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**EARNINGS OF  
FACTORY WORKERS  
1899 TO 1927**

AN ANALYSIS OF PAY-ROLL STATISTICS

BY

PAUL F. BRISSENDEN



CENSUS MONOGRAPHS

X

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## PREFATORY NOTE

This work rests chiefly upon the official returns from the quinquennial and biennial censuses of manufactures, published by the Bureau of the Census of the United States Department of Commerce. Some use has been made, as well, of the statistical data on wages, earnings, and employment collected by the United States Bureau of Labor Statistics, the Massachusetts Department of Labor and Industries, the New York Industrial Commission, the Wisconsin Industrial Commission, the New Jersey Bureau of Labor Statistics, and the Federal Reserve Bank of New York.

Through the courtesy of the Harvard Committee on Economic Research, the National Bureau of Economic Research, the National Industrial Conference Board, and the Helen S. Trounstine Foundation of Cincinnati, Ohio, it has been possible to make supplementary use of some of their statistical material. The customary footnote citations more particularly describe the unofficial material that has been used. A complete list of the official and unofficial sources used or cited in the following pages is printed as an appendix.

The statistical data collected by the National Bureau of Economic Research have been drawn upon more heavily than is the case with any of the other unofficial agencies whose statistical output has been used in this analysis. The national bureau has generously allowed the use, not only of material from several of its published reports, but also of some important unpublished figures. It should be noted, perhaps, that the national bureau report of which most use has been made in this monograph is, as a matter of fact, a semiofficial document which presents, under the title, *Employment, Hours, and Earnings in Prosperity and Depression*, the "results of an inquiry conducted by the National Bureau of Economic Research with the help of the Bureau of Markets and Crop Estimates of the United States Department of Agriculture, and the Bureau of the Census for the President's Conference on Unemployment."

As this monograph goes to the printer complete results of the biennial census of manufactures for 1927 are not available. Some estimates have been made, nevertheless, of per capita earnings in that year. These, like the interpolated estimates given for intercensal years, are based, in part, upon noncensus data. Census materials enter into them, however, since the data of the 1925 manufactures census are used as points of departure for the extrapolation of the estimates for 1927. Some basic figures from the reports of the 1927 manufactures census are given in Appendix V.

## FOREWORD

The Federal Census has been gathering statistics of wages in manufacturing establishments at 10-year, 5-year, or 2-year intervals ever since 1850. An enormous quantity of data on a matter of vital concern to our people has thus been accumulated. But grave doubts concerning the reliability of the figures have restricted their use.

Before the Twelfth Census was taken in 1900, changes in the questions asked on the manufacturing schedules concerning wages, changes in the methods of field work, and changes in the industrial scope of the enumerations compromised comparisons between the tables in successive reports. In addition there was the perennial question, what meaning can be attached to figures for "average wages" computed from number of employees (however reported) and total pay rolls. The officials of the Census Bureau were keenly conscious of the uncertainty of their results, and time after time warned readers against drawing what seemed obvious conclusions. How unfavorable a view university statisticians took of the data was shown by the discriminating paper on Wage Statistics and the Federal Census which Prof. Charles J. Bullock contributed in 1899 to the volume called *The Federal Census: Critical Essays* by Members of the American Economic Association.

On the establishment of a permanent census office and the adoption of a quinquennial enumeration of manufactures, fresh efforts were made to improve the quality of the wage figures, and to conduct successive enumerations in such manner as to secure comparable returns. But statisticians both within and without the Census Bureau have continued to question the results. To determine what the wage returns mean, how they can best be used, and what confidence can be felt in them, required careful scrutiny of the internal evidence afforded by the census data themselves, and extensive comparisons with data collected by other agencies. When a series of Census Monographs was planned in 1920, it became feasible to make a more thorough examination of the whole problem than was appropriate in the regular census reports.

Prof. Paul F. Brissenden, of Columbia University, to whom this task was intrusted, had learned the difficulties of interpreting pay rolls as a field agent of the United States Bureau of Labor Statistics. As a student, teacher, and writer on labor problems he knew the literature of the field, and how to make the best of imperfect materials. In carrying out the present investigations, he had the

further advantage of counsel and support from the staff of the Census Bureau.

An eager and critical group of readers awaits this volume. Everyone who uses American wage data extensively must utilize the new assay of the census figures here presented. Those who have made or studied other investigations of changes in wage rates or earnings will compare Doctor Brissenden's tables with earlier conclusions, and look narrowly into the discrepancies. Men interested in statistical technique will scrutinize the methods employed. Economists will analyze the theoretical concepts on which the discussion rests. Representatives of labor and of capital will debate the results in the light of their own observations. It is a formidable gantlet which Doctor Brissenden's monograph must run.

Writing for such critically interested readers rather than for the general public, Doctor Brissenden has adapted his treatment to their needs. He discriminates with care among the different meanings of the baffling word "wages," gives formal definitions of the technical terms he uses, explains how the census figures are gathered in the field and worked up at headquarters, sets forth minutely the steps in his own processes of elaboration, checks his results with those of other investigators, and discusses the margins of error to which these results are subject. Census volumes are not light reading; but they have their own devoted public. This public, with additions from the labor field, will be grateful that Doctor Brissenden lets them share step by step in the progress of his work, and see every uncertainty which he glimpses in the outcome.

The best introduction to the book is the table of contents. This table has been made full enough to show the reader what he may expect to find in the volume as a whole, and where to look for particular items. The leading problems are raised in Chapter I, and the leading conclusions are stated in Chapter II. But readers who share the thoroughness of the author of the monograph will not be content with a cursory survey of the ground; they will push on to the later chapters which deal with the several topics in full detail. No skill in exposition could make the reading easy; but the book is packed with interest for all who really wish to know how labor incomes have fluctuated in the United States since 1899.

Earlier students of labor conditions have often worked with index numbers of wage rates—not because they preferred such materials, but because they had nothing better at hand. Such figures have their merits; but their defects are not less striking. For example, wage rates seldom decline so sharply after a business crisis as retail prices. "Real wages," computed by dividing indexes of cost of living into indexes of wage rates, actually rise in most periods of depression—whereas common observation is that the increase in

unemployment at such times much more than offsets the inertia of wage rates. One of the advantages of the census data is that they enable an investigator to deal with actual sums paid to wage earners on a nation-wide scale. From these data, supplemented by indexes of employment and pay-roll disbursements, Doctor Brissenden has been able to make estimates for every year since 1899 of the actual *per capita* earnings of factory employees. While he feels no great confidence in the dollar figures, he believes that the fluctuations of factory earnings from census to census are closely approximated. Finally, Doctor Brissenden applies annual indexes of cost of living to his index of actual earnings and obtains an index of purchasing power—or “real wages,” to use the common term. This final index confirms the common impression that real wages fall in years of depression.

Another result of wide significance is evidence that apart from the cyclical oscillations just referred to, the real wages of American factory workers kept to a nearly constant level from 1899 to 1915. During the World War they scored a gain, which was temporarily canceled in the great business collapse of 1921. But since that calamitous year, a renewed advance has carried real wages to a level much higher than that attained in any pre-war period covered by the data. These conclusions confirm and are confirmed by certain previous investigations made by quite different methods.

Elaborate as the present study is, Doctor Brissenden has no thought of claiming to have said the final word about the value or the meaning of the census data. Unquestionably his work is a contribution to our knowledge both of the specific figures he has analyzed and of labor incomes at large. But what he has accomplished is like most scientific work in that it suggests further questions and promises to stimulate other investigators. As Doctor Brissenden's methods and results become the subject of critical inquiry, they will be corrected, modified, amplified, confirmed in ways and degrees which no one can now forecast. Every worker in the field must be grateful both to Doctor Brissenden and to the Bureau of the Census for making our largest collection of wage data more interesting and more useful.

WESLEY C. MITCHELL.