

Some Problems of Statistics of Accidents as Illustrated by the British Statistics

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In no country perhaps are the statistics of accidents so plentiful and varied as in Great Britain. Some twenty independent statistical reports are available at regular intervals on different aspects of the question. These reports are intended to serve different administrative purposes and are the outcome of numerous legislative enactments and administrative orders. Their diversity, in itself, illustrates the diffeent objects which statistics of accidents have to serve and the difficulties of compiling them according to uniform methods. In the following article the author shows how such questions as the notion of accident, the definition of a fatal accident, the degree of completeness of the statistics, the analysis by causes, and the measurement of risk, each raise separate problems which have hitherto not been fully discussed or adequately realised in any of the numerous proposals for international standardisation of such statistics.

THE methods of compiling statistics of industrial accidents on a uniform basis with a view to international comparisons have often been discussed. Before the war the matter had been discussed by a joint committee of the International Accident and Social Insurance Congress ad the International Statistical Institute, which proposed a series of resolutions¹; in 1920 the International Association of Industrial Accident Boards and Commissions (confined to countries of the American Continent) published a scheme for the standardisation of industrial accident statistics²; and in 1923 the International Conference of Labour Statisticians passed a series of resolutions on the subject³. Unfortunately these

¹ Cf. Bulletin de l'Institut international de Statistique, Vol. XV, Part 2. London-1906.

² Cf. UNITED STATES. BUREAU OF LABOUR STATISTICS: The Standardisation of Industrial Accident Statistics. Bulletin No. 276. Washington, 1920.

³ Cf. INTERNATIONAL LABOUR OFFICE : Report of the First International Conference of Labour Statisticians. Studies and Reports, Series N, No. 4. Geneva, 1924.

three proposals have led to little progress in the standardisation of accident statistics. The inherent difficulty of this subject is partly due to the fact that statistics are generally limited by the legislative enactments in the field of accident potification, prevention, and compensation. Laws are drafted independently of statistical considerations, and all proposals for standardisation are considerably limited on this account.¹ Some of the difficulties of comparison and definition are well illustrated by the British statistics, which are of great variety and complexity.² This is due to historical circumstances, to the gradual development of legislation dealing with different categories of accidents, and also to the necessity of treating accidents from various points of view and for different administrative purposes. Their complexity illustrates the different conceptions which are possible, and throws light on the great difficulties of any international comparison in this field. While the sphere of the International Labour Office is primarily confined to the group of accidents known usually as "industrial accidents", i.e. accidents arising out of the contractual relationship of employer and employee, it is not possible adequately to discuss industrial accidents in all their aspects without also covering non-industrial accidents. Measures of prevention and safety are frequently necessary to protect at the same time not only the worker but other persons, and many considerations which apply to industrial accidents (e.g. classifications by causes, by age and sex, and the calculation of the risk) also apply to non-industrial accidents. This is particularly the case as regards accidents due to vehicles (e.g. railway accidents, street accidents, shipping accidents), where the safety of the public is as important as that of the workers employed and where it is often indifferent to the inspecting and controlling authority whether the accidents which occur are "industrial" or "non-industrial". Special reference is however made in the following pages to "industrial accidents", though it will often be necessary to speak of accidents in general, as these throw light in particular on the notion of accident, and on the question of the cause of the accident.

¹ Cf. INTERNATIONAL LABOUR OFFICE: Methods of Statistics of Industrial Accidents (Studies and Reports, Series N, No. 3; Geneva, 1923) for illustrations of these difficulties.

² A complete list of British statistical reports is given as an appendix to this article.

THE FOUR CLASSES OF ACCIDENT STATISTICS IN GREAT BRITAIN

It must be emphasised at the outset that in Great Britain the statistics of the notification and reporting of accidents are, unlike the system existing in certain other countries, guite distinct from those of their compensation. The power of calling for the notification of accidents is vested in many different Government Departments, whereas compensation is usually undertaken by insurance companies, accident insurance being voluntary. The insurance companies, and the employers who have not insured themselves against the risk, are however required by law to render annual returns. These returns will be called the statistics of compensated cases, as distinct from the former group, which will be called the statistics of reported cases. These statistics, it should be emphasised, are completely distinct and independent of each other, and this fact in itself throws light on certain difficulties of compiling statistics for purposes of international comparison. Their scope and nature are briefly indicated in the following paragraphs.

Statistics of Reported Cases

The statistics of reported cases¹ comprise all those which are required to be notified to a Government Department at the time of their occurrence. The legislation which gives rise to these statistics is very extensive, its object being to throw light on the dangers to workmen in the course of their employment, and on certain dangers to the community. Though it cannot be said that every accident arising out of employment is reportable, the field is almost entirely Separate statistics are issued of accidents in mines covered.² and quarries, reportable to the Mines Department³; accidents in factories and workshops and other places, reportable to the Home Office⁴; accidents on railways, reportable to the Ministry of Transport⁵; accidents at sea, reportable to the Board of Trade⁶; accidents due to air transport, reportable to the Air Ministry⁷;

- 4 (3), (4).
- * (5), (6).

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 $^{^{1}}$ (1)-(14). The numbers in parentheses in the footnotes refer to the list of sources at the end of the article.

⁸ It is interesting to note that the Ministry of Labour, which compiles most of the labour statistics of Great Britain, has no authority in this important branch of labour statistics.

^{3 (1), (2).}

accidents to non-civilians, reportable to the Naval and Military authorities¹; and other small miscellaneous (groups.² The only important class of accidents not covered by legislation is that of road-vehicle accidents. Though no legislation exists concerning the reporting of these accidents, all such accidents which come to the notice of the police are notified to the Home Office and annual statistics are published.³ The statistics of reported cases cover nonfatal as well as fatal cases in every group except shipping. The definition of a "non-fatal case" is not always the same in the different groups, and the standard of reportability varies considerably, as will be shown later. In the case of railways, shipping, and vehicles, the statistics are not limited to "industrial accidents"; all accidents involving life, industrial or non-industrial, are reportable. The former, however, are distinguished from the latter in the first two groups; for road-vehicle accidents no such distinction is made. Where exposure to risk is known, these statistics enable the frequency rate of accident to the worker in certain categories of employment to be computed, and a detailed analysis by causes provides the necessary information for preventive measures.

Statistics of Compensated Cases

Under the Workmen's Compensation Acts, the great majority of industrial accidents give rise to a claim for compensation, and statistics of the number of cases in which compensation was paid are published annually by the Home Office.⁴ The statistics of compensated cases relate solely to "industrial" accidents "arising of and in course of employment", and are completely independant of the statistics of reported industrial accidents. They are furnished by the insurance companies, or by the employer in cases where the risk has not been insured, insurance against accident being voluntary in Great Britain. The statistics cover only seven groups of industries, namely, shipping, factories, mines, quarries, constructional work other than buildings, railways, and docks; they cover both fatal and non-fatal cases. No information is given as to the age and sex of the fatal and nonfatal cases. The "average number employed " in each of the seven groups is also given, which enables an approximate indication of the relative frequency to be calculated. In a few cases workmen

^a (14).

¹ (9), (10), (11). ² (12), (13).

have been allowed to "contract out" of the Act under special schemes; statistics of payments for accidents under these schemes are published by the Chief Registrar of Friendly Societies.¹

Before discussing certain questions of statistical method it is necessary to refer to the other two classes of accident statistics. These are not limited to industrial or reportable accidents, but cover accidents of all kinds, and may be described briefly as the statistics of investigated cases, and the statistics of registered cases. Their scope and object is indicated in the following paragraphs.

Statistics of Investigated Cases

Every case of a violent death in England and Wales (the system does not apply to Scotland²) is the occasion of a coroner's inquest, which is held to decide whether the death is due to "criminal causes" (suicide, homicide, etc.), "natural causes", "accident or misadventure", etc. Where the coroner (or his jury) is unable to decide whether the death comes under any of these headings, it is classified as "open verdict". Statistics are published annually by the Home Office showing the number of verdicts returned under each of these headings.³ These statistics relate to fatal cases only and are of no interest for a study of accident statistics, for though coroners are instructed to state the nature of injury and means of violence, no statistics are published under these headings, and the numbers classified as " accident or misadventure " are given as one aggregate total. They are only mentioned here as they form an interesting comparison with the next group, namely:

Statistics of Registered Cases

These statistics are published in virtue of the legislation on civil registration, by which every death is required to be registered and the causes stated. Annual statistics are published showing the classification of such deaths by causes. In this case some difficulty arises from the fact that separate and independent statistics are published for England and Wales⁴ and for Scotland⁵, but

¹ (16).

² In Scotland, investigation is made into certain violent deaths only, and the statistics as published therefore cover only a proportion of the cases. Cf. (18).

³ (17).

^{4 (19).}

⁵ (20).

though certain differences of practice exist in the two divisions the general principles are the same. The cases of death are tabulated according to the "International List of Causes of Death "¹, and the figures enable mortality rates to be calculated by age and sex for a detailed list of causes. Some of the titles of this list relate to industrial accidents (e.g. accidents in coal mining, in other mining, and in quarries), and some cover similar groups of accidents to those covered by the reported cases (e.g. accidents on railways, accidents due to vehicles).

It will thus be seen that of these four classes of accident statistics, two relate to certain classes of accidents and cover fatal and non-fatal cases; two relate to all accidents and cover fatal cases only. Each class fulfils a different object. The statistics of *reported cases* enable safety inspectors to investigate the causes and to take measures for the prevention of accidents; the statistics of *compensated cases* furnish information necessary for insurance against the risk of accident and as to the cost of compensation; the statistics of *investigated cases* are judicial statistics and show to what extent violent deaths are accidental, criminal, or otherwise; and the statistics of *registered deaths* throw light on the general mortality of the population as a whole from accident and from different kinds of accident as compared with other causes of death².

¹ This is discussed farther on in the article.

² Terminology of Accident Statistics. It is necessary here to refer to a difficulty of terminology which has already been reformed to in a general way by the present author in a previous article in this Review ("The Measurement of Risk in connection with Labour Statistics ", by J. W. NIXON, in International Labour Review, Vol. XVII, No. 5, May 1928, pp. 633-650), as British statistics give an illuminating example of the problem. Is the phrase "number of accidents" to be understood as meaning the "number of (reportable) events " or the "number of persons affected "? In other words, if an event (e.g. an explosion) injures ten people, is it counted as one accident or ten accidents ? In British mining statistics the events are termed "number of separate accidents", and the persons involved "numbers killed and injured "; in factory statistics the events are not reportable except in certain special cases, and the persons involved are described as "number of accidents "; on railways the events are known as " accidents " and the persons involved as "casualties", while in shipping the events are known as "casualties" (to vessels) and the persons involved as " deaths (from casualties to vessels and other accidents)"; in street accidents, the terms are "number of accidents" and " number of persons killed and injured " respectively. There is thus no uniformity, and though no difficulty usually arises in the interpretation of the statistics, it might be desirable to adopt some standard terms. The resolutions adopted by the various international bodies usually speak of "number of accidents", without definitely indicating what is the unit to be counted. It is evident from the context, however, that the "number of victims of accident" is meant, and this is the sense in which the phrase is here applied. The number of "events" is of little interest for the purpose of measuring the risk to workmen or the public.

SOME PROBLEMS OD STATISTICS OF ACCIDENTS

WHAT IS A FATAL ACCIDENT ?

The first point of importance concerns "fatal accidents". This term raises two questions : when is an accident to be described ras *fatal* and when is a fatality to be described as The resolution adopted by the First International accidental. Conference of Labour Statisticians merely states that "in the classification of accidents a distinction should be made between fatal and non-fatal accidents "1, and similar statements are made in the resolutions of the other international bodies.² In no case is a definition of a fatal accident given. Now a person may receive injuries from an accident which may kill him instantaneously; on the other hand, he may die from his injuries some time - long or short - after the date of the accident. It is obvious that, if any purpose at all is to be served by international comparisons of fatal cases, some uniformity must be observed. In some countries where the statistics are based on compensation, and are made up at triennial or quinquennial intervals, all cases of death occurring within this period are included; in others only those dying within a short time are included. It may be urged that the point is of little importance, as in the majority of cases death supervenes within a short period. The British statistics throw some light on this point which, though not conclusive, seems to show that the difference is not negligible. The statistics of reported cases include as fatal only those deaths which occur (as a rule) within a year of the accident, or in the case of railways before the annual statistics for that year are made up; the statistics of compensated cases, however, include as fatal all deaths in respect of which compensation was paid during the year, irrespective of the date when the injury was received, provided that it is shown that death was caused or hastened by the accident.

The following table compares the two sets of statistics of accidental deaths for certain groups which cover approximately the same establishments in each category. The figures are annua averages for the five-year period 1922-1926.

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¹ Cf. footnote (1), p. 731.

¹ Cf. footnotes (2) and (3), p. 731.

Industrial group	Deaths in respect of which compen- sation was paid	Deaths reported
Factories	750	6761
Mines	1,134	1,092
Railways	272	244
Docks	111	104
Total	2,267	2,116

¹ Including workshops.

It should be noted that the four groups do not cover quite the same body of workers in each case. The compensated cases do not cover workshops (as distinct from factories) and exclude also all clerical workers (except on railways), but on the other hand include, for factories, certain categories of outside workers (such as carters) not shown in the reported cases, which cover only deaths of persons employed *in* factories and workshops.

The number of compensated cases in each group is considerably higher than the number of reported cases. The real difference in the two totals is, on balance, probably somewhat greater than that shown by the above figures, owing to the exclusions mentioned in the preceding paragraph. The difference appears to be due principally to the fact that many injured workers, who have been shown in the statistics as disabled, die at some period greater than one year after the accident. If fatal reported accidents were limited to deaths occurring within a shorter period than one year, as is the case in some countries, the difference between the number compensated and the number reported would be greater still.

It is further to be noted that the longer the time that elapses between the occurrence of an accident and the death of the victim, the greater is the difficulty of stating whether the death is due to the accident or not. Subsequent pathological conditions may contribute to the death of the victim. This problem, however, is primarily a medical one, and not a statistical one; and arises with greater frequency in the case of non-industrial accidents than in that of "industrial accidents". For the latter category there is less difficulty. "Reported cases" of industrial accidents are reported at the time of occurrence, and fatal cases are those in which death supervenes, usually within a short time. The statistics of compensated cases give the cases in which a valid claim to compensation for accident has been established in respect of the deceased person. In many of these cases pathological conditions may have ensued, but no information is available.¹

Some light is thrown on this problem, however, by the British statistics of investigated cases and those of registered cases. During 1922-1926 the annual average number of investigated cases of " accident or misadventure " was about 14,700 in England and Wales, while during the same period the average number of registered cases was only about 13,200 ("open verdicts" included in both instances). Thus the former are considerably more numerous than the latter — about 12 per cent. during the quinquennial period. This is no doubt due to a large extent to the different conceptions of the notion of accident. The statistics of investigated cases are compiled for judicial purposes and do not give strictly speaking a classification of cause of death in the sense used in other statistics - their object is to show whether the death was due to criminal or other wilful acts, to neglect, to accident, etc. If a death from disease were attended by contributory circumstances of neglect, exposure, excess, accident, etc., it would probably not be classified as a death from natural causes, but as accident or misadventure. In the statistics of registered cases in England and Wales, however, it is stated that "deaths from any definite disease stated to have been accelerated, aggravated, etc. by accident are classed to the disease ", " deaths from injuries received during an epileptic or apoplectic fit are classed to epilepsy or apoplexy", " deaths from lung diseases consequent upon accidental immersion are to be classed to the disease ", and other minor instances.²

This problem of determining whether a death following on an accident is really due to the accident may be of considerable importance in certain schemes of compensation, and must not therefore be neglected in attempting to compare the accident statistics of different countries.

The Completeness of the Statistics of Industrial Accidents

A fundamental requirement in accident statistics is the accurate and complete reporting of accidents. A system of compensation

¹ It is interesting to note that the Italian scheme of accident compensation statistics proposes that deaths should be classified into (i) those or urrin instantaneously: (a) those due exclusively to the accident, (b) those with pre-existent pathological conditions; and (ii) these occurring after the accident : (a) those due to causes independent of the accident, (b) those with pre-existent pathological conditions, (c) those with su'se usent pathological conditions.

⁹ "Rules for the selection of one from two or more jointly stated causes of death ", issued by the Registrar General of England and Wales. (21)

for industrial accidents is generally sufficient to ensure this, for this category of accident. In Great Britain, however, where the reporting of an industrial accident is quite distinct from its compensation, the number of reported cases can be compared with the number of compensated cases. As regards fatal accidents, it is to be expected that few, if any, escape notice, where the death occurs at a reasonable interval from the date of the accident, and in England and Wales the machinery of the coroner's inquest provides an additional safeguard. For non-fatal cases the differences may be considerable, especially where the compensation law is limited in its scope to certain categories of workers and certain types of accident. In Great Britain the scope differs slightly, but since 1924 the degree of accident has been uniform for both groups : the accident, both for reporting and for compensation, must have caused absence from work of at least three days, with the exception of railway accidents, where the limit of one day is applied to reportable cases. The following table compares the figures for the three years 1924-1926.

COMPARISON OF NON-FATAL INDUSTRIAL ACCIDENTS (THBEE-DAY BASIS), 1924-1926

Non-fatal cases in which compensation was paid for the first time during the year		Non-fatal cases reported to inspectors, etc.		
Industrial group Cases		Industrial group	Cases	
Textile factories	49,963	Textile factories and workshops	42,713	
Non-textile factories	482,6521	Non-textile factories and workshops	391,222	
Mines	441.7642	Mines	468.878	
Quarries	17,596	Quarries	18,416	
Docks	33,842	Docks, warehouses, and private railways	25,674	
Railway staff	56,445 ⁸	Railway servants	60,540	
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¹ In addition there were 2,988 cases under special schemes.

² In addition there were 3,915 cases under special schemes.

³ In addition there were 8,484 cases under special schemes.

⁴ Injuries involving absence of one day or more.

Certain victims of industrial accidents are compensated under special schemes, known usually as "contracting-out schemes"; in these cases the limit of three days for "compensability" does not necessarily apply, and one-day and two-day accidents are sometimes included. The numbers of such cases are not therefore added to the number compensated under the Acts but are shown in footnotes.

The scope of the returns is not exactly the same in the two classes, as already indicated in the comparison of fatal cases on page 738, some small categories of workers being excluded in one class and included in the other, or vice versa, and any comparison can only be a rough one. For non-fatal cases, there is the additional limitation in the case of compensation statistics to those accidents " arising out of and in course of employment ". The outstanding feature is the large excess in the number of compensated cases for textile factories, non-textile factories, and docks, which seems to indicate that a large number of non-fatal industrial accidents which should be reported to the factory inspectors are not in fact reported. On railways, making some allowance for the number of cases under the special scheme, the number of non-fatal compensated accidents involving absence of three days or more is as large as the number of reported accidents involving absence of one day or more. In mines and quarries, the number of persons compensated is somewhat less than the number reported. Since the two classes of statistics are compiled by different Departments independently of each other, no information is given in the published reports to explain these differences. They may be partly due to the fact that some of the reported accidents are not in fact accidents arising out of and in course of employment, and that some are not compensable owing to the fact that wages are paid during periods of absence due to accident.

A further test of the extent to which reportable accidents are in fact reported is furnished by the fatality ratio, i.e. the ratio of fatal cases to non-fatal cases. It may be assumed that there is no serious leakage in fatal cases, and any serious divergence in the proportion of fatal to non-fatal cases may be due either to the special circumstances of the industry or to the incompleteness of statistics of non-fatal accidents. The following table shows the fatality rates for the principal industrial groups in the years 1924-1926 :

Industrial group	Basis of calculation	Fatality ratio
Factories	(a)	44.6
Factories and workshops	(b)	46.5
Mines	(a)	74.4
"	(b)	64.8
Quarries	(a)	118.2
"	(b)	117.8
Docks and warehouses	(a)	102.2
Docks, warehouses, and private rail- ways Railways	(b) (a)	110.2 143.5
".	(b)	121.9
Shipping	(a)	514.3
"Buildings"	(b)	527.1

GREAT BRITAIN : BATIO OF FATAL TO 10,000 NON-FATAL CASES (TBIENNIAL AVERAGE 1924-1926)

(a) Based on statistics of compensated cases.
(b) Based on statistics of reported cases.

This table shows several interesting features. In view of the wider scope of the term "fatal case" in the statistics of compensated cases, it might be expected that the ratio based on these statistics would be higher than the ratio based on reported cases; and this is in fact so, in mines, in quarries, and on railways though in the latter case the large difference is partly due to the fact that the basis of the calculation is absence of at least three days for compensation, and at least one day for reported accidents. The lower fatality ratios for compensated cases in factories and docks seem to confirm the suggestion made above that many reportable cases are not in fact reported.

The most striking of the ratios are those in respect of shipping and "buildings". The statistics of reported shipping accidents do not cover non-fatal accidents, so that the ratio based on the statistics of compensated cases is given; and no returns are collected in respect of compensation in "buildings", so that the ratio based on the reported cases is given. These very high figures compared with other industries — over 500 fatal cases per 10,000 non-fatal suggests a serious deficiency in the number of non-fatal cases. In the special circumstances of the shipping industry, where accidents occur often on the high seas without involving any loss of wages, minor injuries do not give rise to a claim for compensation, and no very useful purpose would be served by requiring such accidents to be reported in due course to the competent authority

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at home. As regards the group " buildings ", this term has a special significance arising out of the Factory and Workshop Act. "Buildings" are there defined as premises which are "under construction with the use of machinery moved by mechanical power; buildings over 30 feet high under construction or repair by means of scaffolding; and buildings over 30 feet high in which more than 20 persons (other than domestic servants) are employed for wages ". The last group covers buildings used as offices and for commercial purposes, etc., and it is no doubt this last group that causes the fatality ratio to be so high. It is apparently the case that a large number of reportable non-fatal accidents in this group are not in fact reported to the factory inspectors. As this class of premises is not inspected to the same extent as a factory, the provisions of the Act are probably not strictly enforced. Fatal cases do not escape notification — thanks to the machinery of the coroner's inquest - but it appears probable that the number of non-fatal accidents actually reported (about 2,000 per annum) is much too low and might be easily five or ten times greater if the "fatality ratio" were assumed similar to that in factories or on railways.

THE CAUSES OF ACCIDENTS

A classification by causes is also a fundamental requirement of accident statistics. Unless we know why and how accidents happen, nothing can be done to prevent their recurrence, and no international comparisons can be made unless some uniformity exists in the national classifications by cause. Theoretically every accident is the outcome of a long train of events, and can be traced to some remote cause, which in many cases is the failure in some way of one or more persons. The problem must however be approached differently according as we are dealing with accidents in general (registered cases), or with those concerning the safety of the worker and certain aspects of public safety (reported cases). These two groups are considered separately.

Causes of Reportable Accidents

This group of accidents consists principally of industrial accidents, though in certain classes, of which the principal are railways and shipping, accidents occurring to persons other than those employed are reportable. The object of a classification by causes here is to enable measures to be taken to prevent the recurrence of accident. Some countries have endeavoured to classify these accidents according to their moral and subjective cause (e.g. fault of the employer, of the employee, of a fellow worker, etc.), but it has usually been found that for the great majority of accidents the moral cause cannot be determined. The "material" or "objective" causation is usually adopted, and limited in practice to the immediate cause or to "that conditional circumstance, the absence of which would have prevented the accident".¹ In view of the different kinds of risk to which persons are subject in different branches of industry or service, it is evident that no general classification of causes can be of any use. The factory worker, the mine worker, the railway servant, and the seaman are all exposed to very different risks.

Each of the three international bodies which has considered this question has proposed a standard classification of causes of industrial accidents; but although this fact is not stated by the three bodies, the classifications are in fact hot of industrial accidents, but of factory accidents.² Thus the first place is invariably given to machinery accidents, and special attention is devoted to the sub-classification of such accidents. Machinery accidents are, of course, of special importance in factory accidents, but only in this class, and in Great Britain they form less than 10 per cent. of all industrial accidents (fatal cases). This tendency to treat industrial accidents as primarily factory accidents is surprising, when the statistics are examined. The following table shows the approximate average number of fatal industrial accidents reported per annum in Great Britain in recent years.

Group.	Fatal industrial accidents (approximate annual average)
Factories and workshops	700
Mines	1,150
Quarries	70
Railways	260
Shipping (at sea or in harbour)	700
Docks, etc.	100
"Buildings"	100
Other reported cases	20
Total	3,100
Road vehicle accidents (fatal cases t	o occupants
only)	2,6001

¹ The number given is that of persons killed *on* the vehicles involved; in addition, some 2,800 other persons (chieffy pedestrians) were killed.

¹ UNITED STATES. BUREAU OF LABOUR STATISTICS : The Standardisation of Industrial Accident Statistics.

¹ These three classifications are published in Methods of Statistics of Industrial Accidents (Studies and Reports, Series N, No. 3).

No figures are available for agriculture, domestic service, or commerce, and it is impossible to state how many of the 2,600 accidents to drivers and occupants of road vehicles can be described as "industrial accidents". Even if only a small proportion is taken it will be seen that fatal factory accidents form probably less than 20 per cent. of all fatal cases.

This distinction between the causes of different categories of accidents is fully recognised by the British statistics, which give separate classifications by causes for mining and quarrying accidents, for railway accidents, for shipping accidents, and for a ccidents in factories, workshops, docks, and " buildings ".¹ Thus haulage accidents and falls of ground are a prominent cause in the first category, collision and shunting in the second category, founderings and falls from mast in the third category, and machinery in the fourth category. The problem of classification by cause is therefore only to be solved by treating each category of employment separately; and the existing proposals for international comparability fall far short of completeness.

The British statistics of compensated cases contain no classification by causes. The independence of "compensation" and "notification" previously referred to results in the compensation statistics being confined solely to the number of cases and to the amount paid in compensation.

General Classification of Causes (All Accidents)

Coming now to the general statistics of accidents, which cover all cases of accident, whether in the home, in the street, or in employment, the object of a classification by causes is broadly similar to that of the classifications discussed above. It should show what are the causes preventable by human effort, so as to enable legal and administrative measures to be taken, and to throw light on the course of accident risks from year to year. In nearly all countries the registration of deaths is compulsory, and the cause of death must also be stated. The British statistics of registered deaths give a very complete classification by causes. The scheme adopted is that of the "International List of Causes of Death".

¹ Even in Great Britain there is a tendency to identify "industrial accidents" with factory accidents. In the *Statistical Abstract for the United Kingdom*, the section dealing with "industrial accidents" and the references under "industrial accidents" in the index refer solely to factory accidents, the statistics of other i ndustrial accidents being shown in other parts of the volume.

This List, though established for the purpose of classifying deaths registered by the civil authorities, is also applicable to non-fatal cases. It forms an earnest attempt at increasing the international comparability of national statistics, and as it has been adopted by England and Wales, Scotland, certain other European countries, and the United States of America, it is of interest to examine it more closely.

This List was first established in 1900 and has been revised at successive decennial congresses, the latest revision being that by the International Congress held in Paris in 1920.¹ It consists of (a) a detailed list of 205 headings, and (b) an abridged list of 39 headings, primarily for local and limited purposes. The abridged list contains no classification of accidental deaths and it is therefore not dealt with here. The detailed list contains a group "Violent Deaths", and the part of this group relating to accidents (i.e. the whole group, less suicide and homicide) is comprised in the following titles :

Causes of Accident (according to the International List)

- 175. Food poisoning.
- Poisoning by venomous animals. 176.
- 177. Other acute accidental poisoning (not by gas).
- 178. Conflagration.
- 179. Other accidental burns.
- 180. Accidental mechanical suffocation.
- 181. Accidental absorption of irrespirable or poisonous gas.
- 182. Accidental drowning.
- 183.
- Accidental injury by fire-arms. Accidental injury by cutting and piercing instruments. 184.
- Accidental injury by fall. 185.
- Accidental injury in mining and quarrying. 186.
- 187. Accidental injury by machinery.
- 188. Accidental injury by other forms of crushing (i.e. vehicles, railways, etc.).
- Injury by animals. 189.
- 190. Wounds of war.
- Execution of civilians by belligerent armies. 191.
- 192. Hunger or thirst.
- 193. Excessive cold.
- 194. Excessive heat.
- 195. Lightning.
- 196. Electricity (except lightning).
- 201. Fractures (not specified).
- 202. Other and unstated forms of accidental violence.
- 203. Violent deaths of unstated nature (i.e. accidental, suicidal, etc.) and cause.

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1 (21).

Inspection of this list will at once reveal its chief defect. No consistent criterion has been used. The result is that few headings are "watertight" and many kinds of accidental deaths could be classified under several headings. In some cases the pathological cause is used as the criterion, e.g. accidental mechanical suffocation (180), food poisoning (175); in some cases it is the agent or means of violence, e.g. other forms of crushing (vehicles, etc.) (188), injury by machinery (187), electricity (196), and lightning (195); in some cases it is the nature of the injury, e.g. burns (179); in one case it is the place of accident, namely, accidental injury in mining and quarrying (186) (this might also be described as an industrial criterion). Thus a death by burns might be classified not only under 179, but also under 186 or 188; a death in mining (186) might be due to fall (185), burns (179), drowning (182), crushing (188), machinery (187), or suffocation (180); and a death from injury by machinery might appear not only under 187, but also under 186 or 188. No rules are laid down as to the preferences to be given when a death can be classified under more than one category of accident; without such rules, the list is of little value for purposes of international comparison.

In Great Britain, separate statistics are issued for England and Wales and for Scotland, but the proportion of accidental deaths allocated to the different titles differs so considerably as to seem to indicate that different principles are adopted in these two divisions of the country. The accident death rate, for example, is about 30 per cent. higher in England and Wales than in Scotland, and ome of this difference is probably due to different methods of classifying deaths due to joint causes (i.e. disease and accident).

A further criticism of the classification of accidental deaths in the International List is that little account is taken of the importance of the different causes. Out of the 25 titles, only 5 are of numerical importance, and these account in England and Wales for nearly 90 per cent. of all the deaths from accidental causes. The following table shows the numbers of deaths in 1927 for the principal causes.

Number of title	Name of title	Number of deaths registered		
179	Burns (excluding conflagration)	1,453		
182	Drowning	1,568		
185	Falls (of persons)	3,195		
186	Mining and quarrying	1,054		
188	Other forms of crushing (i.e. chiefly by rail and road vehicles)	5,799		
	Total: 5 chief causes Remaining 20 titles	13,069 1,862		
	Total : all accidental causes	14,931		

ENGLAND	AND	WALES :	REGISTERED	DEATHS	FROM	ACCIDENTAL
CAUSES, 1927						

The five groups indicated in this table are not subdivided, and the same importance is thus given to a minor group like "injury from cutting and piercing instruments" (184) involving some 12 deaths, as to the group of transport accidents (188) involving about 5,800 deaths.

This imperfection in the International List is removed to some extent in British practice by means of subsidiary classifications. These subgroups are not sanctioned by the International List, but are additional to, and independent of, it. This subsidiary list is too detailed to reproduce here, but it throws valuable additional light on the causes of accident; it contains, however, the same defect as the original list, namely, that various criteria are used. Sometimes the title is subdivided to show the place (e.g. in ships, docks, etc.; in metal works), sometimes to distinguish the industry (e.g. building operations), sometimes to indicate the agent (e.g. motor car, lift), and sometimes to define the act (e.g. shotfiring).

As the International List is due for decennial revision in 1929, two Committees have recently issued proposals for its revision: the first a Committee appointed by the Health Section of the League of Nations, the second a Committee appointed by the International Statistical Institute. Both these Committees issued their reports in 1927.¹ As regards that portion of the List referring

¹ LEAGUE OF NATIONS. HEALTH ORGANISATION : Report of the First Session of the Commission of Expert Statisticians. C.H. 576. Geneva, 1927.

INSTITUT INTERNATIONAL DE STATISTIQUE : Rapport sur les travaux préparatoires à la 4^{me} révision décenniale de la nomenclature internationale des causes de décès, par M. HUBEE. Cairo, Imprimerie Nationale, 1927.

to Accidental Deaths, both Committees realised its defects, and suggested that it was at present too long, and that its further adoption by the different countries would be facilitated if it were limited to a list of 9 or 10 titles, instead of the present 25. The two lists proposed are shown as follows, together with the corresponding title numbers of the present list:

PROPOSED CLASSIFICATIONS OF CAUSES OF ACCIDENTAL DEATH

Proposals of the Committee of the International Statistical Institute		Proposals of the League of Nations Committee			
New uum- ber	New title	Numbers in present list	New num- ber	New title	Numbers in present list
81	Acute poisonings	175, 176, 177, 181	80	Acute poisoning (gas excepted)	175, 176, 177
82	Conflagration, burns and scalds	178, 179	81	Other chronic poison- ing	67, 68
83	Drowning ·	182	82	Burns and scalds	178, 179
84	Injury by fall, crush- ing, and earth- quakes	185, 188 (part)	83	Absorption of gases, including suffoca- tion	180, 181
85	Injury in mining and	186	84	Drowning	182
	quarrying		85	Traumatism by fall	185
86	Injury by means of transport	188 (part)	86	Crushing	186, 187, 188,
87	Electric currents	196	87	Other and unstated	183, 184, 189,
88	All other violent or	180, 183, 184,		violence	190, 201, 202
accidental deaths	187, 189, 192, 193, 194, 195, 201-203	88	Unknown violence	203	
		89	Other external cause	192, 195	
	. /				

These new classifications show considerable differences. Drowning, and burns and scalds are the only two titles common to the two lists; the differences as regards poisonings are of minor importance. The chief difference is in the treatment of accidental deaths due to crushings, vehicles, etc. The Institute list still maintains the old defect of different criteria, whereas the League of Nations list attempts to adopt the "nature of injury" as criterion. Thus mining and quarrying accidents are retained as a separate group in the former list, while in the latter they are no longer shown as a separate group.¹ The new group of the League of Nations Com-

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¹ The published tables (as summarised in the above table) imply that the old group mining and quarrying (186) is included in the new group "crushing". It appears, however, that what is intended is that only such deaths as are due to crushing should be so included, deaths due to fall, drowning, etc. being classified to the appropriate titles.

mittee called "accidental crushing " is the most important change; it includes crushing in mines and quarries, by machinery, by road vehicles, and on railways. It is recommended, however - and this is the important part of the scheme --- that separate and independent tabulations be made of all accidents in mines and quarries; on railways; by automobiles; by other vehicles; and by machinery. This scheme marks a considerable progress, for the new titles of the International List would be almost watertight, and separate information would be available for five important categories of accidental deaths, which could be analysed in further detail. In the case of British accident statistics the proposal is especially appropriate, for special statistics already exist of fatal and non-fatal cases (in the statistics of reported cases) for four of these categories. The present system by which such fatal cases are also shown in the statistics of registered deaths as separate rubrics of the International List leads to a certain amount of overlapping.

THE MEASUREMENT OF RISK

Frequency Rates

Hitherto the number of persons killed and injured by accidents has been considered without reference to the number of persons exposed to the risk. Accurate information as to the exposure to risk is essential if a knowledge of the number of victims is to be of any value. As regards general accidents occurring in the population as a whole, the problem is relatively simple, as it is sufficient to know the age and sex distribution of the population in order to calculate their death and disability rates. The statistics of *registered deaths*, which cover all deaths from accident, are of great value in this connection, and the British statistics give a full analysis of such deaths by age and sex, together with the accident death rate.

For the statistics of *reported deaths*, no measure of the accident risk is given, except for mining and quarrying. The other principal groups omit all calculations of rates. For railway and shipping accidents some information is given as to the numbers employed, but special problems arise in these cases which will be referred to later. For factory and workshop accidents no information is available as to exposure to risk. The statistics of *compensated* cases give for each industrial group the "average number employed during the year" — a loosely defined and therefore an approximate figure — and the fatal and disablement rate per 1,000 of such workers. The information in British statistics concerning risk is therefore very meagre.

For industrial accidents, the number employed is an insufficient measure. Such accidents, unlike non-industrial accidents, are a function of the time spent in the employment, and resolutions adopted by the various international conferences all recommend the number of hours worked as the best measure. Where this is not available, the number of days worked (or the number of 300-day workers) is recommended as furnishing an approximate measure. Special problems, however, arise in each of the chief categories of reported accidents, which are dealt with below.

Mining accidents. In the first place, irregularity of work is more important in this industry than in others, in the form of both voluntary and involuntary absenteeism.¹ Moreover, whereas surface workers are employed in similar conditions to factory workers, underground workers work in special conditions and spend a part of their time not in productive work (e.g. winding time and travelling time). Information as to the hours worked by different categories of workers would be the ideal measure, but since 1922 the British statistics use as measure the number of shifts worked. The special risk of hewers and other underground workers is estimated in respect of the two classes of accident which chiefly affect these classes of workers, namely, falls of ground, and haulage accidents ; rates are given showing the number of persons killed and injured by haulage accidents per 100,000 shifts worked below ground other than at the working face, and the number of persons killed and injured by falls of ground at the working face per 100,0000 shifts worked at the coal face.

Factories and workshops. The problem of measuring frequency in factories and workshops raises no special problems, yet no information is available in the British statistics. While the Factory

¹ The unsatisfactory nature of the "number employed" as a basis of calculation can be seen from the figures |u|| s| ed | y t| e h ines 1 epartn ent for theyear 1921, which gave a death rate from accident of 0.66 per 1,000 employed, ascompared with 0.95 in 1922. This great difference was chiefly due to the factthat the three months' stoppage in 1921 greatly reduced the number of accidentsbut not the number of workers. The figures now published, based on thenumber of shifts worked, correct any error due to non-employment of miners.The figure of 0.66 for 1921 was "adjusted" in the report for 1926 to 0.87 toallow for the idle period. The pro lems of the measurement of the avera enumber of workers and of the number of full-time workers are discussed in steatdetail in a re ent tepo t of the international La' our Office, Wages and Hours ofWork in the Coal-Mining Industry (Studies and Reports, Series D, No. 18;Geneva, 1928).

Department recognises the value of measuring accident risk¹, it considers it primarily the duty of establishments themselves to work out their own rates.

Railways. The difficulty in this class of accident is to define "railway risk". Many accidents on railways are totally unconnected with the movement of trains and the operation of railways. Difficulties also arise from the fact that many railway workers are not entirely employed on railway premises. In Great Britain, a large number are employed in railway workshops, repairing sheds, warehouses, etc., which are not "railway premises" used for working the railway. If one of these workers is the victim of an accident while he is engaged on railway premises, the case is included in the statistics, while if the accident occurs while he is at work in the railway factory or workshop it is excluded, and treated as a factory accident reportable to the factory inspectors. The annual Returns of Accidents and Casualties² give no figures of the risk of accident, although the number of accidents and the number of workers employed — both by occupations — are given. The numbers employed are, however, only the numbers employed on one particular day of the year.

Shipping. The measurement of exposure to risk presents peculiar difficulties in the case of seamen. Seamen while at sea are exposed to the risk of accident for twenty-four hours in the day, and any exposure in terms of hours worked would be inaccurate. Seamen also may die in a foreign port after they have left their ship, and no notification of their death be made to the shipping authorities; they may die on shore in their native country while not attached to any ship. Also foreign seamen on foreign ships sometimes die in British ports.

Until recent years, no attempt was made in British statistics to calculate the exposure to risk. The number of accidental deaths at sea or in harbour is reported each year and the "number of persons forming the first crews of British vessels actually employed during each year" is also given. These, it is stated³, "furnish an approximate basis for estimating the variation in the extent of the risk from period to period", but estimates of such risk are in fact not calculated and, if calculated, would be incomplete, as they would take no account of seamen on shore and accidental deaths occurring on shore. Information as to the number of

¹ Cf. (3), 1922, p. 10. ² (6). ³ (7).

seamen on shore is only available at decennial intervals on the occasion of the population census, and information as to the number of their deaths from accident is available (though not tabulated separately) in the statistics of *registered* deaths.

In view of the importance of measuring the mortality of seamen from different causes, a Special Committee recently recommended that an attempt should be made to combine the statistics of reported deaths with those of registered deaths, and the statistics of seamen on articles with those of seamen on shore (only available for 1921), and so obtain a true death rate. This has recently been done in the report on occupational mortality in 1921-1923¹ issued in 1927, where a special section is devoted to the mortality of seamen between the ages of 20 and 65. To the number of seamen of these ages enumerated at home at the 1921 Census (130,141) was added the number at sea or abroad on the same day (77,202), and deduction made of the number of foreign seamen enumerated in foreign vessels in British ports (8,037). The result gives the net total of British seamen of these ages. The number of deaths from accident and other forms of violence in the three years 1921, 1922, and 1923 was 2,005 (registered deaths at home plus reported deaths at sea) in the three years. As cases of suicide and homicide are included it is not possible to give the "accident risk", as usually understood, and when allowance is made for the age constitution of the population, the "standardised mortality" from violence is given as 390, which is no less than 5.3 times the corresponding rate for the occupied and retired male population as a whole, and much higher than the corresponding mortality (standardised) for any other occupation. The seaman's calling is presumably the most dangerous of all callings.

This example is sufficient to indicate the difficulty of measuring the accident risk of seamen, and it is only in 1927 that such a calculation has been made for the first time in Great Britain. No comparable figures exist for any other countries on this basis.

A word must be said about the statistics of *compensated* cases for seamen. All cases of accident arising out of and in the course of employment are compensable, whatever the nationality of the seamen (a few minor occupations are excluded) as long as he is employed on a British ship; though accidents to a man ashore for his own purposes without leave are outside the Act. The compensated cases show the number of deaths and injuries in respect of which compensation was paid. In the five years 1922-1926 the number of such fatal cases (sea or shore) was 1,470, while the number of deaths from accident at sea or in harbour reported to the Mercantile Marine Department was over 3,500. This extreme discrepancy can only be explained by the fact that many deaths do not give rise to a claim for compensation because there are no dependants, or do not give rise to a claim for medical and funeral benefit because the man has been buried at sea, and where the case is that of a Lascar or other foreigner no claim may have been made. It appears therefore that, in the case of shipping, statistics of compensation are no guide to the risk of accident, and the "number of fatal cases per 1,000 workers", which is given in the annual reports of the proceedings under the Workmen's Compensation Acts, is of little value for this purpose.

Street accidents due to vehicles. This is a class of accident which is increasing in importance each year.¹ The measurement of risk cannot be expressed in terms of hours worked or persons employed, nor can the industrial risk in most cases be separated from the Such information is not in fact required for the non-industrial. purpose of preventive measures, as the problem is primarily one of public safety, and the number and causes of industrial accidents, i.e. those occurring to the employed chauffeur or driver, are of little interest as such. Hence no statistics of reported industrial accidents exist for street vehicle accidents. The statistics of compensated cases do not cover this branch. Cases of such accidents occurring to workers attached to factories, mines, railways, etc. are included in the statistics of compensated cases for these industrial groups. The only method of obtaining any reliable information as to the risk of industrial accident of this nature would be for such cases (and the workers employed) to be shown separately, and for returns to be obtained from the road transport undertakings (tramways, omnibuses, carriers, etc.). In view of the rapidly increasing number of such accidents, it may be necessary in the near future to obtain such information.²

The number of persons killed and injured in Great Britain in this class of accident is published annually on the basis of returns

¹ In Great Britain the number of deaths and injuries from vehicle accidents doubled between 1922 and 1927.

² The International Labour Conference at its Eleventh Session passed a resolution requesting the International Labour Office, in view of the rapidly increasing number of street accidents, to make an enquiry into the dangers to which workers in the motor transport industry are exposed.

made by the local police. Though probably complete as far as fatalities are concerned, many non-fatal injuries no doubt escape their notice. These figures are classified according to the vehicle by which the accident was caused (mechanically propelled vehicles, horse-drawn vehicles, cycles, etc.), and since 1927 the figures show the number of cases in which the victims were (a) on the vehicle to which the accident is attributed, (b) on any other vehicle involved, (c) other persons (i.e. chiefly pedestrians). No accurate measurement of exposure is possible in this category of accident on the basis of these statistics. The number of vehicles in circulation may give some indication, but without some information as to the intensity of traffic and the extent to which such vehicles are in use, this measure is of little value.

Severity Rates

Severity rates are an attempt to measure the proportion of working time which is lost from industrial accidents. They therefore necessitate information as to the duration of incapacity. No severity rates of any kind are calculated in any of the British statistics, which therefore cannot be said to throw any direct light on this problem of accident statistics. The reasons for this omission, do however, show certain of the difficulties involved in this calculation. The statistics of reported cases are intended to bring to the notice of the competent authorities all reportable accidents on their occurrence, and their subsequent duration of incapacity is not of primary interest. An identical event (e.g. two men falling from a ladder) might in one case cause death, in another temporary incapacity; similar physical injury (e.g. a broken leg) might have much more serious consequences for an elderly weak person than for a young strong person. In most countries the statistics of compensated cases are the usual source of information for the calculation of severity rates. The duration of incapacity cannot however be obtained from the British statistics owing to the practice of "lump-sum" payments. Of the 353,800 disablement cases in which payments were made during the year 1926, 16,783 were settled by lump-sum payments. In these cases the injured person passes out of the knowledge of the compensation authority and no information is obtainable as to the duration of incapacity. A further difficulty is that the calculation of time loss involves certain arbitrary assumptions as to the loss in cases of fatal, permanent total, and permanent partial disability - it is only in cases of temporary disability that a definite measure of time loss is possible. British compensation legislation however recognises no distinction between permanent and temporary disablement, but only between total and partial disablement. The statistics for 1926 show 3,200 cases in which payments had been made for over ten years and not yet terminated.

The standard definitions adopted by the three international bodies propose a division of accidents, for the purpose of calculating severity, into permanent total (including fatal) disablement, permanent partial disablement, and temporary disablement. It is clear from what has been said in previous sections that this classification depends entirely on the time at which it is made. A]] cases, except those of instantaneous death, start as cases of total disablement (for "absence from work" is the criterion for an accident to be compensable); they may become fatal, or total, or partial, in course of time. Disabilities at first thought to be permanent may in due course prove to be temporary, and partial disablement may not ultimately affect in any way a person's efficiency or earn-The arbitrary assumptions, often due to legal proviing power. sions, on which the classification of accidents is based, render the computation and international comparison of severity rates of very little value. Many other problems arise in connection with the calculation of time loss, which have already been mentioned in a previous article by the present writer.¹ The subject however involves many considerations and, as for frequency rates above, requires special treatment for each of the different classes of accidents. It is hoped to treat this subject in greater detail in a later article, illustrated from the experience of other countries.

SUMMARY AND CONCLUSIONS

The problem of compiling internationally comparable statistics of accidents is one of extreme complexity, due in part to the difficulties in the notion of "accident" and "victim of accident", and in part to the legislative and other provisions for notifying accidents and compensating the victims. To these difficulties are added those of terminology, such as whether an "event" injuring, say, five persons is to be termed one accident or five accidents. Using for brevity, and in the absence of an agreed alternative, the

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¹ International Labour Review, Vol. XVII, No. 5, May 1928, p. 639.

word "accident" to mean a "victim of an accident", the difficulty first illustrated is that of accident complicated by other pathological causes — of which a chief example is drowning, where it is very often impossible to state whether the death is due to accidental or non-accidental causes. This difficulty however is of minor importance for industrial accidents. A second and more important difficulty is that of defining *fatal* accidents, whose number depends on the time which elapses before death supervenes. The answer to the question "how many persons were killed during the year from accidents occurring in the year?" may be very different from the answer to the question "how many persons died during the year from accidental causes ?" and the measurement of risk (i.e. the death rate) would be higher if the second question were taken as the basis.

As regards non-fatal industrial accidents, the British statistics seem to indicate that the statistics based on compensation are more complete than those based on reports by employers of occurrences of accident. Statistics of reported cases, however, have the advantage of enabling the cause to be determined at the time of occurrence, and they can be published much more promptly and in greater detail than those of compensated cases. They do not, however, provide a ready means of estimating the severity of an accident, for once an accident has been notified the obligation of the employer in this respect is terminated. Both classes, however, appear to be inadequate in the case of shipping accidents. The compensation statistics for seamen do not show by any means the total number of accidents occurring to seamen, and the reporting of non-fatal accidents occurring at sea is impracticable. For the most important class of accident at the present time road-vehicle accidents — the distinction between industrial and non-industrial accidents presents almost insuperable difficulties.

The question of the cause of accident is also very complex. The list of causes for accidents in general, namely, the "International List", is very unsatisfactory, as it is based on no discernible criterion of classification, and the British Government, while adopting its general framework, have found it necessary to introduce a subsidiary classification. It is very desirable that the "Violent Deaths" section of this list be completely revised at the next decennial revision in 1929. For industrial accidents no suitable list of causes can be put forward for general adoption, because each category of accident requires a special list of causes appropriate to it. Industrial accidents have unfortunately come to mean primarily factory accidents, and the classifications of causes proposed by the three international bodies mentioned at the outset of this article have been based on those causes that are of particular importance in the latter class of accident.

Not only as regards causation, but also as regards measurement of risk, does each different category of statistics require special treatment. The special problems they raise, as illustrated by the British statistics, have been indicated above. Here again, the three international propositions envisage the problem from the point of view of factory accidents only.

The indefiniteness of the notions permanent disability, temporary disability, total disability, and partial disability, are a further cause of lack of comparability. Often they are merely legal or administrative terms which have little relation to actual facts, and individuals may pass from one category to another at different times. Hitherto, all proposals for international comparability in this sphere have been approached from the point of view of compensation and not from that of notification.

The complexity of British statistics is thus necessitated by the complexity of the subject, and the apparent incompatibility between the different sets of statistics is seen to be due largely to the different objects, administrative and other, which they are intended Their example shows the nature of the difficulties that to serve. have to be surmounted before it is possible to obtain in different countries the data necessary for making international comparisons possible.

APPENDIX

List of British Publications on Accident Statistics

A. STATISTICS OF REPORTED CASES

(1) MINES DEPARTMENT : Annual Report of the Secretary for Mines and Annual Report of H.M. Chief Inspector of Mines.

(2) MINES DEPARTMENT : Report of H.M. Electrical Inspector of Mines. (Annual.)

(3) HOME OFFICE: Annual Report of the Chief Inspector of Factories and Workshops.

(4) HOME OFFICE: Annual Report of H.M. Inspectors of Explosives. (5) MINISTRY OF TRANSPORT: Report to the Ministry of Transport upon the Accidents which occurred on the Railways of Great Britain. (Annual.)

(6) MINISTRY OF TRANSPORT : Returns of Accidents and Casualties as reported by the Several Railway Companies in Great Britain. (Annual.)

(7) BOARD OF TRADE: Return of Shipping Casualties to, and Deaths on, Vessels registered in the United Kingdom, so far as reported to the Board of Trade. (Annual.)

(8) AIR MINISTRY, DIRECTORATE OF CIVIL AVIATION: Annual Report on the Progress of Civil Aviation.

(9) AIR MINISTRY: Report on Health of Royal Air Force. (Annual.)

(10) WAR OFFICE: Report on the Health of the Army. (Annual.)

(11) ADMIRALTY: Statistical Report on the Health of the Navy. (Annual.)

(12) BOARD OF TRADE: Report upon the working of the Boiler Explosions Act, 1882 and 1890. (Annual.)

(13) MINISTRY OF LABOUR: Abstract of Labour Statistics for the United Kingdom. (For statistics under Notice of Accidents Act, 1894.) (Annual.)

(14) HOME OFFICE: Street Accidents caused by Vehicles. Return showing the number of accidents resulting in death or personal injury known by the Police to have been caused by Vehicles in Streets, Roads or Public Places in Great Britain. (Annual.)

B. STATISTICS OF COMPENSATED CASES

(15) HOME OFFICE: Statistics of Compensation and of Proceedings under th. Workmen's Compensation Acts, 1906 and 1923, and the Employers' Liability Act, 1880, (Annual.)

(16) Annual Report of the Chief Registrar of Friendly Societies. Part 1.

C. STATISTICS OF INVESTIGATED CASES

(17) HOME OFFICE: Criminal Statistics, England and Wales: Statistics relative to Criminal Proceedings, Police Coroners, etc. (Annual.)

(18) PRISON COMMISSIONERS FOR SCOTLAND: Report on Judicial Statistics of Scotland. (Annual.)

D. STATISTISTICS OF REGISTERED CASES

(19) Registrar-General's Statistical Review of England and Wales. Part I. Medical. (Annual.)

(20) Annual Reports of the Registrar-General for Scotland. (Annual.)

(21) Manual of the International List of Causes of Death as adapted for use in England and Wales, Scotland and Northern Ireland. (Decennial.)

(22) The Registrar-General's Decennial Supplement. England and Wales. 1921, Part II. Occupational Mortality, Fertility and Infant Mortality. (Decennial.)

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