DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
WASHINGTON

THE INTEGRATION OF INDUSTRIAL OPERATION

A STATISTICAL AND DESCRIPTIVE ANALYSIS OF THE DEVELOPMENT AND GROWTH OF INDUSTRIAL ESTABLISHMENTS AND OF THE SIZE, SCOPE AND STRUCTURE OF COMBINATIONS OF INDUSTRIAL ESTABLISHMENTS OPERATED FROM CENTRAL OFFICES

BY

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NOTE BY THE DIRECTOR OF THE CENSUS.

Apart from its economic and social significance, the integration of industrial operation concerns the Bureau of the Census as presenting a problem in the compilation of statistics; and for that reason the data in reference to central-office groups utilized in the preparation of this monograph are, as the author says, a by-product of the administrative activity of the Bureau, being data that were obtained for administrative purposes only and without any thought of their utilization as the basis of a statistical study.

The concentration of industry in large establishments reduces the number of separate units for which the census has to secure reports, and to that extent tends to a simplification of the work and to economy in the collection of statistics. But, on the other hand, the development of these large industrial establishments in which a variety of products are manufactured has complicated census work by making it difficult and in some instances impossible, to segregate the data for capital, employees, power, and other items so as to show separate totals incident to the manufacture of given products. Furthermore, as is shown in this monograph, many of these large concerns operate plants located in different States and cities for which consolidated accounts are kept at central offices. It is the practice to carry one account for overhead charges, and it is difficult to obtain separate reports for the plants in different localities, although such separate reports are, of course, necessary in order to compile totals for the individual States and cities. To meet this situation the Bureau established the central-office records referred to in Part II of the monograph.

The integration of industrial operation is a further source of embarrassment to the Census Bureau in that under the rule of not publishing any data which would reveal the operation of individual establishments it is impossible to present for a given industry any figures or totals for any State or city in which that industry is represented by less than three establishments. Cases of this kind are apparently multiplying, rendering it more and more difficult to present the statistics in geographic detail for individual industries, or even to some extent for all industries combined.

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FOREWORD.

We commonly think of the Industrial Revolution as a series of events which took place in England between the days of Arkwright and Watt and the days of Cartwright and Stephenson. The high lights in our picture are "the great inventions" and the building of factories; the shadows are the sufferings of the laboring classes—the pauper children kept at work 12 hours a day in cotton mills, trade-union pioneers transported under the anticombination acts and hand-loom weavers sinking in hopeless competition with the power loom. We remember all this as something that happened a hundred years ago on the other side of the ocean.

Every time that the Bureau of the Census issues a report on manufactures it offers us a chance to learn how distorted is the perspective of this romantic vision. The Industrial Revolution did begin in eighteenth-century England, but it is still going on in twentieth-century America. It was marked at the outset by great inventions and the rise of larger industrial units; but the present is not less an age of inventions and industrial reorganization. The beginnings of the Industrial Revolution were darkened by tragic sufferings; its continuation produces new social problems in each successive decade—problems that call for all the knowledge we can muster and all the wisdom we possess.

Usually the census limits its current history of the Industrial Revolution to the presentation of materials. In serried tables of statistics it shows the numbers of manufacturing establishments, numbers of employees, value of products, leading items of cost, and the like, industry by industry, and State by State. In the explanatory text it notes changes in machinery and processes, in geographical location, in sources of supply, in markets, and so on. With these materials a well-equipped reader having abundant leisure can make for himself a more accurate picture of the contemporary stages of the Industrial Revolution in the United States than any historian can draw of the early English stages. But it is only the reader who has abundant leisure, endless patience, and considerable training in research who can work up the elaborate tables and the painstaking text into a lifelike picture.

In publishing the present monograph the Bureau of the Census begins to do with its data for the many what a few have done laboriously for themselves. Doctor Thorp has not attempted to cover all the phases of the Industrial Revolution as it is now developing in the United States. But he has made a careful study of two highly significant phases—the changing size of manufacturing establishments in different industries, and the size, scope, and structure of industrial combinations operated from central offices.

From time to time American opinion has been much exercised by industrial combination, but the center of interest has been the financial aspects of the problem—the rise of "trusts," pools, holding companies, interlocking directorates, and price-fixing agreements. Of all such matters the Bureau of the Census can tell us nothing, for its schedules do not call for details concerning the ownership of industrial establishments or their financial affiliations. On the other hand, the census is our one great authority on the size of manufacturing units and on the *operating* combinations among them.

Concerning the first of these topics elaborate data have been published in every census of manufactures since 1850. Perhaps the most significant single fact brought out by all this work is the progressive trend toward the concentration of manufacturing in establishments of large size. By 1919, 2.2 per cent of the total number of manufacturing establishments had come to employ 53.5 per cent of all the wage earners in factories; but while he gives due prominence to this general trend Doctor Thorp shows that since 1900 the size of establishments has changed scarcely at all in some industries, and that in others the size has actually shrunken. Seldom do we find a clearer demonstration that sweeping generalizations about economic developments, however valid, may cover up a host of significant deviations from the "norm."

Doctor Thorp's second theme—operating combinations among manufacturing enterprises—represents a new departure in census work. In organizing its field work the division of manufactures has found it necessary to keep a record of all "central-office concerns"—that is, of establishments which are managed from an office having an address different from that of the factory—but never before has the bureau made extensive use of this record in

its publications. The unit in its tables has been the single establishment, whether operated by an individual or company which had no other business or operated by a company which ran several other factories.

Even in the Fourteenth Census the plan of analyzing these central-office groups was not formulated until too late to compile more than a table showing the number of central offices, the number of establishments they operate, and the kinds of goods they produce. Hence, the discussion of this topic is less complete than the preceding discussion of the size of single establishments. In particular, there are no data concerning the number of men employed by the central-office groups or the value of their products, and no information about their rate of growth.

Even with this incomplete material Doctor Thorp has been able to reach some significant conclusions. The census records show that in 1919 there were at least 5,838 central offices, each operating two or more factories. The number of manufacturing establishments which they managed reached 21,464, or more than 7 per cent of the grand total reported, 290,105. Presumably, the factor of operating combination is much more important than this percentage would indicate; for there is evidence which, though not precise, shows that the average number of employees and the average value of the products per establishment in central-office concerns must be high above the grand averages for all establishments. And, in addition to their factories, 534 of the central offices operated one or more mines.

About the kinds of products turned out by these operating combinations Doctor Thorp has been able to learn more than about their size. In many cases the combination consists simply of several establishments in different places turning out the same kind of goods; but more often the basis of combination is an effort to utilize by-products, to make joint products, to apply an established process to new materials, to make auxiliary supplies, to furnish different wares which can be handled by the same sales force, or to carry the chief materials through further stages of the manufacturing process. There remain a number of cases, peculiarly interesting, in which a central office operates plants which make quite unrelated products by dissimilar processes from different materials for distinct markets.

Not only by what is here set forth, but also by the promise of further work along similar lines, will the present monograph reward its readers; for now that the Bureau of the Census has begun to interpret the vast stores of fact piled up in its reports we may hope that the many questions which Doctor Thorp's discussion suggests but does not answer will not be dropped again. Gradually we are coming to appreciate as a nation that every stage in our development brings its own problems with it, and that to deal with these problems intelligently we need a wide and accurate knowledge of the underlying facts presented in a form that all can understand. Perhaps there is no other agency that can do so much toward meeting this need as the Bureau of the Census.

WESLEY C. MITCHELL.

THE PROBLEMS.

The Industrial Revolution and particularly the introduction of factory production were the outstanding features of economic development in the nineteenth century; but although the use of machinery and the factory system became the accepted method of manufacture before the beginning of the twentieth century many of the adjustments and developments which such a change in the industrial system required or made possible are by no means completed. The purpose of this study is to examine one of the most evident of the changes which have grown out of the reorganization of methods of production, namely, the concentration of economic activity into larger economic enterprises—the integration of industry.

Industry is organized in three distinct planes. At the bottom, and fundamental to the other two, are the industrial establishments, the units of economic enterprise. The second plane of industrial organization includes the operating combinations—groups of establishments which are operated from some one central office—and, finally, at the top, are found those less tangible alliances, the holding company, the financial combination, the trade association, and similar types of economic organization.

Industrial development has by no means reached its final form on any one of these levels of economic organization. As the process of production has changed from a domestic to a handicraft[1] and then to a factory system, the industrial establishment has changed both in technique and in size. The operating combination has developed with the extension of markets and with the improvement of transportation and methods of communication. The financial combination is a by-product of the development of modern methods of finance and of the accumulation of individual fortunes.

A complete survey of the concentration of industry should concern itself with all three of these levels of economic organization.

1 "* * * the second stage in the history of industry, the transition from the *family system* to the *artisan system*. In the former there was no *class* of artisans so called; no class, that is to say, of men whose time was entirely or chiefly devoted to a particular manufacture; and this because all the needs of a family or other domestic group * * * were satisfied by the labours of the members of the group itself. The latter, on the contrary, is marked by the presence of a body of men each of whom was occupied more or less completely in one particular manufacture."—Ashley, Economic History and Theory, Vol. I, p. 76. [Although this quotation refers to the economic history of England, the same process, while perhaps not so clearly defined, is evident in early American economic development.]

This study, however, inasmuch as it is an attempt to apply material collected by the Bureau of the Census to this subject, must confine itself to the two more fundamental types of concentration—the industrial establishment and the operating combination. In the collection of data concerning manufacturing in the United States the Census Bureau disregards business relationships as not coming within the sphere of its activity as defined by Congress.

THE PROBLEM OF INDUSTRIAL ESTABLISHMENTS.

The study of industrial establishments naturally prefaces that of individual combinations, since it is of individual establishments that the combinations are made. The modern industrial establishment is a relatively recent development in the organization of industry. To quote from the Twelfth Census:

"It seems probable that until about the year 1850 the bulk of general manufacturing done in the United States was carried on in the shop and the household by the labor of the family or individual proprietors, with apprentice assistants, as contrasted with the present system of factory labor, compensated by wages and assisted by power." [2]

This transformation of industry from the domestic and handicraft systems to the factory system has taken place within the period of American census taking. The Industrial Revolution in the United States occurred somewhat later than in England, being almost entirely a development of the nineteenth century and largely of the second half of the century. In Great Britain, the handicraft system began to give way to the factory system in the last quarter of the eighteenth century, particularly in the textile industries.

The factory system, having been once introduced, became the basis for continued development and expansion. The tendency toward concentration was soon recognized. In the Compendium of the Census of 1880, taken 40 years ago, the following statement appears:

"The fact that, in the face of a large increase in the number of hands employed in manufacturing, of the amount of materials consumed, and of the values of the products, *the number of establishments* shows hardly an appreciable gain from 1870 to 1880, notwithstanding an increase of 30 per cent in population, is amply accounted for by the well-known tendency to the concentration of labor and capital in large shops and factories." [3]

[2] Census of 1900, Vol. VII, p. liii.

[3] Census of 1880, Compendium, p. 928.

The latest step in this recognition of industrial development appeared in 1905, when, for the first time, Congress directed the Census Bureau to confine its census of manufactures solely to manufacturing enterprises working under the factory system, thereby excluding the hand and neighborhood trades. Many activities, such as construction work and custom tailoring, whose status as manufacturing industries had long been subject to dispute, were definitely eliminated from census inquiry and records kept of factory production only.

The census of manufactures for 1919 reported 290,105 establishments active in manufacturing during the year. These establishments employed an average of 9,096,372 wage earners and produced manufactured products valued at $62,418,078,773. According to the figures of the National Bureau of Economic Research,[4] factories in the United States contributed 26.53 per cent of the national income in 1918, the last year for which figures are available, which percentage is nearly one-fourth larger than that representing the contribution of agriculture.

The change in the type of industrial establishment outlined above has unquestionably taken place. There were no factories turning out goods for use in the War of 1812 comparable to those in operation during the World War. At that time, little more than 100 years ago, the first railroad in the country had not made its appearance. The problem of the establishment is therefore not one of proving the existence of the factory system but rather of determining its extent, and particularly examining the changes which took place in industrial organization during the first 20 years of the twentieth century.

What are the specific problems to be dealt with? When a satisfactory method has been determined for measuring the establishments in terms of size, applicable both to the various years of census taking and to various industries, problems can be attacked such as: Are establishments growing larger? Is the rate of increase changing? In what industries have establishments grown most rapidly? What industries appear to lend themselves most favorably to large-scale production? Is large-scale production a tendency throughout all industry? Is there any relationship between character of ownership and scale of production? Has the size of establishments increased more rapidly in terms of wage earners or in terms of product?

[4] Income in the United States, National Bureau of Economic Research, 1921, p. 18.

Since the census has customarily used the industrial establishment as its unit of enumeration, data for this particular group of problems are available, though the use of these data is beset with difficulties arising from modifications in classification, scope of enumeration, etc. Fortunately such changes are definite in nature and can be given due weight in the analysis of census records.

THE PROBLEM OF OPERATING COMBINATIONS.

It is impossible to ascertain the many combinations and alliances among industrial establishments in the United States. The lines of control converge and diverge among economic enterprises in a most intricate pattern. The ties which bind establishments together are often quite imperceptible to the outside inquirer and too elusive to permit definite statement.

With the development of the corporate form of ownership the possibilities of the centralization of control were greatly increased. Of the less apparent combinations, those resulting from interlocking directorates and interlocking shareholdings are the subject of frequent discussion. The "gentlemen's-agreement" and "dinner-party" methods of combination have likewise achieved unpleasant publicity. Such relationships, however, are impossible of accurate determination or statistical expression.

It is unfortunate that nearly all the publicity which industrial combinations have received has dealt with the few combinations which have been charged with acting as monopolies and "in restraint of trade." The fact that interest has centered chiefly about the problem of monopoly has colored the examination and analysis of industrial groups. The investigations made have primarily concerned themselves with price fixing, methods of monopoly control, the development of large-scale production, and the relation of the State to such organizations. There are also some few excellent historical studies dealing with the growth and activity of those few combinations whose activities have particularly invited investigation. It is not, however, from the viewpoint of these previous investigations that the present study has been undertaken. No attempt has been made to determine whether or not these combinations are threatening the traditional free competition of our economic order. The analysis does not deal with the functions of government in terms of the regulation of industry. The moral and social implications of the concentration of control are not discussed.

This monograph is based on the belief that the few industrial combinations known as "trusts," whose distinguishing mark is usually a desire for monopoly control, represent but one phase of the industrial-combination problem. For each such combination there are hundreds of other combinations which make no pretense of monopolistic operation. Industrial combinations are to be numbered not by tens, but by thousands. However, the celebrity of the few has quite overshadowed the significance of the many.

This study is concerned with the development and structure of combinations of manufacturing establishments as a form of industrial organization and operation. It deals, therefore, with combinations in their simplest and most openly acknowledged form—combinations in which more than one industrial establishment is operated by a single central office. In these cases, at least, there is no attempt at secrecy, but an open statement and recognition of combination. Financial combination, interlocking directorates, bank control—all such obscure forms of relationship are disregarded. This is a study of *operating* combinations. The individual establishments concerned are all under the control of a single central office which, acting perhaps as the sales agency and also as the directors' chamber, nevertheless is the actual directing force in the activities of the various constituent establishments. The so-called "trusts" may be included in such a classification, although shorn of those lines of control which are purely financial. It can not be overemphasized that the combinations here considered are merely units of operation. They represent the minimum, the lowest terms to which the combinations can be reduced when stripped of financial and indirect affiliations.[5]

The records of the Census Bureau indicate that there are in the United States at least 5,838 such industrial combinations or, as they will be hereafter called, central-office groups. In dealing with certain problems this entire number has been employed; for other problems requiring more complex data a somewhat smaller aggregation of 4,814 central-office groups has been utilized. With such a considerable body of factual material available, it is possible to deal with a large number of questions. A few typical problems with which this study concerns itself are as follows: To what extent does this form of industrial combination appear in industry? Does it extend beyond the manufacturing field? In which manufacturing industries is it most extensive? How large are these

[5] For more complete definition and discussion of "central-office groups," see Chapter VII.

central-office groups? Does the size vary from industry to industry? Where are central offices located? Where are establishments located with reference to their central office? Do these organizations extend into other countries? What are the advantages of centralized operation? Another group of questions has perhaps even more significance: What different types of establishments appear in single central-office groups? What functional relationship exists between the various units in the combinations? To what extent do the relationships represent "vertical" and "horizontal" combinations,[6] organized integration, fabrication, by-product manufacture, etc.? In what industries do the different types of functional relationship appear?

These problems—not a complete list—serve to indicate the type of question with which this study is concerned. They demonstrate that in this particular study industrial combinations are not to be examined for their external relationships—their influence on prices, etc. The attempt is rather to examine them as existing organizations—to see what they are and why they are—to determine the nature and characteristics, both as entities and as complex organizations, of these central-office groups.

It is of the utmost importance to know what sort of economic structure prevails and in what direction it is tending. In modern complex society economic problems and social problems are closely interrelated, and the social implications of economic phenomena have been demonstrated again and again. The concentration of industrial operation is an economic tendency having important social effects. The purpose of this study is, however, not to consider the social implications of an assumed economic development, but to do a more fundamental task—to determine, in at least a partial way, the actual nature of the development upon which such reasoning must be based. This monograph is therefore an appraisal of the integration of industrial operation.

[6] A horizontal combination is one in which the several establishments are engaged in similar activities and would be competitors were it not for the existence of the combination. A vertical combination, on the other hand, is one consisting of establishments which operate in different stages in the process necessary to prepare the final product for the market. (For a more complete discussion, see p. 235.)