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Volume Title: The Output of Manufacturing Industries, 1899-1937

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Volume Publisher: NBER

Volume ISBN: 0-87014-038-8

Volume URL: <http://www.nber.org/books/fabr40-1>

Publication Date: 1940

Chapter Title: Preface to "The Output of Manufacturing Industries, 1899-1937"

Chapter Author: Solomon Fabricant

Chapter URL: <http://www.nber.org/chapters/c6401>

Chapter pages in book: (p. -15 - -12)

## Preface

THE growth of our manufacturing industries—through the comparatively quiet period 1899 to 1914, the war upheaval from 1914 to 1919, the rapid expansion of the 1920's, and the troubled years following 1929—constitutes the material for an exciting tale. The statistics brought together in this volume relate to a single major theme of this story: the long-term changes in the volume and composition of the output of American manufacturing industries between 1899 and 1937. The study is confined to that period chiefly because it is only beginning with 1899 that reasonably adequate data on manufacturing production, collected in the U. S. Census of Manufactures for 1899, 1904, 1909, 1914, 1919 and biennially thereafter through 1937, are available both in detail and at fairly close intervals. These data end with 1937, the latest year for which a Census has been published, and the last peak year of business activity preceding the present war. Our primary interest is in physical output, the actual quantities of goods produced in American factories; we make use of Census data on pecuniary output merely to supplement the available information on physical output.

The first chapter of this book contains a summary of the changes in manufacturing output during the period under discussion, together with a brief consideration of the general economic significance of these events. Some readers may find what they seek to know about manufacturing output within the confines of this single chapter. Others will go on to examine the more complete picture of the changing aspect of manufacturing production outlined in Chapters 3 to 5 of Part One. These readers, we hope, will not find Chapter 2 impass-

able territory. Because indexes are the medium by which the quantities of the enormous variety of factory products are apprehended and summarized, this volume is peppered with index numbers. Chapter 2 assesses the significance of these measures. Further, since the data basic to this survey originated as answers to Census questionnaires, rather than as observations made in controlled laboratory experiments, we have presented in that chapter a brief statement on the nature of the data, and an appraisal of the economic and statistical biases inherent in them. The impatient reader may derive some comfort from the assurance that a more detailed statement concerning both the data and the statistical techniques has been relegated to an appendix. The changes that have occurred in the physical output of all manufacturing industries combined are described in Chapter 3. Major groups of industries, such as foods, textiles and chemicals, are reviewed in Chapter 4; and a general survey of changes in individual manufacturing industries appears in Chapter 5.

Part Two traces in greater detail the course of output for individual industries and for the groups into which they have been classified. Here, indexes are given for all the separate industries covered by adequate data and for as much of the period 1899-1937 as possible. In addition, the changing relative standing of each industry in its respective group is described. Unfortunately, it has been impossible for us to treat all industries in equal detail. All too frequently the text adds little to the data given in the tables concerning a less important industry. It is probable, too, that there are gaps in the discussion of trends in the output of some important industries. In any case, the uneven allocation of space among the various industries is to be imputed at least in part to the chance distribution of the author's store of information on a subject so variegated and so complex as manufacturing output.

The statistician may merely glance at Chapter 2 and at the charts and tables in the remainder of the text, and concentrate his attention upon the appendices. Appendix A contains a fairly detailed discussion of the nature of the Census data and of the procedure followed in the construction of the indexes of physical output. The basic data on the quantity, value and average price of individual products used in the construction of the indexes of output appear in Appendix B, with footnotes on the extent to which these products cover the output of the respective industries, and on incomparabilities discovered in the Census. Data on dollar values added by manufacturing are assembled in Appendix C, also with footnotes concerning such matters as changes in classification. Finally, Appendix D compares the index numbers constructed by us with those of two other agencies, in respect of methods of construction, industrial coverage, and trends—where these differ greatly.

It will be apparent that the appendices and text tables contain more information than is utilized in the text discussion. The latter deals only with the long-run movements of output; yet the biennial indexes should prove useful also for a study of short-run changes, if supplemented by the less comprehensive data that are available on the annual and monthly volume of manufacturing output. Again, the average prices of individual manufactured products, derived from the Census data and presented in Appendix B, may be of interest to students of wholesale prices.

The description of what has taken place in the productive field of manufacturing, the most important industrial sector of our economy, is the primary object of this volume. But the present study has another purpose: it is designed also to provide a base for an investigation of the changes that occurred during the first four decades of this century in the relationship between manufacturing employment and output, and of the rising efficiency of productive effort in factory

establishments. The results of this further study will be published in another volume at a later date. A third volume, dealing with production and productivity in agriculture and other nonmanufacturing industries, will complete the story begun with manufacturing output.

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