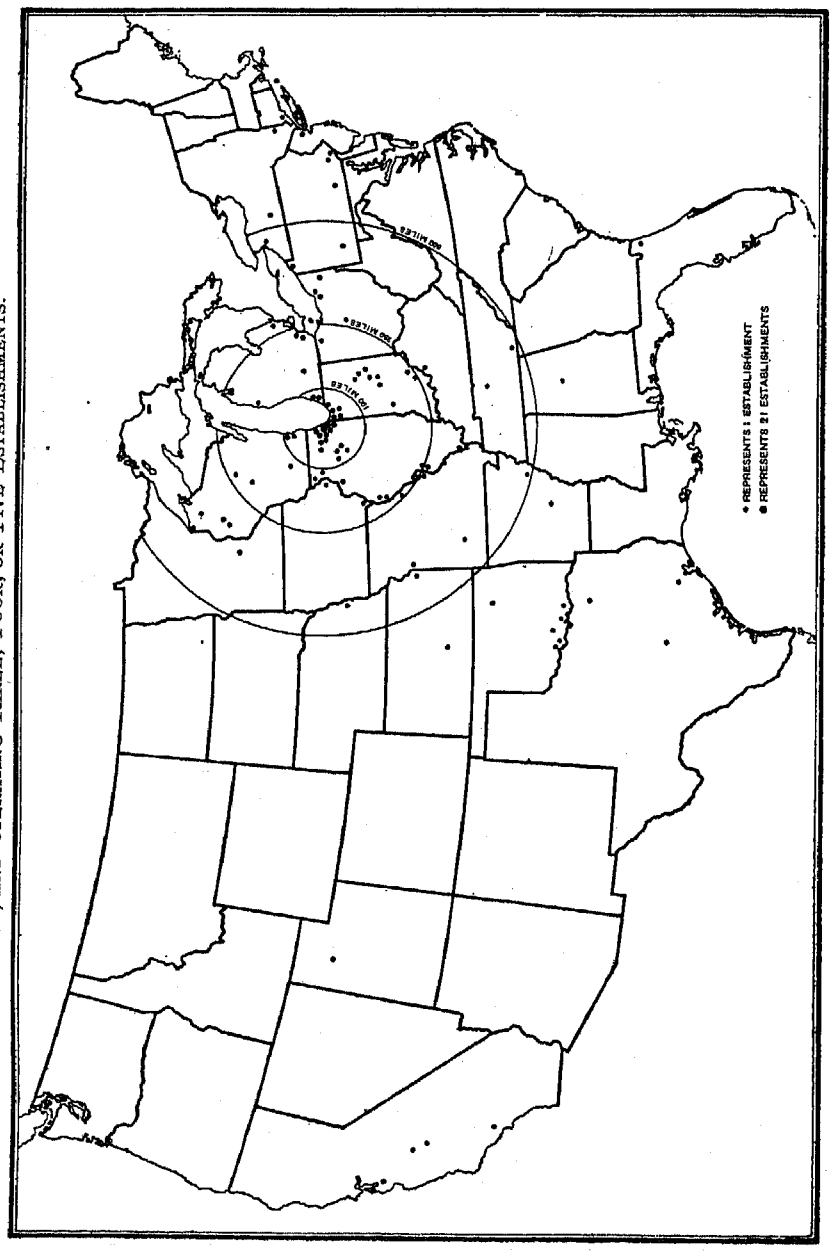


CHART O.—LOCATION OF ESTABLISHMENTS IN 37 SIMPLE CENTRAL-OFFICE GROUPS HAVING CENTRAL OFFICES IN CHICAGO, ILL., AND OPERATING THREE, FOUR, OR FIVE ESTABLISHMENTS.

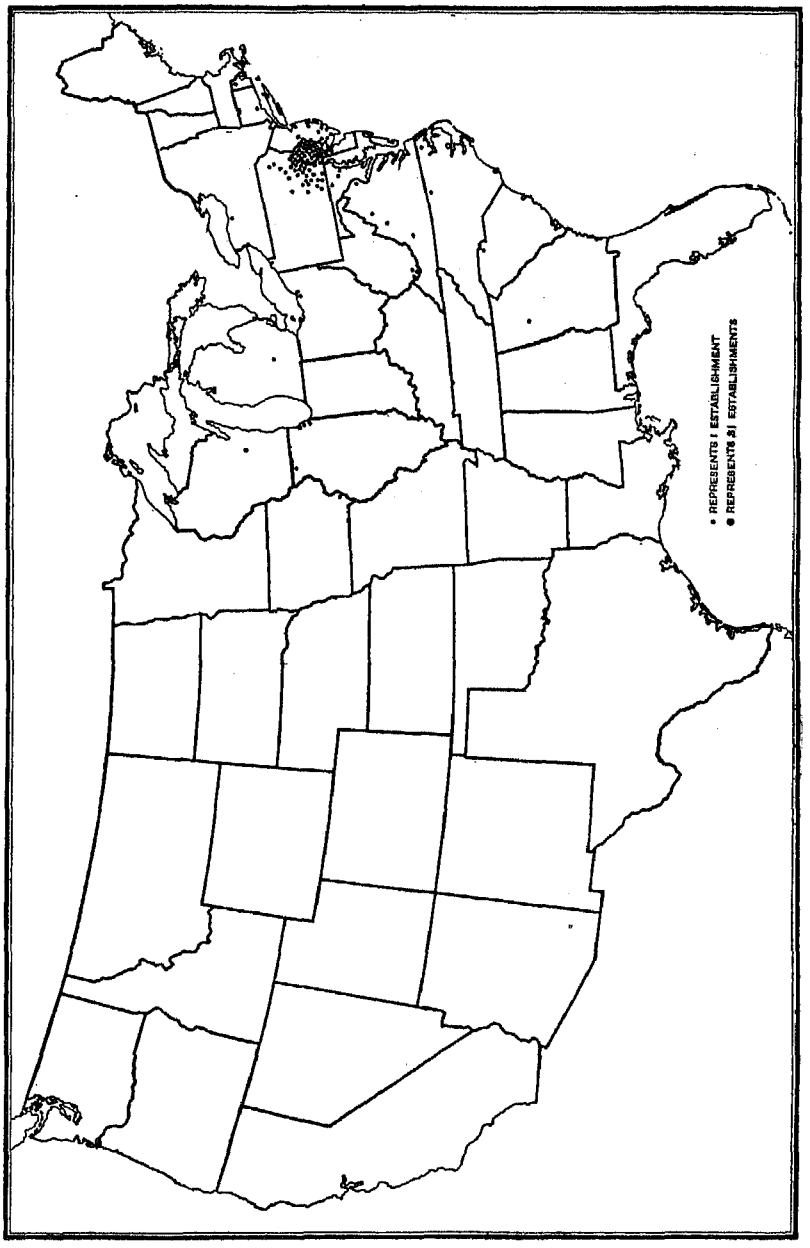


CHART P.—LOCATION OF ESTABLISHMENTS IN 39 SIMPLE CENTRAL-OFFICE GROUPS HAVING CENTRAL OFFICES IN PHILADELPHIA, PA., AND OPERATING THREE, FOUR, OR FIVE ESTABLISHMENTS.