66th Congress, 3d Session - - - - - - - - - House Document No. 889

U. S. DEPARTMENT OF LABOR
W. B. WILSON, Secretary
BUREAU OF LABOR STATISTICS
ETHELBERT STEWART, Commissioner

BULLETIN OF THE UNITED STATES BUREAU OF LABOR STATISTICS . . . . No. 276

INDUSTRIAL ACCIDENTS AND HYGIENE SERIES

STANDARDIZATION OF INDUSTRIAL ACCIDENT STATISTICS

REPORTS OF THE COMMITTEE ON STATISTICS AND COMPENSATION INSURANCE COST OF THE INTERNATIONAL ASSOCIATION OF INDUSTRIAL ACCIDENT BOARDS AND COMMISSIONS, 1915–1919

DECEMBER, 1920

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

CONTENTS.

BULLETIN OF THE

U. S. BUREAU OF LABOR STATISTICS.

NO. 276. WASHINGTON. DECEMBER, 1920.

STANDARDIZATION OF INDUSTRIAL ACCIDENT STATISTICS.

INTRODUCTION.

Each year since its creation in 1915 the committee on statistics and compensation insurance cost has submitted to the International Association of Industrial Accident Boards and Commissions a report of the work accomplished during the year. These reports have been published from time to time by the United States Bureau of Labor Statistics. The first report appeared in the Monthly Labor Review for November, 1915. The second was published in 1916 as Bulletin No. 201 of the Bureau. The third report is contained in the proceedings of the 1917 meeting of the association, which were published as Bulletin No. 248. It was also printed in the Monthly Labor Review for October, 1917. The proceedings of the fifth annual meeting of the association, published as Bulletin No. 264 of the Bureau, contain the fourth report of the committee. The fifth and latest report appeared in the proceedings of the sixth annual meeting of the association, published as Bulletin No. 273 of the Bureau. In addition to the reports of the committee on statistics and compensation insurance cost, the Bureau published in Bulletin No. 157 the work of the several preliminary committees on standardization of industrial accident statistics.

In order to make more readily available to administrators and students the very valuable definitions, recommendations, and information contained in these scattered reports, they have been revised to date and combined in this bulletin. It is hoped that the more convenient arrangement will lead to a more general adoption and use of the recommendations of the committee by the compensation States.

Statistics and statisticians are not held in high esteem. Many people, including legislators and administrators who are most in need of the facts which can be shown in a comprehensive and comprehensible way only by means of statistics, regard statistics as dry and useless arrays of figures. Real statistics are absolutely indispensable for the intelligent and systematic carrying on of business, both public and private, and they need not and should not be dull and dry as dust. Statistical compilations consist in the orderly classification, comprehensible presentation, and intelligent analysis of a large number of facts or cases so as to show their bearing upon some problem or problems. The difference which distinguishes statistics from mere agglomerations of figures consists in the methods of treatment and arrangement. The bulky and ill-arranged tomes,

purporting to present statistical information, which are issued by too many State and Federal departments are of little or no value. Such expensively compiled volumes and libraries of figures are not truly statistics at all. Statistics have fallen into disrepute because of the incompetence of the compilers of so-called "statistics," their pedantry, their ignorance of the real nature of the material and the problems with which they have to deal, and their inability to select and classify facts and to show their significant characteristics in an intelligible and interesting manner. Some real statistics are dry and can not be otherwise because of the nature of the subject matter with which they deal, but statistics which deal with life and death, health and sickness, income and outgo, what we eat and wherewithal we are clothed are as full of interest and meaning as life itself.

No department of statistical inquiry more closely touches the public weal than the study of personal injuries by accident. Statistics of industrial accidents should serve for accident prevention, for the due administration and intelligent revision of workmen's compensation laws, and for the computation of compensation insurance rates. For accident prevention it is needful to know how and why accidents occur. For the better administration of workmen's compensation laws it is necessary to have an accurate statistical record of the disposal of compensation cases—not only the comparatively few cases which are formally passed upon by the administrative board but the immensely larger number of claims which are settled between the parties with only a pro forma administrative approval. For the intelligent enactment and revision of compensation legislation legislators must know the number and character of accidental injuries, the extent of wage loss, and the cost in per cent of pay roll of any proposed scale of benefits. Lastly, for the computation of insurance rates it is necessary to have not only the actual pure premiums by industries but a detailed analysis of the accidents which occasion the pure premiums.

To serve these ends, accident statistics must be analyzed by industry, by cause of accident, and by nature and location of injury and extent of disability, and must be so cross analyzed as to show the correlation of each of these sets of facts with every other. Still other analyses are necessary. It is important to know the number, ages, and relationships of dependents in fatal cases and the age and wage groups of the injured in all cases. In certain industries an occupational analysis will be of value. It goes without saying also that the pay-roll exposure should be obtained by industries, and that the wage loss and the amount of compensation and of medical aid should be shown by industry, by cause of accident, and by nature and location of injury and extent of disability. Many other statistical studies will prove necessary for particular purposes. Nevertheless, the classifications by industry, cause, and nature and extent of injury are primary. Faulty analysis in these respects will vitiate the whole statistical output. Vice versa, if these fundamental classifications are sound and adequate, everything else can be added as opportunity and occasion arise.

The most cursory examination will show that the official industrial accident statistics of the United States are lamentably weak in just these vital particulars. No one State has yet published statistics that are at all adequate to its own needs, and no two States

have produced results that are in any way comparable. One State department follows the census classification of industries, another uses the schedules of the old liability manual, a third the literal classifications of the compensation insurance manual. The classification of accident causes is sometimes so meager as to be of little value for prevention, sometimes so prolix and ill digested as to afford no comprehensive view. The classification of injuries ranges from the simple division into fatal and nonfatal to an individual list of permanent disabilities—the mere raw material of statistics. While weightier matters have been thus neglected, much time and labor have been expended upon such unprofitable subjects as race, conjugal condition, day of the month, day of the week, and hour of the day.

In the five years of its work, the results of which are set forth in this bulletin, the committee on statistics and compensation insurance cost has attempted to overcome in some degree this lack of uniformity and comparability of accident reports and statistics. Its work of standardization may properly be classified as follows:

(1) Standardization of definitions and accident reporting practices.
(2) Classification of industries according to the nature of the business.
(3) Classification of the causes of accidents.
(4) Classification of accident by location and nature of injury and extent of disability.
(5) Formulation of standard tables for the presentation of accident statistics.
(6) Determination of a proper base for the computation of accident rates.
(7) Formulation of a standard scale of weights designed to express the severity of accidental injuries in terms of time loss.
(8) Determination of a standard method for computing compensation insurance costs.

The classifications are not presented as perfect or the embodiment of all wisdom. They are necessarily the result of compromise. The committee had to consider, on the one hand, the requirements of scientific classification, and, on the other hand, the limitations of time and means at the disposal of administrative boards. Due regard for these limitations enforced the omission of much detail which may be within the reach of some favored States and which is very desirable for certain purposes.

Nevertheless, the committee believe that these classifications will serve the most important immediate needs of industrial accident statistics. They are the fruit of much thought and discussion by experienced statisticians. They embody the best that could be found in the official classifications of the United States and Europe. Further improvement may well be left to further experience.

All of the classifications herewith recommended are designed to admit of expansion or contraction, according to the varied needs and facilities of different administrative boards. If a particular board is unable to undertake more, the industry groups will suffice for many purposes and will facilitate comparisons with the accident statistics of other States. In the same manner the classification of accident causes can at need be limited to the primary and secondary divisions of the standard classification. However, if a State has the means, the items may be expanded to any desired extent within the general framework without impairing the comparability of the basic tables which all States, it is to be hoped, will be able to work up. Every capable statistician will naturally undertake such expansion as may be suitable to his own problems and the facilities placed at

his disposal. There are somewhat narrow limits to the detail which can with advantage be shown in general tables, but no classification can be too detailed or too specific for the needs of accident-prevention work in particular industries. It should be remembered, moreover, that the combination of separate items in a detailed code is always easy, whereas the separation of items that are shown only in combination is impossible.

Next to the use of standard classifications, nothing will contribute so much to the value of statistical reports as uniform and effective organization and presentation of the material. Conversely, the lack of any standard organization has detracted greatly from the usefulness of most statistical reports heretofore published by the several States. In many cases essential information which was available in the files of the board or commission is not disclosed by the published reports, because the statistician did not perceive the significance of the facts in his possession. Sixteen standard tables, thoroughly worked out, will present more information in far more accessible form than is ordinarily contained in ten times the bulk of printed matter. Such standard tables have been formulated by the committee and are presented herewith on pages 55 to 68.

The committee has likewise devoted much time to the consideration of accident severity, with a view to obtaining a standard measure of industrial hazard. The committee does not claim perfection for the severity rating scheme it has adopted. Intelligent opinion will differ on many of the points involved. The relative severity of accidental injuries must always be a matter for experienced judgment rather than mathematical calculation. For that very reason, however, the collective judgment of competent statisticians is a safer guide than the opinion of the best informed individual. Above all, the problem is one in which uniformity is more important than meticulous accuracy. If the schedule of relative weights is reasonable upon the whole, and is uniformly applied, the results will be sufficiently accurate for all practical purposes. For the table showing days of disability for specific permanent injuries see page 77.

At a special meeting held at Harrisburg, Pa., December 4–5, 1919, the committee undertook for the first time to formulate a standard method of computing compensation insurance costs. (For a résumé of the committee's work see pages 78 to 84.)

HISTORICAL REVIEW OF THE WORK OF THE COMMITTEE.

PRELIMINARY CONFERENCES.

The practical difficulties in the way of making comparisons of the accident statistics of various countries made the subject of uniform accident reporting and standard methods of tabulation and analysis one of serious concern to the United States Bureau of Labor Statistics for several years. A conference of labor and workmen's compensation officials and others interested in this subject was called by Commissioner Meeker, chiefly for the purpose of devising a plan for standardizing forms and methods of reporting and tabulating accident statistics collected by the Federal and State labor bureaus and workmen's compensation commissions. The first meeting of this

conference was held in New York City on February 26, 1914. The subjects discussed in detail at that time were (1) the definition of a reportable accident; (2) the unit of risk; (3) the classification of industries; (4) the computation of accident rates; (5) accident report forms; and (6) the time of reporting accidents.

At the second meeting of the conference, held in New York City on April 10, 1914, the following additional matters were taken up: (1) The method of reporting accidents causing a disability of less than that specified in the adopted definition of a reportable accident; (2) the classification of accidents according to their consequences; and (3) the standard method of determining the average number of men exposed to risk.

The third meeting of the conference was held at Harrisburg, Pa., September 2, 1914, in conjunction with the committee on standard forms for accident reporting, of the National Safety Council. The chief business of the conference was the consideration of a revision of the standard accident report form. The requirements of certain State laws made it necessary to adopt a standard form considerably at variance with that recommended by the earlier conferences.

The conference held its fourth meeting in Chicago on October 12 and 13, 1914. There were present at this meeting, in addition to representatives of official bodies handling accident statistics, members of the committee on standard forms of the National Safety Council, representatives of the Workmen's Compensation Service Bureau, of insurance companies, and of employers.[1] A definition of reportable accidents was decided upon and the following subjects were taken up for consideration: (1) Classification of accidents according to their consequences, (2) the time of reporting accidents, (3) the basis to be used for computing the average number of men, and (4) the basis for computation of accident rates. The conference also adopted a form of report to be recommended for first reports of accidents. At this meeting two committees were appointed by Commissioner Meeker, one on the nature and extent of injury, the other on a classification of causes of accidents.

The committee on standard classification of causes of accidents[2] met at the same place and time. At that meeting this committee

---

[1] The minutes of the meeting give the following list of persons present:

Representatives of official bodies handling accident statistics.—Royal Meeker, U. S. Commissioner of Labor Statistics; C. H. Verrill, U. S. Bureau of Labor Statistics; A. H. Fay; H. M. Wilson; F. M. Wilcox; J. M. Sampson, U. S. Bureau of Mines; J. B. Vaughn; P. J. Angsten; Robert Eadie; W. V. Conley; Thomas A. Murphy, Industrial Board of Illinois; Edwin Mulready, Commissioner of Labor, Massachusetts; Richard L. Drake, Michigan Industrial Accident Board; Fred C. Croxton, Industrial Commission of Ohio; A. R. Houck; Lew R. Palmer, Pennsylvania Department of Labor and Industry; E. H. Downey; W. H. Burhop, Wisconsin Industrial Commission.

Members of national council of safety committee on standard forms.—C. L. Close, United States Steel Corporation; James B. Douglas, United Gas Improvement Co.; Frederick L. Hoffman, Prudential Insurance Co.; W. B. Spaulding, St. Louis & San Francisco Railroad Co.

Representative of committee on standard schedules, American Association for Labor Legislation.—Dr. John B. Andrews.

Representatives of Workmen's Compensation Service Bureau, insurance companies, and employers.—Albert; W. Whitney, C. E. Scattergood, C. M. Hanson, Workmen's Compensation Service Bureau, New York City; E. G. Trimble, Employers' Indemnity Corporation, Kansas City, Mo.; Louis I. Dublin, Metropolitan Life Insurance Co.; Dudley R. Kennedy, Youngstown Sheet and Tube Co., Youngstown, Ohio; George T. Fonda, Bethlehem Steel Co.; R. C. Richards, Chicago & North Western Railway Co.; Dr. D. Z. Dunott, Western Maryland Railway Co.

[2] The personnel of that committee was as follows: L. W. Hatch, chief statistician Bureau of Statistics and Information, New York State Department of Labor, chairman; F. C. Croxton, chief statistician Industrial Commission of Ohio; E. H. Downey, chief statistician Wisconsin Industrial Commission; A. R. Houck, chief Bureau of Statistics, Pennsylvania Department of Labor and Industry; Robert E. Grandfield, secretary Massachusetts Industrial Accident Board; A. H. Fay, mining engineer, United States Bureau of Mines; C. E. Scattergood, chairman statistical committee, Workmen's Compensation Service Bureau, New York; C. L. Close, member of the committee on standard forms for accident reporting of the National Council for Industrial Safety, New York; W. J. Meyers, statistician United States Interstate Commerce Commission; Royal Meeker, United States Commissioner of Labor Statistics.

defined the primary cause of accident and decided upon a tentative classification of accidents, by causes.

The committee on standard classification of industries [3] met in New York on December 1 and 2, 1914, and agreed upon a tentative classification of industries. The committee considered the possibility of a single classification of industries for the purposes of all accident and industrial statistics and made considerable progress toward such a standard classification.

ORGANIZATION OF PERMANENT COMMITTEE.

In April, 1914, at a meeting held in Lansing, Mich., the National Association of Industrial Accident Boards and Commissions was organized "to bring into closer relation with one another the various boards and commissions administering compensation laws in the United States and to effect so far as possible uniformity of legislation and administration of such laws and to encourage and give effect to all measures looking toward the prevention of accidents and the safeguarding of plants and machinery."

A special meeting of this association called for the purpose of considering the standardization of accident statistics was held in Chicago, January 12, 1915.[a] At this meeting the committee on statistics and compensation insurance cost [4] was created. This committee was charged with the duty of preparing as expeditiously as possible the following reports:

(1) Uniform tables for the establishment of compensation costs.
(2) Uniform classification of industries.
(3) Uniform classification of causes of accidents.
(4) Uniform classification of nature of injuries.

The committee was directed without further authority to send a copy of these reports to each member of the association, and to make a final report at the regular meeting of the association in September, 1915.

The committee on statistics and compensation insurance cost met at Chicago on January 13, 1915, following the meeting of the association and discussed the scope of its work. It adopted the definitions, the classification of causes of accidents and the primary and secondary headings of the classification of industries prepared by the conferences and committees appointed by Commissioner Meeker, already mentioned.

The chairman of the committee called a second meeting at Columbus, Ohio, on July 21, 1915. The purpose of this meeting was

---

[a] The proceedings of this meeting were published under title: Workmen's compensation, statistics and cost. Proceedings of special meeting of National Association of Industrial Accident Boards and Commissions. [Chicago, 1915.] 58 pp.

[3] The personnel of this committee was as follows: E. H. Downey, chief statistician Wisconsin Industrial Commission, chairman; F. C. Croxton, chief statistician Industrial Commission of Ohio; L. W. Hatch, chief statistician Bureau of Statistics and Information, New York State Department of Labor; W. N. Magoun, Insurance Department of Massachusetts; Alba M. Edwards, United States Bureau of the Census; C. E. Scattergood, chairman statistical committee, Workmen's Compensation Service Bureau, New York City; W. J. Meyers, statistician United States Interstate Commerce Commission; Royal Meeker, United States Commissioner of Labor Statistics. The committee also had the assistance in its discussions of A. H. Fay, United States Bureau of Mines, and I. M. Rubinow, Ocean Accident Guarantee Corporation, New York City.

[4] The personnel of this committee was as follows: E. H. Downey, chief statistician Wisconsin Industrial Commission, chairman; Fred C. Croxton, chief statistician Ohio Industrial Commission; Floyd L. Daggett, chairman Washington State Industrial Insurance Commission; W. N. Magoun, chief of Workmen's Compensation Bureau, Massachusetts Insurance Department; Royal Meeker, United States Commissioner of Labor Statistics; Robert K. Orr, manager Michigan State Accident Fund, secretary; H. E. Ryan, associate actuary, New York Insurance Department.

to consider the work so far accomplished by the committee and its individual members and to advance the work sufficiently so that a definite report might be made to the association at its second annual meeting in Seattle, September 30 to October 2, 1915.

The committee felt that a far more satisfactory result would be accomplished in the time at its disposal, prior to the annual meeting, if it investigated one of the above subjects and presented a complete report thereof, than would be attained by a preliminary survey of all four subjects with no definite conclusions in respect to any. The committee therefore devoted its entire attention to the uniform classification of industries, believing this to be the subject most needing immediate attention.

Various State insurance departments and rating bureaus, actuarial societies and insurance companies writing workmen's compensation insurance were interested in the subject. The National Workmen's Compensation Service Bureau of New York and several State rating bureaus already had prepared industrial classifications for their own use. A conference for harmonizing existing groupings appeared to be essential. Under the auspices of the Casualty Actuarial and Statistical Society of America, therefore, a committee of three met in New York City on September 14, 15, and 16, 1915.[5]

This conference for the consideration of classification groupings availed itself of the valuable advice and assistance of safety engineers familiar with industrial plants and processes.[6] The committee spent three entire days in considering the classification groupings. The classification code of the workmen's compensation service bureau was altered in some particulars, the classification groupings of industries as adopted by the committee at Columbus were somewhat modified, and certain suggestions made by the Massachusetts Rating and Inspection Bureau were incorporated. The final result was an agreement by the conference committee on a complete list of divisions, schedules, and groups acceptable to the representative of each organization present. This table, which the committee on statistics and compensation insurance cost approved and presented as part of its first report,[a] was adopted by the International Association of Industrial Accident Boards and Commissions at its second annual meeting held in Seattle, September 30 to October 2, 1915.

The classification groupings were drawn up in accordance with the following arrangement:

Divisions.
Schedules.
Groups.
Classifications.

Divisions.—There were seven principal divisions or primary headings corresponding to those adopted by the committee appointed by Dr. Meeker, already referred to.

---

[5] The committee consisted of Leonard W. Hatch, chief statistician Industrial Commission of New York, authorized to represent the committee on statistics and compensation insurance cost of the National Association of Industrial Accident Boards and Commissions; I. M. Rubinow, chief statistician Ocean Accident and Guarantee Corporation (Ltd.), authorized to represent the Workmen's Compensation Service Bureau of New York; W. N. Magoun, head of the workmen's compensation bureau, Massachusetts insurance department, authorized to represent the Massachusetts Rating and Inspection Bureau.

[6] These experts were: William Newell, safety engineer, New York State Insurance Fund; Grant Earl, chief inspector Workmen's Compensation Service Bureau of New York; William B. Shoe, chief safety engineer Ocean Accident and Guarantee Corporation (Ltd.); David S. Beyer, head of the Accident Prevention Department, Massachusetts Employee's Insurance Association.

[a] This report was published in full in the Monthly Review of the United States Bureau of Labor Statistics for November, 1915, pp. 28-37.

Schedules.—The seven divisions were divided into schedules corresponding to the secondary headings of the same committee. These secondary headings explain the details into which the primary headings were separated.

Groups.—The groups headings were considered the most important in the series and showed a refinement of the secondary headings. Each group heading was intended to be significant of the industries covered under it.

Classifications.—The final subdivision consisted of the classifications of industries appearing in the manuals used by insurance companies in connection with their writing of workmen's compensation insurance.

After the approval of these classifications by the association the committee on statistics and compensation insurance cost gave some attention to the revision of the final subdivisions of classifications under each of the various industry groups, and undertook the preparation of classifications of causes of accidents and of nature of injuries. The committee met in New York City February 3 and 4, 1916, in a joint session with representatives of the Casualty Actuarial and Statistical Society of America and the Workmen's Compensation Service Bureau. This meeting was devoted entirely to the discussion of the classification of causes of accidents. The classification of causes included in the preliminary report of the committee on classification of causes, appointed in accordance with the action of the joint conference held at Chicago, October 12 and 13, 1914, was taken as the basis of discussion and was accepted in large part by the committee. A second meeting was held at Columbus, Ohio, February 21 and 22, 1916. Further consideration was given to the classification of causes of accidents, and the classifications of accidents by location and nature of injury and extent of disability were taken up. The committee met for the third time in New York City, March 16, 1916, jointly with representatives of the Casualty Actuarial and Statistical Society and the Workmen's Compensation Service Bureau. The meeting was devoted to a further discussion of the classification of industries and of causes of accidents. The final committee meeting for the year was held at Philadelphia, March 31, and April 1, 1916. Four sessions were devoted to the discussion and final revision of the classifications of causes of accident and of location and nature of injury and extent of disability.

The result of these meetings was a second report of the committee on statistics and compensation insurance cost[a] presented at the third annual meeting of the association held at Columbus, Ohio, April 25–28, 1916. In this report the groups of industries were further subdivided into classifications corresponding as nearly as possible to the detailed classifications customarily used by the compensation commissions and insurance companies in fixing premium rates. There was also presented a classification of accident causes. The committee recommended that accidents be uniformly assigned to the proximate or immediate cause and adopted the definition of proximate cause which the committee on standard classification of

[a] The report was published as Bulletin 201 of the United States Bureau of Labor Statistics (Industrial accident and hygiene series, No. 9). The personnel of the committee was the same as that of the previous committee (see footnote 4), except for the addition of two members, namely, L. W. Hatch, chief statistician of the Industrial Commission, Albany, N. Y., and E. E. Watson, Industrial Commission, Columbus, Ohio.

causes of accidents formulated at its October meeting in 1914,[7] The committee grouped the causes of accidents into 12 divisions. These were subdivided into general classes. The general classes were made more specific by a subclass division. The report also included classifications of accidents by location and nature of injury and extent of disability. The committee's recommendations on the above heads were officially adopted by the association and were put into practical effect by the several States.

The succeeding year (1916–17) the committee held four meetings.[8] The findings of the committee were embodied in its third report which was submitted to the Boston meeting of the association held August 21–25, 1917.[a] The report presented 13 standard statistical tables on accidents and compensation insurance cost recommended by the committee. It also contained a scheme of severity weighting in terms of days lost as a standard measure of industrial hazard. Standard definitions adopted by the committee, and included in the report, covered among other subjects, tabulatable, reportable, and compensable accidents, medical service, permanent total disabilities, permanent partial disabilities, and accident frequency and severity rates.

Two meetings of the committee were held in 1918, these meetings occupying some ten sessions covering four days. The fourth report of the committee[b] embodies the results of the work done at these meetings. This report was presented to the International Association of Industrial Accident Boards and Commissions and adopted at its meeting held in Madison, Wis., on September 24–27, 1918. The report was devoted largely to a revision of the classification of the causes of accidents, with the addition of numerous explanatory notes, the object of which was to make the interpretation and use of the classifications by the various States more nearly uniform. Some minor revisions of the classifications of accidents by location and nature of injury and extent of disability were also made.

The committee gave some consideration to a revision of the industry classification, but any extended alteration of these classifications was so colossal a task that the committee made but slight progress. The work of revision was taken up by an informal committee, made up of several members of the committee on statistics and compensation insurance cost and representatives of the National Reference Committee on Compensation Insurance Rates.[9] This informal committee held several meetings and completed a tentative revision of the industry classification which it submitted

---

[7] See pp. 9 and 10.

[8] These meetings were as follows: (1) Chicago, May 31 and June 1, 1916; (2) Buffalo, N. Y., July 19, 1916 (3)New York City, November 3 and 4, 1916; (4) Boston, Mass., April 18 and 19, 1917.

[a] This report was published in full in the Monthly Review of the United States Bureau of Labor Statistics for October, 1917, pp. 123–143, and was also published separately. This committee consisted of Messrs. Downey, Croxton, Hatch, Meeker, and Watson, of the previous committee, and Mr. P. A. Broderick, Massachusetts Industrial Accident Board; Mr. T. N. Dean, Workmen's Compensation Board of Ontario; Mr. W. H. Burhop, Compensation Insurance Board of Wisconsin; Mr. C. H. Verrill, United States Employees' Compensation Commission, and Mr. Don L. Lescohier.

[b] This report was published in Bulletin 264 of the United States Bureau of Labor Statistics, pp. 83–104. The personnel of the committee was identical with that of the previous committee, except that Mr. H. S. Hanna, United States Bureau of Labor Statistics, and Mr. C. B. Hensley, California Industrial Accident Commission, replaced Messrs. Croxton and Lescohier.

[9] The members of the informal committee were: E. H. Downey, special deputy Pennsylvania Insurance Department, chairman; L. W. Hatch, chief statistician New York Industrial Commission; C. H. Verrill, member, United States Employees' Compensation Commission; W. N. Magoun, general manager Massachusetts Rating and Inspection Bureau; G. F. Michelbacher, actuary, National Workmen's Compensation Service Bureau. The following persons also attended certain sessions: J. V. Duffey; M. Meltzer, statistician National Workmen's Compensation Service Bureau; R. S. Elberty; G. C. Kelly, general manager Pennsyvania Compensation Rating and Inspection Bureau.

for the consideration of the committee on statistics. However, neither the informal committee nor the committee on statistics was satisfied with this revision. The informal committee, therefore, continued its work with the intention of submitting at a later date, the final revision.

The fifth annual and latest report of the committee was submitted to the Association at its sixth annual meeting, held at Toronto, Canada, September 23–26, 1919. This report[a] included additional standard tables relating to—

(1) Cost of medical and hospital treatment by nature of injury.

(2) Duration of total disability in permanent partial disability cases.

(3) Outline of the essential information in an investigation of industrial cripples.

(4) Outline of an American remarriage table for industrial accident widows.

The committee recommended that the resolution of the association which was adopted at the Chicago meeting of January, 1915, advising that nonfatal accidents be reported within seven days after occurrence and fatal accidents within 24 hours after death, be superseded by a new resolution to read as follows: "Except as State laws otherwise require, all reportable accidents shall be reported to the proper State authority within 48 hours after the occurrence of the accident." The committee also recommended for adoption the classification of industries as revised by the informal committee, pending the final revision by the committee on statistics.

Meetings of the committee were held in Harrisburg December 4 and 5, 1919. At these meetings the committee discussed the advisability of a change of the basis for computing accident frequency and severity rates. The following resolution was adopted:

Resolved, That accident rates, both frequency rates and severity rates, be computed on the basis of 1,000 hours' exposure instead of 3,000 hours' exposure, as heretofore.[10]

The subject of a standard method of computing compensation insurance costs was discussed at length, and a resolution was adopted requesting the chairman to prepare a statement of the proper basis of comparison of compensation costs under different systems and different jurisdictions and to submit it to the committee for criticism and revision. In accordance with the resolution, the chairman sent to members of the committee his statement summarizing the discussion and giving tentative conclusions of the committee on the subject of compensation insurance costs. Later the chairman submitted a final report embodying the suggestions of the committee and including tables for comparison of benefits between different acts.[11]

While the committee decided to defer any thoroughgoing revision of the classification of industries to a later meeting, some discussion was had with a view to examining tentatively the policy which should be followed in revision. The question was raised whether it was possible to adopt any basis for the industrial classification which would

[a] Bulletin 273 of the United States Bureau of Labor Statistics contains this report, see pp. 388-395. The only change in the personnel of the committee at this time was the substitution of Mr. Carl Hookstadt, United States Bureau of Labor Statistics, for Mr. H. S. Hanna.

[10] For discussion of the changes in this unit of measure, see pp. 69 and 70.

[11] This report was adopted as the committee's sixth annual report to the association at the San Francisco meeting, held September 20–24, 1920, and is published as Appendix I of this Bulletin.

result in a greater degree of consistency. It was pointed out that some classifications were based upon the materials used, some upon the products made or produced, and some upon the processes employed. It was agreed, however, that the terminology commonly used made it impossible to accept any single one of these bases to the exclusion of the others.

The principal divisions or primary headings of the industry classification were revised, the following being adopted:

A. Agriculture.
B. Forestry (including logging).
C. Fisheries.
D. Mining and quarrying (not including metallurgy).
E. Manufacturing.
F. Construction.
G. Transportation (including telephones and telegraph).
H. Trade.

A revision of the individual record accompanying Table 16 (see p. 68), showing remarriage experience of widows to whom compensation awards have been made, was also made at this meeting.

At its latest meeting, held in New York City February 12–13, 1920, the committee again took up the detailed revision of the industry classification, using as a working basis the classification of the so-called informal committee. The classification finally agreed upon is published on pages 29 to 32 of this report. This classification is recommended for use by statisticians until the committee completes its final revision.

The standard form for first report of accident was revised at this time, and two additional forms were adopted, namely, the standard form for supplementary report on fatal accidents, and the form for a final report in nonfatal accident cases.

The committee decided that the form "compensable" was to be preferred to the term "compensatable," and recommended its adoption by accident boards and commissions.

The committee also discussed the necessity of emphasizing the fact that for purposes of accurate statistical comparison the distinction should be clearly made between compensable accidents and those which were tabulatable but not of sufficient duration or severity to be compensable.[12]

The committee on statistics and compensation insurance cost is to continue its work. The need which was evident when the committee was organized—that statistical methods be standardized to facilitate comparisons and to aid the boards and commissions in administrative work—becomes more and more pressing with the extension of workmen's compensation laws. Progress in the standardization of accident and compensation statistics is necessarily somewhat slow. The reports of the various boards and commissions concerning the experience as to accidents, compensation, medical and hospital treatment, and administrative expenses are still very inadequate. There has not been the promptness in making use of the committee's recommendations and in developing reports along the lines suggested which the committee confidently had hoped for. State commissions and others interested in compensation questions, especially such as concern the amendment of laws, are constantly confronted with questions con-

[12] For discussion of this subject see page 56.

cerning which accurate information based on actual experience should be available. Crude estimates which are sometimes only guesses and even impressions are put forward as experience because the actual facts of experience have not been studied and compiled in a systematic manner. Commissions are, therefore, not in a position to profit with reasonable promptness by their own experience or by that of other boards. All this is chiefly due to a pennywise policy on the part of the legislature or of the commission. It tends to inefficient and unnecessarily costly administration, which in the long run may bring discredit upon compensation laws.

The committee urges a continuous study of compensation experience as the one safe guide to intelligent and efficient administration. As the first step in this study, everything should be done to secure as far as possible the general adoption and use of the tables which have already been recommended by the committee with such elaboration of detail as may be necessary to show most clearly the experience under any particular compensation act and to exhibit the merits or defects peculiar to the law.

The personnel of the present committee (1919) is as follows:

Mr. E. H. DOWNEY, *Special Deputy Pennsylvania Insurance Department, Chairman.*
Mr. L. W. HATCH, *Chief Statistician New York State Industrial Commission, Vice Chairman.*
Mr. C. H. VERRILL, *Commissioner United States Employees' Compensation Commission, Secretary.*
Miss INEZ F. COOPER, *Statistician Wisconsin Industrial Commission.*
Mr. T. N. DEAN, *Statistician Ontario Workmen's Compensation Board.*
Mr. R. J. HOAGE, *Statistician United States Employees' Compensation Commission.*
Mr. CARL HOOKSTADT, *Expert, United States Bureau of Labor Statistics.*
Mr. WILLIAM LESLIE, *Statistician New York State Insurance Department.*
Mr. ROYAL MEEKER, *Commissioner, United States Bureau of Labor Statistics.*
Mr. R. M. PENNOCK, *Actuary Pennsylvania Department of Labor and Industry.*
Mr. W. P. RATLIFF, *Statistician California Industrial Accident Commission.*
Mr. OSCAR M. SULLIVAN, *Statistician Minnesota Department of Labor and Industries.*
Mr. E. E. WATSON, *Actuary Ohio Industrial Commission.*

STANDARDIZATION OF DEFINITIONS AND INDUSTRIAL ACCIDENT REPORTS.

DEFINITIONS.

One factor which has contributed largely to the lack of uniformity in accident statistics has been the absence of standard definitions. The necessity for such standardization was early recognized and a beginning was made at the conferences held upon the initiative of the United States Bureau of Labor Statistics prior to the appointment of the committee on statistics and compensation insurance cost. The conference committee which met in Chicago in October, 1914,[13] formulated the definition of "reportable accident" which was adopted in toto by the committee at its special meeting held at Chicago in 1915, except that the word "reportable" was changed to "tabulatable." In its second report made to the International Association of Industrial Accident Boards and Commissions in 1916, the committee recommended the definition of "proximate cause."

[13] For history and personnel of this conference committee see p. 9.

During the third year of its work, the committee considered very carefully the question of a proper unit for measuring accident rates and decided to adopt the only unit then in actual use, namely the "300-day worker." This unit together with definitions of reportable accidents, medical service, permanent total disability, and permanent partial disability were recommended by the committee in its third report submitted to the Association at its fourth meeting held in Boston in August, 1917.

In its fifth report, made to the Association in 1919, the committee recommended that the requirement concerning the time of reporting accidents which had been adopted at its first meeting, namely, that nonfatal accidents be reported within seven days after occurrence and fatal accidents within 24 hours after death, be superseded by the requirement that all reportable accidents be reported within 48 hours after the occurrence of the accident.

At a meeting held in New York City, February 12–13, 1920, the committee defined a "compensable accident" as one which is subject to compensation under the law of a particular State, and agreed to use the word "compensable" as applied to industrial accidents in preference to "compensatable" or similar words. The committee recommends this usage to accident boards and commissions.

At Harrisburg in December, 1919, the committee decided to change the unit of measurement for computing accident frequency and severity rates which it had recommended in 1917. The term "300-day worker" gave rise to misunderstandings. Employers and employees regarded it as implying that the desirable working day should be 10 hours and that the desirable number of working days in the year should be 300. Because the "300-day worker" unit was misunderstood as being an actual worker or a recommended standard for workers to measure up to, the committee decided to change the unit of measurement for industrial accidents to 1,000 hours' exposure and multiples thereof. The committee recommends 1,000 thousand (1,000,000) hours for the unit in computing accident frequency rates and 1,000 hours' exposure as the unit in computing accident severity rates.[14]

Following is the list of standard definitions adopted by the committee:

STANDARD DEFINITIONS ADOPTED BY THE COMMITTEE.

NOTE.—In publishing the statistics of accidents, diseases, and injuries, clear definitions of the terms used in the tables should be given either in the tables, in prefatory notes thereto, or in readily accessible text.

1. Reportable accidents.—Reportable accidents, diseases, and injuries should include all tabulatable accidents, diseases, and injuries, and all nontabulatable accidents, diseases, and injuries which require any medical expenditure.

2. Tabulatable accidents, diseases, and injuries.—All accidents, diseases, and injuries arising out of the employment and resulting in death, permanent disability, or in the loss of time other than the remainder of the day, shift, or turn on which the injury was incurred should be classified as "tabulatable accidents, diseases, and injuries," and a report of all such accidents, diseases, and injuries to some State or national authority should be required.

3. Compensable accidents.—A compensable accident is one which is subject to compensation under the law of the particular State in question.

NOTE.—Compensable accidents, diseases, and injuries as used in any report in accordance with the practice in the particular State, should be tabulated separately from noncompensable accidents and should be clearly defined.

[14] For extended description and explanation of change see pp. 69 and 70.

4. Permanent total disability.—Permanent total disability should include every accident, disease, or injury which is designated by statute as permanent total disability, or which permanently incapacitates the workman for performing any work continuously in any gainful occupation.

NOTE.—Information in regard to medical service expenditures should be given as fully as possible. If the statistics given cover only a part of the cases dealt with under the law that fact should be made clear.

5. Permanent partial disability.—Permanent partial disability should include every accident, disease, or injury (less than permanent total disability) which results in the loss of any member of the body or part thereof, or in the permanent impairment of any function of the body.

6. Time of reporting.—Except as State laws otherwise require, all reportable accidents shall be reported to the proper State authority within 48 hours after the occurrence of the accident.

7. Cause.—The accident should be charged to that condition or circumstance the absence of which would have prevented the accident; but if there be more than one such condition or circumstance, then to the one most easily prevented.

8. Accident frequency rates per 1,000,000 hours of working time.—Accident frequency rates should be expressed in terms of the number of accidents per 1,000,000 hours of working time. The basis used should be the actual number of man hours for the year; that is, the total working time for all employees of the establishment or the department for the year reduced to the number of hours required for one man to do the same work. This should be taken from exact records if such records are in existence. If this exact information is not available in this form in the records, then an approximation should be computed by taking the number of men at work (or enrolled) on a certain day of each month in the year, and the average of these numbers multiplied by the number of hours worked by the establishment for the year would be the number of man hours measuring the exposure to risk for the year.

9. Accident rates for $100,000 of audited pay-roll exposure.—Accident rates should also be computed on the basis of $100,000 of pay roll. This information should be published for all State funds and for the entire jurisdiction where practicable.

10. Accident severity rates.—Accident severity should be expressed in terms of days lost per 1,000 hours' exposure of the working force. computed in accordance with the following table:

NOTE.—In computing the duration of temporary disabilities, the day of the accident should be counted as the first day.

SCALE OF TIME LOSSES FOR WEIGHTING INDUSTRIAL ACCIDENT DISABILITIES SO AS TO SHOW SEVERITY OF ACCIDENTS.[1]

Nature of injury.	Degree of disability in per cent of permanent total disability.	Days lost.
Death	100	6,000
Permanent total disability	100	6,000
Arm above elbow, dismemberment	75	4,500
Arm at or below dismemberment	60	3,600
Hand, dismemberment	50	3,000
Thumb, any permanent disability of	10	600
Any 1 finger, any permanent disability of	5	300
2 fingers, any permanent disability of	12½	750
3 fingers, any permanent disability of	20	1,200
4 fingers, any permanent disability of	30	1,800
Thumb and 1 finger, any permanent disability of	20	1,200
Thumb and 2 fingers, any permanent disability of	25	1,500
Thumb and 3 fingers, any permanent disability of	33⅓	2,000
Thumb and 4 fingers, any permanent disability of	40	2,400
Leg above knee, dismemberment	75	4,500
Leg at or below knee, dismemberment	50	3,000
Foot, dismemberment	40	2,400
Great toe, or any 2 or more toes, any permanent disability of	5	300
1 toe, other than great toe, any permanent disability of	0	----------
1 eye, loss of sight	30	1,800
Both eyes, loss of sight	100	6,000
1 ear, loss of hearing	10	600
Both ears, loss of hearing	50	3,000

[1] For explanation of this table see pp. 71 to 77.

ACCIDENT REPORTS.

The fundamental requirement for the accurate and complete reporting of industrial accidents by uniform methods, and upon uniform blanks, has probably not yet been attained for any American State.

On the occasion of a conference of the American Association for Labor Legislation, held in September, 1911, a committee [15] was appointed with the specific duty "of framing a uniform system of reporting industrial accidents and occupational diseases and tabulating accident statistics."

The committee, in cooperation with persons and official bodies interested in accident reporting, prepared a tentative schedule which was subsequently submitted to public officials, insurance companies, and representatives of employers and employees. Numerous helpful suggestions were received and utilized, and the final draft was formally adopted at a joint meeting, held in Washington in December, 1911, of the American Association for Labor Legislation and the American Statistical Association.

Copies of the final draft of the standard schedule for accident reports were sent out with explanatory letters early in 1912 to State officials urging its adoption. In a majority of the States it was found, however, that insufficient legal authority precluded the securing of all the information desired. It therefore became apparent that legislation would be necessary in many States before the standard schedule could be generally adopted. The committee in charge, therefore, agreed upon a standard reporting bill, as follows:

STANDARD BILL FOR INDUSTRIAL ACCIDENT REPORTS.

AN ACT to require the recording and reporting of certain industrial accidents, and to provide for its enforcement.

Be it enacted, etc., as follows:

SECTION 1.—*Record of accidents.*

Every employer of labor, except agricultural or domestic labor, in this State, whether a person, partnership, or corporation, including the State and all governmental agencies created by it, shall keep a record of every accident which causes personal injury to an employee in the course of his employment. The record shall contain such information as the (proper official) may require and shall be open to inspection by him at all reasonable times.

SECTION 2.—*Report of accidents.*

Within 48 hours after any such accident the employer shall send to the (proper official) a report thereof, stating:

(*a*) Name, address, and business of employer.
(*b*) Name, address, and occupation of employee.
(*c*) Cause of injury.
(*d*) Nature of injury.
(*e*) Time of injury.
(*f*) Place of injury.
(*g*) Such other information as may be reasonably required by the (proper official).

Subsequent reports of the results of the accident and of the condition of the injured

[15] The members of the committee were: Leonard W. Hatch, chief statistician of the New York State Department of Labor, chairman; Lucian W. Chaney, United States Bureau of Labor Statistics; John R. Commons, at the time a member of the Industrial Commission of Wisconsin; Don D. Lescohier, statistician Minnesota State Bureau of Labor; and John B. Andrews, Secretary American Association for Labor Legislation.

employee shall be made by the employer at such times and containing such information as the (proper official) may require. The reports herein required shall be on or in conformity with the standard schedule blanks hereinafter provided for. The posting of the report, within the time required, in a stamped envelope addressed to the office of the (proper official) shall be a compliance with this section.

SECTION 3.—*Blanks for reports.*

The (proper official) shall prepare and furnish, free of cost, to the employers included in section 1 standard schedule blanks for the reports required under this act. The form and contents of such blanks shall be determined by the (proper official).

SECTION 4.—*Reports not evidence.*

Reports made under this act shall not be evidence of the facts therein stated in any action arising out of the accident therein reported.

SECTION 5.—*Penalty.*

Any employer who neglects or refuses to send the report or reports as herein required shall be liable to the State for a penalty of ——— dollars for each offense, recoverable by civil action by the (proper official).

SECTION 6.—*Time of taking effect.*

This act shall take effect on the 1st day of ———, 19—.

The accident report schedule as agreed upon by this committee was subsequently modified in minor particulars, largely with reference to the practical requirements of workmen's compensation laws. The form for first reports, as adopted by the committee, has served as a basis, with minor changes, of the accident-report form adopted by a number of the principal States. It also served as a basis of the discussion in nearly all the conferences on the subject which have been subsequently held, and differs but slightly from the standard form which was adopted by the Chicago conference of labor and workmen's compensation officials, which was held in October, 1914, and by the International Association of Industrial Accident Boards and Commissions at its special meeting held at Chicago in January, 1915.

The committee on statistics and compensation insurance cost of the International Association of Industrial Accident Boards and Commissions at a meeting held in New York City, February 12–13, 1920, revised this standard first report of accidents and in addition formulated a final report on nonfatal accidents and a supplementary report on fatal accidents. The committee's decision to take up again the question of accident report forms arose out of the need for greater uniformity in the reporting of accidents on the part of State compensation commissions. The States have not, seemingly, realized the importance of a standardization and uniformity in this respect, yet it is so clear as to be axiomatic that certain fundamental facts as to accident occurrence must be known by every compensation administration in order to make it possible to carry out the compensation law intelligently and effectively.

The revised first accident-report form as adopted by the committee contains three new items, whereas six of the original questions were eliminated. Experience has demonstrated that the questions eliminated were useless for obtaining dependable information. The committee endeavored to frame the report forms so as to elicit every obtainable item of information necessary in the administration of

compensation laws, and to eliminate all unnecessary and useless questions. The forms which follow are minimum standards. Some States because of statutory provision or administrative practice probably require additional information but this should be limited to questions which are absolutely essential.

The forms adopted are as follows:

STANDARD FORMS FOR ACCIDENT REPORTS.

First Report of Accident to Employee.

[To be filled out and sent in within 48 hours of the accident.]

1. Employer.	a. Employer's name..... b. Office address: Street and No. .....; city or village ..... c. Business (goods produced, work done, or kind of trade or transportation)..... d. Location of plant or place of work where accident occurred, if not at office address: Street and No. .....; city or village..... e. Name of insurance carrier.....
2. Injured person.	a. Date on which accident occurred..... b. Working hours per day.....; c. Working days per week..... d. Piece or time worker? .....; e. Wages or average earnings per day .....; per week ..... f. Name.....; address..... g. Sex.....; h. Age..... i. Occupation when injured.....; in what department or branch of work?.....; was this regular occupation?.....; if not, state regular occupation.....
3. Cause of injury.	a. Describe in full how accident happened..... .... b. Name of machine, tool, or appliance in connection with which accident occurred.....; by what kind of power driven?.....; hand feed or mechanical feed?.....; part on which accident occurred .....
4. Nature and extent of injury.	a. State exactly part of person injured and nature of injury..... ..... b. Did injury cause loss of any member or part of a member? If so, describe exactly..... c. Has injured person returned to work?.....; if so, give date and hour..... d. Date disability began.....
5. Medical care.	a. Attending physician; name and address..... ..... b. Hospital; name and address..... .....

Date of report.....; made out by.....

Final Report on Nonfatal Accidents.

1. Employer's name ..... 2. Address .....
3. Name of insurance company .....
4. Name of injured employee ..... 5. Address .....
6. Date of accident ..... 7. Disability began .....
8. Date first compensation payment made .....
9. Date injured able to return to work .....
10. Date of final payment .....
(In case of permanent disability the date the final award was made.)
11. Nature of injury .....
.....
12. Is disability permanent? State exactly part of body injured and nature of disability .....
..... Per cent of total disability .....
13. Wages or average earnings per day ..... Per week .....
14. Payments to compensate for injury: Total, $.....
(Not including medical payments.)
15. For medical treatment, $..... 16. For hospital treatment, $.....
17. For artificial members, $....., as follows: .....
18. Remarks: .....

Supplementary Report on Fatal Accidents.

[A first report of accident must also be made in every case.]

1. Name of employer ..... 2. Address .....
3. Date of accident ..... 4. Date of death .....
5. Name of employee ..... 6. Address .....
7. Dependents:

	Name.	Date of birth.	Relationship.	Present address.
a	.....	.....	.....	.....
b	.....	.....	.....	.....
c	.....	.....	.....	.....
d	.....	.....	.....	.....
e	.....	.....	.....	.....
f	.....	.....	.....	.....
g	.....	.....	.....	.....

8. Cause of death .....
.....

TIME OF REPORTING ACCIDENTS.

The International Association of Industrial Accident Boards and Commissions at its special meeting held in Chicago in January, 1915, adopted a resolution with respect to the time of reporting accidents which was virtually identical with that adopted by the conference meeting of October, 1914. That resolution recommended the requirement that nonfatal accidents should be reported within 7 days after occurrence and fatal accidents within 24 hours after death. In its fifth annual report made in 1919 the committee on statistics and compensation insurance cost submitted a new resolution concerning the time of reporting accidents which was adopted by the association. The resolution is as follows:

> Except as State laws otherwise require, all reportable accidents shall be reported to the proper State authority within 48 hours after the occurrence of the accident.

At the present time Massachusetts is the only State which has a law requiring all employers to report all accidents within 48 hours. Idaho and Iowa require all accidents of more than one day's disability to be reported within 48 hours; South Dakota requires all employers under the compensation act to report all accidents within

48 hours. Maryland, Oregon, and Washington require all employers to report all accidents "immediately." Maine requires all employers under the compensation act to report all accidents "promptly." At present Florida, Georgia, Mississippi, and South Carolina are the only States which require no reports of industrial accidents.

In some of those States in which there is no penalty clause attached to the law considerable difficulty has been experienced in securing reports of accidents. This has resulted in the promulgation of certain supplementary regulations and interpretative orders by the agencies receiving the reports. The following table indicates the statutory requirements as to what accidents are reported and when first reports are required to be made in the various States and in Canada and such data as it was possible to obtain as to the administrative practice of the agencies receiving first reports of accidents.

PROVISIONS AS TO INDUSTRIAL ACCIDENT REPORTING IN THE VARIOUS STATES AND IN THE PROVINCES OF CANADA.

UNITED STATES.

State, and office receiving report.	Statutory requirements.		Administrative requirements if different from statutory provisions.
	Accidents required to be reported.	When first reports are required to be made.	
Alabama: Compensation commissioner.	All employers under the compensation act must report all accidents of over 2 weeks' disability.	Within 15 days..	
Alaska: Mine inspector and commissioner of labor.	Serious or fatal accidents in mines.	Immediately....	Serious accidents required to be reported immediately; minor, monthly. Under general authority all industrial accidents also are required to be reported once a year.
Arizona: Mine inspector.	.....do.....	.....do.....	Serious accidents are defined as those causing disability of 2 weeks or more. Fatal and "very serious" reported at once; others at end of each month.
Arkansas: Mine inspector.	Mine operators must report all serious or fatal accidents.	Without delay..	
California: Industrial accident commission.	All employers, insurers, and attending physicians must report all accidents involving time lost or medical aid.	Fatal accidents must be reported immediately.	Only employers under compensation act required to report accidents.
Colorado: Industrial commission.	All employers must report all accidents.	Within 10 days..	
Connecticut: Compensation commissioner.	Employers under the compensation act must report all injuries of 1 day's disability.	Weekly.....	
Delaware: Industrial accident board.	All employers under the compensation act must report all accidents.	Within 10 days..	Accidents are required to be reported within a month of time of accident—two weeks if possible.
Florida.....	No provision.....	.....	
Georgia.....	.....do.....	.....	
Hawaii: Industrial accident board.	All employers must report all injuries of 1 day's disability or more.	As soon as practicable.	All employers under the compensation act are required to report all injuries as promptly as possible.
Idaho: Industrial accident board.	All employers must report all injuries of 1 day's disability.	Within 48 hours.	All employers under the compensation act are required to report all injuries causing disability or requiring medical aid immediately.
Illinois: Industrial commission.	All employers under the compensation act must report all injuries of more than 1 week's disability.	Fatal accidents at once; others once a month.	Only compensable accidents are required to be reported.

PROVISIONS AS TO INDUSTRIAL ACCIDENT REPORTING IN THE VARIOUS STATES AND IN THE PROVINCES OF CANADA—Continued.

UNITED STATES—Continued.

State, and office receiving report.	Statutory requirements.		Administrative requirements if different from statutory provisions.
	Accidents required to be reported.	When first reports are required to be made.	
Indiana: Industrial board.	All employers must report all accidents of more than 1 day's disability.	Within 1 week..	
Iowa: Industrial commissioner.	.....do.....	Within 48 hours.	Only electing employers are required to report to the industrial commissioner. Nonelecting employers must report to the commissioner of labor.
Kansas: Department of labor and industry.	All employers under the compensation act must report such reasonable particulars as to accidents as State factory inspector may require.	Annually.....	The department requires reports from all employers (except farm labor) of all accidents of more than 1 day's disability within 24 hours.
Kentucky: Workmen's compensation board.	All employers under the compensation act must report all injuries of more than 1 day's disability.	Within 1 week..	
Louisiana: Factory inspector.	All employers of manufacturing, mechanical and other establishments or places where women and children are employed must report fatal accidents and all injuries of more than 2 weeks' disability.	Semiannually...	Reports are required annually.
Maine: Industrial accident commission.	All employers under the compensation act must report all accidents.	Promptly.....	Accidents are required to be reported at once.
Maryland: Industrial accident commission.	All employers must report all accidents.	At once.....	All employers under the compensation act are required to report accidents which cause disability or require medical aid.
Massachusetts: Industrial accident board.	.....do.....	Within 48 hours.	
Michigan: Industrial accident board.	.....do.....	On eighth day after occurrence.	Only employers under the compensation act are required to report accidents.
Minnesota: Commissioner of labor.	All employers engaged in industrial pursuits must report all tabulatable accidents.	Fatal and serious, within 48 hours; others within 14 days.	Accidents from operating railroads, not included.
Mississippi.....	No provision.....	.....	
Missouri: Workmen's compensation commission.	All employers must report all accidents involving compensation or medical aid.	Within 10 days..	(Law not yet in force.)
Montana: Industrial accident board.	All employers and insurers must report all accidents.	As the board requires.	Only employers under the compensation act are required to report tabulatable accidents within 10 days.
Nebraska: Commissioner of compensation.	Reports of accidents shall be made as directed by compensation commissioner.	As commissioner requires.	All accidents causing disability or requiring medical aid are required to be reported within 10 days.
Nevada: Industrial commission.	All employers under the compensation act and physicians must report all accidents.	As commission requires.	All tabulatable accidents are required to be reported within 30 days.
New Hampshire: Commissioner of labor.	All employers under the compensation act must make such reports as required by commissioner of labor.	As required by commissioner.	Employers are required to report all accidents causing disability of 2 weeks or more as soon as possible.
New Jersey: Department of labor.	All employers must report all accidents of more than 2 week's disability.	Within 4 weeks; fatal accidents, within 2 weeks	The industrial commission has requested all employers to report immediately all tabulatable accidents.
New Mexico: Mine inspector.	All mine operators must make brief report of all fatal accidents and must keep a record of all accidents which occur in mines, to which inspectors shall have access.	Brief report at once; complete report within 10 days.	

PROVISIONS AS TO INDUSTRIAL ACCIDENT REPORTING IN THE VARIOUS STATES AND IN THE PROVINCES OF CANADA—Continued.

UNITED STATES—Continued.

State, and office receiving report.	Statutory requirements.		Administrative requirements if different from statutory provisions.
	Accidents required to be reported.	When first reports are required to be made.	
New York: Industrial commission.	All employers must report all accidents.	Within 10 days.	Only employers under the compensation act are required to report all tabulatable accidents and those requiring medical aid.
North Carolina: Mine inspector.	All mine operators must report accidents resulting in death or personal injury.	Within 24 hours.	
North Dakota: Workmen's compensation bureau.	All employers must report all accidents.	Within 1 week.	
Ohio: Industrial commission.	do.	do.	Only employers under the compensation act are required to report compensable accidents or those requiring medical aid; compensable accidents to be reported within 2 weeks; others on 10th day of month.
Oklahoma: Industrial commission.	do.	Within 10 days or reasonable time.	
Oregon: Industrial accident commission.	do.	At once.	Only employers under the compensation act are required to report accidents causing disability or requiring medical aid within 5 days.
Pennsylvania: Department of labor and industry.	All employers (except casual employments) must report all accidents of 2 days' disability.	Within 30 days.	
Porto Rico: Workmen's relief commission.	All employers must report all accidents.	Within 5 days.	
Rhode Island: Bureau of industrial statistics.	All employers under compensation act (except public utilities) must report all injuries of 2 weeks' disability.	Within 3 weeks; fatal, within 48 hours.	
South Carolina.	No provision.		
South Dakota: Industrial commissioner.	All employers under the compensation act must report all accidents.	Within 48 hours.	
Tennessee: Chief mine inspector.	All mine operators must report all accidents.	Promptly.	
Texas: Industrial accident board.	All employers must report all accidents of more than 1 day's disability.	Within 8 days.	
Utah: Industrial commission.	All employers must report all accidents.	Within 1 week.	Only employers under the compensation act are required to report all accidents causing disability or requiring medical aid. Fatal accidents required to be reported by wire.
Vermont: Commissioner of industries.	All employers under the compensation act must report all injuries of 1 day's disability or requiring medical aid.	Within 72 hours.	
Virginia: Industrial commission.	All employers must report all injuries over 1 week's disability.	Within 10 days.	Only employers under the compensation act are required to report accidents. Accidents causing from 1 to 7 days' disability are required to be reported quarterly.
Washington: Industrial insurance department.	All employers must report all accidents.	At once.	Only employers under the compensation act are required to report accidents causing disability. Fatal accidents are reported by telephone or telegraph.
West Virginia: Compensation commissioner.	All employers must report any information required.	Upon request.	Only employers under the compensation act are required to report all accidents within 24 hours.

PROVISIONS AS TO INDUSTRIAL ACCIDENT REPORTING IN THE VARIOUS STATES AND IN THE PROVINCES OF CANADA—Concluded.

UNITED STATES—Concluded.

State, and office receiving report.	Statutory requirements.		Administrative requirements if different from statutory provisions.
	Accidents required to be reported.	When first reports are required to be made.	
Wisconsin: Industrial commission.	All employers of 4 or more persons and insurers must report all accidents.	Within first 5 days of each month.	Only compensable accidents are required to be reported.
Wyoming: District court.	All employers engaged in extra-hazardous employments must report all accidents.	Within 20 days..	
United States: Employees' Compensation Commission.	Immediate superiors must report such information as required by commission.	Immediately....	
CANADA.			
Alberta: Workmen's compensation board.	All employers under the compensation act must report all disabling accidents.	Within 24 hours.	
British Columbia: Workmen's compensation board.	All employers must report all accidents.	Within 3 days...	
Manitoba: Workmen's compensation board.	All employers must report all disabling accidents.	.....do.....	Only employers under the compensation act are required to report accidents.
New Brunswick: Workmen's compensation board.	All employers under the compensation act must report all disabling accidents.	.....do.....	All accidents are required to be reported.
Nova Scotia: Workmen's compensation board.	.....do.....	.....do.....	Employers under the compensation act required to report all accidents.
Ontario: Workmen's compensation board.	All employers must report all accidents which cause disability or necessitate medical aid.	.....do.....	
Quebec: Inspector of industrial establishments and public buildings.	All factories and workshops must report all fatal and serious accidents causing disability.	Within 48 hours.	
Saskatchewan: Bureau of labor.	All employers must report all disabling accidents.	Forthwith.....	

CLASSIFICATION OF INDUSTRIES.

In all tabulations of industrial accident statistics the most important factor is the classification of industries, because all other items relate to it. For example, the number of accidents of a certain nature, such as the loss of an arm, must be assigned to the industries in which such accidents occur, and similarly the number of accidents attributable to a specific cause, such as the lack of a proper safeguard, must be distributed by industries. Uniformity in the classification of industries is therefore of first importance and is absolutely essential if the data prepared by the various States are to be comparable.

At the present time workmen's compensation insurance rates are provided by the insurance companies for some 1,500 different classifications. For the various industrial accident boards and commissions to keep and publish their accident data in the detail indi-

cated by so many classifications is well-nigh impossible, and would result in a refinement too minute for practical purposes. If, however, a logical table of industries can be prepared in such a manner that the 1,500 insurance classifications can be arranged under a reasonable number of headings, then the value of the industrial accident statistics will be greatly enhanced and their usefulness extended. Industrial accident board statistics and insurance statistics will "dovetail," and all doubt as to just what is intended to be covered under a given designation will be removed. The adoption of such a uniform classification of industries throughout this country would mean also that publications of the Federal Government pertaining to industrial accident statistics of the various States would be on the same identical basis, and therefore of greater value than they could otherwise possibly be. This is one of the chief objects which the committee has attempted to accomplish.

State insurance departments and rating bureaus, actuarial societies, and insurance companies writing workmen's compensation insurance are interested in the subject and recognize the desirability of the use of one standard set of classification groupings by all officials and organizations interested in compensation insurance. The National Workmen's Compensation Service Bureau of New York and several State rating and inspection bureaus have prepared industrial classifications for their own use.

A conference for the purpose of harmonizing existing groupings was held in New York in September, 1915, under the auspices of the Casualty Actuarial and Statistical Society of America. This conference committee, in the consideration of classification groupings, availed itself of the valuable advice and assistance of safety engineers familiar with industrial plants and processes. The task undertaken by the committee was to prepare a logical arrangement of all the various industries of the United States according to the "nature of the business." After careful consideration the committee adopted a grouping of industries covering all of the classifications used by insurance companies for writing workmen's compensation risks in this country and acceptable to the representatives of each organization present at the conference. This classification grouping the committee on statistics and compensation insurance cost approved and presented as part of its first report. This report was indorsed by the International Association of Industrial Accident Boards and Commissions at its annual meeting held at Seattle, September 30 to October 2, 1915.

There remained for the committee the preparation of the final subdivisions of classifications under each of the various industry groups. In its second report made to the association at its third annual meeting held in Columbus, Ohio, April 25–28, 1916, the committee submitted a preliminary classification of these groups, which was adopted by the association.[16] These final subdivisions, however, were especially designed for rate making rather than accident prevention purposes and their principal value to industrial accident boards and commissions lies in their service as an index to the industries intended to be covered by the respective groups.

[16] This classification was published in Bulletin 201 of the U. S. Bureau of Labor Statistics, pp. 17–71.

In the fourth year of its work (1918) the committee gave some consideration to a revision of the industry classifications, but any extended revision was so formidable a task that only slight progress was made in the work. A revision was attempted, however, by an informal committee made up of three members of the committee on statistics, and representatives of the National Reference Committee on Compensation Insurance Rates. The classification as revised by this informal committee was submitted to the committee on statistics and compensation insurance cost, and was recommended for adoption in the report of the committee made to the sixth annual meeting of the association held in Toronto, September 25, 1919. The changes recommended by the committee may be grouped under five heads: (1) Regrouping of classifications. (2) Elimination of certain classifications or consolidation with others. (3) Amendment of classification wordings. (4) Definition of classifications, the scope of which does not appear to be clear. (5) Erection of new classifications.

Experience with the classifications, however, proved that they were still unsuitable and inadequate for practical uses. In order that the industry classification might be published in the present report and thus be made immediately available for use by State industrial commissions, boards, and others interested, the committee on statistics held a meeting in New York, February 12 and 13, 1920, and revised the classification of industries, but limited the revision to the divisions, schedules, and groups. At this time a new division (III—Other extractive industries) was added; several schedules were eliminated or rearranged; a large number of groups were eliminated, a few were added, and several were combined. The total number of groups was decreased from 224 to 153. No attempt further to subdivide the groups into classifications was made at the meeting.

The committee, however, considers that the classification of industries, even in its revised form, is still far from perfect and that it must undergo modification from time to time as industrial organization and industrial processes change and as premium rates are readjusted accordingly. The committee on statistics, therefore, is continuing its work of revision. On the other hand, the committee considers that the revised classification is the best of its kind yet produced and its adoption by the agencies interested in workmen's compensation would constitute a step toward securing uniformity in industrial accident statistics, the importance of which can not be overestimated.

The tentative classifications which the committee submit as a result of its efforts are in accordance with the following arrangement:

Divisions.
Schedules.
Groups.

Divisions.—There are eight principal divisions or primary headings as follows:

I. Agriculture.
II. Mining, metallurgy, and quarrying.
III. Other extractive industries.
IV. Manufacturing.
V. Construction.

VI. Transportation and public utilities.
VII. Trade.
VIII. Clerical and professional service.

Schedules.—The eight divisions are divided into 36 schedules, or secondary headings. These secondary headings explain the details into which the primary headings are separated. For example, the primary heading "Manufacturing" is divided into 19 schedules, such as food, textiles, clothing, etc.

Groups.—The group headings, of which there are 153 in the revised classification, are the most important in the series and show a refinement of the secondary headings. Each group heading is intended to be significant of the industries covered under it, and it is the belief of the committee that these tertiary or group headings will prove acceptable to the various industrial accident boards and commissions for general use in tabulating their accident data.

Classifications.—The final subdivision of the groups will consist of the classifications. These, as already noted, are still unsatisfactory and are in the process of revision by the committee. The revision has not yet reached the point where the committee feels it wise to publish this classification and it has, therefore, been omitted for the present.

The industry classifications, as revised by the committee on statistics, with the exception of the final classification, are given below:

SUMMARY OF DIVISIONS, SCHEDULES, AND GROUPS.

I. Agriculture.

Schedule 1—Agriculture.
Group 1—Garden and truck farming.
Group 2—General farming.
Group 3—Operating farm machinery by contractors.

II. Mining, Metallurgy, and Quarrying.

Schedule 2—Mining.
Group 20—Coal mining.
Group 22—Metal mining with shafts, tunnels, etc.
Group 23—Metal mining, surface.
Group 24—Mining (not otherwise classified), with shafts, tunnels, etc.
Group 25—Mining (not otherwise classified), surface.
Group 26—Mineral wells.
Schedule 3—Metallurgy.
Group 40—Ore dressing.
Group 41—Smelting (not refining).
Group 42—Refining.
Schedule 4—Quarries and Stone Crushing.
Group 50—Quarrying and crushing.
Group 51—Clay and sand digging.

III. Other Extractive Industries.

Schedule 5—Forestry.
Group 60—Logging.
Group 62—Forest service.
Schedule 6—Fisheries.
Group 70—Fisheries.

IV. MANUFACTURING.

Schedule 7—Food.
- Group 100—Baking.
- Group 101—Flour and grist-mill products.
- Group 102—Starch, glucose, and sugar.
- Group 103—Confectionery.
- Group 104—Coffee, spices, and nuts.
- Group 105—Dairy products.
- Group 106—Slaughtering and meat packing.
- Group 107—Packing houses (no slaughtering).
- Group 109—Food preserving and canning.
- Group 110—Beverages.
- Group 112—Tobacco.

Schedule 8—Textiles.
- Group 200—Batting, wadding, and shoddy.
- Group 201—Cotton and linen goods.
- Group 204—Woolen goods.
- Group 205—Silk goods.
- Group 206—Jute and hemp.
- Group 207—Knit goods.
- Group 208—Braid and other narrow fabrics.
- Group 209—Lace and embroidery.
- Group 210—Carpets and rugs.
- Group 212—Finishing textiles.

Schedule 9—Clothing.
- Group 220—Clothing.
- Group 221—Headwear.
- Group 222—Furnishing goods.
- Group 223—Bedding.
- Group 224—Miscellaneous needle trades.

Schedule 10—Laundries, Cleaning and Dyeing.
- Group 229—Laundries, cleaning and dyeing.

Schedule 11—Leather.
- Group 230—Tanning and dressing.
- Group 232—Shoe stock.
- Group 233—Boots and shoes.
- Group 234—Gloves.
- Group 235—Heavy leather goods.
- Group 236—Leather goods, miscellaneous.

Schedule 12—Rubber and Composition Goods.
- Group 250—Rubber.
- Group 251—Rubber goods.
- Group 252—Celluloid and celluloid goods.
- Group 254—Bone, horn, shell, and ivory goods.
- Group 255—Oilcloth and linoleum.
- Group 256—Miscellaneous composition goods.

Schedule 13—Paper and Pulp Manufacturing.
- Group 270—Pulp.
- Group 271—Paper.

Schedule 14—Paper Goods.
- Group 280—Paper boxes.
- Group 281—Paper goods (not otherwise classified).
- Group 282—Paper coating and treating.

Schedule 15—Printing.
- Group 290—Printing.
- Group 291—Engraving.

Schedule 16—Wood Products.
- Group 301—Saw mills.
- Group 310—Planing mills.
- Group 311—Cooperage.
- Group 312—Boxes (wooden).
- Group 313—Wood turning and pattern making.
- Group 314—Brooms and brushes.
- Group 315—Furniture.
- Group 316—Rattan and willowware.
- Group 317—Veneer goods.
- Group 318—Musical instruments.
- Group 319—Miscellaneous wood and metal products.

Schedule 17—Blast Furnaces, Steel Works, and Rolling Mills.
Group 330—Blast furnaces.
Group 331—Steel works.
Group 332—Rolling and tube mills.
Group 333—Iron and steel fabricating.
Group 335—Boilers and tanks.
Schedule 18—Metal Goods.
Group 340—Foundries.
Group 344—Forging (not otherwise classified).
Group 346—Cutlery and hand tools.
Group 347—Hardware (not otherwise classified).
Group 348—Gas, electrical, and other fixtures.
Group 350—Sheet-metal products.
Group 352—Wire.
Group 353—Wire products.
Group 354—Eyelets, pins, etc.
Group 355—Metal furniture (not sheet metal).
Group 356—Lead and lead alloys.
Group 360—Jewelry and silverware.
Schedule 19—Machinery (not forging or woodwork).
Group 375—Machine shops (not otherwise classified).
Schedule 20—Fine Machines and Instruments.
Group 380—Fine specialty machines and instruments (small arms, sewing machines, watches, clocks, computing and writing machines, telescopes, microscopes, etc.).
Schedule 21—Vehicles.
Group 390—Automobile and automobile parts.
Group 391—Motorcycles, bicycles, etc.
Group 392—Aeroplanes.
Group 393—Carriages and parts.
Group 394—Railroad cars and parts.
Schedule 22—Stone Products.
Group 400—Cement and plaster.
Group 402—Stone grinding.
Group 403—Stone cutting.
Group 404—Carborundum.
Group 405—Miscellaneous stone products.
Schedule 23—Clay Products.
Group 410—Brick, tile, and terra cotta.
Group 412—Pottery.
Schedule 24—Glass Products.
Group 420—Glass (plate or sheet).
Group 421—Glassware.
Schedule 25—Chemical (the following are the groups adopted by the State of Pennsylvania: Acids, explosives, oil and tar by-products, fertilizers, glue and soap, paint and colors, drugs, and extracts).

V. Construction.

Schedule 26—Construction (not building erection).
Group 460—Pile driving.
Group 461—Clearing and grading.
Group 462—Street and highway construction.
Group 463—Railroad construction.
Group 464—Drilling.
Group 465—Excavating and dredging.
Group 467—Ditching and pipe laying.
Group 468—Tunneling and shaft sinking.
Group 470—Electric line construction.
Schedule 27—Building Erection and Demolition (occupational classification).
Group 481—Masonry.
Group 482—Structural-iron erecting.
Group 483—Concrete construction.
Group 485—Sheet-metal construction.
Group 487—Carpentry.
Group 488—Roofing (not otherwise classified).
Group 489—Plumbing and gas fitting.

Schedule 27—Building Erection and Demolition (occupational classification)—Concluded.
Group 490—Electrical fixtures.
Group 495—Painting and decorating.
Group 496—Plastering.
Group 501—Machinery installation.
Group 502—Wrecking and moving buildings.
Schedule 28—Shipbuilding.
Group 510—Shipbuilding, steel.
Group 511—Shipbuilding, wood.
Group 512—Boat building.
Group 513—Ship repairing in dry dock.
Group 514—Marine wrecking.

VI. TRANSPORTATION AND PUBLIC UTILITIES.

Schedule 29—Water Transportation.
Group 520—Steamers and tugboats.
Group 521—Sailing vessels.
Group 522—Barges, scows, and lighters.
Group 525—Stevedoring.
Schedule 30—Steam and Electric Railroads.
Group 526—Steam railroads.
Group 527—Street railroads.
Schedule 31—Cartage and Trucking (drivers, chauffeurs, truckmen, fuel, lumber, and ice dealers, retail stores, livery stables, storage incidental to trucking, etc.).
Schedule 32—Utilities.
Group 550—Gas, water, and steam.
Group 551—Electric light and power.
Group 552—Sewage and garbage.

VII. TRADE.

Schedule 33—Commercial.
Group 570—Stores.
Group 576—Warehouses.

VIII. CLERICAL AND PROFESSIONAL SERVICE.

Schedule 34—Clerical and Professional Employments.
Group 602—Agents, salesmen, and inspectors (outside).
Group 603—Office employees.
Group 604—Professional employments.
Schedule 35—Care and Custody of Buildings and Grounds.
Group 620—Hotels, clubs, and restaurants.
Group 622—Buildings (not otherwise classified).
Group 625—Amusement parks.
Schedule 36—Miscellaneous Occupations.
Group 651—Domestic and personal service.
Group 652—Policemen and firemen.
Group 653—Not otherwise classified.

CLASSIFICATION OF CAUSES OF ACCIDENTS.

The whole purpose of a classification of accidents by causes is accident prevention. The classification, therefore, should point to the most immediate and tangible preventives. Doubtless every accident is, in fact, the outcome of a long train of events. If only complete information were available, it should be possible to trace any accident to some remote initiating cause—ultimately, in many cases, to some failure of insight or foresight on the part of some human agent. If a tower falls, it is because the builder has miscalculated the strength of its materials in relation to the strains put upon them, or the contractor has failed to carry out the specifications, or a

workman has slighted his task. So the death of those who are buried in the ruins might be attributed to the neglect of the brickmaker, or to the incompetence of the supervising architect. But it is very seldom possible to ascertain the primary cause of an accident in this sense. The attempt, indeed, would generally prove of doubtful utility. The immediate cause is a tangible fact, capable of definite ascertainment. To go further is to venture into the speculative field of personal fault, where the bias of witnesses and the predilection of the statistician will too often determine the result.

The committee recommends, therefore, that accidents be uniformly assigned to the proximate or immediate cause. In the immense majority of cases, the analysis will perforce stop at this point. The comparatively rare catastrophic accidents, however, such as train collisions or coal-mine explosions, should be further analyzed with respect to the antecedent circumstances which produce the catastrophe.

The committee adopted the following definition of proximate cause: "That the accident should be charged to that condition or circumstance the absence of which would have prevented the accident; but if there be more than one such condition or circumstance, then to the one most easily prevented."

The meaning of this rule may be made clear by illustration. A workman passing through an aisle stumbles upon a defective floor and throws his hand into an open gear which mashes off two of his fingers. Under the rule adopted this accident is to be charged to the gear and not to stumbling. Had the gear been properly covered the workman might still have been injured by his fall, but the injury which did occur, namely, the loss of two fingers, would not have happened.

The committee has grouped the causes of accidents, as above defined, into 11 general headings, and these are again divided into subheadings. The subheadings are made still more specific by a division into classes. To illustrate—the general heading "Machinery" is divided into prime movers, power-transmission apparatus, power-working machinery, hoisting apparatus, conveyors, and miscellaneous machinery. The subheading "Prime movers" is again divided into steam engines, gas or gasoline engines, electric motors and dynamos, compressed-air motors, water motors, and other prime movers.

The original cause classification was recommended by the committee in its second report made to the association in 1916 and was adopted at that time. It was put into use by members of the committee and others. This practical experience gave rise to suggestions for changes and additions, and the committee therefore submitted to the association, in its fourth report, two years later, a thoroughly revised and amplified classification which was substituted for the previous one. In this revision "Boilers and steam-pressure apparatus" was combined with "Explosions," and "Corrosive substances" was transferred to the "Poisonous substances" class. The committee also added certain new classifications, eliminated others, and amplified many of those already in use.

The committee has further recommended a detailed analysis of machine accidents by manner of occurrence and by part of machine on which the accident occurred. Such an analysis may not be prac-

ticable for publication in the general statistical tables, since it would require a very large amount of space to show the accidents upon each listed machine by manner of occurrence and part of machine. Nevertheless, it should be practicable to give this information in a summary manner without reference to the individual machines, and the statistical department should be able to obtain the information for any specific machine or group of machines when required for special studies.

The proper classification of power-working machinery caused the committee considerable concern. The number of machines is so great and their relationships so intricate that the subject involved a thorough engineering study. The Workman's Compensation Service Bureau, however, prepared an elaborate list of power-working machines, comprising all the principal classes of machinery. Mr. L. W. Hatch, of the Industrial Commission of New York, has made a grouping of these machines by industry and within each industry by operative hazard. The committee recommended the use of this list until further experience evolved a grouping that could be officially adopted. This list was revised and amplified by the New York Industrial Commission in cooperation with the National Workmen's Compensation Service Bureau, and in its fourth report made to the International Association of Industrial Accident Boards and Commissions in 1918, the committee recommended its use for accident statistics.

Under "Hoisting apparatus and conveyors" the committee have recommended that elevator accidents should be analyzed in some detail, because of the large number and seriousness of these accidents. In mining States a similarly detailed analysis should be made of accidents on mine cages, skips, and buckets. In those States where building construction is an important industry derrick accidents should be similarly analyzed.

The committee has given more attention to nonmachine accidents than has been customary in most States and indeed in foreign countries. Experience, both in the United States and abroad, has shown that machinery of all descriptions—taking even the broad definition here adopted—accounts for not more than one-fourth of industrial accidents, whether considered from the standpoint of mere numbers or from the standpoint of both number and severity. Indeed, less than one-fourth of fatal injuries occur in connection with power machinery. It has been customary to give a somewhat detailed analysis of machine accidents, and to lump all nonmachine accidents under a few general headings. The committee believes, however, that 75 per cent of the accidents should receive at least half of the time and thought of the statistical departments.

In the analysis of railroad equipment accidents, the committee has followed the latest classification of the Interstate Commerce Commission, consolidating, however, to reduce the amount of detail.

It will be noted that under "Vehicles" all accidents caused by objects falling from the vehicle not incident to loading or unloading are charged to the vehicle itself. Accidents incurred in loading or unloading are charged to the handling of objects. This distinction appears to be logical. In the same way falls of persons from the vehicle are considered vehicle accidents. Of course a proper code system will enable any statistician who desires so to do to throw

these accidents into the groups of falling objects and falls of persons, respectively.

Hand trucks are not treated as vehicles, but are included under Division VIII (Handling of objects). It is of course true that a hand truck falls within the common definition of vehicle; the committee believes, however, that hand trucking is not a part of the transportation industry, and that the hazards of hand trucking are more analogous to the hazards of handling objects than to those of power vehicles.

Accidents in the use of hand tools are analyzed by manner of occurrence. It was not believed worth while to analyze these accidents by the type of tool used.

With respect to occupational disease or industrial poisoning, the lack of information in regard to this subject makes it impossible to prepare a satisfactory code. Such a code must be built up as various occupational diseases and poisonings are reported and experience is accumulated. For this purpose it is especially desirable that information should be published in detail rather than in a general grouping which will conceal the exact name of the disease or poison. The correlation of this information with industry and occupation is also exceedingly important.

There are at present but seven jurisdictions in the United States which make provision for the compensation of occupational diseases. All but two of the Canadian Provinces make such provision. Occupational diseases for which compensation is paid in Canada and in Great Britain are noted in Appendix III of this report.

The tentative code for occupational diseases which has been prepared by the Workmen's Compensation Service Bureau while not complete may be helpful, and it is therefore published as Appendix IV (pp. 100–103) of this volume. This code classifies occupational diseases from the cause viewpoint. The committee believes that a similar classification from the point of view of the nature of the disease or injury should be made.

The list of accident causes herewith submitted will require expansion in different States to provide for special industries. Industrial classification of any given State must necessarily fall short of the degree of completeness required for the United States as a whole. In logging States, for example, more extended treatment should be given to animal-drawn vehicles, to falling objects, and to hand tools. The general classes here provided should be made more specific in order to satisfy conditions peculiar to the logging industry. Similarly, wherever an administrative authority is carrying on a safety campaign in the building industry, a special classification of falls of persons and of falling objects in building construction should be introduced. Doubtless there are still other industries which will require special treatment. It is hoped that all these special classifications can be fitted into the general framework here provided. Experience has shown the need of some agreed-upon rules of practice, in order that variations in interpretation of the causes might not develop so as to render results not fairly comparable, and, therefore, seriously impair their usefulness. The committee believes that this experience enabled it to improve greatly the cause classification, and it submits this classification as now revised, with its accompanying notes, with confidence that it represents a marked improvement

on any cause classification hitherto published. The cause of injury code in use by the United States Employees' Compensation Commission and several of the States follows this classification and may be helpful to statisticians using the classification. The code is published as Appendix II of this report (pp. 85 to 97).

GENERAL CAUSE CLASSIFICATION.

I. Machinery.
II. Vehicles (not including construction of).
III. Explosions, electricity, fires, and hot substances.
IV. Poisonous and corrosive substances and occupational diseases.
V. Falls of persons.
VI. Stepping on or striking against objects.
VII. Falling objects (not being handled by injured).
VIII. Handling of objects.
IX. Hand tools.
X. Animals.
XI. Miscellaneous causes.

I. Machinery.

A. Prime Movers.
1. Steam engines.
2. Gas or gasoline engines.
NOTE.—Include all internal-combustion engines.
3. Electric motors and dynamos.
4. Compressed-air motors.
5. Water motors.
6. Other prime movers.

B. Power-Transmission Apparatus.
1. Shafts.
2. Shaft collars and couplings.
3. Set crews, keys, and bolts.
4. Belts and pulleys.
5. Chains and sprockets.
6. Ropes, cables, and drums.
7. Cogs, cams, gears, and friction wheels.
NOTE.—Accidents upon belts, pulleys, shafts, gears, or other driving mechanism or parts thereof which form the connection between a machine and the prime mover or intermediate drive shall be charged to transmission apparatus. This includes parts attached to the machine. Accidents upon belts, pulleys, shafts, gears, or other driving mechanism, or parts thereof which connect one part of the machine with another part of the same machine, shall be charged to the machine.

C. Power-Working Machinery.
NOTE.—The committee believes that power-working machines should be classified by industry, and that within each industry group the principal types of working machines should be grouped by operative hazard. The committee recommends the use of the list of working machines prepared by the Bureau of Statistics and Information of the New York Industrial Commission, in cooperation with the National Workmen's Compensation Service Bureau. The list follows:

POWER-WORKING MACHINES.

STONE, CLAY, AND GLASS PRODUCTS MACHINES.

030 Brick-making machinery (not otherwise classified).
031 Brick cut-off machines.
032 Dry pans.
033 Molding machines.
034 Pug mills.
040 Cement-making machinery (not otherwise classified).
Bag-filling machines (cross index under food).
042 Cement-block machines.
043 Tube mills.

050 Glass-making machinery (not otherwise classified).
051 Polishing wheels.
052 Presses.
053 Surface grinding machines.
060 Pottery-making machinery.
080 Stone crushers.
090 Stone-working machinery other than crushers (not otherwise classified).
091 Drills.
Planers (cross index, metal).
093 Saws.
094 Rubbing beds.

METAL-WORKING MACHINES.

100 All other metal-working machines.
105 Abrasive wheels (emery, etc.).
Bending and straightening machines (revolving rolls, screw or clamp).
106 Corrugating rolls.
107 Crimping rolls.
108 Other metal rolls.
109 Other bending and straightening machines (not rolls).
110 Bolt and nut, pipe-cutting, threading, and tapping machines.
111 Boring machines or mills (horizontal and vertical) (not otherwise classified).
115 Drills (drill presses), radial and upright or gooseneck.
Milling and gear-cutting machines (not otherwise classified).
119 Broaching machines.
120 Die sinkers.
121 Gear-cutting machines.
122 Key seaters.
123 Milling machines.
124 Profilers.
125 Slotters.
129 Other or indefinite.
Hammers and forging machines (not otherwise classified).
130 Belt machines.
132 Drop hammers.
133 Forging hammers.
134 Scrap breakers.
135 Swaging machines.
136 Upsetting machines (not otherwise classified).
139 Other or indefinite.
Lathes and automatic screw machines.
140 Lathes (not otherwise classified).
141 Screw machines.
142 Turret lathes.
145 Cleaning mills—tumblers or rumblers.
146 Molding machines (core, sand mixers, tamping, etc.) (not otherwise classified).
Planers and shapers.
151 Planers.
152 Shapers.
155 Polishers and buffers.
156 Portable power tools (pneumatic and electric drills, hammers, and riveters).
Presses (power) (including punches).
157 Arbor presses.
158 Bulldozers.
159 Button presses.
160 Draw presses.
161 Embossing presses.
162 Punch, stamping, and trimming presses.
163 Punch and eyeleting machines.
164 Punches and riveting presses (not riveting hammers).
167 Other or indefinite.
168 Presses (foot and hand operated—no mechanical power) (not otherwise classified).
169 Button presses.
170 Rolling mills (including blooming mills).

171 Saws (not otherwise classified).
172 Band.
173 Circular.
174 Hack.
175 Scroll and jig.
176 Shears (not otherwise classified).
185 Welding and heat cutting machines.
186 Wireworking machines (not otherwise classified).
190 Winding machines (armatures, etc.).
191 Cable-making machines (not otherwise classified).
195 Wire and tube drawing machines.
197 Presses—hydraulic, pneumatic, and screw.

Woodworking Machines.

200 All other woodworking machines (not otherwise classified).
205 Bending machines.
206 Boring machines and drills.
207 Cork working machines (not otherwise classified).
208 Band knife.
209 Cork board cutters, block cutters, etc.
210 Cork-slicing machines.
213 Lathes (not otherwise classified).
214 Spoke lathes.
215 Shoe-last machines.
216 Button lathes (ivory, etc.).
220 Mortising machines (not otherwise classified).
221 Chain mortisers.
222 Chisel mortisers.
223 Pocket and boring machines.
225 Tenoning, planing, and molding machines (not otherwise classified).
226 Auto blind slat (tenoner).
227 Edgers.
228 Jointers.
229 Matchers.
230 Molders.
231 Planers.
232 Stickers.
234 Tenoning machines.
237 Presses (not otherwise classified).
238 Clamping machines.
239 Box nailers.
240 Box-board squeezers.
241 Door and blind clamps.
242 Hoop presses.
245 Sanding machines (not otherwise classified).
246 Belt (felloe and panel).
247 Disk.
248 Spindle and post.
249 Surface or drum.
250 Saws (band, scroll, or jig) (not otherwise classified).
251 Band.
252 Band resaw.
253 Jig or scroll.
254 Saws (circular and all other) (not otherwise classified).
255 Circular.
256 Gaining machine.
257 Gang circular.
258 Lath bolter.
259 Swing.
260 Dado.
261 Dovetailing.
262 Rabbeting.
265 Shapers (including special head cutters) (not otherwise classified).
266 Core-box machines.
267 Shapers.
268 Variety machines.

270 Veneering machines (all kinds) (not otherwise classified).
272 Veneer machines.
280 Brush and broom making machines (all kinds).

LEATHER-WORKING MACHINES—TANNERIES.

300 All other.
301 Buffing drums.
302 Other drums and paddle vats.
303 Fur-working machines.
304 Fleshing, shaving, and skiving machines.
305 Jacks—felting, glassing, rolling, etc.
306 Presses and baling machines.
307 Hair washing and drying machines.
308 Setting up (or setting out) machines.
309 Splitting machines.
310 Unhairing machines.
311 Extractors (centrifugal).

LEATHER-WORKING MACHINES—LEATHER PRODUCTS.

320 All other.
330 Cutting machines (not otherwise classified).
340 Punching and pressing machines (not otherwise classified).
350 Sewing machines.
351 Buffing and scouring machines.
352 All other shoe-making machines.

PAPER-MAKING MACHINES.

360 All other.
365 Barkers, chippers, splitters, and grinders, indefinite:
366 Barkers.
367 Chippers.
368 Grinders.
369 Splitters.
370 Beaters (including rag washers).
371 Screens.
Paper machines:
372 Other or indefinite.
373 Head box.
374 Apron.
375 Wire.
376 Suction roll.
377 Couch roll.
378 Dryers.
379 Calenders.
380 Doctors.
381 Rolls and winders.
382 Cutters and slitters.
383 Choppers.
384 Digestors.

PAPER-PRODUCTS MACHINES.

386 All other (not otherwise classified):
387 Paper-cup machines.
388 Tube machines.
389 Twine-making machines.
390 Automatic box-making machines.
391 Covering machines.
392 Cutting and punching machines (not otherwise classified).
393 Die cutters.
394 Guillotines.
395 Paper cutters (hand).
396 Perforators.
397 Punches.
398 Rotary cutters.
399 Saws.
400 Shears.

401 Doming and ending machines (not otherwise classified).
402 Doming machines.
403 Corrugating machines (not rolls).
404 Ending machines.
406 Corner staying machines.
407 Bag and envelope making machines.
408 Paper finishing machines.
Embossing rolls or calendars (cross index, rubber).
Embossing presses (cross index, metal).

Printing and Bookbinding Machines.

420 Composing machines (type casting and trimming machines) (not otherwise classified).
421 Linotypes.
422 Monotypes.
423 Type casters.
424 Gathering machines.
426 Presses (printing) (not otherwise classified).
427 Web newspaper presses.
428 Flat-bed cylinder presses.
429 Job platen presses.
430 Other printing presses.
431 Presses (binders) (not otherwise classified).
440 Sewing and stitching machines (not otherwise classified).
441 Wire stitchers.
442 Wire staplers.
445 Other printing machines.
450 Other bookbinding machines.

Textile Machines.

460 All other (not otherwise classified).
461 Washers.
462 Driers.
469 Opening and cleaning machines (not otherwise classified).
470 Openers.
471 Pickers.
472 Rag pickers.
473 Willow.
475 Carding and combing machines (not otherwise classified).
476 Cards.
477 Combs.
478 Garnett machines.
479 Slubbers.
485 Spinning machines (not otherwise classified).
486 Jacks and mules.
487 Spinning frames.
489 Drawing frames.
490 Weaving machines (not otherwise classified).
491 Looms.
492 Wire-cloth looms.
493 Warpers.
500 Dyeing, finishing, and printing machines (not otherwise classified).
501 Pile-cutting machines.
502 Shearing machines.
510 Braiding and knitting machines.
515 Rope-making machines.
Sewing machines (cross index, Leather products).
520 Cloth cutting and stamping machines (not otherwise classified).
530 Hat-making machines.
540 Coating and inlaying machines (linoleum, etc.; other coated fabrics).
545 Winders, doublers, and quillers.

LAUNDRY MACHINES.

Extractors (cross index, Leather).
560 Ironing machines (not otherwise classified).
561 Body ironers.
562 Flat-work ironers.
563 Mangles.
570 Washing machines (rotary).

FOOD-PRODUCTS MACHINES.

580 All other.
585 Cleaning, preparing, and sorting machines (not otherwise classified).
595 Milling and grinding machines (not otherwise classified).
605 Mixing machines and mixing kettles (dough and chocolate mixers, etc.).
606 Dough mixers.
610 Cookers (not mixers) and ovens (not otherwise classified).
615 Shaping and forming machines (not otherwise classified).
620 Cutting machines (not otherwise classified).
625 Coating and polishing pans (not otherwise classified).
630 Colanders (candy rolls, etc.) (not otherwise classified).
635 Crushers (ice crushers, etc.)
636 Barreling, bagging, packing, and wrapping machines (automatic or semiautomatic).
640 Bottling machines.
645 Tobacco working machines.
Stamping presses—power-operated (cross index, Metal).
Stamping presses—foot or hand-operated (cross index, Metal).
655 Bleaching and blanching machines.
660 Containers, washing and cleaning machines.

FARM MACHINES.

670 All other.
671 Feed and ensilage cutting and shredding machines.
672 Harvesters.
673 Thrashers.
674 Hay presses and balers.
675 Shelling machines.
676 Cream separators.
677 Cotton gins.

ENGINEERING AND CONTRACTING MACHINES.

680 All other.
681 Concrete mixers.
682 Rock drills.
550 All other.
683 Pile drivers.
684 Road rollers.
685 Grouting machines and cement guns.
686 Well drills.
687 Trench and ditch digging machines.

CHEMICAL-PRODUCTS MACHINES—ACIDS AND SALTS.

690 All other.
691 Grinding machines (except abrasive wheels).
692 Agitating mixers, vats, and kettles (except paint and pony mixers).
693 Machinery of recovery, such as screens, sifters, filters, and extractors, not centrifugal.
694 Furnaces, ovens, dryers, and evaporators, mechanically fed or operated.
Crushers (cross index, Stone crushers).
Calenders (cross index, Rubber).
Centrifugal extractors (cross index).

CHEMICAL-PRODUCTS MACHINES—SOAPS, GREASES, OILS, AND FERTILIZERS.

700 All other.
Agitating mixers, vats, and kettles (except paint and pony mixers) (cross index, Acids).
Soap-stamping presses—Power-operated (cross index, Power presses, under Metal).
Soap-stamping presses—Hand and foot operated (cross index, Foot presses, under Metal).
Soap grinders (cross index, Grinding machines, under Acids).
Barreling, bagging, packing, and wrapping machines—Automatic or semi-automatic (cross index, Food products).
Machinery of recovery, such as screens, sifters, filters, and extractors, not centrifugal (cross index, Acids).

CHEMICAL-PRODUCTS MACHINES—DRUGS.

705 All other.
Grinding machines (cross index, Acids).
Mixers (except pony mixers) (cross index, Acids).
Tablet presses and pill machines (cross index, Shaping machines, under Foot).
Pony mixers (cross index, Paint mixers).

PAINTS, VARNISHES, DRY COLORS, INKS, AND DYES.

710 All other.
Agitating vats and kettles (except paint or pony mixers) (cross index, Acids).
715 Pony or paint mixers.
Grinding machines (cross index, Acids).
Machinery of recovery, such as screens, sifters, filters, and extractors, not centrifugal (cross index, Acids).
Furnaces and ovens, mechanically fed or operated (cross index, Acids).
Crushers (cross index, Stone crushers).
Calenders (cross index, Rubber).
Centrifugal extractors (cross index, Leather, tanneries).

RUBBER, CELLULOID, COMPOSITION, PEARL, BONE, AND TORTOISE SHELL.

720 All others.
725 Calenders.
726 Tire and tube making machines.
727 Hose-making machines.
728 Rubber-band choppers and cutters.
Mixers, not of calender type (cross index, Pony mixers—paint).
Cutting and slitting machines (cross index, Paper making).
729 Tubing and hose wrapping machines.
730 Tire-wrapping machines.
Tumblers (cross index, Cleaning mills, in Metal).
Presses—Foot and hand operated (cross index, Metal).
731 Tubing machines.
Punching and pressing machines (press and dye type) (cross index, Leather products).
Cutting and punching machines (guillotine type) (cross index, Paper products).
732 Comb-cutting machines and ornament shapers.
733 Drills (button, etc.).
734 Grinding, washing, milling, and cracking machines.

MINING AND ORE-REFINING MACHINES.

735 Sackett machine (gypsum products).
744 All other.

MISCELLANEOUS.

745 Office machinery.
748 All other.

D. Machines Other than Working Machines.

1. Pumps.
2. Fans and blowers.
3. Turntables.

D. Machines, Other than Working Machines—Concluded
4. Compressors.
5. Automatic stokers.
6. All other.

E. Hoisting Apparatus.
1. Elevators controlled (not construction elevators).
   (*a*) Cable, breaking.
   (*b*) Cable, unwinding.
   (*c*) Cable, overwinding (car rising too high).
   (*d*) Cable, caught by.
   (*e*) Counterweight, struck by.
   (*f*) Machinery, breaking.
   (*g*) Machinery, caught in.
   (*h*) Car, caught between floor and.
   (*i*) Car, caught between shaft side and.
   (*j*) Car, caught between gate and.
   (*k*) Car, struck by, in pit.
   (*l*) Caught between car and overhead equipment or top of shaft.
   (*m*) Car, struck by, elsewhere.
   (*n*) Car, sudden start or stop.
   (*o*) Car, dumping.
   (*p*) Car rising too high.
   (*q*) Fall of person into shaft, from floor.
   (*r*) Fall of person into shaft, from car.
   (*s*) Fall of person into car, from floor.
   (*t*) Objects falling down shaft, from floor.
   (*u*) Objects falling down shaft, from car.
   (*v*) Objects falling from floor, into car.
   (*w*) Catching of load or part thereof between car and shaft.
   (*x*) Gates, not otherwise classified.
   (*y*) All other.
2. Elevators, automatic, and dumb waiters.
3. Elevators, sidewalk.
4. Construction hoists and elevators (not derricks).
   (*a*) Cable, breaking.
   (*b*) Cable, unwinding.
   (*c*) Cable, overwinding (car rising too high).
   (*d*) Cable, caught by.
   (*e*) Counterweight, struck by.
   (*f*) Machinery, breaking.
   (*g*) Machinery, caught in.
   (*h*) Car, caught between floor and.
   (*i*) Car, caught between shaft side and.
   (*j*) Car, caught between gate and.
   (*k*) Car, struck by, in pit.
   (*l*) Caught between car and overhead equipment or top of shaft.
   (*m*) Car, struck by, elsewhere.
   (*n*) Car, sudden start or stop.
   (*o*) Car, dumping.
   (*p*) Car rising too high.
   (*q*) Fall of person into shaft, from floor.
   (*r*) Fall of person into shaft, from car.
   (*s*) Fall of person into car, from floor.
   (*t*) Objects falling down shaft, from floor.
   (*u*) Objects falling down shaft, from car.
   (*v*) Objects falling from floor, into car.
   (*w*) Catching of load or part thereof between car and shaft.
   (*x*) Gates, not otherwise classified.
   (*y*) All other.
5. Mine cages, skips, and buckets.
   NOTE.—In those cases where mines are important, special analysis of mine-cage accidents should be made.
6. Cranes, locomotive.
   (*a*) Car, striking person.
   (*b*) Car, falling.
   (*c*) Cable or chain, catching or striking person.
   (*d*) Machinery, catching person.

E. Hoisting apparatus—Concluded.
6. Cranes, locomotive—Concluded.
(*e*) Hook or sling, catching or striking person
(*f*) Load, struck by, swinging.
(*g*) Load, struck by, lowering or raising.
(*h*) Load falling, broken cable.
(*i*) Load falling, slipping cable.
(*j*) Load falling, breaking of hook.
(*k*) Load falling, slipping of hook.
(*l*) Load falling, sling breaking
(*m*) Load falling, machinery breaking.
(*n*) Load falling, hitch slipping.
(*o*) Load falling, failure of current on magnet.
(*p*) Objects falling from load.
(*q*) Falls from crane or crane track (not in erecting or rigging).
(*r*) Other.
7. Cranes, other traveling.
(*a*) Car, striking person.
(*b*) Car, falling.
(*c*) Cable or chain, catching or striking person.
(*d*) Machinery, catching person.
(*e*) Hook or sling, catching or striking person.
(*f*) Load, struck by, swinging.
(*g*) Load, struck by, lowering or raising.
(*h*) Load falling, broken cable.
(*i*) Load falling, slipping cable.
(*j*) Load falling, breaking of hook.
(*k*) Load falling, slipping of hook.
(*l*) Load falling, sling breaking.
(*m*) Load falling, machinery breaking.
(*n*) Load falling, hitch slipping.
(*o*) Load falling, failure of current on magnet.
(*p*) Objects falling from load.
(*q*) Falls from crane or crane track (not in erecting or rigging).
(*r*) Other.
8. Derricks and jib cranes.
(*a*) Derrick or crane, striking person.
(*b*) Derrick or crane, falling.
(*c*) Cable or chain, catching person.
(*d*) Machinery, catching person.
(*e*) Hook or sling, catching person.
(*f*) Boom swinging.
(*g*) Boom breaking.
(*h*) Load, struck by, swinging.
(*i*) Load, struck by, lowering and raising.
(*j*) Load falling, slipping cable.
(*k*) Load falling, breaking hook.
(*l*) Load falling, sling breaking.
(*m*) Load falling, machinery breaking.
(*n*) Load falling, hitch slipping.
(*o*) Load falling, failure of current on magnet.
(*p*) Load falling, not otherwise classified.
(*q*) Objects falling from load.
(*r*) Falls from crane load.
(*s*) Falls from crane cab, car, or track (not in erecting or rigging).
(*t*) Other.
9. Wood stackers.
10. Blocks and tackles, windlasses, capstans, and winches, not otherwise classified.
11. Hay forks, derricks, and stackers.

F. Conveyors.
1. Air hoists.
(*a*) Objects falling from.
(*b*) Caught in.
(*c*) Struck by load.

F. Conveyors—Concluded.
2. Overhead trolleys.
(*a*) Objects falling from.
(*b*) Caught in.
(*c*) Struck by load.
3. Belt and chain conveyors.
(*a*) Objects falling from.
(*b*) Caught in.
(*c*) Struck by load.
4. Screen conveyors.
(*a*) Objects falling from.
(*b*) Caught in.
(*c*) Struck by load.
5. Bucket conveyors.
(*a*) Objects falling from.
(*b*) Caught in.
(*c*) Struck by load.
6. Platform conveyors and escalators.
(*a*) Objects falling from.
(*b*) Caught in.
(*c*) Struck by load.

The committee recommends that machine accidents should be further classified by manner of occurrence and part of machine, as follows:

(*a*) Manner of occurrence, machine accidents.
(1) Adjusting machine, tool, or work.
(2) Starting, stopping, or operating machine.
(3) Cleaning or oiling machine.
(4) Repairing machine.
(5) Breaking of machine or work.
(6) Flying objects, striking operator.
(7) Flying objects, striking person other than operator.
(8) All other.

(*b*) Part of machine on which accident occurred.
(1) Point of operation.

NOTE.—Point of operation means that part of machine at which work is actually inserted and maintained during any process of forming, cutting, shaping, or other operation.

(2) Belts.

NOTE.—Accidents upon belts, pulleys, shafts, gears, or other driving mechanism or parts thereof which form the connection between a machine and the prime mover or intermediate drive, shall be charged to transmission apparatus. This includes parts attached to the machine. Accidents upon belts, pulleys, shafts, gears, or other driving mechanism, or parts thereof, which connect one part of the machine with another part of the same machine, shall be charged to the machine.

(3) Cranks or eccentrics.
(4) Flywheels.
(5) Gears.
(6) Set screws, keys, and bolts.
(7) Counterweights.

GENERAL NOTE.—The classification of part of machine and manner of occurrence applies as well to prime movers and hoisting or conveying machinery as to working machines.

II. Vehicles (not Including Construction of).

A. Cars and Engines—Steam and Electric Railways.
1. Train wrecks.
(*a*) Collisions.
(*b*) Derailments.
(*c*) Car striking object on track without derailing.
2. Falls from or in.
(*a*) In getting on or off, in motion.
(*b*) In getting on or off, at rest.
(*c*) While riding on, due to sudden start or stop.
(*d*) While riding on, due to slipping or loss of balance.

A. Cars and Engines—Steam and Electric Railways—Concluded.

2. Falls from or in—Continued.
   (*e*) While riding on, contact with overhead structure.
   (*f*) While riding on, contact with side structure.
   (*g*) Falls, not otherwise classified.
3. Struck by or caught between.
   (*a*) While coupling or uncoupling.
   (*b*) While switching.
   (*c*) While repairing cars or engines.
   (*d*) While repairing track.
   (*e*) While crossing track.
   (*f*) While standing or walking on track.
4. Other causes.
   (*a*) Setting or releasing hand brakes. (Exclude falls due to.)
   (*b*) Objects falling from. (Not in loading or unloading.)
   (*c*) Objects shifting on load.
   (*d*) All other.

B. Mine and Quarry Cars and Motors.

1. Collisions.
2. Derailments.
3. Falls from, due to sudden start or stop.
4. Falls from riding on tail chain.
5. Riding on, contact with roof.
6. Riding on, contact with rib or side structure.
7. Caught between, and overhead obstruction.
8. Struck by or caught between while coupling or switching.
9. Struck by, not otherwise classified.
10. Braking.
11. Spragging.
12. Lifting or pushing car.
13. Caught or struck by rope or chain.
14. Caught by car or load in dumping.
15. Getting on or off car.
16. Struck or caught between, not otherwise classified.

NOTE.—Include here animal-drawn mine or quarry cars.

C. Plant, Trucks on Tracks.

1. Collisions.
2. Derailments.
3. Falls from, due to sudden start or stop.
4. Falls from riding on tail chain.
5. Riding on, contact with roof.
6. Riding on, contact with rib or side structure.
7. Caught between, and overhead obstruction.
8. Struck by or caught between, while coupling or switching.
9. Struck by, not otherwise classified.
10. Braking.
11. Spragging.
12. Lifting or pushing car.
13. Caught or struck by rope or chain.
14. Caught by car or load in dumping.
15. Getting on or off car.
16. Struck or caught between, not otherwise classified.

D. Automobiles and Other Power Vehicles.

1. Collisions, skidding.
2. Collisions, breaking of parts.
3. Collisions, all other.
4. Overturning, skidding.
5. Overturning, breaking of parts.
6. Overturning, all other.
7. Struck by.
8. Collisions with cars or engines.
9. Cranking.
10. Engines, not otherwise classified.

D. Automobiles and Other Power Vehicles—Concluded.

11. Breaking of car or part not resulting in collision or overturning.
12. Falls from.
13. Objects falling from.
14. Objects shifting on load.
15. Mechanical unloading.
16. All other.

NOTE.—All collisions of automobiles should be classed under automobiles, whether with other vehicles or with cars.

Accidents due to the engine in an automobile or other power vehicle should be charged to the power vehicle.

Accidents due to testing gas or gasoline engines should be charged to prime movers.

E. Bicycles.

F. Aeroplanes.

G. Animal-drawn Vehicles (not Mine or Quarry Cars).

1. Collisions with cars or engines.
2. Collisions with other vehicles.
3. Collisions with stationary objects.
4. Overturning.
5. Whiffletrees.
6. Falls from.
7. Struck by.
8. Objects falling from (not in loading or unloading).
9. Objects shifting on load.
10. Breaking of parts.
11. Mechanical unloading.
12. All other.

NOTE.—All vehicle accidents due to runaways should be charged to animals (X–A–3).

H. Animal-drawn Implements (not Machinery).

I. Water Craft.

1. Collisions with vessels.
2. Collisions with other objects.
3. Capsizing.
4. Hawsers and other ropes.
5. Falls from, or jumping overboard.
6. Falls from, rigging.
7. Falls into, hatchway.
8. All other.

NOTE.—Accidents from machinery on water craft should be charged to the specific machine.

J. All Other Vehicles.

III. Explosions, Electricity, Fires, and Hot Substances.

A. Boilers and Steam-pressure Apparatus.

1. Steam boilers, explosions of.
2. Steam boilers, escaping steam and hot water.
3. Steam boilers, all other causes.
4. Steam pipes, explosions of.
5. Steam pipes, all other causes.
6. Steam and hot water gauges, explosions of.
7. Steam and hot water gauges, all other causes.
8. Economizers and superheaters, explosions of.
9. Economizers and superheaters, all other causes.
10. Other steam-pressure apparatus, explosions of.
11. Other steam-pressure apparatus, all other causes.

B. Explosions of Explosive Substances.

1. Explosives, manufacturing and storing.
2. Explosives, transportation and handling.
3. Explosives, blasting.
   (*a*) Premature shot.
   (*b*) Misfires or delayed shot.
   (*c*) Windy shot.
   (*d*) Tamping.
   (*e*) All other.
4. Dust.
5. Gas.
6. Gasoline and other petroleum products.
7. All other.

C. Other Explosions.

1. Ammonia apparatus.
2. Other high-pressure apparatus.
3. All other.

NOTE.—Includes accidents due to bursting under pressure.

D. Electricity.

E. Conflagrations.

NOTE.—Includes accidents due to bursting under pressure.

F. Hot Substances and Flames.

1. Hot water.
2. Asphalt, pitch, and tar.
3. Other hot liquids.
4. Molten metal, explosions of.
5. Molten metal at furnace or cupola.
6. Molten metal, pouring.
7. Molten metal or slag, all other.
8. Radiant heat from incandescent metal.
9. Metal not molten, handling of.
10. Hot surfaces, contact with.
11. Oxyacetylene or electric cutting and welding.
12. Flames, clothing.
13. Flames, all other.
14. All other hot objects.

IV. Poisonous and Corrosive Substances and Occupational Diseases.

NOTE.—In case of occupational disease or industrial poisoning, it is desirable to subdivide specifically so as to show each occupational disease or poisoning. In the present state of knowledge in regard to the subject it is not possible to prepare a satisfactory code.[17] It must be built up as various occupational diseases and poisonings are reported and experience is accumulated. For this purpose it is especially desirable that detailed information should be published rather than general groups which will conceal the exact name of the disease or poison. The correlation of this information with industry and occupation is also exceedingly important.

V. Falls of Persons.

A. From Elevations.

1. Benches, boxes, chairs, and tables.
2. Bridges, dams, and docks (not in construction or demolition).
3. Cranes, derricks, elevators, and hoists in erecting and rigging.
4. Elevated bins, pockets, and tanks.

NOTE.—Include here falls from, but not falls into.

5. Buildings in construction or demolition not elsewhere specified.
6. Floors, temporary.

[17] A tentative code for occupational diseases which has been prepared by the Workmen's Compensation Service Bureau, 18 Park Row, New York City, will be found to be helpful, and is published as Appendix III of this bulletin.

A. From Elevations—Concluded.
7. Ladders.
(*a*) Breaking of ladder or parts.
(*b*) Slipping, twisting, or fall of ladder.
(*c*) Knocked off ladder.
(*d*) All other.
8. Scaffolds and stagings.
(*a*) Breaking or slipping.
(*b*) Breaking of tackle or support.
(*c*) Tilting of scaffold.
(*d*) Tilting or falling of loose plank.
(*e*) Other.
9. Boilers, engines, and machines.
NOTE.—Include platforms or walkways on, but not stairways leading thereto.
10. Piles.
11. Poles and trees.
12. Roofs.
13. Runways, balconies, and platforms (not loading platforms).
14. Loading platforms.
15. Gangplanks.
16. Stairs and steps.
NOTE.—Include all falls on stairs, steps, or lands.
17. Tramways and trestles.
18. Windows and wall openings.
19. All other.

B. Into Excavations, Pits, and Shafts.
1. Bins and vats containing hot or corrosive substances.
2. Bins and vats, all other.
3. Floor openings (not elevator shafts).
4. Manholes.
5. Excavations, not otherwise classified.

C. On Level.
1. Slipping.
2. Stumbling over fixed objects.
3. Stumbling over loose objects.
NOTE.—Include here stepping on rolling objects.
4. All other.
NOTE.—Strains due to near falls from slipping or stumbling, without falling, should be placed under slipping or stumbling in this group.

VI. Stepping on or Striking Against Objects.

A. Stepping on Objects.
1. Nails.
2. All other sharp objects.
NOTE.—Stepping on rolling objects should be charged to stumbling.

B. Striking Against Objects.
1. Nails.
2. Splinters or sharp projections from walls or structures.
3. Other fixed objects.
4. Fellow employee.
5. All other objects.

VII. Falling Objects—Not Being Handled by Injured.

A. Collapse of—
1. Buildings and walls.
2. Piles (stacked, stored, or piled-up material).
3. Scaffolds or staging.
4. Chutes, conveyors, and slides.
5. All other.

B. From Elevations.
1. Buildings not in course of construction or demolition.
2. Bins and pockets.
3. Tramways and trestles.
4. Runways, balconies, and platforms.

B. From Elevations—Concluded.
5. Racks and shelves.
6. Floor openings (not elevator shafts).
7. Chutes, conveyors, slides, and screens.
8. Machines and workbenches.
9. Piles (stacked, stored, or piled-up material).
NOTE.—Exclude accidents in piling or handling of material.
10. Dumps—at mines and quarries.
11. Buildings in course of construction or demolition (not otherwise classified).
12. Scaffolds and staging.
13. Temporary floors.
14. Floor openings—in building construction.
15. Other elevations.

C. Trees.
1. Trees in felling (not otherwise classified).
NOTE.—Include dead limbs and tops.
2. Trees lodged in felling.
NOTE.—Include trees and limbs struck by felled tree.
3. Trees, kickbacks of, in felling.
4. Spring poles—flybacks of.
5. Limbs, not in felling trees.
6. Trees, not in felling.

D. Objects tipping over (except vehicles).
NOTE.—Exclude objects which tip over while being handled.

E. Into excavations.
1. Ditches and trenches.
2. Other excavations (not tunnels, mines, or quarries).

F. Cave-ins (Not Mines or Quarries).
1. Ditches and Trenches.
2. Tunnels.
3. Other excavations.

G. In Tunnels.

H. In Mines and Quarries—Inside.
NOTE.—Include all accidents from falling objects in mines and quarries.
1. Coal, rock, and ore at the working face (not roof).
NOTE.—Include rolls of coal or rock, but exclude accidents in stopes and all pillar robbing.
2. Coal, rock, and ore from pillars or ribs (not roof).
NOTE.—Include rolls of coal or rock.
3. Coal, rock, and ore from or in underground chutes, manways, and batteries.
NOTE.—Include rushes of coal, rock, or gob in same.
4. Roof in working places (not stopes).
5. Roof in entries.
6. Ore and rock in stopes (metal mines).
7. Timbers (not in handling).
8. From surface into shaft.
9. From cage into shaft.
10. From or in underground bins.
11. Cave-in of mine.
12. All other.

VIII. Handling of Objects.

A. Heavy Objects.
NOTE.—Exclude handling of objects by power appliances. Include objects set in motion by the handling of other objects.
1. Objects dropped.
NOTE.—Include tipping over of object handled.
2. Objects thrown.
3. Objects falling from load (while loading or unloading).
4. Objects falling from pile (while piling or unpiling).
5. Caught between object handled and other object.
6. Strain in handling.
NOTE.—Include only strains, hernias, etc., caused by excessive weight of object handled.
7. Handling (not otherwise classified).

B. Sharp or Rough Objects.

NOTE.—Include only injuries due to sharpness or roughness of object handled, not tools or machines.

1. Glass.
2. Protruding nails in objects handled.
3. Protruding wires.
4. Sheet metal and sheet-metal objects.
5. Slivers, wood.
6. Slivers, metal.
7. Castings.
8. Bones.
9. All other.

C. Hand Trucks, Carts, and Wheelbarrows.

1. Struck by truck handled by injured person.
2. Struck by truck handled by coworker.
3. Caught between truck and other object.
4. Object falling from (not in loading or unloading).
5. Overturning.
6. All other.

IX. Hand Tools.

A. In Hands of Injured Worker.

1. Glancing or slipping of tool in use.
2. Breaking or coming apart of tool.
3. Flying particles set in motion by tool.
   (*a*) Nails and spikes.
   (*b*) Metal chips.
   (*c*) Stone.
   (*d*) All other.
4. All other.

B. In Hands of Fellow Worker.

1. Glancing or slipping of tool in use.
2. Breaking or coming apart of tool.
3. Flying particles set in motion by tool.
   (*a*) Nails and spikes.
   (*b*) Metal chips.
   (*c*) Stone.
   (*d*) All other.
4. All other.

NOTE.—Causes given show manner of occurrence. Principal tools found as causes of accidents may be listed.

X. Animals.

A. Draft Animals.

1. Kicks and stepped on.
2. Bites.
3. Runaways.

NOTE.—Include all vehicle accidents due to runaways.

4. All other.

B. Other Animals.

NOTE.—Specify any animals which may be especially important.

XI. Miscellaneous Causes.

1. Flying particles (not otherwise classified).

NOTE.—Chips, dust, sparks, and other particles set in motion by working machines or tools are to be charged to the specific machine or tool. The above number relates only to nonassigned flying particles.

2. Doors, windows, covers, and gates, exclusive of elevators.
3. Drenching (not drowning).
4. Heat prostration and sunstroke.
5. Cold, including frostbites.
6. Lightning.
7. Violence of coemployee.
8. Violence, all other.
9. Wrestling, sparring, and horseplay.

NOTE.—Include all accidents directly attributable to horseplay, giving description of horseplay accidents.

10. Compressed air (not explosions).
11. All other.

LOCATION AND NATURE OF INJURY AND EXTENT OF DISABILITY.

The committee has recommended four classifications of the results of accidental injuries as distinguished from the accidents themselves, namely, the location of injury or part of body injured, the nature of injury, the extent of disability, and, as a subdivision of the last, the degree of partial disability.

In assignment of the location of injury, the committee has followed the common anatomical divisions, beginning with the head and ending with the feet. Special provision has been made for injuries involving two or more parts. The amount of detail given is not so great as that called for by the specific indemnity schedules of some States, but it is believed sufficient for all ordinary statistical purposes. Any State which needs more detail can easily provide it. It is specially to be noted that accidents involving dismemberment or permanent loss of use of members should be listed in detail.

The nature of injury classification is confined to the injuries sustained at the time of the accident, and is designated by popular rather than technical medical terms. Special provision is recommended for infections, so that the infection shall be correlated with the nature of injury and also with the extent of disability.

With respect to extent of disability, injuries are divided into the generally recognized classes of fatalities, permanent total disabilities, permanent partial disabilities, temporary total disabilities, and temporary partial disabilities. Permanent total disabilities are further divided into dismemberment, and others.

Permanent partial disabilities are more minutely subdivided as follows: Dismemberment, total loss of use, impairment of use, disfigurement, and others.

The degree of partial disability need be shown only with respect to permanent disabilities other than dismemberments. By degree in this connection is meant the degree of impairment of the member affected, and not the degree of disability of the injured workman. Any attempt to determine the degree of disability of the workman or his loss of earning capacity will be more or less arbitrary. In any given case the measure adopted by the statistician will probably reflect the compensation law of the particular State as interpreted by the administrative authorities thereof. The California schedule, e. g., would show the degree of disability from the loss of an index finger to a piano tuner. But statistics of degree of disability in this sense would add nothing to our information. With regard to partial impairment of members, however, it is highly important to know the extent of impairment, and this is a matter which can be ascertained with a fair degree of accuracy.

The present form of the classification of industrial accidents by location of injury, nature of injury, and extent of disability is substantially the same as that recommended by the committee in its second report submitted to the association in 1916. A few minor changes were adopted in 1918. For example, traumatic amputation, asphyxiation, and drowning were added to the nature of injury classification, while permanent partial disabilities were further subdivided. The classifications revised to date follow:

CLASSIFICATION OF INDUSTRIAL ACCIDENTS BY LOCATION AND NATURE OF INJURY AND EXTENT OF DISABILITY.

Multiple Injuries.

In case of an injury involving more than one location or one nature of injury, as specified below, as a rule the injury should be placed in that classification which indicates the most serious disability. If one or more dismemberments are involved, each should be separately listed. If the injury is a temporary disability only, it may be charged to the general part of the body, but if it is a permanent disability the above rule should be strictly followed.

I. Location of Injury.

Note.—If the injury extends ultimately to a part of the body other than that first affected, charge to the major part finally involved.

A. Head.

1. Brain.
2. Eye.
3. Both eyes.
4. Internal ear.
5. Both internal ears.
6. External ear.
7. Skull.
8. Scalp.
9. Head (not otherwise classified).

B. Face and Neck.

1. Forehead.
2. Eyelids.
3. Nose.
4. Cheek.
5. Upper jaw.
6. Lower jaw.
7. Teeth.
8. Tongue.
9. Lips and chin.
10. Face (not otherwise classified).
11. Neck.

C. Trunk.

1. Spinal cord.
2. Vertebræ.
3. Back (external).
4. Sternum.
5. Ribs.
6. Thorax (generally), external.
7. Thoracic organs, internal.
8. Abdomen, external.
9. Abdominal viscera.
10. Groin.
11. Sacrum or coccyx.
12. Pelvis (not otherwise classified).
13. Anus, rectum, or perineum.
14. External generative organs.
15. Hernia, umbilical.
16. Hernia, inguinal.
17. Hernia, other.

D. Upper Extremities.

1. Scapula.
2. Clavicle.
3. Shoulder joint.

   Note.—Use this number only for dislocations of shoulder or fractures of head of humerus.
4. Humerus.
5. Upper arm.
6. Elbow.
7. Radius.
8. Ulna.
9. Radius and ulna.

D. Upper Extremities—Concluded.

10. Forearm.
11. Wrist.
12. Arm, general.
13. Both arms or one arm and one hand.
14. Arm and leg.
15. Hand, general.
16. Both hands.
17. Hand and foot.
18. Palm.
19. Back of hand.
20. One metacarpal.
21. Two or more metacarpals.
22. Thumb, one phalange.
23. Thumb, more than one phalange.
24. Index finger, one phalange.
25. Index finger, more than one phalange.
26. Middle finger, one phalange.
27. Middle finger, more than one phalange
28. Ring finger, one phalange.
29. Ring finger, more than one phalange.
30. Little finger, one phalange.
31. Little finger, more than one phalange.
32. Thumb and one finger.
33. Thumb and two or more fingers.
34. Two fingers.
35. Three fingers.
36. Four fingers.

E. Lower Extremities.

1. Hip joint.

NOTE.—Use this number only for dislocations of hip or fractures of head of femur.

2. Femur.
3. Upper leg.
4. Patella.
5. Knee, other than patella.
6. Tibia.
7. Fibula.
8. Tibia and fibula.
9. Lower leg.
10. Both legs or one leg and one foot.
11. Ankle.
12. Metatarsals.
13. Foot.
14. Both feet.
15. Great toe, one phalange.
16. Great toe, more than one phalange.
17. Lesser toe, one phalange.
18. Lesser toe, more than one phalange.
19. Great toe and lesser toe or toes.
20. Two or more lesser toes.

II. NATURE OF INJURY.

1. Bruises, contusions, and abrasions.
2. Burns and scalds.
3. Concussions.
4. Cuts and lacerations.
5. Punctures.
6. Amputations, traumatic.
7. Dislocations.
8. Fractures.
9. Sprains and strains.
10. Asphyxiation.
11. Drowning.
12. All other.

NOTE.—In case of infection, nature of injury should be correlated with the infection. This is especially important in cases of bruises, contusions and abrasions, burns and scalds, and cuts and lacerations.

III. Extent of Disability.

1. Fatal.
2. Permanent total disability—dismemberment.
3. Permanent total disability—other.
4. Permanent partial disability—dismemberment.
5. Permanent partial disability—total loss of use.
6. Permanent partial disability—impairment of use.
7. Permanent partial disability—disfigurement.
8. Permanent partial disability—other.
9. Temporary total disability.
10. Temporary partial disability.

IV. Degree of Partial Disability.

Note.—This classification should be used only for permanent disabilities not dismemberments, and for temporary partial disabilities. It relates only to the degree of impairment of the specific organs or members affected.

1. 10 per cent and under.
2. 11 to 20 per cent.
3. 21 to 30 per cent.
4. 31 to 40 per cent.
5. 41 to 50 per cent.
6. 51 to 60 per cent.
7. 61 to 70 per cent.
8. 71 to 80 per cent.
9. 81 to 90 per cent.
10. 91 to 100 per cent.

STANDARD TABLES FOR ACCIDENT AND COMPENSATION STATISTICS.

The 16 standard tables proposed by the committee are intended to bring out in convenient form and in due correlation the significant facts of work accidents. Next to the use of standard classifications, nothing will contribute so much to the value of statistical reports as uniform and effective organization of material. Conversely, the lack of any standard organization has detracted greatly from the usefulness of most statistical reports heretofore published by the several States. In many cases essential information, which was available in the files of the board or commission, is not disclosed by the published reports, because the responsible official did not perceive the significance of the facts in his possession. It is often necessary to wade through hundreds of pages to obtain facts which can and should be so clearly set forth that he who runs may read. A moderate number of standard tables, thoroughly worked out, will present more information in far more accessible form than is ordinarily contained in ten times the bulk of printed matter.

The standard tables proposed by the committee are designated by serial numbers and titles. They are so designed as to admit of adaptation to the administrative needs and financial resources of different jurisdictions.

The work of preparing standard tables for the presentation of accident statistics was begun by the committee in February, 1916. In its third report made to the International Association of Industrial Accident Boards and Commissions in 1917, the committee recommended the adoption of the first 12 tables here presented.

In its fifth annual report, made to the association in 1919, the committee recommended the adoption of Tables 13–16.

Some of the tables recommended by the committee originally provided for the publication of all tabulatable accidents. This recommendation was made upon the assumption that the tables prepared on this uniform basis, the same definition of a tabulatable accident being accepted by all, would permit ready comparison of experience in various States. Experience proved, however, that reports of accidents for any industry or State were practically never complete except for those accidents which were compensable. The tabulation of compensable accidents appears, therefore, to be of greatest importance, and in all tabulations made careful distinction should be made between compensable accidents and those which are tabulatable but not of sufficient duration or severity to be compensable. In any tabulation where it is desired to compare accident frequency and severity rates it would, of course, be misleading to compare two industries or localities, in one of which perhaps 95 per cent of the accidents were reported while in the other only 75 per cent were reported. It is quite probable that such comparisons have been made without a full realization of the incompleteness of the reporting in some cases.

In the tabulation of accident statistics it is, of course, absolutely essential that tabulations of all compensable injuries be made and kept up to date for the information and guidance of those responsible for the administration of the compensation law. In the interest of uniform comparable accident statistics, it is desirable that all tabulatable accidents be tabulated, but in all tables which have to do with accident rates or compensation costs, compensable accidents should be tabulated separately and not included with noncompensable accidents. In any case, it should be clearly stated just what accidents are included in the tables presented, and the terms used should be clearly defined.

Table 1 originally provided for the tabulation of tabulatable accidents. A duplicate table, called Table 2, was published for the use of those jurisdictions in which injuries and diseases not attributable to accidents were reported. One table with a note explanatory of the uses which may be made of it has been substituted for the original duplicate forms.

Tables 1 and 2 as now presented are designed to exhibit the frequency and severity of accidents by industry and extent of disability. They are equally well adapted to the tabulation of tabulatable accidents, compensable accidents, or nonaccidental injuries and diseases, and are therefore adapted to the use of all jurisdictions whatever their practice in regard to the reporting of accidents. It is altogether desirable to tabulate injuries both as to severity and as to frequency. In case this is impossible, the severity table is of course much more important. It is highly desirable that nonaccidental injuries be segregated and tabulated separately, both as to frequency and as to severity. The exposures for these tables are calculated both in terms of pay roll and of hours worked by employees in the establishment. It is expected that the industries will be shown in such detail as the volume of exposure and the financial resources of the particular commission will admit.

TABLE 1.—FREQUENCY OF ACCIDENTS, BY INDUSTRIES AND EXTENT OF DISABILITY.

Industry.[1]	Number of 1,000-hour workers.	Payroll exposure.	Number of compensable accidents.							Rates.	
			Total.	Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.			Per 1,000,000 hours worked in establishment.	Per $100,000 of audited pay roll.
							Over 2 weeks.	Over 1 to 2 weeks.	1 week and under.		
1	2	3	4	5	6	7	8	9	10	11	12

[1] For list of industries see pp. 29 to 32.

TABLE 2.—SEVERITY OF INJURIES, BY INDUSTRIES AND EXTENT OF DISABILITY.

[Days lost should be expressed in terms of working days. Calendar days can be converted into working days by multiplying by 6/7. For scale of severity rates see pp. — to —.]

Industry.[1]	Number of 1,000-hour workers.	Payroll exposure.	Total days lost.	Days lost due to—						Rates.	
				Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.			Days lost per 1,000 hours worked in the establishment.	Days lost per $100,000 of audited pay roll.
							Over 2 weeks.	Over 1 to 2 weeks.	1 week and under.		
1	2	3	4	5	6	7	8	9	10	11	12

[1] For list of industries see pp. 29 to 32.

Table 3 exhibits the number and severity of injuries by causes. This is in many respects the most important table of the entire group. It is particularly desirable that in publishing this table the standard classification of accident causes be adhered to. The table should be made for each industry schedule also, and for all important groups. Further analysis of causes of fatalities and permanent injuries is suggested. Analysis by location of injury is also suggested.

It is highly desirable that nonaccidental injuries be segregated and tabulated separately on this form.

TABLE 3.—CAUSES OF ACCIDENTS, BY EXTENT OF DISABILITY.

[Days lost should be expressed in terms of working days. Calendar days can be converted into working days by multiplying by 6/7.]

Cause.[1]	Number of compensable accidents.							Total days lost.	Days lost due to—					
	Total.	Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.				Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.		
					Over 2 weeks.	Over 1 to 2 weeks.	1 week and under.					Over 2 weeks.	Over 1 to 2 weeks.	1 week and under.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

[1] For list of causes see pp. 36 to 51.

Table 4 shows the compensation cost of injuries by severity of injury. The table as drawn provides for the separation of benefits, but it is not particularly essential to carry this separation further than a distinction between compensation and medical aid. In other words, a table in which columns 5, 6, 7, and 8 were consolidated in one would answer all practical purposes.

TABLE 4.—COMPENSATION AND MEDICAL AID INCURRED ON ACCOUNT OF ACCIDENTS, BY EXTENT OF DISABILITY.

[In this table the duration of temporary disabilities should be expressed in calendar days, as the table is not intended for weighting purposes.]

Injuries causing—	Number of cases.	Benefits paid and outstanding.						
				Compensation.				
		Total amount.	Average amount per case.	Death and funeral.[1]	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.	Medical.
1	2	3	4	5	6	7	8	9
Deaths, with dependents								
Deaths, without dependents								
Permanent total disabilities:								
Loss of both eyes								
Loss of both arms								
Loss of both hands								
Loss of both legs								
Loss of both feet								
Paralysis of both arms or legs								
Loss of mental faculties								
Other permanent total disability								
All permanent total disabilities								
Permanent partial disabilities:								
Dismemberments—								
Loss of arm								
Loss of hand								
Loss of thumb								
Loss of index finger								
Loss of middle finger								
Loss of ring finger								
Loss of little finger								
Loss of thumb and 1 or more fingers								
Loss of 2 or more fingers								
Loss of 1 phalanx of thumb								
Loss of phalanx of index finger								
Loss of phalanx of middle finger								
Loss of phalanx of ring finger								
Loss of phalanx of little finger								
Loss of fingers with injuries to other fingers.								
Loss of 1 leg								
Loss of toes								
Loss of 1 eye.								
Loss of 1 eye with injury to the other								
Other permanent partial disabilities[2]								
All permanent partial disabilities								
Temporary disabilities:								
1 day								
2 days								
3 days, etc., up to 14 days								
Over 2 to 3 weeks								
Over 3 to 4 weeks								
Over 4 to 5 weeks								
Over 5 to 6 weeks								
Over 6 to 7 weeks								
Over 7 to 8 weeks								
Over 8 to 9 weeks								
Over 9 to 10 weeks								
Over 10 to 11 weeks								
Over 11 to 12 weeks								
Over 12 to 13 weeks								
Over 13 to 26 weeks								
Over 26 to 39 weeks								
Over 39 to 52 weeks								
Over 52 weeks								
All temporary disabilities								
Grand total								

[NOTE.—The action of the committee in regard to Table 4 provided for the use of a "standard list" of permanent total disabilities based on the "Standard accident table" and for a similar "standard list" of dismemberments under permanent partial disabilities.

The "Standard accident table" contains no list of permanent total disabilities, but only a list of dismemberments. The list of permanent total disabilities here given is taken from some of the State laws. These standard lists have not yet been prepared.]

[1] Form of notes to be used whenever applicable, e. g.: Including —— cases of funeral benefits amounting to $——. Not reported in —— cases.

[2] For list see Table 14.

Table 5 shows the compensation cost of occupational diseases (or nonaccidental injuries) by severity of the disability, and will apply, therefore, only to those jurisdictions which compensate for such injuries.

TABLE 5.—COMPENSATION AND MEDICAL AID INCURRED ON ACCOUNT OF OCCUPATIONAL DISEASES, BY EXTENT OF DISABILITY.

[In this table the duration of temporary disabilities should be expressed in calendar days, as the table is not intended for weighting purposes.]

Occupational diseases causing—	Total cases.	Benefits paid and outstanding.						
				Compensation.				
		Total amount.	Average amount per case.	Death and funeral.[1]	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.	Medical.
1	2	3	4	5	6	7	8	9
Deaths, with dependents								
Deaths, without dependents								
Permanent total disabilities								
Permanent partial disabilities involving specified percentage of impairment:								
20 per cent and under								
21 per cent to 40 per cent								
41 per cent to 60 per cent								
61 per cent to 80 per cent								
81 per cent and over								
All permanent partial disabilities								
Temporary disabilities:								
1 day								
2 days								
3 days, etc., up to 14 days								
Over 2 to 3 weeks								
Over 3 to 4 weeks								
Over 4 to 5 weeks								
Over 5 to 6 weeks								
Over 6 to 7 weeks								
Over 7 to 8 weeks								
Over 8 to 9 weeks								
Over 9 to 10 weeks								
Over 10 to 11 weeks								
Over 11 to 12 weeks								
Over 12 to 13 weeks								
Over 13 to 26 weeks								
Over 26 to 39 weeks								
Over 39 to 52 weeks								
Over 52 weeks								
All temporary disabilities								
Grand total								

[1] Form of notes to be used whenever applicable, e. g.: Including —— cases of funeral benefits amounting to $—— not reported in —— cases.

Tables 6 and 7 are alternative. It is recommended that where the information is available the degree of impairment of each specified member shall be shown, but in those jurisdictions in which compensation is based upon loss of earnings rather than impairment of the particular member, Table 7 may be given in lieu of Table 6.

TABLE 6.—PERMANENT PARTIAL DISABILITIES, BY LOCATION OF INJURY AND PERCENTAGE OF IMPAIRMENT OF MEMBER.

Location of injury.[1]	Total cases.	Number of cases (not dismemberments) involving specified percentage of impairment of member.					Number of dismemberments.
		20 per cent and under.	21 per cent to 40 per cent.	41 per cent to 60 per cent.	61 per cent to 80 per cent.	81 per cent and over.	
1	2	3	4	5	6	7	8

[1] For classification of location of injury for use in this table, see pp. 53 and 54.

TABLE 7.—PERMANENT DISABILITIES, BY PERCENTAGE OF IMPAIRMENT OF EARNING CAPACITY.

Location of injury.[1]	Total cases.	Number of cases involving specified percentage of impairment of earning capacity.										
		10 per cent and under.	11 per cent and under 20 per cent.	21 per cent and under 30 per cent.	31 per cent and under 40 per cent.	41 per cent and under 50 per cent.	51 per cent and under 60 per cent.	61 per cent and under 70 per cent.	71 per cent and under 80 per cent.	81 per cent and under 90 per cent.	91 per cent and under 100 per cent.	Total disability.
1	2	3	4	5	6	7	8	9	10	11	12	13

[1] For classification of location of injury for use in this table see pp. 53 and 54.

Table 8 is intended to show the importance of infection as a cause of disability and death. It seems especially desirable that this table should be made in order to emphasize the possibilities of reducing the duration of disabilities by efficient first-aid and medical treatment.

TABLE 8.—INFECTED INJURIES, BY NATURE OF INJURY AND EXTENT OF RESULTING DISABILITY.

[In this table the duration of temporary disabilities should be expressed in calendar days, as the table is not intended for weighting purposes.]

1	Total. 2	Bruises. 3	Burns and scalds. 4	Concussions. 5	Cuts and lacerations. 6	Punctures. 7	Dislocations. 8	Fractures. 9	Sprains and strains. 10	All other. 11
Total injuries										
Total infected injuries										
Infected injuries resulting in—										
Deaths										
Total loss of—										
Eye										
Arm										
Hand										
Leg										
Foot										
Fingers										
Toes										
Other members										
Permanent impairment of—										
Eye										
Arm										
Hand										
Leg										
Foot										
Fingers										
Toes										
Other members										
Temporary disabilities—										
Number										
Days lost										
Average duration										
Total benefits, including medical, hospital, etc.										

Table 9 is intended to show the nature of injuries due to each particular cause. It is especially desired to bring out the causes which are responsible for the greater number of dislocations and fractures. Table 9, however, is less important by far than Table 3.

TABLE 9.—NATURE OF INJURY, BY CAUSE.

Cause of accident.[1]	Bruises.	Burns and scalds.	Concussions.	Cuts and lacerations.	Punctures.	Dislocations.	Fractures.	Sprains and strains.	All other injuries.	Total injuries.	Infected injuries.
1	2	3	4	5	6	7	8	9	10	11	12

[1] For classification of causes, see pp. 36 to 51.

Table 10 is intended to show the nature and location of injuries by the severity of the disability. It is particularly intended for the benefit of the medical profession. Obviously medical attention ought to be centered upon those injuries which are producing the greater number of serious disabilities.

TABLE 10.—ACCIDENTS, BY NATURE AND LOCATION OF INJURY AND EXTENT OF DISABILITY.

[In this table the duration of the temporary disabilities should be expressed in calendar days, as the table is not intended for weighting purposes. Degree of impairment of member or degree of permanent incapacity may be used in this table according to the practice prevailing in the particular State.]

Nature[1] and location[2] of injury.	Total cases.	Deaths.	Total permanent disabilities.	Number of permanent disabilities (not dismemberments) involving specified percentage of impairment of member.					Number of dismemberments.	Temporary disabilities.	
				20 and under.	21 to 40.	41 to 60.	61 to 80.	81 and over.		Number.	Average duration.
1	2	3	4	5	6	7	8	9	10	11	12
1. Bruises: Head, etc.											
2. Burns: Head, etc.											

[1] For classification of nature of injury for use in this table, see pp. 53 and 54.
[2] For classification of location of injury, see pp. 53 and 54.

Tables 11 and 12 should be made for all industries combined and for important industry schedules. Table 11 is designed to show the weekly wages and sex of the injured. This information is necessary of course in the computation of compensation to be paid. Table 12 shows the age and sex of the injured. Average weekly wages for the first and last groups in this table would be useful for actuarial purposes.

TABLE 11.—SEX AND WAGES OF INJURED.

[For this table use the calculated wages upon which compensation awards are based, irrespective of maximum or minimum limits.]

Weekly wages.	Total cases.	Males.					Females.				
		Total males.	Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.	Total females.	Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.
1	2	3	4	5	6	7	8	9	10	11	12
Under $4.00											
$4.00 and under $5.00											
$5.00 and under $6.00											
Etc.											
$28.00 and under $29.00											
$29.00 and under $30.00											
$30.00 and over											
Total											

TABLE 12.—SEX AND AGE OF INJURED.

Age.	Total cases.	Males.					Females.				
		Total males.	Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.	Total females.	Deaths.	Permanent total disabilities.	Permanent partial disabilities.	Temporary disabilities.
1	2	3	4	5	6	7	8	9	10	11	12
Give ages by years, using age at time of accident.											

Table 13 is designed to show the cost of medical treatment. The scope of this table when published by any board or commission should be clearly given. For example, any practice which may be followed according to a particular law and organization of service in including or excluding first-aid treatment should be explained, as well as the limitations of any law with regard to the period during which medical and hospital treatment is furnished or in regard to the limitation upon the amount which may be spent for medical and hospital treatment to which an injured employee is entitled. Any limitations in the data available for the purpose of a report should also be explained, in order that comparisons may not be made between any two States where the data is of such a character as to make comparisons unfair.

TABLE 13.—COST OF MEDICAL AND HOSPITAL TREATMENT BY NATURE OF INJURY AND AMOUNT OF MEDICAL AID PER CASE.

Nature of injury.	Total cases with medical or hospital expenditure.	Cost of medical and hospital treatment.										
		Average cost per case.	$5 and under.	Over $5 to $10.	Over $10 to $15.	Over $15 to $20.	Over $20 to $25.	Over $25 to $50.	Over $50 to $100.	Over $100 to $150.	Over $150 to $200.	Over $200.
1	2	3	4	5	6	7	8	9	10	11	12	13
Bruises. Burns. For full list see below.												

Bruises.
Burns and scalds.
Concussions.
Cuts and lacerations.
Punctures.
Amputations to—
- Arm.
- Hand.
- Fingers, one or more.
- Leg.
- Foot.
- One or more toes.
- All other.

Dislocations:
- Shoulder.
- Elbow.
- Wrist.
- Hip.
- Knee.
- Ankle.
- All others.

Fractures:
- Skull.
- Ribs.
- Clavicle.
- Humerus.
- Ulna.
- Radius.
- Ulna and radius.
- Hand.
- Fingers.
- Femur.
- Tibia.
- Fibula.
- Tibia and fibula.
- Os calcis.
- Other bones of foot (not toes).
- Toes.
- All others.

Sprains and strains:
- Back.
- Side.
- Hernia.
- Shoulder.
- Elbow.
- Forearm.
- Wrist.
- Thumb.
- Hand.
- Hip (including thigh).
- Knee.
- Leg.
- Ankle.
- Foot.
- All others.

Asphyxiation.
Drowning.
All others.

Table 14 relates only to cases of permanent partial disability. It is designed to show the duration of total disability in cases of permanent partial disability, according to the nature of the permanent disability.

TABLE 14.—DURATION OF TOTAL DISABILITY IN PERMANENT PARTIAL DISABILITY CASES, BY NATURE OF PERMANENT DISABILITY.

Nature of permanent partial disability.	Total number of cases.	Duration of total disability.										
		Average days per case.	7 days and under.	Over 7 to 14 days.	Over 14 to 21 days.	Over 21 to 28 days.	Over 28 to 56 days.	Over 56 to 91 days.	Over 91 to 182 days.	Over 182 to 273 days.	Over 273 to 365 days.	Over 365 days.
1	2	3	4	5	6	7	8	9	10	11	12	13
For list see below.												

Loss of—
1. Arm, right or major.
2. Arm, left or minor.
3. Forearm, right or major.
4. Forearm, left or minor.
5. Hand, right or major.
6. Hand, left or minor.
7. Thumb, right or major.
8. Thumb, left or minor.
9. Thumb and one finger, right or major.
10. Thumb and one finger, left or minor.
11. Thumb and two or more fingers, right or major.
12. Thumb and two or more fingers, left or minor.
13. One finger, right or major.
14. One finger, left or minor.
15. Two fingers, right or major.
16. Two fingers, left or minor.
17. Three fingers, right or major.

Loss of—
18. Three fingers, left or minor.
19. Four fingers, right or major.
20. Four fingers, left or minor.
21. Leg above knee.
22. Leg at or below knee.
23. Foot.
24. Great toe.
25. Great toe and lesser toe or toes.
26. One lesser toe.
27. Two or more lesser toes.
28. One eye (including loss of sight).
29. One eye with injury to other eye.
30. One ear.
31. Two ears.
32. Facial disfigurement.
33. All other dismemberments.

Impairment of use of member—
1. Arm, right or major.
2. ———, etc.
33. All other impairments.

Table 15 is intended to show the condition of the injured employee one year after injury. Investigation should be made each succeeding year. The facts as to the individuals included in the table can only be comparable if they represent conditions at a definite time after injury. It has seemed to the committee that the proper procedure was to make an investigation at the end of each completed year after injury for several years. There will thus be accumulated a mass of definite information in regard to what happens to an employee who has sustained a partial permanent disability. At this time little is known definitely in regard to this matter and practically all of the schedules for rating permanent partial disabilities have been based upon assumptions which may not be in accordance with actual experience.

TABLE 15.—SUMMARY OF CONDITION OF INDUSTRIAL CRIPPLES AS DISCLOSED BY INVESTIGATION ONE YEAR AFTER INJURY.

Nature of permanent disability.	Condition one year after injury.										
	Cases investigated.	Still disabled for work.	Number recovered unemployed.	Number employed.							
				By same employer.				By other employer.			
				At same occupation.		At other occupation.		At same occupation.		At other occupation.	
				Same pay or better.	Lower pay.	Same pay or better.	Lower pay.	Same pay or better.	Lower pay.	Same pay or better.	Lower pay.
1	2	3	4	5	6	7	8	9	10	11	12
Loss of—											
Arm, right or major..											
Arm, left or minor, etc. (For full list see Table 14.)											
Impairment of use of 50 per cent or more—											
Arm, right or major..											
Arm, left or minor, etc. (For full list see Table 14.)											

In order that full information may be available for summarization in Table 15 it is suggested that individual records be kept of each important case, and that the essential details for such individual record shall be as follows:

1. Name or case number of employee.
2. Date of injury.
3. Age at injury.
4. Occupation at injury.
5. Rate of pay at injury.

One year after injury, and to be repeated annually, the following details:

6. Still disabled.
7. Recovered—unemployed because of disability.

Employed by same employer:

8. At what occupation?
9. Rate of pay?

Employed by other employer:

10. At what occupation?
11. Rate of pay?
12. Lower rate of pay due to disability?
13. Has employment been irregular because of disability, since employee was able to resume work?
14. Remarks.
15. Date of death.

Table 16 is suggested by the committee for the purpose of providing for the accumulation of actual American experience in regard to the remarriage of widows to whom compensation awards have been made. It is not believed that the Dutch remarriage table now in use can be assumed to be a proper measure applicable to American experience.

Individual records should be kept, showing the following details:

1. Name or case number.
2. Date of husband's death.
3. Industry or occupation of husband.
4. Date of birth of widow.
5. Number of children under 18 years of age.
6. Date of birth of each child under 18 years of age.
7. Other beneficiaries and relationship of each to deceased.
8. Date of birth of each such beneficiary.
9. Date of remarriage of widow.
10. Date of death of widow without remarriage.
11. Present value of compensation of widow, children and other beneficiaries (each individual separately) at time of death of husband without discount for remarriage.
12. Present value of compensation of widow and children and other beneficiaries (each individual separately) after remarriage of widow.
13. Bonus of widow on remarriage.

This information may be summarized as to age as follows:

TABLE 16.—SUMMARY OF REMARRIAGE EXPERIENCE OF WIDOWS TO WHOM COMPENSATION AWARDS HAVE BEEN MADE, FOR EACH YEAR, BY AGE (NEAREST BIRTHDAY) OF WIDOW AT DEATH OF HUSBAND.

Widow's age at death of husband.	Number of cases.	Average age of children under 18.	Number of widows married in—				Number of widows who died without remarriage.				Aggregate years of widowhood.	Remarriage rate per 100.
			First year.	Second year.	Third year.	Etc.	First year.	Second year.	Third year.	Etc.		
1	2	3	4	5	6	7	8	9	10	11	12	13
Under 20 years:												
No children...												
1 child.....												
2 children.....												
3 children.....												
4 or more children.....												
20 to 24 years:												
No children...												
1 child.....												
2 children.....												
3 children.....												
4 or more children.....												
25 to 29 years, etc.												

STANDARD METHOD OF COMPUTING FREQUENCY AND SEVERITY RATES.

The committee has devoted much time and thought to the consideration of proper methods for the computation of the rate of frequency and severity of accidents. Attempts to compare the hazards of different industries or of the same industry at different times have been unsuccessful because of the lack of an adequate basis of comparison. There were three chief difficulties to be faced: First, there was no accepted rule as to what accidents should be tabulated; second, no uniform and adequate base for the computation of accident rates had been determined; and, third, there was no uniform and adequate system of weighting accidents in accordance with their severity.

Some establishments attempt to take account of all accidents no matter how trivial. Others exclude those of a minor character and take account of only such as cause loss of a specified amount of time. It is obvious that the accident showing of a plant may be completely altered by a change in the definition of accident and that in the absence of a uniform definition all comparisons between the accident data of different establishments become almost worthless. The precise definition is not so important, but it is necessary that a uniform definition be everywhere observed. The committee believes that a more general adoption of the standard definitions recommended in this report will overcome this difficulty.

ACCIDENT FREQUENCY.

The determination of a uniform, adequate unit of exposure to measure the risk of accident occurrence presents much more serious obstacles. In early attempts to compile accident statistics attention was limited to the number of accidents occurring in a given plant or the number of persons exposed to accident. This led to the custom of expressing accidents in the terms of so many per 1,000 workers. But the term "one thousand workers" was indefinite and variable, because it took no account of the number of hours workmen were exposed to risk. To say that the accident rate for 1915 in a given establishment was 72 per cent per thousand employees is indefinite and meaningless because (1) the number of employees varies from day to day, (2) the working day varies in different plants all the way from 14 to 8 hours or less, (3) some plants operate 365 days in the year, others as low as 160 days, (4) the hours worked per day vary from season to season, and (5) both the hours per day and the days per year vary from year to year with fluctuations in industry. This method was also based on the assumption that all injuries are equal—that a broken back and a broken cuticle have the same importance in accident records.

To correct these defects in the computation of industrial accident statistics, the United States Bureau of Labor Statistics in its studies of accidents in the machine-building industry and in the iron and steel industry ascertained from the time records the number of man-hours worked per year in the establishments studied. The number of man-hours worked per year was not an easily comprehensible or convenient base upon which to calculate accident rates. For convenience and greater clearness man-hours were converted into "full-time workers." The "full-time worker" had already been adopted by the joint committee of the International Congress on Social Insurance and the International Institute of Statistics and defined as one who works 10 hours per day for 300 days per year, or 3,000 hours. The "full-time worker" seems at first thought to be a mere statistical abstraction. It is true that the "full-time worker," like the "average man," is a unit of measure, but for the purpose of accident statistics a standardized workman to serve as a unit of measure is absolutely essential. Furthermore, the statistical full-time workman who is assumed to work 10 hours a day for 300 days a year was considered to conform very closely in most industries to the actual workman who enjoys good health and works every day the establishment is running. This unit of measure,

however, was not intended to suggest a 10-hour day or a 300-day year as the ideal and proper working day and industrial year.

This "full-time" or "full-year worker" as a unit of measure was formally adopted by the committee on statistics and compensation insurance cost at its first meeting held in Chicago in 1915, and recommended for adoption by all of the States interested in the comparison of accident statistics. It became evident, however, that there were certain valid objections to the use of this basis for computing accident rates. There was a certain amount of difficulty in making perfectly clear what was meant by the "full-year worker," e. g., whether the "full year" meant the 365 day year or the "full-year worker" one who worked every day the establishment was running. Perhaps the most serious objection was based on the fact that both employers and employees regarded the "300-day worker" as implying some judgment regarding the proper length of the working day and working year. It was suggested that since the 8-hour day is becoming the standard working day the unit of measure be made 2,400 hours per year instead of 3,000, so as more nearly to reflect the working time. A 2,000-hour year was also considered by the committee, but is was recognized by all members of the committee that any standard unit of measure which suggested the length of time men do or should work was undesirable. At the meeting of the committee held in Harrisburg, December 4 and 5, 1919, the following resolution was passed:

Resolved, That accident rates, both frequency rates and severity rates, be computed on the basis of 1,000 hours' exposure instead of 3,000 hours' exposure, as heretofore.

The committee gives the following explanation of this action:

In view of the fact that the working time, both the hours per day and the days per year, varies widely from plant to plant, from industry to industry, from city to city, from country to country, and from year to year, it was thought best by the committee to cut loose entirely from a unit of measure that could be misunderstood as in any way implying what the proper working time should be. The adoption of 1,000 hours' exposure rids us forever of any such implication and gives a unit which is convenient in size and will remain unaffected by changes in the working day or variations in the working year. The 1,000-hour exposure is a stable, scientific, mathematical unit of measure, which is what is needed for the measurement of accident rates. It has the further advantage that accident rates measured by any other unit of exposure may be readily expressed in terms of the 1,000-hour unit and vice versa. For instance, all accident rates computed in units of the "300-day worker" may be converted into rates per 1,000 hours' exposure by dividing by 3. Frequency rates are to be expressed in rates per 1,000 thousand (1,000,000) hours' exposure of the working force, instead of per thousand "300-day workers." Severity rates are to be expressed as days lost per 1,000 hours' exposure of the working force, instead of days lost per "300-day worker." In both instances the new rates can be derived from the old rates by dividing by 3.

This base also has another very practical advantage. It is possible to diminish or increase the base without altering the figure in the rate, the only change being a shift in the decimal point. For example, a severity rate of 1.12 days per 1,000 hours' exposure becomes 11.2 per 10,000 hours' exposure, or 112 per 100,000 hours' exposure. When an extended analysis is undertaken it may be very desirable to increase the base in order to avoid extended decimals.

ACCIDENT SEVERITY.

By the method above outlined an accurate measure of the risk of accident occurrence or frequency may be obtained. The true measure of hazard in an industry, however, is not given by the mere number of accidents of all kinds per 1,000 hours' exposure. A true measure of the hazard must show the economic losses resulting from injuries. The accident frequency rates may be the same in two plants in the same industry, and the hazards may be entirely different because one plant has very few severe accidents, while the other has a large proportion of serious accidents. To put all industries and all plants on a common basis, a system of computing accident rates must be devised which will take into account the difference in economic significance between the accident which bruises the workman's thumb and the accident which smashes his head.

The immense majority of tabulatable accidents cause only a few days' disability, with no permanent impairment of earning capacity. A single death will produce greater economic loss to the victim's family and to the community at large than many hundred minor temporary disabilities. This difference would matter little for the purpose in hand if the number of deaths and of permanent injuries bore any reasonably uniform relation to the number of tabulatable injuries. Unfortunately, however, the very reverse is the case. In some of the lighter machine trades there may be a thousand tabulatable accidents for one fatality, whereas among coal miners, railway trainmen, lumbermen, and structural-iron workers the proportion of fatal and serious injuries is many fold greater than in industry as a whole. Accident rates, therefore, as ordinarily compiled are worse than inaccurate; they are positively misleading.

Various attempts have been made to overcome this defect by publishing, not one but several, accident rates for each industry. Thus German and Austrian statistics show the whole number of accidents, the number of deaths, and the number of permanent injuries per thousand full-time workmen. But permanent injuries again cover a wide range—from the loss of the tip of a little finger to total paralysis of the body. And the several degrees of permanent disability are most unevenly distributed among industrial employments. In woodworking industries, e. g., finger injuries predominate; in logging and in coal mining there is an excessive number of permanent total disabilities. To be at all significant the analysis of accident rates must be carried further. We must know not merely the number of all permanent injuries, but the number causing total incapacity and the number involving loss of hand, foot, eye, or fingers. The moment such an analysis is made, however, the resultant accident rates become too multiform for practical use. No mind can compare six columns of figures at one time. Neither are the separate comparisons capable of any intelligent summation. If the several rates happen to vary in the same direction, the meaning is sufficiently clear, but how if a decrease in fatalities is accompanied by a marked increase in permanent and temporary disabilities? What is wanted evidently is some common denominator in terms of which can be expressed the total volume of accidental injury per unit of exposure—a single expression which shall combine the number with the severity of work accidents.

In seeking for such a common denominator the committee early fixed upon time loss as the most significant, stable, and convenient expression of the economic cost of industrial accidents.[18] Obviously, it is only the loss of time due to accidents that is susceptible of satisfactory measurement. The physical or physiological results can not be reduced to a common denominator and the cost in terms of human suffering can neither be estimated nor expressed in standard units. Obviously, again, the economic cost of accidents can not be measured by the compensation paid. No one of our American acts even purports to give full compensation for the worker's immediate economic loss, and no two of them agree in the scale of benefits assigned to particular injuries. Compensation cost in industries of equal hazard accordingly fluctuates enormously from State to State and the aggregate cost in every jurisdiction grossly understates the relative importance of permanent disabilities. Wage loss likewise, even if it could be accurately obtained, is not a satisfactory index of occupational hazard. Wages vary tremendously from occupation to occupation and from time to time, insomuch that no constant relation can be predicated between extent of disability on the one hand and wage loss upon the other hand. The same wage loss per thousand employees per annum will consequently not indicate the same hazard in different occupations or in different communities. The computation of wage loss, moreover, presents numerous difficulties, more especially in the case of fatal and permanent injuries. Shall it be assumed that the particular wage rates prevailing at the time of injury will continue throughout the working life of the injured? Shall the prospective earnings of an apprentice be computed from his present earnings or from the wage which he would probably earn as a journeyman? Shall the foregone earnings of 20 years be taken at face value or discounted for interest?

Time loss, on the contrary, is relatively definite and stable. It relates directly to the physiological results of accidental injury and is, by comparison with compensation cost or with wage loss, but little affected by the occupation of the injured, the prevailing rate of wages, the scale of legal benefits, or the spirit of courts and commissions. A month's disability per employee per annum means the same degree of occupational hazard, whether it occurs among lumbermen or locomotive engineers, in the State of Washington or the principality of Wales, in 1900 or in 1920. If, then, all injuries by accident can be reduced to this one common denominator, we shall

[18] A system of assigning time losses for a computation of accident severity rates was worked out by the U. S. Bureau of Labor Statistics in the early part of 1914, and was applied in the preparation of a group of charts exhibited by the bureau at the Panama-Pacific International Exposition. As first used, the time allowances, as fixed by the Wisconsin workmen's compensation act for specific injuries, were employed. Later, these time allowances were changed, death being based on life expectancy and permanent disabilities on the New York scale increased 50 per cent. This scale has since been used by the bureau in its Bulletin 216, presenting the results of a study of accidents and accident prevention in the machine-building industry, and Bulletin 234, a similar study, covering the iron and steel industry. (Bulletin 216 has been revised and published as Bulletin 256, the severity weighting scale herein described being used. Bulletin 234 is to be superceded by a new bulletin (now in press) covering the iron and steel industry to the end of the year 1919. The severity weighting scale adopted by the committee has been used in this bulletin also.)

The computation of an accident severity rate by the use of time losses has occurred to a number of other persons, independently. At the Third Annual Safety Congress of the National Safety Council, held in Chicago, Oct. 13–15, 1914 (Proceedings, pp. 133, 134), Mr. Dudley R. Kennedy, of the Youngstown Sheet & Tube Co., made suggestions in regard to severity rates along the same line, and early in 1915 submitted to the National Safety Council a plan somewhat similar to that adopted by the committee. A scale of severity weighting was worked out by the Wisconsin Industrial Commission in the latter part of 1914, and was applied to the accident statistics of that State in a bulletin issued Aug. 1, 1915. So far as can be ascertained the above are the only published tabulations or suggestions for the compilation of accident statistics classified on the basis of time losses.

have what has heretofore been wanting—an index of industrial accident hazard.

TEMPORARY DISABILITIES.

In the attempt to express accident severity in terms of time loss temporary disabilities present few problems. The duration of disability in these cases is shown on the face of the record. The only conversion required by the proposed plan is that from calendar to working days. The committee, as already noted, recommends that exposures be expressed in terms of 1,000 working hours and that the duration of disabilities be expressed in working days. It is therefore recommended that the number of working days chargeable to temporary disabilities be uniformly obtained by deducting one-seventh from the number of calendar days intervening between the beginning of disability and the recovery therefrom. The committee is not unmindful of the fact that the seven-day week prevails in certain occupations and the five-and-a-half-day week in others. But it must be remembered that time loss is here used as a measure of accident severity. A disability of one calendar week represents the same severity of injury whatever the length of the working day or the working week.

FATALITIES.

More complicated questions arise in the consideration of fatal accidents. The governing principle, indeed, is easy of determination. Death entails a total cessation of labor power and the resultant time loss is evidently the working life expectancy of the individual concerned. It is in the detailed application of this principle that difficulties are encountered. To the discredit of our governments, be it said that no American records exist to show the average age at which industrial workers cease to be employable, or the number of productive years which a wage earner of given age may reasonably anticipate. In the absence of such records, your committee was forced to rely upon personal judgment, checked and guided by several special investigations.[19] Working life expectancy is a function of mortality and superannuation; it is less than life expectancy by the interval between voluntary or enforced retirement from gainful employment and death. It is well known, however, that the life expectancy of our industrial population is markedly below that experienced by life insurance companies, while the evidence of accident statistics, as well as common knowledge, goes to show that relatively few wageworkers maintain a footing in industry beyond the age of 55. On the whole, it seems reasonable to assume that working life expectancy, between ages 20 and 50, is about two-thirds of the full life expectancy shown by the American Experience Table. The compensation experience of a number of States indicates that the average age of persons fatally injured by industrial accidents is approximately 33 years. The committee accordingly adopted 20

[19] Mr. G. F. Michelbacher constructed a very ingenious table of working life expectancies from the ages of persons reported as injured by industrial accidents in California and Ohio. His results, while admittedly not conclusive because of inadequate data, were of special value to the committee. Collateral evidence tending to support the committee's conclusions will be found in the Invalidity Insurance Experience of the German Empire and in the investigations of the British Parliamentary Committees on Old-Age Pensions.

years, or 6,000 working days, as the average severity weight of fatal accidents.

The question whether each fatal accident should receive a weight proportionate to the calculated working life expectancy of the individual involved was considered at length. It is not doubted that significant differences exist in the average ages of workmen in different industries, in different occupations within the same industry, and in different communities within the same occupational lines. Nor is it disputable that more labor power is lost by the death of a man at 20 than at 50. But the age of the individual killed is, after all, not particularly indicative as to the character of the hazard which produced the injury. The proposed plan, moreover, is to be applied to industries by States, and the number of fatalities in most industry-State subdivisions will be small. Hence, if the severity weight were to vary with the age of the injured—if a death at 20, e. g., were to count for 10,000 days and a death at 50 for only 3,000—the resultant severity rates would be distorted by merely chance deviations. The committee, therefore, recommends that a uniform time-loss value of 6,000 days be assigned to each fatal accident.

PERMANENT DISABILITIES.

The severity weight of permanent total disability was settled upon the principles just discussed. Permanent total disability, equally with death, entails a time loss equivalent to the full working life expectancy of the person injured. For the reasons above recounted, it was deemed best to use an average expectancy rather than the actual (calculated) expectancy of each individual. Finally, it was resolved to recommend the same weight as for a death. Against this course may be urged that a permanent total disability entails a greater economic burden upon the sufferer's family and upon the community than a death. Were the question solely one of economic loss, permanent total disability might reasonably be valued at the full working life expectancy and a death at, say, two-thirds thereof. But the question is one of industrial hazard and not merely one of economic loss. Surely it can not reasonably be said that an accident which results in permanent total disability indicates a greater hazard than an accident which results in death. No injury can be more severe—and we are speaking of an accident severity—than a fatal injury. It so happens, furthermore, that the average age of those who are permanently totally disabled by accident is higher than that of persons who die from accidental injuries—about 42 as against 33 years.[20] The fact is that the natural powers of recuperation fail with advancing years, so that a given injury is more likely to cause serious permanent disability in an older than in a younger man. The use of actual working life expectancies would, on this account, give lower average weights for permanent total disabilities than for deaths. Lastly, it is by no means always true that a permanent total disability involves a total economic loss. A man may be incapacitated for employment and still contribute something to the family income. Taken all in all, therefore, your committee recommends that permanent total disabilities, like deaths, be valued uniformly at 6,000 working days each.

[20] This difference is found in both American and European experience

Permanent partial disabilities clearly ought to be rated in percentages of permanent total disability. Precisely here, however, is the nub of all severity rating, namely, the determination of the degree of permanent disability. It might well be supposed by one not familiar with the situation that the precise extent of disability, being a material fact in the fixation of compensation, would invariably appear on the face of the records. Such, however, is nowhere the case. In most American jurisdictions permanent disabilities are graded by a legislative schedule which assigns so many weeks' compensation to each enumerated physical injury. Even in those jurisdictions, as California, Washington, and Ontario, where no such schedule is established by law, the administrative practice is not widely different. Almost everywhere compensation is determined not by the actual impairment of earnings but by the loss or disability of specified bodily members.[21]

Such being the run of facts in the record, the statistician is constrained to follow the same course in the severity rating of permanent disabilities. He has no choice but to rely upon the actual bodily impairments which the records disclose as the index of the extent of disability. Why not, then, rate these disabilities in accordance with the specific indemnity schedule, statutory or administrative, of each particular jurisdiction? Because the numerous American schedules differ widely among themselves in both the absolute and the relative rating of the same injuries; because certain jurisdictions have no official schedule, and the official schedules of other jurisdictions omit many permanent injuries of common occurrence; because, finally, no one of these schedules gives an adequate rating to permanent disabilities. The use of any one of these schedules would understate the relative hazard of extrahazardous industries, while the use of all of them together would produce severity rates as little capable of combination or comparison as the official accident rates of Massachusetts and the German Empire.

The committee, in the course of its investigation, carefully compared all of the American specific indemnity schedules as well as the French and German adjudications, the Austrian official ratings, the scale of the Italian law, the Russian scale, and the European scales of Imbert, Miller, Bähr, Thiem, and Könen-Köln.[22] It was found that none of the existing schedules is derived from a statistical study of loss of earnings as the result of injury. The best of the American schedules are based upon local investigations of limited scope or are borrowed from European scales, which in turn represent averages of awards in various countries more or less modified by medical or otherwise expert judgment.[23] The committee, after mature deliberation, was unable to recommend any one of these scales in its entirety. It is the unanimous judgment of the committee that the American schedules, without exception, underrate the more serious permanent injuries, such as loss of hand, leg, or eye, and that the European scales overrate such minor injuries as the loss of fingers and toes. These considerations appeared to warrant the construction of the composite scale appended to this report.

---

[21] Massachusetts is a partial exception, as are also Pennsylvania and other States, as respects nonenumerated injuries. Such exceptions, however, are rather de jure than de facto.

[22] For a comparison of these scales, see Bulletin 240 of the United States Bureau of Labor Statistics, p. 59 et seq.

[23] See article entitled "Determination of the consequences of industrial accidents in Austria," in MONTHLY REVIEW of the United States Bureau of Labor Statistics, December, 1916, p. 731 et seq.

The schedule recommended is less detailed than several of the extant lists, but is believed to be sufficient for its purpose. In adjudging compensation it is customary and proper to distinguish between the loss of an index and a ring finger and between the loss of one phalanx and an entire digit. But these refinements are quite unimportant for the calculation of accident severity rates by industries or occupations. Permanent injuries to the fingers are very numerous and they occur in an endless variety of combinations. In any considerable exposure, however, it will be found that the relative frequency of the many specific finger injuries do not greatly vary, so that an average value for all will give nearly the same aggregate time loss as a specific value for each.[24]

DISABILITY FOR PARTICULAR OCCUPATIONS NOT CONSIDERED.

It will be observed that the scale recommended takes no account of occupational differences. The committee recognizes, of course, that the same physical injury causes more serious disability for some occupations than for others, but these differences are believed not to be significant from the standpoint of accident severity or of industrial hazard. The committee scale is not intended to serve as a basis for awarding compensation but as a standard for comparing the severity of accidental injuries and the accident hazards of industrial employments. The loss of a leg indicates an accident of the same severity whether it befall a stevedore or an elevator operator, and the annual loss of 10 index fingers per thousand full-time workers points to the same degree of hazard in one industry as another. In fine the committee concludes that the severity of accidental injuries must be adjudged from their physiological effects and that the average time loss produced by each physiological class of injuries is the fairest common measure both of accident severity and of industrial hazards.

SUMMARY.

To sum up, the committee recommends that a severity weight be assigned to each industrial accident. In the case of a temporary disability this weight is the actual duration of disablement in working-days. For a death or a permanent total disability the severity weight is the working life expectancy, which is taken at the average value of 6,000 working-days. For a permanent partial disability the weight is an aliquot part of 6,000 working-days, proportionate to the average degree of disability resulting from the particular bodily impairment involved. The aggregate time loss so obtained, divided by the number of hours of exposure (hours worked), is the accident severity rate. This rate is usually expressed in terms of days lost per thousand hours' exposure. In cases where this computation results in a very small rate it is sometimes more convenient to express it in terms of multiples of 1,000.

The severity rate above described would serve all the purposes of an index number of occupational hazards. It would afford, for the first time, a common basis for the comparison of accident experience

[24] The average values recommended for permanent injuries to fingers, thumbs, and toes were calculated from the very detailed statistics of the Industrial Commission of Wisconsin.

from year to year, from industry to industry, from establishment to establishment, and from State to State. It should prove a powerful stimulus to safety first by providing a concrete test of results. Applied to compensation insurance, it would furnish, what has hitherto been lacking, a statistical basis for both schedule and experience rating.

No one will claim perfection for the scheme here proposed. Intelligent opinions will differ on many of the points involved. The relative severity of accidental injuries must always be a matter for experienced judgment rather than mathematical calculation. For that very reason, however, the collective judgment of competent statisticians is a safer guide than the opinion of the best informed individual. Above all, the problem is one in which uniformity is more important than meticulous accuracy. If the schedule of relative weights is reasonable upon the whole, and is uniformly applied, the results will be sufficiently accurate for all practical purposes. The scale is as follows:

SCALE OF TIME LOSSES FOR WEIGHTING INDUSTRIAL ACCIDENT DISABILITIES SO AS TO SHOW SEVERITY OF ACCIDENTS.

Nature of injury.	Degree of disability in per cent of permanent total disability.	Days lost.
Death	100	6,000
Permanent total disability	100	6,000
Arm above elbow, dismemberment	75	4,500
Arm at or below elbow, dismemberment	60	3,600
Hand, dismemberment	50	3,000
Thumb, any permanent disability of	10	600
Any one finger, any permanent disability of	5	300
Two fingers, any permanent disability of	12½	750
Three fingers, any permanent disability of	20	1,200
Four fingers, any permanent disability of	30	1,800
Thumb and one finger, any permanent disability of	20	1,200
Thumb and two fingers, any permanent disability of	25	1,500
Thumb and three fingers, any permanent disability of	33⅓	2,000
Thumb and four fingers, any permanent disability of	40	2,400
Leg above knee, dismemberment	75	4,500
Leg at or below knee, dismemberment	50	3,000
Foot, dismemberment	40	2,400
Great toe, or any two or more toes, any permanent disability of	5	300
One toe, other than great toe, any permanent disability of	0	.....
One eye, loss of sight	30	1,800
Both eyes, loss of sight	100	6,000
One ear, loss of hearing	10	600
Both ears, loss of hearing	50	3,000

(1) Injuries not involving amputation should be rated as a proportion of the weight assigned to the entire loss of the member involved, in accordance with the degree of impairment.

(2) The weighting for impairment of function of any member should be such percentage of the weighting for dismemberment as may be determined by the adjudicating authority in fixing the compensation for such impairment—i. e., if loss of an arm is compensated by 240 weeks' indemnity, then an impairment of the arm for which 160 weeks' compensation was paid should rate as two-thirds of the loss of the arm in the above scale.

(3) Hernia should be included only as a temporary disability on the basis of the actual time lost.

(4) For the weighting of temporary disabilities the actual duration of disability in calendar days less one-seventh should be used.

APPENDIX I.—METHODS OF COMPARING COMPENSATION COST.[a]

By E. H. Downey, Compensation Actuary, Insurance Department of Pennsylvania.

Ease and diversity of social experimentation is commonly thought by the admirers of a federal system of government to be one of its outstanding advantages. Successful experiments, so it is claimed, will be widely imitated while those that prove disadvantageous will expend their untoward results within a restricted area. Whatever be the merits of this theory, its practical working is admirably illustrated by the workmen's compensation system of the United States and Canada. Every known form of insurance and every imaginable diversity in the scale of benefits is somewhere being tried within the confines of North America. It only remains to make this superabundant experimentation fruitful by providing facilities for the comparative study of results.

A comparative study of compensation cost in different jurisdictions and under different plans of insurance should throw much light upon the questions: What is a reasonable scale of benefits? What is the most effective administrative organization? Which is the most efficient type of insurance carrier? To serve these several uses, the comparative study must comprise at least the following four analyses:

(1) Total cost of the compensation system;
(2) Cost of compensation insurance;
(3) Administrative as distinguished from insurance cost;
(4) Compensation benefits in relation to wages lost on account of industrial injuries.

Obviously, such a comparison can be made only upon the basis of uniform statistical and accounting methods. Much of the work of your statistical committee for the past several years has converged upon this problem, and the standard tabulations recommended by that committee, if consistently carried out, would afford the data requisite for intelligent comparisons. It is the object of the present paper not to propose further statistical tabulations, but merely to outline in some detail the analyses needful to a comprehensive view of compensation cost.

1. TOTAL COST OF COMPENSATION SYSTEM.

The entire cost of the compensation system consists in the benefits paid to injured workmen and their dependents (including the cost of medical care), the expenses and profits of insurance carriers, the analogous expenses of noninsured employers, and the cost of administrative supervision on the part of the State. No comparison of compensation cost in different jurisdictions which leaves any of these elements out of the account can be either adequate or conclusive. Yet it is perhaps not too much to say that a full statement of compensation cost is nowhere disclosed by the published records of any State or Province in North America. Even the gross amount of compensation benefits incurred in any given period is known for comparatively few jurisdictions. Some States give full returns for insurance carriers, omitting the experience of noninsured employers, which is commonly from one-fourth to one-half of the total; others omit all medical and hospital costs; others, still, publish the amount of compensation awarded within the year irrespective of the year of occurrence of the injuries for which the awards are made. The overhead expenses of private insurance carriers are published by some half dozen States; the analogous expenses of noninsured employers are nowhere a matter of record. Administrative costs, lastly, are published in some detail by a few boards and commissions, but is a wholly unknown quantity in those States which are blessed with court administration. In short, the present state of public records is such that any attempt to compare gross compensation cost as between any two jurisdictions, however conscientiously made, will yield only conjectural results.

2. COST OF COMPENSATION INSURANCE.

The cost of compensation insurance is to be distinguished, on the one hand, from the benefits paid to injured workmen and their dependents and, on the other hand, from the cost of governmental administration. Neglect of these obvious distinctions has befuddled many attempted comparisons of insurance costs.

---

[a] Paper submitted to the seventh annual meeting of the I. A. I. A. B. C. at San Francisco, Calif., Sept. 20–24, 1920, as the Sixth Report of the Committee on Statistics and Compensation Insurance Cost.

From a social standpoint the crucial question is the relative efficiency of different types of insurance carriers, which in its cost aspect resolves itself into the relative cost of paying the same benefits and performing the same insurance services. Insurance cost, in this sense, is the difference between premiums and benefits, commonly spoken of as the expense ratio. To compare expense ratios, however, it is first of all necessary to obtain an accurate measure of both premiums and benefits.

Compensation insurance is primarily a means of securing the payment of compensation benefits and of distributing the cost thereof among insured employers. Most insurance carriers, in addition, undertake to investigate and adjust compensation claims, to make the actual payments, and to promote industrial safety by inspections and propaganda. The several types of insurance carriers—stock, mutual, and State fund—differ among themselves in the degree in which these services are performed, in the sources from which their revenues are drawn, and in the expenses imposed upon them by their methods of doing business. Private insurance companies, whether stock or mutual, derive their whole revenue from premium income,[1] are usually subject to tax, and are burdened with heavy competitive expenses. State funds, whether competitive or monopolistic, are tax-exempt and often receive a substantial subsidy from the State; monopolistic funds are further favored by exemption from the very heavy selling costs imposed upon all competitive insurers. Participating carriers, lastly, including State funds, return to their policyholders, in the form of "dividends," any excess of premium collections over actual requirements. Any fair comparison of insurance costs must evidently take account of these differences and must reduce the premiums of the several forms of insurance, so nearly as may be, to a common denominator.

(*a*) The cost to the public of stock company insurance is represented by premiums less taxes.[2]

(*b*) The cost of mutual insurance (including reciprocal and participating stock company insurance) is represented by premiums less taxes and dividends to policy holders. For the present purpose an earned surplus which is indubitably held for the benefit of policyholders is to be accredited to dividends.

(*c*) The cost of State fund insurance is represented by premiums, less dividends to policyholders, plus any subsidy received from the State.

In the case of several monopolistic funds such subsidy is to be distinguished from the cost of administering the compensation act, apart from State insurance.[3] Where no separation of functions is made in the published accounts the cost of compensation administration may perhaps be taken as a fair offset to the premium tax paid by private insurance companies.

Against the premiums as thus ascertained are to be set the benefits paid or payable by insurance carriers. Here, again, pains must be taken to secure comparable figures.[4] The more severe disabilities and costly claims mature slowly, so that those incurred in any given year can not be ascertained with much accuracy until the lapse of a considerable time. Even on matured losses a period of four or five consecutive years is necessary to give representative results. Furthermore, private insurance companies state their losses, other than life pensions, at terminal values, i. e., without discounting future payments for interest and mortality. This method of statement, as a matter of course, considerably exaggerates the amount of compensation, particularly in the low-benefit States. Any accurate comparison must reduce all losses to a uniform present-value basis by the use of standard interest, mortality, and remarriage tables.[5]

The difference between benefits incurred and premiums earned, when ascertained upon a uniform basis, constitutes the true cost of compensation insurance. It is obvious from what has been said as to the lack of uniform statistical and accounting methods that no exact comparison can at present be made as among the several types of insurance carriers. Roughly, however, it may be said that the expenses and profits of stock companies, after deducting taxes, will average, over a period of years, about 35 per cent of premiums, or 60 per cent of benefits. The corresponding expense ratio

---

[1] Investment earnings, of course, bulk large in the income of insurance companies, but the investments themselves are derived ultimately from premium income.

[2] State and Federal taxes range in different jurisdictions from 2½ per cent to 5 per cent of premiums. A fair average is 3½ per cent of stock company premiums.

[3] Compare Downey, Audit of the Ohio State Fund, p. 48.

[4] The tabulations of premiums and losses compiled from the annual statements of insurance carriers and disseminated by such publications as "Bests" and the "Spectator" are simply crude misinformation.

[5] The several mortality tables in use for computing compensation annuities—the American Experience Table, the British Healthy Males Table, the Danish Survivorship Annuitants' Table, and the Carlisle Table—all differ markedly among themselves. Probably the General Population Mortality Table, constructed from the United States Census, would be more suitable for the purpose than any of the foregoing. The interest rates used for compensation reserves are likewise variously taken at 3, 3½, and 4 per cent.

of reputable mutual companies [6] varies from 15 to 20 per cent of premiums or from 25 to 33⅓ per cent of benefits, and the management expenses of State funds range from 5 to 15 per cent of premiums and from 6 to 25 per cent of benefits. Stated in other terms, the overhead cost of carrying $1 in compensation benefits is about 60 cents by the stock company plan, 25 or 30 cents by the mutual insurance plan, and something less than 10 cents by the plan of compulsory State insurance. How far these wide discrepancies in expense ratios are offset by a difference in insurance services is, in the present state of statistical records, mainly a matter of opinion. It does not appear, however, from any evidence in hand that the private insurance companies are more liberal in the settlement of compensation claims or more prompt in the making of payments thereon or more secure against ultimate insolvency than the compulsory State funds.

To employers the most interesting comparison of insurance costs is that between net premium rates. Within a single jurisdiction such comparisons are readily made and are a legitimate selling argument. As between different jurisdictions, however, a fair comparison of premium rates is next to impossible. In the first place, the published or manual rates of private insurance companies are subject to increase or decrease by merit rating, with decreases decidedly preponderating. The amount of such decreases, and consequently the ratio of effective to manual rates, varies markedly from jurisdiction to jurisdiction. Thus in Pennsylvania the correspondence between manual and effective rates is much closer than in New York, whereas in Illinois there is scarcely any definable relationship between manual rates and the rates actually collected. In the second place, the classifications are by no means uniform even as between private insurance carriers and still less so as between monopolistic and private insurance carriers. Manifestly no fair comparison can be made between the Pennsylvania rate of $3.85 for stevedoring and the New York rate of $27 for stevedoring, n. o. c., because the Pennsylvania rate covers all longshore employees, whereas the New York manual provides a half-dozen rates, from 79 cents to $27, all applicable to the same employees on the same job. Furthermore, the distribution of premiums as between stock and mutual companies, and the mutual dividend rate, vary from State to State and from one industry to another, which variations are not disclosed in the published reports of any State. Lastly, the scale of compensation benefits is different for every State and for every class of injury, insomuch that no ready conversion of one to another is at all possible. For all these reasons premium rate comparisons between States as commonly made are calculated rather to mislead than to inform. The object sought in such comparisons—to show the saving effected by one type of insurance as against some other—is far more accurately and more readily attained by the method of expense ratios already explained.

3. ADMINISTRATIVE, AS DISTINGUISHED FROM INSURANCE COST.

Under whatever system of insurance, the State commonly provides some sort of tribunal for the adjudication of claims and exercises some supervision over claim payment and over the direct settlement of those claims which do not come before a public tribunal for formal adjudication. Many States, further, undertake to supervise the rates and reserves of private insurance carriers. There is also commonly some attempt, at least ostensibly, to compile statistics of industrial accidents. These functions are here subsumed under the rubric "Compensation Administration." The cost of compensation administration as so defined is nowhere large in proportion to the volume of compensation payments—probably from 2 to 5 per cent of compensation benefits. The precise cost, however, is nowhere readily ascertainable.

Administrative costs include the salaries of officials and employees engaged in compensation administration, traveling expenses incident thereto, rent, heat, light, postage, telegraph, telephone and express charges, office equipment, supplies, and printing. Where, as is often the case, office space, heat, light, janitor service, equipment, supplies, and printing are not charged to the specific appropriation of the administrative board or department, the fair value thereof should be approximated or the exclusion of these items clearly noted in the published reports. Court costs are likewise to be taken account of—a very considerable, even if unascertainable, item in those jurisdictions which rely upon common-law courts for the adjudication of compensation claims.

Accounting methods of the several States are so extremely diverse and so many items of expenditure are habitually omitted from the published reports that comparative statements of administrative cost are little to be trusted. Even were all

[6] Some mutual companies show an expense ratio as high as 40 per cent of premiums, but this is to be attributed to exploitation of the mutual plan by insurance promoters.

expenditures known, comparisons would be worse than useless without a clear analysis of the administrative work actually performed. In direct cost to taxpayers, court adjudication without any administrative supervision of claim settlement, as in Alabama, is doubtless cheaper than any effective administration—as it is also indubitably more productive of unconscionable settlements and of wholesale short changing in the payment of claims. By the same token, the administrative board which most nearly approaches the fainéant ideal of common-law courts, will make the most favorable showing in point of minimum expense. To serve any useful purpose, in short, administrative accounts must exhibit the volume and quality of work performed as well as the itemized cost thereof—the number of cases disposed of and how, the number of claims disallowed and why, the number of hearings postponed, adjourned, or appealed, the amount of attorneys' fees approved, the usual time required for the adjudication of an ordinary disputed claim, and, above all, the effective waiting period, or length of time elapsed upon an average between the occurrence of a compensable injury and the actual commencement of payments. For this latter purpose a frequency distribution of waiting periods, as well as the weighted average for different insurance carriers, will be highly useful. It is a singular fact that this vital matter of promptness of claim payment has been consistently ignored in the heated contentions over the relative merits of State and private insurance. The fragmentary and scattered data heretofore published[7] appear to indicate that the record of all insurance carriers under this head—stock, mutual, and State funds—is intolerably bad, but that noninsured employers bear the palm for willful neglect, delay, and short changing of claimants.

4. COMPENSATION BENEFITS IN RELATION TO WAGES LOST.

Compensation benefits under different laws may be compared either for the purpose of measuring the relative adequacy or inadequacy of the benefits themselves or for the purpose of determining proper relative insurance rates. Comparison of benefits with respect to adequacy is of deep social significance but has heretofore received little attention; comparisons for the purpose of insurance rate making or of exhibiting or explaining differences in insurance cost are extremely common and controversial.

The common method of making such comparisons, down to a very recent date, was the theoretical "law differential," which purported to show the relative cost of compensating 100,000 accidents in an assumed "standard" distribution of severity of injury.[8] Law differentials so obtained, expressed in the form of flat multipliers, have been applied indiscriminately to all industries, and have been made the basis, not merely of comparison between compensation acts as a whole, but of innumerable insurance rate computations.[9]

The fallacies of this method are too obvious and too generally admitted to require extended discussion. No two compensation acts, among the 50 or more in the United States and Canada, stand in uniform relationship as respects death benefits, permanent total disability benefits, permanent partial disability benefits, minor dismemberment benefits, temporary disability benefits, and medical benefits. The nominal percentage of wages, the weekly and total minima and maxima, the waiting period, the basis of compensation for death and permanent disability, the period for which such compensation shall continue, the time and money limits upon medical aid—all vary widely and erratically from State to State in such wise that no conversion multiplier which holds for one class of injuries will hold for any other. As between New York and Pennsylvania, e. g., the aggregate ratio of benefits is probably in the neighborhood of 2 : 1. But the ratio of death benefits is more nearly 1.5 : 1; of permanent total disability benefits, 4 : 1; of specific indemnities for loss of hand, 2.4 : 1; for loss of eye, 1.7 : 1; of medical benefits, perhaps 1.10 : 1.

A flat or average law differential is thus necessarily a composite of dissimilar ratios, and will hold only for those industries which conform to the "standard" distribution of accidents with respect to severity of injury. But no given industry does in fact conform to this standard. A glance at the accompanying table will show the extreme divergence of representative industries in the proportion of each kind of benefits to

[7] For Illinois, in the Annual Reports of the Industrial Accident Board; for Ohio, in Audit of the Ohio State Fund; for Pennsylvania, in Monthly Labor Review of U. S. Department of Labor.

[8] The "Standard Accident Table" for this purpose was constructed by Dr. I. M. Rubinow, and the finished method of "law differentials" was mainly his work. An earlier computation by very similar methods, based upon Wisconsin experience, was published by the present writer and Mr. S. Bruce Black in the August, 1913, Bulletin of the Industrial Commission of Wisconsin.

[9] If, e. g., the "law differential" for Pennsylvania is 1.35 and for Ohio 1.85, the method assumes that the compensation cost per $100 pay roll for any industry under the Ohio law is $\frac{1.85}{1.35}$, or 1.37 of the cost experienced under the Pennsylvania law.

total compensation cost. Since the ratio of benefits as between any two States—e. g., New York and Pennsylvania—is different for each class of injuries and since the severity distribution of injuries is different for each industry, no composite ratio which is true for the aggregate of all industries will hold for any given industry. Since, moreover, the industry distribution of the two States is very different, a flat differential computed upon a theoretical standard distribution of industries is true for neither. Theoretical law differentials, in short, however computed and for whatsoever purpose used, are a delusion and a snare.

PROPORTION OF EACH KIND OF BENEFITS TO TOTAL COMPENSATION COST, PENNSYLVANIA COMPENSATION INSURANCE EXPERIENCE, 1916–1918.

Industry classification.	Pay roll exposed (000 omitted).	Total compensation cost.	Percentage attributable to—			
			Death and permanent total disability.	Major permanent disability.	Temporary disability.	Medical benefits.
All industries	$2,724,709	$19,853,597	37	17	23	23
Anthracite mining	49,661	1,369,461	56	12	16	16
Bituminous mining	263,689	4,783,283	46	16	22	16
Stone quarrying	22,477	416,580	40	23	20	17
All manufacturing	1,166,432	6,962,619	23	20	25	32
Blast furnaces	10,410	172,138	54	9	16	21
Rolling mills	78,437	552,514	31	17	26	26
Iron foundries	34,690	308,157	27	16	27	30
Machine shops	75,441	505,951	18	18	25	39
Woolen manufacturing	35,273	113,943	16	25	28	31
Silk manufacturing	49,919	48,897	10	20	30	40
Brick manufacturing	26,107	238,761	39	16	25	20
Glassware manufacturing	20,895	55,709	.....	19	27	54
Building construction	170,399	2,042,345	37	17	27	19
Masonry n. o. c	10,715	184,574	53	9	20	18
Carpentry n. o. c	15,854	257,976	21	17	32	30
Structural iron erecting	3,575	179,775	49	18	18	15
Department stores	57,320	78,035	36	7	28	29

The so-called "experience differential"[10] is but a refinement upon the theoretical law differential and is subject to much the same weaknesses, though not to the same degree. By this method death and permanent total disability benefits are taken at the average value developed by the experience of the State and industry for which insurance rates are to be projected while other benefits are compared by means of a complex calculation which may be briefly expressed as follows:

$$\frac{1}{2}\left[\frac{\text{New York pay roll}\times\text{Pa. pure premium}^{11}}{\text{New York losses}}+\frac{\text{Pa. losses}}{\text{Pa. pay roll}\times\text{N. Y. pure premium.}}\right]$$

These two computations are carried out for each of a selected group of representative industries and the mean of the two composite ratios, or some correction thereof or approximation thereto, is selected as the true law differential or "conversion multiplier" for all industries deemed to be analogous in respect to the severity distribution of injuries. Such conversion multipliers may be computed separately for each class of benefits or two or more kinds of benefits may be lumped together. In either case the resultant multipliers are used to convert the losses experienced in one State to the level of benefits obtaining in the other.

Detailed criticism of this method of comparing compensation costs would be out of place in the deliberations of this body and would far overpass reasonable bounds. Suffice it to say that the method is inapplicable to permanent partial disabilities and is inadequate for the comparison of either temporary disability or medical benefits. It is inapplicable because the rates and periods of compensation allowed by

[10] The experience differential method was suggested so far back as the general rate conference (augmented standing committee) of 1917 by Messrs. A. H. Mowbray and S. Bruce Black. It was first applied by the Pennsylvania Compensation Rating and Inspection Bureau in 1918. The method has since been developed and refined by Messrs. A. H. Mowbray, W. W. Greene, George Moore, and others, and was applied by the National Council of Workmen's Compensation Insurance in the general rate revision of 1920.

[11] Pure premium $=\frac{\text{losses}}{\text{pay roll}}$.

different acts for the several classes of permanent partial disabilities, as loss of arm, hand, leg, foot, eye, or fingers, bear no constant ratio [12] and because the frequency distribution of these injuries is different for different industries, injuries to the eye predominating in quarries, coal mines, and foundries, injuries to the hand in bakeshops, laundries, and woodworking establishments, finger injuries in paper-box and sheet-metal ware manufacturing. (See Table 2.) The method is inadequate even for medical and temporary disability benefits because the conversion ratios for these benefits under different laws vary with wage levels and with the frequency distribution of disabilities in respect to duration. The true conversion multiplier for any class of injuries as between different scales of benefits is not the same for anthracite as for bituminous mining, for iron foundries as for steel foundries, for carpentry as for concrete work, for drivers and chauffeurs as for retail stores. The method of experience differentials breaks down in practice because it necessarily assumes a composite or average ratio, the same for all or for many industries, whereas the true ratio is specific to each industry.

TABLE 2.—FREQUENCY DISTRIBUTION OF PERMANENT PARTIAL DISABILITIES, PENNSYLVANIA COMPENSATION INSURANCE EXPERIENCE, 1916–1918.

Industry.	Major permanents per 1,000 compensable accidents.	Per cent of all major permanents involving loss or loss of use of—				
		Arm.	Hand.	Leg.	Foot.	Eye.
All industries	23	07	27	05	09	50
Anthracite mining	20	08	08	12	12	43
Bituminous mining	22	05	15	10	19	45
Quarrying	39	03	07	07	13	68
All manufacturing	24	12	32	03	06	47
Baking	40	30	60	.....	.....	05
Rolling mills	18	12	20	06	12	50
Steel foundries	24	08	17	04	10	54
Machine shops	27	06	23	02	05	66
Planing mills	27	17	56	01	02	22
Building construction	22	10	20	13	17	40

There is but one reasonably accurate method of comparing compensation cost under contrasted scales of benefit: By actually applying both scales to the accident experience of the same industry in the same jurisdiction. If it be desired, e. g., to ascertain the probable cost of compensation for bituminous coal mining in Pennsylvania under the New York scale of benefits, it would be necessary to make an individual valuation, under the New York scale, of the deaths and permanent disabilities experienced in the bituminous mines of Pennsylvania [13] and to make a similar valuation of temporary disabilities and minor permanents distributed into wage and duration groups. For medical benefits, lastly, the effect of the differing time and money limits would have to be evaluated from a cost-per-case distribution, such as recommended in Table 5 of your committee on statistics. The same procedure applied to the aggregate accident experience of Pennsylvania would give a measure of the total difference in cost between the two scales of benefits. The ratio so obtained, however, would not hold for particular industries nor would the reciprocal of this ratio hold for the aggregate accident experience of New York.

[12] The specific indemnity periods (number of weeks) for enumerated major permanent disabilities in the New York and Pennsylvania acts compare as follows:

	Pennsylvania.	New York.	Ratio.[a]
Loss of arm	215	312	2.41
Loss of hand	175	244	2.32
Loss of leg	215	288	2.23
Loss of foot	150	205	2.28
Loss of eye	125	128	1.71

[a] Having regard to wage limits.

[13] A very competent actuary, taking the actual dependency and wage distribution of 800 fatalities in Pennsylvania coal mines, estimated the average increase in death benefits by the compensation act amendment of 1919 at 10 per cent. An individual valuation of the same cases showed that the actual average increase was only 5 per cent.

The statistical method of benefit comparison is so laborious and involves so much detailed analysis that it is not likely to be employed unless for the purposes of some special study or for insurance rate making. Insurance companies have hitherto resorted to unscientific and inaccurate short cuts because they have been unwilling to compile intelligible statistics of their own experience. If, however, compensation insurance rate making is ever to be placed upon a scientific footing, detailed statistical analyses of accident experience can not be avoided.

Comparisons of compensation insurance cost and of benefit scales for mere rate-making purposes have played a part in public discussions altogether disproportionate to their real importance. From a social standpoint the decisive fact of any compensation system is not its aggregate nor its relative cost, but the relationship of the benefits paid thereunder to the economic loss imposed upon wageworkers by reason of industrial injuries. To make good this loss is the professed object of the compensation system; for any shortcoming therein low insurance rates are, socially considered, but a poor recompense.

To the wage earner and his family the direct cost of an industrial injury is the wage loss during disability plus the cost of medical and hospital care. In cases of death or permanent disability neither wage loss nor the capitalized value of earnings can it is true, be accurately ascertained. Wages of the same individual fluctuate from time to time and periods of unemployment are of uncertain incidence. Nevertheless, just as earnings at the time of injury are made the basis of compensation, so the same earnings will serve for an approximate estimate of wage loss.

For this purpose wage loss on account of temporary disability may be taken at the number of weeks' disability times the average weekly earnings of the injured. For death or permanent total disability, wage loss may be taken at the present value of the average weekly earnings of the injured for his working-life expectancy. The wage loss on account of permanent partial disability may be estimated by applying the scale of severity rating recommended by your committee on statistics.

It will not be claimed that such a computation is meticulously accurate. It will, however, give a standard gauge of the adequacy of compensation. By applying such a computation to the accident experience of a given jurisdiction and comparing the total with the compensation paid or payable for the same accidents we will obtain an index of the adequacy of the compensation system in that jurisdiction and this index will be directly comparable with the like index for other jurisdictions. If such a computation should give an index of compensation to wage loss equivalent, say, to 0.40 for New York, 0.30 for Ohio, and 0.20 for Pennsylvania, these three index numbers would give at once a useful comparison of compensation cost and a measure of the inadequacy of compensation benefits in each of these States. It could be fairly said, not only the benefit scales of these three States, taken as a whole, stand in the ratios to each other of 40, 30 and 20, respectively, but that each and all fall greatly short of reasonably adequate compensation.

I am convinced that your association could do nothing of broader public usefulness than to establish such a standard gauge of adequacy. State officials, employers, legislators, and the public have been very complacent with respect to the American compensation system. The public press, as also most discussions of the subject, leave the impression that the nominal percentage of wages expressed in the compensation acts represent the actual relationship between compensation and wage loss. So in the legislative hearings in Pennsylvania it was repeatedly emphasized that the act of 1915 aimed to divide the cost of industrial accidents equally as between employers and employees and the amendments of 1919 were objected to on the ground that the nominal 60 per cent would increase the employer's share to three-fifths. The bald fact is that on any reasonable estimate of wage loss the benefits payable under the Pennsylvania compensation act of 1919 will amount to not more than 20 per cent of the economic cost of industrial accidents, to say nothing of occupational diseases. The individual wage earner and his family in Pennsylvania still bears, not one-half, but four-fifths of the wage loss incident to industrial injuries. Even in New York industry pays much less than half of the direct economic loss imposed by work injuries upon wage earners. These facts should be brought forcibly before the public. And nothing will make the facts so vivid as a tabulation of compensation in relationship to wage loss.

Whether the compensation insurance cost for bituminous coal mining is 3 per cent, 5 per cent, or 10 per cent of wages is of very little social importance. The effect upon the retail price of coal will be nearly negligible in any event. But whether the victims of coal-mine accidents are to be thrown upon their resources or provided for through an adequate compensation system is a matter of high public moment. It is time to shift the interest of public administrative bodies from the comparative cost of different plans of insurance to the adequacy of compensation benefits.

APPENDIX II.—CAUSE OF INJURY CODE IN USE BY THE UNITED STATES EMPLOYEES' COMPENSATION COMMISSION AND SEVERAL OF THE STATES.

This code, established after several years' careful study and experience in the tabulation of accident statistics, follows in general the classification formulated by the committee on statistics and compensation insurance cost, except that the numerical arrangement of the divisions, groups, and schedules have been reversed. For statistical purposes it was desirable to reduce the number of divisions to 10, and Groups III and IV of the committee's classification—i. e., "explosions, electricity, fires, and hot substances" and "Poisonous and corrosive substances and occupational diseases"—have therefore been combined, making Group III; Group V of the committee's classification—i. e., falls of persons—becoming Group IV of this classification, etc.

In order to conform as nearly as possible to the classification adopted by the committee, division No. 1 has not been designated in the code as such, for the reason that all of the spaces were needed properly to describe the machine and the manner of occurrence, but all mechanical injuries are recognized as division No. 1.

The mechanical code allows for greater detail in description of the cause of accident than codes commonly in use for the reason that it specifies the manner of occurrence as well as the kind of machine on which the accident occurred, a detail which greatly enhances the value of such statistics in accident prevention work.

The mechanical code comprises five figures; the first two at the left are used for the manner of occurrence, and should be coded according to the figures under that heading. Under the heading of "Adjusting or operating" the twelfth punch may be used as the first figure in the manner of occurrence; under the heading "Breaking" the X space and the rest of the numbers as shown in the code should be used. In order to distinguish mechanical from nonmechanical X should be used over the right-hand figure of the mechanical code.

(*Example.*—Back firing of gasoline engine would be coded as follows: $\overset{X}{R2211}$ "X" over the right-hand digit means in every instance a mechanical accident. By referring to the manner of occurrence code it will be noted that R2, which means a punch in the twelfth and the second space, refers to back firing and the 211 under the head of power transmission refers to a gasoline engine.)

In coding nonmechanical accidents the figures shown in front of each group should be used. However, these figures should be modified in States having an unusual amount of business producing a certain type of injuries. The code allows for expansion and readjustment in such cases. In States in which lumbering is carried on extensively, for example, the predominance of injuries occurring in logging operations would necessitate expansion of the code under the heading "Falling objects." In States in which mining is carried on to a large extent more detail would have to be included for mining injuries.

In Group III of the nonmechanical causes of accidents, relating to the poisonous and corrosive substances, it will be noted that a single list is given including both, and that the numbers in the fifth left-hand space designate the group in which the accident belongs. This list is incomplete and will have to be amplified to meet the needs of the jurisdiction using it. The list here given will serve, however, as a suggestion in applying code numbers.

CAUSE OF INJURY CODE.

GENERAL CLASSIFICATION.

Mechanical code.
- Manner of occurrence.
- List of machines—
  - Prime movers.
  - Power-transmission apparatus.
  - Power working machinery.

Nonmechanical code.
- II. Vehicles.
- III. Explosions, electricity, fire and hot substances and poisonous and corrosive substances.
- IV. Falls of persons.
- V. Stepping on or striking against objects.
- VI. Falling objects—not being handled by injured.
- VII. Handling of objects.
- VIII. Hand tools.
- IX. Animals.
- X. Miscellaneous.

MECHANICAL CODE.

Manner of Occurrence.

Adjusting or operating.
- R1 Adjusting or operating.
- R2 Backfiring.
- R3 Dumping.
- R4 Failure of current on magnet.
- R5 Contact with current.
- R6 Starting or stopping.
- R7 Sudden starting or stopping of car.
- R8 All other.

Breaking.
- X1 Apparatus.
- X2 Belt.
- X3 Flywheel.
- X4 Machinery (part of).
- X5 Emery wheel.
- X6 Cable.
- X7 Boom.

01 Caught by, n. o. c.
- 02 Belt and pulley.
- 03 Chain and sprocket.
- 04 Clothing, loose.
- 05 Eccentrics.
- 06 Gears.
- 07 Gloves.
- 08 Gate or shaft.
- 09 Knife (reaching for article).
- 10 Knife (slipping into).
- 11 Needle or punch.
- 12 Set screws.
- 13 Shaft.

  Cables.
  - 14 Reeling and unreeling.
  - 15 Overwinding.
  - 16 Slipping.
  - 17 Or rope or block.
- 18 Chainfall.
- 19 Car dumping.
- 20 Car rising too high.
- 21 Side of elevator shaft or fixed object.
- 22 Dumping due to sudden start or stop while loading or unloading.
- 23 Caught between car and floor.
- 24 Load shifting after being placed on car.
- 25 Other load accidents.

30 Falling objects, n. o. c.
- 31 Dropped from load.

30 Falling objects, n. o. c.—Concluded.
- 32 Load falling.
- 33 Cable slipping.
- 34 Cable or attachment breaking.
- 35 Machine breaking.
- 36 Hook slipping.
- 37 Hook breaking.

  Into shaft.
  - 38 From landing floor.
  - 39 From car tipping.
  - 40 From car not tipping.
  - 41 From overhead equipment or shaft.
  - 42 From ledge or window.
  - 43 On to car from ledge or window.
  - 44 On to car from landing floor.
  - 45 Part of machine (only such as are caused by mechanical devices).
  - 46 Overturning.
  - 47 From incline.

Fall of persons.

  Into shaft.
  - 50 From landing floor.
  - 51 From car (tipping).
  - 52 From car (not tipping).
  - 53 From overhead equipment or shaft.
  - 54 From ledge or window.
  - 55 From runway, n. o. c.
  - 56 From cab, or going to or from cab.
  - 57 From load, while riding thereon.
  - 58 From empty hook or sling, while riding thereon.
  - 59 From crane, n. o. c.

60 Flying objects, n. o. c.
- 61 Part of machine (breaking or coming loose).
- 62 Object set in motion by.

63 Struck by, n. o. c.
- 64 Belt.
- 65 Bucket.

  Cable.
  - 66 Attachments.
  - 67 Breaking.
  - 68 Slipping.
  - 69 Reeling or unreeling.
  - 70 Overwinding.

63 Struck by, n. o. c.—Continued.
Cable—Concluded.
71 Sliver.
72 Standing in bite.
73 Counterweight.
74 Crank.
75 Lever.
76 Moving parts.
77 Pulley.
78 Shaft.
79 Wheel.
Load.
80 Moving.
81 Swinging.
63 Struck by, n. o. c.—Concluded.
Load—Concluded.
82 Falling.
83 Miscellaneous.
84 Elevator car in pit.
Boom.
85 Swinging.
86 Falling.
Miscellaneous, n. o. c.
90 Cleaning.
91 Contact.
92 Oiling.
93 Repairing.

List of Machines.

XI. PRIME MOVERS.

111 Steam engines.
211 Internal combustion engines (gas, oil, or gasoline).
311 Electric motors and dynamos.
411 Compressed-air motors.
511 Water motors.
611 All other prime movers.

B. POWER-TRANSMISSION APPARATUS.

Shafts.
121 Shafts.
221 Shaft collars, and couplings.
321 Shaft projections (set screws, keys, and bolts).
Belts and pulleys.
421 While shifting belt.
521 While removing belt (not shifting).
621 Belt shifter.
721 All other.
Chains and sprockets.
731
Ropes, cables, sheaves, or drums.
831
Gears.
141 Cogs.
241 Cams.
341 Gears, n. o. c.
441 Friction wheels.
Other.
151 Counterweights.

C. POWER-WORKING MACHINERY.

a. Brick-making machinery.
112 Brick cut-off machines.
212 Dry pans.
312 Molding machines.
412 Pug mills.
512 Brick presses (include repressers).
b. Cement-making machinery.
122 Bag-filling machines.
222 Cement-block machines.
322 Tube mills.

C. POWER-WORKING MACHINERY—contd.

c. Glass-making machinery.
132 Bottle machines.
232 Polishing wheels.
332 Presses.
432 Rolls.
532 Surface-grinding machines.
d. Pottery-making machinery.
142 Throwing wheels.
242 Jigs.
342 Filter presses.
442 Ball machines.
e. Stone and ore crushers.
152.
f. Stone and marble working machinery other than crushers (n. o. c.).
162 Drills.
262 Planers.
362 Saws.
462 Rubbing beds.
562 Lathes.
g. Metal-working machinery.
All other metal-working machines.
113
Abrasive wheels.
513
Bending and straightening machines.
123 Corrugating rolls.
223 Crimping rolls.
323 Other metal rolls.
423 Other bending and straightening machines (not rolls).
Bolt and nut, pipe cutting, threading, and tapping machines.
523.
Boring machines or mills (horizontal and vertical, n. o. c.)
623
Drills (drill presses) (radial and upright or goose neck).
723
Milling and gear-cutting machines.
133 Broaching machines.
233 Die sinkers.
333 Gear-cutting machines.
433 Key seaters.

C. POWER-WORKING MACHINERY—contd.

g. Metal-working machinery—Continued.

Milling and gear-cutting machines—Continued.
- 533 Milling machines.
- 633 Profilers.
- 733 Slotters.
- 833 Other or indefinite.

Hammers and forging machines, n. o. c.
- 143 Belt machines.
- 243 Drop hammers.
- 343 Forging hammers.
- 443 Scrap breakers.
- 543 Swaging machines.
- 643 Upsetting machines, n. o. c.
- 743 Other or indefinite.

Lathes and automatic screw machines.
- 153 Lathes, n. o. c.
- 253 Screw machines.
- 353 Turret lathes.
- 453 Multi-spindle.
- 553 Boring lathes.
- 653 Automatic.
- 753 Spinning.

Cleaning mills, tumblers or rumblers.
- 853

Molding machines (core, sand mixers, temping, n. o. c.).
- 953

Planers and shapers.
- 163 Planers (bed).
- 263 Planers (rotary).
- 363 Shapers.
- 463 Engravers.

Polishers and buffers.
- 563

Portable power tools (pneumatic and electric drills, hammers, and riveters).
- 663

Presses (power), (including punches).
- 173 Presses (hydraulic, pneumatic, and screw).
- 273 Bulldozers.
- 373 Button presses.
- 473 Draw presses.
- 573 Embossing presses.
- 673 Punch, stamping, and trimming presses.
- 773 Punch and eyeletting machines.
- 873 Punches and riveting presses.
- 973 Other or indefinite.

Presses (foot and hand operated—no mechanical power) n. o. c. (including shears).
- 183
- 283 Button presses.

Rolling mills (including blooming mills).
- 383

C. POWER-WORKING MACHINERY—contd.

g. Metal-working machinery—Concluded.

Saws, n. o. c.
- 483 Saws, n. o. c.
- 583 Band.
- 683 Circular.
- 783 Hack.
- 883 Scroll and jig.

Shears, n. o. c.
- 983

Welding and heat cutting machines.
- 193

Wire-working machines.
- 293

Winding machines.
- 393
- 493 Cable-making machines, n. o. c.

Wire and tube drawing machines.
- 593

Automatic can-making machines.
- 693

Topping machines.
- 793

h. Woodworking machines.

All other woodworking machines.
- 114

Bending machines.
- 214

Boring machines and drills.
- 314

Lathes, n. o. c.
- 024 All other.
- 124 Spoke lathes.
- 224 Shoe-last machines.
- 324 Shaper lathes.
- 424 Cutter-head lathes.
- 524 Carving heads.
- 624 Button lathes.

Mortising machines, n. o. c.
- 034 All other.
- 134 Chain mortisers.
- 234 Chisel mortisers.
- 334 Pocket and boring machines.

Tenoning, planing, and molding machines, n. o. c.
- 144 Auto, blind slat (tenoner).
- 244 Jointers.
- 344 Matchers, molders, and stickers.
- 444 Planers.
- 544 Tenoning machines, n. o. c.

Saws, band, scroll, or jig, n. o. c.
- 154 Band.
- 254 Band resaw.
- 354 Jig or scroll.

Saws, circular and all other, n. o. c.
- 164 Circular (including dado and rabbetting).
- 264 Gaining machine.
- 364 Gang circular (including edgers).
- 464 Lath bolter.
- 564 Swing.
- 664 Dovetailing.

C. POWER-WORKING MACHINERY—contd.

h. Woodworking machines—Concluded.
Shapers (including special head cutters), n. o. c.
174 Core-box machines.
274 Shapers.
374 Variety machines.
Veneering machines (all kinds), n. o. c.
184 Veneer machines.
284 Peeler.
384 Trimmer (knife).
484 Trimmer (saw).
Cooperage machines.
584
Brush and broom making machines.
684
Hogs.
784
Excelsior machines.
884
Presses, n. o. c.
194 Clamping machines.
294 Box mailers.
394 Box-board squeezers.
494 Door and blind clamps.
594 Hoop presses.
Sanding machines, n. o. c.
104 Belt (felloe and panel).
204 Disk.
304 Spindle and post.
404 Surface or drum.
Cork-working machines, n. o. c.
504 Band knife.
604 Cork-board cutters, block cutters, etc.
704 Cork-slicing machines.

i. Leather-working machines—Tanneries.
115 All other.
215 Buffing drums.
315 Other drums and paddle vats.
415 Fur-working machines.
515 Fleshing, shaving, and skiving machines.
615 Jacks—felting, glassing, rolling, etc.
715 Presses and baling machines.
815 Hair washing and drying machines.
915 Setting up (or setting out) machines.
125 Splitting machines.
225 Unhairing machines.
325 Extractors (centrifugal).

j. Leather products.
425 All other.
525 Cutting machines, n. o. c.
625 Punching and pressing machines.
725 Sewing machines.
825 Buffing and scouring machines.
925 All other shoemaking machines.

C. POWER-WORKING MACHINERY—contd.

k. Paper-making machines.
All other.
135
Barkers, chippers, splitters, and grinders, n. o. c.
145 Barkers.
155 Chippers.
165 Grinders.
175 Splitters.
Beaters (including rag washers).
185
Screens.
195
Paper machines.
205 Other or indefinite.
215 Head box.
225 Apron.
235 Wire.
245 Suction roll.
255 Couch roll.
265 Dryers.
275 Calenders.
285 Doctors.
Rolls and winders.
295
Cutters and slitters.
305
Choppers
315
Digestors.
325

l. Paper-products machines.
All other.
335
345 Paper-cup machines.
355 Tube machines.
365 Twine-making machines.
Automatic box-making machines.
375
Covering machines.
385
Cutting and punching machines, n. o. c.
395 All other.
405 Die cutters.
415 Guillotines.
425 Paper cutters (hand).
435 Perforators.
445 Punches.
455 Rotary cutters.
465 Saws.
475 Shears.
Doming and ending machines, n. o. c.
485 All other.
495 Doming machines.
505 Corregating machines (not rolls).
515 Ending machines.
Corner staying machines.
525
Bag and envelope-making machines.
535

C. POWER-WORKING MACHINERY—contd.

l. Paper-products machines—Concluded.
Paper-finishing machines.
545
Embossing rolls or calenders (cross index, rubber).
555
Embossing presses (cross index, metal).
565
Printing and bookbinding machines—composing machines.
575 All other.
585 Linotypes.
595 Monotypes.
605 Type casters.
Stamping and stencil-cutting machines.
615
Gathering machines.
625
Presses (printing).
635 Web newspaper presses.
645 Flat bed cylinder presses.
655 Job platen presses.
665 Other printing presses.
Presses (binders), n. o. c.
675
Sewing and stitching machines, n. o. c.
685 All other.
695 Wire stitchers.
705 Wire staplers.
Other printing machines.
715
Other bookbinding machines.
725

m. Textile machines.
106 All other, n. o. c.
116 Washers.
126 Dryers.
Opening and cleaning machines, n. o. c.
136 All other.
146 Openers.
156 Pickers.
166 Rag pickers.
176 Willow.
Carding and combing machines, n. o. c.
186 All other.
196 Cards.
206 Combs.
216 Garnett machines.
226 Slubbers.
Spinning machines, n. o. c.
236 All other.
246 Jacks and mules.
256 Spinning frames.
266 Drawing frames.
Weaving machines, n. o. c.
276 All other.
286 Looms.
296 Wire-cloth looms.
306 Warpers.

C. POWER-WORKING MACHINERY—contd.

l. Paper-products machines—Continued.
Dyeing, finishing, and printing machines, n. o. c.
316 All other.
326 Pile-cutting machines.
336 Shearing machines.
Sewing machines.
346
Cloth cutting and stamping machines.
356
Hat-making machines.
366
Coating and inlaying machines (linoleum, etc.; other coated fabric).
376
Winders, doublers, and quillers.
386
Braiding and knitting machines.
396
Rope-making machines.
406

n. Laundry machines.
All other.
416
Extractors.
426
Ironing machines, n. o. c.
436 All other.
446 Body ironers.
456 Flat-work ironers.
466 Manglers.
Washing machines (rotary).
476

o. Food-products machines.
107 All other.
117 Cleaning, preparing, and sorting machines, n. o. c.
127 Milling and grinding machines, n. o. c.
137 Mixing machines and mixing kettles (dough, chocolate, etc.).
147 Cookers (not mixers) and ovens, n. o. c.
157 Shaping and forming machines, n. o. c.
167 Cutting machines, n. o. c.
177 Coating and polishing pans, n. o. c.
187 Colanders (candy rolls, etc.), n. o. c.
197 Crushers (ice crushers, etc.).
207 Barreling, bagging, packing, and wrapping machines (automatic and semiautomatic).
217 Bottling machines.
227 Tobacco-working machines.
237 Stamping presses, power operated.
247 Stamping presses, foot and hand operated.
257 Bleaching and blanching machines.
267 Containers, washing and cleaning machines.

C. POWER-WORKING MACHINERY—contd.

p. Chemical-products machines.
Acids and salts.
277 All other.
287 Grinding machines.
297 Agitating mixers, vats, and kettles (except paint and pony mixers).
307 Machinery of recovery, such as screens, sifters, filters, and extractors—not centrifugal.
317 Furnaces, ovens, dryers, and evaporators, mechanically fed or operated.
327 Crushers.
337 Calenders.
347 Centrifugal extractors.
Soaps, greases, oils, and fertilizers.
357 All other.
367 Agitating mixers, vats, and kettles (except paint and pony mixers).
377 Soap-stamping presses, power operated.
387 Soap-stamping presses, hand and foot operated.
397 Soap grinders.
407 Barreling, bagging, packing, and wrapping machines.
417 Machinery of recovery, such as sorters, sifters, filters, and extractors—not centrifugal.
Drugs.
427 All other.
437 Grinding machines.
447 Mixers (except pony mixers).
457 Tablet presses and pill machines.
467 Pony mixers.
Paints, varnishes, dry colors, inks, and dyes.
477 All other.
487 Agitating vats and kettles.
497 Pony and paint mixers.
507 Grinding machines.
517 Machinery of recovery, such as screens, sifters, filters, and extractors—not centrifugal.
527 Furnaces and ovens, mechanically fed or operated.
537 Crushers.
547 Calenders.
557 Centrifugal extractors.
Rubber, celluloid, composition, pearl, bone, and tortoise shell.
567 All other.
577 Calenders.
587 Tire and tube making machines.
597 Hose making machines.
607 Rubber band choppers and cutters.
617 Mixers, not of calender type.
627 Cutting and slitting machines.

C. POWER-WORKING MACHINERY—contd.

p. Chemical-products machines—Concld.
637 Tubing and hose wrapping machines.
647 Tire wrapping machines.
657 Tumblers.
667 Presses, foot and hand operated.
677 Tubing machines.
687 Punching and pressing machines (press and dye type).
697 Cutting and punching machines (guillotine type).
707 Comb cutting machines and ornament shapers.
717 Drills (button, etc.).
727 Grinding, washing, milling, and cracking machines.
q. Mining and ore refining machines.
737 Sackett machines (gypsum products).
747 All other.
r. Munition-working machines.
757 Powder grinders.
767 Powder presses.
777 Shell loading machines.
787 Reforming machines.
s. Hoisting apparatus.
Elevators.
108 Elevators, controlled.
118 Elevators, automatic and dumb waiters.
128 Elevators, sidewalk.
138 All other.
Hoists, cages, cranes, derricks, and conveyors.
Construction hoists and elevators, not derricks.
148
Mine cages, skips, and buckets.
158 Mine cages.
168 Skips (quarry, blast furnace, cupola, etc., inclusive).
178 Buckets (coal, rock, dirt, etc.).
Cranes.
188 Cranes, locomotive.
198 Cranes, other traveling.
208 Derricks and jib cranes.
218 All other.
Miscellaneous.
228 Wood stackers.
238 Blocks and tackles, windlasses, capstans, and winches, n. o. c.
248 Hay forks, derricks, and stackers.
Conveyors.
258 Air hoists.
268 Overhead trolleys.
278 Belt and chain.
288 Screens.
298 Bucket.
308 Platform conveyors and escalators.
318 All other.

C. POWER-WORKING MACHINERY—contd.

t. Miscellaneous.
- Construction machinery.
  - 109 Concrete mixers.
  - 119 Rock drills.
  - 129 Pile drivers.
  - 139 Road rollers.
  - 149 Grouting machines and cement guns.
  - 159 Well drills.
  - 169 All other.
- Excavating machinery.
  - 179 Trench and ditch digging machines.
  - 189 Steam shovels.
- Special machinery.
  - 199 Pumps.
  - 209 Compressors.
  - 219 Ice-manufacturing machinery.
  - 229 Fans and blowers.

C. POWER-WORKING MACHINERY—concld.

Miscellaneous—Concluded.
- 239 Turntables.
- 249 Automatic stokers.
- 259 All other.
- Farming machinery.
  - 269 Feed and ensilage cutting and shredding machines.
  - 279 Harvesters.
  - 289 Thrashing machines.
  - 299 Hay presses and balers.
  - 309 Shelling machines.
  - 319 Cream separators.
  - 329 Cotton gins.
  - 339 All other.
- Office machinery.
  - 349 Tabulating and sorting machines.
  - 359 Other office machinery,

NONMECHANICAL CODE.

II. VEHICLES (NOT INCLUDING CONSTRUCTION OF).

Cars and engines.
- Train wrecks.
  - 112 Collisions.
  - 212 Derailments.
  - 312 Car striking object on track without derailing.
  - 412 All other.
- Falls from or in.
  - 512 In getting on or off, in motion.
  - 612 In getting on or off, at rest.
  - 712 While riding on, due to sudden start or stop.
  - 812 While riding on, due to slipping or loss of balance.
  - 912 While riding on, contact with overhead structure.
  - 1012 While riding on, contact with side structure.
  - 1112 Falls, n. o. c.
- Struck by or caught between.
  - 1512 While coupling or uncoupling.
  - 1612 While switching.
  - 1712 While repairing cars or engines.
  - 1812 While repairing track.
  - 1912 While crossing track.
  - 2012 While standing or walking on track.
  - 2112 While braking or spragging.
  - 2212 Caught between and side structure.
  - 2312 N. o. c.
- Other causes.
  - 2512 Setting or releasing hand brakes.
  - 2612 Objects falling from (not in loading or unloading).
  - 2712 Objects shifting on load.
  - 2812 All other.

Mine and quarry cars and motors.
- Train wrecks.
  - 122 Collisions.
  - 222 Derailments.
  - 322 Car striking object on track without derailing.
- Falls from or in.
  - 522 In getting on or off, in motion.
  - 622 In getting on or off, at rest.
  - 722 While riding on, due to sudden start or stop.
  - 822 While riding on, due to slipping or loss of balance.
  - 922 While riding on, contact with overhead structure.
  - 1022 While riding on, contact with side structure.
  - 1122 Falls, n. o. c.
- Struck by or caught between.
  - 1522 While coupling or uncoupling.
  - 1622 While switching.
  - 1722 While repairing cars or engines.
  - 1822 While repairing track.
  - 1922 While crossing track.
  - 2022 While standing or walking on track.
  - 2122 While braking or spragging.
  - 2222 Caught between and side structure.
  - 2322 N. o. c.
- Other causes.
  - 2522 Setting or releasing hand brakes.
  - 2622 Objects falling from (not in loading or unloading).
  - 2722 Objects shifting on load.
  - 2822 Caught by while dumping.
  - 2922 All other (include here animal-drawn mine or quarry cars).

Plant trucks on tracks.
- 132 Collisions.
- 232 Derailments.
- 332 Falls from, due to sudden start or stop.
- 432 Falls from, riding on tail chain.
- 532 Riding on, contact with roof.
- 632 Riding on, contact with rib or side structure.
- 732 Caught between and overhead obstruction.
- 832 Struck by or caught between while coupling or switching.
- 932 Struck by, n. o. c.
- 1032 Braking.
- 1132 Spragging.
- 1232 Lifting or pushing car.
- 1332 Caught or struck by rope or chain.
- 1432 Caught by car or load in dumping.
- 1532 Getting on or off car.
- 1632 Struck by or caught between, n. o. c.
- 1732 Object falling from in transit.

Automobiles and other power vehicles.
- 142 Collisions, skidding.
- 242 Collisions, breaking of parts.
- 342 Collisions, all other.
- 442 Overturning, skidding.
- 542 Overturning, breaking of parts.
- 642 Overturning, all other.
- 742 Struck by.
- 842 Collisions with cars or engines.
- 942 Cranking.
- 1042 Engines, n. o. c.
- 1142 Breaking of car or part not resulting in collision or overturning.
- 1242 Falls from.
- 1342 Objects falling from.
- 1442 Objects shifting on load.
- 1542 Mechanical unloading.
- 1642 All other.
- 5042 Motor cycles.
  - 5142 Colliding with auto or cars.
  - 5242 Colliding with bicycles.

Automobiles and other power vehicles—Concluded.
- 5342 Colliding with fixed objects.
- 5442 Falls from.
- 5542 All other.
- 8042 Aeroplanes.

Animal-drawn vehicles (not mine or quarry cars).
- 152 Collisions with cars.
- 252 Collisions with other vehicles.
- 352 Collisions with stationary objects.
- 452 Overturning.
- 552 Whiffletrees.
- 652 Falls from.
- 752 Struck by.
- 852 Objects falling from (not in loading or unloading).
- 952 Objects shifting on load.
- 1052 Breaking of parts.
- 1152 Mechanical unloading.
- 1252 Animal-drawn implements (not machinery).
- 1352 Logs, etc., being drawn by animals (all vehicle accidents due to runaways should be charged to animals).
- 1452 All other.

Water craft.
- 162 Collisions with vessels.
- 262 Collisions with other objects.
- 362 Capsizing.
- 462 Hawsers and other ropes.
- 562 Falls from or jumping overboard.
- 662 Falls from rigging.
- 762 Falls into hatchway.
- 862 Blowing up of water craft.
- 962 All other.

(Accidents from machinery on water craft should be charged to the specific machine.)

All other vehicles.
- 172 Bicycles.
- 372 Collisions, bicycles.
- 672 All other vehicles.

III. Explosions, Electricity, Fires, and Hot Substances; Poisonous and Corrosive Substances, and Occupational Diseases.

Boilers and steam pressure apparatus.
- 113 Economizers and superheaters, explosions of.
- 213 Economizers and superheaters, all other causes.
- 313 Escaping steam and hot water.
- 413 Steam boilers, explosions of.
- 513 Steam boilers, all other causes.
- 613 Steam pipes, explosions of tubes and flues.
- 713 Steam pipes, all other causes.
- 813 Steam and hot water gauges, explosions of.
- 913 Steam and hot water gauges, all other causes.
- 1013 Other steam pressure apparatus, explosions of.

Boilers and steam pressure apparatus—Concluded.
- 1113 Other steam pressure apparatus, all other causes.

Explosions of explosive substances.
- 123 Explosives, manufacturing and storing.
- 223 Explosives, transportation and handling.
- 323 Charging shells, etc.

Explosives, blasting.
- 423 Premature shot.
- 523 Misfires or delayed shot.
- 623 Windy shot.
- 723 Tamping.
- 823 All other.

Other explosions.
Dust:
233 From other electric lights.
333 From spontaneous combustion.
Gas.
1133 From open lights or fire.
1233 From electricity.
1333 From explosives.
2033 Gasoline and other petroleum products.
3033 All other gas explosions.
4033 Ammonia apparatus.
5033 Acetylene.
6033 Other high pressure apparatus.
7033 All other explosive substances.
(Include accidents due to bursting under pressure.)

Electricity.
243 From trolley wire.
343 From third rail.
443 From transmission wire.
543 From switchboard apparatus.
643 From switches and controllers (not switchboard).
743 From motors and generators.
843 From transformers.
943 All other.

Conflagrations and flames.
(Give description of individual conflagration or catastrophe.)
Conflagrations.
253 Mine fires, asphyxiation due to.
353 Mine fires, explosions from.

Conflagrations and flames—Concluded.
Conflagrations—Concluded.
453 Burning building (including panic due to).
553 Other conflagrations.
653 Spontaneous combustion.
753 Mixture of acids or compounds.
853 Alcoholic solutions.
953 Gasoline.
1053 Oxacetylene welding and cutting.
1153 Oxacetylene gas and electric flash.
1253 Flames, clothing.
1353 Flames, n. o. c.
1453 All other.

Hot substances.
Hot liquids.
163 Hot water.
263 Asphalt, pitch, and tar.
363 Other hot liquids.
Molten metal.
463 Explosion of.
563 At furnace or cupola.
663 Pouring.
763 Transportation or carrying.
863 All other.
Hot metal (not molten).
1263 Radiant heat from.
1363 Handling of.
1463 Contact with (not handling).
1563 All other.
2063 All other hot objects.

POISONOUS AND CORROSIVE SUBSTANCES AND OCCUPATIONAL DISEASES.

Poisonous substances.
10000 From handling or contact with.
20000 From inhaling fumes.
30000 From swallowing.

Corrosive substances.
40000 From handling or contact with.
50000 From inhaling fumes.
60000 From swallowing.

Alphabetical list of poisonous and corrosive substances.
0173 Alcohol.
0273 Alcohol, wood.
0373 Ammonia.
0473 Aniline.
0573 Arsenic.
0673 Barium hydroxide.
0773 Benzine.
0873 Benzol.
0973 Brass and copper poisoning.
1073 Calcium.
1173 Carbolic acid (phenol).
1273 Carbolineum.
1373 Carbon monoxide.
1473 Carbon tetrachloride.
1573 Cement (Portland type).
1673 Chlorine.
1773 Chloropicrin.
1873 Coal oil (kerosene).
1973 Coal tar products, n. o. c.
2073 Creosote.

Alphabetical list of poisonous and corrosive substances—Continued.
2173 Cresole (including lysol).
2273 Cyanides (including HCN).
2373 Ether (sulphuric).
2473 Gasoline.
2573 Hydrochloric acid.
2673 Iodine.
2773 Ivy, oak, etc.
2873 Lead.
2973 Lye (potash and soda).
3073 Metol.
3173 Mercury.
3273 Mustard oil.
3373 Naphthol.
3473 Nitric acid.
3573 Nitrohydrochloric acid (muriatic and nitric).
3673 Oxyacetylene.
3773 Phosgene.
3873 Phosphoric acid.
3973 Phosphorous, white.
4073 Phosphorous, red.
4173 Potash.
4273 Potassium bichromate.
4373 Selenium.
4473 Soda (sal soda and caustic).
4573 Sulpho naphthol.
4673 Sulphuric acid.

Alphabetical list of poisonous and corrosive substances—Concluded.
4773 Toluol.
4873 T. N. T. (trinitrotoluol).
4973 Turpentine.
5073 Zinc.
Occupational diseases.
Noninfectious.
0183 Caisson.
0283 Neuritis.
0383 Pneumoconiosis.

Occupational diseases—Concluded.
Noninfectious—Concluded.
0483 All other, n. o. c.
Infectious.
3083 Anthrax.
3183 Foot and mouth.
3283 Glanders.
3383 Malaria.
3483 Pneumonia.
3583 All other, n. o. c.

IV. Falls of Persons.

From elevations.
114 Benches, boxes, chairs, and tables.
214 Bridges, dams, and docks (not in construction or demolition).
314 Cranes, derricks, elevators, and hoists in erecting and rigging.
414 Elevated bins, pockets, and tanks (include here falls from, but not into).
514 Boilers, engines, and machines (include platforms or walkways on, but not stairways leading thereto).
614 Piles.
714 Poles and trees, and piling.
814 Runways, balconies, and platforms (not loading platforms).
914 Loading platforms.
1014 Gangplanks.
1114 Tramways and trestles.
Buildings.
2014 Buildings, in construction or demolition, n. o. c.
2114 Floors, temporary.
2214 Roofs.
2314 Stairs and steps.
2414 Windows and wall openings.
2514 All other.
Ladders.
3014 Breaking of ladder or parts.
3114 Slipping, twisting, or fall of.
3214 Knocked off ladder.
3314 All other.

From elevations—Concluded.
Scaffolds and staging.
3414 Breaking, slipping, or collapsing.
3514 Breaking of tackle or support.
3614 Tilting of scaffold.
3714 Tilting or falling of loose plank and scaffold.
3814 All other.
9914 All other elevations.
Into excavations, pits, and shafts.
124 Bins and vats containing hot or corrosive substances.
224 Bins and vats, all other.
324 Floor openings (not elevator shafts).
424 Manholes.
524 Excavations, n. o. c.
On level.
134 Slipping.
234 Stumbling over fixed objects.
334 Stumbling over loose objects (include here stepping on rolling objects).
434 Stepping on or off elevations.
Other falls.
534 Slipping of objects handled.
634 Slipping of tool or instrument.
734 Other falls, n. o. c. (include strains due to near falls from slipping or stumbling in this group).

V. Stepping on or Striking Against Objects

Stepping on objects.
115 Nails.
215 All other sharp objects (stepping on rolling objects should be charged to stumbling).
Striking against objects.
125 Nails, screws, etc.

Striking against objects—Continued.
225 Splinters or sharp projections.
325 Other fixed objects.
425 Fellow employee.
525 Struck by swinging object.
625 Struck by flying object.
1025 All other objects.

VI. Falling Objects—Not being handled by injured.

Collapse of.
116 Buildings and walls.
216 Piles (stacked, stored, or piled-up material).
316 Scaffolds and staging.
416 Chutes, conveyors, and slides.
516 Derricks.
1016 All other.

From elevations.
126 Buildings not in course of construction or demolition.
226 Buildings in course of construction or demolition.
326 Bins and pockets.
426 Tramways and trestles.

From elevations—Concluded.
526 Runways, balconies, and platforms.
626 Racks and shelves.
726 Floor openings (not elevator shafts).
826 Chutes, conveyors, slides, and screens.
926 Machines and work benches.
1026 Piles (stacked, stored, or piled-up material).
1126 Dumps, at mines.
1226 Scaffolds and staging.
1326 Temporary floors.
2026 Other elevations.
Trees.
136 Trees in felling, n. o. c. (including dead limbs and tops).
236 Trees lodged in felling (including trees and limbs struck by felled trees).
336 Trees, kickbacks of, in felling.
436 Spring poles, flybacks of.
536 Limbs, not in felling trees.
636 Trees, not in felling.
146 Objects tipping over (except vehicles and objects which tip over while being handled).
Into excavations.
156 Ditches and trenches.
256 Other excavations (not tunnels, mines, or quarries).
Cave-ins (not mines or quarries).
166 Ditches and trenches.
266 Tunnels..
366 Other.

In tunnels—objects falling into. In mines and quarries, inside (including all accidents from falling objects in mines and quarries).
176 Coal, rock, and ore at the working face, not roof (including rolls of coal or rock, but excluding accidents in stopes and in pillar robbing).
276 Coal, rock, and ore from pillars or ribs not roof (including rolls of coal or rock).
376 Coal, rock, and ore from or in underground chutes, manways, and batteries (including rushes of coal, rock, or gob in same).
476. Roof in working places (not stopes).
576. Roof in entries.
676. Ore or rock in stopes (metal mines).
776. Timbers, not in handling.
876. From surface into shaft or pit.
976. From cage into shaft.
1076 From or in underground bins.
1176 Cave-in of mine.
1276 All other.
Other falling or shifting objects.
186 Poles.
286 Miscellaneous shifting objects (due to wind).
386 All other.

VII. Handling of Objects.

Heavy objects.
117 Objects dropped (including tipping over of object handled).
217 Objects thrown.
317 Objects falling from load (while loading or unloading).
417 Objects falling from pile (while piling or unpiling).
517 Caught between object handled and other objects.
617. Strain in handling (including only strains, hernias, etc., caused by excessive weight of object handled).
717 Handling, n. o. c.
817 Caught by roller.
917 Caught by dolly.
Sharp or rough objects (include only injuries due to sharpness or roughness of object handled).
127 Glass.
227 Protruding nails in objects handled.
327 Protruding wires.

Sharp or rough objects—Concluded.
427 Sheet metal and sheet-metal objects.
527 Slivers, wood. .
Metal:
627 Slivers.
727 Castings.
827 Pig iron.
927 Sheet-metal objects.
1027 All other metal.
1127 Bones.
1227 All other.
Hand trucks, carts, and wheelbarrows.
137 Struck by truck, handled by injured person.
237 Struck by truck, handled by coworker.
337. Caught between truck and other object.
437 Object falling from (not loading or unloading).
537 Overturning.
637 Running over hands or feet.
937 All other (including collisions).

VIII. Hand Tools.

In hands of injured worker.
- 118 Glancing or slipping of tool in use.
- 218 Breaking or coming apart of tool.
- Flying objects set in motion by tool:
  - 318 Nails and spikes.
  - 418 Metal chips.
  - 518 Stone.
  - 618 Other objects set in motion by.

Handling.
- 718 Bruise or aggravation from use of.
- 918 All other.

In hands of fellow-worker.
- 128 Glancing or slipping of tool.
- 228 Breaking or coming apart of tool.

In hands of fellow-worker—Concluded.
- Flying objects set in motion by tool.
  - 328 Nails and spikes.
  - 428 Metal chips.
  - 528 Stone.
  - 628 All other objects set in motion by.
  - 728 Struck by.
  - 928 All other (things in hands of fellow worker).

(Causes given show manner of occurrence. Principal tools found as causes of accidents may be listed.)

IX. Animals.

Draft animals.
- 119 Kicks and stepped on.
- 219 Bites.
- 319 Runaways (including all vehicle accidents due to runaways).
- 419 Fall from.
- 519 All other.

Other animals, etc. (Specify any animal which may be especially important.)
- 129 Dogs.
- 229 Insects.
- 329 Snakes.
- 429 Other animals.

X. Miscellaneous.

Elements.
- 110 Heat prostration and sunstroke.
- 210 Cold, including frostbites.
- 310 Other exposure (weather, etc.).
- 410 Lightning.
- 510 All other.

Violence.
- 120 Violence of coemployee.
- 220 Resulting from strikes or other labor trouble.
- 320 In protecting property (watchman, caretakers, etc.).
- 420 Maintaining order, etc.
- 520 All other violence.
- 130 Flying particles n. o. c. (relative only to nonassigned flying particles).

Violence—Concluded.
- 230 Doors, windows, covers, and gates, exclusive of elevators.
- 330 Drenching (not drowning).
- 430 Falling in the water.
- 530 Wrestling, sparring, and horseplay (includes all accidents directly attributable to horseplay, giving description of horse-play accidents).
- 630 Compressed air (not explosions).
- 730 Discharge of weapons.
- 140 Strains due to position assumed.
- 240 Swallowing objects (pins, tacks, nails, etc.).
- 990 All other.

APPENDIX III.—COMPENSATION FOR OCCUPATIONAL DISEASES.

The committee has not yet taken up the question of the classification of occupational diseases, due principally to the lack of adequate information on this subject. Of the 46 workmen's compensation jurisdictions in the United States only 7 (California, Connecticut, Hawaii, Massachusetts, North Dakota, Wisconsin, and the Federal Government) make provision for the compensation of occupational diseases and the problem is therefore not an immediate one in most of the States. In Massachusetts, North Dakota, and the United States this inclusion has been effected through the commissions and courts, whereas in the other States it has been brought about by statutory enactment. In all the other States, as already noted, occupational diseases are excluded, in theory at least, from the operation of the compensation acts. This exclusion has been brought about (1) by limiting the scope of the law to injuries by "accident," (2) by adverse rulings of the courts and commissions, and (3) by express provisions in the compensation acts themselves. Compensation acts of the Canadian Provinces, with the exception of Quebec and Yukon, make provision for compensation for occupational diseases, as does the workmen's compensation act of Great Britain.

The various classes of occupational diseases for which compensation is awarded by the British Workmen's Compensation Act of 1906, as amended up to 1918, are shown in the following schedules:

COMPENSABLE OCCUPATIONAL DISEASES UNDER WORKMEN'S COMPENSATION ACT OF GREAT BRITAIN.

Original act of 1906.

Description of disease.	Description of process.
1. Anthrax	Handling of wool, hair, bristles, hides, and skins.
2. Lead poisoning or its sequelæ	Any process involving the use of lead or its preparations or compounds.
3. Mercury poisoning or its sequelæ	Any process involving the use of mercury or its preparations or compounds.
4. Phosphorus poisoning or its sequelæ	Any process involving the use of phosphorus or its preparations or compounds.
5. Arsenic poison or its sequelæ	Any process involving the use of arsenic or its preparations or compounds.
6. Ankylostomiasis	Mining.

Subsequent additions, in effect as of Feb. 28, 1918, by order of Secretary of State.

1. Arsenic poisoning or its sequelæ	Handling of arsenic or its preparations or compounds.
2. Lead poisoning or its sequelæ	Handling of lead or its preparations or compounds.
3. (*a*) Poisoning by benzine and its homologues, or the sequelæ.	Handling benzine or any of its homologues, or any process in the manufacture or involving the use thereof.
(*b*) Poisoning by nitro and amido derivatives of benzine and its homologues (trinitrotoluene, anilin, and others), or the sequelæ.	Handling any nitro or amido derivative of benzine or any of its homologues, or any process in the manufacture or involving the use thereof.
4. Poisoning by dinitrophenol or its sequelæ	Handling dinitrophenol, or any process in the manufacture or involving the use thereof.
5. Poisoning by nitrous fumes or its sequelæ	Any process in which nitrous fumes are evolved.
6. Dope poisoning; that is, poisoning by any substance used as, or in conjunction with, a solvent for acetate of cellulose, or its sequelæ.	Any process in the manufacture of aircraft.
7. Poisoning by tetrachlorethane or its sequelæ	Any process in the manufacture or involving the use of tetrachlorethane.
8. Poisoning by carbon bisulphide or its sequelæ	Any process involving the use of carbon bisulphide or its preparations or compounds.
9. Poisoning by nickel carbonyl or its sequelæ	Any process in which nickel carbonyl gas is evolved.
10. Poisoning by African boxwood (*Gonioma Kamassi*) or its sequelæ.	Any process in the manufacture of articles from African boxwood (*Gonioma Kamassi*).

COMPENSABLE OCCUPATIONAL DISEASES UNDER WORKMEN'S COMPENSATION ACT OF GREAT BRITAIN—Concluded.

Subsequent additions, in effect as of Feb. 28, 1918, by order of Secretary of State—Concluded.

Description of disease.	Description of process.
11. (*a*) Dermatitis produced by dust or liquids.	
(*b*) Ulceration of the skin produced by dust or liquids.	
(*c*) Ulceration of the mucous membrane of the nose or mouth produced by dust.	
12. (*a*) Epitheliomatous cancer or ulceration of the skin due to tar, pitch, bitumen, mineral oil, or paraffin, or any compound, product, or residue of any of these substances.	Handling or use of tar, pitch, bitumen, mineral oil, or paraffin, or any compound, product, or residue of any of these substances.
(*b*) Ulceration of the corneal surface of the eye, due to tar, pitch, bitumen, mineral oil, or paraffin, or any compound, product, or residue of these substances.	Do.
13. Chrome ulceration or its sequelæ	Any process involving the use of chromic acid or bichromate of ammonium, potassium, or sodium, or their preparations.
14. Scrotal epithelioma (chimney sweep's cancer)	Chimney sweeping.
15. Compressed-air illness or its sequelæ	Any process carried on in compressed air.
16. Cataract in glassworkers	Processes in the manufacture of glass involving exposure to the glare of molten glass.
17. The disease known as miner's nystagmus, whether occurring in miners or others, and whether the symptom of oscillation of the eyeballs be present or not.	Mining.
18. Subcutaneous cellulitis of the hand (beat hand)	Do.
19. Subcutaneous cellulitis over the patella (miner's beat knee).	Do.
20. Acute bursitis over the elbow (miner's beat elbow).	Do.
21. Inflammation of the synovial lining of the wrist joint and tendon sheaths.	Do.
22. Glanders	Care of any equine animal suffering from glanders; handling the carcass of such animal.
23. Telegraphist's cramp	Use of telegraphic instruments.
24 Writer's cramp	

In their treatment of occupational diseases the Candian Provinces have followed in the footsteps of Great Britain. Nova Scotia, Manitoba, and British Columbia adopted verbatim the occupational disease schedule in the British act of 1906. Ontario and Alberta copied the British law, but did not adopt the schedule. Instead, the New Brunswick act confers discretionary power upon the workmen's compensation board to declare what occupational diseases and processes shall be covered by the compensation law. Quebec and Saskatchewan are the only Provinces of the Dominion which have thus far failed to provide compensation for industrial diseases.[1]

[1] For information concerning compensation for occupational diseases in other foreign countries see Monthly Labor Review of the U. S. Bureau of Labor Statistics, April, 1919, p. 209.

APPENDIX IV.—OCCUPATIONAL DISEASE CODE.[1]

Poisonous substances.

Code No.	Poison or disease.	Remarks.
01	Ammonia	A highly irritant and penetrating gas. Poisoning by inhalation. Industries: Gas and chemical works, manufacture of sal ammoniac, refrigerating plants, varnish and dye works, calico printing, bleaching, tanning.
02	Amyl alcohol	A colorless, oily fluid used in preparation of fruit essences, aniline dyes, and in rectification of spirits. Poisoning by inhalation of vapor.
03	Aniline	A colorless oil. Poisoning by absorption through skin by direct contact or saturation of clothing, and by inhalation as vapor and dust. Industries: Manufacturing of aniline and derivatives, also of aniline dyes.
04	Aniline dyes	Dyestuffs acting on the skin and respiratory organs in the form of dust.
05	Antimony (compuonds)	Industries: Preparation of type and white metal, Britannia metal, fireworks, paints, aniline dyes, etc. Enters the body in the form of vapor or dust.
06	Arsenic	Occurs in following industries: Mining, foundries, chemical works, aniline and other dyes, wall paper, oilcloth, tanning, etc. Enters the body as vapor or dust.
07	Arseniuretted hydrogen	A gas developed in the production of hydrogen in the arts and in the manufacture of hydrochloric and sulphuric acids. Enters the body in the form of gas through the organs of respiration.
08	Benzine	A fluid. Enters the body in the form of vapor through organs of respiration. Industries: Benzine distillation, cleansing plants, lacquer, varnish, and India rubber industries, manufacturing of waterproof material, etc.
09	Benzol	Vapor of this fluid enters the body through organs of respiration. Used in the industries which use benzine.
10	Brass (brass chills)	Also called "brass founders' ague." An illness attended by shivering. Caused by dust and fumes produced in the casting, filing, cutting, and polishing of brass which is an alloy of zinc and copper.
11	Bronze	Occurs in bronzing work with bronze powder or liquor.
12	Carbon dioxide (carbonic acid gas).	A colorless, odorless gas generated in mines, sewers, and wells, in manufacture of carbonic acid, mineral waters, compressed yeast; in breweries, etc. Large quantities occasion sudden death by suffocation.
13	Carbon disulphide	In form of vapor it enters the body through respiratory organs; as a fluid, through the skin. It causes heavy damage to red blood corpuscles and to the central nervous system. Used in the extraction and dissolving of fats and oils, in vulcanizing rubber, in imitation silk factories, etc.
14	Carbon monoxide	An odorless, tasteless gas evolved from blast furnaces, in manufacture of illumination gas, in explosions, in coal mines, in cement and brick works, and in tunneling.
15	Chloride of lime	A white granular powder. Poisoning by inhalation as vapor or dust; also acts directly on the skin. Used in bleaching establishments, for disinfection, in manufacture of chloroform, oxygen, dyes, and in calico printing.
16	Chlorine	A suffocating gas of penetrating odor. Poisoning by inhalation and occurs in bleacheries, paper mills, laundries, tinning works, etc.
17	Chromium (or its compounds).	Manufacture of chrome steel, hectographs, matches: mineral tanning, photography, etc. Enters the body in the form of dust or by absorption through the skin.
18	Ferrosilicon	This substance, a mixture of iron and silica, when brought in contact with water, evolves phosphurated and arseniuretted gases, both of which are powerful poisons. Wholesale poisoning is liable to occur upon steamers carrying ferrosilicon in their holds. Dock laborers employed in unloading ferrosilicon are also subject to this danger.
19	Formaldehyde	A liquid used in coal-tar color industry and for disinfecting and preserving. Inhalation in the form of vapor produces intense irritation of the skin and mucous membranes.
20	Gassing (not otherwise specified).	Poisoning by carbon monoxide gas, illuminating gas, marsh gas, etc.
21	Hydrochloric acid	A colorless gas. Poisoning occurs in potteries, enameling works, glass factories, in chemical, india rubber, and shoddy industry; manufacture of fertilizer, cotton print works, etc.

[1] Formulated by the National Workmen's Compensation Service Bureau.

Poisonous substances—Concluded.

Code No.	Poison or disease.	Remarks.
22	Hydrofluoric acid	A colorless gas of pungent odor. In the form of gas enters the body through respiratory organs. In fluid state acts on the skin and mucous membranes. Poisonings occur in practically the same industries that are enumerated under hydrochloric acid.
23	Lead	Known as plumbism, lead colic, painters' and miners' colic. Causes paralysis (wrist drop), insanity, death, and disturbances in the sexual sphere in women (abortion, premature birth, etc.). Occurs in any process involving the use of lead or its preparations and compounds. According to some authorities lead is used and poisoning occurs in 150 trades.
	Lead colic	See 23—Lead.
24	Manganese (manganese dioxide).	Caused by inhalation of the dust. Symptoms: Paraesthesia, tremors, derangement of articulation, mental depression, paralysis.
25	Mercury (quicksilver)	Known also as mercurial tremors. Absorbed in form of vapor or dust. Occurs in mercury and gold mining, smelting, gilding and silvering, mirror making, photography, steel engraving, manufacture of felt hats, etc.
	Mercurial tremors	See 25—Mercury.
	Methyl alcohol	See 34—Wood alcohol.
	Miners' colic	See 23—Lead.
26	Nitrobenzol (and its derivatives and compounds).	A colorless fluid. Absorption takes place through the skin and organs of respiration and digestion. Poisoning occurs in coal-tar color industry, in explosive works, perfumery and soap factories, pharmaceutical laboratories, etc.
27	Nitrous gases	Poisoning by inhalation in gaseous form occurs in chemical and celluloid works, in preparation of nitric, sulphuric, and picric acids, aniline, nitroglycerin, etching of metals, hat making, stamp mills, mints, etc.
28	Nitroglycerin	An oily colorless fluid. Poisoning by inhalation of the vapor and by absorption through the skin. Occurs in the manufacture of explosives and in the use of dynamite.
	Painters' colic	See 23—Lead.
29	Petroleum	Poisoning by inhalation of its vapor occurs in production of the oil and in refining of the crude oil. Causes acute poisoning with a condition of inebriation accompanied by shouting, reeling, and prolonged sleep. Symptoms in general resemble those resulting from benzine poisoning.
30	Phosphorus	Also known as "phossy jaw" and "phosphorus necrosis." Poisoning by inhalation of the vapor and by means of food contaminated by dirty fingers.
31	Phosphuretted hydrogen	A colorless gas of nauseating odor. Poisoning by inhalation in the extraction of phosphorus; in the preparation of phosphorous compounds, in the reduction of iron silicate containing phosphorus; by the action of moisture and in production of acetylene.
	Plumbism	See 23—Lead.
32	Sulphuretted hydrogen	A colorless gas, having the fetid odor of rotten eggs. Poisoning by inhalation of the gas. Occurs in tanneries, sewers, illuminating gas plants, blast furnaces; in the manufacture of matches and of sulphur and phosphorous compounds; in Leblanc soda and chemical factories, etc.
33	Sulphuric acid	A colorless and odorless fluid. Poisoning by inhalation of the vapor. Occurs in manufacture of sulphuric acid; in textile industry, hat factories, petroleum distillation, and in manufacture of powdered fertilizers.
34	Wood alcohol	A colorless fluid of faint odor, produced by dry distillation of wood. Used in preparation of varnish, lacquer polish, and perfumes, for denaturing of spirits; also used, in combination with shellac, in cabinet making and furniture polishing; as a solvent for aniline dyes; for adulterating whisky and in hair tonics. Poisoning by inhalation of the vapor and by absorption through the skin and digestive organs. The effect is persistent and very serious. Absorption of a small quantity frequently causes blindness, deafness, delirium, affection of respiratory organs, and even death by paralysis of the heart.
35	Wood (African boxwood and others.)	Workers in the following woods are subject to poisoning and other affections: African boxwood, California sequoia, Japanese "tagayasa," satinwood, teakwood, redwood, cokus wood, cocoa-bola, ebony, etc. This is due to alkaloids and other toxic substances contained in these woods.

Pulmonary diseases caused by dust and fibers.

Code No.	Poison or disease.	Remarks.
51	Anthracosis	Or coal miners' phthisis. Due to inhalation of coal dust.
52	Byssinosis	A lung disease caused by inhalation of cotton particles.
	Chalicosis	See 56—Silicosis.
	Coal miners' phthisis	See 51—Anthracosis.
	Knife grinders' phthisis	See 55—Siderosis.
53	Pneumokoniosis (not otherwise specified).	Under this term are included all lung diseases caused by dust. Such diseases are attended by an increase of the fibrous tissue of the organs—harden ng or fibrosis of the lungs.
54	Potters' rot or potters' asthma.	A form of lung disease common among workers engaged in manufacture of pottery. Due to inhalation of clay dust.
55	Siderosis	Met with in persons who work in operations producing iron or steel dust, such as cutlery grinders, tool sharpeners; workers in red oxide of iron, such as looking-glass makers, gold beaters, glass polishers, etc.
56	Silicosis	A pulmonary dust disease caused by inhalation of stone or other nonmetallic mineral dust. The men who are liable to this disease are grinders, brickmakers, etc.
	Stone-cutter's rot	See 56—Silicosis.

Diseases caused by parasites and microorganisms.

61	Ankylostomiasis	Also known as miners' hookworm and miners' anemia. Occurs in mines, tunnels, among brick workers, etc. Caused by the intestinal parasite, ankylostoma duodenale. Spread by means of human feces. Provision of portable sanitary appliances and disinfecting stools with sulphuric acid will prevent contamination of mines by this parasite.
62	Anthrax	An infectious disease transmitted by a microorganism, the bacillus anthracis. Acquired in the handling of wool, hair, bristles, hides, and skins. There are three forms of this disease—cutaneous, pulmonary, and intestinal. Also known as "wool-sorters' disease."
63	Farcy	An infectious disease transmitted by the same germ (bacillus mallei) which causes glanders. It is termed "farcy" when the disease affects only the skin.
64	Foot-and-mouth disease	This disease, which attacks cattle, pigs, and sheep, is occasionally transmitted to man through infected meat, as well as by handling cattle. Butchers, cowboys, drivers, stablemen, horse dealers, and milkmen are liable to become infected.
65	Glanders	An infectious disease acquired in the care of horses suffering from glanders or in the handling of carcass of such animals. Caused by the bacillus mallei.
66	Lockjaw	See 66—Tetanus.
66	Tetanus	(Lockjaw.) Limited to infection by tetanus bacillus through material handled in occupation. Cases of tetanus resulting from infected wounds excluded, as these must be considered injuries arising out of accidents.
67	Tuberculosis	Considered either as (1) directly attributable to the occupation, or (2) as the terminal disease of various industrial affections. Cases resulting from traumatism, e. g., contusions, bruises, fractures, etc., to be excluded.
68	Pneumonia	Limited to cases resulting from exposure. Traumatic pneumonia excluded.
69	Sugar boils	An affection confined to the sugar industry. Also known as "lymphangitis of sugar makers."

Due to fatigue, strains, excessive light and heat, friction, etc.

71	Amblyopia	Temporary loss of vision. Occurs in tobacco workers, dye workers, etc.
72	Asthenopia	An affection of the eyes (retinal fatigue) caused by constant contraction of pupils in the effort to exclude light. Occurs in trades such as gilders, metal polishers, glassworkers, etc., compelling a close attention to polished surfaces.
73	Electric ophthalmia	An affection of the eyes due to intense light and heat evolved in electric welding.
74	Glassworkers' cataract	Glassworkers exposed to the intense glare of molten glass are subject to this malady.
75	Miners' nystagmus	An affection of the eyes due to their peculiar way of looking at their work. Causes oscillation and unsteadiness of the eyeballs. Occurs in mining and occasionally in other occupations.
76	Myopia	Impairment of vision due to close attention to fine work, as in the case of lithographers, engravers, etc.

Cramps and other nerve affections.

Code No.	Poison or disease.	Remarks.
81	Occupation neurosis (not otherwise specified).	Under this general term are included diseases arising from fatigue, physical strain, high nerve tension, and sustained volitionary muscular movements. It affects cigar makers, seamstresses, typesetters, writers, typists, telegraphers, pneumatic-tool users (from vibration), etc. The nerves and muscles of the hand and arm are involved in 90 per cent of the cases of neurosis.
82	Telegraphers' cramp	Or telegraphists' spasm.
83	Writers' cramp	Also writers' palsy and scriveners' spasm.
87	Boiler makers' deafness	Due to excessive vibration of the tympanic membrane and bones and fluid in the ear.

Inflammation of joints and tendons.

88	Bursitis	Known in England as "beat elbow." A chronic inflammation of the bursa (a sack containing the lubricating fluid of the joint) over the elbow, due to prolonged pressure.
89	Cellulitis of the hand	Known in England as "beat hand." Subcutaneous inflammation, due to friction, usually on the palmar surface.
90	Bursitis over patella	Known in England as "beat knee."
91	Synovitis	Inflammation of the synovial lining of the wrist joint and tendon sheaths.
92	Dupuytren's contraction	Contraction of the palmar tendon sheaths due to prolonged pressure on tools and other hard objects.

Due to compressed air.

97	Compressed-air disease	Also called "caisson disease" and the "bends." Occurs after too hasty emergence from air pressure. Under high pressure the atmospheric air is dissolved in the blood and tissues; during decompression there is a rapid disengagement of the gas in the form of bubbles, which block the blood vessels and tear the tissues.
98	Divers' paralysis	Due to too rapid ascent after diving. Cause and symptoms practically the same as in caisson disease.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
15 CENTS PER COPY