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UNITED STATES DEPARTMENT OF LABOR

BULLETIN OF THE WOMEN'S BUREAU, NO. 81

**INDUSTRIAL ACCIDENTS  
TO MEN AND WOMEN**

[PUBLIC—No. 259—66TH CONGRESS]

[H. R. 13229]

An Act To establish in the Department of Labor a bureau to be known as the Women's Bureau

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established in the Department of Labor a bureau to be known as the Women's Bureau.*

SEC. 2. That the said bureau shall be in charge of a director, a woman, to be appointed by the President, by and with the advice and consent of the Senate, who shall receive an annual compensation of \$5,000. It shall be the duty of said bureau to formulate standards and policies which shall promote the welfare of wage-earning women, improve their working conditions, increase their efficiency, and advance their opportunities for profitable employment. The said bureau shall have authority to investigate and report to the said department upon all matters pertaining to the welfare of women in industry. The director of said bureau may from time to time publish the results of these investigations in such a manner and to such extent as the Secretary of Labor may prescribe.

SEC. 3. That there shall be in said bureau an assistant director, to be appointed by the Secretary of Labor, who shall receive an annual compensation of \$3,500 and shall perform such duties as shall be prescribed by the director and approved by the Secretary of Labor.

SEC. 4. That there is hereby authorized to be employed by said bureau a chief clerk and such special agents, assistants, clerks, and other employees at such rates of compensation and in such numbers as Congress may from time to time provide by appropriations.

SEC. 5. That the Secretary of Labor is hereby directed to furnish sufficient quarters, office furniture, and equipment for the work of this bureau.

SEC. 6. That this act shall take effect and be in force from and after its passage.

Approved, June 5, 1920.

**U. S. DEPARTMENT OF LABOR**

JAMES J. DAVIS, SECRETARY

**WOMEN'S BUREAU**

MARY ANDERSON, Director

BULLETIN OF THE WOMEN'S BUREAU, NO. 81

**INDUSTRIAL ACCIDENTS  
TO MEN AND WOMEN**

By EMILY C. BROWN



UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1930

For sale by the Superintendent of Documents, Washington, D. C. - - - Price 15 cents

U. S. DEPARTMENT OF LABOR

JAMES L. DAVIS, SECRETARY  
WOMEN'S BUREAU  
FRANK J. WATSON, CHIEF

BULLETIN OF THE WOMEN'S BUREAU, NO. 21

# INDUSTRIAL ACCIDENTS TO MEN AND WOMEN

By EARLY C. BROWN



UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON, D. C.

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## LETTER OF TRANSMITTAL

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UNITED STATES DEPARTMENT OF LABOR,  
WOMEN'S BUREAU,  
*Washington, June 26, 1930.*

SIR: I have the honor to submit the first of a series of reports by this bureau on the subject of industrial accidents to men and women, undertaken to learn what accident data reported by sex are available in State publications and to call attention to the slightness of such material and the seriousness of its not being reported more fully. The study was made by Emily C. Brown while associate industrial economist in this bureau.

Only 21 States at any time during the period 1920 to 1927 published accident data for men and women separately. The States reporting in any one year ranged only from 10 to 14 in number. Some made only one such report and others published figures for each of the eight years.

Besides being fragmentary, the data made public are strikingly noncomparable, so that a contrasting of conditions in various States and industries, something highly desirable in the interests of accident prevention, is far from satisfactory. As a basis for such prevention, complete and comparable data, classified by sex, age, industry and occupation, cause, nature and location of injury, and extent of disability, would appear to be the minimum requirements.

In view of the fact that every year many thousands of women suffer industrial accidents—New York State alone reported about 7,400 compensated cases in the fiscal year 1927, to say nothing of the large number not compensable because the time loss did not exceed a week—information concerning them should not be a matter of indifference.

Grateful acknowledgment is made of the cooperation extended by the various State officials and of the courtesy of the United States Bureau of Labor Statistics, of Mr. Walter O. Stack, and of Dr. Leonard W. Hatch in reading the completed report.

Respectfully submitted.

MARY ANDERSON, *Director.*

HON. JAMES J. DAVIS,  
*Secretary of Labor.*

▼

# INDUSTRIAL ACCIDENTS TO MEN AND WOMEN

## PART I

### INTRODUCTION

Industrial accidents in the United States levy an appalling toll on wage earners and industry every year. There can be no doubt as to the serious character of this problem; with our present knowledge this toll can only be approximated, since exact and complete statistics are lacking. When it is possible to estimate that each year there are from 15,000 to 25,000 fatal industrial accidents, more than 100,000 accidents causing permanent disability, and at least 2,500,000 causing temporary disability of one day or more, with a total loss of working time of perhaps 250,000,000 days in a year,<sup>1</sup> a suggestion is had of the cost of accidents in terms of human suffering and of the loss to individuals and to industry.

Accident prevention is the end toward which all study of accidents leads. Alleviation of the effects of injury through workmen's compensation also needs a basis of statistical knowledge for effective administration of the laws, but to prevent an accident is infinitely better than to compensate after the injury has occurred. Knowledge about accidents sufficient to help forward the work of accident prevention is, therefore, the principal object of a study of accidents occurring in industry.

Data on industrial accidents—accurate, comparable, and carefully compiled and analyzed—are the principal need of the accident-prevention program. Facts regarding the number of accidents, the sex and age of the workers injured, the industries and occupations in which accidents occur, and the cause, nature, and cost of each accident are vitally needed. Such facts are available here and there, and of late to a slightly increasing extent, but the incompleteness of the data is almost more conspicuous than are those parts of the field that are adequately covered.

The Women's Bureau is charged with definite duties in regard to the work problems of women, and as the matter of accidents to employed women is one of great importance, this inquiry was undertaken to ascertain what data were available on accidents to men and women separately.

It became apparent that much the greater proportion of the accident statistics obtainable were not analyzed by sex. As the bureau believes,

<sup>1</sup> Woodbury, Robert Morse. *Workers' Health and Safety: A statistical program*, pp. 6-7. Macmillan Co., New York, 1927.

The magnitude of the figure for days lost is due to the fatal and the permanent-disability cases, which, according to the standards worked out by the committee on statistics and compensation insurance cost of the International Association of Industrial Accident Boards and Commissions, are responsible for about 85 per cent of the loss of working time as here estimated.

however, that many pertinent facts that can contribute to the understanding needed for accident prevention may emerge from a comparative study of industrial accidents to men and women, such data as are available in published form in a recent year have been assembled and analyzed for the purpose of learning the extent of present knowledge concerning industrial accidents to men and women and ascertaining what light such facts may throw on the incidence, character, cause, and means of prevention of accidents and on fruitful questions for further study.

It seems to the bureau that the publication in one volume of information on the accident experience of employed women in comparison with that of employed men in one year is of importance to the women themselves, to employers, to officials of State departments of labor, and to the public. It ventures the hope that such a publication is a contribution in the field of accident statistics.

### Sources.

The sources of information on industrial accidents by sex are the reports issued by the various States, in most cases by the agency that administers the workmen's compensation act—the industrial commission, the industrial accident board, or whatever it may be called.

Chart I lists the States that have published any accident data classified by sex in the eight years 1920 to 1927 and shows how incomplete and inadequately analyzed is the material.

CHART I.—Extent of the information on accidents to women published in the period 1920 to 1927 by the 21 States that reported the sex of injured persons

2744°—30—2

Type of information about women <sup>1</sup>	Number of States publishing <sup>2</sup>	State	Period covered by published reports	Source
Number injured	21	Alabama	1920 to 1922	First quadrennial report of Workmen's Compensation Commission, 1919-1922.
		California	1920 to 1921	Annual reports of Industrial Accident Commission, July 1, 1920, to June 30, 1921, and July 1, 1921, to June 30, 1922.
		Colorado	1919-20 to 1926-27	Reports of Industrial Commission: Fourth, Dec. 1, 1919, to Nov. 30, 1920, to tenth, Dec. 1, 1926, to Nov. 30, 1928.
		Georgia	1927-28	Seventh and eighth annual reports of Industrial Commission, Jan. 1, 1927, to Dec. 31, 1928.
		Idaho	1919-20 to 1921-22; 1922-1924 to 1926-1928	Biennial reports of Industrial Accident Board: Second, Oct. 31, 1918, to Nov. 1, 1920, to sixth, Nov. 1, 1926, to Oct. 31, 1928.
		Illinois	1920 to 1927	Annual report of Industrial Commission, year ended June 30, 1921; annual reports of Department of Labor: Fifth, July 1, 1921, to June 30, 1922, to eleventh, July 1, 1927, to June 30, 1928; and Labor Bulletin of Department of Labor, June, 1928.
		Indiana	1919-20 to 1926-27	Annual reports of Industrial Board, years ended Sept. 30, 1920 to 1927.
		Iowa	1925-26	Biennial report of Bureau of Labor Statistics, period ended June 30, 1926.
		Kentucky	1919-20 to 1926-27	Annual reports of Workmen's Compensation Board, years ended June 30, 1920 to 1927.
		Maryland	1919-20 to 1926-27 (1922, 1923, and 1924, incomplete periods)	Annual reports of State Industrial Accident Commission: Sixth, Nov. 1, 1919, to Oct. 31, 1920, to thirteenth, Nov. 1, 1926, to Oct. 31, 1927.
		Massachusetts	1919-20 to 1926-27	Annual reports of Department of Industrial Accidents, years ended June 30, 1920 to 1927.
		Minnesota	1919-20 to 1923-24	Seventeenth biennial report of Department of Labor and Industries, 1919-1920; Biennial reports of Industrial Commission: First, 1921-1922, and second, 1923-1924.
		Missouri	1927 (period incomplete)	First annual report of Workmen's Compensation Commission, Jan. 9, 1927, to Dec. 31, 1927.
		Nebraska	1927	Biennial report of Department of Labor for period ended Dec. 31, 1927.
		New Jersey	1927	Industrial Bulletin of Department of Labor, vol. 2, No. 9, September, 1928.
		New York	1919-20 to 1926-27	Special bulletins of Department of Labor: No. 126, September, 1924, Analysis of workmen's compensation cases closed July 1, 1922, to June 30, 1923; No. 142, March, 1926, Compensation awards year ended June 30, 1924; and compensated accidents, July, 1914, to June, 1922; No. 144, June, 1926, Some recent figures on accidents to women and minors; No. 146, July, 1926, Accidents compensated in year ended June 30, 1925, Cost of compensation; No. 148, January, 1927, Compensation statistics year ended June 30, 1926; No. 157, August, 1928, Compensation statistics year ended June 30, 1927; and Industrial Bulletin of Department of Labor, vol. 6, No. 7, April, 1927; vol. 7, No. 7, April, 1928; and vol. 7, No. 9, June, 1928.
		Pennsylvania	1920, 1921, 1924	Report of Bureau of Workmen's Compensation, 1920; Special bulletin of Department of Labor and Industry, No. 17, 1926, An analysis of compensated accidents to minors for the year 1924; Labor and Industry, Monthly bulletin of Department of Labor and Industry, November, 1922, December, 1926.

<sup>1</sup> Type of accidents tabulated varies in different States and in some States from year to year. See Table 1.

<sup>2</sup> Does not include Kansas. See F, in note following.

CHART I.—Extent of the information on accidents to women published in the period 1920 to 1927 by the 21 States that reported the sex of injured persons—Continued

Type of information about women	Number of States publishing	State	Period covered by published reports	Source
Number injured—Con.	9	Rhode Island.....	1926-27.....	Report of Commissioner of Labor for the year 1927. Eighth annual report of Bureau of Workshop and Factory Inspection, Jan. 1 to Dec. 31, 1920. Annual reports of Industrial Commission: Second, 1920, and third, 1921; Biennial reports of Industrial Commission, 1922-1923 and 1924-1925. Wisconsin Labor Statistics, Vol. II, Nos. 1 and 2, January-February, 1924; Vol. III, Nos. 1 and 2, January-February, 1925; Vol. IV, Nos. 4 and 5, April-May, 1926.
		Tennessee.....	1919-20.....	
		Virginia.....	1919-20 and 1920-21; 1921-1923 and 1923-1925. (Figures for 1920-21 include nonfatal cases only; 1921-1923 and 1923-1925, temporary total disabilities only.)	
		Wisconsin.....	1923 to 1927 (1923, 1924, 1925 cover injuries by machinery only).	
Age.....	11	Alabama.....	1920 to 1922.....	Same as for number injured. Do. Annual report of Industrial Commission, year ended June 30, 1921; Annual reports of Department of Labor: Fifth, July 1, 1921, to June 30, 1922, to eleventh, July 1, 1927, to June 30, 1928. Annual reports of Industrial Board, years ended Sept. 30, 1920, 1921, 1926, and 1927. Annual reports of State Industrial Accident Commission: Ninth, Nov. 1, 1922, to Oct. 31, 1923, to thirteenth, Nov. 1, 1926, to Oct. 31, 1927. Same as for number injured. Do. Do. Special bulletins of Department of Labor: No. 126, September, 1924, Analysis of workmen's compensation cases closed July 1, 1922, to June 30, 1923; No. 142, March, 1926, Compensation awards year ended June 30, 1924; Compensated accidents, July, 1914, to June, 1922; No. 144, June, 1926, Some recent figures on accidents to women and minors; No. 146, July, 1926, Accidents compensated in year ended June 30, 1925, Cost of compensation; No. 148, January, 1927, Compensation statistics year ended June 30, 1926; No. 157, August, 1928, Compensation statistics year ended June 30, 1927; and Industrial Bulletin of Department of Labor, vol. 6, No. 7, April, 1927, and vol. 7, No. 9, June, 1928. Special bulletin of Department of Labor and Industry, No. 17, 1926, An analysis of compensated accidents to minors for the year 1924. Same as for number injured.
		Georgia.....	1927-28.....	
		Illinois.....	1920 to 1927.....	
		Indiana.....	1919-20 to 1920-21; 1925-26 to 1926-27.....	
		Maryland.....	1924-25 to 1926-27 and incomplete reports for 1923 and 1924	
		Massachusetts.....	1919-20 to 1926-27.....	
		Minnesota.....	1919-20 to 1923-24.....	
		New Jersey.....	1927.....	
		New York.....	1919-20 to 1926-27.....	
		Pennsylvania.....	1924.....	
		Rhode Island.....	1926-27.....	
Extent of disability.....	11	Alabama.....	1920 to 1922.....	Do.
		Idaho.....	1919-20 to 1921-22; 1922-1924 to 1926-1928.	Do.

	Illinois.....	1920 to 1927 (1926 fatal and permanent cases only).	Annual report of Industrial Commission, year ended June 30, 1921; annual reports of Department of Labor: Fifth, July 1, 1921, to June 30, 1922, to ninth, July 1, 1925, to June 30, 1926; Eleventh, July 1, 1927, to June 30, 1928; and Labor Bulletin of Department of Labor, June, 1928.
	Iowa.....	1925-26. (Report shows number of accidents to women and number of fatal cases.)	Same as for number injured.
	Maryland.....	1924-25 and incomplete reports for 1923 and 1924.	Do.
	Massachusetts ..	1919-20 to 1926-27 .....	Do.
	Minnesota.....	1919-20 .....	Seventeenth biennial report of Department of Labor and Industries, 1919-1920.
	New Jersey.....	1927. (Fatal and permanent total disabilities only.)	Same as for number injured.
	New York.....	1919-20 to 1926-27 .....	Special bulletins of Department of Labor: No. 126, September, 1924, Analysis of workmen's compensation cases closed July 1, 1922, to June 30, 1923; No. 142, March, 1926, Compensation awards year ended June 30, 1924; Compensated accidents, July, 1914, to June, 1922; No. 146, July, 1926, Accidents compensated in year ended June 30, 1925, Cost of compensation; No. 148, January, 1927, Compensation statistics year ended June 30, 1926; No. 157, August, 1928, Compensation statistics year ended June 30, 1927; and Industrial Bulletin of Department of Labor, vol. 6, No. 7, April, 1927, and vol. 7, No. 9, June, 1928.
	Pennsylvania...	1920 to 1921 .....	Report of Bureau of Workmen's Compensation, 1920; Labor and Industry, November, 1922.
	Virginia.....	1919-20 and 1920-21; 1921-1923 and 1923-1925. (Figures for 1919-20 include fatal and temporary cases; 1920-21, nonfatal cases only; 1921-1923 and 1923-1925, temporary total disabilities only.)	Same as for number injured.
Cause.....	5 Indiana.....	1919-20 to 1920-21; 1925-26 to 1926-27 ..	Same as for age.
	Iowa.....	1925-26 .....	Same as for number injured.
	New Jersey.....	1927 .....	Do.
	New York.....	1924-25 to 1926-27 .....	Special bulletin of Department of Labor, No. 144, June, 1926, Some recent figures on accidents to women and minors; and Industrial Bulletin of Department of Labor, vol. 6, No. 7, April, 1927; and vol. 7, No. 9, June, 1928.
	Pennsylvania...	1924 .....	Labor and Industry, Monthly bulletin of Department of Labor and Industry, December, 1926.
Industry.....	7 California.....	1920 to 1921 .....	Same as for number injured.
	Indiana.....	1919-20 to 1920-21; 1925-26 to 1926-27 ..	Same as for age.
	Kentucky.....	1919-20 .....	Annual report of Workmen's Compensation Board, June 30, 1919, to June 30, 1920.
	New Jersey.....	1927 .....	Same as for number injured.
	New York.....	1924-25 to 1926-27 .....	Same as for cause.
	Pennsylvania...	1920, 1924 .....	Report of Bureau of Workmen's Compensation, 1920; Labor and Industry, Monthly bulletin of Department of Labor and Industry, December, 1926.
	Tennessee <sup>3</sup> .....	1919-20 .....	Same as for number injured.

<sup>3</sup>Tennessee classified occupations with industries

CHART I.—Extent of the information on accidents to women published in the period 1920 to 1927 by the 21 States that reported the sex of injured persons—Continued

Type of information about women	Number of States publishing	State	Period covered by published reports	Source
Wage-----	4	Illinois-----	1920 to 1924, 1926-----	Annual report of Industrial Commission, year ended June 30, 1921; Annual reports of Department of Labor: Fifth, July 1, 1921, to June 30, 1922, to eighth, July 1, 1924, to June 30, 1925; Tenth, July 1, 1926, to June 30, 1927.
		Indiana-----	1919-20 to 1926-27-----	Same as for number injured.
		Nebraska-----	1927-----	Do.
		New York-----	1919-20 to 1926-27-----	Special bulletins of Department of Labor: No. 126, September, 1924, Analysis of workmen's compensation cases closed July 1, 1922, to June 30, 1923; No. 142, March, 1926, Compensation awards year ended June 30, 1924; Compensated accidents, July, 1914, to June, 1922; No. 146, July, 1926, Accidents compensated in year ended June 30, 1925, Cost of compensation; No. 143, January, 1927, Compensation statistics year ended June 30, 1926; No. 157, August, 1928, Compensation statistics year ended June 30, 1927.
Time lost-----	4	Alabama-----	1920 to 1922-----	Same as for number injured.
		Illinois-----	1925-----	Ninth annual report Department of Labor, July 1, 1925, to June 30, 1926.
		New York-----	1926-27-----	Industrial Bulletin of Department of Labor, vol. 7, No. 9, June, 1923.
		Virginia-----	1921-1923 and 1923-1925. (Temporary total disabilities only.)	Biennial reports of Industrial Commission, 1922-1923 to 1926-1927.
Nature of injury-----	3	Indiana-----	1919-20 to 1920-21; 1925-26 to 1926-27-----	Same as for age.
		Nebraska-----	1927-----	Same as for number injured.
		Pennsylvania-----	1920, 1924 (1924, fatal only)	Report of Bureau of Workmen's Compensation, 1920; Labor and Industry, May, 1925.
Conjugal condition-----	6	Georgia-----	1927-23-----	Same as for number injured.
		Maryland-----	1919-20 to 1921-22-----	Annual reports of State Industrial Accident Commission: Sixth, 1919-20 to eighth, 1921-22.
		Missouri-----	1927 (incomplete)-----	Same as for number injured.
		Nebraska-----	1927-----	Do.
		Pennsylvania-----	1920-----	Report of Bureau of Workmen's Compensation, 1920.
		Virginia-----	1919-20 and 1920-21; 1921-1923. (Figures for 1919-20 include fatal and temporary cases; 1920-21, nonfatal cases only; 1921-1923, temporary total disabilities only.)	Annual reports of Industrial Commission: Second, 1920, and third, 1921; Biennial report of Industrial Commission, 1922-1923.
Frequency rate-----	2	New York-----	1925-26-----	Industrial Bulletin of Department of Labor, vol. 7, No. 7, April, 1928.
		Pennsylvania-----	1924-----	Special bulletin of Department of Labor and Industry, No. 17, 1926, An analysis of compensated accidents to minors for the year 1924.

NOTE.—This chart does not include the following published data on women injured:

- A. Location of injury. *In* annual reports of Industrial Board, Indiana, years ended Sept. 30, 1920, 1921, 1926, and 1927.
- B. Compensation per disability for eye, arm, hand, foot, and leg losses. *In* report of Workmen's Compensation Bureau, Pennsylvania, 1920.
- C. Machine accidents analyzed according to cities and counties in the State. *Wisconsin Labor Statistics*, Vol. II, Nos. 1 and 2, January-February, 1924; Vol. III, Nos. 1 and 2, January-February, 1925; Vol. IV, Nos. 4 and 5, April, 1926.
- D. Fatal accidents classified by industry, conjugal condition, and part of body injured; also blood-poison cases. *In* report of Workmen's Compensation Bureau, Pennsylvania, 1920; fatal accidents by industry, cause, and nature of injury, 1924. *In* Labor and Industry, monthly bulletin of Pennsylvania Department of Labor and Industry, May, 1925; fatal accidents by cause and nature of injury, 1926. *Ibid.*, April, 1926.
- E. Fatal cases classified by conjugal condition and number of dependents, 1919-20. *In* second annual report of Industrial Commission of Virginia, 1920.
- F. Special study of 102 accidents to women classified by industry and cause of injury, 1924. *In* fifth annual report of Court of Industrial Relations, Kansas, year ended Dec. 31, 1924.
- G. Special reports—New York Department of Labor: Some social and economic effects of work accidents to women. A study of five hundred women compensated for permanent partial injuries, 1918-20. Classified according to age, wage, occupation, industry, nature of injury, location of injury, cause of accident, manner of occurrence of machine accidents, extent of disability, degree of impairment, proportion of infections, present earning capacity, ability to speak English, schooling, change of employer, experience on machines and length of time machine operators had been on accident job. Special Bul. 127, November, 1924. An analysis of one hundred accidents on power punch presses, 1923-24. Classified by number of establishments, product of plant, and nature and location of injury. Special Bul. 131.
- H. Special study—Cases of anthrax, by industry and extent of disability, 1922 to 1926. *In* Labor and Industry, monthly bulletin of Pennsylvania Department of Labor and Industry, June, 1927.

Only 21 States have published accident data by sex at any time from 1920 to 1927. Of the 21 States only 7 have reported numbers for the entire period. Of these, Colorado, Illinois, Indiana, Kentucky, Massachusetts, and New York report numbers of men and women each year; Idaho reports yearly for 1920, 1921, and 1922, and biennially thereafter. Six of the 21 States have published no information by sex since 1925.

When it is considered how incomplete are the data made public, their inadequacy as an aid to accident prevention becomes more apparent. During the period covered—1920 to 1927—the reports of only 11 States give age data separately for women. Eight of these and 3 others furnish information by sex as to the extent of disability. Seven of the 21 show for each sex the industry in which the accident occurred; 5, the cause of the accident; and 2, the frequency rates. In the 8-year period only 1 State, New York, published data on all these factors for one year's accidents, and New York published such figures for the one year only, dropping the significant figure of the frequency rate the year following. No State has had an adequate program of publishing accident data that has been followed continuously and consistently throughout the eight years.

The States vary greatly in the amount of information on accidents that they collect, as well as in the type of information they publish. Differences in the provisions of the laws and in the administrative practices naturally result in the basic information being much less adequate in some States than in others.<sup>2</sup>

Besides the inadequacy of accident statistics in most of the States, the data published are, to a surprising extent, unstandardized and noncomparable. Differences in definition, in the scope of the accidents and employments covered, and in methods of tabulation make impracticable, without very careful differentiation and qualification, a compilation and comparison of data from the various States. Only very cautious generalizations, if any, may be made from such non-homogeneous material.

In determining the character of their accident reports, the States necessarily are actuated by their own immediate needs in the administration of the workmen's compensation laws. Furthermore, the funds available rarely are adequate for a detailed analysis of the figures. In spite of various limitations and the fact that the scope of reports is influenced by the character of the accident-reporting and workmen's compensation laws, much greater uniformity among them than prevailed at the time this study was made is not only possible but extremely desirable. While each State must consider first its own conditions and problems, a comparison of experience would be to the advantage of all, and a standardized system of accident reporting would not interfere in any way with meeting the peculiar needs of a State. Tables and analyses within the framework of the standard system may be made adequate for State needs and for comparisons among localities and a record for the country as a whole.

### **Standardization of statistics.**

A uniform method of collecting, classifying, analyzing, and publishing statistics of industrial accidents has been worked out by the Inter-

<sup>2</sup> See Monthly Labor Review, April, 1929, pp. 115-116. Workmen's Compensation in the United States as of January 1, 1929.

national Association of Industrial Accident Boards and Commissions and is recommended to its members, the State agencies engaged in administering the workmen's compensation laws.

This standard system is the result of several years' work, from 1915 to 1919, of a very important committee of the association, the committee on statistics and compensation insurance cost. Published in 1920 as Bulletin 276 of the United States Bureau of Labor Statistics and entitled Standardization of Industrial Accident Statistics, it is generally accepted as the authority on the subject.

Changes in industrial conditions since 1919 have made it necessary that there be revisions in the plan as then approved. Accordingly, by action of the International Association of Industrial Accident Boards and Commissions in 1926, revision was undertaken by that association jointly with the National Safety Council and the National Council on Workmen's Compensation Insurance, under the auspices of the American Standards Association (formerly the American Engineering Standards Committee). The association recommended that the existing system should be followed until the revision was ready, since the new plan would be coordinated with the old in such way that the continuity of the figures need not be broken.<sup>3</sup>

The proposed plan for the overcoming of lack of uniformity and comparability among accident reports has several essential parts:

1. Standardization of definitions and of accident reporting.
2. Standard classification of (a) industries, (b) causes of accidents, and (c) accidents by location and nature of injury and extent of disability.
3. Standard tables for the presentation of statistics.
4. Standard methods of computing frequency and severity rates and compensation insurance costs.

All these steps toward uniformity have been strongly recommended and have to greater or less degree made their way into general practice. Nevertheless, much of the volume of present-day statistics is unstandardized and noncomparable. Many States have failed to recognize the value of the standard classifications and table forms that admit of expansion or contraction to meet the needs of a particular situation. Consequently, much less can be done than otherwise would be the case in bringing together statistics from various States to get a broad view of conditions as regards industrial hazards. For example, of the 21 States that at any time in the period 1920 to 1927 have published some data on accidents to women, only 11 have reported the age of the injured and even these reveal a lack of uniformity in the age classifications. Of the 11 reporting, only Illinois, Massachusetts, and New York have used throughout the period the form recommended for presenting extent of disability by sex and age. Maryland, Alabama, and Minnesota used the standard method for some of the time, and Georgia, Indiana, Pennsylvania, and Rhode Island reported sex and age but did not correlate these data with the extent of disability as is recommended. New Jersey reported age and extent of disability in classifications different from those recommended by the International Association of Accident Boards and Commissions.

<sup>3</sup> U. S. Bureau of Labor Statistics. Monthly Labor Review, November, 1928, p. 21; and Bul. 432, pp. 61-65.

Furthermore, of the five States that have reported separately for men and women on the important subject of cause of accidents, only three—New Jersey, New York, and Pennsylvania—have followed the standard classification of causes. Indiana and Iowa have given an unstandardized list of causes that must be reclassified, with results dubious at best, before any comparison with other States can be made.

Similarly, on the question of the industries in which accidents occurred, seven States have given, at least once during the eight years, some data on this subject, but only New York and Pennsylvania have followed the standard industry classification in most of its detail. New Jersey and California abbreviated it considerably, and Indiana, Kentucky, and Tennessee, though reporting accidents by sex and by industry or occupation in detail, used an unstandardized form that only with the greatest difficulty and uncertainty could be combined with the reports of other States.

The Women's Bureau feels that those States that do not present their accident statistics in harmony with the standard plan recommended by the International Association of Industrial Accident Boards and Commissions should give earnest consideration to the advisability of doing so. The difficulties of comparing and combining material from the various States when uniformity of method is lacking are almost insurmountable. The problems that emerged in this study are strong evidence of the need of standardization. The proposed form can be contracted or expanded to admit of greater or less detail according to State requirements. But, as before stated, it is of the greatest importance that special inquiries or analyses to meet the needs of the State should be within the framework of the standard system so that any one State may compare its experience with that of other States and aggregations of statistics from all States may be made; and, furthermore, that at least the basic figures should be tabulated by sex.

The standard presentation by all States of data on industrial accidents by sex, age, and extent of disability, by industry, and by cause, including work conditions that contribute to their occurrence, is urgently needed. Especially should tables on industry and cause be presented by sex and in accordance with the proposed standard, because of the help given to the work of accident prevention by such detailed analysis. In fact, each State must collect data in regard to conditions that bring about accidents if it is to be hoped ever to lessen their number, to say nothing of preventing their occurrence.

A type of information greatly needed is accident rates, in terms of frequency and severity. For these rates it is necessary to have figures on employment—the pay-roll exposure—to correlate with accidents. The United States Bureau of Labor Statistics has made a start in compiling accident rates, but the States have done little. This is a fruitful field for investigation by the States, and it is to be hoped that other studies of accident rates for representative groups of firms may be made. Where it is possible to separate the data by sex and show the comparative accident rates for men and women in various occupations and industries, the analysis will throw light on specific hazards and the points at which accident prevention is most needed.

Compensation laws do not lay down specific regulations for the classification and form of publication of accident reports. Nor do they require that information on costs of administration be supplied to the exclusion of information on human problems. In short, the failure of 22 of the 43 States that in 1927 had compensation laws to report by sex on industrial accidents must be attributed in the main to indifference on the part of the public, which does not demand more explicit and useful information because it does not realize the magnitude of the accident problem. The human and economic costs of accidents should be of concern to every community, and therefore should create a demand for the information needed for the prevention of accidents.

Although it is true that the failure of States to separate accident material by sex and to publish sufficient and comparable material on so important a subject is due largely to indifference on the part of the public, it is influenced by inadequacy of appropriation, and some of the lack can be charged directly to administrative practices. If States are to compile reliable data in regard to sex and age of injured, cause and nature of accident, and the work-time lost, the officials in charge must take certain preparatory steps to make this possible. They must—

Set up a satisfactory form for reporting accidents.

Demand prompt and complete reports on the details called for.

Edit and audit reports and return the report blank for data omitted or apparently incorrect.

In some cases make detailed inspections immediately after the accident occurs, to ascertain what factors, in addition to the most apparent cause, contributed to the accident.

Obviously, sufficient money must be available to employ persons qualified to do this work. Inadequacy of appropriation is a very serious handicap to those who administer compensation laws.

There can be no question of the necessity of greater effort to prevent accidents. And there can be little question as to the first steps to be taken in such a program, namely, adequate safety laws; an adequate inspection service for the prevention of accidents; the collection of reliable and comparable information on accidents; the analyzing of accident information, classified accurately and in standard form, so as to permit of correlations and comparisons of related phases of the question.

Can anyone question the need for each State to know the relation of the ages of the workers to the frequency rates of accidents of a specified type; the relation between working conditions and accidents in specified occupations and industries, and their importance in regard to frequency rates; or the paramount importance of analyzing accident data in respect to the nature and extent of the injuries and the amount of time lost?

The public should urge much greater attention by the States to the collection of scientific and usable information on accidents in order that the work of accident prevention may make more rapid progress.

## SUMMARY

## INADEQUACY OF REPORTS

Reports on industrial accidents to men and women by the various States are inadequate and unsatisfactory except in a very few cases.

To have an adequate basis for the work of accident prevention, more facts are needed, and these should be compiled and analyzed in the standard form recommended by the International Association of Industrial Accident Boards and Commissions, the unrevised draft of which (see footnote 3 and the lines to which it refers) is available in Bulletin 276 of the United States Bureau of Labor Statistics.

Analysis of accidents by cause and industry, for men and women separately, is a very important step toward the detailed knowledge necessary to direct accident prevention to the points where it is most needed.

The lack of comparability in the statistics reported by the various States is partly the result of differences in the laws. For example, the term "accident" is defined in several ways; the employments covered differ considerably; the minimum period of disability ranges from no time at all, where every accident must be reported, to as much as two weeks; and certain laws are compulsory while others are elective.

On the other hand, ignorance of or indifference to the tremendous advantages of standardized reporting—the impetus it would give to cooperative efforts for accident prevention—is responsible for certain other inconsistencies and irregularities that make quite impossible the combining and the comparing of the figures of several States. Inadequacy of appropriation and clerical staff also has its influence.

Only 21 States at any time during the period 1920 to 1927 published accident data for men and women separately.

Only 7 of the 21 States published even the number of accidents for each of the eight years.

Only 11 reported on age, 11 on extent of disability, 7 on industry, 5 on cause, and 2 on frequency rates of accidents to the two sexes separately at any time within this period.

The accident data published ranged from the number of "compensable cases," variously defined, to "all cases reported." In 8 States occupational diseases were included.

Employments included varied in different States from all employments to all except nonhazardous occupations, all except agriculture, domestic service, and casual labor, or all except those in the smaller establishments employing less than a certain number, ranging from 4 to as many as 16.

The minimum period of disability included in the reports ranged from none, in a State that called for reports on all accidents, through one week, the most usual period, to two weeks.

For those States that have reported on age, cause, industry, and extent of disability, only occasionally was the standard classification and form of presentation of the figures used.

To sum up: It is extremely difficult, if not impossible, to be certain of the comparability of the statistics from any 2 States of the 21 reporting at some time in the period 1920 to 1927, an unfortunate condition in view of the fact that by comparing the experiences of the various States and by making an aggregation for the country as a whole a very helpful statistical background could be secured for an

intelligent understanding of this problem and for adequate measures for prevention.

#### ACCIDENTS TO MEN AND WOMEN

From the published data available on accidents to men and women in 21 States for the years 1920 to 1927, inclusive, certain facts stand out:

Accidents to women were actually and relatively fewer than those to men. Women were a smaller proportion of the total number injured than of the total number gainfully occupied.

The number of women injured was large. In the State of New York, for example, as many as 7,000 women had been compensated for industrial accidents in one year.

The proportion of injuries to women usually was higher when women were a substantial proportion of all persons gainfully occupied and when a large proportion of the women were employed in manufacturing.

A much larger proportion of the women injured than of the men were under 21 years of age.

Fatalities were a considerably smaller proportion of injuries to women than to men, although their number was by no means negligible. The proportions of permanent total disabilities, in the States for which information is available, were little different for the two sexes.

Permanent partial disabilities formed larger proportions of the injuries to women than of those to men in 3 States, and they were very high for women and approached the figures for men in 2 other States. In the 4 States showing extent of disability correlated with age, the records reveal that many of these dismemberments, disfigurements, and injuries causing loss of use of a member occurred to workers under 21.

Reports from New York and Illinois showed an average period of disability somewhat less for women injured than for men.

In 5 of the 6 States reporting industry classifications for men and women according to the standard form, more than one-half of the injuries to women were in manufacturing. Trade and the group classification hotels, restaurants, and care of buildings also accounted for many accidents to women.

Food, clothing, textiles, metals, and machinery and vehicles were chief among the manufacturing industries causing accidents to women.

Machinery was the principal cause of accidents to women in 3 of the 5 States reporting and falls of persons and handling of objects also were very important causes. For men the handling of objects and, though generally to a much less extent, falls, usually caused more accidents than did machinery.

Machines caused more accidents relatively and falls fewer accidents to boys and girls than to men and women. In the 3 States reporting cause of accident and age of men and women, machine accidents were approximately one-half of all accidents to women under 21 years of age.

In the case of New York, sewing machines, power presses, and food-products machines were the chief types of machines injuring women.

## PART II

### ANALYSIS OF REPORTS OF ACCIDENTS TO MEN AND WOMEN

In the 8-year period 1920 to 1927, only 21 States have at any time made a regular annual or biennial report on industrial accidents by sex. The States reporting in any one year have ranged from 10 to 14 in number; some have made only one such report and others have published statistics for each of the eight years. The various reports afford an excellent illustration of the inadequacy and noncomparability so unfortunately prevailing.

#### Character of data.

Before attempting to analyze the accident reports of the various States, it is necessary to distinguish the varying definitions of the term "accident." Chart II attempts to make clear briefly the character of the cases tabulated—how they are defined and what accidents are included.

The chief difference is between those States that report "compensable cases," or cases subject to compensation under the workmen's compensation law, and those that report industrial accidents in general, "cases reported" or "tabulatable injuries,"<sup>4</sup> without regard to their compensability, the latter including, of course, many more cases than are covered in the term "compensable cases." In a few instances "cases reported" are only in employments subject to the compensation law, although cases noncompensable because of the short period of disability are included. Among the States reporting only compensable cases, some report compensation claims, others claims allowed, and still others closed cases in which payments have been completed. In 8 of the 21 States occupational diseases are included.

A second distinction made clear in Chart II concerns the minimum period of disability of the accidents tabulated. Missouri, which tabulates "cases reported," requires that all accidents be reported; Nebraska requires, in all compensable employments, reports of all accidents causing loss of time or incurring any medical expense. In California and Indiana all accidents causing loss of more than a day must be reported; in Massachusetts, more than a shift. In Kentucky the waiting period is one day, but only compensable employments are affected. Iowa tabulates accidents when more than two days' disability is caused, and Maryland its compensable cases that have a minimum of three days of disability. The more usual waiting period, one week, determines the reporting of accidents in 10 States, the majority of those that tabulate only compensable cases. For Colorado and Pennsylvania, at the dates covered by these reports, 10 days was the waiting period. Alabama was alone in reporting only compensable accidents that caused disability of more than two weeks.

<sup>4</sup> Tabulatable injuries, according to the standard definition, are injuries arising out of the employment and resulting in death, permanent disability, or the loss of time other than the remainder of the day, shift, or turn on which the injury was incurred. See United States Bureau of Labor Statistics, Bul. 276, p. 17.

CHART II.—Character of accidents tabulated in the 21 States that reported the sex of injured persons in 1927 or most recent year of the period 1920 to 1927

Source: Bureau of Labor Statistics, Series of reports of compensation laws: Buls. 272, 332, 379, 423, and 496; Monthly Labor Review, January, 1928; and State reports.

State	Period covered by figures tabulated	Accidents tabulated	Minimum period of disability of accidents tabulated	Employments covered by accident-reporting law (marked *) or compensation law (where only accidents under compensation law are tabulated)		Elective or compulsory compensation law (where only accidents under law are tabulated)
				Private	Public	
Alabama	1922	Compensable cases	More than 2 weeks	All except those having less than 16 employees, farm labor, domestic service, common carriers doing an interstate business while engaged in interstate commerce, and casual employees not in usual course of employer's business. Voluntary as to all excepted employments except farm labor.	State employees. Voluntary as to other public employees.	Election presumed in absence of written notice. <sup>1</sup>
California	1921	Tabulatable injuries <sup>2</sup>	Longer than day of injury	*All	*All	Election presumed in absence of written notice. <sup>1</sup>
Colorado	Dec. 1, 1926, to Nov. 30, 1927	Compensation claims	More than 10 days	All except those having regularly less than 4 employees, farm and ranch labor, private domestic service, and casual employees not in the usual course of employer's business. Voluntary as to excepted employments.	All except elective officials and National Guard.	Compulsory as to public employees.
Georgia	Jan. 1, 1927, to Dec. 31, 1928	Closed compensable cases	More than 1 week	All except those having regularly less than 10 employees, common carriers engaged in interstate (intrastate) trade (or) commerce the motive power of which is steam, farm labor, domestic service, or employees not in the usual course of employer's business. Voluntary as to excepted employments.	All except public charities	Election presumed in absence of written notice. <sup>1</sup> Compulsory as to public employees except public charities.
Idaho	Nov. 1, 1926, to Oct. 31, 1928	do	do	All conducted for gain except agricultural pursuits, domestic service, outworkers, casual employment, and charitable institutions. Voluntary as to excepted employments.	All except elective officials and those receiving salary of over \$2,400.	Compulsory.
Illinois	1927	do <sup>3</sup>	do	"Extrahazardous" employments as enumerated. <sup>4</sup> Farm labor and persons not in usual course of employer's business excepted. Voluntary as to excepted employments.	All except officials and duly appointed members of fire departments in cities of 200,000 or more.	
Indiana	Oct. 1, 1926, to Sept. 30, 1927	Cases reported	More than 1 day	*All	*All	
Iowa	July 1, 1925, to June 30, 1926	do	More than 2 days	*All except mines and railway train service. <sup>5</sup>	*All	
Kentucky	July 1, 1926, to June 30, 1927	do <sup>6,7</sup>	More than 1 day	All except those having less than three employees, agriculture, domestic service, and common carriers engaged in interstate commerce. Threshing and hulling grains and seeds are within the act. Voluntary as to excepted employments.	All municipal corporations having 3 or more employees. Voluntary as to others.	Election in writing by employer and employee.
Maryland	Nov. 1, 1926, to Oct. 31, 1927	Compensation claims allowed	More than 3 days	"Extrahazardous" employments as enumerated. <sup>4</sup> Casual employees, farm labor, domestic service, country blacksmiths, wheelwrights, or similar rural employments excepted. Voluntary as to works not extrahazardous.	All workmen employed for wages and engaged in extrahazardous employments, including the State police force and guards of penal institutions. Voluntary as to other employments.	Compulsory.
Massachusetts	July 1, 1926, to June 30, 1927	Tabulatable injuries <sup>8</sup>	1 day or 1 shift	*All	*All	
Minnesota	July 1, 1923, to June 30, 1924	Closed compensable cases <sup>9</sup>	More than 1 week	All employments except farm labor, domestic service, common carriers by steam railroad, casual employees not in usual course of employer's business. Commercial threshing and baling included in act. Voluntary as to farm labor.	Employees of State, counties, cities, towns, villages, and school districts, except officials.	Election presumed in absence of written notice. <sup>1</sup>
Missouri	Jan. 9, 1927, to Dec. 31, 1927	Cases reported <sup>10</sup>		*All	*All	
Nebraska	1927	do <sup>11</sup>		All employments except farm labor, household domestic service, railroad companies engaged in interstate or foreign commerce, outworkers, and casual employees not in usual course of employer's business. Voluntary as to excepted employments.	All employees except officials elected or appointed for fixed terms.	Election presumed in absence of written notice. Compulsory as to public employees.
New Jersey	1927	Closed compensable cases <sup>9</sup>	More than 1 week	All except casual employees	All except elective officials and employees receiving over \$1,200.	Election presumed in absence of written notice. <sup>12</sup> Compulsory as to public employees.
New York	July 1, 1926, to June 30, 1927	do <sup>9</sup>	do	All enumerated "hazardous" employments, <sup>4</sup> and all others having 4 or more workmen, conducted for gain. Farm labor and domestic service excluded. Voluntary as to other employments.	All employees	Compulsory.
Pennsylvania	1924	do <sup>9</sup>	More than 10 days <sup>13</sup>	All except farm labor, domestic service, casual employees, and outworkers	do	Election presumed in absence of written notice. <sup>12</sup> Compulsory as to public employees.
Rhode Island	Oct. 1, 1926, to Sept. 30, 1927	do	More than 1 week	All except those having less than 6 employees, farm labor, domestic service, casual employees, and employees receiving over \$3,000 a year. Voluntary as to excepted employments.	All employees of State, cities, and towns, except fire and police departments.	Election in writing by employer, <sup>1</sup> and presumed in absence of written notice by employee. Compulsory as to State employees.
Tennessee	July 1, 1919, to July 1, 1920	Reported cases closed <sup>14</sup>	do	*All in "any kind of an establishment wherein labor is employed or machinery used"		
Virginia	Oct. 1, 1923, to Sept. 30, 1925	Closed cases, temporary total disabilities	do	All except those employing less than 11 employees, farm labor, domestic servants, steam railroads, casual employees, or those not in usual course of employer's business. Voluntary as to excepted employments.	All except administrative officers and employees elected or appointed for definite terms.	Election presumed in absence of written notice. <sup>1</sup> Compulsory as to public employees.
Wisconsin	1927	Closed compensable cases <sup>2</sup>	do	All except those having less than 3 employees, <sup>15</sup> farm labor, and employees not in usual course of employer's business. Voluntary (joint election) as to steam railroads.	All except officials	Election presumed as to employers of 3 or more persons in absence of written notice. <sup>13</sup> Compulsory as to public employees.

<sup>1</sup> Inducement to election is offered by abrogation of common law defenses where employer rejects the law.

<sup>2</sup> Includes occupational diseases.

<sup>3</sup> Includes occupational diseases in certain occupations.

<sup>4</sup> The principal industrial employments are included.

<sup>5</sup> Reports of accidents to workers in mines or in railway service are not received by the Iowa Bureau of Labor. All industrial accidents are reported, however, to the compensation commissioner of the State.

<sup>6</sup> Only employers subject to compensation act are required to report.

<sup>7</sup> Includes injury from gas or smoke in mines or from any gas.

<sup>8</sup> Occupational diseases included by court decision.

<sup>9</sup> Designated occupational diseases included.

<sup>10</sup> All injuries are required to be reported.

<sup>11</sup> Every accident that causes loss of time or where medical expense is incurred must be reported by employers who come under compensation act.

<sup>12</sup> Common law defenses abrogated regardless of acceptance or rejection of act.

<sup>13</sup> In 1927 the minimum period of disability was 1 week.

<sup>14</sup> The accident reporting law of 1913 required reports from the employments listed. "Reported cases closed," therefore, includes both closed compensable cases and noncompensable cases.

<sup>15</sup> Common law defenses abrogated where employers reject law. Employers of less than 3 persons lose defense of assumed risk if they do not elect law.

It is apparent, therefore, that any comparison among States must allow for the great variation in inclusiveness of the reports, some of which ostensibly include every accident while others include only those so serious as to have a time loss of at least a week, or of 10 days, or even of two weeks, as the case may be.

Another serious limitation upon the comparability of the State reports follows from the differences in the employments covered. (See Chart II.) The States that report on number of accidents rather than on compensable cases usually include all employments. Where compensable cases only are reported, on the other hand, many employments—most frequently agriculture, domestic service, and casual work—are excluded. Some States include only "hazardous" or "extrahazardous" employments, although these cover the principal industrial employments. In many States firms having less than a certain number of employees are excluded, the number ranging from 3 in Kentucky and Wisconsin to 16 in Alabama.

A further hindrance to the comparability of the compensable cases reported is that some compensation laws are compulsory for all employments covered, while others are elective. Under an elective law, employer or employee may decide not to be subject to its provisions. Usually an incentive to come under the law is given by the fact that if an employer rejects the law he loses certain defenses that in common law are used in defending suits for damages.<sup>5</sup> Election generally is presumed unless rejection is made in writing.

Except under the compulsory laws, usually there are some employees in employments within the law who are not covered and accidents to whom are not reported. On the other hand, many laws permit employments not covered by the law to come under its provisions by voluntary election, and some of the accidents in these employments therefore appear among the compensable cases reported.

In view of all these factors, it is not possible to be certain of the comparability of statistics from any two States. Chart II, however, in summing up the principal points that determine the inclusiveness of accident reports, makes it possible to decide whether or not the figures from a given group of States are comparable within a reasonable margin of error, and this chart must be referred to constantly in attempting any generalizations from the tables that are to follow.

An illustration will make clear how the chart may be used. If New Jersey and New York for the year 1927 are to be compared, it may be learned from the chart that both States reported closed compensable cases and that to be compensable there had to be loss of time of more than a week. The New Jersey report included all private employments except casual employees and all public employees except elective officials and persons receiving over \$1,200; but since for private employments the law is elective, some might be outside the law. In New York the law is compulsory, but it is less inclusive as to employments, as farm labor, domestic service, and nonhazardous employments<sup>6</sup> having fewer than four workers are not included. The employments excluded, however, may choose voluntarily to come under

<sup>5</sup> Under the common law an employee often had to prove that his injury was not due to an ordinary risk in his employment, nor to an abnormal danger of which he was aware, nor to the carelessness or negligence of a coemployee, nor to his own negligence, before he could be awarded damages. Abrogating these defenses of the employer makes it easier for a worker to secure damages. See Commons, J. R., and Andrews, J. B., *Principles of Labor Legislation*. Harper and Brothers, New York and London, 1927, p. 426 ff.

<sup>6</sup> In New York the principal industrial employments are included in the list of hazardous employments.

the law, so some of the accidents tabulated in 1927 probably occurred there. It is apparent that, though the reports of New Jersey and New York are much more comparable than are those of most of the States, the greater inclusiveness of the New Jersey report must be taken into account.

If Massachusetts is to be compared with these States, it must be remembered that its statistics cover all employments and include those minor injuries—excluded from the New York and New Jersey reports—that cause a loss of time of as little as one day or one shift.

It is obvious from the foregoing that, in the present state of knowledge regarding accidents to working men and women as available in State reports, practically nothing can be said with assurance except that very little is known of the facts in most States, very uncertain must be any conclusions based upon comparisons among States, and very great is the need of accurate, comprehensive, and comparable accident reports. Analysis of accident data by sex, which is a step toward the understanding of the incidence and causes of accidents, is part of a background essential for accident prevention, the real purpose of all studies of accidents.

*Accidents by sex in 21 States.*—In Table 1 are assembled data on the industrial accidents occurring to men and to women in 1927, or the latest year in the period 1920 to 1927, in the 21 States that have published some report by sex within this period.

TABLE 1.—Industrial accidents tabulated by sex by 21 States in 1927 or most recent year of the period 1920 to 1927; per cent of women among the injured persons reported and among the gainfully occupied in 1920; and per cent in manufacturing of all women gainfully occupied in 1920

[For sources of information, see appendix]

State	Period covered	Accidents tabulated	Minimum period of disability of accidents tabulated	Accidents			Per cent of women among—		Per cent in manufacturing of all women gainfully occupied in 1920 <sup>1</sup>
				Total	Men	Women	Injured persons reported	Persons gainfully occupied in 1920 <sup>1</sup>	
Rhode Island.....	Oct. 1, 1926, to Sept. 30, 1927	Closed compensable cases.....	More than 1 week.....	3,985	3,479	506	12.7	29.3	56.2
Missouri.....	Jan. 9, 1927, to Dec. 31, 1927	Cases reported.....	( <sup>2</sup> ).....	89,577	78,332	11,031	12.3	18.6	20.7
Massachusetts.....	July 1, 1926, to June 30, 1927	Tabulatable injuries.....	1 day or 1 shift.....	64,167	58,217	5,950	9.3	29.1	43.6
New York.....	do	Closed compensable cases.....	More than 1 week.....	98,984	91,535	7,399	7.5	25.2	30.9
New Jersey.....	1927	do	do	25,895	24,053	1,812	7.0	22.6	37.3
Georgia.....	Jan. 1, 1927, to Dec. 31, 1928 <sup>4</sup>	do	do	6,067	5,653	414	6.8	25.6	10.0
Nebraska.....	1927	Cases reported.....	( <sup>2</sup> ).....	19,054	17,822	1,232	6.5	15.7	9.9
Maryland.....	Nov. 1, 1926, to Oct. 31, 1927	Compensation claims allowed.....	More than 3 days.....	14,521	13,686	835	5.8	22.7	26.4
Tennessee.....	July 1, 1919, to July 1, 1920	Reported cases closed.....	More than 1 week.....	14,811	14,043	768	5.2	18.3	14.8
Wisconsin.....	1925	Closed compensable cases.....	do	3,595	3,422	173	4.8	18.3	24.9
Minnesota.....	July 1, 1923, to June 30, 1924	do	do	15,681	14,965	716	4.6	18.1	14.3
California.....	1921	Tabulatable injuries.....	Longer than day of injury.....	62,273	59,529	2,744	4.4	18.9	14.5
Indiana.....	Oct. 1, 1926, to Sept. 30, 1927	Cases reported.....	More than 1 day.....	40,539	38,745	1,794	4.4	16.6	24.6
Illinois.....	1927	Closed compensable cases.....	More than 1 week.....	52,591	50,505	2,086	4.0	20.6	22.7
Colorado.....	Dec. 1, 1926, to Nov. 30, 1927	Compensation claims.....	More than 10 days.....	5,751	5,566	185	3.2	17.1	10.0
Pennsylvania.....	1924 <sup>5</sup>	Closed compensable cases.....	do	78,774	76,546	2,228	2.8	20.0	32.5
Virginia.....	Oct. 1, 1923, to Sept. 30, 1925 <sup>4</sup>	Closed cases, temporary total disabilities.....	More than 1 week.....	7,032	6,832	200	2.8	18.7	18.2
Iowa.....	July 1, 1925, to June 30, 1926	Cases reported.....	More than 2 days.....	8,910	8,690	220	2.5	16.5	13.0
Idaho.....	Nov. 1, 1926, to Oct. 31, 1928 <sup>4</sup>	Closed compensable cases.....	More than 1 week.....	7,594	7,413	181	2.4	11.4	7.5
Kentucky.....	July 1, 1926, to June 30, 1927	Cases reported.....	More than 1 day.....	26,021	25,524	497	1.9	15.4	19.4
Alabama.....	1922	Compensable cases.....	More than 2 weeks.....	5,769	5,736	33	.6	24.6	6.7

<sup>1</sup> U. S. Census of Occupations, 1920, p. 51, Table 12.

<sup>2</sup> U. S. Census of Occupations, 1920, p. 55, Table 14.

<sup>3</sup> All injuries are required to be reported.

<sup>4</sup> The numbers reported for this 2-year period have been divided by two, to give an estimated number for one year.

<sup>5</sup> Excludes 104 fatalities not classified by sex.

<sup>6</sup> Every accident that causes loss of time or where medical expense is incurred must be reported by employers who come under compensation act.

<sup>7</sup> Unpublished data for 1927, furnished by letter, are: Total, 74,881; men, 72,190; women, 2,691; women 3.6 per cent of total number injured.

The general impression that women are the victims of industrial accidents to a less extent than are men is found to be true. On the other hand, the injured women employees are by no means a negligible group that may be disregarded, for in New York, for example, in the year ended June 30, 1927, more than 7,000 women were compensated for injuries that caused over a week's disability, and in the same year in Massachusetts, where all injuries of as much as one day's disability are reported, nearly 6,000 women were included in the cases tabulated. Even in the nonindustrial States, substantial numbers of women are found to have been injured.

The proportion of women among the injured persons reported ranges from 12.7 per cent in Rhode Island in the year ended September 30, 1927, to less than 1 per cent in Alabama in 1922, the last year for which there was a separate tabulation for women in the published reports of that State.

Accidents to women are both absolutely and relatively fewer than those to men. In each of the 21 States reporting, women were a much smaller proportion of the total number injured than they were of the total number of persons gainfully occupied in 1920. Because of lack of information on numbers of women employed since 1920 and uncertainty as to the numbers of employees in the occupations included in the accident reports of the States, this analysis can not be pushed to the point of exact accident rates. It is evident, however, that in all these States the rates are, in varying degree, much less for women than for men.<sup>7</sup>

Three tendencies are discernible in explanation of the varying proportions of women in the accident reports of States. Striking exceptions to each will call for explanation, while other variations that are not susceptible of definite explanation can only be accounted for on the basis of the lack of uniformity in accident reporting among the States. In spite of this serious difficulty, these tendencies are strong enough to appear through the reports:

1. The proportion of accidents to women in the accidents reported tends to be greatest where the proportion of women among all gainfully occupied is greatest. Exceptions to this tendency will find their explanation in the character of occupations predominant in the States and in the exclusion of certain occupations from the reports.

2. The proportion of accidents to women tends to be greatest in States where large proportions of the women gainfully occupied are in manufacturing. As this tendency is closely related to the one just stated, exceptions will find their explanation in the same factors.

3. The proportion of accidents to women tends to be more in agreement with the proportion of women among all persons gainfully occupied in those States that are without the most striking differences in the occupations of men and women. To say that those States in which mining, iron and steel, and other heavy industries are important have the greatest discrepancies between the accident rates for men and for women is to restate the same tendency.

In Table 1 the States are arranged in descending order according to the proportion that accidents to women formed of all accidents re-

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<sup>7</sup> It is possible that women workers are less well informed than men of their rights under the workmen's compensation laws and in some cases do not present claims. Actual accident rates therefore may be somewhat higher than indicated in the reports of accidents.

ported. The last two columns, showing the proportion that women form of the total number of persons gainfully occupied in 1920 and the proportion that women in manufacturing were of all employed women, tend, though with exceptions and irregularities, to the same descending order as that of the column next preceding, on which the table is arranged. This fact is the basis of the first two tendencies stated.

A study of the table shows exceptions to these tendencies. In Missouri the proportion of women in the total number gainfully occupied in 1920 and the proportion that women in manufacturing were of all women workers in that year were not so high as in many of the other States here reported. But the proportion of accidents to women in Missouri was very high; in fact, two-thirds as high as the proportion of women among the gainfully occupied. Less discrepancy in the accident rates of men and women is indicated in Missouri than in any of the other States reported. Several factors explain this situation. Missouri is without a great amount of mining or other industries that have the heaviest accident rates for men. Moreover, all industries and all accidents are included, and therefore there is not the exclusion of large numbers of women in domestic service and large numbers of women suffering minor injuries that exists in many States. But probably the chief explanation of the large proportion of women among the persons injured in Missouri is that the differences between the occupations of men and those of women are less strikingly in the direction of the most hazardous occupations for men than is true in many States.

In Nebraska the situation is much as it is in Missouri, a relatively high proportion of women among the injured in spite of a relatively low proportion of women among the gainfully occupied and in manufacturing. Again the explanation may be found in the facts that minor injuries are included, although certain occupations are excluded, and that the hazardous occupations that so heavily weight the accident rates for men in some States are not of great importance in Nebraska.

Georgia shows a relatively high proportion of women both among those injured and among all gainfully occupied, although a low proportion of the working women are in manufacturing industries. The large number of women in agriculture and domestic service is not covered by the compensation law. The women covered, therefore, are chiefly in manufacturing, and here the textile industries, with their large numbers of women employees, are most important.

Both Illinois and Pennsylvania have about average proportions of women among the gainfully occupied (that is, their per cents—respectively 20.6 and 20—are much like the average for the United States as a whole, 20.5) and they have higher than average proportions engaged in manufacturing (respectively 22.7 per cent and 32.5 per cent, compared to the United States figure of 22.6 per cent); but the proportions of their accidents to women are small. These are States where mining and iron and steel and other heavy manufacturing increase the accident rates for men, at the same time that the large numbers of women in domestic service, and in Illinois in clerical occupations, are excluded from the calculation.

Alabama shows very striking exception to the general tendencies discussed. It has a large proportion of women among the gainfully employed but a much less proportion than the other States in manufacturing, and an almost negligible proportion of the accidents reported are accidents to women. Only compensable accidents are reported and the compensation law is very narrow in scope. Excluding farm labor and domestic service, it excludes well over 50 per cent of the men and 65 per cent of the women reported as gainfully occupied in 1920.<sup>8</sup> Moreover, it excludes employments having fewer than 16 employees, thus leaving out small factories. At the same time the number reported does not include accidents for which a disability of two weeks or less is shown. In view of these exclusions, except for cases where the compensation law was voluntarily elected, the accidents reported in 1922 were chiefly in mining and the iron and steel industries, with their heavy accident rates for men.

Except for such special cases as those noted, in general it holds true that it is in the industrial States where women are a substantial proportion of all persons gainfully occupied and where many women are in the manufacturing industries, that the largest proportions of women are found among the injured workers. Rhode Island, Massachusetts, New York, and New Jersey are among the States that show the largest numbers of women, relatively, among the industrially injured.

While such data as are presented in Table 1—the number of persons of both sexes as obtained from the published accident reports of the various States—have value as an introduction to the study of accidents as they befall men and women, further analysis is needed. For the adequate understanding necessary to efficient accident-prevention work, it is important to have information for each sex on age of the injured, extent of disability, causes of accidents, and the industries in which they occur. For only a few States is this type of information available for men and women separately.

*Age of person injured.*—In the period 1920 to 1927, 11 States have supplied information on the age of the injured persons by sex. (Table 2.) In all 11 States, however lacking the reports are in uniformity of scope and definition, one striking fact stands out: A much larger proportion of the women injured than of the men were young.

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<sup>8</sup> U. S. Bureau of the Census. Fourteenth Census: 1920, vol. 4, Population, Occupations, pp. 874-876.

TABLE 2.—Distribution of accidents to men and women by age of injured, in 1927 or most recent year of the period 1920 to 1927, in 11 States  
 [For sources of information, see appendix]

Age of injured	Alabama		Georgia		Illinois		Indiana		Maryland		Massachusetts		Minnesota		New Jersey		New York		Pennsylvania		Rhode Island		
	1922 (com- pensable cases)		1927 (closed com- pensable cases)		1927 (closed com- pensable cases)		Oct. 1, 1926, to Sept. 30, 1927 (cases reported)		Nov. 1, 1926, to Oct. 31, 1927 (compen- sation claims allowed)		July 1, 1926, to June 30, 1927 (tabu- latable in- juries)		July 1, 1923, to June 30, *1924 (closed compensable cases)		1927 (closed compensable cases)		July 1, 1926, to June 30, 1927 (closed compensable cases)		1924 (closed compensable cases)		Oct. 1, 1926, to Sept. 30, 1927 (closed compensable cases)		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
NUMBER																							
Total.....	5,736	33	5,653	414	50,505	2,086	38,745	1,794	13,686	835	58,217	5,950	14,965	716	24,053	1,812	91,585	7,399	76,546	2,228	3,479	506	
Age not reported.....	437	3	514	25	228	16	620	52	213	38	58,217	5,950	1,311	96	-----	-----	9,657	960	-----	-----	145	21	
Total reporting age.....	5,299	30	5,139	389	50,277	2,070	38,125	1,742	13,473	797	58,217	5,950	13,654	620	24,053	1,812	81,928	6,439	76,546	2,228	3,334	485	
Under 16 years.....	9	1	66	10	55	7	-----	-----	64	24	384	113	-----	-----	129	26	200	59	9,197	3,773	28	10	
16 to 20 years.....	635	10	813	134	4,038	591	2,912	1,417	1,677	298	6,420	1,403	1,158	138	2,478	523	8,263	1,731	1,200	67,349	1,455	539	163
21 to 25 years.....	1,320	4	1,017	63	6,100	291	-----	-----	2,436	136	10,146	1,329	2,265	153	21,446	1,263	13,141	1,200	-----	-----	436	87	
26 to 30 years.....	909	5	874	50	-----	-----	13,119	6,632	2,119	90	8,428	767	2,209	85	-----	-----	12,746	789	-----	-----	435	48	
31 to 35 years.....	651	3	636	38	14,487	536	-----	-----	1,681	57	8,525	611	1,830	57	-----	-----	10,965	604	-----	-----	379	43	
36 to 40 years.....	642	4	569	29	-----	-----	9,613	317	1,651	56	6,717	569	1,713	55	-----	-----	10,560	691	-----	-----	372	47	
41 to 45 years.....	365	1	364	26	13,044	380	-----	-----	1,237	51	4,982	442	1,907	39	-----	-----	8,068	476	-----	-----	317	25	
46 to 50 years.....	408	1	347	15	11,567	253	6,638	215	985	46	4,460	346	989	42	-----	-----	6,786	377	-----	-----	291	33	
51 years and over.....	360	1	453	24	986	12	5,843	161	1,623	39	8,155	370	2,183	51	-----	-----	11,199	512	-----	-----	537	29	
PER CENT																							
Total reporting age: Number.....	5,299	30	5,139	389	50,277	2,070	38,125	1,742	13,473	797	58,217	5,950	13,654	620	24,053	1,812	81,928	6,439	76,546	2,228	3,334	485	
Per cent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Under 16 years.....	0.2	3.3	1.3	2.6	0.1	0.3	-----	-----	0.5	3.0	0.7	1.9	-----	-----	0.5	1.4	0.2	0.9	12.0	34.7	0.8	2.1	
16 to 20 years.....	12.0	33.3	15.8	34.4	8.0	28.6	7.6	23.9	12.4	37.4	11.0	23.6	8.5	22.3	10.3	28.9	10.1	26.9	-----	-----	16.2	33.6	
21 to 25 years.....	24.9	13.3	19.8	16.2	12.1	14.1	-----	-----	18.1	17.1	17.4	22.3	16.6	24.7	89.2	69.7	16.0	18.6	88.0	65.3	13.1	17.9	
26 to 30 years.....	17.2	16.7	17.0	12.9	28.8	25.9	34.4	36.3	15.7	11.3	14.5	12.9	16.2	13.7	-----	-----	15.6	12.3	-----	-----	13.0	9.9	
31 to 35 years.....	12.3	10.0	12.4	9.8	-----	-----	-----	-----	12.5	7.2	14.6	10.3	13.4	9.2	-----	-----	13.4	9.4	-----	-----	11.4	8.9	
36 to 40 years.....	12.1	13.3	11.1	7.5	25.9	18.4	25.2	18.2	12.3	7.0	11.5	9.6	12.5	8.9	-----	-----	12.9	10.7	-----	-----	11.2	9.7	
41 to 45 years.....	6.9	3.3	7.1	6.7	-----	-----	-----	-----	9.2	6.4	8.6	7.4	9.6	6.3	-----	-----	9.8	7.4	-----	-----	9.5	5.2	
46 to 50 years.....	7.7	3.3	6.8	3.9	23.0	12.2	17.4	12.3	7.3	5.8	7.7	5.8	7.2	6.8	-----	-----	8.3	5.9	-----	-----	8.7	6.8	
51 years and over.....	6.8	3.3	8.8	6.2	2.0	0.6	15.3	.2	12.0	4.9	14.0	6.2	16.0	8.2	-----	-----	13.7	8.0	-----	-----	16.0	5.9	

<sup>1</sup> Under 20 years.

<sup>2</sup> 15 to 20 years, 20 to 25 years, etc.

<sup>3</sup> Under 21 years.

<sup>4</sup> 21 to 24 years—remaining classes run 25 to 34, 35 to 44, 45 to 64, 65 years and over.

<sup>5</sup> 21 years and over.

<sup>6</sup> 20 to 30 years—remaining classes run 30 to 40, 40 to 50 years, etc.

In New York, for example, 27.8 per cent of the women compensated in the year ended June 30, 1927, but only 10.3 per cent of the men, were under 21 years. In Massachusetts in the fiscal year 1927, 25.5 per cent of the women injured were under 21, in contrast to 11.7 per cent of the men. In Illinois in 1927, persons under 21 comprised 28.9 per cent of the women compensated and 8.1 per cent of the men. In Georgia in 1927, 37 per cent of the closed compensable cases for women, as compared to 17.1 per cent of those for men, were reported as under 21 at the time of the accident.

In some of the States the proportion of the women in the next age group, 21 to 25 years, also was larger than that of the men. In 5 of the 6 States for which the ages of the men and women injured are reported in such a way that classification by 5-year periods could be made, it is found that the greatest concentration of the injuries to women in any 5-year age group was that of girls of 16 to 20 years, while for men the groups 21 to 25 and 26 to 30 show the greatest concentration of injuries.

In absolute terms, much larger numbers of young men than of young women were injured, although a relatively small proportion of the accidents to men were to those under 21. This is to be expected from the fact that the number of males employed is greater than the number of females, among minors as well as adults. Relative to the total number of accidents, however, those to young persons were a greater proportion in the case of women than in the case of men.

The greater relative number of accidents to females under 21 than to males under 21 follows naturally from the fact that a greater proportion of females than of males gainfully occupied are young. In 1920, of all females 10 years of age and over gainfully occupied in the United States, 20.6 per cent were under 20 years and 41.7 per cent were under 25; while of men only 9.9 per cent were under 20 and only 22.3 per cent were under 25.<sup>9</sup>

Nevertheless it is apparent that a disproportionate number of the younger women employees are injured. Where comparable figures are available it is clear that the young women formed larger proportions of the injured than of all gainfully employed women. For example, in Pennsylvania in 1924 girls under 20 constituted 30.4 per cent of the closed compensable cases reported among women, though they were only 23.9 per cent of all women gainfully occupied in 1920; in Minnesota in 1924 they constituted 22.3 per cent of closed compensable cases of women, though only 18 per cent of all employed women in 1920; and in Indiana they were 23.9 per cent of all cases of accidents to women reported in 1927, though they were only 20.5 per cent of the women gainfully occupied in 1920.<sup>10</sup> For other States figures are not available on injuries to women under 20 for comparison with the number of occupied women under 20. But a comparison of the proportion of the injured women who were under 21 with the per cent of all occupied who were under 20 showed too large a discrepancy to be accounted for by one year's difference in age classification.

<sup>9</sup> U. S. Bureau of the Census. Fourteenth Census: 1920, vol. 4, Population, Occupations, p. 376.

<sup>10</sup> U. S. Bureau of the Census. Fourteenth Census: 1920, vol. 4, Population, Occupations, pp. 444 and 445; Pennsylvania Department of Labor and Industry, Special Bul. 17, 1926, pp. 27 and 91; and Table 2, p. 21.

State	Proportion of women under 20 among all gainfully occupied in 1920 <sup>1</sup>	Proportion of women under 21 in women's accident cases made public <sup>2</sup>
	<i>Per cent.</i>	
Alabama.....	28.4	36.7 per cent of compensable cases, 1922.
Georgia.....	25.1	37 per cent of closed compensable cases, 1927.
Illinois.....	20.9	28.9 per cent of closed compensable cases, 1927.
Maryland.....	20.7	40.4 per cent of compensation claims allowed in 1927.
Massachusetts.....	17.7	25.5 per cent of tabulatable injuries, 1927.
New Jersey.....	25.0	30.3 per cent of closed compensable cases, 1927.
New York.....	19.9	27.8 per cent of closed compensable cases, 1927.
Rhode Island.....	22.9	35.7 per cent of closed compensable cases, 1927.

<sup>1</sup> U. S. Bureau of the Census. Fourteenth Census: 1920, vol. 4, Population, Occupations, pp. 444 and 445.

<sup>2</sup> See Table 2, p. 21.

Since such large proportions of the women employed are young and the number of accidents to this group indicates that many are employed in hazardous occupations, special attention to the circumstances of their employment, as well as to that of boys under 21, is needed as a part of any accident-prevention program. Light on these problems must be sought in further analysis of accidents according to the industries in which they occur and their causes.

*Extent of disability.*—The relative seriousness of accidents to men and to women is shown in only a few reports. Seven States, following the standard classification, have reported the sex of the injured and classified the accidents as fatals, permanent total disabilities, permanent partial disabilities, and temporary disabilities in at least one year of the period 1920 to 1927.

TABLE 3.—Distribution of accidents to men and women by extent of disability, in 1927 or most recent year of the period 1920 to 1927, in 7 States<sup>1</sup>

[For sources of information, see appendix]

State	Period covered	Accidents tabulated	Men					Women				
			Total	Fatal	Perma- nent total	Perma- nent partial	Tempo- rary	Total	Fatal	Perma- nent total	Perma- nent partial	Tempo- rary
NUMBER												
Alabama.....	1922.....	Compensable cases.....	5,736	231	4	355	5,146	33	-----	-----	3	30
Idaho.....	Nov. 1, 1925, to Oct. 31, 1928 <sup>2</sup> .....	Closed compensable cases.....	7,413	59	4	327	7,023	181	-----	-----	5	176
Illinois.....	1927.....	do.....	349,603	349	24	11,669	37,561	2,071	5	2	411	1,653
Maryland.....	Nov. 1, 1925, to Oct. 31, 1927.....	Compensation claims allowed.....	13,686	104	2	602	12,978	835	1	-----	43	791
Massachusetts.....	July 1, 1926, to June 30, 1927.....	Tabulatable injuries.....	58,217	311	16	1,141	56,749	5,950	6	1	91	5,852
Minnesota.....	July 1, 1919, to June 30, 1920.....	Closed compensable cases.....	12,325	196	7	1,137	10,985	413	5	-----	39	369
New York.....	July 1, 1926, to June 30, 1927.....	do.....	91,585	1,012	38	17,370	73,165	7,399	30	3	1,148	6,218
PER CENT												
Alabama.....	1922.....	Compensable cases.....	100.0	4.0	0.1	6.2	89.7	100.0	-----	-----	9.1	90.9
Idaho.....	Nov. 1, 1926, to Oct. 31, 1928 <sup>2</sup> .....	Closed compensable cases.....	100.0	.8	.1	4.4	94.7	100.0	-----	-----	2.8	97.2
Illinois.....	1927.....	do.....	100.0	.7	( <sup>3</sup> )	23.5	75.7	100.0	0.2	0.1	19.8	79.8
Maryland.....	Nov. 1, 1926, to Oct. 31, 1927.....	Compensation claims allowed.....	100.0	.8	( <sup>3</sup> )	4.4	94.8	100.0	.1	-----	5.1	94.7
Massachusetts.....	July 1, 1926, to June 30, 1927.....	Tabulatable injuries.....	100.0	.5	( <sup>3</sup> )	2.0	97.5	100.0	.1	( <sup>4</sup> )	1.5	98.4
Minnesota.....	July 1, 1919, to June 30, 1920.....	Closed compensable cases.....	100.0	1.6	.1	9.2	89.1	100.0	1.2	-----	9.4	89.3
New York.....	July 1, 1926, to June 30, 1927.....	do.....	100.0	1.1	( <sup>3</sup> )	19.0	79.9	100.0	.4	( <sup>4</sup> )	15.5	84.0

<sup>1</sup> Four other States gave less detailed reports on the extent of disability. In Iowa, July 1, 1925, to June 30, 1926, one of the accidents to women was fatal (0.45 per cent) and 39, or 0.4 per cent, of the accidents to men were fatal. (Iowa Bureau of Labor, Report for biennial period ending June 30, 1926, pp. 11 and 12.) In New Jersey, of the cases compensated in 1927, fatalities to women were 4, or 0.2 per cent of the total accidents to women; fatalities to men were 230, or 1 per cent of the total; and there were 11 permanent total disabilities among men. (New Jersey, Industrial Bulletin, September, 1928, pp. 43 and 45.) Pennsylvania reported on accidents that caused disability of two days or more, in 1921. Of 136,195 accidents to men, 1,911, or 1.4 per cent, were fatalities; 80,014, or 58.7 per cent, were serious injuries; and 54,270, or 39.8 per cent, were minor injuries resulting in time loss of not over 10 days. Of 4,002 accidents to women, 13, or 0.3 per cent, were fatalities; 2,373, or 59.3 per cent, were serious; and 1,616, or 40.4 per cent, were minor. (Pennsylvania, Labor and Industry, November, 1922, pp. 35 and 12.) Virginia reported on cases of temporary total disability disposed of during the 2-year period. The numbers have been divided by two to get an estimated figure for one year. Of the 7,031 cases of temporary total disabilities estimated for one year, 199, or 2.8 per cent, occurred to women. (Virginia, Biennial report of the Industrial Commission, 1924-25, p. 12.)

<sup>2</sup> The numbers reported for this 2-year period have been divided by two, to give an estimated number for one year.

<sup>3</sup> Excludes accidents to 902 males and 15 females, extent not classified.

<sup>4</sup> Less than 0.05 per cent.

That for men as for women the very great majority of injuries cause temporary rather than permanent disability and that there are more serious accidents to men than to women are very apparent from Table 3. As a rule women are not employed in the most dangerous industries. The proportion of accidents that culminated fatally was as much as 4 per cent in the case of males in Alabama, a State where the compensation law excludes all employments having fewer than 16 employees and all accidents but those whose time loss exceeds two weeks. Fatalities to men formed 1.6 per cent of the accidents to men in Minnesota and 1.1 per cent of those to men in New York. Fatalities to women were a smaller proportion, 1.2 per cent of the accidents to women in Minnesota and 0.4 per cent of those in New York and Iowa being the highest proportions in the States reporting. The fact that the reports quoted in Table 3 show 30 fatal cases in New York, 13 in Pennsylvania, 6 in Massachusetts, 5 in Minnesota, 5 in Illinois, 4 in New Jersey, and 1 each in Iowa and Maryland proves, nevertheless, that women are subject to serious employment hazards. Permanent total disabilities, infrequent to men, were reported in only a few cases of women; in the reports of 1927 New York showed 3 women, Illinois 2, and Massachusetts 1 to have been the victims of accidents having this terrible result.

It is significant that in the year for which the last report by sex was made, permanent partial disabilities—the dismemberments, disfigurements, and complete or partial loss of use of members that handicap workers for life—occurred to women in almost as large proportions as to men in four States and in larger proportions in Alabama, Maryland, and Minnesota.

In Illinois and New York, 19.8 per cent and 15.5 per cent, respectively, of the injuries to women, as compared to 23.5 per cent and 19 per cent of those to men, were permanent partials. Injuries of this extent occur frequently both to men and to women.

The fact is very striking that the reports of Illinois and New York showed for both men and women a larger proportion of injuries causing permanent partial disabilities than is true of other States reporting by sex. In Maryland and Massachusetts, where the injuries reported included all those with disability of over three days in the one case and of as much as a shift in the other, it is understandable that temporary disabilities should be a larger proportion of the total than in those States reporting only disabilities that lasted more than a week, the minimum period in both Illinois and New York. On the other hand, Alabama, with a law exclusive as to employments and with a two weeks' waiting period, reports chiefly the more serious accidents in mining and heavy industries and accordingly shows a larger proportion of fatals and permanent total disabilities and a relatively smaller proportion of temporary disabilities.

The difference between Illinois and New York on the one hand, with relatively large proportions of permanent partials and proportions of temporary disabilities much below the average, and Idaho and Minnesota on the other hand, is not susceptible of assured explanation from the facts available. All these States reported closed compensable cases with a minimum period of disability of more than one week. In the absence of detailed analysis in all the States, it appears probable that the reason is found in the prevailing character of industry. The Idaho and Minnesota reports covered all employ-

ments except certain occupations commonly excluded. Illinois, however, with its law applying only to "extrahazardous" occupations, is less inclusive, while New York excluded also the nonhazardous employments in which fewer than four persons were employed.

These exclusions apparently weight the accident reports in the direction of occupations in which permanent partial injuries are more likely to occur. In Minnesota permanent partial disabilities occurred in greatest numbers in mining, the metal and wood industries, and construction, while in New York the metal industries, construction, and transportation and public utilities were responsible for many such injuries. The proportion of permanent partials among all injuries in the various industries, however, ran higher in New York than in Minnesota. For example, in New York construction caused a larger proportion of all accidents, and permanent partial disabilities were a larger proportion of all construction accidents, than was the case in Minnesota.<sup>11</sup> Apparently, conditions in New York and Illinois industries tend to cause more injuries of a permanent partial character than are caused by the industries of some other States. On the other hand, it is possible that a difference in liberality of administration may compensate as permanent partial disabilities certain conditions of disfigurement or partial loss of use that would not be compensated in other States. Without detailed knowledge of the administration in the different States it can not be said just how such differences in administration affect the statistics.

<sup>11</sup> Minnesota. Seventeenth Biennial Report of the Department of Labor and Industries, 1919-1920, pp. 36-37; and New York. Department of Labor. Special Bul. 157, pp. 46-54.

TABLE 4.—Distribution of accidents to men and women by age group and extent of disability, in 4 States, 1927

[For sources of information, see appendix]

State	Period covered	Accidents tabulated	Men					Women				
			Total	Fatal	Perma- nent total	Perma- nent partial	Tempo- rary	Total	Fatal	Perma- nent total	Perma- nent partial	Tempo- rary
NUMBER												
Illinois	1927	Closed compensable cases	14,054	19	3	873	3,159	1,595	1		132	462
Under 21 years			145,333	312	21	10,724	34,276	1,460	3	2	276	1,179
21 years and over												
Maryland	Nov. 1, 1926, to Oct. 31, 1927	Compensation claims allowed	1,741	9		89	1,643	322			20	302
Under 21 years			11,732	92	2	507	11,131	475	1		22	452
21 years and over												
Massachusetts	July 1, 1926, to June 30, 1927	Tabulatable injuries	6,804	11		134	6,659	1,516	2		32	1,482
Under 21 years			51,413	300	16	1,007	50,090	4,434	4	1	59	4,370
21 years and over												
New York	July 1, 1926, to June 30, 1927	Closed compensable cases	8,463	44	1	1,287	7,131	1,790	7		200	1,583
Under 21 years			73,465	951	36	14,728	57,750	4,649	22	3	835	3,789
21 years and over												
PER CENT												
Illinois	1927	Closed compensable cases	100.0	0.5	0.1	21.5	77.9	100.0	0.2		22.2	77.6
Under 21 years			100.0	.7	(?)	23.7	75.6	100.0	.2	0.1	18.9	80.8
21 years and over												
Maryland	Nov. 1, 1926, to Oct. 31, 1927	Compensation claims allowed	100.0	.5		5.1	94.4	100.0			6.2	93.8
Under 21 years			100.0	.8	(?)	4.3	94.9	100.0	.2		4.6	95.2
21 years and over												
Massachusetts	July 1, 1926, to June 30, 1927	Tabulatable injuries	100.0	.2		2.0	97.9	100.0	.1		2.1	97.8
Under 21 years			100.0	.6	(?)	2.0	97.4	100.0	.1	(?)	1.3	98.6
21 years and over												
New York	July 1, 1926, to June 30, 1927	Closed compensable cases	100.0	.5	(?)	15.2	84.3	100.0	.4		11.2	88.4
Under 21 years			100.0	1.3	(?)	20.0	78.6	100.0	.5	.1	18.0	81.5
21 years and over												

<sup>1</sup> Excludes accidents not classified by age and extent of disability.

<sup>2</sup> Less than 0.05 per cent.

The relative seriousness of the accidents that befall young persons and adults, both males and females, is indicated in Table 4 for those States that have reported on the extent of disability by age. In each of the 4 States reporting, the proportion of accidents that terminated fatally is larger for the persons above than for those below 21 years. Greater seriousness of accidents to older than to younger persons is by no means conclusively indicated, however, by the figures on permanent partial disabilities. In Maryland a larger proportion of the accidents both to boys and to girls than of those to men and to women caused permanent partial disability. In Massachusetts more of the accidents to girls than of those to women caused permanent partial disability, but for boys and men the proportions were the same.

Turning to New York and Illinois, where, as before noted, the proportions of permanent partial disabilities are large even after allowing for the fact that minor injuries with disability of a week or less are excluded, a different situation appears. In New York, injuries causing permanent partial disability were a considerably smaller proportion of the total in the case of boys and girls than in the case of men and women. In Illinois the proportion was less in the case of boys though a decidedly larger proportion of the injuries to girls than of those to women were dismemberments, disfigurements, or other permanent partial disabilities. The unfortunate fact must be realized that, in such industrial States as New York and Illinois, 11.2 per cent and 22.2 per cent, respectively, of the compensable accidents to women under 21 years of age, and 15.2 per cent and 21.5 per cent, respectively, of those to men under 21 years, have left the workers with permanent injuries, a handicap of greater or less extent for life. In the case of adult women in these States, 18 per cent and 18.9 per cent, respectively, received injuries that resulted in permanent disability to some degree.

The relative frequency of accidents that cause these dismemberments, disfigurements, and other permanent partial disabilities points strongly to the need of accident prevention. In many cases such accidents are caused by machinery. Machine guarding and the prohibition of the employment of young persons on dangerous machinery are necessary and obvious steps toward accident prevention. In States where permanent partial injuries form greater proportions of the accidents to young persons than of those to adults, the second of these steps particularly would seem to be indicated.

Accidents causing only temporary disability are in the great majority in the case of boys and girls, as of men and women. However liberally the workers may be compensated for these temporary disabilities, nevertheless the social waste can not be completely repaired. And that these disabilities can not be disregarded is evident from records of the National Safety Council and the United States Bureau of Labor Statistics—the former receiving reports from over 700 industrial establishments and the latter receiving reports for over 700,000 full-year workers—each of which shows a tendency in many industries to a severity rate of temporary-disability accidents greater in 1928 than in 1927.<sup>12</sup>

Although the increased rates may be accounted for partly by changes in the method of classifying accidents and in the reporting

<sup>12</sup> National Safety News, December, 1929, p. 21; Monthly Labor Review, January, 1930, p. 55.

groups, they are large enough to indicate a serious trend. Accidents causing only temporary disability can not be dismissed as of minor importance when their severity appears to be increasing.

For many minor injuries the time lost is uncompensated, although it amounts to large proportions. In those States where compensation does not begin until the passing of a week, 10 days, or two weeks, there is involved a loss of time that creates a serious problem for the wage earner.

From a New York report are obtainable the ages of the injured workers correlated with extent of disability. It is found that here the more serious injuries tended to occur to older workers. Where only temporary disability was caused, the median of the ages of the men was 33 years and that of the women was 26 years; where permanent partial disabilities occurred, the medians were respectively 37 and 33; deaths and permanent total disabilities affected a still older group, the medians being 41 years for the men and 43 for the women.<sup>13</sup>

It is a grave matter for workers, men or women, to lose time under any conditions, and especially so when shock and suffering as well as increased financial burdens are the result.

The total loss of production from industrial accidents also is a heavy toll. The human and industrial costs call loudly for further attention—the ounce of prevention that shall make unnecessary the pound of cure.

In spite of the importance of this problem to the men and women involved, the States, on the whole, have neglected to collect and publish full details on the loss of time in accidents, both major and minor. In the period 1920 to 1927 only four States published information on the loss of time from accidents to men and to women.

The Illinois report for the calendar year 1925 and the New York report for the year ended June 30, 1927, furnish evidence of the somewhat greater relative seriousness of injuries to men than to women in tabulations showing the number of weeks of temporary total disability per case.<sup>14</sup> In Illinois in 1925 (Table 5) the disability lasted less than two weeks in 31.2 per cent of the temporary total disability cases reported for women and in 26.5 per cent of those reported for men. Two and under four weeks was the time of disability for about 38 per cent both of men and of women. Disability of four weeks or more was suffered by 30.1 per cent of the women and by 35.6 per cent of the men.

<sup>13</sup> New York. Department of Labor. Compensation statistics, year ended June 30, 1927. Special Bul. 157, p. 16.

<sup>14</sup> Alabama, 1922 (also in 1920 and 1921), and Virginia, 1925, published information on time lost, but these figures are not comparable to those of Illinois or New York.

TABLE 5.—*Distribution of temporary total disabilities of men and women by weeks of disability, cases closed in 1925, Illinois*

[For source of information, see appendix]

Weeks of disability	Number		Per cent	
	Men	Women	Men	Women
Total.....	40, 733	1, 308	100. 0	100. 0
Under 2.....	10, 809	408	26. 5	31. 2
2 and under 3.....	9, 979	319	24. 5	24. 4
3 and under 4.....	5, 432	187	13. 3	14. 3
4 and over.....	14, 513	394	35. 6	30. 1

The figures for New York (Table 6) show, for persons under 21 years and for those 21 years and over, the average number of weeks awarded in all cases compensated in the year ended June 30, 1927. In this table the standard weighting of 6,000 days for each death or permanent total disability was used. The average number of weeks awarded was 10.8 for women under 21 years and 17.5 for women of 21 years or more; for men under 21 it was 13.9 and for older men 24.8. The average disability thus was considerably less for women than for men, but a condition of substantial industrial hazard for women as well as for men nevertheless is very clear.

TABLE 6.—*Number of weeks of disability of adults and minors, by sex—cases of compensated accidents closed in year ending June 30, 1927, New York*

[For source of information, see appendix]

Sex and age group	Number of cases	Weeks of disability	
		Number <sup>1</sup>	Average per case
Women:			
Under 21 years.....	1, 790	19, 332	10. 8
21 years and over.....	5, 609	98, 364	17. 5
Men:			
Under 21 years.....	8, 463	117, 387	13. 9
21 years and over.....	83, 122	2, 063, 409	24. 8

<sup>1</sup> The standard weighting of 6,000 days (1,000 weeks) is used for each death and each permanent total disability.

For New York the analysis is carried further in Table 7, which gives the industry in which the accident occurred and the average number of weeks awarded in cases of temporary and permanent partial disability. Here the average numbers are not weighted by the fatal and permanent total disability cases, and with these more serious cases excluded it is found that, for all industries, the average number of weeks was only a little less for women than for men—11.5 and 12.5, respectively.

TABLE 7.—Industrial distribution of all cases, and weeks of disability of temporary and permanent partial cases, by sex—cases of compensated accidents closed in year ending June 30, 1927, New York

[For sources of information, see appendix]

Industry	Men			Women		
	Number of cases	Weeks of disability <sup>1</sup>		Number of cases	Weeks of disability <sup>1</sup>	
		Number	Average per case		Number	Average per case
Total.....	91, 585	1, 130, 796	12. 5	7, 399	84, 696	11. 5
Manufacturing.....	35, 673	442, 299	12. 5	4, 164	39, 345	9. 5
Metals and metal goods.....	7, 820	94, 570	12. 2	288	3, 981	13. 8
Machinery and vehicles.....	6, 458	90, 195	14. 1	281	2, 925	10. 4
Wood and wood products.....	3, 697	53, 921	14. 7	69	306	4. 4
Food products.....	4, 321	52, 789	12. 3	466	4, 270	9. 3
Clothing.....	2, 193	17, 869	8. 2	1, 422	8, 201	5. 8
Laundries.....	464	7, 549	16. 5	295	6, 197	21. 1
Textiles.....	1, 337	17, 433	13. 1	504	4, 617	9. 2
Chemicals.....	1, 595	19, 962	12. 7	89	1, 025	11. 6
Paper and paper goods.....	2, 077	23, 711	11. 6	245	3, 041	12. 5
Printing.....	1, 530	16, 705	11. 0	118	1, 152	9. 8
Leather, rubber, and composition goods.....	1, 922	19, 257	10. 1	263	2, 023	7. 7
Stone, clay, and glass products.....	1, 686	21, 757	13. 0	26	161	6. 2
Miscellaneous.....	573	6, 581	11. 5	104	1, 446	13. 9
Construction.....	21, 595	298, 297	14. 0	11	284	25. 8
Transportation and public utilities.....	16, 596	182, 453	11. 1	70	1, 078	15. 6
Trade.....	8, 617	92, 994	11. 0	650	7, 470	11. 5
Clerical and personal service.....	7, 123	89, 846	12. 8	2, 436	35, 807	14. 8
Clerical and professional employment.....	802	10, 010	12. 8	457	5, 096	11. 2
Hotels, restaurants, and care of buildings.....	4, 689	57, 473	11. 9	1, 933	29, 981	15. 7
Miscellaneous.....	1, 432	22, 363	16. 0	46	730	15. 9
Mining and quarrying.....	981	12, 947	13. 7	-----	-----	-----
Agriculture.....	716	10, 250	14. 5	36	575	16. 0
Not otherwise classified.....	384	1, 670	4. 4	32	137	4. 3

<sup>1</sup> Number of weeks awarded for temporary and permanent partial disability cases only. Figures from Industrial Bulletin, June, 1928, p. 274.

For both men and women the most serious of these injuries, disregarding the question of frequency, occurred in the laundry industry, where the average number of weeks per case was 21.1 for women and 16.5 for men. Groups in which considerable numbers of women were injured and a high average of weeks per case indicated serious consequences were hotels, restaurants, and care of buildings, with an average number of weeks of disability of 15.7; the manufacture of metals and metal goods, of paper and paper goods, and of machinery and vehicles, with 13.8, 12.5, and 10.4 weeks, respectively; trade, with 11.5; and clerical and professional employment, with 11.2. For men the hazards were most serious, with considerable numbers of accidents and high averages of weeks awarded, in construction, the manufacture of wood and wood products, of machinery and vehicles, of textiles, of stone, clay, and glass products, of food products, and of metals and metal goods, in hotels, restaurants, and the care of buildings, and in transportation and public utilities.

*Industries in which accidents occur.*—To know where accidents occur—the industry and occupation—and what causes them is to know where and on what general lines accident-prevention work is most needed. Four States—Indiana, New Jersey, New York, and Pennsylvania—have reported recently on accidents to men and women by industry, and their figures, together with those of California for 1921, are given in Table 8. Kentucky and Tennessee also, in 1919–20, reported accidents by sex and industry, but the classifications used were not comparable with those set up by the International Association of Industrial Accident Boards and Commissions.

The difference in inclusiveness of the reports, which affects the distribution of accidents by industry, must be allowed for. The reports from California and Indiana cover all employments and all injuries of more than one day's disability; the other 3 States report compensable injuries that caused disability of more than a week. As to employments, New Jersey excludes only casual employees and public employees receiving over \$1,200; Pennsylvania excludes farm labor, domestic service, casual employees, and out-workers; and New York excludes farm labor, domestic service, and nonhazardous employments with fewer than four employees.

The difference in character of the occupations in which women and men are injured is at once apparent from Table 8. In the data reported the largest proportions of accidents to men occurred in manufacturing, construction, transportation and public utilities, and mining in the States where mining is an important occupation, but accidents to women were more concentrated in the manufacturing group. In all the States here reported except California more than one-half of the accidents to women were in manufacturing. Trade (mercantile establishments) was the source of a considerable proportion of accidents to women, while work in hotels, restaurants, and the care of buildings also was responsible for large numbers of accidents—20 per cent of the accidents to women reported in California and about 26 per cent of the cases compensated in New York.

Within the manufacturing group the importance of specific industries as a source of accidents to women varied from State to State. In California nearly 22 per cent of the women injured were employed in food manufactures. In Indiana, where two-thirds of the accidents to women were in manufacturing, 14.3 per cent were in metals, machinery, and vehicles, 12.4 per cent in food and food products, and 9 per cent in clothing. In New York the clothing industries, with 19.2 per cent of the injured, were second of the classifications included, hotels, restaurants, and care of buildings being the most important source of accidents. Metals, machinery, and vehicles followed clothing, having nearly 8 per cent of the injured women; then textiles, with nearly 7 per cent, and food with 6.2 per cent. In Pennsylvania textiles led among the manufacturing industries as a source of accident, with 13 per cent of all accidents to women; the clothing industries, with 12.3 per cent, were next, and the manufacture of metals, machinery, and vehicles, with 7.6 per cent, was third.

The New York Department of Labor publishes also a separate tabulation for men and women under 21 years of age in relation to the

TABLE 8.—Industrial distribution of accidents to men and women, in 1927 or most recent year of the period 1920 to 1927, in 5 States<sup>1</sup>

[For sources of information, see appendix]

Industry	California		Indiana <sup>2</sup>		New Jersey		New York		Pennsylvania		California		Indiana		New Jersey		New York		Pennsylvania		
	1921 (tabulatable injuries)		Oct. 1, 1926, to Sept. 30, 1927 (cases reported)		1927 (closed com- pensable cases)		July 1, 1926, to June 30, 1927 (closed com- pensable cases)		1927 <sup>3</sup> (com- pensable cases)		1921 (tabulat- able injuries)		Oct. 1, 1926, to Sept. 30, 1927 (cases reported)		1927 (closed com- pensable cases)		July 1, 1926, to June 30, 1927 (closed com- pensable cases)		1927 <sup>3</sup> (com- pensable cases)		
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	
Number										Per cent											
Total.....	59,529	2,744	38,745	1,794	24,053	1,812	91,585	7,399	72,190	2,691	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Manufacturing.....	16,163	1,215	21,432	1,198	11,334	1,145	35,673	4,164	25,047	1,446	27.2	44.3	55.3	66.8	47.1	63.2	39.0	56.3	35.9	53.7	
Food.....	3,962	598	2,660	222	1,467	146	4,321	460	2,344	166	6.7	21.8	6.9	12.4	4.7	6.2	3.2	6.2	3.2	6.2	
Clothing.....	146	67	94	162	1,337	504	2,193	1,422	420	332	0.5	2.4	0.2	9.0	2.4	19.2	1.6	12.3	1.6	12.3	
Textiles.....	4,472	477	6,838	195	7,820	288	14,457	4,205	930	349	7.5	17.6	4.3	10.9	8.5	3.9	20.0	4.7	6.8	1.3	13.0
Metals and metal goods.....	4,488	61	4,488	61	6,458	281	6,458	281	14,457	4,205	7.5	11.6	3.4	3.4	7.1	3.8	20.0	3.8	7.1	3.8	
Machinery and vehicles.....	124	105	124	105	464	295	( <sup>4</sup> )	( <sup>4</sup> )	( <sup>4</sup> )	( <sup>4</sup> )	0.2	0.3	0.3	0.3	0.5	0.4	( <sup>4</sup> )	( <sup>4</sup> )	( <sup>4</sup> )	( <sup>4</sup> )	
Laundries, cleaning and dyeing goods.....	495	92	495	92	1,922	263	1,922	263	729	37	0.8	1.3	0.3	5.1	2.1	3.6	0.6	1.0	1.4	1.4	
Leather, rubber, and composition goods.....	732	74	732	74	2,077	245	2,077	245	( <sup>5</sup> )	( <sup>5</sup> )	1.2	1.9	0.1	4.1	2.3	3.3	0.3	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	
Paper, pulp, and paper goods.....	252	40	252	40	1,530	118	1,530	118	1,119	123	0.4	0.7	0.2	2.2	1.7	1.6	0.2	1.6	1.6	4.6	
Printing.....	3,989	43	3,075	73	3,697	69	3,697	69	2,250	23	6.7	1.6	7.9	4.1	4.0	0.9	3.1	0.9	3.1	0.9	
Wood and wood products.....	1,719	66	1,719	66	1,686	26	1,686	26	1,978	50	2.9	4.4	3.7	4.4	1.8	4.4	2.7	1.9	1.9	1.9	
Stone, clay, and glass products.....	1,088	40	809	41	1,595	89	1,595	89	1,361	15	1.8	1.5	2.1	2.3	1.7	1.2	1.9	0.6	1.9	0.6	
Chemicals.....	2,652	457	2,652	457	573	104	573	104	7,359	714	4.5	16.7	0.2	0.2	0.6	1.4	7.5	7.5	5.4	5.4	
Miscellaneous.....	10,311	1,443	748	318	1,316	481	7,123	2,436	378	305	17.3	52.5	1.9	17.7	5.5	26.5	7.8	32.9	0.5	11.3	
Clerical, professional, and personal service.....	7,475	835	347	101	802	457	802	457	12,600	30,400	12.6	30.4	0.9	5.6	0.9	6.2	0.9	6.2	0.9	6.2	
Clerical and professional.....	1,854	550	354	208	4,889	1,933	4,889	1,933	378	305	3.1	20.0	0.9	11.6	5.3	26.1	0.5	11.3	0.5	11.3	
Hotels, restaurants, and care of buildings.....	982	58	47	9	1,432	46	1,432	46	1,432	46	1.6	2.1	0.1	0.5	1.6	0.6	0.1	0.5	0.1	0.5	
Miscellaneous, including domestic service.....	( <sup>6</sup> )	( <sup>6</sup> )	1,808	223	1,434	124	8,517	650	3,084	392	( <sup>6</sup> )	( <sup>6</sup> )	4.7	12.4	6.0	6.8	9.3	8.8	4.3	14.6	
Trade.....	13,194	32	2,748	39	3,775	35	16,596	70	2,890	55	22.2	1.2	7.1	2.2	15.7	1.9	18.1	0.9	4.0	2.0	
Transportation and public utilities.....	10,524	1	5,664	3	5,246	4	21,595	11	8,965	17	17.7	( <sup>6</sup> )	14.6	0.2	21.8	0.2	23.6	0.1	12.4	0.6	
Construction.....	4,360	51	176	400	22	716	36	27,047	2	7.3	1.9	0.5	5.5	1.7	1.2	8.5	0.5	1.2	0.5		
Agriculture.....	4,977	2	5,878	9	548	1	981	1	27,047	2	8.4	0.1	15.2	0.5	2.3	0.1	1.1	0.1	37.5	0.1	
Mining, metallurgy, and quarrying.....	291	4	291	4	384	32	3,879	474	3,879	474	0.5	0.2	0.8	0.2	0.4	0.4	5.4	0.4	17.6	17.6	
Miscellaneous.....	291	4	291	4	384	32	3,879	474	3,879	474	0.5	0.2	0.8	0.2	0.4	0.4	5.4	0.4	17.6	17.6	

<sup>1</sup> Kentucky and Tennessee also in 1919-20 reported accidents by sex in detailed unclassified lists of industries and occupations.

<sup>2</sup> Indiana reports accidents in a detailed unclassified list of industries and occupations. For this table the data have been reclassified according to the standard industry classification. The result is approximately accurate although (a) in a few cases dealers are included with manufacturers, and (b) several cases for which the appropriate classification could not be determined from the original description of the industry or occupation have been included with miscellaneous occupations.

<sup>3</sup> The Pennsylvania Department of Labor and Industries has published a table giving data in percentages for 1924. The data for 1927 used here are from a typewritten table furnished by the department.

<sup>4</sup> Includes all metal and machinery manufacturing.

<sup>5</sup> Laundries included with miscellaneous industries.

<sup>6</sup> Paper included with printing.

<sup>7</sup> Tobacco included.

<sup>8</sup> Trade is included with clerical and professional service.

<sup>9</sup> Less than 0.05 per cent.

industries in which the accidents occurred.<sup>15</sup> For the women in this classification, the group hotels, restaurants, and care of buildings was less important as a source of accidents than it was for all women injured, while over 75 per cent of all accidents to young women occurred in manufacturing. The clothing, textile, food, and metal industries were foremost among these. Many accidents occurred also to young women engaged in trade.

*Causes of accidents.*—In the years under review only 5 States have published data on the causes of accidents to men and to women. Figures from the reports of Indiana, Iowa, New Jersey, New York, and Pennsylvania are assembled in Table 9. The Indiana and Iowa data are more inclusive than are those of the other States, for they cover all accidents reported in all occupations in Indiana and in all but mines and railway train service in Iowa, when the disability is of more than one day in Indiana and of more than two days in Iowa. For New Jersey, New York, and Pennsylvania the reports are of compensable cases, with disability of over one week in the first two of these States and of more than 10 days in Pennsylvania.

<sup>15</sup>New York. Industrial Bulletin, June, 1928, p. 274.

TABLE 9.—Distribution of accidents to men and women by cause, in 1927 or most recent year of the period 1920 to 1927, in 5 States  
[For sources of information, see appendix]

Cause of accident	Indiana		Iowa		New Jersey		New York		Pennsylvania	
	Oct. 1, 1926, to Sept. 30, 1927 (cases reported)		July 1, 1925, to June 30, 1926 (cases reported)		1927 (closed compensable cases)		July 1, 1926, to June 30, 1927 (closed compensable cases)		1924 (closed compensable cases)	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
NUMBER										
Total.....	38,745	1,794	8,690	220	24,053	1,812	91,585	7,399	76,546	2,228
Machinery.....	3,814	391	1,045	33	3,301	585	13,995	1,990	10,172	785
Falls of persons.....	4,732	358	1,344	44	3,885	494	15,854	2,238	7,884	548
Handling of objects.....	7,900	224	961	3	8,489	377	26,608	1,084	16,553	348
Stepping on or striking against objects.....	4,093	277	-----	-----	1,472	108	4,443	480	3,171	181
Hand tools.....	1,653	98	625	31	( <sup>1</sup> )	( <sup>1</sup> )	6,946	554	6,212	68
Explosions, electricity, heat, etc.....	2,063	125	136	3	1,258	75	3,505	272	4,784	120
Falling objects.....	6,365	84	1,146	12	1,813	53	6,002	239	11,748	70
Vehicles.....	2,870	36	171	-----	2,441	32	8,819	78	13,793	53
Harmful substances.....	344	20	-----	-----	435	24	1,296	42	( <sup>2</sup> )	( <sup>2</sup> )
Animals.....	305	2	-----	-----	-----	-----	685	6	-----	-----
Miscellaneous and indefinite.....	4,606	179	3,262	94	959	64	3,432	416	2,229	55
PER CENT										
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Machinery.....	9.8	21.8	12.0	15.0	13.7	32.3	15.3	26.8	13.3	35.2
Falls of persons.....	12.2	20.0	15.5	20.0	16.2	27.3	17.3	30.2	10.3	24.6
Handling of objects.....	20.4	12.5	11.1	1.4	35.3	20.8	29.1	14.7	21.6	15.6
Stepping on or striking against objects.....	10.6	15.4	-----	-----	6.1	6.0	4.9	6.5	4.1	8.1
Hand tools.....	4.3	5.5	7.2	14.1	( <sup>1</sup> )	( <sup>1</sup> )	7.6	7.5	8.1	3.1
Explosions, electricity, heat, etc.....	5.3	7.0	1.6	1.4	5.2	4.1	3.8	3.7	6.2	5.4
Falling objects.....	16.4	4.7	13.2	5.5	7.5	2.9	6.6	3.2	15.3	3.1
Vehicles.....	7.4	2.0	2.0	-----	10.1	1.8	9.6	1.1	18.0	2.4
Harmful substances.....	.9	1.1	-----	-----	1.8	1.3	1.4	.6	( <sup>2</sup> )	( <sup>2</sup> )
Animals.....	.8	.1	-----	-----	-----	-----	.7	.1	-----	-----
Miscellaneous and indefinite.....	11.9	10.0	37.5	42.7	4.0	3.5	3.7	5.6	2.9	2.5

<sup>1</sup>Included with handling of objects.

<sup>2</sup>Included with explosions, etc.

A striking difference in the causes of the industrial accidents to men and to women is seen in the report from each of these States. For men the heavier and more dangerous character of their occupations is evident from the fact that the handling of objects is the greatest cause of accidents in four of the five States, while falls of persons, machinery, and falling objects, in various orders in the different States, also, are very important as causes. In Pennsylvania, accidents from cars and engines in mines make vehicles one of the most prolific causes of accident, and vehicles likewise cause large numbers of accidents to men in New York, New Jersey, and Indiana.

Machinery ranks high as the cause of accidents for a large proportion of women in the States reporting. As high as 35.2 per cent of the compensable accidents to women in Pennsylvania in 1924 were caused by machinery, as were 32.3 per cent of those in New Jersey in the calendar year 1927, and 26.8 per cent of those in New York in the fiscal year 1927. In Indiana and Iowa, which include more of the minor injuries than do the other States, 21.8 per cent and 15 per cent, respectively, of the injuries to women were caused by machinery, which outranked all other causes in Indiana and in Iowa was exceeded only by falls of persons. Falls of persons were an important cause of accidents to women; in New York, as in Iowa, falls caused more accidents than did machinery. Handling of objects also caused many accidents to women.

For Kansas, in 1924, a report was made on the causes of industrial accidents to a small group of women.<sup>16</sup> Here, also, machinery was one of the chief causes of accidents, for it was responsible for 20.6 per cent of the 102 accidents reported. Falls of persons and the handling of objects, however, each with 21.6 per cent of the accidents, were slightly more important than machinery as a cause of accidents to women.

For New Jersey, New York, and Pennsylvania it is possible to learn the cause of accidents to men and women of the two age groups 21 years or more and under 21. In the data from the reports of these States, assembled in Table 10, one fact stands out with startling clearness—the greater relative importance of machinery and the lesser relative importance of falls as a cause of accidents to boys and girls than to men and women. In New York, for example, falls caused nearly 18 per cent of the accidents to adult men and only 12.4 per cent of those to boys, and they caused practically 35 per cent of the accidents to women of 21 and over and less than 16 per cent of those to women under 21.<sup>17</sup>

<sup>16</sup> Kansas. Court of Industrial Relations. Fifth annual report, year ended December 31, 1924, p. 99.

<sup>17</sup> A New York study of accidents in the year ended June 30, 1925, gave further details on accidents due to falls. "Of the accidents to females caused by falls, one-half were due to falls on the level, almost a half to falls from elevations. Two-thirds of the falls on levels were caused by slipping of the foot, and 14 per cent by stumbling over loose objects. This suggests correct shoes and cleared aisles and workrooms as accident preventives." New York. Department of Labor. Special Bul. 144. Some recent figures on accidents to women and minors. June, 1926, p. 10.

TABLE 10.—*Distribution of accidents to men and women by cause and age group, in New Jersey, 1927, New York, 1927, and Pennsylvania, 1924*

[For sources of information, see appendix]

Cause of accident	New Jersey				New York				Pennsylvania			
	1927 (closed compensable cases)				July 1, 1926, to June 30, 1927 (closed compensable cases)				1924 (closed compensable cases)			
	Men		Women		Men		Women		Men		Women	
	21 and over	Under 21	21 and over	Under 21	21 and over	Under 21	21 and over	Under 21	21 and over	Under 21	21 and over	Under 21
	NUMBER											
Total.....	21,446	2,607	1,263	549	83,122	8,463	5,609	1,790	67,349	9,197	1,455	773
Machinery.....	2,644	657	311	274	11,870	2,125	1,195	795	8,387	1,785	375	410
Falls of persons.....	3,579	306	421	73	14,806	1,048	1,955	283	7,169	715	474	74
Handling of objects.....	7,658	831	263	114	24,294	2,314	836	248	14,098	1,855	225	123
Stepping on or striking against objects.....	1,313	159	82	26	4,000	443	368	112	2,712	459	129	52
Hand tools.....	(1)	(1)	(1)	(1)	6,237	709	393	161	5,563	649	39	29
Explosions, electricity, heat, etc.....	1,125	133	57	18	3,205	300	226	46	4,260	524	80	40
Falling objects.....	1,699	114	41	12	5,631	371	186	53	11,015	733	58	12
Vehicles.....	2,156	285	22	10	7,994	825	66	12	11,594	2,199	37	16
Harmful substances.....	390	45	14	10	1,209	87	34	8	(2)	(2)	(2)	(2)
Animals.....					644	41	6					
Miscellaneous and indefinite.....	882	77	52	12	3,232	200	344	72	1,951	278	38	17

PER CENT

Total .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100
Machinery .....	12.3	25.2	24.6	49.9	14.3	25.2	21.3	44.4	12.5	19.4	25.8	53.0	53.0
Falls of persons .....	16.7	11.7	33.3	13.3	17.8	12.4	34.9	15.8	10.6	7.8	32.6	9.6	9.6
Handling of objects .....	35.7	31.9	20.8	20.8	29.2	27.3	14.9	13.9	21.8	20.2	15.5	15.9	15.9
Stepping on or striking against objects .....	6.1	6.1	6.5	4.7	4.8	5.2	6.6	6.3	4.0	5.0	8.9	6.7	6.7
Hand tools .....	(1)	(1)	(1)	(1)	7.5	8.4	7.0	9.0	8.3	7.1	2.7	3.8	3.8
Explosions, electricity, heat, etc. ....	5.2	5.1	4.5	3.3	3.9	3.5	4.0	2.6	6.3	5.7	5.5	5.2	5.2
Falling objects .....	7.9	4.4	3.2	2.2	6.8	4.4	3.3	3.0	16.4	8.0	4.0	1.6	1.6
Vehicles .....	10.1	10.9	1.7	1.8	9.6	9.7	1.2	.7	17.2	23.9	2.5	2.1	2.1
Harmful substances .....	1.8	1.7	1.1	1.8	1.5	1.0	.6	.4	(2)	(2)	(2)	(2)	(2)
Animals .....					.8	.5	.1						
Miscellaneous and indefinite .....	4.1	3.0	4.1	2.2	3.9	2.4	6.1	4.0	2.9	3.0	2.6	2.2	2.2

<sup>1</sup>Included with handling of objects.

<sup>2</sup>Included with explosions, etc.

Turning to machine accidents, the differences are equally striking. In each of the three States reported in this table, machine accidents constituted less than 15 per cent of all accidents to adult men, but they were 25.2 per cent of those to men under 21 in New Jersey and New York and 19.4 per cent of those to the younger group in Pennsylvania. Machine accidents were from 21.3 per cent to 25.8 per cent of all accidents to adult women in these States, but they comprised approximately half of all accidents to women under 21—in New Jersey 49.9 per cent, in New York 44.4 per cent, and in Pennsylvania 53 per cent. Expressed differently, the condition is clear in this statement:

	Per cent under 21 years of age among—			
	All women injured	All women injured by machinery	All men injured	All men injured by machinery
New York.....	24. 2	39. 9	9. 2	15. 2
New Jersey.....	30. 3	46. 8	10. 8	19. 9
Pennsylvania.....	34. 7	52. 2	12. 0	17. 5

From such figures it may be realized how important is machinery in its toll of injuries to young people and how rich a field for accident prevention is found in the machine industries.

A study by the Women's Bureau of industrial accidents to women in New Jersey, Ohio, and Wisconsin from July 1, 1919, to June 30, 1920, had similar findings. Comments of the report on these points may be quoted:<sup>18</sup>

"The age element in accident causation is an important factor in a program for the prevention of industrial injury. A study of the material recorded on this point indicates that certain causes operate with more serious effect in some age groups than in others, which fact points to one potent method for reducing industrial injury; that is, the need of prohibiting the employment of very young persons on certain types of work.

"Of the 3,095 women injured for whom age was reported, 46.4 per cent were injured by machinery. The steady decrease in the number of injuries due to machinery with increase in age \* \* \* indicates in general that a larger number of injuries occurred in the younger age groups. Twenty-seven per cent of all the injured women reporting age were under 20, while 37 per cent of those injured by machinery were under 20.

"A glance at the nonmachine accidents reveals that falls of persons, which next to machinery were by far the most serious cause of injury numerically, show just the opposite curve; that is, the number of injuries increases with a fair degree of continuity as the age of the injured woman increases. Forty-four per cent of the injuries caused in this way occurred to women of 40 and over and only 12 per cent were to women under 20. Furthermore, of all accidents to women of 40 or more, 43 per cent were falls; of those to women of under 20, less than 10 per cent were falls. The women injured by handling objects, which as a cause of accident was third in numerical importance, were fairly evenly dispersed among the various age groups."

<sup>18</sup> U. S. Department of Labor. Women's Bureau. Industrial Accidents to Women in New Jersey, Ohio, and Wisconsin. Bul. 60, 1927, pp. 127 and 130.

The New York State Department of Labor has published further analyses of accidents by cause. In a report covering compensable accidents to women and minors for the year ended June 30, 1927, the kinds of machines on which accidents occurred are reported. This information is shown for males and females under 21 years and is compared with figures for the group of adult women whose injuries were due to machinery.<sup>19</sup> It was found that textile and textile-products machines and metal-working machines were responsible for almost three-fifths (58.5 per cent) of the machine accidents to girls under 21, sewing machines and power presses accounting for the majority. Among older women, sewing machines and food-products machines were the chief types causing accidents. Among boys under 21, for whom machinery was the cause of accidents, metal-working machines were the most dangerous (37.7 per cent of all), with power presses responsible for almost two-fifths of the accidents of this character.<sup>20</sup> Saws and printing presses also injured many boys. It is significant that accidents to boys and girls engaged in metals and metal-goods manufacturing were shown to be considerably more serious than the average, judging by the number of weeks of disability per case.

A report from Pennsylvania in analyzing machine accidents shows that these were 19.4 per cent of all accidents to boys, 53 per cent of all to girls, and 25.8 per cent of the total number to adult women.<sup>21</sup> Power-working machines caused 84.5 per cent of all machine accidents to workers under 21 (81.5 per cent of those to boys and 97.8 per cent of those to girls), 93.8 per cent of those to adult women, but only 69.3 per cent of those to adult men. The metals and metal-products industries were responsible for more than a third (36.1 per cent) of the injuries to minors on power-working machines.

Specific knowledge of the sort given in the reports referred to, concerning the industries in which accidents occur in greatest numbers and the most common causes of accidents, is of the utmost value in directing attention to the industries and occupations where accident prevention is most needed. The New York State Department of Labor gives further aid in practical means of preventing accidents by a very valuable series of bulletins on the causes of accidents occurring in various industries. The purpose of these bulletins is "to acquaint employers and employees with the different ways in which accidents occur in an industry and to give suggestions as to their prevention with the hope that with this information they will be able to prevent the occurrence of similar accidents in their individual factories."<sup>22</sup>

These studies, with their accounts of accidents and pictures of machines both unguarded and with suitable and practical guards, have the greatest educational value in promoting safe practices. Other States might well follow the lead of New York by similar specific studies of the problems that appear to offer the greatest hazards in their own States.

<sup>19</sup> New York. Department of Labor. Industrial Bulletin, June, 1928, pp. 274-276.

<sup>20</sup> Power presses caused 269 of the 707 metal-working-machine accidents to boys under 21 and 96 of the 170 metal-working-machine accidents to girls under 21.

<sup>21</sup> Pennsylvania. Department of Labor and Industry. Special Bul. 17. An Analysis of Compensated Accidents to Minors for the year 1924, pp. 39, 40, 90, and 91.

<sup>22</sup> New York. State Department of Labor. Special bulletin: An analysis of 300 accidents in plants manufacturing or preparing food products with suggestions as to safe practice and suitable machine guards, p. 3. See also: Special Bul. 130, An analysis of 300 accidents in wood-working factories with suggestions as to safe practice and suitable machine guards, and special Bul. 131, An analysis of 100 accidents on power punch presses with suggestions as to the installation of suitable guards on such machines.

## PART III

### ACCIDENT PREVENTION

The analysis in Part II of the information available on accidents by sex pointed out certain striking facts in regard to the questions as to what workers, in what industries, and from what causes, do industrial accidents occur in the greatest numbers. Such information has one chief purpose: To direct attention to the points where accident prevention is most needed.

Part III is not a complete discussion of the problem of accident prevention. It attempts rather to do two things: First, to point out briefly a type of preventive work that is clearly called for by the facts shown in this study; and second, as examples of State accident-prevention programs, to quote reports from several industrial States.

The prevention of accidents is one of the most difficult problems of industry. The various States attack the problem by inspection of work conditions, enforcement of safety regulations, general safety campaigns, orders to promote safe practice by the use of suitable machine guards, and finally by prohibiting the employment of young persons below certain ages in specified dangerous occupations.

The importance of factory inspection as a means of preventing and reducing accidents can not be too strongly emphasized. The employment of inspectors who are qualified to recommend where safety equipment is needed and to advise regarding adjustments and repairs that will further the protection of the workers, is a long stride toward the prevention of accidents. No State can materially reduce the occurrence of accidents until it provides competent inspection of work places and efficient enforcement of safety regulations. Unfortunately, only a few States provide sufficient personnel for an adequate inspection service, though the cost is an investment that will bring returns in large measure.

#### **Prohibition of employment of young persons in dangerous occupations.**

Machine accidents furnish one of the useful points of attack for prevention of accidents. It has been seen how important is machinery among the causes of accidents to women, and particularly to women under 21, while to young men also machines are the cause of great numbers of accidents. Remembering how large a number of the accidents to women occur to those under 21, who are so disproportionately the victims of machine accidents, and that several times as many boys as girls are injured by machinery, the importance of machine hazards in their toll of young workers is seen. The prohibition of employment of young persons in dangerous occupations is an important way of meeting this problem.

The age limits set for young persons and the employments prohibited to them vary from State to State. The larger part of the prohibitions, however, apply only to boys and girls under 16.<sup>23</sup> Among

<sup>23</sup> See child labor laws of various States. For example, New York State Labor Law, with amendments, additions, and annotations to Aug. 1, 1928, pp. 33-35; Wisconsin Child Labor Law, 1925, Bulletin of Industrial Commission of Wisconsin, pp. 2-5 and 10-11; Massachusetts Labor Law Bulletin No. 9, pp. 12-14.

the dangerous machines frequently listed in child-labor laws as ones on which minors under 16 may not be employed are some of those that cause many accidents; for example, power punches or shears, drill presses, stamping machines, and certain laundry, food-products, and wood-working machines. Adjusting belts and oiling or cleaning machinery in motion commonly are prohibited, and in some cases any such work even when the machinery is at rest. In addition, varying lists of other dangerous occupations are prohibited to children under 16, often including certain building-trades work, the manufacture of paints, poisons, or tobacco products, and work in or about mines or quarries or in occupations causing dusts in injurious quantities.

In many States certain occupations are prohibited to minors under 18. These include some of the heavy occupations into which women do not go, such as work in or about blast furnaces, in or about wharves and docks, and sometimes certain employments on railroads and vessels. Furthermore, in some States children under 18 may not operate elevators nor be employed in the manufacture of explosives, or liquors, or matches. The oiling or cleaning of dangerous machinery in motion is in some cases prohibited up to the age of 18.

In New York, additional safeguards to young machine workers are given by two rules adopted by the industrial board in 1928.<sup>24</sup> The employment of children under 16 is prohibited on all other machines than those specifically prohibited unless all moving parts other than keys, levers, or handles moved by the operator are safely covered; and minors between 16 and 18 are permitted to work on dangerous machines only when the machine is equipped at the point of operation with a guard described in the industrial-code rules.

Notwithstanding the prohibitions referred to, in most States the restrictions for minors of 16, 17, and 18 years are comparatively few, and to a large extent boys and girls from 16 to 18 are employed on punch presses and other machines that are known to cause many accidents, with no more restrictions than are made for the safety of workers in general.

The large number of accidents, particularly machine accidents, indicates that insufficient protection to young workers is given by present standards. As long as youth is careless and venturesome, accidents will occur unless safeguarding is more complete than seems necessary or possible in the case of adults. Figures on the ages of injured persons, from whatever State, give sufficient argument for the greater protection of minors either by adding to the lists of employments prohibited or by raising the age below which minors may not be employed in dangerous occupations, or by both these precautions. Further provision for the protection of young workers is an urgent need.<sup>25</sup> Such action undoubtedly would reduce the number of accidents that occur to young men and women in industry. This is a particularly important field for the prevention of accidents to women, since so considerable a proportion of accidents to women are to those under 21.

<sup>24</sup> New York. Department of Labor. Industrial Bulletin, May, 1928, p. 239.

<sup>25</sup> See Publication No. 152, U. S. Department of Labor, Children's Bureau. Industrial Accidents to Employed Minors in Wisconsin, Massachusetts, and New Jersey, pp. 117-119.

### Accident-prevention programs of the States.

Accident prevention is among the important functions of the State departments of labor. Laws and regulations for the promotion of safety are the first step. Factory inspection is a very important part of the program to insure that the regulations are followed and to educate employers to the value of safe practices. In addition, some States accomplish much by general safety education. Safety committees in the plants are encouraged, safety bulletins are issued, meetings are held, and safety contests staged, in the effort to arouse the active interest and cooperation of employers and employees. Safety museums are a useful part of the program in some cases.

From the reports of a few industrial States may be seen in more detail how the work of accident prevention is carried on.

#### PENNSYLVANIA <sup>26</sup>

The Pennsylvania Department of Labor and Industry inaugurated, in January, 1929, a state-wide no-accident campaign throughout the industries of Pennsylvania. The inspectors of the department call upon employers in their respective jurisdictions and tell them of the plan to hold such a campaign and enlist their interest and support. The formation of a safety organization and the keeping of accident records is stressed. These employers are then asked if they will bring the matter to the attention of their employees and ask them to sign individual pledges <sup>26a</sup> as an indication of their interest in the movement.

The accident reports received from various employers are tabulated monthly for the individual establishments and such records then referred to the respective supervising districts for the attention of the local inspectors. These inspectors then call upon the plants, refer to the accidents that have occurred in the establishment during the past month, and recommend the proper steps to be taken to prevent recurrences.

In addition, members of the department staff address service clubs in the State, also groups of foremen, or groups of employees in individual establishments whenever the opportunity is available. Talks on accident prevention are being given by members of the department over radio stations in the State at stated intervals. Slides and motion picture trailers have been prepared and are being shown in theaters calling attention to the campaign and urging every person to participate.

In addition to the above work, which pertains particularly to the no-accident campaigns, all accident reports sent to the department are carefully scrutinized for the purpose of following up those in which it seemed corrective measures were necessary or would prove beneficial. All fatal accidents and a great majority of the nonfatal accidents reported to the department, that seem to involve illegal employment, unsafe practices, lack of proper safeguards, or defective equipment are sent out by the Harrisburg office for investigation by the local inspectors. The purpose of such investigation is to determine the cause and fix the responsibility for such accidents. Proper corrective recommendations are then given by our inspectors to employers. In cases of flagrant violations of law the offenders are prosecuted.

Where investigations show that machinery accidents have been caused by such machines not having been provided with proper safeguards by the manufacturers building these machines, information is sent to them and they are asked to remedy such conditions with respect to machines manufactured by them in the future.

We have never before had the interest aroused throughout the State as it is at the present time in accident-prevention work. More than two-and-one-half millions of individual pledge cards have been signed by employees in this State. <sup>26a</sup> These employees thus pledged their interest and effort to prevent accidents to themselves and their fellow employees.

The response, by both employer and employee, in the no-accident campaign this year has been remarkable. This, coupled with the fact that our inspection activities are concentrated on plants reporting accidents, makes us believe that by the end of the year results will be self-evident.

<sup>26</sup> Circular and letter from Peter Glick, Secretary of Labor and Industry, Pennsylvania. June 23, 1929.

<sup>26a</sup> The individual pledge card reads as follows: I pledge myself to do my best in Pennsylvania's safety campaign, to be responsible for no accidents to myself or to anyone so that life may be happier and labor more profitable for me and my fellowmen.

NEW JERSEY <sup>27</sup>

For State purposes several bureaus, consisting of bureau of structural inspection, hygiene and sanitation, electrical and mechanical equipment and steam-boiler operators, were organized. Each bureau within its jurisdiction has absolute control of the activities that are in its class. To assist in achieving the statutory purpose of the department of labor, 23 factory inspectors (to which may be added a group of steam-boiler inspectors) make regular visits to our factories, examine premises and equipment and recommend such orders as may be necessary to correct violations found. Each of the bureaus enumerated above supervises the enforcement of the orders coming under its jurisdiction.

In addition to this, a bureau for women and children has been created to give special consideration to conditions that may affect the labor and welfare of minors and women.

As a corollary to the above the legislature created a bureau for the promotion of safety education. It is the purpose of this bureau to encourage plants to organize and maintain safety committees, hold safety meetings, discuss and analyze accident causes and take steps to prevent them. In addition, the bureau encourages the formation of safety councils in the congested industrial centers and assists in preparing lecture courses and public demonstrations to bring to the attention of the people of the State the necessity for accident-prevention work. It has become a practice of the bureau to encourage State-wide inter-plant safety contests for the purpose of arousing industry to the extreme necessity of careful supervision in order to prevent accidents.

NEW YORK <sup>28</sup>

The prime purpose of the New York State labor law, as expressed in section 28, is that "all places to which it applies shall be so constructed, equipped, arranged, operated, and conducted in all respects as to provide reasonable and adequate protection to the lives, health, and safety of all persons employed therein, and frequenting the same."

The most that workmen's compensation offers to a worker injured by accident, or occupational disease, is partial reward for the wage loss suffered. Great as is this benefit, it is only a palliative after damage has been done. Prevention of accidents strikes at the root of the evil and avoids the financial loss to the worker as well as the suffering, loss of members, or enfeebled condition. To the employer, the compensation payments are saved as well as the greater amounts occasioned by lost time, labor turnover, wasted materials, and other items of loss.

A direct attack upon accidents is made by this department through the bureau of inspection. Work places of every sort and description in New York State are inspected and safety orders are issued. The division of industrial codes formulates detailed rules for safety to be enforced by inspectors. Aiding by information as to what the accidents are, how they may be lessened or eliminated, and what progress is being made are the bureau of industrial hygiene, bureau of statistics and information, and the bureau of women in industry.

MASSACHUSETTS <sup>29</sup>

Reporting industrial injuries constitutes an integral part of any efficient system in the work of preventing accidents. It is fundamental to know when, how, and where accidents happen. \* \* \*

All reports of injuries filed by employers with the department of industrial accidents are carefully examined by a clerk in the employ of the department of labor and industries. This clerk selects for the attention of the director accidents classified as follows: 1. Fatal accidents; 2. Permanent disabling injuries; 3. Injuries to minors between 14 and 16 years of age; 4. Injuries to minors between 16 and 18 years of age, if the information indicates that the minors are employed at processes prohibited by law; 5. Occupational diseases; 6. Accidents occurring in the building-trade line; 7. Accidents occurring in establishments where the rate is high. This classification of injuries furnishes a basis for systematic inquiry into the causation of industrial accidents.

<sup>27</sup> Letter from John Roach, Deputy Commissioner of Labor, New Jersey, June 21, 1929.

<sup>28</sup> Letter from Frances Perkins, Industrial Commissioner, New York, July 22, 1929.

<sup>29</sup> From memorandum furnished in July, 1929, by John P. Meade, director, division of industrial safety, Massachusetts Department of Labor and Industries.

The division of industrial safety in the department of labor and industries follows up these reports with inspection, investigation, and educational prevention programs.

Through a staff of 40 men and women, each one of whom is assigned to a district allotted to his care, the inspection of industrial establishments goes on each day. These inspectors are persons well trained in this work, some of them having had extensive training for such duties. Some are experts in sanitation, others advanced in machinery experience, and 8 of them have had many years' training in the trades connected with the construction of buildings.

In 1928, they made a total of 52,252 inspections. There were 44,385 establishments visited, of which 19,931 were manufacturing or mechanical and 24,454 were mercantile. The number of employees working in these places totaled 904,694—756,913 working in manufacturing establishments and 147,781 in mercantile; 597,988 were males and 306,706 females.

In 1928, 10,742 orders were issued; 809 were outstanding on November 30, 1928. Nearly all of these were in process of compliance at that time and have been fully complied with since. They dealt principally with lighting facilities, safeguarding of machinery, installing equipment for ventilation and sanitation, and the construction of first-aid rooms. An explanation of orders issued by the department should be made here:

These are in substance notices forwarded when a condition is found that is prohibited by the statute or by regulations made by the department. The relation of the orders issued to the problem of industrial-accident prevention is seen at once in presenting these facts:

Fifty-one (51) orders were issued when minors were found at prohibited trades; 6,219 required that work places be made safe for employees. These latter included safeguarding of machinery and compliance with regulations in building operations to prevent accidents. In the protection of the health of employees, 288 were issued dealing with ventilation, humidity, dust removal, and drinking water; 448 for lighting; 1,855 with toilet and washing facilities; lockers, 6; requiring medical chest or first-aid room, 1,033.

Approximately 8,746 industrial injuries have been investigated by inspectors in the past four years.

Injuries because of contact with machinery have been reduced from 18,490 for the year ending June 30, 1919, to 8,586 for the year ending June 30, 1928.

\* \* \* There has been a slight increase in nonmachinery accidents. Their number for the year ending June 30, 1919, was 49,740, while for the year ending June 30, 1928, a total of 50,190 was recorded. Special attention has been given to this side of the question.

Other advantages of this combination of inspection and investigation activities are that:

It stimulates interest in the prevention of accidents and occupational diseases. Regular visitation by inspectors maintains this interest. \* \* \* Every accident investigated means a visit of the inspector to the establishment where it occurs. If an inspection has not been made within six months, one must be made during the visit. It must be certain that adequate first-aid treatment is provided and injured employees treated as the law directs. When accident-prevention work was included within the duties of factory inspection work, a good thing was accomplished. It was the logical thing to do. It was the best means by which factory hazards might be controlled and conditions for employment made safe in industry.

An important development in this work has been securing cooperation of machine manufacturers in equipping their product with safeguards before they are installed for use in mill and factory. This work is at once beneficial to employer and workman, in that safety devices are provided more economically and the period of exposure of workmen to industrial hazards is diminished.

The organization of safety committees and the steady promotion of accident-prevention educational programs have been other phases of this work.

WISCONSIN <sup>20</sup>

Our accident prevention activities may be classified under three heads, as follows: Periodical inspections, special investigation of individual accidents, and safety education. The State is divided into districts and we have at least one factory inspector in each district whose duty is to make periodical inspections of the places of employment in his district. In addition to making the regular inspections, the deputies are required to investigate all serious accidents and also all accidents, regardless of how serious they are, the employer's report of which indicates that they may have been caused by violation of a general safety order of this commission.

The commission also has a director of safety education, whose duties are to organize and supervise foreman safety schools and regional safety conferences. As soon as these schools are better organized he will engage in other educational activities.

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<sup>20</sup> Statement by Fred M. Wilcox, Chairman, Industrial Commission, Wisconsin, Sept. 19, 1929.

## APPENDIX

### STATE REPORTS IN WHICH ACCIDENT STATISTICS BY SEX ARE OBTAINABLE, 1920 TO 1927, USED IN TABLES 1 TO 10

- Alabama*.—First quadrennial report of Workmen's Compensation Commissioner, 1919-1922, pp. 226-228.
- California*.—Report of Industrial Accident Commission, July 1, 1921, to June 30, 1922, pp. 57 and 122.
- Colorado*.—Tenth report of Industrial Commission for the biennium Dec. 1, 1926, to Nov. 30, 1928, facing p. 22.
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- No. 2. Labor Laws for Women in Industry in Indiana. 29 pp. 1919.
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- No. 4. Wages of Candy Makers in Philadelphia in 1919. 46 pp. 1919.
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- No. 19. Iowa Women in Industry. 73 pp. 1922.
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