

**UNITED STATES DEPARTMENT OF LABOR**

W. N. DOAK, *Secretary*

**BUREAU OF LABOR STATISTICS**

ETHELBERT STEWART, *Commissioner*

**BULLETIN OF THE UNITED STATES } . . . . . No. 542**  
**BUREAU OF LABOR STATISTICS }**

**EMPLOYMENT AND UNEMPLOYMENT SERIES**

**REPORT OF THE  
ADVISORY COMMITTEE ON  
EMPLOYMENT STATISTICS**



**MAY, 1931**

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# BULLETIN OF THE U. S. BUREAU OF LABOR STATISTICS

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## REPORT OF THE ADVISORY COMMITTEE ON EMPLOYMENT STATISTICS

### Introduction

On August 12, 1930, the following committee was appointed by the President to advise him "on methods by which we should set up statistics of employment and unemployment":

James J. Davis,<sup>1</sup> ex officio; Noel Sargent; R. P. Lamont, ex officio; W. M. Steuart; Harold F. Browne; Ethelbert Stewart; John P. Frey; Arthur O. Wharton; P. W. Litchfield; Leo Wolman; Joseph H. Willits, chairman.

The committee, called together on October 22, 1930, was asked by the President also to consider the subject of "technological unemployment," and, if it seemed wise, to make recommendations concerning the studies which should be made of this problem.

For the exploration of these two subjects two subcommittees were appointed and to each a considerable number of technical experts were added as advisers. These two subcommittees with their technical advisers were as follows:

*Subcommittee on measurement of employment and unemployment.*—Leo Wolman, chairman; Noel Sargent; Harold F. Browne; Arthur O. Wharton.

*Technical advisers.*—W. C. Berridge; Thomas S. Holden; Otto Beyer; R. Hurlin; Meredith Givens; Bryce M. Stewart; E. F. Hartley; Matthew Woll.

*Subcommittee on technological unemployment.*—Joseph H. Willits, chairman; John P. Frey; P. W. Litchfield.

*Technical advisers.*—Anne Bezanson; William Green; Ewan Clague; H. S. Person; J. M. Clark; Sumner Slichter; Benjamin Squires.

It is a privilege to record the debt which the committee is under to its technical advisers, who, although not technically members of the committee, contributed fundamentally to the committee's analysis of its problem.

It is a pleasure also to record the contribution which was made to the work of the committee by the Social Science Research Council, not only for the assistance which was rendered by their staff and for the use of their offices as a meeting place, but also because they made available funds with which to meet the traveling expenses of certain members of the subcommittees.

Part I represents, therefore, the report of the subcommittee on measurement of employment and unemployment, with such slight modifications as were made by the entire committee.

Part II represents the report of the subcommittee on technological unemployment, with such modifications as were made by the entire committee.

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<sup>1</sup> The place of Secretary James J. Davis was later taken by Secretary W. N. Doak when the latter became Secretary of Labor.

## PART 1.—Measurement of Employment and Unemployment

The terms of reference on this problem are indicated in the following statement of President Hoover issued on July 29, 1930:

I am to-day appointing a committee to advise the governmental departments on methods for revision of the statistical services for the determination of unemployment and to establish the method of cooperation between Government departments and business. Congress at the last session added somewhat to the requirements of this service, the purpose of such information being not only a barometer of business but the necessary information as to measures which need to be taken by local agencies as well as the Government in any constructive relief of unemployment.

The question is not as simple as it appears on the surface. The inclusion of a determination of the amount of unemployment in the census taken April 1 gives us for the first time an accurate base on which to formulate plans and a knowledge on the whole problem which we have never hitherto possessed. But if we were to attempt such an absolutely accurate determination of employment once every three months it would require a house-to-house canvass of the entire Nation and would be practically the equivalent of the census, and might cost us ten or fifteen million dollars per annum \* \* \*.

Measuring the course of employment and unemployment involves two distinct problems. Only when there is a complete and continuous record of the changes in all known sources of employment in the country is it possible to draw from the statistics of employment satisfactory inferences as to the probable volume and course of unemployment. Lacking such a perfect record of employment, estimates of changes in the volume of unemployment must be based (a) upon a count of the total numbers unemployed on a date or during a specified period, and (b) upon changes in indexes of employment that are regarded as representative of the available sources of employment. When two such bodies of data are available, the statistical procedure of estimating the numbers unemployed from time to time consists in applying indexes of employment to the base count of the unemployed. Error in the final results of this procedure or differences of opinion as to validity of alternative estimates of unemployment arise, naturally, from variations in the definition of unemployment used in the base count of the unemployed, and from doubts concerning the representative character of the indexes of employment.

### I. Measurement of the Course of Employment

Statistics of the number of persons employed have a significance of their own, aside from their use as a factor in estimating the volume of unemployment. They are a valuable indicator of business activity; they reveal the shift of labor from one industry to another; and where they are accompanied by the statistics of wage disbursements, as they usually are, they are a valuable index of the purchasing power of employees. Our statistics of employment have

been vastly extended and improved during the past 10 years. At the beginning of the period the Federal statistics of employment covered only manufacturing industries and rail transportation. Since 1920, and particularly in the past several years, new industrial groups have been added, and the United States Bureau of Labor Statistics and the Interstate Commerce Commission now supply the employment records of the following industries:

## DATE OF BEGINNING, AND INDUSTRY

December, 1914	Manufacturing.
July, 1921	Railroads.
July, 1928	Wholesale and retail trade.
August, 1928	Public utilities.
September, 1928	Coal mining.
October, 1928	Metalliferous mining.
May, 1929	Quarrying and nonmetallic mining.
October, 1928	Hotels.
April, 1930	Crude petroleum producing.
April, 1929	Canning and preserving.
November, 1930	Dyeing and cleaning.
Do.	Laundries.

During the month of December, 1930, therefore, the employment data published by departments of the Federal Government cover the foregoing comprehensive list of industries, representing a sample of approximately 6,150,000 recipients of wages and salaries.

In the use of these materials for the interpretation of the state of employment throughout American industry two serious difficulties are encountered. Since many of the series now published have become available in the past year or two, while some are much older, it is not possible to obtain that perspective which is essential to a sound understanding of the relative flow of employment in various industries. The index of employment, therefore, does not over the past 10 years always include the same items. This defect, however, is not remediable, since it is difficult and costly, if not impossible, to go back far into the records of industry. The second and more serious weakness of the present series is that they still omit large and important categories of employment, notably the various branches of the construction industry, a great variety of service occupations that have become increasingly important in the occupational structure of American industry and agriculture. The seriousness of these gaps becomes evident when the attempt, such as has been made often since 1921, is made to account for the drop in employment that took place in the manufacturing and rail transportation industries after 1921. In the absence of employment records for other industries and services, it proved to be impossible, except by processes of broad estimate, to discover how far reduction in employment in one group of industries was accompanied by a growth of employment, and therefore by the absorption of displaced employees, in others.

Federal employment data, as they now stand, afford no satisfactory measure of the amount of unemployment that arises out of the part-time operation of industry. The statistics of wage disbursements, which are generally published with the numbers employed, are not satisfactory for this purpose since they reflect changes in the rate of wages, as well as in the volume of employment.

Current statistics of employment are, necessarily, only samples of the total volume of employment. It follows, therefore, that new series are more defective samples in the early period of their collection than in the later. Since the gathering of employment data for new industries is a task of considerable magnitude this difficulty can only be handled by constant effort to improve the size and quality of the sample. For all of the industries included in the employment series published by the United States Bureau of Labor Statistics, the samples bear evidence of marked and consistent improvement. In a changing industry, also, even a large sample may be misleading if it does not take into account such developments in industry as the replacement of established firms by new ones, and the rise of wholly new fields of employment. Particularly in a period like that of the last decade, when many new industrial and service occupations were created and grew to substantial proportions, the failure to account for them in the employment series at the proper time is bound to produce an inadequate, if not a misleading, picture of the true state of employment in the country.

Any measure of employment which is essentially a sample may, in the course of time, develop a statistical bias, either upward or downward, which acts to conceal the actual trend of employment. It is the opinion of the statisticians concerned with the preparation of the index of employment published by the Federal Reserve Board, which is based on the data supplied by the United States Bureau of Labor Statistics, that the bureau indexes of manufacturing employment exhibit, over long periods of time, a downward bias. Where past studies tend to support this view it is essential that arrangements be made to compare, at frequent intervals, the sample data published by the bureau with total counts, such as were in the past available in the biennial reports of the Census of Manufactures. In making these comparisons much remains to be done toward reconciling the classifications of industry employed by separate and independent statistical agencies of the Government.

Much of the value of indexes of employment depends upon their timeliness. Considerable progress has been made in the prompt publication of the current series. It is unfortunate that the series of employment and wages of railroad employees, compiled by the Interstate Commerce Commission, becomes available two months later than the series for other industries, published by the United States Bureau of Labor Statistics.

In view of these observations of the character of the present statistics of employment published by the statistical agencies of the Federal Government, this committee makes the following recommendations for the improvement and greater accuracy of our measures of the course of employment:

### 1. Improvement of the Indexes of Employment

(a) *Manufacturing industries.*—Shortly after the depression of 1921 the bureau began increasing not only the size of the sample in those few manufacturing industries which it had theretofore been measuring but also (even more important) it greatly expanded the number of manufacturing industries represented. By the middle of 1923 the number of separate manufacturing industries represented



had been raised to 50, or more than four times as many as had been sampled a year earlier. At the present time the number of such industries sampled each month is in excess of 60, including some which have only become important in recent years, such as rayon, radio, and aircraft, some of which were, however, previously included in other categories in the bureau's employment statistics. Over 14,000 plants, employing about 3,000,000 workers, reported in November, 1930. As a whole, this sample is now very adequate—about 40 per cent of all manufacturing wage earners.

In recent years the bureau has classified these manufacturing industries into major industrial groups comparable with the system of classification used by the Bureau of the Census. It also classifies the plants into regional groups, according to the nine standard geographic divisions long used by the Bureau of the Census. Both the major industrial classification and the geographic grouping of the data each month are features which greatly increase the practical usefulness of the current data to the business men of the country and to other users of employment and pay-roll statistics.

This committee feels that it is important to urge upon the Bureau of Labor Statistics certain technical improvements which might well be made in the character of the index numbers computed by the bureau from the month-to-month changes which it records.

The Federal Reserve Board has carried out the tests necessary to bring the bureau indexes into alignment with the data on employment in the biennial census of manufactures.

Since the carrying out of these various types of test and adjustment necessarily involve considerable labor, we would recommend that the proper authorities consider the possibility of directly utilizing in the Bureau of Labor Statistics the results obtained by the Federal Reserve Board's division of research and statistics since it first studied the problem in 1923. That organization has already completed the tests and adjustments through the census of 1927, and is doubtless contemplating doing so for that of 1929. Some such labor-saving arrangement would seem especially commendable in view of the large amount of other work which the Bureau of Labor Statistics is engaged upon and under limited appropriations.

One other project concerning factory employment data impresses this committee as worthy of consideration. This is the possibility that the bureau could tabulate employment data for at least some leading cities, and possibly for entire States, in those areas where no State department of labor is conducting local tabulations. It is true that many important cities are already on record through the work of State bureaus, but in many other areas, particularly in the South, no suitable data are being collected locally. Through such a segregation the Federal bureau might find that the localized data thus made available would arouse such interest as to stimulate such an undertaking by official local organizations in cooperation with the bureau.

(b) *Nonmanufacturing employments.*—The committee wishes to place on record its appreciation of the initiative shown by the Bureau of Labor Statistics in beginning the collection of employment and pay-roll data for various nonmanufacturing activities. From 1928 to date these additional activities included coal mining, both

bituminous and anthracite; metal mining; quarrying and nonmetallic mining; crude petroleum producing; public utilities of several types; trade, both wholesale and retail; hotels; canning and preserving; laundries; and dyeing and cleaning establishments. These data greatly broaden and clarify the public's view of what is happening currently to the employment and buying power of wage earners throughout the country.

The committee strongly urges, however, that the Bureau of Labor Statistics commence at the earliest possible moment to compile and issue employment indexes for building and other construction activities. We understand that this project has been on the bureau's agenda for some time, and hope that it will be expedited to the utmost. Private and public construction activity in its many forms has in late years assumed a very great importance, and should be a matter of employment and pay-roll record.

The practicability of a construction employment index on a national scale is suggested by the fact that it has already been carried on locally in six States, and with some degree of success in Wisconsin, Ohio, and Massachusetts, for periods ranging from two to nine years. We assume that the importance of subcontractors will not be overlooked in this connection, and also that the data now being tabulated for the construction contracting division of the 1929 Census of Distribution will be utilized as fully as possible—for example, the monthly figures showing the number of skilled and unskilled workmen on pay roll at the 15th of each month in 1929, and the year's total wages. That census will also be helpful in solving the sampling and other problems for the various divisions of construction recognized by the census.

In regard to other employments, we recommend that (as rapidly as opportunity arises) a similar project be launched for each of the following, which besides covering some additional manual employments include also certain of the more important groups in the "white-collar class," so called; we have not attempted to set up these additional employments in order of priority: Investment bankers and brokers; commercial banks and trust companies; mortgage and title companies; mutual and stock savings banks; building and loan organizations; life, casualty, and property insurance companies; advertising agencies; real estate brokerage and building maintenance; restaurants; shipping and stevedoring; taxicab, bus, and trucking companies; garages and automobile service stations; public employment exclusive of public works.

(c) *The census of manufactures as a source of employment statistics.*—Consideration of the factors involved in a proper understanding of employment conditions necessarily includes data compiled by the United States Census Bureau in connection with the Census of Manufactures. From 1840 to 1900 these data were gathered at 10-year intervals. From 1900 to 1920 they were compiled at 5-year intervals and since 1920 they have been published biennially. These changes in frequency of gathering manufacturing statistics have reflected the increasing importance of this branch of industry in our national life. In the opinion of your committee, the growing importance of manufactures in our social and economic life has now reached a point where the collection of manufactures data should be on an annual basis.

It may be pertinent to point out that the lack of yearly data seriously affects the comparability of indexes of activity and expansion of our leading basic industries, and that monthly employment, as recorded in the biennial census, affords a most useful check on current indexes of employment. Again, total wage payments by industries, States, cities, and other areas are needed, against which the samples of wages collected at monthly or other intervals may be measured.

It is scarcely necessary to emphasize the fact that the acceleration of business, due to vastly improved methods of transportation and communication, requires more timely data on industrial operations. The change recommended in frequency of manufactures reports from a biennial to an annual basis is not so great as the change involved in the transition from the quinquennial to the biennial census of manufactures.

Size of establishments by average number of wage earners employed: This table has been a feature of census returns up to and including the 1923 biennial Census of Manufactures. It was omitted from the 1925 and 1927 volumes on manufactures, but will again be included in the 1929 reports. In this connection, we may say that not only studies of labor problems but also any market analyses or any research looking to the extension of business activity should take into account such data on the number of wage earners employed by size groups along with other factors.

Monthly employment of wage earners: Data showing the number of wage earners employed in each month in the year were not compiled for the census of 1927, except for 13 selected industries. While monthly wage-earner-employment figures are (we understand) promised for all industries in future censuses, it is not understood that this applies to figures for States and other areas. It would be very helpful and desirable indeed to have available monthly statistics for: (1) The United States by States (as in 1921 and previously); (2) each State by leading industries; (3) each industry by leading States. Among many uses to which such data would be put, an important one is the testing by State bureaus of the seasonal soundness and reliability of their respective samples, within each manufacturing industry important within a particular State.

County statistics of manufactures: Statistics of manufactures by counties are found in Volume VIII, Census of Manufactures, 1919, (pages 239 to 277), and also in the reports of the Census of Manufactures for 1909. The presentation of manufactures data by cities and States does not give a sufficient breakdown to be of much assistance in any use of the figures for sales analyses, market studies, or for other purposes. Beside their use for labor purposes, advertising agencies and other business interests throughout the United States would like to see the bureau supply manufactures information by counties, at least with respect to establishments, wage earners, wages, cost of materials, value of products, and value added by manufacture. This information will be included, for all counties for which it is possible to supply it without disclosing the data for individual establishments (which is prohibited by the census law), in the published census report for 1929. Similar information was published for

1927 in mimeographed form but was not included in the census report proper.

Statistics by industries: These will be published, for the first time, for industrial areas (each comprising two or more important industrial counties) and for individual counties of industrial importance.

Hours of labor in manufacturing industries: These statistics were omitted from the 1925 and 1927 censuses, but will be included in the 1929 census. Prior censuses have carried tables showing the hours of labor, by individual industries, and the average number of wage earners distributed according to the prevailing hours of labor per week. These data were useful in showing the trend of the working day in different branches of industry, and in presenting a comparison of conditions in different industries.

Statistics of automobile repair shops: No data for this industry have been included since the 1919 Census of Manufactures. It scarcely need be pointed out that this industry, giving employment to many thousands of wage earners, was omitted from census inquiries on the ground of expediency. Although automobile repair shops were covered by the recent Census of Distribution, the industry should be restored to the biennial Census of Manufactures.

The foregoing illustrations of the omission of census inquiries are by no means inclusive, but they are sufficient to show that a process of attrition has been followed in the presentation of statistics of manufactures, and especially of the labor data therein.

## 2. The Measurement of Part-Time Employment

The committee recommends that the Bureau of Labor Statistics proceed slowly in attempting to obtain man-hours from cooperating business establishments. It has already been demonstrated that the collection of man-hours is practicable. While the wording of the Wagner Act makes it mandatory for the bureau to gather data showing hours of employment from all of the seven general classifications of business effort that are enumerated, and this must be the ultimate goal of the bureau's efforts, it would seem advisable that its first efforts be confined to manufacturing industries and railroad transportation. The reasons for singling out these two fields of work are: (1) That already many manufacturing establishments are accustomed to compiling man-hours and these can serve as a nucleus upon which to build; (2) in spite of the fact that some companies can readily furnish this information, there are many more that can not do so from their regular records and the field staff of the bureau will be fully occupied for some time in educating such companies to believe in the value and feasibility of furnishing such data, since the Wagner bill does not make it mandatory for companies to report; (3) conditions of manufacturing operation, in so far as they apply to the accurate compilation of man-hours, are more nearly standardized than in some other fields of work and consequently present fewer statistical problems; and (4) since the Interstate Commerce Commission already compiles hours of employment on railroads, it would seem that a clear understanding of what is included under their various classifications of man-hours is all that is needed to make these data available for us. It is believed that the experience

gained by the bureau in obtaining and computing man-hours data from these more readily available and standardized sources will be of material assistance in suggesting solutions for problems of procedure which will inevitably be encountered when the attempt is made to obtain similar data from other business groups.

It should be recognized that for some time many of the establishments in any group, except railroads, which report employment will not be able to report man-hours. There is a possibility of a sort of self-selection in this regard which will tend to make the establishments which report man-hours not representative of all those which report employment. It is suggested that, for a time at least, the bureau make special tabulations of the employments of the establishments returning man-hours. If, after a period of several months, both sets of employment indexes are in substantial agreement, the extra tabulation may be dropped. If not, it should be continued until the sample is increased sufficiently to be typical. Only by some such check as this can the bureau determine accurately how large a sample it should obtain.

The committee recommends that the Bureau of Labor Statistics, so far as possible, obtain hours of employment for all employees in a company, but that figures be obtained separately for (1) wage earners, and (2) salaried employees. In the case of the latter it may be simpler to obtain "man-days," and because of the substantial agreement of working periods of such employees with the established hours of work, man-hours could easily be computed. Overtime, moreover, does not affect earnings of salaried employees in the same way that it affects earnings of wage earners, and short time does not result in temporary lay-off. To avoid confusion in classifying certain employees, it is suggested that wage earners include all those whose compensation is on a daily, hourly, or unit-of-output basis and that all others up to but excluding officers of the company be regarded as salaried employees.

The committee recommends that in addition to man-hours, the Bureau of Labor Statistics secure data showing the number of hours in the normal work week of the establishment. While man-hours will indicate the trend of employment, they can not, by themselves, indicate the extent of unemployment. However, contrasted with full-time hours they will show the extent of part-time employment during periods of depression and also the amount of overtime operations during periods of peak operation.

The committee recommends that in drafting its schedule for securing data the Bureau of Labor Statistics be more explicit in its questions than is now the case. A few clear instructions might advantageously be placed upon the schedule. Space should be provided for indicating the suspension of compensated employment on account of holidays, labor troubles, or other reasons not connected with the business conditions.

The committee also recommends that the Bureau of the Census consider the desirability of extending its work of securing man-hours in order to make possible the same periodic adjustment of figures for man-hours that is now possible for employment series.

### 3. The Timeliness of the Series of Employment of Railroad Labor

It is recommended that the Bureau of Labor Statistics and the statistical division of the Interstate Commerce Commission confer with a view to hastening the monthly publication on the employment and wages paid to Class I railroad employees, so that they may be incorporated monthly into the series now published monthly by the Bureau of Labor Statistics.

## II. Measurement of the Course of Unemployment

The only perfectly satisfactory method for measuring the volume of unemployment at any specified time and for determining the changes in its volume is through some system of the universal registration of the unemployed. Such systems exist in countries which have universal unemployment insurance. Under the administration of such insurance, provision is made for the continuous definition of unemployment, and for the registration of the unemployed. In this country no such machinery exists.

In the absence of registration a comprehensive view of the extent of unemployment can only be had by a count of the unemployed through a country-wide census. This method is, of necessity, inadequate because it must be limited to the conditions prevailing during a short period of time and because the fact of unemployment is not established after investigation or by a search of the records of industry, but by personal inquiries made by thousands of census enumerators throughout the country. How important these sources of error are can only be determined by a most careful examination of the results of the census. Since it is much too expensive to take frequent censuses of unemployment, the determination of changes in the volume of unemployment must be arrived at by reducing or increasing the volume of unemployment, found to exist on the base date, in the proportion that the available indexes of employment show a rise or fall in employment since then. Unless these indexes of employment are exhaustive, in the sense of including at least all the principal fields of employment in the country, and making continuous provision for the inclusion of new and rapidly growing establishments in each industry or occupational field, they may fail to reveal the growth of employment in some occupations and its decline in others. The confidence which such estimates should inspire will depend, as has already been pointed out, on the adequacy of our indexes of employment.

For a view of the current unemployment situation in the United States, we have now available the partial results of the census of unemployment taken in April, 1930. In this census a serious effort has been made to ascertain the number of unemployed, within the terms of the categories set up, making allowance for the errors incident to any enumeration of the kind, the inexperience of the Bureau of the Census in the field, and the character of the field personnel it had to employ for this much more technical inquiry than the census of population. The staff employed by the bureau at Washington was probably the best it ever had, and the editing on the unemployment census seems to have been well done. If errors crept in, they were

probably due mainly to the inexperience of the enumerators and to lack of adequate supervision in the field.

Accepting these census data as they are now reported, estimates of the numbers fully unemployed in April, 1930, must be made by adding together the numbers reported by the census in Class A (persons out of a job, able to work, and looking for a job) and the numbers in Class B (persons having jobs, but on lay-off without pay, excluding those sick or voluntarily idle). The total for either of these groups alone gives an inadequate and misleading picture of the volume of unemployment in the census period. The Bureau of the Census has completed its tabulation of Class A and finds the numbers included in this group to be 2,508,151. The tabulations for Class B are not yet completed and the published data show a wide degree of variation in the relation between these two classes in various parts of the country and in various industrial areas. On the basis of the tabulations of Class B already available estimates of the combined total of Classes A and B run from 3,000,000 to 3,350,000, depending upon whether deductions are made from Class B of persons estimated to be employed on part time.

The projection of these census data in the future would require either another complete census, which is impracticable, or sample censuses, or the use of the indexes of employment for estimating changes in the volume of unemployment since April, 1930. Although current estimates of the volume of unemployment in December, 1930, which place the numbers then unemployed at near 5,000,000 would seem reasonable in view of the available data, no scientific conclusion regarding the matter can be had without a detailed analysis of the complete returns of the census of 1930, of the recent sample census in selected cities taken by the Metropolitan Life Insurance Co., and of the sample census made by the United States Bureau of the Census as of January 15, 1931.

For the more satisfactory and reliable measurement of unemployment in the future, the committee recommends the following:

1. The prompt extension of employment statistics in the direction and in the manner described in the first part of this report.

2. The continuance of the decennial census of unemployment.

3. Serious consideration of the desirability of a quinquennial census of employment, so that we shall have a more frequent and more reliable record than is now available of the shifts in occupations and employment in the great categories of industry.

4. The latest data collected by the United States Bureau of the Census on unemployment, manufactures, occupations, and distribution constitute invaluable material for explorations into the volume and character of unemployment in this country. This committee strongly recommends, therefore, that the Bureau of the Census be instructed to arrange for the immediate preparation of census monographs of the following subjects: (a) Occupational changes; (b) unemployment; (c) age changes of American workers; (d) man-hours; (e) changes in employment as revealed by the Census of Manufactures; (f) the relation between value of output, value added by manufacture, and wages; (g) the distribution of employees by size of establishment; (h) employment in distributive trades.

## PART 2.—Studies in “Technological Unemployment”

In considering the subject of “technological unemployment” the committee recognized the complicated character of that problem. On few subjects are terms used more loosely than in the discussion of the direct or indirect displacement of labor due to the introduction of machinery, to the improvement of processes, or to the increase of productivity for other causes. It is more difficult still to measure the effect of such technological improvements on the displacement of labor, since displacement may occur in the plant in which the improvements occur, in a competing plant several thousand miles away, or in a plant or plants manufacturing totally different products. Under these circumstances relating cause to effect is an exceedingly complicated task.

In view of these facts, the committee sought and obtained the services of Mr. Ewan Clague, then of Yale University, to make a preliminary survey which might serve as a basis for the committee's discussions. Mr. Clague was asked to survey the entire area and indicate the types of studies which have been or are being made, the basic data available, the studies needed, and the basic data essential to their successful prosecution. The committee is under obligations to Doctor Clague for an able and scholarly piece of work. His memorandum is appended to this report (pp. 16–31). It was on the basis of this memorandum that the committee discussions proceeded.

The committee was unanimously of the opinion that because of the acceleration of the rate of technological advance, the subject of “technological unemployment” was of vital importance in the analysis and discussion of the entire problem of unemployment. It therefore recommended that the collection of fundamental data and the prosecution of specific studies should be a continuing part of the responsibility of the Federal Government and especially of the United States Bureau of Labor Statistics.

The committee recommendations fall under two categories—those referring to the collection of basic data and those referring to specific studies.

### I. Basic Data

The committee recognized that the first responsibility of the Federal Government is to provide the fundamental data upon which definitive studies of “technological unemployment” must be based. If technological displacement is to be considered in definite terms, it is first essential that the basic data for continuous and current measurement of industrial productivity should be available. Part of this essential data is already being collected by the Bureau of Labor Statistics and the United States Census. The collection of additional essential data is recommended in Part I of this report.

But the committee further recommends the collection by appropriate agencies of such further basic data as are necessary for the con-



tinuous and current measurement of industrial productivity; i. e., output per man-hour for as many manufacturing industries as possible and for certain highly industrial areas, including important States and cities. It considers that this will involve three things:

1. The improvement and expansion of the existing data on employment and pay rolls in manufacturing industries, with the addition, as rapidly as they may become available, of data on actual man-hours of labor time, all these data being collected and published at monthly intervals for all industries combined, for individual industries and for certain geographic areas.

2. The improvement and expansion of the current statistics of industrial production both for individual industries and for geographic areas similar to those adopted for employment statistics.

With these data covering statistics of employment and industrial production available, it will be possible to compute and develop continuous series of indexes on output per man-hour, showing the long-time trend of productivity for as many industries as possible and for certain geographic areas.

It was recognized by the committee that the data on employment, pay rolls, man-hours, and industrial production should be collected from identical firms, should cover the same period of time, and should be on a comparable basis.

3. Finally, it is suggested that data on the capacity of industry in terms of equipment and plant be collected and compiled for industries and geographic areas.

## II. Special Studies

The committee recommends that from time to time, in cases which the basic facts of productivity or unemployment warrant, special intensive surveys of particular industries for the purpose of determining the exact processes or machinery responsible for the increased productivity and the type of labor affected by it. Such studies should be sufficiently comprehensive and thorough to justify the time and effort required to make them, and it is the recommendation of the committee that they should be broad enough to include—

1. The calculation of the amount, kind, and cause of labor displacement brought about by the introduction of machines, improvements in processes, etc.

2. The tracing down, in a sampling study, of individual workers permanently laid off as a result of these technological improvements, for the purpose of finding out the average length of time required for the reabsorption of the technologically unemployed workers, the average loss in wages and income suffered, the reduction in skill, etc.<sup>2</sup>

3. The assembling of the above data by geographic areas in all cases where such segregation would give significant contrasts between different parts of the country.

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<sup>2</sup> The committee suggests that other studies of this phase of the problem involving the unemployment experience of workers displaced as a result of mechanization and other technological factors be made with particular attention being directed to local situations, such as plant shutdowns, bankruptcies, wholesale lay-offs, etc.

4. A thorough economic analysis of the industry to be surveyed—its rate of growth, present size, existing markets, corporate organization, volume of employment, etc.—should be included as an integral part of every special study of productivity, since the results of such studies are of little use in the absence of these types of information.

5. The development of further studies directed toward the problem of reabsorption and readjustment of the displaced workers. These should cover, among many others, the two following points: (a) The effect of the hiring policies of firms and corporations upon the reabsorption of displaced workers; and (b) what individual plants and labor organizations are doing to retain workers whose jobs have been permanently eliminated.

### PART 3.—Administrative Recommendations

In order to carry into practical effect the preceding recommendations contained in this report, the committee submits certain administrative recommendations as follows:

1. It recommends that the sum of \$200,000 additional be made available in the budget in the next fiscal year to the United States Bureau of Labor Statistics for the carrying out of such of the above recommendations concerning the measurement of employment and unemployment and the study of "technological unemployment" as fall within its jurisdiction.

2. It is recommended also that of this sum \$50,000 be made available at once so that the work may begin without delay.

3. The committee also recommends that steps be taken within the Government looking toward a more effective coordination of the various statistical services of the Government. Specifically, it suggests that there be appointed a permanent coordinating committee composed of the heads of the various statistical services of the Government, whether in executive departments, independent commissions, or elsewhere, this committee to have authority to study and make recommendations directly to some central authority on such matters as the following: (*a*) The elimination of duplication among the statistical branches of the Government; (*b*) methods of insuring still closer cooperation among the different statistical branches of the Government, especially on studies in which two departments have an interest; (*c*) the encouragement of uniformity of methods (when such is desirable).

4. The committee further considers that both in the collection of data and the analysis of such material, an extension of the policy of cooperation with responsible outside agencies is to be encouraged, providing it is clearly understood that agencies cooperating in collection shall use schedules determined by the Government and that the cooperation of outside agencies in studies shall be of such a character as to preserve inviolate the confidential nature of the Government data.

Dated February 9, 1931.

## MEMORANDUM ON TECHNOLOGICAL UNEMPLOYMENT

By EWAN CLAGUE

### Causes of Unemployment

The basic causes of unemployment can, for most purposes, be classified as follows:

1. Seasonal changes in individual industries.
2. Cyclical swings in business, affecting at once the entire industrial structure of the country.
3. Long-time trend factors, particularly (a) technological improvements, such as increased mechanization, improved processes, production reorganization, etc.; (b) major industrial changes, involving either decreasing demand for the products of a dying industry, or rapid geographical shifts in manufacturing activities.
4. Frictional factors, especially the disorganization of the labor market, and the utter lack of facilities for aiding the rapid transfer of displaced workers to new industries and new occupations.
5. Miscellaneous factors, mostly of a personal, individual nature; illness, unemployment, personal characteristics, etc.

Admittedly, these classes are not always sharply defined; at times they so merge into one another as to be practically indistinguishable. When an automobile plant laid off men last month (December), the resulting unemployment could have been described either as seasonal, due to the normal year-end let down in that industry, or as cyclical, due to the current depression. Perhaps the employers themselves could not have said which was the predominant cause.

Again, in any given case, there is frequently considerable crossing between unemployment due to improved technology and that due to business depression. When times are prosperous and industry is expanding, no workers are laid off, but when the boom period is over and retrenchment is necessary, then the surplus workers are laid off, and the resulting unemployment appears to be wholly cyclical in its origin. This is equivalent to saying that there may be a considerable lag in time, a long distance in space, and even an actual difference in the industry affected, between the installation of labor-saving machinery and the eventual unemployment.

Or, to take still another example, personal and individual factors may frequently be confused with the technological, in that the workers first laid off as the result of an efficiency campaign in the factory would, in all probability, be the least efficient, the least adaptable, and the hardest to manage, etc. In the subsequent search for a job these personal factors might prove decisive, and the worker himself would eventually become convinced that his failure to obtain work was due to individual handicaps.

Therefore, any attempt to study the long-time trend factors in unemployment must mean the elimination, so far as possible, of all

the remaining causes. This requires the most careful restriction of the problem at the very beginning of the inquiry. Thus, it would be foolhardy to take up such a study under present conditions, because the abnormal volume of unemployment existing at this particular time is due in large measure to the normal midwinter unemployment, resulting from seasonal slackness, and the additional unemployment resulting from the business depression. The segregation of the long-time factors, under present conditions, would be well-nigh impossible. So, too, the problems of employment offices, of industrial transfer, and of all the other factors making for sluggishness in the reabsorption of the unemployed workers into industry must be pushed into the background; these could only be introduced into the study after the preliminary work on the long-time factors had been completed. It is true, of course, that the seriousness of the problem of technological unemployment is very greatly enhanced by the lack of facilities for transferring and adapting unemployed workers to new jobs. Finally, there is no place in a technological unemployment study for a detailed analysis of illness, unemployability, etc., with all the allied problems centering around the question as to who shall be permitted to work. Whenever unemployment becomes at all acute, the problem of allocating jobs comes to the front. With it goes the whole range of problems arising out of the competition of groups of workers. In this class of cases are found the typical disputes as to men versus women, married men versus single men, married women versus single women, white versus colored, citizens versus aliens, and so on. These disputes have nothing to do with the case of technological unemployment and must be eliminated.

The problem of technological unemployment (and for the purposes of this paper the term "technological unemployment" will be used to designate all the long-time trend factors) can be approached in two ways: (1) From the side of increasing productivity or output per man-hour, on the assumption that increased efficiency, under most circumstances, must mean at least some displacement of labor; and (2) from the side of unemployment itself, by analyzing and studying those unemployed workers who owe their displacement to increased mechanization or declining demand. This report will examine both these approaches to the problem. The first step is the listing of the major studies which have been or are being made.

### Types of Productivity and Technological Unemployment Studies Which Have Been Made

#### I. Indirect approach to technological unemployment—measurement of productivity:

##### A. Continuous measurement—

##### (a) Kinds of studies—

- (1) United States Bureau of Labor Statistics: Productivity indexes for 11 industries, 1914-1925—Monthly Labor Review, July, October, November, December, 1926, and January, 1927, with the addition of later years, March, 1930.

- (2) United States Department of Commerce, Bureau of the Census: Indexes of productivity 1899-1925, for all industry, for manufacturing, mining and agriculture, and for major industrial groups, by Woodlief Thomas, then with the Federal Reserve Board, published in American Economic Review, March, 1928.
- (b) Essential data—
  - (1) Statistics of employment and man-hours, monthly or annually.
  - (2) Statistics of industrial production, monthly or annually.
  - (3) Considerable improvement in such productivity data might be effected if employment and production statistics for *identical firms* could be put together.
  - (4) A certain amount of reclassification of industries by the Census Bureau would make possible a wider extension of this method.
- B. Special surveys of productivity, changes by industries, or individual processes—
  - (a) Kinds of studies—
    - (1) United States Bureau of Labor Statistics: Hand and machine labor, 1896—a comparison of output per man-hour in 1895 by machine methods with corresponding output by the hand methods of 40 to 50 years earlier.
    - (2) United States Bureau of Labor Statistics: Series of bulletins on productivity of labor and industry, covering such industries as brick, glass, pottery, steel, etc. Examples are Bulletin 441, Productivity of Labor in the Glass Industry, or Bulletin 474, Productivity of Labor in Merchant Blast Furnaces; a four-year study of productivity in longshoring in the leading ports of this country, is now nearing completion.
    - (3) Bureau of Economic Research: Professor Harry Jerome of the University of Wisconsin has for some years been gathering data on productivity in individual industries in connection with his study of mechanization.
    - (4) University of Pennsylvania, Department of Industrial Research: Under the direction of Professor Joseph H. Willits, a number of studies of productivity changes in certain industries have been and are being undertaken.
    - (5) The Institute of Human Relations, Yale University: Professor Eliot Dunlap Smith, of Sheffield Scientific School, has just begun an intensive study of the "stretch-out" in the textile industry; although primarily directed toward managerial problems, this study will concern itself to some

extent with the problem of measuring increased output per man-hour through the use of this labor-saving device.

(b) Essential data—

Generally speaking, this method involves the collection at individual plants of detailed statistics of output and labor time for the purpose of comparing at least two distinct methods of production. The study of the glass industry by the United States Bureau of Labor Statistics compared output per man-hour under conditions of (1) hand labor, (2) semiautomatic machinery, and (3) automatic machinery. In the steel study annual data were obtained for the period 1911-1926, so as to make a continuous series of productivity indexes for the entire industry over a period of 16 years.

It is not absolutely essential to use the industry as a unit in this method; a special process or even a particular machine can be isolated for study, although the significance of the results is greatly decreased by each such narrowing of the coverage.

## II. Direct approach to technological unemployment:

A. The direct approach to technological unemployment has been made through the study of the experiences of the unemployed workers themselves.

(a) Kinds of studies—

- (1) Dr. Isador Lubin, Institute of Economics, Washington, D. C.: "Absorption of the unemployed by American industry," a study covering the unemployment experiences of 750 workers, laid off because of technical improvements, in Baltimore, Worcester, and Chicago; these workers represented many industries.
- (2) Dr. Robert J. Myers, University of Chicago, in the *Journal of Political Economy*, August, 1929, has analyzed the unemployment experiences of over 500 skilled cutters displaced from the clothing industry in Chicago during the period 1922-1926. The features of Myers's study are (1) the fact that one particular highly skilled trade was involved, and (2) that a number of the displaced workers received a dismissal wage.
- (3) Professors Clague and Couper, Institute of Human Relations, Yale University: An extensive analysis of the experiences of some 1,200 ex-rubber workers laid off in two factory shutdowns in Connecticut in 1929; to be published in part in the *Quarterly Journal of Economics*, February, 1931. Important points in connection with this study are: (a) The payment of a dismissal wage to long-service workers by the company; (b) the concentration upon two entire work forces in a particular industry; (c)

the inclusion of workers of both sexes; (d) the collection of data on the families of the displaced workers.

- (4) Miscellaneous analyses of the unemployed registering at employment offices or charitable organizations have frequently been made, but these can seldom be so sharply differentiated into the various classes of unemployment. All three studies listed above followed a common method, in that the workers to be surveyed were identified through specific lay-offs involving technological displacement. The worker himself is a very poor judge of the reasons for his lay-off, and therefore a good study of technologically unemployed workers must begin with an analysis of the lay-off itself.

### Advantages and Disadvantages of the Various Methods of Study

Although some progress has been made in each of the three lines of attack listed above, it is safe to say that comparatively little has been accomplished, especially when the magnitude and uncertainty of the problem are taken into consideration. Perhaps the basic reason for this situation is that no one of these methods is free from serious disadvantages, both of a practical and a theoretical nature. In order to present all three methods in their true light, both the advantages and disadvantages of each have been listed below. The briefest kind of treatment is all that can be attempted in this report.

#### A. Continuous measurement of productivity:

##### (a) Advantages—

- (1) The development of continuous, current data on rates of change in output per man-hour, which will keep our information on the subject more up to date than is otherwise possible. The calculation of annual indexes of productivity might make possible the construction of trend lines that would forecast the rise of unemployment problems which are at the present only in the early stages of development.
- (2) It can be argued that rates of increase in productivity furnish at least a rough approximation of the rate of change or turnover in employment due to technological factors. This does not mean that the extent of technological unemployment is thus being measured; it only indicates the extent of potential labor displacement, much of which may never eventuate in unemployment. (For elaboration of certain features of this point, see under "Disadvantages" below.) In answering the question whether this is worth measuring it may be urged that the determination of the maximum risk of technological unemployment in industry might be of considerable value.
- (3) It seems very likely that the development of this type of productivity data would have a very important



indirect influence upon our knowledge of unemployment problems in that it would make possible a great deal of research work by economists and others. The effect of increased productivity upon total social costs, the influence of mechanization upon wage rates and on the total wage bill of an industry, the relationship between efficiency and foreign trade—these are only a few of the problems which could be examined if more productivity data were available to economic students.

(b) Disadvantages—

Unfortunately, over against the above must be set a formidable list of disadvantages which seriously curtail the value of this type of work.

- (1) There are many technical statistical difficulties encountered in attempting to measure output per man-hour on a large scale.

- (aa) If the method used by Clague in constructing the Bureau of Labor Statistics indexes is followed, then many industries have to be eliminated from consideration because satisfactory estimates of production or of labor time can not be obtained. (This is a technical point which need not be pursued here.)

- (bb) The Woodlief Thomas method avoids some of the difficulties of measuring the physical product of an industry by substituting a value product deflated in accordance with the price level. But in avoiding one problem this method runs into others, such as the uncertainty of census valuations and the further uncertainty of the deflating index.

- (cc) The collection of these production and employment data, and the issuance of production indexes of this type, can only be done through governmental agencies. It would be impossible for any nongovernmental body to undertake work of this character. This point does not imply that the Government is incapable of doing such work, but merely suggests that outside help, other than that of a purely technical or advisory character, can not be enlisted.

- (dd) The improvement of this type of index can only be brought about, under present conditions, by a higher degree of cooperation between Government departments than has yet been attained. (For detailed discussion, see section below on "Suggested recommendations.")

- (2) In the second place, increases in productivity are after all only indirectly and rather remotely connected with unemployment.

- (aa) For example, the two industries in the Bureau of Labor Statistics series which showed the

most rapid increase in output per man-hour between 1914 and 1925 (automobiles and rubber tires) are industries in which up to the latter year there had been no pronounced unemployment other than that of a seasonal or cyclical character. The census data show no shrinkage in the number of employees in either of these industries between 1914 and 1925. In other words, either the mechanization did not cause any unemployment to speak of, or, as seems more likely, the displaced workers were speedily reabsorbed in the rapid expansion of the industry.

The relationship between rapid expansion and high productivity in an industry is a very close one, but also a very complex one. Sometimes the initiating factor making for change is potential demand, as in the case of the automobile industry; while occasionally a remarkable improvement in productivity, e. g., in the glass industry, reduced costs and opened up new markets which had never been tapped. It is clear, of course, from these two examples that once the start has been made there has been considerable interaction of the one factor on the other. If, in the automobile industry, it can be said that the enormous demand for the product led to the development of maximum efficiency in production, it must also be pointed out that Ford's mass production technique opened up new markets which might have lain untouched for decades.

- (bb) As with industries, so with concerns. The rapidly expanding concern which is achieving new records in output per man-hour may actually be taking on workers; the blow is likely to fall on the inefficient concern which has not introduced a new machine into the plant for many years, but which is compelled to shut down as a result of the pressure of competition. The ostensible reason for the shutdown may be far removed from technology; in fact, it is almost certain to be largely financial, thus obscuring the real basic causes of the unemployment.
- (3) In the next place, Professor Slichter has stressed the point that when the problem is split up into its elements, it will probably be found that shifting demand for products is a far more potent cause of unemployment than is labor-saving machinery. If such is the case, the measurement of productivity in the rapidly expanding industries would be of little or no help, since the unemployment would appear in just those

industries for which the productivity indexes would be colorless and insignificant.

- (4) Again, productivity measurement must run the gauntlet of certain basic principles of economic theory. Prof. Paul H. Douglas, of the University of Chicago and of the Swarthmore Unemployment Institute, made this point, in an article in the *American Federationist* for August, 1930. Professor Douglas summarizes the viewpoint of a large class of economists when he insists that, strictly speaking, there is no such thing as technological unemployment. Mechanization does produce change, and jobs are lost in the process, but "in the long run" the displaced labor is reabsorbed somewhere else in the system. Thus, any unemployment resulting from the use of machinery must be wholly temporary in character, and even at the very time that men are being displaced by labor-saving machinery in one industry, workers are being hired in another.

- (5) Lastly, there is still another basic theoretical difficulty. When the relationship existing between the productive operations of industry and the unemployment of labor is brought into focus, it will be seen that increased efficiency represents only one side of the picture. There is the reverse side—decreased efficiency and restriction of output. It is only when the relationship is studied under both these conditions that a full and complete understanding can be obtained. Therefore, any attempt to study technological unemployment through an analysis of productive operations might have to be widened to include not only a preliminary survey of increasing productivity, but also one of restriction of output. The tremendous expansion of the problem implied in this suggestion will be apparent to every one.

B. The method of special surveys of productivity in particular industries and even in special processes offers much more scope for research than the preceding method. Its advantages are numerous and important.

(a) Advantages—

- (1) This method makes possible a detailed study of just how increased productivity and improved efficiency affect the workers in an industry. Is the improvement in technology very spotted and uneven? Do its burdens fall heavily on special groups of workers while its benefits are reaped by others?
- (2) The relation of improved technology to the growth (or decline) of skill, and the substitution of women for men in industry, are vital matters which can only be studied in this intensive way.
- (3) If a direct study of unemployed workers is desired, this method furnishes the means of getting access to the necessary data; analysis of the technological change

would reveal the group or groups of workers directly affected, and the plant records of these men would furnish valuable data on their history prior to their lay-off.

- (4) Because of the intimate contact between research workers and industrial managers established in the course of studies such as these, there is the powerful practical advantage that the research may cause industrial leaders to become interested in the problem of the displacement and reabsorption of labor. Industry itself, whether by dismissal wage payments or by transfer and retraining, must necessarily play a very important part in easing the transition of displaced workers to new industries or new occupations.

(b) Disadvantages—

- (1) First and foremost is the element of discontinuity or isolation. Such studies, however valuable they may be at the time they are made, speedily become antiquated and out of date. The increase in productivity is a constant, continuous thing; its measurement should not be irregular and discontinuous. In this connection, it is pertinent to stress the fact that these studies are exceedingly difficult to duplicate, to say nothing of linking them up in some way with succeeding ones. The monumental study of hand and machine labor, made by the United States Bureau of Labor in 1893-1895, is now wholly useless except as a historical document. It would be next to impossible to link any modern study up with it. Only a measurement of rate of change in productivity, such as that attempted in the merchant blast furnace study, is of any use as a landmark to later research workers.
- (2) There are serious technical difficulties in studies of this kind, particularly those involved in obtaining satisfactory measures of output and in calculating the volume of overhead labor. It is a simple matter to measure the man-hours of direct labor on a process, and from this to arrive at an estimate of the amount of theoretical labor displacement. It is not an insurmountable obstacle to estimate roughly the apportionment of such indirect labor as that of cleaning, repairing, supervising, etc. But when it becomes a question of allowing for engineering research, for tool making, and for all the other forms of overhead labor, the problem becomes very formidable. And in proportion as the process to be studied is narrowed in the interests of definiteness, the overhead assignments become more complex and indefinite.
- (3) To carry the last point still further, there is a give and take between whole industries which can not be properly taken into consideration, because of the narrowing of the problem which is so essential in this

type of work. The decline in employment consequent to technical discoveries in the glass industry is partly balanced by the rapid expansion of employment in the electrical manufacturing industry. Yet how could any possible combination of these two industries be established for purposes of measuring productivity?

C. The analysis of the unemployed:

(a) Advantages—

- (1) This type of study makes a direct hit on the problem of technological unemployment. The problems of productivity measurement are entirely eliminated at the outset. Sufficient study of the originating circumstances is necessary to establish beyond doubt the nature of the unemployment, but after this preliminary groundwork all subsequent attention and effort can be directed toward the solution of the problems of the reabsorption of the unemployed by industry.
  - (2) In the second place, this type of study furnishes the answer to the argument that there can not "in the long run" be any technological unemployment. How long is the "long run"? If temporary unemployment is continually being created by labor-saving machinery, and the average length of time out of work after such displacement is about six months, then it is quite clear that there is at any one time in the country a substantial volume of unemployment due to the introduction of machines. We need to know what the average length of the period of displacement is.
  - (3) Studies such as these have a very important practical aspect in that they focus community interest on unemployment problems and make it possible to capitalize that interest for the furtherance of remedial measures. Industrial interest, as pointed out above, is aroused by special productivity studies, but if the community, or the geographic area, is ever to become a vital factor in meeting the problem of technological unemployment, it must be through studies which appeal to community rather than industry interest.
  - (4) There is still another practical aspect to these studies. If dismissal wage systems, or unemployment reserves, or unemployment insurance are ever up for consideration, the results of these analyses of the unemployed will furnish data by which to judge the adequacy or the advisability of various proposals.
- (b) Over against these powerful advantages must be set a number of very serious disadvantages—
- (1) The time and expense involved in making studies of this kind are such that only occasional surveys can be made.
  - (2) The necessity of restricting and narrowing the case so as to have a clean-cut situation absolutely prohibits

- large-scale work and practically insures that the coverage will be very small.
- (3) There is the further difficulty that the "representative" qualities of the case are generally doubtful. It is hard to say whether or not a given case is "typical" of the vicinity or the industry; and the freakish cases are likely to prove more interesting and so may be more frequently surveyed. Thus it will be exceedingly dangerous to generalize from one or more of these special cases.
  - (4) Even when the case as such is fairly representative, a serious problem of sampling is likely to arise. When practically all displaced workers are located (92 per cent in the New Haven case—Institute of Human Relations, Yale University, study), there is no difficulty at all, but if the survey coverage is only about 50 per cent (as in the Hartford shutdown) then many of the basic results of the survey are open to doubt because there is no assurance that the "lost" workers would not have differed widely in their job experiences from the scheduled workers.
  - (5) Lastly, it is very probable that clean-cut cases of technological unemployment will be hard to find; for the most part, shutdowns and lay-offs are rather mixed in their origins, and many of them, therefore, would have to be eliminated from any proposed survey.

### Suggested Recommendations

The final question then becomes, What, if anything, remains to be done? To begin with, there need be no question of curtailment of any of the existing work. There is some value in each type of study now being made, and the various agencies now engaged in or contemplating such work should be urged to carry on. However, the foregoing analysis has consistently emphasized the point that the present studies are far from perfect either in scope or in method. There is plenty of room for improvement. There are two general ways in which this can be brought about: (1) By a general stiffening up of the standards and improvement of the quality of the work now being done; and (2) by the development of new projects which may lead to the exploration of entirely new phases of the problem.

#### I. The improvement of the quality of studies now being made:

##### A. Continuous measurement of productivity—

1. The first prerequisite is the expansion and improvement of the Bureau of Labor Statistics data on employment, and the inclusion, if feasible, of data on man-hours of labor time. Some industrial plants have already begun to compile man-hours for their own accounting purposes, and many plants do so in the course of preparation of accident statistics. It is not beyond possibility that a considerable volume of man-hour data could be obtained by the Bureau of Labor Statistics in connection with the collection of employment data.

2. There is even greater need for the improvement of data on industrial production. The chief source of current data on production is the Survey of Current Business, published by the United States Department of Commerce. In some series the data are collected from firms reporting to the department itself, but in the vast majority of cases the survey data are obtained from trade association offices. Obviously, the collection of statistics is an important function of any trade association, and a great deal of such work is being done, but the quality of the work leaves much to be desired. In only a few cases, apparently, is there a really competent statistician in charge of the work of collecting trade statistics; these few supply noteworthy examples of what could be accomplished in trade association statistics. It is difficult to see how the Government could do very much about this, and, of course, the Survey of Current Business must use the data as they come in, but here at least is a field in which a great deal remains to be done.
3. The development of satisfactory current indexes of productivity will further require greatly increased co-operation between the various Government departments in the use of data. A typical example of the present situation is found in the Bureau of Labor Statistics study of productivity in iron and steel. The field schedule, among other things, called for data on the annual output of pig iron. Time and again the field workers were met with the statement, "Why, you have that—we send it in to Washington every year." One manufacturer insisted that at least five Government bureaus had called for his production figures. Such useless duplication is not only wasteful of time and money, but it has a very bad effect on manufacturers and others who supply data.

Admittedly, firms which supply data for one purpose might refuse to supply it for another; it is also true that the larger the number of agencies which have access to the data, the smaller is the chance that the data will remain confidential. Nevertheless it should be perfectly feasible for Government departments to cooperate to a far greater extent than is now done. Thus, if the Bureau of Labor Statistics had gone out into the field and collected data on labor time, and had then drawn up a list of firms, the Bureau of Mines might well have supplied the total annual production of pig iron of those firms without in any way violating the confidential pledge. So, too, at present there is no reason why employment data in the Bureau of Labor Statistics and production data in the Bureau of Foreign and Domestic Commerce could not be compared for a list of identical firms.

4. It is further suggested that, in such an unexplored field as productivity, at least, access to the data should be given more freely to nongovernmental organizations and agencies interested in making studies. The reason for this is that the Government is generally restricted too much by its responsibilities in making the utmost possible use of the material. Another example from the productivity work of the Bureau of Labor Statistics may be cited. When the productivity data were being worked up, the question of the relationship of productivity and wages came to the front. The bureau was publishing data on both productivity and wages; and yet it would scarcely have dared to venture into the problem of the relationship of these two. But some outside agency might piece the results together and draw conclusions, if there were any opportunity for checking over the original work.
  5. In view of the numerous statistical and theoretical difficulties involved in productivity measurement, it may be in point to suggest that some nongovernmental committee of statisticians and engineers be formed for the purpose of keeping in touch with this work and making suggestions. Since this touches so closely on the work of the Committee on Governmental Labor Statistics, and since this committee is already functioning, the best move in this direction might be for the Committee on Governmental Labor Statistics to add this to its present duties. However, if such were done it would be desirable to enlarge the committee so as to include some engineers or experts in production measurement. Perhaps the simplest solution would be the formation of a new committee.
- B. Special surveys of productivity—
1. There are sound reasons for continuing and even for further expanding the work on special studies now being done by the Bureau of Labor Statistics.
  2. These special surveys should be used to supplement the productivity indexes. In many industries the latter are difficult or impossible to obtain; in others they seem to show nothing of importance taking place. Yet these are the very places at which further effort should be applied. This point means simply that careful judgment in the selection of industries for study is required.
  3. The scope and content of the special studies should be broadened considerably.
  4. Lastly, in cases where increased productivity appears to be leading directly to unemployment, some attempt should be made to enlist the cooperation of the industry in a comprehensive study of both phases of the problem. The Bureau of Labor Statistics has not hesitated to take positive action on occasion, as in the case of the conference of the paper box-board industry, on



the 7-day week. The cooperative study of productivity might well lead to the formation of labor boards, as suggested by Professor Slichter, which might serve as continuing agencies for meeting unemployment and adjustment problems arising out of the mechanization of industry.

C. Analysis of unemployed workers—

1. This type of study gets closer probably than any other to the fundamentals of the problem. So little has as yet been done along this line that our knowledge on the subject is extremely meager. A considerable expansion of this type of work is greatly needed.
2. These studies, by their very nature, must remain essentially local and decentralized in character. Unemployment, however widespread it may be, always finds expression locally, and its relief has always remained essentially a community problem. What is needed, therefore, is a large number of small, district studies along the lines of the Lubin, Myers, or Clague-Couper surveys.
3. Since there is little need for centralization beyond the establishment of some mildly coordinating organization (such as perhaps the Social Science Research Council), the effort here should be to encourage as many municipal or university groups as possible to undertake small, carefully chosen, narrowly restricted studies of unemployment caused by plant shutdowns or widespread lay-offs attributable to long-time trend factors. There is the distinct advantage that declining markets as well as increasing productivity can be brought into the picture by this type of research.
4. A minor point arises in connection with the dismissal wage. This device has been used but rarely in the past, but there are indications that it may spread rapidly. It would be very valuable to have much additional data along the lines of the Chicago and Yale studies, and local bodies should be urged to set in motion studies of this kind whenever dismissal wages cases occur in a community.

II. Possible new projects:

It is not absolutely necessary to go beyond the above program. The gradual tightening up of the work in productivity measurement and the encouragement of coordinated research on unemployment may be as far as it is advisable to go at the present time. However, if further analyses of the problem are to be attempted, a few suggestions as to the nature of these projects may now be in order.

1. One group of studies which has long since been contemplated and which has been held up for lack of data will be pushed forward in half a dozen directions as soon as the 1930 census data on occupations becomes available. There is some ground for thinking that the best approach to the problem of technological unemployment may be through the study

of occupational shifting. Intensive research into occupational changes will require no prompting once the data are published by the Census Bureau; and, on the other hand, in the absence of such data, any pretentious study of technological unemployment may go off half-cocked.

2. Since, whatever the basic, originating cause may be, most unemployment attributable to trend factors actually comes into existence through wholesale lay-offs, plant shutdowns, bankrupt companies, etc., it may well be that the most fruitful attack on the problem could be made through a study of such shutdowns, bankruptcies, lay-offs, etc. This would mean concentrating on shifts in demand, in markets, and in manufacturing areas rather than on productivity.
3. It is clear that the burning practical problem at the present time is that of the transfer and retraining of displaced workers. Eliminating for the moment the question of employment offices, there is much to be done to focus the attention of both industry and the community on the problem of the readjustment of unemployed workers. The part which industry itself is playing and should play needs to be thoroughly and critically examined, while the extent to which the community should take steps to assist in this matter must be carefully surveyed.
4. Others might be added to the list, but these few should be sufficient to illustrate the types of studies which could be made. The suggestion of other projects may safely be left to the ingenuity of research workers in this field. There is, however, one last project worthy of examination—a proposal for a sort of superstudy which would cut across at least three or four of the more specific studies discussed above. Such a project would of necessity have to be a special productivity survey; it would have to include both productivity and unemployment, but it would concern itself much less with the measurement of productivity than it would with (1) the relationship of increased productivity to unemployment, and (2) the transfer or reabsorption into industry of technologically unemployed workers.

Such a study, if undertaken at all, must be outlined in a comprehensive way. It would require a set-up somewhat analogous to that of the E. D. Smith study, now under way at the Institute of Human Relations, although it would have to be focused on a different point, for the Smith study is primarily concerned with the influence of the machine on the worker on the job.

Briefly outlined, a study of the type suggested should be confined to one or two important and significant industries (glass industry of six or seven years ago would have furnished an excellent example); it should begin with the introduction of machinery or improved processes, trace the results of these through the individual plants to the industry as a whole and even to other related industries, try to locate cases of large-scale lay-offs and shutdowns involving direct and indirect displacement of labor, and eventually

follow up these displaced workers with some kind of a sampling study; concurrently with the last mentioned should go a thorough examination into the facilities available to the worker for transfer, placement, retraining, etc., and, in closing, the project might well concern itself with the problem of setting up machinery within industry to meet future cases.

Such a study would necessarily involve an enormous expenditure of time and money; it would require the hearty cooperation of industry, of labor organizations, of Government bureaus, and of research agencies. It should be fundamentally a research project, and yet it would have to relate its own findings to practical ends. Unless it is to be given a sufficiently comprehensive scope, such a project had better not be undertaken, and this subcommittee had better content itself with the more modest program of improving the quality of existing studies in this field and of encouraging further research by interested agencies.



## LIST OF BULLETINS OF THE BUREAU OF LABOR STATISTICS

*The following is a list of all bulletins of the Bureau of Labor Statistics published since July, 1912, except that in the case of bulletins giving the results of periodic surveys of the bureau only the latest bulletin on any one subject is here listed.*

*A complete list of the reports and bulletins issued prior to July, 1912, as well as the bulletins published since that date, will be furnished on application. Bulletins marked thus (\*) are out of print.*

### **Conciliation and arbitration (including strikes and lockouts).**

- \*No. 124. Conciliation and arbitration in the building trades of Greater New York. [1913.]
- \*No. 133. Report of the industrial council of the British Board of Trade on its inquiry into industrial agreements. [1913.]
- No. 139. Michigan copper district strike. [1914.]
- \*No. 144. Industrial court of the cloak, suit, and skirt industry of New York City. [1914.]
- \*No. 145. Conciliation, arbitration, and sanitation in the dress and waist industry of New York City. [1914.]
- \*No. 191. Collective bargaining in the anthracite-coal industry. [1916.]
- \*No. 198. Collective agreements in the men's clothing industry. [1916.]
- No. 233. Operation of the industrial disputes investigation act of Canada. [1918.]
- No. 255. Joint industrial councils in Great Britain. [1919.]
- No. 283. History of the Shipbuilding Labor Adjustment Board, 1917 to 1919.
- No. 287. National War Labor Board: History of its formation, activities, etc. [1921.]
- \*No. 303. Use of Federal power in settlement of railway labor disputes. [1922.]
- No. 341. Trade agreement in the silk-ribbon industry of New York City. [1923.]
- No. 402. Collective bargaining by actors. [1926.]
- No. 468. Trade agreements, 1927.
- No. 481. Joint industrial control in the book and job printing industry. [1928.]

### **Cooperation.**

- No. 313. Consumers' cooperative societies in the United States in 1920.
- No. 314. Cooperative credit societies (credit unions) in America and in foreign countries. [1922.]
- No. 437. Cooperative movement in the United States in 1925 (other than agricultural).
- No. 531. Consumers', credit, and workers' productive cooperative societies, 1929.

### **Employment and unemployment.**

- \*No. 109. Statistics of unemployment and the work of employment offices in the United States. [1913.]
- \*No. 172. Unemployment in New York City, N. Y. [1915.]
- \*No. 183. Regularity of employment in the women's ready-to-wear garment industries. [1915.]
- \*No. 195. Unemployment in the United States. [1916.]
- \*No. 196. Proceedings of Employment Managers' Conference held at Minneapolis, Minn., January 19 and 20, 1916.
- \*No. 202. Proceedings of the conference of Employment Managers' Association of Boston, Mass., held May 10, 1916.
- \*No. 206. The British system of labor exchanges. [1916.]
- \*No. 227. Proceedings of the Employment Managers' Conference, Philadelphia, Pa., April 2 and 3, 1917.
- \*No. 235. Employment system of the Lake Carriers' Association. [1918.]
- \*No. 241. Public employment offices in the United States. [1918.]
- \*No. 247. Proceedings of Employment Managers' Conference, Rochester, N. Y., May 9-11, 1918.
- \*No. 310. Industrial unemployment: A statistical study of its extent and causes. [1922.]
- No. 409. Unemployment in Columbus, Ohio, 1921 to 1925.
- No. 520. Social and economic character of unemployment in Philadelphia, April, 1929.

**Foreign labor laws.**

- \*No. 142. Administration of labor laws and factory inspection in certain European countries. [1914.]
- No. 494. Labor legislation of Uruguay. [1929.]
- No. 510. Labor legislation of Argentina. [1930.]
- No. 529. Workmen's compensation legislation of Latin American countries. [1930.]

**Housing.**

- \*No. 158. Government aid to home owning and housing of working people in foreign countries. [1914.]
- No. 263. Housing by employers in the United States. [1920.]
- No. 295. Building operations in representative cities in 1920.
- No. 524. Building permits in the principal cities of the United States in [1921 to] 1929.

**Industrial accidents and hygiene.**

- \*No. 104. Lead poisoning in potteries, tile works, and porcelain enameled sanitary ware factories. [1912.]
- No. 120. Hygiene of painters' trade. [1913.]
- \*No. 127. Danger to workers from dusts and fumes, and methods of protection. [1913.]
- \*No. 141. Lead poisoning in the smelting and refining of lead. [1914.]
- \*No. 157. Industrial accident statistics. [1915.]
- \*No. 165. Lead poisoning in the manufacture of storage batteries. [1914.]
- \*No. 179. Industrial poisons used in the rubber industry. [1915.]
- No. 188. Report of British departmental committee on the danger in the use of lead in the painting of buildings. [1916.]
- \*No. 201. Report of the committee on statistics and compensation insurance costs of the International Association of Industrial Accident Boards and Commissions. [1916.]
- \*No. 209. Hygiene of the printing trades. [1917.]
- \*No. 219. Industrial poisons used or produced in the manufacture of explosives. [1917.]
- No. 221. Hours, fatigue, and health in British munition factories. [1917.]
- No. 230. Industrial efficiency and fatigue in British munition factories. [1917.]
- \*No. 231. Mortality from respiratory diseases in dusty trades (inorganic dusts). [1918.]
- \*No. 234. The safety movement in the iron and steel industry, 1907 to 1917.
- No. 236. Effects of the air hammer on the hands of stonemasons. [1918.]
- No. 249. Industrial health and efficiency. Final report of British Health of Munitions Workers' Committee. [1919.]
- \*No. 251. Preventable death in the cotton-manufacturing industry. [1919.]
- No. 256. Accidents and accident prevention in machine building. [1919.]
- No. 267. Anthrax as an occupational disease. [1920.]
- No. 276. Standardization of industrial accident statistics. [1920.]
- \*No. 280. Industrial poisoning in making coal-tar dyes and dye intermediates. [1921.]
- \*No. 291. Carbon monoxide poisoning. [1921.]
- No. 293. The problem of dust phthisis in the granite-stone industry. [1922.]
- No. 298. Causes and prevention of accidents in the iron and steel industry, 1910-1919.
- No. 306. Occupation hazards and diagnostic signs: A guide to impairments to be looked for in hazardous occupations. [1922.]
- No. 392. Survey of hygienic conditions in the printing trades. [1925.]
- No. 405. Phosphorus necrosis in the manufacture of fireworks and in the preparation of phosphorus. [1926.]
- No. 427. Health survey of the printing trades, 1922 to 1925.
- No. 428. Proceedings of the Industrial Accident Prevention Conference, held at Washington, D. C., July 14-16, 1926.
- No. 460. A new test for industrial lead poisoning. [1928.]
- No. 466. Settlement for accidents to American seamen. [1928.]
- No. 488. Deaths from lead poisoning, 1925-1927.
- No. 490. Statistics of industrial accidents in the United States to the end of 1927.
- No. 507. Causes of death, by occupation. [1929.]

**Industrial relations and labor conditions.**

- No. 237. Industrial unrest in Great Britain. [1917.]
- No. 340. Chinese migrations, with special reference to labor conditions. [1923.]

**Industrial relations and labor conditions—Continued.**

- No. 349. Industrial relations in the West Coast lumber industry. [1923.]  
No. 361. Labor relations in the Fairmont (W. Va.) bituminous-coal field. [1924.]  
No. 380. Postwar labor conditions in Germany. [1925.]  
No. 383. Works council movement in Germany. [1925.]  
No. 384. Labor conditions in the shoe industry in Massachusetts, 1920-1924.  
No. 399. Labor relations in the lace and lace-curtain industries in the United States. [1925.]  
No. 534. Labor conditions in the Territory of Hawaii, 1929-1930.

**Labor laws of the United States (including decisions of courts relating to labor).**

- No. 211. Labor laws and their administration in the Pacific States. [1917.]  
No. 229. Wage payment legislation in the United States. [1917.]  
No. 285. Minimum wage laws of the United States: Construction and operation. [1921.]  
No. 321. Labor laws that have been declared unconstitutional. [1922.]  
No. 322. Kansas Court of Industrial Relations. [1923.]  
No. 343. Laws providing for bureaus of labor statistics, etc. [1923.]  
No. 370. Labor laws of the United States, with decisions of courts relating thereto. [1925.]  
No. 408. Laws relating to payment of wages. [1926.]  
No. 517. Decisions of courts and opinions affecting labor, 1927-1928.  
No. 528. Labor legislation. 1929.

**Proceedings of annual conventions of the Association of Governmental Officials in Industry of the United States and Canada. (Name changed in 1928 from Association of Governmental Labor Officials of the United States and Canada.)**

- \*No. 266. Seventh, Sattle, Wash., July 12-15, 1920.  
\*No. 307. Eighth, New Orleans, La., May 2-6, 1921.  
\*No. 323. Ninth, Harrisburg, Pa., May 22-26, 1922.  
\*No. 352. Tenth, Richmond, Va., May 1-4, 1923.  
\*No. 389. Eleventh, Chicago, Ill., May 19-23, 1924.  
\*No. 411. Twelfth, Salt Lake City, Utah, August 13-15, 1925.  
\*No. 429. Thirteenth, Columbus, Ohio, June 7-10, 1926.  
\*No. 455. Fourteenth, Paterson, N. J., May 31 to June 3, 1927.  
\*No. 480. Fifteenth, New Orleans, La., May 21-24, 1928.  
No. 508. Sixteenth, Toronto, Canada, June 4-7, 1929.  
No. 530. Seventeenth, Louisville, Ky., May 20-23, 1930.

**Proceedings of annual meetings of the International Association of Industrial Accident Boards and Commissions.**

- No. 210. Third, Columbus, Ohio, April 25-28, 1916.  
No. 248. Fourth, Boston, Mass., August 21-25, 1917.  
No. 264. Fifth, Madison, Wis., September 24-27, 1918.  
\*No. 273. Sixth, Toronto, Canada, September 23-26, 1919.  
No. 281. Seventh, San Francisco, Calif., September 20-24, 1920.  
No. 304. Eighth, Chicago, Ill., September 19-23, 1921.  
No. 333. Ninth, Baltimore, Md., October 9-13, 1922.  
\*No. 359. Tenth, St. Paul, Minn., September 24-26, 1923.  
No. 385. Eleventh, Halifax, Nova Scotia, August 26-28, 1924.  
No. 395. Index to proceedings, 1914-1924.  
No. 406. Twelfth, Salt Lake City, Utah, August 17-20, 1925.  
No. 432. Thirteenth, Hartford, Conn., September 14-17, 1926.  
\*No. 456. Fourteenth, Atlanta, Ga., September 27-29, 1927.  
No. 485. Fifteenth, Paterson, N. J., September 11-14, 1928.  
No. 511. Sixteenth, Buffalo, N. Y., October 8-11, 1929.  
No. 536. Seventeenth, Wilmington, Del., September 22-26, 1930. (In press.)

**Proceedings of annual meetings of the International Association of Public Employment Services.**

- No. 192. First, Chicago, December 19 and 20, 1913; second, Indianapolis, September 24 and 25, 1914; third, Detroit, July 1 and 2, 1915.  
\*No. 220. Fourth, Buffalo, N. Y., July 20 and 21, 1916.  
No. 311. Ninth, Buffalo, N. Y., September 7-9, 1921.  
No. 337. Tenth, Washington, D. C., September 11-13, 1922.  
No. 355. Eleventh, Toronto, Canada, September 4-7, 1923.  
No. 400. Twelfth, Chicago, Ill., May 19-23, 1924.  
No. 414. Thirteenth, Rochester, N. Y., September 15-17, 1925.  
No. 478. Fifteenth, Detroit, Mich., October 25-28, 1927.

**Proceedings of annual meetings of the International Association of Public Employment Services—Continued.**

No. 501. Sixteenth, Cleveland, Ohio, September 18–21, 1928.

No. 538. Seventeenth, Philadelphia, September 24–27, 1929, and eighteenth, Toronto, Canada, September 9–12, 1930. (In press.)

**Productivity of labor.**

No. 326. Productivity costs in the common-brick industry. [1924.]

No. 360. Time and labor costs in manufacturing 100 pairs of shoes, 1923.

No. 407. Labor cost of production and wages and hours of labor in the paper box-board industry. [1926.]

\*No. 412. Wages, hours, and productivity in the pottery industry, 1925.

No. 441. Productivity of labor in the glass industry. [1927.]

No. 474. Productivity of labor in merchant blast furnaces. [1928.]

No. 475. Productivity of labor in newspaper printing. [1929.]

**Retail prices and cost of living.**

\*No. 121. Sugar prices, from refiner to consumer. [1913.]

\*No. 130. Wheat and flour prices, from farmer to consumer. [1913.]

\*No. 164. Butter prices, from producer to consumer. [1914.]

No. 170. Foreign food prices as affected by the war. [1915.]

No. 357. Cost of living in the United States. [1924.]

No. 369. The use of cost-of-living figures in wage adjustments. [1925.]

No. 495. Retail prices, 1890 to 1928.

**Safety codes.**

\*No. 331. Code of lighting: Factories, mills, and other work places.

No. 336. Safety code for the protection of industrial workers in foundries.

No. 350. Rules for governing the approval of headlighting devices for motor vehicles.

\*No. 351. Safety code for the construction, care, and use of ladders.

No. 375. Safety code for laundry machinery and operations.

No. 382. Code of lighting school buildings.

No. 410. Safety code for paper and pulp mills.

\*No. 430. Safety code for power presses and foot and hand presses.

No. 433. Safety codes for the prevention of dust explosions.

No. 447. Safety code for rubber mills and calenders.

No. 451. Safety code for forging and hot-metal stamping.

No. 463. Safety code for mechanical power-transmission apparatus—first revision.

No. 509. Textile safety code.

No. 512. Code for identification of gas-mask canisters.

No. 519. Safety code for woodworking plants, as revised, 1930.

No. 527. Safety code for the use, care, and protection of abrasive wheels.

**Vocational and workers' education.**

\*No. 159. Short-unit courses for wage earners, and a factory school experiment. [1915.]

\*No. 162. Vocational education survey of Richmond, Va. [1915.]

\*No. 199. Vocational education survey of Minneapolis, Minn. [1917.]

No. 271. Adult working-class education in Great Britain and the United States. [1920.]

No. 459. Apprenticeship in building construction. [1928.]

**Wages and hours of labor.**

\*No. 146. Wages and regularity of employment and standardization of piece rates in the dress and waist industry of New York City. [1914.]

\*No. 147. Wages and regularity of employment in the cloak, suit, and skirt industry. [1914.]

No. 161. Wages and hours of labor in the clothing and cigar industries, 1911 to 1913.

No. 163. Wages and hours of labor in the building and repairing of steam railroad cars, 1907 to 1913.

\*No. 190. Wages and hours of labor in the cotton, woolen, and silk industries, 1907 to 1914.

No. 204. Street-railway employment in the United States. [1917.]

No. 218. Wages and hours of labor in the iron and steel industry, 1907 to 1915: With a glossary of occupations.

No. 225. Wages and hours of labor in the lumber, millwork, and furniture industries, 1915.



### **Wages and hours of labor—Continued.**

- No. 285. Industrial survey in selected industries in the United States, 1919.
- No. 297. Wages and hours of labor in the petroleum industry, 1920.
- No. 356. Productivity costs in the common-brick industry. [1924.]
- No. 358. Wages and hours of labor in the automobile-tire industry, 1923.
- No. 360. Time and labor costs in manufacturing 100 pairs of shoes, 1923.
- No. 365. Wages and hours of labor in the paper and pulp industry, 1923.
- No. 394. Wages and hours of labor in metalliferous mines, 1924.
- No. 407. Labor cost of production and wages and hours of labor in the paper box-board industry. [1926.]
- \*No. 412. Wages, hours, and productivity in the pottery industry, 1925.
- No. 416. Hours and earnings in anthracite and bituminous coal mining, 1922 and 1924.
- No. 476. Union scales of wages and hours of labor: Supplement to Bulletin 457.
- No. 484. Wages and hours of labor of common street laborers, 1928.
- No. 497. Wages and hours of labor in the lumber industry in the United States, 1928.
- No. 498. Wages and hours of labor in the boot and shoe industry, 1910 to 1928.
- No. 499. History of wages in the United States from colonial times to 1928.
- No. 502. Wages and hours of labor in the motor-vehicle industry, 1928.
- No. 503. Wages and hours of labor in the men's clothing industry, 1911 to 1928.
- No. 504. Wages and hours of labor in the hosiery and underwear industries, 1907 to 1928.
- No. 513. Wages and hours of labor in the iron and steel industry, 1929.
- No. 514. Pennsylvania Railroad wage data. From report of Joint Fact Finding Committee in wage negotiations in 1927.
- No. 516. Hours and earnings in bituminous coal mining, 1929.
- No. 522. Wages and hours of labor in foundries and machine shops, 1929.
- No. 523. Hours and earnings in the manufacture of airplanes and aircraft engines, 1929.
- No. 525. Wages and hours of labor in the Portland cement industry, 1929.
- No. 526. Wages and hours of labor in the furniture industry, 1910 to 1929.
- No. 532. Wages and hours of labor in the cigarette manufacturing industry, 1930.
- No. 533. Wages and hours of labor in woolen and worsted goods manufacturing, 1910 to 1930.
- No. 534. Labor conditions in the Territory of Hawaii, 1929-1930.
- No. 535. Wages and hours of labor in the slaughtering and meat-packing industry, 1929. (In press.)
- No. 537. Wages and hours of labor in the dyeing and finishing of textiles, 1930. (In press.)
- No. 539. Wages and hours of labor in cotton-goods manufacturing, 1910 to 1930. (In press.)
- No. 540. Union scales of wages and hours of labor, May 15, 1930. (In press.)

### **Welfare work.**

- \*No. 123. Employers' welfare work. [1913.]
- No. 222. Welfare work in British munitions factories. [1917.]
- \*No. 250. Welfare work for employees in industrial establishments in the United States. [1919.]
- No. 458. Health and recreation activities in industrial establishments, 1926.

### **Wholesale prices.**

- \*No. 284. Index numbers of wholesale prices in the United States and foreign countries. [1921.]
- No. 453. Revised index numbers of wholesale prices, 1923 to July, 1927.
- No. 521. Wholesale prices, 1929.

### **Women and children in industry.**

- No. 116. Hours, earnings, and duration of employment of wage-earning women in selected industries in the District of Columbia. [1918.]
- \*No. 117. Prohibition of night work of young persons. [1913.]
- \*No. 118. Ten-hour maximum working-day for women and young persons. [1913.]
- No. 119. Working hours of women in the pea canneries of Wisconsin. [1913.]
- \*No. 122. Employment of women in power laundries in Milwaukee. [1913.]
- \*No. 160. Hours, earnings, and conditions of labor of women in Indiana mercantile establishments and garment factories. [1914.]
- \*No. 167. Minimum-wage legislation in the United States and foreign countries. [1915.]
- \*No. 175. Summary of the report on condition of woman and child wage earners in the United States. [1915.]

**Women and children in industry—Continued.**

- \*No. 176. Effect of minimum-wage determinations in Oregon. [1915.]
- \*No. 180. The boot and shoe industry in Massachusetts as a vocation for women. [1915.]
- \*No. 182. Unemployment among women in department and other retail stores of Boston, Mass. [1916.]
- No. 193. Dressmaking as a trade for women in Massachusetts. [1916.]
- No. 215. Industrial experience of trade-school girls in Massachusetts. [1917.]
- \*No. 217. Effect of workmen's compensation laws in diminishing the necessity of industrial employment of women and children. [1918.]
- \*No. 223. Employment of women and juveniles in Great Britain during the war. [1917.]
- No. 253. Women in the lead industries. [1919.]
- No. 467. Minimum wage legislation in various countries. [1928.]

**Workmen's insurance and compensation (including laws relating thereto).**

- \*No. 101. Care of tuberculous wage earners in Germany. [1912.]
- \*No. 102. British national insurance act, 1911.
- No. 103. Sickness and accident insurance law in Switzerland. [1912.]
- No. 107. Law relating to insurance of salaried employees in Germany. [1913.]
- \*No. 155. Compensation for accidents to employees of the United States. [1914.]
- \*No. 212. Proceedings of the conference on social insurance called by the International Association of Industrial Accident Boards and Commissions, Washington, D. C., December 5-9, 1916.
- \*No. 243. Workmen's compensation legislation in the United States and foreign countries, 1917 and 1918.
- No. 301. Comparison of workmen's compensation insurance and administration. [1922.]
- No. 312. National health insurance in Great Britain, 1911 to 1921.
- No. 379. Comparison of workmen's compensation laws of the United States as of January 1, 1925.
- No. 477. Public-service retirement systems, United States and Europe. [1929.]
- No. 496. Workmen's compensation legislation of the United States and Canada as of January 1, 1929. (With text of legislation enacted in 1927 and 1928.)
- No. 529. Workmen's compensation legislation of the Latin American countries. [1930.]

**Miscellaneous series.**

- \*No. 174. Subject index of the publications of the United States Bureau of Labor Statistics up to May 1, 1915.
- No. 208. Profit sharing in the United States. [1916.]
- No. 242. Food situation in central Europe, 1917.
- No. 254. International labor legislation and the society of nations. [1919.]
- No. 268. Historical survey of international action affecting labor. [1920.]
- No. 282. Mutual relief associations among Government employees in Washington, D. C. [1921.]
- No. 319. The Bureau of Labor Statistics: Its history, activities, and organization. [1922.]
- No. 326. Methods of procuring and computing statistical information of the Bureau of Labor Statistics. [1923.]
- No. 342. International Seamen's Union of America: A study of its history and problems. [1923.]
- No. 346. Humanity in government. [1923.]
- No. 372. Convict labor in 1923.
- No. 386. Cost of American almshouses. [1925.]
- No. 398. Growth of legal-aid work in the United States. [1926.]
- No. 401. Family allowances in foreign countries. [1926.]
- No. 461. Labor organizations in Chile. [1928.]
- No. 462. Park recreation areas in the United States. [1928.]
- \*No. 465. Beneficial activities of American trade-unions. [1928.]
- No. 479. Activities and functions of a State department of labor. [1928.]
- No. 483. Conditions in the shoe industry in Haverhill, Mass., 1928.
- No. 489. Care of aged persons in the United States. [1929.]
- No. 505. Directory of homes for the aged in the United States. [1929.]
- No. 506. Handbook of American trade-unions: 1929 edition.
- No. 518. Personnel research agencies: 1930 edition.
- No. 541. Handbook of labor statistics: 1931 edition. (In press.)