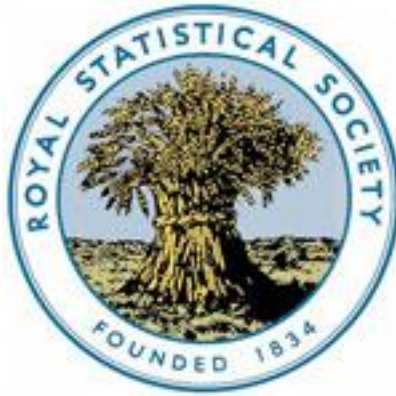


WILEY



On the Number of Deaths from Accident, Negligence, Violence, and Misadventure in the United Kingdom and Some Other Countries

Author(s): Cornelius Walford

Source: *Journal of the Statistical Society of London*, Vol. 44, No. 3 (Sep., 1881), pp. 444-527

Published by: Wiley for the Royal Statistical Society

Stable URL: <http://www.jstor.org/stable/2339059>

Accessed: 27-06-2016 15:33 UTC

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at

<http://about.jstor.org/terms>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Wiley, Royal Statistical Society are collaborating with JSTOR to digitize, preserve and extend access to *Journal of the Statistical Society of London*

On the NUMBER of DEATHS from ACCIDENT, NEGLIGENCE, VIOLENCE, and MISADVENTURE in the UNITED KINGDOM and some other COUNTRIES. By CORNELIUS WALFORD, F.I.A., F.S.S., F.R.HIST. So., Barrister-at-Law.

[Read before the Statistical Society, 15th February, 1881.]

CONTENTS :

	PAGE		PAGE
Part I.—HISTORICAL.....	445	Part III.—PRACTICAL— <i>Contd.</i>	
Early Bills of Mortality, &c.	446	Remarkable Causes of Violent	
Part II.—STATISTICAL	451	Deaths	502
1. England and Wales	451	Total Accidents in United King-	
2. Scotland	465	dom	504
3. Ireland	471	Homicide, Suicide, and Execu-	
4. Foreign Countries	475	tions	504
5. United States.....	480	Sunstroke and Lightning	505
6. Australia.....	482	Accident or Negligence	507
Part III.—PRACTICAL	484	Ages at Death.....	508
Analysis of the Causes of Violent		Net Results: Fatal Injuries	510
Deaths.....	487	Proportion of Non-Fatal In-	
Localities and Causes of Deaths	489	juries	511
Causes of Violent Deaths in Six		Conclusion	513
Classes	492		
1. Railways.....	493		
2. Mines	494		
3. Mechanical Injuries	495		
4. Chemical Injuries	497		
5. Asphyxia.....	500		
6. Violent Deaths unclassified	501		

APPENDIX.

Effect of Intemperance on Violent	
Deaths and Mortality generally	517

THE discussion upon and subsequent passage of the Employers' Liability Act (43 and 44 Vict., cap. 42), "An Act to Extend and Regulate the Liability of Employers to make Compensation for Personal Injuries suffered by Workmen in their Service," 1880, which came into operation on the first day of the present year, has naturally drawn attention to the question of deaths from the causes here enumerated, and equally so as to the more difficult problem of the number of non-fatal injuries so resulting. It is in accordance with the traditions of this Society, that an attempt should be made by its Fellows to throw some light upon these respective problems, so far as statistics may be able to accomplish this.

I am not aware that any attempt has yet been made to deal in a comprehensive manner with the returns of deaths from accidents, negligence, violence, and misadventure in this kingdom, or in either division thereof. And when I speak of the divisions of the

kingdom in this connection, it is for the purpose of expressing my regret that we still have no compiled statistics treating the kingdom as a whole. The three divisions are kept as distinct as if they were distinct nationalities; and much inconvenience is thereby occasioned to inquirers. I can, however, only deal with the facts as I find them in this regard, and have to fall back upon the distinct sets of reports of the registrars-general of the three divisions—admirably arranged as these are, each within itself—as exponents of the occurrences within the territory it covers.

I propose also, in view of comparisons, as well as for general reference, to survey the statistics of other countries relating to deaths from the same causes, so far as the same are available. In truth, as this is the first time the subject has been dealt with before this Society, I shall seek to make the present paper as comprehensive as the time and materials at my disposal will allow.

PART I.—HISTORICAL.

But before dealing with the modern returns, which must indeed constitute the chief feature of this paper, I think it will be instructive to look at the figures furnished by the early bills of mortality, although these indeed limit us very much to the city of London; yet there is something to be learned.

The causes of death were recorded by the company of parish clerks, to whom (as the descendants of the guild or fraternity of St. Nicholas, incorporated as early as 1253 by charter 17, Henry III) the superintendence of the compilation of the bills of mortality of the city was intrusted.

The first bill wherein the causes of death were specified seems to have been issued in 1629, and the practice was continued down to 1636, when a hiatus occurs, until the year 1647, the total deaths only being given in the interval.

These early bills of mortality are in a very limited degree available for statistical purposes; but it must be admitted that they do present us with almost photographic exactitude some of the features of the period. Thus I take at random one issued in the first year of the reign of Queen Anne. One person is returned as having died "choked with fat;" 61 died of "surfeit;" 9 of "St. Anthony's fire;" 21 were "found dead in the streets;" 90 were "overlaid;" 1 "stified in the mud." In the following year 70 "died of surfeit," 72 were "hanged," 12 "murdered," and 69 "overlaid." The ravages of "smallpox" were cruel, and "drunkenness" claimed a very large portion of victims, but the exact proportion could not be ascertained then, nor indeed can it now! The humorists found these same bills a fruitful source of mirth. Thus Addison, in a paper designated "Dying for Love," enumerates some of the imaginary causes which worked such dire disaster:—

The returns under the same arrangement extend no further. On the whole the fluctuations are not larger than might have been expected. The return of seventy murdered in 1659 may be an error.

The famous Captain John Graunt, F.R.S., passed the figures here given, or the greater part of them, carefully under review, and his "Observations" contain the following sagacious remark thereon: "We shall say nothing of the number of those that have been drowned, killed by falls from scaffolds, or by carts running over them, &c., because the same *depends upon the casual trade and employment of men, and upon matters which are but circumstanced to the seasons and regions we live in, and affords little of that science and certainty we aim at.*"

His reasoning that the deaths of this class vary with the occupations of men was true enough, but his conclusion that therefore no correct average could be obtained we shall hereafter see is erroneous.

A special bill issued in 1665, the plague year, wherein the deaths were in total 97,306, "whereof of the plague 68,596," leaving 28,710 as resulting from other causes, amongst which were the following:—

Kil'd by several accidents	46	Murthered and shot.....	9
Drowned	50	Poysoned	1
Hang'd and made away with } themselves.....	7	Total from these causes	121
Burnt and scalded	8		

These being about 1 in 237 of the whole of the deaths returned.

From a table prepared by Mr. Corbyn Morris, of deaths in the "City and Suburbs," during the period 1675 to 1757, embracing thus eighty-three years, the following facts are drawn.

The deaths of the classes under notice in this paper were there classed as follows, being not dissimilar to the modern classification of the registrar-general, thus:—

"Casualties, bruised, burnt, drowned, executed, frightened, falls, "and other accidents, self-murder [suicide], murdered, overlaid, "poisoned, scalded, shot, strangled, smothered, starved, and "suffocated."

These are all "lumped" together, and constitute one item in the table. We give the figures in Col. 3 of the following table:—

TABLE B.—*Deaths in City and Suburbs of London during the following Years, specifying Proportion resulting from Casualties.*

Year.	Total Deaths.	Deaths from Violence as above Enumerated.	Being in the Proportion of 1 in	Year.	Total Deaths.	Deaths from Violence as above Enumerated.	Being in the Proportion of 1 in
1675....	17,244	290	59	1717	23,446	320	73
'76....	18,732	325	57	'18	26,523	340	78
'77....	19,067	324	58	'19	28,347	331	85
'78....	20,678	323	64	1720	25,454	309	82
'79....	21,730	318	68	'21	26,142	365	71
1680....	21,053	311	67	'22	25,750	299	86
'81....	23,971	358	66	'23	29,195	338	86
'82....	20,691	332	62	'24	25,952	349	74
'83....	20,587	346	59	'25	25,525	366	69
'84....	23,202	327	70	'26	29,647	376	78
'85....	23,222	350	66	'27	28,418	375	75
'86....	22,609	334	67	'28	27,810	397	70
'87....	21,460	310	69	'29	29,722	405	73
'88....	22,921	362	63	1730 ...	26,761	407	65
'89....	23,502	357	65	'31	25,262	449	56
1690....	21,461	374	57	'32	23,358	466	50
'91....	22,691	322	70	'33	29,233	459	63
'92....	20,874	297	70	'34	26,062	443	58
'93....	23,959	344	60	'35	23,538	445	52
'94....	24,100	305	79	'36	27,581	455	60
'95....	19,047	284	67	'37	27,823	373	74
'96....	18,638	274	68	'38	25,825	367	70
'97....	20,970	273	76	'39	25,432	445	57
'98....	20,183	Causes of death not registered	—	1740	30,811	462	66
'99....	20,795		—	'41	32,169	466	69
1700....	19,443	—	—	'42	27,483	426	64
'01....	20,471		60	'43	25,200	404	62
'02....	19,481	337	71	'44	20,606	395	52
'03....	20,720	272	75	'45	21,296	429	51
'04....	22,684	274	81	'46	28,157	384	73
'05....	22,097	278	85	'47	25,494	375	67
'06....	19,847	257	79	'48	23,869	371	64
'07....	21,600	249	78	'49	25,516	408	62
'08....	21,291	275	76	1750	23,727	363	65
'09....	21,800	277	86	'51	21,028	294	71
1710....	24,620	251	107	'52	20,485	316	64
'11....	19,833	228	87	'53	19,276	331	58
'12....	21,198	226	102	'54	22,696	298	76
'13 .	21,057	206	88	'55	21,917	391	56
'14....	26,596	238	94	'56	20,872	329	63
'15....	22,232	282	80	'57	21,313	318	67
'16....	24,436	275	85				
		285					

I think on the whole that the steadiness shown in the results of this table is quite remarkable. There are, indeed, occasional jumps and depressions, the cause of which cannot be now unravelled; but we are to look upon it as a whole.

A perusal of this and the preceding tabular abstracts of the old bills of mortality, carries the mind back to the dangers of the streets of the metropolis in the seventeenth and eighteenth centuries, so vividly portrayed by Gay in his "Trivia:"—

"Where a dim gleam the paly lanthorn throws
O'er the said pavement, heapy rubbish grows;
Or arched vaults their gaping jaws extend,
Or the dark caves to common shores descend;
Oft by the winds extinct the signal lies,
Or smother'd in the glimmering socket dies,
Ere night has half roll'd round her ebon throne;
In the wide gulph the shatter'd coach o'erthrown."

or again:—

"Entangled here the waggon's lengthen'd team
Cracks the tough harness; here a ponderous beam
Lies overturn'd athwart; for slaughter fed
Here lowing bullocks raise their horned head.
Now oaths grow loud, with coaches coaches jar,
And the smart blow provokes the sturdy war."

and Dr. Johnson, a great observer of the London streets, at a later period wrote:—

"For who would leave unbrib'd Hibernia's land,
Or change the rocks of Scotland for the *Strand*?
There some are swept by sudden fate away,
But all whom hunger spares, with age decay.
Here malice, rapine, accident conspire,
And now a rabble rages, now a fire;
Their ambush here relentless ruffians lay,
And here the fell attorney prowls for prey;
Here falling houses thunder on your head,
And here a female atheist talks you dead."

The early dramatists are full of such allusions to the dangers of the town.

Dr. Farr made an abstract of the results to be deduced from the London bills of mortality, following them down to 1829, of which Table C contains the details, including some figures from the registrar-general's returns next to be spoken of:—

TABLE C.—*Violent Deaths in the London Bills of Mortality, at different periods from 17th to 19th Centuries.*

Years.	Drowned.	Burnt and Scalded.	Suicide.	Killed.	Murdered.	Poisoned.	Smothered and Suffocated.	Executed.	Total.	Found Dead.	Total, including Found Dead.	Total Deaths.
1647 to 1700...	3,448	419	901	3,520	683	96	108	1,043	10,218	478	10,696	1,054,201
1701 " '49...	3,943	384	1,978	3,120	419	115	151	681	10,791	1,770	12,561	1,223,343
'50 " '99...	5,679	744	1,571	3,546	218	76	288	935	13,057	510	13,567	1,043,759
1800 " 1829...	3,635	1,150	1,090	2,632	99	109	216	595	9,526	406	9,932	586,322
'37½ " '39...	—	—	—	—	—	—	—	—	3,119	—	—	123,098

Proportion of Deaths by Violence in 10,000 Deaths from all Causes.												
1647 to 1700...	32.7	4.0	8.5	33.4	6.5	0.9	1.0	9.9	96.9	4.5	101.4	10,000
1701 " '49...	32.3	3.1	16.2	25.5	3.4	0.9	1.2	5.6	88.2	14.5	102.7	10,000
'50 " '99...	54.4	7.1	15.0	34.0	2.1	0.7	2.8	9.0	125.1	4.9	130.0	10,000
1800 " 1829...	62.0	19.6	18.6	44.9	1.7	1.9	3.7	10.1	162.5	6.9	169.4	10,000
'37½ " '39...	—	—	—	—	—	—	—	—	253.4	—	—	10,000

The results to be read from this table are these:—In the first period (1647-1700) the annual rate of mortality was about 7, in the second 5·2, in the third 5, and in the fourth 3 per cent.; whence it may be deduced that in the seventeenth century 6·8 (nearly 7) in 100,000, in the eighteenth century 5·4, and in the nineteenth century 5, died violent deaths. Out of a given amount of population the deaths by drowning increased in the latter half of the eighteenth century; the deaths by scalds and burns were twice as great in 1800-30 as in the seventeenth century. The tendency to suicide remained nearly stationary, so did death by poisoning. All the deaths by personal violence rapidly decreased.

In the seventeenth century therefore, in a population of 100,000, about 23 were killed by injuries of various kinds, and 4·6 were murdered; in the nineteenth century about 13 were “killed,” and 0·5 were murdered. The chance of being murdered diminished ninefold. The executions were more frequent in the latter half than in the beginning of the eighteenth century, compared with the population within the bills of mortality; they were not, however, half so frequent in the first thirty years of the nineteenth century as in the latter half of the eighteenth century, when about 7 were executed annually to a population of 10,000. Relatively to the murders, the number of executions increased.

I must leave this part, instructive as it is, and turn to the present period.

PART II.—STATISTICAL.

All modern statistics date from the coming into operation of the machinery of the Registration Acts, applicable to deaths in three divisions of the kingdom respectively. That for England and Wales was enacted in 1836; for Scotland in 1854, and for Ireland in 1863.

The returns available under these Acts are so much in advance of anything previously existing, that they in fact constitute a new era—the practical compared with the problematical or simply historical.

I propose to investigate the returns of each division of the kingdom separately, no other plan being deemed really practicable.

1. **England and Wales.** The registration of deaths and their causes, under a scientific arrangement, came into operation for this division of the kingdom in 1837, but no return under the head “violent deaths,” which includes all the designations we here adopt, was actually compiled earlier than for the year 1838. From thence down to 1842 they were given with regularity; then came a hiatus of four years, 1843-46, but the returns were resumed in 1848, and have since remained continuous.

The following table gives the totals of such deaths for each

year embraced in the returns, distinguishing the number of males from females :—

TABLE D.—*Deaths by Violence (including Accident, Negligence, and Misadventure) in England and Wales, distinguishing Males and Females; also Total Deaths (both Sexes), showing Ratio of Deaths from Violence.*

Year.	Violent Deaths.			Deaths, all Causes.	Violent Deaths to General Mortality, One in
	Males.	Females.	Totals.		
1838	8,359	3,368	11,727	342,762	29
'39	—	—	11,980	338,984	28
1840	—	—	11,922	359,687	30
'41	—	—	11,468	343,847	29
'42	—	—	11,338	349,519	30
'43	—	—	—	346,443	—
'44	—	—	—	356,933	—
'45	—	—	—	349,366	—
'46	—	—	—	390,315	—
'47	—	—	13,720	420,977	30
'48	9,785	3,768	13,553	398,533	29
'49	9,624	3,709	13,333	440,839	33
1850	9,984	4,000	13,987	368,602	26
'51	9,723	3,836	13,559	392,369	28
'52	10,458	4,017	14,475	407,135	28
'53	10,725	4,087	14,812	421,097	28
'54	10,990	4,197	15,187	437,905	28
'55	10,951	4,341	15,292	425,703	27
'56	10,885	4,027	14,912	390,506	26
'57	11,048	3,979	14,027	419,815	29
'58	10,327	3,824	14,151	449,656	31
'59	10,785	3,464	14,249	440,781	30
1860	10,666	4,108	14,774	422,721	28
'61	11,143	3,842	14,985	435,114	29
'62	10,994	3,950	14,944	436,566	29
'63	11,635	4,045	15,680	473,837	30
'64	12,576	4,442	17,018	495,531	29
'65	13,105	4,269	17,374	490,909	28
'66	12,735	4,180	16,915	500,689	29
'67	12,657	4,209	16,866	471,075	27
'68	12,833	4,135	16,968	480,622	28
'69	12,419	4,078	16,497	494,828	29
1870	12,339	4,254	16,593	515,329	31
'71	12,678	4,315	16,993	514,879	30
'72	13,045	4,212	17,257	492,265	28
'73	12,900	4,346	17,246	492,520	28
'74	13,414	4,506	17,920	526,632	29
'75	13,925	4,964	18,889	546,453	28
'76	13,691	4,688	18,379	500,315	27
'77	13,144	4,540	17,684	500,496	28
'78	13,666	5,181	18,847	539,872	28
'79	12,866	4,769	17,635	—	—

Note.—The figures in the early portion of this table underwent some slight adjustment afterwards.

Commentary on Table D.

These results present a wonderful uniformity, and indeed establish the fact that the law of average obtains as fully in this class of deaths as in those resulting from what are usually termed natural causes. It will be observed, however, that the increase has been far more progressive with males than with females, as indeed was to be expected from the nature of the occupations of the former.

But in order to arrive at the true value and force of the figures now furnished, a critical examination of the results is required, and this I now proceed to make in chronological order.

At the census of 1831 the total population was returned at 13,897,187. Of this population there were 834,543 families engaged chiefly in agriculture; 1,227,614 engaged chiefly in trade, manufactures, and handicraft; and 849,717 families engaged in other pursuits or living on their means. This gave a total of 2,911,874 families, the heads of which might be regarded as the persons more liable than others to the chances of death by accident, negligence, violence, or misadventure.

1833. Children under 9 years of age were prohibited from working in factories.

1838. The deaths placed under this year were really those occurring between 1st July, 1837, and 30th June, 1838, both inclusive. This arrangement continued down to 1840. The first clear period of a year (January to December) embraced in my report was in the fifth, containing abstracts for 1841. The registrar-general remarked upon his first summary of the deaths of this class relating to this year (Second Report, p. 77): "The violent deaths are exceedingly numerous, and will perhaps lead to a general inquiry into their causes—drowning, fires, accidents with machinery, the bursting of steam boilers, explosions in mines, and poisons which can be procured, of the most destructive and subtle nature, with extraordinary facility. *In a political point of view violent deaths are of great importance, as they bear upon the efficient part of the population.*"

The mortality from violent deaths throughout England and Wales was 1·064; or in other words 106·4 in 100,000 males (living) died a violent death. In the northern counties it was found that 16 in 10,000 males died violent deaths annually; in Staffordshire, and Warwickshire, and some other midland counties the deaths were 14; in Lancashire and Cheshire 13; in Cornwall and other south-western counties 11; in the metropolis 8; in Essex, Suffolk, and Norfolk 7. The deaths of females by violence were most numerous in Cheshire, Lancashire, Yorkshire, and some other counties where they were employed in factories, and sustained injury by machinery.

In Kent and other south-eastern counties, 3 females in 10,000 died violent deaths; in Lancashire and Cheshire 5 in 10,000 annually.

The mortality of *males* from violent deaths was to that of *females* as 26 to 10. It was found that two-thirds of males killed by violence were aged 20 and upwards, while less than half of the females were of that age. But the same data also showed that many more accidents happened when the men were young and inexperienced than in maturer life. The violent deaths of men with occupations above ground were very generally from the effects of falls, to which masons, plasterers, slaters, painters, and glaziers were found peculiarly liable.

Speaking generally, it was found that violent deaths were least common in the agricultural districts, more frequent in cities and manufacturing towns, and most fatal in mining districts, but even here more fatal in the midland districts than in the northern counties.

The interesting point of "Locality" is further illustrated by the following table :—

TABLE E.—*Number of Violent Deaths out of One Hundred Thousand Persons by Various Causes in the Metropolis; in Manchester, Liverpool, and Birmingham; in Norfolk and Suffolk, and in the Mining Districts.*

Causes of Death.		Metropolis (Two Years).	Norfolk and Suffolk.	Manchester, Liverpool, and Birmingham.	Mining Districts.
Mechanical injury	Gunshot wounds.....	0·7	1·0	0·7	1·0
	Other "	2·6	1·5	2·4	1·0
	Fractures and contusions	21·6	20·6	35·0	53·2
Chemical injury	Explosions, scalds, burns, } lightning	14·6	20·7	28·3	38·8
	Poisons	3·3	2·2	4·0	1·8
Suspension of respiration (asphyxia)	Drowning	16·4	19·4	17·5	21·9
	Hanging	4·7	6·5	4·0	1·4
	Mephitic gases	0·2	—	—	0·9
	Suffocation	2·7	2·9	3·3	0·6
Total		66·8	74·8	95·2	120·6

1839. The violent deaths were found to range from 50·9 to 101·5 per 100,000 of the population—that is the highest in the mining and manufacturing, the lowest in the agricultural districts; the metropolis occupying a mean position between the two; average over the whole 79·2. The actual proportion in the different districts will be valuable for future reference.

TABLE F.—*Annual Rate of Violent Deaths per One Hundred Thousand of the Population,—Exclusive of Suicides.*

Districts.	Males.		Females.		Mean of the Two Years.		
	1838.	1839.	1838.	1839.	Males.	Females.	Both Sexes.
Northern counties	165·8	163·9	42·5	33·9	164·8	38·2	101·5
Western „	134·6	143·2	48·5	50·5	138·9	49·5	94·2
North-Western counties	137·0	130·2	52·5	53·7	133·6	53·1	93·3
Monmouth and Wales	114·0	129·2	36·0	38·3	121·6	37·1	79·3
South-Western counties	115·3	104·4	40·5	37·5	109·8	39·0	74·4
North Midland „	95·9	107·8	39·6	39·3	101·8	39·5	70·7
Yorkshire	92·7	88·2	43·9	41·2	90·5	42·5	66·5
Metropolis	85·3	78·7	38·7	37·3	82·0	38·0	60·0
South Midland counties	76·7	78·0	36·5	32·0	77·3	34·3	55·8
South-Eastern „	87·9	73·1	33·6	27·0	80·5	30·3	55·4
Eastern counties	71·6	76·0	27·4	28·9	73·8	28·1	50·9
England and Wales	106·4	105·8	41·1	39·4	105·8	40·2	73·0

The mortality of males from violent deaths was thus seen to be as 105 to 40 of females.

Attention was drawn to the fact that many accidents happened from ignorance and carelessness; that fewer accidents occurred in one factory than in another; that men were crushed, burnt or blown to pieces much less frequently in the coal mines of certain proprietors than in those of others. Hence human agency might be employed in mitigation of violent deaths. “The knowledge or “the accidents to which people are exposed in different occupations “may put them more on their guard against danger.”—Third Report, Registrar-General, p. 88.

An analysis of the violent deaths in three other European countries compared with England and Wales, was given in the third report of the registrar-general, and will be given in our statistics relating to “foreign countries.”

1840. An analysis of the deaths by accidental violence this year furnished the following details:—Out of 7,152 males 3,268 were under 20, and 3,884 above. Out of 2,828 females 1,996 were under 20, and 832 above. Lancashire and Cheshire presented the highest totals for both males and females. In those counties united the death-rate from this cause was, for males 1,098, for females 459 to 1 million living. In London alone no less than 1,016 persons were killed that year, of whom 711 were males, and 305 females. The deaths from accidents were, therefore, for males 82·1, and females 31·0 to 100,000 living. The causes of death were thus classified: mechanical injuries 3,305, chemical injuries 3,245, drowning, &c., 2,297.

The registrar-general in his sixth report (1842), thus drew attention to this subject :—

“The violent deaths in England appear to be nearly twice as frequent as in other countries of Europe from which returns have been procured. . . . The coroners’ informations, although not made at present on a uniform plan, furnish many valuable facts, and when compared with the occupations and other circumstances recorded in the registers, or ascertained at the census, become doubly interesting . . . it is very desirable that in all cases in which inquests are held, the coroner should instruct the juries to state in their verdicts with greater minuteness than at present the cause of death; recording more in detail the nature of the injury, and the circumstances in which the death happened.”

It was still apparent that the modern classification of these deaths was not yet settled.

1841. The population of England and Wales as shown by the census of this year was 15,911,757—males 7,775,224, females 8,136,533.

1844. The “Factory Act” of this year provided for the fencing in and guarding of machinery where children and women were employed (see 1856).

1850. Dr. Farr commenced his useful annual review in the reports of the registrar-general of the “Causes of Death” (*vide* Thirteenth Annual Report, part ii, p. 136); and in the same for this year he indicates that some changes had been introduced in the classification of violent deaths. This may account for the sudden jump up in the number of such deaths this year; but they recede again speedily.

A few of the causes contributing to the total are indicated: cold 102; burns and scalds 2,782; poisons 455; drowning 2,532; suffocation by other means 1,173; mechanical injuries caused 4,824 deaths, viz., 4,233 by fractures and contusions, and 591 by wounds. There were 1,225 cases of death by violence where the causes were not returned. There were 323 deaths registered as consequent upon intemperance.

1851. The population of England and Wales, as shown by the census of this year, was 17,927,609—males 10,223,558, females 9,146,384. Nearly 80 in every 100,000 of the population died by violent deaths this year.

1852. The deaths from violence again increased this year considerably, and amounted to 3·6 per cent. (or 36 per 1,000) of the deaths of the year. Thus 80 in 100,000 of the population were killed by some form of violence.

An intimation was given in the fifteenth report of the registrar-general, that tables were being prepared “which will show the “peculiar diseases, and the dangers of each sex at several periods “of age.”

1854. The deaths by *fractures* and *contusions* had been increas-

ing rapidly, viz., from 4,228 in 1848 to 5,777 in 1854, and if deaths from "other violence" be added, the increase had been from 5,254 to 6,274. On the other hand the deaths from *poison* which had ranged from 444 to 467 in the four years 1848-51, had become reduced during the three following years to 370, 409, and 398 respectively; this was believed to be consequent upon legislation regarding the sale of poisons.

The deaths from fractures in England and Wales during the seven years 1848-54 had reached the enormous total of 33,239, taking rank as No. 21 in a table of the causes of death arranged in the order of their mortality.

1856. In the nineteenth report of the registrar-general, containing abstracts for this year, there is a most careful analysis of violent deaths for the five years 1852-56. The total deaths of this class in that period were 68,554, viz., 50,287 males and 18,267 females, that is in the proportion of three males to one female. Their causes were now classed into six groups, viz.:—1, connected with *railways*; 2, mines (in two divisions, coal and metals); 3, mechanical injuries; 4, chemical injuries; 5, asphyxia (suspension of respiration); 6, violence (not defined). The most numerous class was No. 3, but very little below came No. 4, while No. 5 was very large.

The arrangement admitted of many details in the way of sub-classes, and is still continued. Particular attention will be drawn to it in a later division of this paper.

The number of deaths from *mechanical violence*, which had been for some years increasing, now showed signs of a gradual decline, and continued in this favourable condition, 1867 and 1876 showing periods of reaction.

In Dr. Farr's letter to the registrar-general in the same report, the following details are given regarding the year 1856. The mortality from violent causes was nearly 80 in 100,000 living, and nearly 4 in 100 deaths were by violence; 2,919 deaths were from burns and scalds; 2,681 were from drowning; and the deaths at sea were not included in the registers. 5,433 deaths were from fractures and contusions. He says, in his commentary upon coroners' returns:—"The progress of science has created new forces, often fatal, and has produced new substances, of which our forefathers had no knowledge. Machinery is organised on a large scale, so that the lives of numbers of men are liable to be destroyed, not by malicious intent, but by the negligence of other men who have their lives in charge;" and adds, "1,107 persons are killed annually by horses and horse conveyances;"—more than double the number killed by railways.

The deaths from *drowning* constitute an important class. They

numbered 11,758 in the five years 1852-56, but the details concerning the mode are very obscure. 588 were drowned while bathing; 215 by falling from ships and boats; 265 by shipwreck; 4 while sliding and skating; and the great bulk are unaccounted for. We shall recur to these deaths at a later portion of this paper.

In *mines*, during the five years 1852-56, the total deaths had been 5,683, males 5,629, females 54;—average annual deaths 1,136; 985 in coal mines and 151 in metal mines. The causes most generally associated in the popular view with mining accidents are explosions of fire damp; but accurate registration shows that the deaths from this cause are on the annual average but 198 to 939 from other causes. The fall of coal, stone, and other substances kills 509 men and women annually, including the crushed; 157 fall into the pits and shafts. This branch of the inquiry is specially followed up in a later section of this paper.

The deaths from *railway accidents* were showing signs of considerable increase, as was indeed to be expected, owing to the rapid extension of railway travelling. The numbers rose from 391 in 1852 to 548 in 1856. The registrar-general's returns only extended to England and Wales here as in other cases; but in this instance we have access to the Board of Trade returns, the totals of which however differ very materially from the registrar-general's returns, and can therefore give those for the other divisions of the kingdom, as far as they go.

TABLE G.—*Deaths from Railway Accidents from 1852 to 1856, both inclusive, as Reported to the Board of Trade.*

Years.	England and Wales.	Scotland.	Ireland.	Total.
1852	181	24	11	216
'53	243	36	26	305
'54	180	29	14	223
'55	214	14	18	246
'56	232	30	19	281

The explanation of the discrepancies between the Board of Trade returns and those of the registrar-general as to numbers, may be gathered from a report by Captain Galton, R.E. :—

“I believe railway companies return to us *all* the fatal accidents “to passengers, except perhaps occasionally when death ensues a “long time after the accident, but probably *not more than one-half of the fatal* accidents to their own servants are returned; “and I believe that many cases of fatal accidents to trespassers “are not returned. We endeavour to get as complete returns as “we can, but the law only requires returns of accidents to passengers.”

In further explanation of these discrepancies and their causes, the following abstracts are given :—

<i>The Causes of Death in the Registrar-General's Returns of the Persons Killed by "Accidents in Connection with Railways" in 1856.</i>		<i>Similar Accidents attended with Death, Reported to the Board of Trade as having occurred in 1856 in England and Wales.</i>	
Run over on line	306	Run over on line	137
Fall from carriage or engine	22	Fall from carriage or engine	35
Collisions	11	Collisions	14
Carriages off rails, &c.	7	Carriages off rails, &c.	10
Explosion of boilers.....	7	Explosion of boilers.....	1
Killed between buffers.....	8	Killed between buffers.....	23
Fall of earth.....	3	Fall of earth.....	Nil
Other deaths (manner not stated)	184	Other deaths.....	12
	<hr/>		<hr/>
Total	548	Total	232
	<hr/>		<hr/>

There was a further amendment of the Factory Acts this year (see 1844 and 1867).

1857. The execution of Palmer for the Rugeley Life Insurance murders, drew attention to the great number of deaths resulting from *poisoning*, which were of course included under the class violent. The multiplication of poisonous substances has followed upon improved chemical knowledge, and many of these, from the subtle nature of their effects, have been found well, too well, adapted to the murderous art—as witness the Wainwright ("Janus Weathercock," of the "London Magazine") poisoning of his wife and her sister, the beautiful Helen Abercrombie (life insurance again) in the first half of the present century. Poisons are in truth the most insidious instruments the assassin can employ. The deaths registered from poisons this year were 428; but there is so often an extreme difficulty of proof, that they are and have always been probably more than can be actually discovered (see 1868).

1858. Of the number of deaths from violence returned in the table for this year (14,151), no less than 12,523 were regarded as resulting from accident—that is, the suicides, homicides, and murders were excluded. Of these deaths by accident there were 5,159 from fractures and contusions, 3,125 from burns and scalds, 2,124 from drowning, 903 from suffocation, 282 from poison, 136 from gunshot wounds, 80 from wounds by sharp instruments, and 714 were apparently accidental, but by ways or with weapons not defined. The deaths from accident were about eight times those produced wilfully.

The county of Lancashire yielded 2,036: London, with a greater

population, returned 1,937. The ratio of violent deaths in Liverpool was remarkably high. It was also high in Monmouthshire, for with a population equal to that of Dorsetshire, there were 269 deaths in the former, and only 119 in the latter. South Wales altogether gave a high ratio, it returned 594 deaths from accident; Northumberland only 255. Taking equal parts of the population, there were in the latter only 84 as against 97 in the former.

1859. This year attention was drawn to deaths by *lightning*. The recorded deaths from this cause had been 18 in 1857; in 1858 they were 26, and this year they were 17. These nearly all occurred to persons following out-door occupations. Of the entire number 52 were males, 9 females; 54 were of the age of 15 and upwards, one a female child under 5. The attention of coroners to the importance of making careful returns in such cases was invoked. There is a tradition that deaths from lightning never occur on chalk soils. Mr. Alfred Haviland has this point under investigation.

1860. Dr. Farr, F.R.S., in his letter to the registrar-general on the causes of death for this year, said: "Probably more than half 'the violent deaths of both sexes may be prevented by care and 'vigilance on their own part, and on the part of their employers.'" He also pointed out that the deaths from murders and man-slaughters were imperfectly returned. "Suicide is most frequently 'committed by hanging, but many of the suicides by drowning are 'undoubtedly classed under accidental death from want of information." The *suicides* ascertained were 7 in 100,000 of the population—1 in 14,286.

In the "Assurance Magazine" (vol. ix, pp. 20 and 156) at this date will be found a paper by Mr. H. W. Porter, B.A., containing considerations as to how far the mortality exhibited by the reports of the registrar-general is controllable by human agency.

1861. The population of England and Wales as determined by the census of this year was 20,066,224—males 9,776,259, females 10,289,965.

The report of the registrar-general for this year contains the following startling statement:—"39,927 persons were burnt alive 'in England, or were scalded to death, in the fourteen years '1848-61." The following table shows the ages whereat these forms of death most frequently arise :—

TABLE H.—*Mortality in England and Wales from Burns and Scalds, in the Fourteen Years 1848-61.*

Ages.	Deaths in the Fourteen Years.		Average Annual Deaths.		Average Annual Rate of Mortality to 100,000 Living.	
	Males.	Females.	Males.	Females.	Males.	Females.
All ages.....	19,736	20,191	1,409	1,443	1·60	1·57
Under 5 years	10,800	8,996	771	643	6·53	5·47
5 years.....	2,958	4,982	211	356	2·00	3·41
10 „	792	1,273	57	91	0·59	0·96
15 „	777	582	56	42	0·63	0·46
20 „	731	328	52	23	0·66	0·27
25 „	1,240	474	89	34	0·67	0·24
35 „	839	419	60	30	0·59	0·28
45 „	580	490	41	35	0·56	0·45
55 „	401	525	29	37	0·60	0·70
65 „	282	796	20	57	0·75	1·83
75 „	271	972	19	69	1·96	5·58
85 „	61	329	4	24	3·14	12·63
95 „ and up- wards.....	4	25	—	2	—	19·72

Note.—The ratios in the two last columns being based upon the population of 1851, give the mortality slightly too high.

1862. The returns for this year show a further decrease in the deaths from *poisoning*. In the eight years 1850-57 they had varied from 2·1 to 2·6 per 100,000 of the population; they had fallen to 1·5, 1·4, 1·2, 1·3, and 1·3 in the five years 1858-62. This was, as already intimated, due to the increased care of chemists and druggists consequent upon legislation. “No precautions against these deaths are too great; they diminish the fatality of accidents, and make “suicide and murder difficult by poisons.”—(*Dr. Farr.*)

1863. Attention was drawn to the numbers of murders, homicides, infanticides, suicides, and executions at this date; not so much on account of any great increase in their proportions, but rather as a proper subject for statistical inquiry in relation to violent deaths.

Of the 258 *murders* of the year, 81 were infanticides—34 boys and 47 girls, including infants. Exclusive of infanticides, 177 persons were murdered—103 males, 74 females; 176 of these, however, were children under 1 year of age, leaving 47 males and 35 females at various ages, of which 14 males were from 35 to 45, and 12 females from 45 to 55 years of age.

Of the 141 *homicides* (returned by coroners’ juries as manslaughter) 100 were of males and 41 of females at various ages, 23 males and 11 females being between 35 and 45 years of age. The homicides fluctuate from year to year. Since 1858 they had ranged from 1·6 to 2·1 in 100,000 of the population annually.

The *infanticides* were included in the returns of murders and homicides, all being in the tabular returns designated homicides. These have increased during the last two and present years. In the three years 1858-60 the reported annual deaths by homicide and infanticide were 353; in the three years 1861-63 they were 379, showing an average increase of 26.

The *executions* had also increased. They averaged 9 per annum in the three years 1858-60, and 16 in the three years 1861-63. During this year 20 men were executed—6 of the age of 15—25; 10 of 25—35; 1 of 35—45; 2 of 45—55; and 1 of 65—75. But 1 woman, age 25—35, was executed. The returned homicides (by coroners' inquests) in the six years 1858-63 were to the executions as 2,196 to 75, or as 29 to 1.

The *suicides* of the year (so returned) were 1,319; the proportion to the population being 6·6 in 100,000, homicides being 20, and executions 1. The proportion of suicides to 100,000 of the population on an average of the six years 1858-63 was 6·7, and the successive numbers for those years run 6·6, 6·4, 7·0, 6·8, 6·5, and 6·6. The most common way of committing suicide is shown in the following table:—

TABLE I.—*Suicides to every One Hundred Thousand of the Population in England and Wales, 1858-63.*

Means Employed.	1858.	1859.	1860.	1861.	1862.	1863.
Hanging	3·0	2·7	3·0	3·0	3·0	2·8
Cutting, stabbing.....	1·3	1·4	1·4	1·3	1·1	1·3
Drowning	1·0	1·1	1·1	1·1	1·0	1·2
Poisoning	0·6	0·6	0·8	0·6	0·6	0·6
Gunshot wounds	0·3	0·3	0·3	0·3	0·3	0·3
Otherwise	0·4	0·3	0·4	0·5	0·5	0·4
All ways	6·6	6·4	7·0	6·8	6·5	6·6

The regularity here shown is little short of surprising; but the subject is too large to be followed up now. It will some day command a paper exclusively.

The deaths of each class here spoken of, and of nearly all classes constituting violent deaths, form the subject of inquiry before coroners' courts. The reform of the coroner's court is a subject demanding further consideration than it has yet received. The number of inquests held in 1863 was 20,591. The juries in 2,429 instances returned verdicts of "found dead," and in 7,118 instances "natural death" as the result of their investigations. The coroners at present are composed in large proportions of lawyers and doctors. Under more enlightened government the office will probably be deemed purely a legal one; but a proper certification of the cause of death by a medical practitioner attending the coroner's court

should be part of the process. In too many instances the present finding of a coroner's jury is a farce, and in other cases absolutely misleading.

1864. In the fifteen years 1850-64 the deaths by violence of every kind, including accidents, negligence, suicide, and murder, were in the proportion of 75·3 to 100,000 of the population, that is rather more than 7 to 10,000 living. The proportion in the three periods of five years were 74·6, 74·2, and 77·0 in 100,000. The increase began in 1863, when the proportions rose to 77·2, and in the three following years to 82·6, 83·5, and 80·7.

1865. The violent deaths had increased from 14,151 in 1858 to 17,374 in 1865. The deaths to 100,000 of the population were 73·4 in 1858, and were now 83·5; while the population had been increasing, the violent deaths had increased in a more rapid ratio. The increase was almost wholly due to accidental causes, chiefly to mechanical forces. The danger of London streets demanded attention. "Children, women, old people, and even vigorous men "are killed weekly by horses and carriages of various kinds."

1866. The following passage from Dr. Farr's letter to the registrar-general on the causes of death this year, deserved and received marked attention:—

"It is well worthy of note that although deaths by accident "attract adequate attention when many persons are killed at the "same time by great explosions in coal mines, or formidable "collisions on railways, *the causes of the greatest number of deaths "escape public notice.* Thus if explosions are dangerous in mines, "the fall of stone and of other materials which knock men on the "head one by one at intervals, are much more fatal. *So street "accidents by horse carriages kill more people in a year than "railways."*

The experience of *Accident Insurance Companies* has long confirmed this fact.

There were twenty deaths from lightning this year.

1867. The registrar-general's report for this year contained in elaborate detail returns of violent deaths during the five years 1863-67. The results here given will be submitted to analysis in a later portion of this paper.

There had been a decided increase in the deaths by violence during the decennium. In 1847 there were 7 deaths in 10,000 of the population; there were now 8. The deaths by violence to 100,000 of the population had ranged from 71·6 to 76·0 in the four years 1851-54, and from 79·5 to 83·5 in the four years 1864-67. There was no increase of deaths from murder and manslaughter in the ten years 1858-67, nor in suicide. The increase was in the deaths attributed to accident or negligence.

The 15,147 deaths of the latter character were thus divided: males, 11,446; females, 3,701. Of the males, 791 met with their deaths under 1 year of age, and 2,069 under 5; 753 between 5 and 10; 870 between 10 and 15; 946 between 15 and 20; 949 between 20 and 25; 1,501 between 25 and 35; 1,347 between 35 and 45; 1,083 between 45 and 55; 858 between 55 and 65; 569 between 65 and 75; 231 between 75 and 85; 47 between 85 and 95, and 1 above 95. Of the females, 715 met with their deaths under 1 year, and 1,566 under 5 years; 372 between 5 and 10; 153 between 10 and 15; 118 between 15 and 20; 84 between 20 and 25; 140 between 25 and 35; 154 between 35 and 45; 190 between 45 and 55; 198 between 55 and 65; 259 between 65 and 75; 288 between 75 and 85; 98 between 85 and 95, and 4 over 95.

Dr. Farr, reviewing the causes of violent deaths this year, said (thirtieth report, p. 225):—

“It is only correct to say that deaths by violence are more frequent in civilised than in barbarous communities, when we leave out of sight the slaughters of war and the perils of starvation. But as the progress of civilisation depends very much upon the free application and employment of the vast forces of nature in the intercourse and arts of life, it is found practically in this country that deaths by violence are rapidly increasing in England. Special precautions are demanded.”

The Factory Acts were amended and their scope much extended this year.

1868. An Act to regulate the sale of *poisons* was enacted this year.

1870. The “Elementary Education Act” was passed this year, and under it all children between 5 and 13 years of age were required to attend school. Burns and scalds, which had decreased from 3,166 in 1860 to 2,545 in 1869, showed a further decrease this year. For the years 1860-64 they were at the rate of 14·7 per 100,000 of the population. They were for the years 1865-69 but 122, and were for the present year reduced to 116. Homicide was decreasing.

1871. The population of England and Wales, as determined by the census of this year, was found to be 22,712,266—males 11,058,934, females 11,653,332.

1872. It became more apparent that the deaths by violence bear a certain proportion to the quantity of mechanical force in use.

As to the deaths from *drowning*, it was pointed out that there were 2,297 among merchant seamen (as drawn from maritime registry), and 67 in the royal navy, not included in the returns.

The mortality from accident and negligence was 6·62 to 10,000 of the population this year; by homicide, 0·17, by suicide 0·66,

and by execution 0'004. There were 46 persons killed by lightning in the year.

There were enacted this year two important measures: "The Coal Mines Regulation Act, 1872," and the "Metalliferous Mines Regulation Act, 1872." No girls or women were to be employed in any underground work.

1873. The deaths from *lightning* presented marks of great fluctuation. They had increased since 1868 as follows: number of deaths 11, 7, 19, 28, 46, 21; giving in the first three years of the period 37, in the last three years 95. "Thus the electrical action "of the earth, measured by deaths from lightning, increased "rapidly from 1869."

1874. The accidents resulting from *horses* and horse conveyances were again prominent. No less than 1,313 persons had been killed since the year by these means—1,113 males and 200 females. "Carts, vans, and wagons are great offenders. The *trams* evidently require great care in their management; although "they are not in such general use, they killed more people (62) "than omnibuses (55). By cabs 61 persons were killed, by "carriages 82; and this limitation of numbers implies great "skill on the part of the drivers in streets often crowded."—Dr. FARR.

Sunstroke was fatal in 71 males and 19 females.

1875. It was remarked that the introduction of every new force was followed by a certain number of deaths. "The chances of "death are increased, and the people about the machines and "instruments which the force animates, are untrained in their use, "and so do not avoid the danger that, with the requisite precautions, "are not inevitable." This was found to be especially the case with steam in all its applications.

The deaths from railways had, during the three years now ended, rapidly increased.

2. **Scotland.** The registration of deaths in this division of the kingdom came into operation with the year 1855. I believe there is nothing in the early bills of mortality of either Edinburgh or Glasgow which throws any light upon the subject of violent deaths in Scotland; and hence I pass at once to the data furnished by the registrar-general in the "Detailed Annual Reports," which I know will be found very complete.

The registrar of Scotland first divided the territory under his superintendence into three great divisions, sufficiently expressive of the varying incidents attached to each, viz., insular (consisting of 186 islands), mainland, and town districts. References to these will continuously occur in this section of our subject. More recently (1871) he has rearranged the divisions into five groups,

which will be described later, and which has caused a break in some of the tables.

TABLE J.—*Showing the Deaths from Violence and from all Causes in Scotland, during the Period 1855-76.*

Year.	Violent Deaths (Scotland).			Deaths from all Causes (Scotland).	Ratio of Deaths from Violence, to Deaths from all Causes, 1 in
	Males.	Females.	Total.		
1855	1,410	503	1,913	62,004	32
'56	1,461	542	2,003	58,529	29
'57	1,509	559	2,068	61,906	30
'58	1,406	574	1,980	63,539	32
'59	1,480	574	2,054	61,714	30
1860	1,593	594	2,186	68,170	31
'61	1,547	542	2,089	62,341	30
'62	1,496	561	2,057	67,195	32
'63	1,680	580	2,260	71,481	31
'64	1,711	580	2,291	74,416	32
'65	1,799	583	2,382	70,891	29
'66	1,627	618	2,245	71,348	31
'67	1,639	557	2,196	69,068	31
'68	1,723	524	2,247	69,416	31
'69	1,729	584	2,313	75,875	32
1870	1,793	570	2,363	74,165	31
'71	1,734	627	2,361	74,712	31
'72	1,933	638	2,571	75,794	29
'73	2,124	715	2,839	76,946	27
'74	2,248	855	3,103	80,720	26
'75	2,107	801	2,908	81,761	28
'76	2,208	782	2,990	74,129	25

Commentary on Table J.

The population of *Scotland* in 1851 was 2,888,742, viz., insular, 166,487; mainland, 1,714,522; towns, 1,007,733.

1855. The violent deaths gave the proportion of 70 to every 100,000 of the inhabitants—a proportion considerably lower than that for England and Wales, where as we have seen it was at that date 82. The registrar (of Scotland) says, “The great mass of the deaths tabulated in this class result from fractures and contusions, from drowning, and from burns and scalds; and though the proportion of these forms of violent deaths *differs to a great extent in the three great divisions of Scotland*, it is surprising how very near the general mortality from that class is in the insular, mainland, and town districts.”

In the insular districts, the violent deaths were at the rate of 63 (per 100,000 of population); in the mainland districts 66, and in the town districts 77. In the whole of Scotland, the proportions were 109 males to 35 females, or just over 3 males to 1 female.

Of the total violent deaths, 617—males 513, females 104—resulted from *fractures* and *contusions*, being at the rate of 22 to every 100,000 of the population. But in the insular districts these only bore the proportion of 10, while in the mainland they were 20, and the town districts 26.

Drowning accounted for 440 deaths—males 374, females 66—being in the proportion of 16 per 100,000 of the population. Here the insular districts claimed the proportion of 26, the mainland and town districts only 15 respectively.

Burns and *scalds* claimed 311 victims, being in the proportion of 11 per 100,000 population, and each of three divisions showed the same proportions.

1856. The deaths of males from violence this year bore the proportion of 111 to 100,000 of population, females 36 to a like population.

Attention was drawn to the proportion of *suicides*; 103 cases of violent death were attributed to this cause, being in the proportion of 3·4 to each 100,000 of the population—considerably less than those in England and Wales.

1857. It was remarked that the deaths from *drowning* in the insular districts entirely compensated for all the more common causes of violent death which occur on the mainland and in towns, so much so that the ratio of violent deaths in the insular districts in some years even exceeds that in the two other districts: thus this year the respective proportions were, insular 82, mainland 70, town 77. The fact is that the passages between the islands are rendered very dangerous by the rapidity of the tidal currents, and the broken nature of the channels, aggravated too frequently by high wind or ground swells. The large proportion of persons engaged in the fisheries is also a contributing cause.

1858. Attention was called to the fact that the fluctuation in violent deaths was almost less than in any other cause of death. The proportion this year was 69 per 100,000 of the population.

The average of the five years' observations on violent deaths has been 71 per 100,000 of population. In three of the five years this had been the actual proportion of those years, in the two other years there had been slight variations.

1859. The chief causes of violent deaths this year were, fractures and contusions 722—males 590, females 132; drowning 421—males 350, females 71; burns and scalds 303—males 137, females 166; *intemperance* 101—males 65, females 36; wounds 100—males 79, females 21; suffocation 88; hanging 58; poisons 52.

1860. The deaths from all causes in Scotland this year were unusually high, being at the rate of 2·23 per cent. of the population, whereas the average rate for the preceding five years had been

2'05. The death-rate in England and Wales this year was the same as in Scotland.

1861. The population of Scotland this year was found to be 3,062,294—males 1,449,848; females 1,612,446.

1862. The violent deaths were 70 per 100,000 of the population, or 3'22 per cent. of the specified causes of death of the year. The deaths from *burns and scalds* were at the rate of 11 per 100,000 of population, being much lower than in England; and this circumstance was believed to be due to the prevalent use of woollen garments for females in Scotland, but the use of peat instead of coal fires may have much to do with this difference.

1863. The mortality from all causes in Scotland was remarkably high this year, 2'3 per cent., and it is quite noticeable *that the mortality from violent deaths rose in a like proportion*; "as if the "deaths from violence were regulated by the same laws which "increased the deaths by the ordinary diseases." The violent deaths were 76 per 100,000 of the population this year.

1864. The highest death-rate occurred in Scotland this year which had been experienced since the Registration Act came into force—being as much as 2'3 per cent. of the population—the average rate of the preceding nine years having been 2'1 per cent. No less than 8,388 more persons died than would have died if the ratio had remained at the previous average. The violent deaths thus did not increase in a corresponding ratio.

During the ten years terminating with the present year, the violent deaths registered in Scotland had amounted to 20,901—constituting 3'4 per cent. of deaths from all causes during that period; being at the rate of 72'7 per 100,000 of the population.

1865. The violent deaths were 3'51 per cent. of the general mortality.

1867. The mortality from burns and scalds again attracted attention. The mortality during the five years 1863-67 had been 1,468—males 748, females 720. "But this excess of male deaths "was limited to the period of infancy, that is, the first five years "of life, during which the sexes are dressed in much the same "material. After the fifth year the boys begin to be dressed in less "inflammable materials, and the girls more in those inflammable "materials which constitute their dress in after life. Accordingly "between five and ten years, only 75 boys, but 95 girls lost their "lives by burning. After that period of life, notwithstanding the "more dangerous occupations in which many men are engaged, "only 216 men, but 267 women lost their lives by burning."

1871. The population of Scotland this year was found to be 3,360,018—males 1,603,143; females 1,756,875.

The registration divisions of Scotland were rearranged. See Table M.

1874. The deaths from all causes in Scotland this year show a very remarkable increase, which seems to be attributable almost entirely to the intense cold of the month of December, when the temperature fell lower than at any other period since the registration returns had been instituted. And what is most remarkable is that the violent deaths appear to have increased with even a greater intensity than the deaths from all causes combined. Very cold and very hot weather equally increase the number of accidents in England—on which more in a later part of this paper.

1875. There being no coroners' inquest in Scotland, and only an inquiry before the procurator-fiscal when there is suspicion of murder or other criminal intent, it is felt that the returns concerning homicide in all its forms are less authoritative than in England. The total return of violent deaths is not much, if at all, affected by this circumstance.

TABLE K.—*Causes of Violent Deaths in Scotland, Males and Females, 1876.*

Causes.	Males.	Females.	Total.	Percentage of Violent Deaths.
Intemperance	115	82	197	6.59
Privation	3	4	7	0.25
Want of breast milk.....	31	30	61	2.04
Neglect	4	1	5	0.17
Cold	42	16	58	1.94
Poison	32	23	55	1.84
Poisoned wounds	2	1	3	0.10
Burns and scalds	130	155	285	9.53
Hanging, &c.	46	16	62	2.07
Suffocation	152	120	272	9.10
Drowning	624	97	721	24.11
Fractures and contusions	769	168	937	31.34
Gunshot wounds	23	—	23	0.77
Cuts and stabs	44	8	52	1.74
Other violent causes	191	61	252	8.43

The deaths this year were not at all above the average, nor did the causes vary materially.

Suicides, homicides, and executions are included in these figures.

TABLE L.—*Showing the Violent Deaths Registered in each of the Three Great Registration Divisions, 1855-70 (SCOTLAND).*

Years.	Insular.		Mainland.		Towns.		Total.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1855....	61	21	798	270	551	212	1,410	503
'56....	75	25	828	278	558	239	1,461	542
'57....	92	21	831	302	586	236	1,509	559
'58....	82	24	797	297	527	253	1,406	574
'59....	82	22	818	284	580	268	1,480	574
1860 ...	116	31	905	298	571	265	1,592	594
'61....	64	19	859	248	624	275	1,547	542
'62....	77	18	783	258	636	285	1,496	561
'63....	111	21	865	274	704	285	1,680	580
'64....	75	13	887	267	749	300	1,711	580
'65....	74	19	891	266	834	298	1,799	583
'66....	74	17	778	274	775	327	1,627	618
'67....	57	13	821	247	761	297	1,639	557
'68....	67	10	890	243	766	271	1,723	524
'69....	82	18	848	242	799	324	1,729	584
1870....	78	16	890	271	825	283	1,793	570

After this date a new distribution of registration districts was adopted.

From 1871 inclusive, the arrangement of the abstracts (tables) in the reports of the registrar-general of Scotland is into five distinctive groups as follows:—

1. PRINCIPAL TOWNS, each containing at least 25,000 inhabitants.
2. LARGE TOWNS, each containing not less than 10,000 and not more than 25,000 inhabitants.
3. SMALL TOWNS, each with at least 2,000, and not more than 10,000 inhabitants.
4. MAINLAND RURAL, from which are excluded all towns with 2,000 or more inhabitants.
5. INSULAR RURAL, which includes the whole population of the islands of the coast, but from which are excluded the inhabitants of the four small towns of Kirkwall, Lerwick, Stornoway, and Rothesay.

The population of these respective groups in 1871 is shown in Table N, but the area has not been given yet.

TABLE M.—*Showing the Violent Deaths in each Principal Registration Group, Sexes combined, Registered during the Period 1871-76 (SCOTLAND).*

Years.	Principal Towns.	Large Towns.	Small Towns.	Mainland Rural.	Insular Rural.	Total.
1871	959	215	524	617	46	2,361
'72	1,087	295	536	590	63	2,571
'73	1,094	281	690	704	70	2,839
'74	1,231	300	702	762	108	3,103
'75	1,097	316	677	743	75	2,908
'76	1,122	335	649	801	83	2,990

There was an extraordinary jump in 1873, and again in 1874, which I have already commented upon in commentary upon Table J. The chief increase in 1873 was in the mainland rural, the next important in the small towns.

TABLE N.—*Showing the Area, Population, Number, and Proportion of Violent Deaths in the Five Great Groups, adopted from the Registrar-General (SCOTLAND).*

Districts.	Area in Statute Acres.	Proportion to whole Area.	Population, 1871.	Proportion to whole Population.	Violent Deaths, 1878.	Proportion to whole Violent Deaths.	Principal Occupations.
Principal towns	—	—	1,068,556	31'80	1,122	39'98	{ Commercial, manu- facturing
Large towns	—	—	334,257	9'95	790	28'15	{ Trading, manufac- turing
Small „	—	—	776,087	23'10	332	11'83	{ Agricultural
Mainland rural	—	—	1,049,114	31'22	335	11'94	{ Agricultural, fish- ing
Insular rural	—	—	132,004	3'93	227	8'10	{ Fishing
	—	—	3,360,018	100'00	2,806	100'00	

This table is arranged to harmonise with similar tables for England and Wales (Table D), and Ireland (Table R), and its design is to show the intensity of violent deaths in the different districts as affected by the occupations and circumstances of those districts. The chief intensity of violent deaths is here seen to arise in the large towns.

3. **Ireland.** The registration of deaths for this division of the kingdom came into operation in 1863, under the authority of 26 Vict., cap. 11, “An Act for the Registration of Births and Deaths “in Ireland;” and the first report of the Irish registrar-general thereunder was issued in 1869, giving details for the year 1864.

The only available sources of information, regarding the causes of deaths previously, was to be obtained from the bills of mortality published in the cities and towns, of which, however, I have only

seen those for the capital. The first bill of mortality for Dublin I have met with is for the year 1683, and contains (*inter alia*) the following items:—

Hurt by accident.....	001	Burnt	001
By a kick	001	Found murdered in aunge fiel	001
Broken leg	001	Hurt and ill-used by her	} 001
Fell of the new building	001	master and mistress	
Bruised.....	001	Hanged her self	001
Broken thigh	001	„ him self	001
Poysoned herself.....	001	Drowned her self.....	001
Killed by the gaol man	001	Murdered	001
Drowned	001	Hanged at the gallows	010
Choked herself.....	001		

The old mode of keeping accounts is here shown. The total number of deaths returned for the year was 2,154; the deaths above enumerated amount to 27 in all, or about 1 in 73 of the deaths from all causes.

The returns of the registrar-general subdivide the violent deaths into five groups or sections: (*a*) accident or negligence; (*b*) homicide; (*c*) suicide; (*d*) executions; (*e*) violent deaths not classed. This is a convenient arrangement, of which we shall make use hereafter.

TABLE O.—*Showing the Deaths from Violence and from all Causes in Ireland, during the Period 1864-79.*

Years.	Violent Deaths (Ireland).			Deaths from all Causes (Ireland).	Ratio of Deaths from Violence to Deaths from all Causes, One in
	Males.	Females.	Total.		
1864	1,496	714	2,210	93,144	42
'65	1,499	684	2,183	93,154	42
'66	1,423	739	2,162	93,027	43
'67	1,485	692	2,177	93,503	43
'68	1,494	649	2,143	86,185	40
'69	1,459	672	2,131	89,593	42
1870	1,510	695	2,205	90,462	41
'71	1,488	613	2,101	88,348	42
'72	1,368	630	1,998	97,294	48
'73	1,480	647	2,127	97,537	45
'74	1,371	696	2,067	91,961	44
'75	1,464	643	2,107	98,114	46
'76	1,451	635	2,086	92,384	44
'77	1,442	609	2,051	93,543	45
'78	1,437	604	2,041	99,629	48
'79	1,364	621	1,985	105,098	52

Commentary on Table O.

The population of *Ireland* at the census of 1861 was 5,764,543, viz., 2,804,961 males, and 2,959,582 females.

1864. The deaths from violence were 40 per 100,000 of the population, or 1 in 42·1 of all the deaths returned. *Burns and scalds* claimed 619 victims—males 285, females 334; *fractures and contusions*, 608; *drowning*, 440—males 344, females 96; *suicide*, 84—males 60, females 24; *suffocation*, 71; *poisoning*, 25; *gunshot wounds*, 24; *cuts and stabs*, 18; *lightning*, 2.

1870. There was a decided increase in the violent deaths of this year, but this arose almost entirely in the class of “accidents” and “negligence,” and curiously enough applies to each sex in a proportionate degree.

1871. The population of Ireland by the census of this year was 5,402,759—males 2,634,123, females 2,768,636; the cause of 1 in every 37 of the violent deaths was unspecified or ill defined.

1873. The violent deaths averaged over the whole of Ireland 38·78 per 100,000 of the population. The ratio was highest in the eastern, south-eastern, and south-western divisions, and lowest in the western, north midland, and north-western divisions—see Table R.

1874. There was some fluctuation in the violent deaths in the different registration divisions of the country this year, as is seen by reference to Table O.

1875. The violent deaths of this year bore a marked similarity of proportion to that of the average of the preceding ten years.

There were held in Ireland during this year 2,707 coroners’ inquests, being 1 for every 36 deaths “registered.” Emphasis is placed upon the word “registered” in the reports, leading to the inference that there is some laxity about the registration.

1876. The violent deaths were slightly under the average of the preceding ten years, being 39·20 against 39·24 to each 100,000 of the population. There were 643 deaths from *fractures and contusions*, 448 from *burns and scalds*, and 437 from *drowning*.

1877. There was still a further falling off in the rate this year, being 38·42 against 39·24 average of preceding ten years.

1878. The rate was still decreasing slightly, being 38·14 per 100,000 of the population.

1879. There is a still further reduction of violent deaths to 37·02.

The following tables throw light upon some points which are not fully developed in this analysis.

It is a feature of the reports of the registrar-general for Ireland that the deaths resulting from (1) accidents or negligence, (2) homicide, (3) suicide, (4) executions, and (5) those left unclassified, are designated. For details see the following table:—

TABLE P.—*Violent Deaths, Subdivided into Classes, for Period 1864-79*
(IRELAND).

Years.	Accident or Negligence.		Homicide.		Suicide.		Executions.		Not Classed.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1864	1,299	643	34	14	64	20	2	—	97	37
'65	1,362	625	47	22	58	19	2	—	30	18
'66	1,258	631	80	60	45	22	2	—	38	26
'67	1,296	591	83	68	59	24	—	—	47	9
'68	1,273	561	87	56	68	19	—	—	66	13
'69	1,263	580	90	54	73	27	—	—	33	11
1870	1,368	631	64	32	55	25	—	—	24	6
'71	1,286	549	56	28	87	25	2	—	57	11
'72	1,225	567	61	31	73	29	—	—	9	3
'73	1,319	585	56	32	68	18	2	—	35	12
'74	1,234	633	71	29	65	34	1	—	—	—
'75	1,336	592	56	20	48	27	3	—	21	4
'76	1,292	560	55	33	74	37	3	—	27	5
'77	1,290	548	61	30	70	20	—	—	21	7
'78	1,283	556	65	27	76	17	—	—	13	4
'79	1,214	566	59	30	69	21	2	—	20	4

TABLE Q.—*Showing the Violent Deaths (including Accidental, Homicidal, and Suicidal) in each Registration Division of Ireland, registered during the Period 1864-79, with Average and Rate per Hundred Thousand of Population (IRELAND).*

Years.	Divisions.								Total Ireland.
	North Eastern.	North Western.	Eastern.	North Midland.	South Midland.	Western.	South Eastern.	South Western.	
1864	463	223	391	165	192	223	238	315	2,210
'65	416	197	385	173	189	248	198	377	2,183
'66	477	146	415	153	174	227	227	343	2,162
'67	426	186	406	159	147	256	219	378	2,177
'68	444	174	395	174	166	259	192	339	2,143
'69	443	179	374	194	159	230	191	361	2,131
1870	427	171	428	163	165	247	210	394	2,205
'71	432	167	385	174	164	227	189	363	2,101
'72	434	163	387	132	145	233	159	345	1,998
'73	464	155	417	156	149	240	204	342	2,127
'74	458	174	385	139	135	228	184	364	2,067
'75	441	166	385	165	143	240	201	366	2,107
'76	425	164	434	154	154	215	206	334	2,086
'77	444	175	433	127	167	212	184	309	2,051
'78	415	139	441	148	142	229	189	338	2,041
'79	472	165	390	145	151	236	139	287	1,985
Totals	7,081	2,744	6,451	2,521	2,542	3,750	3,130	5,555	33,774
Average over whole period of 16 years	442'56	171'50	403'19	157'56	158'87	234'37	195'63	347'19	2110'87
Rate per 100,000 inhab- itants, 1879.	41'73	31'92	49'89	29'08	34'78	31'30	31'49	35'78	—

Note.—The average rate per 100,000 of inhabitants of all eight divisions, 35'74.

For registration purposes Ireland is divided in eight divisions, as shown in the following table:—

TABLE R.—*Showing the Area, Population, Number, and Proportion of Violent Deaths in each Registration Division, with Indication of Leading Occupations (Ireland).*

Division.	Area in Statute Acres.	Per- centage of Whole Area.	Population, 1871.	Per- centage of Whole Popula- tion.	Violent Deaths in 1878.	Per- centage of Whole Violent Deaths.	Principal Occupation.
I. North-Eastern	2,328,305	11·46	1,111,167	20·53	415	20·33	{ Manufacturing, agricultural, and fishing
II. North-Western	2,392,501	11·78	526,339	9·72	139	6·81	{ Agricultural, manufacturing, and fishing
III. Eastern	1,993,016	9·80	787,416	14·55	441	21·61	{ Manufacturing, trading, fishing, and agricultural
IV. North Midland	2,019,408	9·94	511,940	9·46	148	7·25	{ Agricultural
V. South „	2,361,709	11·62	448,840	8·29	142	6·96	{ Agricultural
VI. Western	4,088,459	20·12	766,202	14·16	229	11·22	{ Agricultural and fishing
VII. South-Eastern	1,826,172	8·98	451,488	8·34	189	9·26	{ Agricultural, trad- ing, and fishing
VIII. South-Western	3,313,071	16·30	808,990	14·95	338	16·56	{ Agricultural, trad- ing, and fishing
Totals	20,322,641	100·00	5,412,377	100·00	2,041	100·00	

The intensity of violent deaths is here seen to fall upon the eastern registration division, which includes Dublin, city and port, and the towns along the coast in a southerly direction, where there is a large railway traffic.

4. **Foreign Countries.** I have not ready access to the data of the different continental countries of Europe in respect to violent deaths; nor indeed is it my present purpose to carry an investigation far in this direction. Still it is essential to learn to what extent the proportion of such deaths to the deaths from all causes, or to the population, differs from that which obtains with us. And to this extent at least I have some materials at hand.

The first data available are very meagre, but as these relate to the period corresponding with the commencement of the earliest of our modern records in England and Wales, it has a peculiar interest and value.

TABLE S.—*Showing the Violent Deaths, in Sweden, Prussia, and France, compared with those in England and Wales.*

Country and Date of Return.	Mean Population.	Annual Number of			To a Population of 100,000.		
		Ascertained Suicides.	Other Violent Deaths.	Total Violent Deaths.	Suicides.	Accidental Deaths, &c.	Total Violent Deaths.
Sweden, 1810-30	2,616,874	134	1,637	1,771	5·1	62·6	67·7
Russia '20-34	12,393,162	1,112	4,912	6,024	9·0	39·6	48·6
France '39	34,154,224	2,747	6,402	9,149	8·0	18·7	26·8
England and Wales } 1838-39.....	15,666,800	1,000	10,679	11,679	6·4	68·2	74·5

The Swedish returns were understood to be made on the same principles as those in England and Wales. The mines and lakes of the country occasioned many violent deaths. The returns for Prussia and France were considered to be incomplete in some details.

In 1865 Monsieur A. Legoyt, the then head of the General Statistical Department of France, and secretary to the Statistical Society of Paris, published the results of an elaborate inquiry relative to "Accidents in Europe and the United States." The shape his investigation took was practical. 1. The ratio of accidents to the population; 2. Their ratio to the general mortality of each sex; 3. Their ratio as regards the female population, the male standard being taken at 100 in the different countries.

Under the first head of inquiry he found the proportion to be 682 in England, 679 in Norway, 575 in the United States, 232 in Russia, 202 in Spain, and 201 in Denmark per million of the population. As to France and some other countries, he enters into details which do not admit of general comparison with countries concerning which such details are not given.

It was one of the conclusions of M. Legoyt that accidental deaths were increasing in a greater ratio than the population, and this point he illustrated by special reference to France, where the following successive and increasing ratio had taken place:—15 fatal accidents to 100,000 inhabitants from 1827 to 1830; 16 ditto from 1831 to 1835; 19 ditto from 1836 to 1840; 22 ditto from 1841 to 1845; 24 ditto from 1846 to 1850; 25 ditto from 1851 to 1855; and 28 ditto from 1856 to 1860. No doubt, he said, some of this increase was due to the more exact character of recent enumerations; still, the continuously progressive rate which is here seen indicates a sure though lamentable onward movement.

He regarded it as evident from such variable proportions in the different countries, that the determining causes of fatal accidents must be of very complex nature, and could not be explained simply by what may be called the economic character of different countries.

In fact, if the predominance of manufacturing and mining industry justifies the exceptional rate of fatal accidents in England, and to a certain extent in the United States, it surely could not do so as regards Norway, the Duchy of Oldenburg, and Sweden. On the other hand, we should miss with surprise Belgium and Saxony, two of the chief industrial States of Europe, from amongst the countries with a high rate of mortality from fatal accidents, if a great development of manufacturing industry were the chief cause of such mortality. We must, therefore, be considered, fall back upon the existence of special local causes dependent on the manners, customs, and configuration of the country, perils of navigation, fishing, and modes of transport, neglect of children, or actual exposure of them to dangers of various kinds, etc. To some extent, but to a much smaller extent than he appeared to imagine, this may be true.

M. Legoyt was able only to compare a small number of countries in reference to the immediate causes or nature of accidents, but his conclusions, as far as they go, are instructive. With the exception of England, where "burns and scalds," and of the United States, where contusions and injuries (classified under "crushing and "bruising"), occupy the first place amongst accidents, "submersion" was the cause of the greatest number of deaths. Next come "falls" from an elevation, then burns, crushings, and asphyxia. Amongst the Scandinavian countries the large number of "congelations" is not to be wondered at; but there must evidently be some error as regards Spain in this particular. So also, whilst we are not surprised to find that "alcoholic excesses" play an important part in Russia and Sweden, we are struck by their insignificance in England, Denmark, and the United States; some fallacy, we suspect, likewise lurks here. It is with respect to "burns" that the ratio of fatal accidents rises higher amongst women than amongst men in all the countries under observation. As to the proportion of such accidents amongst women to 100 amongst men, it oscillated between one-fourth and one-third. It would appear to be quite exceptional in the United States, 46 per 100. In our own country the proportion is relatively high; and here a great number of female hands participate in the production of our industry. In Bavaria and in Saxony the ratio is highest during early infancy, and in the former State lowest between 40 and 50 years of age. At every age it attains its maximum through "burns," which in Bavaria are more common during summer than in winter. Women more frequently succumb to burns, suffocation by fire, submersion, and poisoning.

Children everywhere constituted a high proportion of the victims of fatal accidents. In Bavaria the latter form a very large part of the causes of mortality of childhood and adolescence, from birth to 20 years of age, and within this range the maximum is attained

between the time of birth and 5 years. Submersion is the more frequent cause—particularly as regards male children—of the fatal event. Burns and poisoning are frequent in tender years; but strangely enough, children are less frequently victims in towns than country districts, the solution probably being found in the fact that they are more generally sent to school during the hours of the day when their parents' attention would be least devoted to them.

M. Legoyt found fatal accidents to be of much more frequent occurrence in summer than during the other three seasons of the year, and considered this probably due to the fact of the former season being the chief one for out-door operations, navigation, etc. In England it is found that the extremes of heat and cold are productive of non-fatal injuries. This circumstance is referred to more minutely in another portion of this paper. The proportion of non-fatal to fatal injuries he had no means of investigating.

The final conclusions of M. Legoyt were that there would not appear to be any absolute relation between the ratio of deaths from accidents and the population, and between such ratio and the total number of deaths therein. I cannot agree with him,—for I think if one fact be more clearly shown than another, alike in the historical and statistical sections of this paper, it is that the deaths by violence bear a very distinct relation to the population under observation, as also to the deaths from all causes.

The latest returns available for the principal European countries are condensed into the following table based upon one given in the fortieth report of the registrar-general:—

TABLE T.—*Showing the Population in 1876, and the Number of Deaths from Violence, distinguishing those from Suicide, Homicide, and Accident, in each of the undermentioned Countries.*

Countries.	Population, 1876.	Deaths from Violence	Suicide.	Homi- cide.	Accident and Negligence.	Proportion to 100,000 Living.			
						All Causes of Violent Deaths.	Suicide.	Homi- cide.	Accident and Negligence.
Switzerland.....	2,759,854	2,550	540	109	1,901	92·4	19·6	3·9	68·9
United Kingdom	33,304,490	25,798	2,052	533	23,213	77·5	6·2	1·6	69·7
England and Wales	24,244,010	18,358	1,770	412	16,176	75·7	7·3	1·7	66·7
Scotland	3,495,214	2,516	128	4	2,384	72·0	3·7	0·1	68·2
Ireland	5,321,618	2,083	111	88	1,884	39·1	2·1	1·7	35·3
Norway	1,787,960	1,295	126	23	1,146	72·4	7·0	1·3	64·1
Finland	1,883,556	1,179	64	66	1,049	62·6	3·4	3·5	55·7
Sweden	4,429,713	2,740	409	88	2,243	61·9	9·2	2·0	50·7
Prussia	25,693,677	15,815	3,432	547	11,836	61·6	13·4	2·1	46·1
Bavaria	5,062,125	2,629	522	198	1,909	51·9	10·3	3·9	37·7
Belgium	5,336,185	2,577	439	85	2,053	48·3	8·2	1·6	38·5
Austria	21,565,435	10,150	2,438	—	—	47·1	11·3	—	—
Italy	27,769,475	6,656	1,024	1,504	4,128	24·0	3·7	5·4	14·9

Analysis of Table T.

The above facts given for *Norway* are for the year 1873, for *Scotland* 1875, for *Finland* 1874, and for *Prussia* 1875.

The figures for the *United Kingdom* relate to the population inclusive of the Royal Navy and Merchant Service.

The difference between the homicides in *Scotland* and *England* may be partly accounted for by the returns for *England* being made by coroners' juries, and in *Scotland* by the sheriff-substitute; of 430 persons apprehended for murder or manslaughter, and 417 cases of inquest in which the verdict was murder, or manslaughter, or homicide, 247 prisoners were committed for trial in *England*.

The fatal pre-eminence of *Switzerland* in this table is believed to be due to falls down precipices and to avalanches. There may have been something exceptional this year. The violent deaths in 1879 were 2,508, of which 1,719 were accidents—males 1,386, females 333; suicides 701—males 606, females 95; and murders 88.

As to *Italy*, the means are at hand—thanks to its most efficient statistical bureau—for comparing the returns of violent deaths with those for *England* and *Wales*. The homicides there amounted to 1,504, as against 412 recorded in *England* and *Wales* during that year. Thus to 100,000 of population there were 5·4 homicides in *Italy* against 1·7 in *England*. If we had the same proportion, the homicides would have amounted to 1,309 in *England* and *Wales*. In *Rome* the proportion is much higher; it is 14·1 in *Rome*, in *Sicily* 13·7. The practice of assassination is thus shown to yield these terrible results. But while *England* is so much more favourably placed in this one respect, it is the reverse with the other violent deaths, for, exclusive of executions, the deaths in *England* were at the rate of 75·7 per 100,000 of the population, against 24·0 in *Italy*. Deducting the homicides, 1,504, the suicides, 1,024, there remain 4,128 violent deaths, as follows:—

TABLE U.—*Deaths from Violence in Italy, 1876, excluding Homicides and Suicides.*

Causes.	Numbers.	Percentage.	Rate per 100,000 of the Population.
Drowning	1,324	32·1	4·77
Falls	1,109	26·8	4·00
Burns	337	8·3	1·22
Crushes from falls of fabrics, } trees, earth, &c.	332	8·0	1·20
Horses and horse conveyances	167	4·0	0·60
Lightning	147	3·5	0·53
Suffocation	137	3·3	0·50
Explosions	131	3·2	0·48
Railways	84	2·0	0·30
Violence of animals	68	1·7	0·25
Intemperance	47	1·1	0·17
Agricultural machinery	34	0·8	0·12
Injection of poisonous substances	34	0·8	0·12
Avalanches	7	0·2	0·03
Hydrophobia and bites	6	0·2	0·02
Privation	1	0·0	0·00
Unknown and various	163	4·0	0·59
Total	4,128	100·0	14·90

5. **United States.**—The earliest record we have of deaths from “accidents and injuries” in the United States is for the census year 1850. The following are the only facts available:—

Population as determined by the census of that year 23,191,876.

Deaths from all causes 323,023.

Violent deaths 11,743, being 1 in 27·5 deaths from all causes, or 3·6 per cent. of the whole.

Specified causes—

Burns and scalds	2,052, being	17·5 per cent. of violent deaths.
Lightning	94	0·8
Drowning	2,357	20·1
Suffocation	934	8·0
Exposure to cold	73	0·6
Fractures	171	1·4
Other injuries	5,323	45·3
Homicide	227	1·9
Suicide	491	4·2
Execution	21	0·2
	<u>11,743</u>	<u>100·0</u>

The following returns were obtained by the census of 1860:—

Population 31,443,321.

The deaths from all causes in that year were 394,153.

The violent deaths were 19,181, being 1 in 20·5 of the deaths from all causes, or 4·8 per cent. of the whole.

[Another return gave these deaths as 20,131—males 14,178; females 5,953.]

Specified causes—

Burns and scalds.....	4,266,	being	22·2	per cent. of violent deaths.
Lightning stroke	191	„	1'0	„
Drowning	3,121	„	16'3	„
Suffocation	2,129	„	11'1	„
Exposure to cold	139	„	0'7	„
Neglect and exposure	162	„	0'8	„
Falls	1,323	„	6'9	„
Gunshot wounds	741	„	3'9	„
Railroad accidents	599	„	3'1	„
Other injuries	4,469	„	23'3	„
<i>Homicide</i>	989	„	5'2	„

Suicides—

By gunshot.....	112			
„ cutting throat ...	82			
„ drowning	71			
„ hanging	306			
„ poison	137			
Not specified	285			
		993,	being	5'2 per cent. of violent deaths.
<i>Execution</i>	59	„	0'3	„
	<u>19,181</u>		<u>100'0</u>	

The census of 1870 yielded the following details:—

Population, 38,556,371.

Deaths from all causes 492,263.

Violent deaths 22,740, being 1 in 21·6 of deaths from all causes, or 4·6 per cent. of the whole.

Specified causes—

1. Burns and scalds	3,391,	being	14·9	per cent. of violent deaths.
2. Lightning stroke.....	202	„	0'9	„
3. Explosions.....	290	„	1'3	„
4. Drowning	4,075	„	18'0	„
5. Suffocation	1,257	„	5'5	„
6. Exposure to cold	36	„	0'1	„
7. Neglect and exposure	344	„	1'5	„
8. Falls	2,074	„	9'1	„
9. Falling bodies	712	„	3'1	„
10. Fractures	665	„	3'0	„
11. Gunshot wounds	971	„	4'3	„
12. Other wounds	1,070	„	4'7	„
13. Railroad accidents	1,582	„	7'0	„
14. Mining accidents	365	„	1'6	„
15. Injuries by machinery	420	„	1'8	„
16. Other injuries	1,853	„	8'2	„
<i>Homicide</i>	2,057	„	9'0	„

Suicide—

By gunshot.....	251			
„ cutting throat	133			
„ drowning	119			
„ hanging.....	370			
„ poison	203			
Not specified	269			
	—	1,345	being 5·9	per cent. of violent deaths.
<i>Execution</i>	31	„	0·1	„
	—	—	—	—
	22,740		100·0	

I have not returns for all the individual States, and could not use them if I had. The State of Michigan may be taken as a representative State. It is away from the seaboard, and yet has water communication by the lakes; its pursuits are almost entirely agricultural; none of its towns are very large; its climate is medium, but with severe winters. Its superintendent of vital statistics, Dr. Henry B. Baker, M.D., is a gentleman well qualified for his position, being familiar with the work of his predecessors in Europe, whom, however, he does not blindly follow.

The population of the State as determined by the census of 1870 was 1,184,282—males 618,251, females 566,031.

The *deaths* from all causes in 1873 were 14,258—males 7,651, females 6,590.

The <i>violent</i> deaths in 1869 were 468, being 5·11 per cent. { of the deaths from					all causes	
„	'70	„	495	„	4·59	„
„	'71	„	539	„	5·54	„
„	'72	„	541	„	4·04	„
„	'73	„	685	„	4·80	„

6. **Australia.**—I am glad to be able to add here, alike for information and comparison, the statistics relating to violent deaths in one of the most prominent sections of this great country—*Victoria*. The “*Victorian Year-Book*” for 1879-80, compiled by one of our own hon. members, Mr. Henry Heylyn Hayter, the government statist of the colony, contains this following table:—

TABLE V.—*Violent Deaths in Victoria during the Ten Years 1869-78, and during the Year 1879, showing the Modes of Death, and distinguishing the Sexes (AUSTRALIA).*

Causes of Death.	Ten Years, 1869-78.			Year 1879.		
	Males.	Females.	Total.	Males.	Females.	Total.
<i>Accidents—</i>						
Fractures and contusions	3,015	247	3,262	272	23	295
Gunshot wounds	214	35	249	17	—	17
Cuts, stabs, &c.....				6	2	8
Burns and scalds				42	61	103
Sunstroke	142	59	201	18	4	22
Lightning	21	5	26	2	—	2
Poison	128	58	186	8	7	15
Snake and insect bite	27	13	40	1	—	1
Drowning	1,637	391	2,028	137	34	171
Suffocation	454	220	674	28	19	47
Others	88	23	111	5	5	10
Total	6,097	1,532	7,629	536	155	691
<i>Homicide</i>	133	75	208	9	6	15
<i>Suicide—</i>						
Gunshot wounds	62	1	63	8	—	8
Cuts, stabs, &c.....	152	18	170	13	4	17
Poison	137	47	184	16	4	20
Drowning	134	74	208	14	1	15
Hanging	193	19	212	39	3	42
Otherwise	26	4	30	6	—	6
Total	704	163	867	96	12	108
<i>Execution</i>	25	—	25	1	—	1
Grand total	6,959	1,770	8,724	642	173	815

Commentary on Table V.

The deaths from violence in this colony were formerly more numerous than those from any single disease; this was especially so in the early period of the gold discoveries; but in 1879 they were less than those caused by phthisis, atrophy, or diarrhoea. Violent deaths are still much greater here than in most of the European countries.

During the eleven years ended with 1879, there had died of specified causes 65,625 males and 55,987 females. One in every 10 of the *males* had died a violent death, 1 in every 11 died of an accident, 1 in every 533 was a victim of homicide, 1 in every 95 committed suicide, and 1 in every 2,909 was executed. Of the *females* 1 in every 29 died a violent death, 1 in every 33 died of an accident, 1 in every 691 died by the hand of another, 1 in every 320 committed suicide, but happily not one was executed.

Of the 815 violent deaths in 1879 there were 691 (85 per cent.) attributed to accident, 15 (2 per cent.) to homicide, 108 (13 per cent.) to suicide, and 1 to execution. Homicides were below, but suicides were above the average. Only twice in thirteen years had the suicides exceeded 100, viz., in 1876 and 1879. Of the deaths by violence there were 642 (79 per cent.) males, and 173 (21 per cent.) females.

Speaking generally 4 males die of violent deaths in Victoria to 1 female, and the same proportion applies to deaths from accident. As to murders, there are about 2 male victims to 1 female, and as to suicides, 4 males to 1 female. Only 1 woman had been executed since the first settlement of the colony; but in the eleven years embraced in this table 26 males were executed. The only violent deaths which habitually affect females more than males are those resulting from burns and scalds.

Of the 691 accidental deaths, 43 per cent. were due to fractures and contusions, and 25 per cent. to drowning.

While it is noted that violent deaths occur in Victoria in a greater ratio than in European countries generally, it has to be stated that Switzerland has a still higher rate; and speaking of suicides separately, Switzerland and Prussia each has a higher ratio. Homicides seem to be in about the same ratio as in England and Wales.

TABLE W.—*Showing the Death-Rate from Violence in Victoria and in various European Countries during the Years named therein.*

Countries.	Year of Observation.	Proportion to 100,000 of the Population.			
		Violence of all Kinds.	Accident and Negligence.	Homicide.	Suicide.
Victoria.....	1879	91·7	77·8	1·7	12·2
Switzerland	'76	92·4	68·9	3·9	19·6
United Kingdom	'76	77·5	69·7	1·6	6·2
England and Wales....	'76	75·7	66·7	1·7	7·3
Scotland	'75	72·0	68·2	0·1	3·7
Ireland	'76	39·1	35·3	1·7	2·1
Norway	'73	72·4	64·1	1·3	7·0
Finland	'74	62·6	55·7	3·5	3·4
Sweden	'76	61·9	50·7	2·0	9·2
United States	'70	58·9	50·1	5·3	3·5
Prussia	'76	61·6	46·1	2·1	13·4
Bavaria	'76	51·9	37·7	3·9	10·3
Belgium	'76	48·3	38·5	1·6	8·2
Austria	'76	47·1	—	—	11·3
Italy	'76	24·0	14·9	5·4	3·7

PART III.—PRACTICAL.

By way of rendering this investigation of practical value, it becomes necessary to review the results contained in the first and

second parts, and test their bearing upon the present. In this way alone shall we see the increasing ratio of violent deaths to the deaths from all causes, and to the entire population, from the date when the population became systematically enumerated in the United Kingdom at the commencement of the present century.

The causes of this long continued increase in the proportion of violent deaths to deaths from all causes, and to the population, are not far to seek; they have increased with our mechanical arts, and with our social appliances; they seem, in truth, to have increased almost in the ratio of our civilization! This is not a pleasant reflection; but there seems some consolation (if a poor one) at hand: for it does appear that a maximum has been reached, and that the tide has really turned.

It is worth while to halt for a moment and survey the exact figures. The facts recorded by Table C are as follows:—During the period 1647-1700 the violent deaths (London) to each 10,000 deaths from all causes were 96·9, or including the “found dead,”* 101·4. During the period 1701-49 the proportion was less, viz., 88·2, or including the “found dead,” 102·7. In the period 1750-99 the proportion had gone up to 125·1, or with the “found dead,” 130·0; while during the early part of the present century, 1800-29, the proportion had increased to 162·5, or with the “found dead” to 169·4; and during the period shown in Table D, the modern period, based upon the statistics of the nation (England and Wales) the proportion has risen to 342·8 over the whole period, ranging from a minimum of 302·4 in 1849 to a maximum of 381·8 in 1856.

A comparison of the violent deaths to the deaths from all causes is not a very reliable test, for when the aggregate of deaths has been augmented by plague or any other extraordinary cause, the tendency is to make the violent deaths appear to be on the decrease; whereas in relation to the numbers living that may be at the same rate as previously, or even higher. The true test is to find the ratio of such deaths to the population at the time of observation. This was of course impossible until there were systematic numerations of the people; and in the remaining portions of this paper it will therefore be understood that the percentages given are upon the population, unless it shall be otherwise stated. And yet it is not without interest to notice how regularly on the whole (Table B) was the proportion of violent deaths to the deaths from all causes over a period of more than a century.

The point of greatest practical importance in connection with violent deaths is the constantly recurring changes in their causes,

* The numbers of persons “found dead” indicates a state of society happily long since passed away, where nearly *one-seventh* of the whole deaths consisted of bodies found in the streets, fields, and vacant houses and buildings.

or rather in the intensity of those causes. The ratio these deaths bear to the population over a given period of time may show very little variation in the aggregate, while in the subdivisions of causes there may be, as indeed there has been, various changes of considerable significance in operation. This has been made apparent in the "commentary upon Table D," and was one of several purposes for which that commentary was instituted. For instance, in 1854 the decrease of deaths from *poisoning* is noticed as having been marked, yet the violent deaths for the year show a considerable increase—far beyond any possible increase in the population. The solution is, either that new forces were at work, or that there was a sudden increase in some of the causes previously known. The decrease in the deaths from poisoning was continuous. So again with *burns* and *scalds*, the decrease between 1860 and 1870 was very considerable, and during a portion of the decade there was a reduction in the number of violent deaths, as against periods in the previous decade; but during several years of the decade 1860-70 the violent deaths were more numerous than they had ever been at any previous period.

A careful study of Table D reveals many noteworthy results. Take one, for instance: the violent deaths show a considerable advance in nearly the same period of three several decades, the incomplete returns of the decade 1840-50 not admitting of any similar contrast. Thus in decade 1850-60 the great increase occurs in the years 1854 and 1855 respectively, after which the numbers again recede. In the decade 1860-70 the great increase is in the corresponding years 1864 and 1865; then the numbers recede. In the decade 1870-80 the great influx occurs first in 1875, and is maintained in 1876, a year later than in the former decade.

Now seeking for a reason to account for this periodical advance and recession, it seems rational to suppose it may be found in the extension of our manufacturing operations during those respective periods. The first two were epochs of great commercial activity, followed by years of marked depression. It is possible that our good friends Mr. Giffen and Mr. Bourne can throw some especial light upon Col. 4 of this table from a trade point of view. I leave the point for their consideration and pass on, merely remarking that any such theory seems to encounter a sad blow in the last of the three decades (for 1875-76 were years of depression), and 1878,* which shows nearly as large a return of violent deaths in 1875, was certainly a period of very profound depression. It would seem, indeed, more as if the malignant influence of the sun-spot

* During this there are included the deaths resulting from the "Princess "Alice" disaster on the Thames, which alone accounts for about 600 drowning cases.

theory was apparent in this last decade; and this point I commend to the consideration of my friend Professor Jevons.

That there are cycles in the occurrence of accidental injuries, I have had, during thirty years of official connection with one of the leading accident insurance companies—the first that entered upon the business of insuring against general as distinguished from railway accidents only—good opportunities of knowing; but the maximum fatality of these cycles in the business of accident insurance does not correspond with the maximum periods indicated in Table D. And there is another fact of interest in this connection, which is that there are sub-cycles *applying to localities*, not ranging simultaneously with the cycles of general intensity. The policy holders are scattered pretty evenly through the country. A district embracing one or more counties or parts of counties, which has previously shown no undue tendency to casualties, suddenly becomes the scene of many and continuous disasters. This state of things continues for several months—even the particular accidents encountered bearing perhaps a general resemblance during that period—and then the locality subsides into its former state of average. and the epidemic breaks out elsewhere, far away.

I had at first supposed that some of the variations shown in Table D were consequent upon an unsettled classification in compiling the returns. The periods when violent deaths were receiving special attention from the staff of the registrar-general's department were 1856 and 1862—so I judge from the details contained in the reports for those years; and it is to be remarked that 1856 shows a decrease in violent deaths, while 1862 is followed by an increase. But I have now arrived at the conclusion that there are influences at work beyond mere incidents of this character; and in view of endeavouring to determine this and some other points, as also in view of the large interests at stake, not only in the business of accident insurance—for these companies may very well be left to take care of themselves, as they have heretofore done—but of the problems involved in association with the Employers' Liability Act, I now propose to enter upon a more minute examination of the returns of the registrar-general than any previously made.

Analysis of the Causes of Violent Deaths.

Sub-classes.—The registrar-general classes all the deaths called violent, and which make up the aggregate of “violent deaths” in England and Wales, into six broad subdivisions as follow:—

1. Connected with RAILWAYS.
2. Injuries in MINES. $\left\{ \begin{array}{l} \text{Coal.} \\ \text{Metals.} \end{array} \right.$
3. MECHANICAL injuries, not connected with mines or railways.

4. CHEMICAL injuries, not connected with mines or railways.
5. ASPHYXIA, &c. (suspension of respiration), not connected with mines or railways.
6. VIOLENCE, not otherwise classed.

The first return made under this arrangement commenced with 1852.

TABLE X.—*Violent Deaths, arranged in Six Sub-Classes, from 1852 to 1879 (ENGLAND AND WALES).*

Year.	Males.						Females.							
	1		2		3		4		5		6			
	Rail-ways.	Coal.	Metals.	Mechanical.	Chemical.	Asphyxia.	Violence.	Rail-ways.	Coal.	Metals.	Mechanical.	Chemical.	Asphyxia.	Violence.
1852	357	969	65	3,381	1,250	3,006	799	40	6	1	870	1,488	945	261
'53	408	996	89	3,380	1,383	2,812	901	41	15	1	838	1,551	891	297
'54	493	1,036	166	3,299	1,483	2,812	923	62	10	1	899	1,538	962	246
'55	454	907	232	3,241	1,589	2,857	793	71	6	4	762	1,834	897	227
'56	501	974	195	3,339	1,494	3,008	695	55	8	2	777	1,616	941	186
'57	—	—	—	—	—	—	—	—	—	—	—	—	—	—
'58	—	—	—	—	—	—	—	—	—	—	—	—	—	—
'59	—	—	—	—	—	—	—	—	—	—	—	—	—	—
'60	—	—	—	—	—	—	—	—	—	—	—	—	—	—
'61	—	—	—	—	—	[No returns]	—	—	—	—	—	—	—	—
'62	—	—	—	—	—	—	—	—	—	—	—	—	—	—
'63	697	978	168	4,105	1,469	3,338	970	40	6	1	1,007	1,480	1,162	350
'64	745	906	198	4,636	1,580	3,588	928	51	8	3	1,084	1,726	1,175	395
'65	885	890	141	4,833	1,521	3,810	1,025	62	7	2	1,144	1,538	1,158	358
'66	837	1,010	134	4,626	1,397	3,661	1,070	71	4	1	1,216	1,386	1,157	345
'67	822	1,317	123	4,320	1,450	3,571	1,054	55	2	—	1,143	1,396	1,208	406
'68	714	1,117	98	4,701	1,601	3,816	786	83	—	—	1,172	1,337	1,207	336
'69	735	1,076	112	4,556	1,357	3,780	803	56	1	—	1,129	1,365	1,222	305
'70	861	999	109	4,511	1,442	3,590	827	69	1	—	1,219	1,393	1,256	316
'71	1,042	921	109	4,730	1,467	3,676	733	84	3	—	1,174	1,433	1,345	276
'72	1,068	1,050	135	4,575	1,874	4,114	729	92	1	1	1,268	1,151	1,388	311
'73	1,185	882	108	4,839	1,501	3,768	617	105	—	—	1,231	1,283	1,425	302
'74	1,165	938	118	5,100	1,568	3,762	763	84	4	—	1,364	1,432	1,347	275
'75	1,151	967	123	5,108	1,597	4,332	647	83	3	1	1,508	1,558	1,528	283
'76	1,100	964	66	5,044	1,662	4,262	593	77	1	—	1,451	1,413	1,491	255
'77	1,106	823	86	5,049	1,445	4,198	437	77	4	—	1,396	1,344	1,510	209
'78	1,077	998	78	4,797	1,741	4,540	435	75	—	—	1,519	1,483	1,899	205
'79	945	1,043	68	4,494	1,631	4,227	458	84	5	—	1,434	1,445	1,568	233

Note.—The total deaths for each sex in each year is given in Table D.

A careful perusal of this table will go far to show how the fluctuations in Table D arise,—that is to say, to which of the sub-classes they are due. Thus in 1855 there was an increase of several hundreds in the violent deaths of females, while the males for that year showed a slight decrease. It is here seen that in the sub-class chemical injuries, some 300 more females than in the preceding year

are enumerated. In 1864 it is seen (Table D) that there was a considerable increase in the deaths alike of males and females. This table shows that as to males it arose from a combined increase in the mechanical, chemical, and asphyxia classes, while with the females the increase was due alone to class "chemical." In 1875 the deaths of females show a sudden increase; mechanical injuries account for this. In 1878 the deaths of males and females are each heavy. The chemical and asphyxia sub-classes account for this as to males, and the mechanical, chemical, and asphyxia sub-classes as to females. A concurrent table enumerating the more prominent disasters of the last thirty years would form an important key to these variations.

Localities and Causes of Death.—Under date 1839 (commentary on Table D), I have shown the variations in the sub-classes of violent deaths in the different *localities* (*i.e.*, registration districts) of England and Wales. It will be useful that such a table be reproduced (under a different arrangement) showing the returns of the latest date for males and females :—

TABLE Y.—*Violent Deaths in England and Wales, and in each of the Eleven Divisions, in the Year 1878, Males and Females, (including all Deaths resulting from Accident, Negligence, Suicide, Murder, or Manslaughter).*

Num-ber.	Causes of Death.	England and Wales.	Divisions.										
			I. London.	II. South-Eastern.	III. South-Midland.	IV. Eastern.	V. South-Western.	VI. West-Midland.	VII. North-Midland.	VIII. North-Western.	IX. York-shire.	X. Northern.	XI. Mon-mouthshire and Wales.
	MALES—Total violent deaths in the year 1878 }	13,666	2,087	1,213	715	528	792	1,586	796	2,622	1,378	983	1,016
1	Connected with railways	1,077	120	90	74	24	38	99	97	219	115	93	108
2	Injuries in mines— Connected with coal mines	998	—	—	—	—	8	141	46	374	81	138	210
3	Connected with copper, tin, iron, &c., mines ...	78	—	—	—	—	25	3	—	7	21	16	6
	Mechanical injuries (not connected with mines or railways)	4,797	791	404	308	216	343	544	262	866	493	284	276
4	Chemical injuries (not connected with mines or railways)	1,741	228	125	81	65	95	266	126	352	199	97	107
5	Asphyxia, &c., suspension of respiration (not connected with mines or railways) ...	4,540	905	535	223	202	246	484	228	757	424	278	258
6	Violence, not otherwise classed	435	43	59	29	21	37	49	37	47	45	17	51
	FEMALES—Total violent deaths in the year 1878 }	5,181	1,290	348	229	218	297	629	291	983	443	247	256
1	Connected with railways	75	11	4	3	1	3	1	4	18	7	9	14
3	Mechanical injuries (not connected with mines or railways)	1,519	310	123	75	64	117	167	84	269	152	79	79
4	Chemical injuries (not connected with mines or railways)	1,483	226	88	71	54	84	223	111	311	151	80	84
5	Asphyxia, &c., suspension of respiration (not connected with mines or railways) ...	1,899	713	118	66	85	77	207	77	305	117	72	62
6	Violence, not otherwise classed	205	30	15	14	14	16	31	15	30	16	7	17

The greatest preponderance of violent deaths shown in this table arise in three registration divisions, viz., London, the west midland, and the north-western. Thus, as to railway accidents, over 10 per cent. occur in London, and over 20 per cent. in the north-western division. As to injuries in *mines*, these necessarily occur where the mines are located. In the class mechanical injuries, a large number occur in London, only exceeded by those in the north-western division. In chemical injuries, the north-western division stands most prominent, then the west midland, and London occupies the third place. In the class asphyxia, London stands first (perhaps exceptional with the year), the north-western district next, and the west midland third: this as to *males*. As to *females*, in mechanical injuries, London first, north-western division second, west midland third. In the class chemical injuries, north-western first, London second, west midland third. In class asphyxia, London first (exceptional), north-western second, and the west midland third. In violent deaths, London and the north-western divisions stand equally.

A still more minute examination becomes necessary in order to appreciate entirely the influence of *locality* upon the causes of violent deaths; but here locality is only an indication of the nature of the employments, and hence of the risk involved.

Population of Divisions.—It is important to take note of the *population* of the several divisions, and this is shown in the following table; yet the population in itself affords no sufficient index of the liability of the division to a high percentage of violent deaths. The occupation of the people is the true test, but this is not capable of detailed demonstration. All persons familiar with our manufacturing industries understand something of their principal seats geographically, and also something of their peculiar risks mechanically.

TABLE Z.—*Showing the Area, Population, Number, and Proportion of Violent Deaths in each Registration Division, with Indication of Nature of Leading Occupations (ENGLAND AND WALES).*

Divisions.	Area in Statute Acres.	Per- centage of whole Area.	Population (Estimated), 1871.	Per- centage of whole Popula- tion.	Violent Deaths, Male and Female (1878).	Per- centage of whole of Violent Deaths.	Principal Occupations.
I. London	75,362	0'22	3,254,260	14'33	3,377	17'93	{ Commercial, manu- facturing
II. South-Eastern ..	3,994,431	10'70	2,167,726	9'54	1,561	8'28	{ Agricultural, sea- faring
III. South Midland..	3,201,325	8'58	1,442,654	6'35	944	5'01	{ Agricultural
IV. Eastern	3,211,441	8'60	1,218,728	5'36	746	3'96	{ Agricultural, fish- ing
V. South-Western ..	4,981,170	13'35	1,880,777	8'28	1,089	5'78	{ Agricultural, metal mining
VI. West Midland...	3,956,951	10'60	2,721,931	12'00	2,215	11'75	{ Manufacturing, Agricultural
VII. North Midland..	3,535,445	9'48	1,406,935	6'19	1,087	5'76	{ Manufacturing, mining (coal)
VIII. North-Western..	1,998,914	5'35	3,389,044	14'92	3,555	18'86	{ Manufacturing, commercial
IX. Yorkshire	3,721,710	9'97	2,444,762	10'76	1,821	9'66	{ Manufacturing, agricultural
X. Northern	3,528,621	9'45	1,365,041	6'01	1,180	6'26	{ Mining, manufac- turing, agricul- tural
XI. Monmouthshire and Wales}	5,113,851	13'70	1,420,408	6'26	1,272	6'75	{ Agricultural, mining, manu- facturing
Total	37,319,221	100'00	22,712,266	100'00	18,847	100'00	

Note.—The areas exclude tidal waters, creeks, and foreshores.

Here we learn, by a comparison of the three columns of percentages, where the force of occupation bears upon the proportion of violent deaths. The *intensity* of violent deaths in the different divisions of the kingdom is made quite apparent.

Similar test tables for *Scotland* and *Ireland* respectively have already been given (see Tables N and R).

Details of Causes of Violent Deaths in each of their Six Classes.

In view, then, of the branch of inquiry last named, I arrange the following series of tables:—

TABLE AA.—*Causes of Deaths, “in Connection with Railways,” Males and Females, 1878*
(ENGLAND AND WALES).

1. Railways.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES.												
Run over on the line	694	87	66	47	17	27	77	63	131	69	60	50
Collision	11	—	2	—	—	1	—	3	1	3	—	1
Carriage off rails, &c.	5	—	—	—	—	—	—	—	2	2	1	—
Fall from carriage or engine	90	14	5	2	1	4	2	5	22	11	12	12
Crushed by „	156	10	9	10	1	3	17	12	46	18	13	17
Struck against bridge, &c.	5	—	1	2	—	—	1	—	—	—	1	—
Locomotive machinery	7	1	1	—	1	—	—	—	—	—	2	2
Explosion of boiler	1	—	—	—	—	—	—	—	1	—	—	—
Fall from height	11	1	—	—	1	1	1	2	1	2	—	2
Crushed by fall of heavy sub- stances on.....	32	2	1	7	—	—	—	2	10	4	—	6
Suffocated by fall of heavy substances on	1	—	—	1	—	—	—	—	—	—	—	—
Scalded	1	—	—	—	—	—	—	—	—	1	—	—
Other deaths (manner not stated, or otherwise than above) }	63	5	5	5	3	2	1	10	5	5	4	18
Total	1,077	120	90	74	24	38	99	97	219	115	93	108
FEMALES.												
Run over on the line	56	6	1	2	1	2	1	4	17	6	8	8
Collision	3	—	3	—	—	—	—	—	—	—	—	—
Fall from carriage or engine	10	5	—	1	—	—	—	—	1	1	1	1
Other deaths (manner not stated, or otherwise than above) }	6	—	—	—	—	1	—	—	—	—	—	5
Total	75	11	4	3	1	3	1	4	18	7	9	14

It is impossible to determine with precision the proportions of the deaths occurring to passengers and *employés* respectively. For a full elucidation of this latter point reference must be had to the Board of Trade returns for the corresponding year; but an approximate idea may be obtained from the nature of the injuries: thus the persons “run over” on the line, by far the most numerous class, will probably not be passengers (unless in quite exceptional cases), but those having occasion to use level crossings; and perhaps still more, plate-layers and others engaged in the repair of the permanent way.

TABLE BB.—*Causes of Death from Injuries in Coal and Metal Mines, Males and Females, 1878 (ENGLAND AND WALES).*

2. Mines.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES.												
COAL MINES.												
Fall of coal, stone, &c., on	420	—	—	—	—	4	70	32	86	43	74	111
Crushed.....	49	—	—	—	—	—	10	4	12	6	14	3
Fall from ladder	1	—	—	—	—	—	—	—	—	—	1	—
„ in pit or shaft	51	—	—	—	—	I	13	2	11	5	5	14
„ on barrow	1	—	—	—	—	—	—	—	—	—	1	—
Rope, &c. breaking	5	—	—	—	—	—	—	—	2	—	—	3
Machinery.....	14	—	—	—	—	—	4	I	3	—	2	4
Explosion of steam boiler	7	—	—	—	—	—	—	—	—	—	4	3
Horse	5	—	—	—	—	I	—	I	1	2	—	—
Waggon, tram, &c.	59	—	—	—	—	I	1	3	4	12	7	31
Tub	36	—	—	—	—	—	5	2	6	I	22	—
Blasting.....	9	—	—	—	—	—	4	I	2	I	1	—
Explosion of fire-damp	313	—	—	—	—	—	31	—	241	5	5	31
„ gunpowder.....	1	—	—	—	—	I	—	—	—	—	—	—
Burnt or scalded (<i>manner not stated</i>)	2	—	—	—	—	—	1	—	—	1	—	—
Drowned	14	—	—	—	—	—	2	—	6	I	1	4
Choke-damp	8	—	—	—	—	—	—	—	—	4	1	3
Suffocated (<i>manner not stated</i>)	1	—	—	—	—	—	—	—	—	—	—	I
Other deaths (<i>manner not stated, or otherwise than above</i>)	2	—	—	—	—	—	—	—	—	—	—	2
COPPER, TIN, IRON, &C., MINES.												
Fall of stone, wood, &c., on	28	—	—	—	—	3	—	—	2	12	9	2
Crushed.....	4	—	—	—	—	—	—	—	1	I	2	—
Fall in shaft.....	11	—	—	—	—	4	2	—	1	—	3	I
„ from kibble, ladder, &c.	2	—	—	—	—	2	—	—	—	—	—	—
Machinery	2	—	—	—	—	2	—	—	—	—	—	—
Explosion of steam boiler	1	—	—	—	—	I	—	—	—	—	—	—
Waggon, tram, &c.	6	—	—	—	—	—	—	—	1	4	—	I
Blasting	12	—	—	—	—	4	1	—	2	3	2	—
Suffocated	2	—	—	—	—	I	—	—	—	—	—	I
Other deaths (<i>manner not stated, or otherwise than above</i>)	10	—	—	—	—	8	—	—	—	I	—	I
Total.....	1,076	—	—	—	—	33	144	46	381	102	154	216

Note.—Females, nil: this is exceptional. See Table X.

Here it is seen that the working of the metal mines in the west of England is not entirely abandoned.

Those who desire more comprehensive details respecting mining casualties will do well to consult the exhaustive “Preliminary Report on the Rate of Fatal and Non-Fatal Accidents in and about Mines, &c.,” published by a well-known member of this Society (Mr. Neison), 1880.

TABLE CC.—*Causes of Death from Mechanical Injuries (not connected with Railways or Mines) to Males and Females, 1878 (ENGLAND AND WALES).*

3. Mechanical Injuries.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES.												
Fall from scaffold, ladder	201	56	19	10	3	7	27	7	49	13	4	6
„ from window	68	30	5	—	2	4	5	—	14	3	5	—
„ down stairs	251	60	11	10	4	11	29	10	62	29	22	3
„ in ships and boats	103	17	6	—	3	13	4	2	25	6	17	10
„ from height	512	77	44	37	14	44	32	23	113	55	32	41
„ in walking, &c.	7	3	—	—	—	1	1	—	—	1	1	—
„ in sliding	1	—	—	—	—	—	—	1	—	—	—	—
„ (not stated how)	366	67	28	20	11	27	38	26	80	37	17	15
„ of heavy substances on	347	41	22	16	3	23	42	12	76	44	30	38
Horse or other animals	270	25	32	19	17	28	33	18	25	28	19	26
Horse conveyance—												
Carriage	53	7	3	2	4	4	10	1	5	10	2	5
Omnibus	32	13	—	—	—	—	3	1	12	3	—	—
Tramcar	16	8	—	—	—	1	1	—	2	3	—	1
Cab	47	29	2	—	2	—	—	3	7	1	2	1
Van, waggon	262	60	26	23	26	39	37	15	11	17	4	4
Dray	28	8	1	1	—	—	4	6	1	7	—	—
Cart	481	48	28	47	29	27	53	24	132	48	24	21
Others	81	6	14	6	9	3	18	4	10	3	3	5
Iron roller.....	1	—	—	—	—	—	—	—	—	1	—	—
Bicycle	1	—	—	—	—	—	1	—	—	—	—	—
Explosion of steam boiler	10	—	1	—	—	—	2	2	1	2	—	—
„ retort	1	1	—	—	—	—	—	—	—	—	—	—
Machinery in factory, cotton } mill, &c.	31	—	—	—	—	—	3	—	14	13	—	1
Machinery, agricultural	55	—	11	7	5	7	7	6	3	2	3	4
„ marine	6	1	—	—	—	1	—	—	—	—	3	1
Other machinery or kind not } distinguished	161	23	6	2	2	3	27	7	45	26	10	10
Fight.....	1	1	—	—	—	—	—	—	—	—	—	—
Kick	4	—	—	—	—	—	—	1	1	2	—	—
Blow, &c.	104	17	14	5	2	4	12	4	18	14	6	8
Blasting, &c.	6	—	—	—	—	2	1	—	1	—	—	2
Fracture (not stated how)	596	74	47	49	41	36	72	47	75	63	45	47
Gunshot wounds	202	35	30	24	17	17	28	8	14	7	13	9
Cut throat	258	47	23	11	14	18	29	22	38	36	14	6
Cut, stab	52	10	6	2	1	6	7	3	7	5	1	4
Other wounds, &c.	73	4	12	5	3	8	4	5	10	7	11	4
Traumatic tetanus	44	4	7	8	1	4	1	2	5	5	3	4
Injury at birth.....	29	6	3	2	1	4	7	2	3	—	1	—
Operation	36	13	3	2	2	1	6	—	7	2	—	—
Total	4,797	791	404	308	216	343	544	262	866	493	294	276
FEMALES.												
Fall from scaffold, ladder	4	—	—	—	—	—	3	—	—	—	—	1
„ from window	43	18	6	3	—	2	5	—	4	3	2	—
„ down stairs	269	69	23	10	6	17	24	10	62	26	12	10
„ from height	69	29	4	1	1	3	5	—	13	6	4	3
„ in walking, &c.	4	1	—	—	—	1	—	—	1	1	—	—
„ (not stated how)	243	46	16	9	6	22	28	18	48	25	15	10
„ of heavy substances on	38	2	3	2	1	2	2	4	10	4	6	2

TABLE CC.—*Causes of Death from Mechanical Injuries, Males and Females, 1878—Contd.*

3. Mechanical Injuries.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
FEMALES—Contd.												
Horse or other animals	22	3	—	1	1	2	6	1	2	3	2	1
Horse conveyance—												
Carriage	18	4	1	2	—	3	1	1	2	3	—	1
Omnibus	2	—	—	—	—	—	—	—	2	—	—	—
Tramcar	3	2	—	—	—	—	—	—	1	—	—	—
Cab	13	6	1	1	—	—	2	—	3	—	—	—
Van, waggon.....	27	13	2	—	1	6	1	—	—	3	—	1
Dray	13	3	1	1	—	—	2	1	—	5	—	—
Cart	89	14	6	1	5	2	16	6	23	7	5	4
Others	34	6	—	3	2	3	5	—	5	3	2	5
Bicycle	2	1	1	—	—	—	—	—	—	—	—	—
Explosion of steam boiler	2	—	—	—	—	—	—	—	1	1	—	—
Machinery in factory, cotton mill, &c.}	5	—	—	1	—	—	—	—	3	1	—	—
Machinery, agricultural	6	—	—	—	—	2	1	—	2	—	1	—
Other machinery or kind not distinguished	10	1	—	—	—	1	2	2	2	1	1	—
Blow, &c.	18	5	2	1	3	1	—	—	2	1	1	2
Fracture (<i>not stated how</i>)	399	51	36	29	29	36	38	34	50	45	22	29
Gunshot wounds	19	5	1	2	1	1	3	—	4	—	1	1
Cut throat	60	11	13	1	4	7	6	3	10	2	1	2
Cut, stab	27	6	2	1	—	1	5	—	4	3	2	3
Other wounds, &c.	25	4	2	1	1	2	3	1	4	4	1	2
Traumatic tetanus	14	2	2	2	—	1	1	2	2	—	1	1
Injury at birth.....	23	2	1	3	2	2	4	—	5	4	—	—
Operation	18	6	—	—	1	—	4	1	4	1	—	1
Total	1,519	310	122	75	64	117	167	84	269	152	79	79

There is some slight variation in the causes from year to year, but the principal items are always the same. The item in each table, injury at birth, will be eliminated in our analysis given in Table KK.

The deaths from “explosions” of various kinds are serious. These seem to admit of diminution. I am preparing a special paper on this question to be read before the Society of Arts on an early occasion. [*Vide* Journal of that Society, vol. xxix, p. 398.]

TABLE DD.—*Causes of Death from Chemical Injuries (not connected with Mines and Railways) to Males and Females, 1878 (ENGLAND AND WALES).*

4. Chemical Injuries.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES.												
Burns by—												
Clothes taking fire	256	38	9	7	5	5	65	8	64	29	14	12
Fires	18	6	1	—	1	—	3	—	2	3	1	1
Lime	2	—	—	—	—	—	—	—	—	1	—	1
<i>Manner not stated, or other- wise than above</i>	343	30	26	15	15	26	48	42	61	40	15	25
Scalds by—												
Drinking hot water	23	3	3	2	1	2	5	4	2	—	—	1
<i>Manner not stated, or other- wise than above</i>	381	45	23	12	14	16	56	25	88	51	23	28
Burns or scalds by explosion of—												
Vitriol	1	—	—	—	—	—	—	—	—	—	—	1
Cotton powder.....	1	—	—	—	—	—	—	—	—	—	—	1
Gunpowder	18	—	2	1	—	1	—	—	5	1	6	2
Fireworks	1	—	—	—	—	1	—	—	—	—	—	—
Gases.....	7	—	1	—	—	1	—	—	1	1	—	2
Paraffin	2	—	—	—	—	—	—	—	1	—	1	—
Dynamite	5	—	—	—	—	—	—	—	—	—	—	5
Steam.....	18	1	2	—	—	1	—	—	7	2	1	4
<i>Kind not stated, otherwise than above</i>	3	—	—	—	—	—	1	—	—	1	1	—
Lightning	20	—	4	—	1	1	4	1	4	3	1	1
Sunstroke	184	18	18	19	13	16	21	13	32	21	4	9
Gelatio and exposure to cold	107	9	13	4	4	12	8	12	21	9	11	4
Poisoned by—												
Arsenic	12	4	2	—	1	—	2	3	—	—	—	—
Mercury	5	1	—	—	—	1	1	—	—	—	1	1
Lead	51	5	4	6	—	4	8	2	10	11	1	—
Green paint	1	—	—	—	—	—	1	—	—	—	—	—
Chloride of zinc	2	—	1	1	—	—	—	—	—	—	—	—
Ammonia	5	1	—	1	—	—	—	—	1	—	1	1
Nitre	3	1	—	—	—	—	—	1	—	1	—	—
Chlorate of potash	1	1	—	—	—	—	—	—	—	—	—	—
Soapsuds	1	1	—	—	—	—	—	—	—	—	—	—
Washing liquor	2	—	—	—	—	—	—	—	2	—	—	—
Phosphorus	3	1	1	—	—	—	1	—	—	—	—	—
Sulphuric acid	2	—	—	—	—	1	1	—	—	—	—	—
Nitric acid.....	2	—	—	—	—	—	1	—	—	1	—	—
Hydrochloric acid	12	6	—	—	—	1	—	1	2	—	2	—
Oxalic acid	8	3	1	—	—	—	2	—	2	—	—	—
Carbolic acid	26	8	2	3	1	—	3	1	6	1	1	—
Corrosive liquid	1	—	—	—	—	—	1	—	—	—	—	—
Opium	17	5	1	3	—	—	3	—	2	2	—	1
Morphia	5	3	—	—	—	1	—	—	—	1	—	—
Laudanum and syrup of poppies	50	9	—	2	4	1	6	1	14	5	7	1
Godfrey's cordial	2	—	—	—	—	—	—	2	—	—	—	—
Paregoric	2	—	—	—	—	1	—	—	—	—	1	—
Infant's friend	1	—	—	—	—	—	—	—	1	—	—	—
Black currant cough elixir	1	—	—	—	—	—	—	—	—	1	—	—
Alcohol	23	7	—	2	1	—	5	1	3	3	1	—
Turpentine	1	—	—	—	—	—	—	1	—	—	—	—
Methylated spirit.....	1	1	—	—	—	—	—	—	—	—	—	—
Chlorodyne	3	1	—	—	—	—	—	—	1	1	—	—

TABLE DD.—*Causes of Death from Chemical Injuries, Males and Females, 1878—Contd.*

4. Chemical Injuries.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES—Contd.												
Poisoned by—												
Chloral	15	3	2	1	—	—	1	1	3	—	2	2
Hyoscyamus	1	—	—	—	—	—	—	—	1	—	—	—
Belladonna and atropine	5	2	1	1	—	—	1	—	—	—	—	—
Prussic acid	17	5	4	—	—	—	4	—	2	1	—	—
Cyanide of potassium	6	3	—	—	1	—	2	—	—	—	—	—
Benzoline	2	—	1	—	—	—	—	—	—	1	—	—
Hemlock	1	—	—	—	—	—	—	—	—	—	—	1
Aconite	2	—	—	—	—	—	—	—	1	—	—	1
Strychnia	7	1	—	—	1	—	1	2	—	2	—	—
Vermine killer	5	1	—	—	—	—	1	2	1	—	—	—
Liniment	1	—	—	—	—	—	—	—	—	1	—	—
Sheep scab mixture	1	—	—	—	—	—	—	—	—	—	—	1
Poisonous or unwholesome food	4	—	—	—	—	—	1	—	1	1	—	—
Overdose of medicine	1	—	—	—	—	—	—	—	1	—	—	—
Kind not stated	40	5	3	1	2	3	8	3	10	4	1	—
Total	1,741	228	125	81	65	95	266	126	352	199	97	107
FEMALES.												
Burns by—												
Clothes taking fire	406	60	29	10	7	15	93	16	97	45	18	16
Fires	5	—	1	—	—	1	—	1	2	—	—	—
Manner not stated, or other- wise than above	448	36	29	30	22	27	57	52	88	45	22	40
Scalds by—												
Drinking hot water	10	2	—	—	1	2	3	1	—	—	1	—
Manner not stated, or other- wise than above	297	48	11	12	10	28	33	13	68	39	20	15
Burns or scalds by explosion of—												
Gunpowder	2	—	—	—	—	—	—	—	2	—	—	—
Gases	1	—	—	—	—	—	—	—	—	—	1	—
Benzoline	4	—	1	1	1	—	—	1	—	—	—	—
Paraffin	3	2	—	—	—	—	—	1	—	—	—	—
Kind not stated, or other than above	1	—	—	—	1	—	—	—	—	—	—	—
Lightning	4	1	1	—	1	—	1	—	—	—	—	—
Sunstroke	42	5	4	5	2	2	7	2	6	2	2	5
Gelatio and exposure to cold	43	11	—	2	4	3	4	1	8	4	5	1
Poisoned by—												
Arsenic	9	2	—	—	1	—	2	1	1	—	2	—
Mercury	4	3	—	1	—	—	—	—	—	—	—	—
Lead	10	5	1	—	—	—	2	—	—	—	2	—
Walton's argentine	1	—	1	—	—	—	—	—	—	—	—	—
Ammonia	2	—	—	—	—	1	1	—	—	—	—	—
Carbonate of potash	1	—	—	—	—	—	—	—	1	—	—	—
Phosphorus	2	1	—	—	—	—	—	—	—	1	—	—
Iodine	1	—	—	—	—	—	1	—	—	—	—	—
Sulphuric acid	5	2	—	—	—	—	—	—	3	—	—	—
Nitric acid	2	1	—	—	—	—	1	—	—	—	—	—
Hydrochloric acid	3	3	—	—	—	—	—	—	—	—	—	—
Oxalic acid	7	5	—	—	—	—	—	—	2	—	—	—
Carbolic acid	21	9	—	1	—	—	2	1	8	—	—	—
Soldering fluid	1	1	—	—	—	—	—	—	—	—	—	—

TABLE DD.—*Causes of Death from Chemical Injuries, Males and Females, 1878—Contd.*

4. Chemical Injuries.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
FEMALES—Contd.												
Poisoned by—												
Colocynth.	1	—	—	—	—	—	—	—	—	I	—	—
Ergot of rye	1	I	—	—	—	—	—	—	—	—	—	—
Opium	13	I	—	—	—	I	—	4	4	—	3	—
Morphia	2	I	—	—	—	—	—	I	—	—	—	—
Laudanum and syrup of poppies	27	4	2	—	—	I	1	6	7	3	2	I
Godfrey's cordial	1	—	—	—	—	—	—	I	—	—	—	—
Infant's "	1	—	—	—	—	—	—	I	—	—	—	—
" preservative	1	—	—	—	—	—	—	I	—	—	—	—
Paregoric	1	—	—	—	—	—	1	—	—	—	—	—
Dover's powder	1	I	—	—	—	—	—	—	—	—	—	—
Soothing "	1	I	—	—	—	—	—	—	—	—	—	—
Cough drops.....	1	I	—	—	—	—	—	—	—	—	—	—
Alcohol	5	2	—	—	—	—	—	I	2	—	—	—
Chloroform	1	—	—	—	—	—	—	—	—	I	—	—
Chlorodyne	2	I	—	—	—	—	—	—	—	—	1	—
Chloral	5	2	—	2	—	—	1	—	—	—	—	—
Belladonna and atropine	4	2	—	—	—	—	1	—	1	—	—	—
Prussic acid	3	I	—	—	—	—	—	—	2	—	—	—
Cyanide of potassium	2	I	1	—	—	—	—	—	—	—	—	—
Benzoline	1	—	—	I	—	—	—	—	—	—	—	—
Paraffin	1	—	—	—	—	—	—	—	1	—	—	—
Aconite	3	—	—	—	—	—	1	I	1	—	—	—
Digitalis	1	—	—	—	—	—	—	—	—	I	—	—
Strychnia	11	—	1	3	1	—	2	—	—	4	—	—
Vermin killer	20	3	—	I	1	2	4	2	2	3	—	2
Santonine	1	I	—	—	—	—	—	—	—	—	—	—
Salt sorrel	1	—	—	—	—	—	—	—	1	—	—	—
Poisonous fungi	3	—	2	—	1	—	—	—	—	—	—	—
Green tea	1	—	—	—	—	—	—	I	—	—	—	—
Coffee grounds.....	1	I	—	—	—	—	—	—	—	—	—	—
Liniment	3	—	—	—	—	—	—	I	—	—	—	2
Poisonous or unwholesome food	4	—	—	—	—	—	2	—	—	I	—	I
Overdose of medicine	2	—	—	—	—	—	—	—	2	—	—	—
Kind not stated	22	5	4	2	1	I	3	I	2	I	1	I
Total	1,483	226	88	71	54	84	223	111	311	151	80	84

Here it is seen that the causes affecting the two sexes differ. The "burns and scalds by explosions" to the males were produced by nine variations, to the females by five only. On the other hand, the varieties of fatal poisonings to the females were 48 as against 43 to the males. The deaths from poisons are of growing importance, and deserve a paper specially devoted to their consideration. Such a paper I propose to read before the Society of Arts, in view of remedial measures, in due course.

TABLE EE.—*Causes of Death from Asphyxia (not connected with Mines or Railways) to Males and Females, 1878 (ENGLAND AND WALES).*

5. Asphyxia.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES.												
Drowned—												
While bathing	312	26	35	16	15	17	30	15	60	35	33	30
By fall overboard	77	16	16	2	7	4	6	3	7	4	6	6
Shipwreck	157	—	142	—	1	—	1	6	2	—	2	3
Collision	232	219	1	—	12	—	—	—	—	—	—	—
While sliding and skating	31	—	—	5	1	2	1	1	13	3	4	1
Boat upset	79	13	15	3	3	11	5	2	6	7	10	4
Sinking of barge	1	1	—	—	—	—	—	—	—	—	—	—
"Found drowned"	786	82	74	57	35	57	73	43	163	86	51	65
Manner not stated	1,359	181	134	82	84	85	176	84	222	150	73	88
Suffocated by—												
Food, &c.	78	14	7	6	2	3	10	4	16	14	2	—
Bed clothes	511	241	20	10	3	8	90	4	101	16	17	1
Overlying	72	—	4	3	2	7	8	8	12	8	19	1
Cat on face	1	—	—	—	—	—	—	—	—	1	—	—
Gases	13	1	—	—	—	—	—	1	5	3	2	1
Smoke, &c.	9	1	—	—	—	—	3	1	3	—	1	—
Fires	3	—	—	—	—	—	—	—	1	1	—	1
Kiln and furnace	20	1	4	2	—	2	—	1	2	1	4	3
Bichlorate of methylene	2	1	—	—	—	—	—	—	1	—	—	—
Cyanogen	1	—	—	—	1	—	—	—	—	—	—	—
Chloroform, &c.	13	3	1	—	—	1	—	—	4	2	2	—
Carbonic acid gas	20	1	2	—	—	—	5	1	5	3	3	—
Bran	1	—	1	—	—	—	—	—	—	—	—	—
Mud	1	—	—	—	—	—	—	—	—	—	—	1
Privy	1	—	—	—	—	—	—	—	1	—	—	—
Panic at music hall	35	—	—	—	—	—	—	—	35	—	—	—
Fall of earth, &c., on	9	1	3	—	—	1	—	1	—	—	3	—
Manner not stated	197	34	26	11	10	11	25	15	16	21	9	19
Hanged (not executed)	463	56	43	23	24	36	50	35	68	64	35	29
Strangled	42	12	6	—	1	1	1	1	11	4	1	4
Executed	14	1	1	3	1	—	—	2	3	1	1	1
Total	4,540	905	535	223	202	246	484	228	757	424	278	258
FEMALES.												
Drowned—												
While bathing	3	—	1	—	—	1	—	—	—	—	1	—
By fall overboard	4	—	1	—	1	—	—	—	1	—	—	1
By shipwreck	3	—	1	—	—	—	—	1	1	—	—	—
Collision	348	326	—	—	22	—	—	—	—	—	—	—
While sliding and skating	1	—	—	—	—	1	—	—	—	—	—	—
Boat upset	9	—	—	—	—	3	—	2	1	1	—	2
"Found drowned"	230	35	16	12	13	8	40	12	52	24	10	8
Manner not stated	404	45	40	31	27	25	52	30	76	35	15	28
Suffocated by—												
Food, &c.	38	10	8	2	1	2	3	—	3	7	1	1
Bed clothes	473	217	19	3	4	7	73	5	109	19	17	—
Overlying	70	2	9	5	—	4	7	6	13	6	18	—
Kitten on face	1	1	—	—	—	—	—	—	—	—	—	—
Gases	1	—	—	—	—	—	—	1	—	—	—	—
Smoke, &c.	8	—	2	—	—	1	1	—	4	—	—	—
Fires	5	1	—	—	1	—	—	1	—	2	—	—

TABLE EE.—*Causes of Death from Asphyxia, Males and Females (ENGLAND AND WALES), 1878.—Contd.*

5. Asphyxia.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
FEMALES—Contd.												
Suffocated by—												
Coal gas.....	1	—	—	—	—	—	—	—	1	—	—	—
Charcoal	4	1	—	—	—	—	—	—	—	—	—	3
Chloroform, &c.	5	2	—	—	1	—	—	1	—	—	—	1
Carbonic acid gas.....	4	3	—	—	—	—	—	—	—	1	—	—
Fall of house	2	2	—	—	—	—	—	—	—	—	—	—
Fall of earth, &c., on	3	—	—	—	1	—	—	—	1	—	1	—
Panic at music hall	2	—	—	—	—	—	—	—	2	—	—	—
Manner not stated	150	48	8	9	9	10	23	7	14	6	6	10
Hanged (not executed)	108	13	11	4	4	11	7	10	23	15	3	7
Strangled	21	7	2	—	1	3	1	1	4	1	—	1
Executed	1	—	—	—	—	1	—	—	—	—	—	—
Total	1,899	713	118	66	85	77	207	77	305	117	72	62

This table contains a variety of items requiring more or less of special consideration. The item “found drowned,” as applied to each sex, no doubt embraces many suicides incapable of proof. “Panic at music hall,” causing the death of 37 persons (35 males and 2 females), may be regarded as exceptional. But a still greater item of an exceptional character is that of “collisions,” including no less than 630 persons (282 males and 348 females). We know the greater part of these was occasioned by the one disaster to the “Princess Alice” on the Thames. The last item in each section of the table requires special elimination, and will be dealt with in Table HH.

TABLE FF.—*Causes of Death from Violence (not otherwise classed) to Males and Females, 1878 (ENGLAND AND WALES).*

Violent Deaths Unclassed.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES.												
Starvation.....	5	1	—	1	—	1	—	—	1	—	—	1
Neglect.....	27	5	2	1	1	1	1	1	3	2	4	6
Neglected whooping cough	1	—	—	—	1	—	—	—	—	—	—	—
Navel hæmorrhage	52	9	4	1	3	1	5	2	11	12	2	2
Foreign body in lung	1	—	—	—	—	—	—	1	—	—	—	—
" alimentary canal	10	3	2	—	—	1	1	—	2	—	—	1
Accidental rupture of intestine....	2	—	1	—	—	—	—	—	—	—	—	1
Needle in foot	1	—	—	—	—	—	1	—	—	—	—	—
Tight bandaging	1	1	—	—	—	—	—	—	—	—	—	—
Bite of animal.....	5	1	1	—	—	—	—	—	—	3	—	—
Sting of insect	2	1	—	—	—	1	—	—	—	—	—	—
Shock from bathing when hot	1	—	—	—	—	—	—	—	—	—	1	—

TABLE FF.—*Causes of Death from Violence to Males and Females, 1878—Contd.*

Violent Deaths Unclassed.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
MALES—Contd.												
Accident (<i>not otherwise described</i>)	159	10	24	11	4	17	23	24	10	14	4	18
Murder (<i>manner not stated</i>)	28	4	4	3	—	2	3	2	1	1	2	6
Manslaughter (<i>manner not stated</i>)	21	1	2	2	1	5	4	—	1	2	2	1
Suicide (<i>manner not stated</i>)	37	1	7	3	5	2	4	3	8	1	—	3
Injury (<i>how or what kind not stated</i>)	82	6	12	7	6	6	7	4	10	10	2	12
Total	435	43	59	29	21	37	49	37	47	45	17	51
FEMALES.												
Starvation.....	2	—	—	1	—	—	—	—	—	—	—	1
Neglect	39	14	2	2	1	2	5	3	9	1	—	—
Injury after confinement	1	—	—	1	—	—	—	—	—	—	—	—
Nasal hæmorrhage	53	9	3	3	6	5	6	2	9	6	2	2
Attempt to procure abortion.....	1	—	1	—	—	—	—	—	—	—	—	—
Foreign body in larynx	1	—	—	—	—	—	—	—	1	—	—	—
" alimentary canal	3	1	—	1	—	—	—	—	—	—	—	—
Rupture of bladder.....	1	—	—	—	—	—	—	1	—	—	—	—
Inflammation of bowels	1	—	—	—	—	1	—	—	—	—	—	—
Prick of finger	1	—	—	—	—	—	—	—	—	1	—	—
Scratch of cat	1	—	—	—	—	—	—	1	—	—	—	—
Killed by ferret	1	—	—	—	—	—	—	—	—	—	—	1
Sting	1	—	—	1	—	—	—	—	—	—	—	—
Accident(<i>not otherwise described</i>)	27	2	2	—	—	2	4	6	3	—	2	6
Murder (<i>manner not stated</i>)	27	1	3	3	1	4	8	1	3	2	—	1
Manslaughter (<i>manner not stated</i>)	14	—	1	—	1	2	3	—	1	3	2	1
Suicide (<i>manner not stated</i>)	9	—	1	—	2	—	2	—	1	1	—	2
Injury (<i>how or what kind not stated</i>)	22	3	2	2	3	—	3	1	2	3	—	3
Total	205	30	15	14	14	16	31	15	30	16	7	17

There are many remarkable causes of individual deaths which can find no place in the ordinary tables of the registrar-general. The experience of the accident insurance companies could furnish many others equally remarkable.

TABLE GG.—*Remarkable Causes of Violent Deaths (the list of Examples capable of great expansion).*

Tetanus, produced by a stick being thrust up the nose—a male, 11.

Sitting on a rick-pin, which went up his body—a male, 26.

Accidentally choked by a string—a male, 6 months.

Suddenly, in consequence of a piece of orange peel getting into the wind-pipe—a male, 75.

By the passing of a piece of shrimp into the wind-pipe—a male, 7.

Accidentally swallowing a piece of tin—a female, 7.

Suffocated by a fish bone sticking in the throat—a female, 1.

Wounded in the knee from a skewer running into it—a male, 1

Suffocated from being choked with meat—5 males, 64, 47, 2, 17 months, and 9 months; 2 females, 2 and 1.

TABLE G.G.—*Remarkable Causes of Violent Deaths—Contd.*

- By swallowing a large quantity of meat—a male, 1.
 Accidentally, by a cherry-stone in the wind-pipe—a male, 9.
 Suffocated by a piece of bread in the wind-pipe—a male, 5 months.
 By swallowing a button, which choked him—a male, 7.
 Accidentally hung by a trap-door catching his neck—a male, 5.
 Over-exertion in winding water out of a well—a female, 25.
 Choked by a horsebean—a male, 6.
 Convulsions from eating hard peas—a male, 10.
 Accidentally choked by a pea—a male, 1.
 A knitting needle run into the hand—a female, 65.
 Accidentally swallowing a marble—a male, 3.
 By falling into a brewing of ale-wort—a male, 23.
 Fall from a bedroom window during sleep—a female, 53.
 Scalding in new-slaked lime—a female, 3.
 Burnt by falling into a kiln—a male, 16.
 In consequence of a quantity of fireworks exploding in his pocket—a male, 12.
 Accidentally falling out of a window—3 males, 4, 4, and 3; 7 females, 9, 5, 3, 3, 1, and 16 months.
 Accidentally suffocated in a turn-up bedstead—a female, 9 months; another, 3 months.
 Accidentally falling into a pan or pail of water—a male, 2; 6 females, 2, 1½, 1½, 11 months, and 11 weeks.
 Accidental fall from a table—a male, 1½.
 „ falling into boiling water—2 males, 88 and 2; a female, 2.
 By swallowing bug poison, not being conscious of its deadly nature—a female, 17.
 Accidentally poisoned by taking phosphorus—a female, 3.
 By taking poison, mixed with bread and butter, to destroy rats—a male, 13.
 Accidentally taking poison, mixed with paste, to destroy vermin—a male, 8.
 „ poisoned by prussic acid—a male, 2.
 By eating yew berries—a female, 4.
 Taking arsenic by mistake for magnesia—a female, 27.
 Cantharides given by mistake—a male, 46.
 Taking oil of bitter almonds—a male, 2.
 „ an overdose of calomel—a male, 4; a female, 1.
 Incautious use of mercury—a male, 11.
 By incautiously burning wood embers in her bedroom—a female, 20.
 An overdose of tartar emetic—a male, 7.
 Accidentally taking corrosive sublimate—a female, 4.
 Taking laudanum instead of tincture of rhubarb—2 males, 3 and 1.
 Drinking aquafortis—a male, 2.
 Salivation by ointment of white precipitate and oil of vitriol ignorantly applied—a female, 7.
 Poisoned by eating berries of the dulcamara—a female, 7.
 From inhaling the fumes of whitelead—a female, 20.
 „ the effects of swallowing tobacco—a male, 21.
 „ eating the root of water hemlock for the purpose of procuring abortion—a female, 30.
 Poisoning from drinking brandy—a female, 5.
 From taking incautiously a large quantity of gin—a female, 3.
 Frozen to death, having fallen asleep in a state of intoxication—a female, 52.

TABLE GG.—*Remarkable Causes of Violent Deaths—Contd.*

Accidentally drinking a large quantity of gin—a male, 9.
" drowned in a tub of water while the mother was intoxicated—a female, 1.
Mental effect produced by drinking rum—a female, 49.
Accidentally falling into a cistern in his cellar in a state of intoxication—a male, 80.
By drinking spirits of wine—a male, 7.
From drinking a quantity of gin—a male, 7.
Drinking undiluted rum—a female, 3.
Thrown and injured by a bull—2 males, 46 and 84.
Injured and dragged by a cow—2 males, 14, 13 ; a female, 77.
From the bite of a pig—a female, 9.
By swallowing false teeth—a female, 40.

Total Accidents in the United Kingdom.—It is now time that I should attempt to draw some deductions regarding the aggregate of deaths from violence in the United Kingdom. This involves a blending of the results of the preceding sets of tables. It also involves something more. It becomes necessary, in order that our statistics may have a practical value for business purposes, that we eliminate all causes of violent death which do not proceed from accident, negligence, or misadventure—misadventure not inevitable.

The items to be eliminated from the gross returns consist of three classes:—

1. Those resulting from homicide, suicide, and executions.
2. Those resulting from sunstroke and lightning.
3. Those designated "violence *not otherwise classed*," plus "exposure to cold," and "injury at birth."

The mortality resulting from these causes is next considered.

HOMICIDE, SUICIDE, AND EXECUTIONS.

Beginning with 1858, the reports of the English registrar-general distinguish these important classes. There had been some previous investigations in this direction, of which I note the following:—

Homicides.—These embrace murders, manslaughter, infanticide. No details earlier than those in the following table seem reliable.

Suicides.—In the returns for 1838 and 1839 respectively, the suicides are specified, viz., in 1838 there were 1,058—males 751, females 307; in 1839 there were returned 943 only—males 636, females 307.

Executions.—Returns were made for the five years 1852-56, as follows:—In 1852 there were 4—males 3, females 1; 1853, all males, 12; 1854, all males, 4; 1855, all males, 5; 1856 they increased

to 10—males 9, females 1. The regular annual returns begin with 1858, as shown in the table which follows:—

TABLE HH.—*Showing the Homicides, Suicides, and Executions during the Period 1858-78, with Percentages of each upon Violent Deaths (ENGLAND AND WALES).*

Year.	Homicide.			Percentage of Violent Deaths.	Suicide.			Percentage of Violent Deaths.	Executions.			Percentage of Violent Deaths.
	Males.	Females.	Total.		Males.	Females.	Total.		Males.	Females.	Total.	
1858	215	129	344	2·4	921	354	1,275	9·0	9	—	9	0·063
'59	194	144	338	2·3	929	319	1,248	8·7	7	—	7	0·049
'60	204	173	377	2·5	990	375	1,365	9·2	10	—	10	0·067
'61	163	157	320	2·1	982	365	1,347	9·0	11	—	11	0·073
'62	277	141	418	2·8	960	357	1,317	8·8	15	2	17	0·113
'63	237	162	399	2·5	974	345	1,319	8·4	20	1	21	0·134
'64	231	181	412	2·4	993	347	1,340	7·8	21	—	21	0·123
'65	269	174	443	2·5	1,024	368	1,392	8·0	6	—	6	0·034
'66	308	172	480	2·8	951	378	1,329	7·8	11	1	12	0·071
'67	238	154	392	2·3	963	353	1,316	7·8	10	1	11	0·065
'68	271	190	461	2·7	1,117	391	1,508	8·8	8	2	10	0·060
'69	245	142	387	2·3	1,178	409	1,587	9·6	9	—	9	0·054
'70	240	141	381	2·3	1,160	394	1,554	9·3	6	1	7	0·042
'71	238	143	381	2·2	1,103	392	1,495	8·8	4	—	4	0·023
'72	212	175	387	2·2	1,095	419	1,514	8·7	10	—	10	0·058
'73	258	149	407	2·3	1,129	389	1,518	8·8	8	1	9	0·052
'74	249	160	409	2·3	1,204	388	1,592	8·8	15	3	18	0·100
'75	207	144	351	1·8	1,184	417	1,601	8·4	22	1	23	0·122
'76	235	177	412	2·2	1,312	458	1,770	9·6	21	—	21	0·114
'77	205	142	347	2·0	1,113	388	1,501	8·4	23	—	23	0·130
'78	206	168	374	2·0	1,299	465	1,764	9·3	14	1	15	0·079

Note.—The totals of executions will not necessarily agree with the criminal returns; the latter take the date of sentence, the registrar-general the date of execution.

The returns of the registrar-general for *Scotland* do not furnish such details. Those for *Ireland* do. See Table P.

SUNSTROKE AND LIGHTNING.

A certain percentage of deaths results every year from these causes; in some years the deaths from *sunstroke* are very numerous, varying with the temperature.

In the commentary upon Table D, under date 1859, I have drawn attention to some details on the subject of deaths by *lightning*; out of 103 deaths under observation in the five years 1852-56, but 3 occurred to persons under 5 years of age, and these all to males. During the same period the deaths were apportioned in the following manner amongst the registration divisions:—

TABLE II.—*Showing Deaths from Lightning in each Registration Division in 1878 (ENGLAND AND WALES).*

Registration Divisions.	Number of Deaths.	Average Annual Mortality to 100,000 Living.	Density.
I. London	2	1·6	0·3
II. South-Eastern	6	7·1	24·2
III. South Midland	3	4·7	25·3
IV. Eastern	11	19·3	28·2
V. South-Western	6	6·6	27·4
VI. West Midland	20	18·0	17·4
VII. North Midland	13	20·8	28·3
VIII. North-Western	14	10·6	7·5
IX. Yorkshire	10	10·7	19·6
X. Northern	11	21·5	34·2
XI. Monmouthshire and Wales	7	11·4	42·4
England and Wales	103	11·0	20·0

TABLE JJ.—*Showing Deaths from Sunstroke and Lightning respectively during the Period 1852-78 (ENGLAND AND WALES).*

Year.	Sunstroke.			Percentage of Violent Deaths.	Lightning.			Percentage of Violent Deaths.
	Males.	Females.	Total.		Males.	Females.	Total.	
1852....	—	—	—	—	37	8	45	0·311
'53....	—	—	—	—	8	2	10	0·067
'54....	—	—	—	—	16	1	17	0·107
'55....	—	—	—	—	14	3	17	0·111
'56....	—	—	—	—	13	1	14	0·093
'57....	—	—	—	—	—	—	18	0·128
'58....	—	—	—	—	—	—	26	0·183
'59....	—	—	—	—	—	—	17	0·119
'60....	—	—	—	—	—	—	—	—
'61....	—	—	—	—	—	—	—	—
'62....	—	—	—	—	—	—	—	—
'63....	19	2	21	0·134	3	1	4	0·025
'64....	22	5	27	0·158	9	1	10	0·059
'65....	27	4	31	0·179	16	3	19	0·109
'66....	30	8	38	0·224	17	5	22	0·130
'67....	30	14	44	0·261	14	4	18	0·106
'68....	182	41	223	1·314	9	2	11	0·064
'69....	63	23	86	0·521	5	2	7	0·042
'70....	86	26	112	0·675	13	6	19	0·114
'71....	52	14	66	0·388	23	5	28	0·165
'72....	77	25	102	0·600	35	11	46	0·266
'73....	71	25	96	0·556	17	4	21	0·121
'74....	71	19	90	0·502	25	—	25	0·140
'75....	35	11	46	0·243	13	4	17	0·090
'76....	149	35	184	1·001	15	4	19	0·103
'77....	67	15	82	0·463	10	2	12	0·067
'78....	184	42	226	1·200	20	4	24	0·127

The deaths from each of these causes may be in part due to negligence, but mostly purely personal. In the case of a building unprotected by lightning-rods being struck with electric fluid, and any of the workpeople thereby injured, it would be a nice judicial point whether the employer could be held to be liable for negligence.

TABLE KK.—*Showing Deaths from "Violence not otherwise Classed," from Exposure to Cold (Gelatio), and from "Injury at Birth," during the Period 1858-78 (ENGLAND AND WALES).*

Year.	Injury at Birth.			Per-centage of Violent Deaths	Exposure to Cold (Gelatio).			Per-centage of Violent Deaths.	Violence not otherwise Classed.			Per-centage of Violent Deaths.
	Males.	Females.	Total.		Males.	Females.	Total.		Males.	Females.	Total.	
1858.....	—	—	—	—	Previously to 1873 included in "violence not otherwise classed."	—	—	—	—	—	—	—
'59.....	—	—	—	—		—	—	—	—	—	—	—
'60.....	—	—	—	—		—	—	—	24	8	32	0·216
'61.....	—	—	—	—		—	—	—	101	19	120	0·800
'62.....	—	—	—	—		—	—	—	102	35	137	0·916
'63.....	57	36	93	0·593		—	—	—	139	30	169	1·077
'64.....	65	43	99	0·582		—	—	—	126	28	154	0·905
'65.....	62	46	108	0·621		—	—	—	223	78	301	1·732
'66.....	50	40	90	0·532		—	—	—	155	53	208	1·230
'67.....	42	36	78	0·462		—	—	—	222	77	299	1·772
'68.....	34	39	73	0·430		—	—	—	211	63	274	1·614
'69.....	34	25	59	0·358		—	—	—	191	63	254	1·540
'70.....	41	41	82	0·494		—	—	—	197	61	258	1·554
'71.....	42	24	66	0·388		—	—	—	121	31	152	0·894
'72.....	41	33	74	0·428		—	—	—	148	36	184	1·066
'73.....	53	27	80	0·463	111	27	138	0·800	139	67	206	1·194
'74.....	56	38	94	0·524	90	24	114	0·636	174	60	234	1·305
'75.....	59	44	103	0·545	156	44	200	1·058	223	70	293	1·551
'76.....	59	37	96	0·522	115	37	152	0·827	128	53	181	0·981
'77.....	36	16	52	0·293	86	32	118	0·667	—	—	—	—
'78.....	29	23	52	0·276	107	43	150	0·795	—	—	—	—

Accident or Negligence.—In the returns of the registrar-general for *England and Wales*, there has been given since the year 1858 a column of deaths from "accident and violence," which is obtained by deducting from the total violent deaths returned those attributed to homicide, suicide, and executions respectively. But it is clear that for the purposes in view in this paper, the figures so returned are not applicable. I give them, as they may be useful for other purposes.

TABLE LL.—*Showing the Deaths attributed to "Accident and Violence" in the Reports of the Registrar-General during the Period 1858-78 (ENGLAND AND WALES).*

Year.	Males.	Females.	Both Sexes.	Percentage of Total Violent Deaths.	Year.	Males.	Females.	Both Sexes.	Percentage of Total Violent Deaths.
1858....	9,182	3,341	12,523	88·5	1869....	10,769	3,464	14,233	86·3
'59....	9,655	3,401	13,056	92·3	'70....	10,736	3,657	14,393	86·9
'60....	9,438	3,553	12,991	88·0	'71....	11,212	3,749	14,961	88·0
'61....	9,886	3,301	13,187	88·0	'72....	11,580	3,582	15,162	87·8
'62....	9,640	3,415	13,055	87·4	'73....	11,366	3,740	15,106	87·7
'63....	10,265	3,507	13,772	87·8	'74....	11,772	3,895	15,667	87·4
'64....	11,205	3,886	15,091	88·6	'75....	12,289	4,332	16,621	88·0
'65....	11,583	3,649	15,232	87·6	'76....	11,995	4,000	15,995	87·1
'66....	11,310	3,576	14,886	88·0	'77....	11,065	4,010	15,075	85·2
'67....	11,224	3,624	14,846	88·0	'78....	12,147	4,547	16,694	85·4
'68....	11,226	3,489	14,715	86·9					

Ages at Death.—A still further process of diminution is requisite before we can arrive at net results. A very large proportion of violent deaths occurs to infants and children, and these require to be deducted before any estimates of the effect of the Act upon the working population of the country can be formed.

For the purpose of this analysis, we may take it that young persons up to the age of 14 years are prevented by the Factory Acts and the School Board from entering upon active industrial occupations. In this view, therefore, I propose to exclude all who meet with deaths from violence under the age of 15. These are shown in the following Table (MM) to have been in England and Wales in 1878, a fair average year, 6,391—males 3,908, females 2,483, or 33·9 per cent. upon the whole deaths by violence returned for the year.

The like proportions for *Scotland* and *Ireland* respectively are shown in Tables NN and OO.

TABLE MM.—*Causes of Violent Deaths at different Ages, 1878 (ENGLAND AND WALES).*

Causes.	Males.							
	Total under 15.	Ages.						
		15—	25—	35—	45—	55—	65—	75 and over.
Railways	78	255	206	196	157	125	49	11
Mines	89	283	221	187	118	79	18	3
Mines	5	21	17	16	13	6	—	—
Mechanical	868	583	631	671	679	663	398	304
Chemical	991	83	111	139	129	149	79	59
Asphyxia	1,720	710	561	488	445	365	188	63
Violence	157	36	45	56	46	45	38	12
Total at different ages	3,908	1,971	1,792	1,753	1,587	1,432	770	452

Causes.	Females.							
	Total under 15.	Ages.						
		15—	25—	35—	45—	55—	65—	75 and over.
Railways	13	5	3	9	15	16	10	4
Mines	—	—	—	—	—	—	—	—
Mines	—	—	—	—	—	—	—	—
Mechanical	381	58	69	109	135	177	226	364
Chemical	926	85	63	64	81	80	98	86
Asphyxia	1,023	177	157	171	154	123	66	28
Violence	140	6	9	14	10	11	5	10
Total at different ages	2,483	331	301	367	395	407	405	492

A further examination of this table shows that males meet with more injuries from railways and mines at age 15—25 than at any other age, either because more are employed in these occupations at this age, or because those so employed are more venturesome. From that age the number of deaths steadily decreases. With females the numbers killed by railways is greatest at age 55—65.

As to mechanical injuries the deaths of males are lighter at age 15—25 than at any except the two most advanced ages. With females these injuries are lighter at age 15—25, and increase up to the advanced ages, when they become very heavy. With each sex they are heavy during childhood.

Chemical injuries inflict a heavy mortality at the early ages with each sex; age 15—25 is the highest with males except the two most advanced ages; while with females 25—35 and 35—45 are the lightest ages, probably because the smallest numbers are then employed.

In drowning and suffocation cases generally the juvenile deaths are very heavy, and then with the males there is a steady decrease during all the later years; with females 35—45 shows a light mortality, while 45—55 is greater, after which a rapid decline.

The deaths from violence are by far the greatest at ages under 15; they increase with males at age 35—45, and with females at age 45—55, and then decline until the most advanced age in the latter, when they go up again.

TABLE NN.—*Causes of Violent Deaths at Different Ages for each Sex, 1876 (SCOTLAND).*

Causes.	Males.								Females.							
	Total under 15.	Ages.						75 and over.	Total under 15.	Ages.						75 and over.
		15—	25—	35—	45—	55—	65—			15—	25—	35—	45—	55—	65—	
Intemperance...	—	6	21	22	32	29	4	1	—	1	13	14	22	23	6	3
Privation.....	—	—	—	—	—	1	2	—	2	—	—	—	—	1	1	—
Want of breast milk	31	—	—	—	—	—	—	—	30	—	—	—	—	—	—	—
Neglect	4	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—
Cold.....	6	3	2	7	4	6	6	8	4	—	2	1	3	2	3	1
Poison.....	10	1	7	6	3	3	2	—	4	5	—	3	4	3	3	1
Poisoned wounds	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Burns and scalds	69	13	13	15	10	4	1	5	91	21	2	4	6	10	11	10
Hanging, &c.	1	5	4	7	9	13	6	1	—	2	1	2	4	3	2	2
Suffocation	100	5	6	9	11	14	5	2	96	1	—	10	7	4	2	—
Drowning	106	131	127	112	77	43	14	14	34	11	7	10	13	13	9	—
Fractures and contusions }	101	152	118	134	111	68	58	27	34	13	2	12	19	19	29	38
Gunshot wounds	3	8	6	3	3	—	—	—	—	—	—	—	—	—	—	—
Cuts and stabs ..	2	3	7	10	7	7	7	1	—	1	1	—	1	4	—	1
Other violent causes	54	29	18	26	19	23	10	12	20	7	5	2	4	3	4	16
Total	488	357	329	351	286	211	115	71	316	62	33	58	83	85	70	73

TABLE OO.—*Causes of Violent Deaths at Different Ages for each Sex, 1878 (IRELAND).*

Causes.	Males.								Females.							
	Total under 15.	Ages.							Total under 15.	Ages.						
		15—	25—	35—	45—	55—	65—	75 and over.		15—	25—	35—	45—	55—	65—	75 and over.
Accident or negligence }	371	187	155	147	131	120	102	70	267	25	27	28	36	40	69	64
Homicide	22	19	9	4	2	2	6	1	16	1	—	4	2	—	1	3
Suicide	—	3	19	17	10	11	7	9	1	3	1	3	2	3	4	—
Executions	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Violent deaths not classed }	1	5	2	2	—	3	—	—	1	—	1	—	—	—	1	1
Total	394	214	185	170	143	136	115	80	285	29	29	35	40	43	75	68

Note.—In the above classification of ages I have, as a matter of convenience, added all the unclassified to the Col. 75 and over.

NET RESULTS (FATAL INJURIES).

I think we are now in a position to deal with “net results,” so far as fatal accidents are concerned. The position stands thus :—

England and Wales—

Total violent deaths registered in 1878..... 18,847

From which is deducted—

1. Deaths by homicide (374), suicides (1,764), and executions (18) 2,156

2. By sunstroke (226) and lightning (24)..... 250

3. Causes not attributable to accidents ordinarily understood, viz., injury at birth (52), exposure to cold (150) 202

2,608

16,239

4. From which has further to be deducted all injuries to infants, children, and boys and girls under 15 years of age (see Table OO)

6,391

Leaving net result for England and Wales or being 52·2 per cent. of the gross total

9,848

Scotland—

Total violent deaths registered in 1876 (latest year available) 2,990

From which is deducted—

For causes as above specified (but many of which are not set out in detail in the registrar-general's reports) at a like ratio of 47·8 per cent. 1,429

Leaving net result (52·2 per cent.) 1,561

Ireland—

Fatal violent deaths registered in 1878..... 2,041

From which is deducted—

For causes as above specified at the same ratio.... 976

Leaving similar net result 1,065

Net total for United Kingdom

12,474

Hence it may be regarded that the annual deaths in the United Kingdom from accident, negligence, and misadventure, to males and females of the age of 15 and upwards, average not less than 12,000. But in truth they are many more, for numbers of persons receive injuries from which they do not die at the time; they linger on for months, it may be years, and their deaths are finally, almost unavoidably, registered as resulting from other causes.

PROPORTION OF NON-FATAL TO FATAL INJURIES.

The most important problem yet to be worked out in connection with the "Employers' Liability Act," as with accident insurance generally, is the proportion of non-fatal injuries to be expected and paid for. In the accident insurance companies, the amount yearly paid for non-fatal injuries very far exceeds that paid for fatal injuries; and this, notwithstanding that the amount of such compensation ranges from as low as a few shillings, up to (in exceptional cases) several hundred pounds.

The accident insurance companies draw the great bulk of their business from the professional and trading classes. They do not assume to take the place of sick benefit clubs, nor are their rates usually calculated for industrial operatives. Their experience then may be regarded as many degrees more favourable than would be the business of a company for the industrial classes against injuries resulting from accidents and negligence. The experience of all insurance companies which have granted "collective" "policies," applicable to operatives in engineering works, machine shops, quarries, mines, &c., has been unfavourable—that is, the claims have exceeded the calculated rates, either in number or amount. Of course it has to be remembered that, under the "Employers' Liability Act," the master is only liable for injuries resulting from the negligence of himself, and the foreman, overlookers, and others in his employ. For the results of the individual neglect of the men towards themselves, he is, I read it, not responsible; but for such injury as may thereby extend to any and all others in the works, he may be held liable. Take the case of a steam boiler explosion—which too often arise from carelessness or neglect in some form—the employer, if negligence be proved against him, is liable to compensate all those who are injured on his premises if in his employ; as also, indeed, under Lord Campbell's Act, for damage done to persons unconnected with the works. This latter liability is not a new one,—does not arise, indeed, under the Act of 1880; and care must always be exercised in making contracts that it be properly exempted.

I have tried to utilise in such estimates as are here involved various medical returns, but nearly always without success.

In the "Medical Annual," 1839 (p. 51), Mr. Curling, one of the surgeons of the London Hospital, states that, of 2,245 patients admitted on account of accidents, 129 died; the mortality was thus 1 in 19. But it has here to be remembered that it is only the more serious injuries which usually go into hospital; and, as to these, many lame and otherwise disable the survivors for the remainder of life. Injuries of the more ordinary kind, such as broken arms and legs, sprains and contusions, burns and scalds, unless in a very severe shape, do not go into hospital; and these, we have seen, constitute by far the largest proportion of all accidental injuries.

The experience of accident insurance companies, in the class of business they now undertake, and with the classes they ordinarily insure, is that out of every 100 claims, there is about 1 fatal injury and 99 non-fatals. With the industrial classes generally, the proportion of fatal cases would be larger. The fatal and non-fatal injuries alike would certainly be in excess of any present experience by the English accident insurance companies on a large scale. See commentary on Table D, 1838.

But assuming the proportion on the population all round to be the same as in the selected classes insured in the accident insurance companies—then if the deaths by accident and violence, properly so called, be only 12,000 per annum in the United Kingdom, this still gives a total of 1,200,000 (one million two hundred thousand!) cases of fatal and non-fatal injury occurring every year—a considerable portion of which may fall within the scope of the "Employers' Liability Act, 1880." What a prodigious crop of litigation may be foreseen out of all this! It is surely incumbent upon all who believe in the welfare of their race to ponder seriously upon this fact, in view of concerting means for harmonising the interests of employers and employed in this matter.

I have in the present paper furnished the means of ascertaining that the ratio of violent deaths to the population has, for many years, ranged at about 8 to the 10,000 (or 0·08 per cent.). This is just under 1 per 1,000; but it includes women, children, domestic servants, and many persons who incur no "occupation hazard." On the other hand, it undoubtedly includes (as I have already shown) many deaths which would not be regarded as "accidental" by the accident insurance companies.

If we assume the normal death-rate from accidents of all kinds to be 1 per 1,000 of the population per annum, we may safely take it that the death-rate for the more hazardous occupations reaches to threefold this percentage.* Now an insurance company always

* Mr. Neison shows in his report (1880) already referred to, that the deaths of *miners* from accidents, in the "Lancashire and Cheshire Miners' Permanent Relief Society" in the six years of its existence 1863-68, had been at the rate

has to take cognisance of the fact that a "selection against it" is continuously going on—not necessarily always intentional—indeed rather involuntary on the part of individuals; but the combined action of the human will produces the results of adverse selection; in other words, the more risky feel the necessity of insurance and act upon it; persons following the less hazardous occupations do not feel such necessity, and therefore do not insure. In this way it comes about that the insurance companies always get a higher percentage of risk than prevails amongst the population generally.

I am disposed to think that in the case of the more hazardous occupations the proportion of non-fatal injuries may not increase in a corresponding ratio with the fatal. Thus, if in an average population the violent deaths be 1 per 1,000 of that population, and there be 99 non-fatal injuries for each fatal one, there comes to be *claims*—fatal and non-fatal combined—upon the funds of the company at the ratio of 10 per cent. per annum. But where the mortality is lifted up to 3 per 1,000 by reason of the risk of occupation, I am not prepared to say that the non-fatal claims will be raised up in a like ratio—making a total of 300 claims per 1,000. That is a point which has not yet been determined in practice over a sufficiently large area of observation. I am disposed to think that *from the severity of the injuries* a larger percentage of the cases terminate fatally, not that the entire number of injuries is lifted up to correspond with the fatal rate.

This inference finds support in the case of sickness clubs (*i.e.*, friendly or benefit societies). Mr. Neison, Mr. Finlaison, and other investigators, have found that with classes that are liable to death-claims in a severe ratio, the sickness and superannuation claims do not follow in anything like the same proportion. *The fact is the claimants are killed off at once*, and do not therefore live to come upon the funds from time to time over a series of years, as do those who are subjected to less severe bodily injuries.*

Conclusion.

I have accumulated a large mass of statistics bearing upon the problems here involved; but these have been drawn from the experience of individual insurance companies, which for the most

of 3,295 (p. 38). Among those employed in connection with *railways*, the rate of fatal accidents per annum varied from $2\frac{1}{2}$ per 1,000 on passenger traffic lines to $3\frac{1}{2}$ per 1,000 on those lines possessing a heavy goods traffic (p. 51).

* This view is also borne out in part by Mr. Neison's report (1880). The actual experience of the *Miners' Permanent Relief Funds* had varied from 140 to 190 cases of temporary disability per 1,000 members; whereas the rate of mortality had varied from 3.6 down to 2.3 per 1,000 employed. In the case of railway *employés*, the disablement cases had only reached 84 per 1,000, while the death-rates had been on an average perhaps about 3 per 1,000 (p. 502).

part only insured certain selected classes. These "observations" have been made over a period of thirty years; *but the risks have been undergoing changes during this period.* The direction of these changes will be found noted up in the present paper. I do not regard this as a fitting occasion to enlarge in detail upon the past experience of the accident insurance companies, or of sickness societies, or even of those special associations—of which so many have been founded during the last half-century—in connection with railways, mines, and other industrial enterprises. The "Employers' Liability Act" is a national measure; I cannot say I think it to be based upon the wisdom of Parliament. It has a certain show of equity in its design, but the principle it embodies must, I think, be regarded as tentative. It is an indication of the tendency of the times—savours of experimental legislation!

My present purpose is this: the measure is a national one. Its provisions apply to all classes of the community who are engaged in industrial or manufacturing pursuits. Any insurance company undertaking the business of indemnifying employers under it should be prepared to grant protection against all, or certain defined proportions of, the risks thrown upon the employer, and of course at equitable rates, otherwise the contracts will not be continued. For this reason then I have dealt with the national statistics. No general investigation of a similar character has been previously attempted. This would not have been undertaken by me at this time if I could have foreseen the labour involved—labour which might have been reduced by three-fourths if the reports of the registrars-general of the three sections of the kingdom were shaped upon uniform lines of classification and general arrangement. For most statistical and many social purposes the so-called United Kingdom is in truth three kingdoms! When shall we find a statesman sufficiently enlightened to break down these barriers of obstruction, and make our records at least uniform and really national, instead of being sectional and multifarious?

The mention of statesmanship brings to my mind this fact. There is now before the House of Commons a Bill to amend the "Employers' Liability Act, 1880." The aim of this amendment appears to be to prevent the workmen from contracting themselves out of the Act. Hitherto they have only done so in view of proper protection by the aid of funds and associations, founded for the especial purposes of providing proper or agreed allowances in the event of fatal or non-fatal injury—insurance organisations in truth. It seems to me to be essentially the province of insurance to meet cases of this character. To the employer the risk he incurs under the Act of 1880 is an unknown quantity—a casualty may arise which will completely overwhelm him. Where is the protection

to the workman then? May we not take a lesson from Germany? The sagacious statesman who so ably regulates the social well-being of that kingdom, sees in insurance the only safeguard that can be reached. *He is going to make it compulsory!* Here some of our short-sighted politicians are doing their worst in trying to abolish it.

The result at which I have arrived appears to be this:—Violent deaths, on an average of all classes and causes, approximate to 1 per 1,000 of the population every year. The non-fatal injuries among such classes as have heretofore insured are about 99 per 1,000 of the population each year. Hence fatal and non-fatal injuries together reach 10 per cent. per annum—that is 1 in 10 of all persons insured meets with an accidental injury, slight or serious, up to fatal, every year. I remember when the proportion was only 1 in 12. There is an advance equal to 15 per cent. upon the rate which prevailed within the last twenty years. In the United States about 1 in 8 of the insured meets with accidental injury during the year. In the United Kingdom 1 person in 10 of all classes of persons heretofore insured makes a claim every year; or in other words a person not engaged in an occupation regarded as hazardous will have an accidental injury once in ten years. If you find him on the books more frequently, his occupation or his habits render him no longer a first class risk.

In the matter of *habits*, of which I have heretofore said very little, I propose to add an appendix hereto, showing the effect of intoxication, usually designated intemperance, not only upon deaths from accidental violence, but likewise its influence upon the death-rate of the kingdom generally, so far as this can be measured by registered results. These indeed fall very far short of the actual results—incapable of measurement. I laid it down as an axiom at the very commencement of accident insurance, *that no rate of premium will cover the risk of intemperance*—so manifold and insidious are its workings in the direction of danger! The experience of a lifetime has confirmed and intensified this view. The actuary of the future—in the wider range the business is sure to take—must endeavour to guard against its consequences, as I have striven to guard against them in the past.

My task is finished. I have made the inquiry as complete as the materials within my reach will allow. To those who may attempt to draw deductions from the figures and opinions here presented, I give this word of parting advice—proceed cautiously. Those who are engaged in industrial and other pursuits know more of their real hazards than outsiders, however scientific, can ever know. Statistics in fact do not reach the whole case. The moral hazard of the business can only be compassed by judgment and

experience. There was a recent opportunity—in the passing last session of the Act for taking the census of this year—to have learned how many persons in the kingdom were prevented from sickness and accident on a given day from following their usual occupations, together with the cause of the injury or disability, and its past duration. No minister of the crown had the sagacity to perceive the great value resulting from such a record. If that simple and obviously practical inquiry had been undertaken, as was urged by this and other learned societies, there would have been accomplished one step decidedly in advance. As it is, we must struggle on, making use of the best materials at our present command. These I have endeavoured to make available for the purpose in view.

APPENDIX.

Influence of Intemperance (Intoxication) upon Violent Deaths, &c.—It is certain that a very material proportion of the deaths enumerated in the preceding tables have been influenced more or less by habits of intoxication ; but it is impossible to estimate to what extent this may have been the case. A drunken driver upsets a coach, several passengers are killed, he escapes ; or a drunken cabman drives over children or persons in the street with the like result. While in the case of steam boiler and other kinds of explosion, the act of one man wholly or partially intoxicated may be more extensively fatal ; the same in railways and steamboats.

The registrar-general has noted in his annual reports in such cases as are specified in the returns sent in to him, the effects of intemperance upon violent deaths ; but these do not, and cannot reach more than a small proportion of the whole.

TABLE PP.—*Violent Deaths from (or Accelerated by) Intoxication, to Males and Females, in the different Registration Divisions of England and Wales during 1878.*

MALES.—Out of 13,666 violent deaths of males, 102 are stated to have occurred to persons while in a state of intoxication, and 11 to persons suffering from delirium tremens, and in 295 other cases death was accelerated by the supervention of erysipelas, mortification, pyæmia, or tetanus. Total 408. Here follow the details :—

Causes of Violent Death.	England and Wales.	Divisions as in Table Z.										
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
Returned distinctly as occurring—												
In a state of intoxication	102	21	7	3	4	3	4	4	21	21	10	4
While suffering from deli- rium tremens	11	2	—	3	—	1	1	1	3	—	—	—
Accelerated by—												
Erysipelas.....	64	13	4	3	4	4	4	6	13	7	3	3
Mortification.....	28	1	—	1	3	5	7	3	2	—	6	—
Pyæmia.....	90	22	8	5	3	3	8	9	13	5	9	5
Tetanus.....	113	18	15	8	6	15	4	8	16	9	6	8

FEMALES.—Out of 5,181 violent deaths to females, 45 are stated to have occurred to persons while in a state of intoxication, and 1 to a person suffering from delirium tremens, and in 73 other cases death was accelerated by the supervention of erysipelas, mortification, pyæmia, or tetanus. Total 119.

Returned distinctly as occurring—												
In a state of intoxication	45	20	—	—	—	1	1	1	11	3	6	2
While suffering from deli- rium tremens	1	1	—	—	—	—	—	—	—	—	—	—
Accelerated by—												
Erysipelas.....	29	6	1	1	2	3	3	1	5	2	—	2
Mortification.....	13	2	—	2	3	—	3	1	1	—	1	—
Pyæmia.....	11	2	—	—	—	—	1	2	—	2	3	1
Tetanus.....	20	6	2	—	1	1	1	1	6	1	—	—

London stands pre-eminently bad in this table; nor does there seem reason to believe that there is anything exceptional during this particular year. I propose however to prepare a return of the proportion of deaths from intemperance registered during a series of years—registered subject to all the imperfection from want of precise knowledge already referred to

TABLE QQ.—*Deaths from Violence, occurring "during Intoxication," to Males and Females, during the Years 1852-75 (ENGLAND AND WALES).*

Years.	Males.	Females.	Total.	Percentage of Total Deaths from Violence. (Table D)
1852	69	23	92	0·63
'53	84	23	107	0·72
'54	53	13	66	0·43
'55	76	19	95	0·62
'56	80	23	103	0·69
'57-62	No returns for these years.			
'63	112	18	130	0·82
'64	117	25	142	0·83
'65	94	19	113	0·65
'66	94	28	122	0·72
'67	81	33	114	0·67
'68	94	26	120	0·70
'69	110	36	146	0·88
'70	119	40	159	0·95
'71	143	53	196	1·15
'72	106	28	134	0·77
'73	100	40	140	0·81
'74	119	42	161	0·89
'75	153	59	212	1·12
'76	133	67	200	1·08
'77	130	56	186	1·05
'78	102	45	147	0·83
Average of 21 years				0·81

It is difficult to account for the fluctuations in this table; periods of high wages do not appear to be a solution; see 1871, yet still higher 1876.

But here we have dealt with the influence of intoxication upon violent deaths only. That influence also extends to the mortality from all causes, where there is at least an equal, perhaps even a greater, difficulty in measuring its intensity. Dr. Farr, in his letter to the registrar-general (Twentieth Report, p. 171) says, "Intemperance induces various diseases *which appear under other heads*, and it is difficult to over-estimate the injury to the public "health arising directly and indirectly from this cause."

I propose now to abstract from the returns of the three divisions of the kingdom, the numbers of deaths annually attributed directly to intemperance, classed under its more modern designation, in medical nosology—*alcoholism*. The relevancy of this part of the

inquiry being that intemperance in all its phases tends to the multiplication of accidental injuries, only a certain undefined portion of which are fatal, and so become recorded; the non-fatals being, as I have already said, incapable of actual enumeration, are only to be reached by estimate.

TABLE RR.—*Deaths from Intemperance and Delirium Tremens (Alcoholism) during the Period 1847-78, excluding Violent Deaths (ENGLAND AND WALES).*

Year.	Males.		Females.		Both Sexes, Totals.	Percentage on Deaths from all Causes.	Percentage on Violent Deaths.
	Intemperance.	Delirium Tremens.	Intemperance.	Delirium Tremens.			
1847....	—	—	—	—	772	0·183	5·6
'48....	211	451	67	68	797	0·200	5·9
'49....	233	450	74	60	817	0·185	6·1
'50....	242	476	81	64	863	0·234	6·1
'51....	211	449	78	54	792	0·201	5·8
'52....	230	459	78	58	825	0·202	5·7
'53....	273	430	100	79	882	0·209	5·9
'54....	224	485	94	66	869	0·198	5·7
'55....	195	483	91	53	822	0·193	5·4
'56....	171	390	66	61	688	0·176	4·6
'57....	198	429	96	55	778	0·185	5·5
'58....	195	371	93	53	712	0·158	5·0
'59....	221	475	124	70	890	0·202	6·2
'60....	212	407	106	50	775	0·183	5·2
'61....	165	359	77	56	657	0·151	4·4
'62....	162	421	84	50	717	0·164	4·8
'63....	226	424	138	47	835	0·176	5·3
'64....	298	532	169	60	1,059	0·213	6·2
'65....	304	543	133	69	1,049	0·213	6·0
'66....	308	430	138	57	933	0·186	5·5
'67....	252	326	122	43	743	0·157	4·4
'68....	247	390	102	49	788	0·164	4·6
'69....	231	388	100	45	764	0·154	4·6
'70....	202	294	106	43	645	0·125	3·9
'71....	247	320	123	50	740	0·143	4·3
'72....	256	290	128	39	713	0·144	4·1
'73....	286	330	126	35	777	0·157	4·5
'74....	380	430	188	55	1,053	0·200	5·8
'75....	438	419	216	70	1,143	0·209	6·0
'76....	411	406	247	56	1,120	0·224	6·1
'77....	479	370	255	42	1,146	0·229	6·4
'78....	489	290	288	49	1,116	0·207	5·9
Average of 32 years						0·185	5·3

Note.—Down to and including 1857 all deaths registered as resulting from intemperance were classed under violent deaths, while those resulting from delirium tremens were classed under deaths resulting from diseases of the nervous system. Since that date both have been classed under zymotic.

Scotland.—The deaths attributed to intemperance in Scotland are here shown to be at a smaller ratio than in England (*vide* next table). In *Ireland* the rate is very high.

TABLE SS.—*Deaths from Intemperance, Males and Females, during the Period 1855-76 (SCOTLAND).*

Year.	Males.	Females.	Total.	Percentage of Entire Deaths from Violence (Table J).
1855	37	20	57	2·9
'56	52	26	78	3·8
'57	56	29	85	4·1
'58	51	37	88	4·4
'59	65	36	101	4·9
'60	37	18	55	2·5
'61	48	30	78	3·7
'62	39	14	53	2·5
'63	37	22	59	2·6
'64	47	30	77	3·3
'65	56	32	88	3·7
'66	45	33	78	3·4
'67	47	29	76	3·4
'68	51	31	82	3·6
'69	57	44	101	4·3
'70	56	42	98	4·1
'71	77	53	130	5·5
'72	99	52	151	5·8
'73	88	60	148	5·2
'74	153	81	234	7·5
'75	123	86	209	7·1
'76	115	82	197	6·5
Average of 22 years				4·3

The fluctuations in this table appear almost incapable of elucidation. The increase in the three last years in the table is very remarkable.

Ireland.—The deaths from intemperance in *Ireland* bear a much larger ratio to the violent deaths from all causes than in England, as is shown by the following table:—

TABLE TT.—*Deaths resulting from Alcoholism (i.e., Intemperance and Delirium Tremens), Males and Females, 1864-79 (IRELAND).*

Year.	Males.	Females.	Total.	Percentage of Total Deaths from Violence. (Table O).
1864	91	11	102	4·6
'65	119	28	147	6·7
'66	155	24	179	8·3
'67	152	23	175	8·0
'68	122	18	140	6·5
'69	105	14	119	5·5
'70	116	15	131	6·0
'71	123	17	140	6·6
'72	134	22	156	7·8
'73	128	26	154	7·2
'74	158	38	196	9·5
'75	160	35	195	9·2
'76	122	37	159	7·6
'77	154	26	180	8·9
'78	131	29	160	8·0
'79	124	22	146	7·3
Average of 16 years				7·3

The fluctuations here too are very considerable.

A careful examination of the three preceding tables reveals the fact that the deaths from "intemperance" in each division of the kingdom show a very decided increase over the periods during which they are respectively recorded. The fluctuations are more considerable than in most of our other tables. This may arise from irregularities in the registration (not very probable), or from some other cause not easily apparent—as for instance from high wages, the prevalence of "strikes," or the temperature of the seasons. As to England and Wales we have the influence of intemperance recorded in two forms: 1, its influence upon violent deaths; 2, its influence upon the general mortality of the kingdom; but adding these two influences together, their conjoint effect is far less than the effect shown in the death-rate of Ireland. The conjoint death-rate from intemperance as shown in the returns for *England* and *Wales* over a series of years, is over 5 per cent. of the violent deaths; in *Scotland* it has been over 4 per cent.; in *Ireland* over 7 per cent.!

DISCUSSION ON MR. C. WALFORD'S PAPER.

MR. CHARLES HARDING having expressed his great pleasure in listening to the paper, said he did not intend to occupy the time of the meeting by going over all the ground covered by Mr. Walford. He could only deal with the business view of accidents as connected with insurance. Mr. Walford had said that there were cycles in the occurrence of accidental injuries, of which he had good opportunities of knowing. Now he (the speaker) might as well supply what Mr. Walford did not seem to supply in regard to this circumstance, namely, that those cycles were brought about, as far as localities were concerned, more by the active exertions of agents in pushing the business of their companies. What he meant to say was, that in localities where agents were particularly active in pushing their business, the effect of cultivating an active insurance business was to cultivate the accidents of localities. It was a singular thing, that accident companies had to deal very often not only with cases of accidents pure and simple, but with cases which were attributable to accidents, but which were due to other causes. He would tell them of a case where an elderly gentleman, passing along a street, sprained his ankle. In the course of three weeks afterwards, notice was given to the office that the gentleman had died from the effects of his accident. But when the certificate of the medical man came to be presented to the office, the cause of death was put down as "Injury to ankle—diabetes." Therefore in dealing with many of these classifications, they must take care that

they could always rely on the certificate of the medical referee. His past experience with accident companies was that medical men did now and again favour their patients against the companies. In conclusion he thought there was nothing to call for special remark in regard to the paper, except so far as he did not quite go the length of Mr. Walford in saying that the death claims amounted to one in a hundred. They were rather more favourable in the company to which he belonged. He congratulated Mr. Walford on the very able paper which he had read to the Society.

Mr. L. L. COHEN said that Mr. Walford established, as far as any tables could establish, the fact that accidents which occurred to workmen, or to any other class of persons, were capable of being reduced to a general average. Very possibly there might be cases arising of particular injustice, or of particular advantage either against the employed and in favour of the workmen, or *vice versa*, and therefore to found permanent legislation at the present time, dealing necessarily with circumstances as they now existed, would entail the result that one class might be hereafter unduly benefited, and another class unduly prejudiced. They might depend upon it as a general principle, that the best course was to leave trade matters to regulate themselves, and not attempt to legislate upon them. He was not going to follow Mr. Walford in his average tables, which were full of interest, and which they could not too much admire, in view of the great labour they had cost the compiler, but he thought this general deduction must come from them, viz.: that the intervention of the legislature in these matters was entirely superfluous. It was only necessary that the teachings of economical science should be brought sufficiently home to masters and men, to lead them to understand that legislative interference was not in any way necessary, and they would then understand how they could themselves cover all the risks which might be cast upon them. If a man chose to take an employment which was dangerous, that was a question in which it was not for anyone to control him; but if he took that employment, he ought to know as nearly as science could teach him the extent of his risks, and he should be taught that it was part of his business that he should protect himself from those risks, and exact from his master a sufficient wage to provide against them. He thought this phase of the question was of great importance for the Society to teach, and if Mr. Walford's paper would bring to the minds of people the universality of that principle, and that masters and men, who had equal rights, could do for themselves what parental legislation sought to do for them, he thought the effect of this paper would be indeed most valuable.

Mr. F. G. P. NEISON wished to bear testimony to the obligations which the Society was under for the valuable paper which Mr. Walford had read. Having had occasion during the last few years to go over a good deal of the same ground, he could speak with some knowledge of the amount of labour involved in getting together the facts contained in the paper. He would not have

risen to speak, but for the fact that he had some special information on this subject, through the introduction last session of the Employers' Liability Bill. At that time a great number of employers were in deadly fear and tremor as to the responsibility which would be placed upon them by the passing of the Act, and instructed him to inquire into the matter, to ascertain what would be the practical operation of the Bill; and for that purpose he had special facilities. Well they naturally thought that if they took the question of mines first, they would undoubtedly be dealing with the most dangerous class of occupation in this country, and therefore the reports of the inspectors of mines for twenty years were carefully analysed, and some large colliery accident funds supplied additional information. To sum up the matter as far as mines were concerned, he might state that the result arrived at was that the rate of fatal accidents among miners might be safely put down at 23 per 10,000. It had been some ten or fifteen years ago as high as 36, but he was glad to notice that each year the rate had been reduced. They next proceeded to the subject of railways, and here he must say they were obliged to have recourse to returns other than those of the Board of Trade, which did not take in all the accidents that occurred. Well the result of their investigations was this, that the rate of accidents was found to depend materially upon the nature of the traffic conducted upon the line. If they took a passenger line, like some of the lines south of London, they found that in the course of the year some 25 out of every 10 000 *employés* met with fatal accidents. But when they went to large goods traffic lines, like those north of the Thames, the rate ran up to 35; so that they were surprised to find that while the accidents in mines were only 23 in 10,000, in railways under the most favourable circumstances the rate was 25. Since that inquiry he had had special facilities in connection with the large trades union in connection with the railways, and it was found that the facts arrived at were completely borne out by the experience of the union. They next proceeded to a branch of inquiry not mentioned there that evening. They investigated the returns of the Navy for twenty years; and they found although the rate of accidents in the navy had decreased very considerably in the last few years, taking an average of fifteen years, the rate of deaths from violence in that service was 40 in 10,000. In the mercantile marine the rate was astounding. They found there that instead of 40, the deaths were as high as 150. They found one very considerable element to account for this, and that was, that the deaths from shipwrecks alone in the mercantile marine amounted to 80 in 10,000, which still left 70 due to causes other than shipwreck. Hitherto he had dealt with fatal accidents, but now as far as non-fatal accidents were concerned, they found taking the country as a whole that about one-fifth of the men employed in and about mines met with an accident of greater or less intensity every year. In some mines they found the rate ran up to a half of those employed. A significant fact in their inquiry was this, that they ascertained with regard to the north of England, that when the coal trade was bad, the rate of non-fatal accidents increased

wonderfully, and men whose backs were sprained in times of depression were never heard of in times of prosperity; but always when the price of labour went down, the men got their backs sprained with greater intensity. Turning to quite another branch of the subject, and with regard to accidents all over the kingdom from horse vehicles, they would find that whereas in London by far the greater portion of persons were killed by waggons, outside London it was by light carts, whatever might be the explanation. In conclusion the speaker said as to the division of the United Kingdom which seemed to be a great hindrance in the way of the statistician, he thought as one result of the report from this Society to the Government in connection with the next census, the Registrars-general would have to adopt a uniform system of compiling their statistics for the three kingdoms.

Dr. GRAHAM BALFOUR, F.R.S., expressed the gratification he had felt in listening to Mr. Walford's very interesting paper. He had some knowledge of the labour involved in compiling such an amount of statistics, and he had seldom heard a paper read in the Society on which more careful work appeared to have been bestowed. He should like, however, to call Mr. Walford's attention to the question of mortality by poisoning. He could not at that moment say positively, but he was disposed to think that the diminution in the number of deaths by poison might probably be to some extent a result of the legislation of comparatively recent years on the subject of the sale of poisons. The beneficial effects of precautions against deeds of violence were well shown in the case of suicides in the army. At one time the attention of the military authorities was called to the large number of suicides by firearms in the army, and the practice of issuing ball cartridge to be kept in their possession by soldiers in the barrack room discontinued, and consequent upon this change the number of suicides had considerably diminished. He might also mention that a good many years ago it was the practice invariably to allow soldiers, or rather to compel them, to wear their side arms on all occasions when out of barracks; and the consequence was that there were a very large number of cases brought before the police magistrates in which serious assaults were committed by them with their bayonets. The result of a discontinuance of that practice was that the number of serious assaults diminished. He thought these points were worth being remembered, as showing how much could be done by proper precautions in preventing deaths and accidents by violence. There was another point which Mr. Walford brought forward in his paper, and that was the influence of intemperance on mortality. He would recommend Mr. Walford to look into the question of age in that connection, for he was satisfied from an inquiry that he had made on that subject many years ago, it would be found that at the higher ages, say above 40, the proportion of deaths from intemperance would be found to increase rapidly with the advance of life.

Mr. N. A. HUMPHREYS, having expressed his concurrence with the views generally set forth in the paper, thought it was satisfac-

tory to know that the proportion of deaths from violence was decreasing. So far as it was possible to judge from the returns of the registrar-general, the proportion of deaths from violence in England and Wales during the last fifteen years had declined from 797 per million to 675 in England and Wales; and the death-rate from violence in 1880 was lower than in any previous year.

Mr. E. HEPPLE HALL was of opinion that if there was one point upon which he thought the paper exhibited weakness, it was in regard to the quotation made from the reports of Dr. Henry Baker, and although he (the speaker) felt a great deal of hesitancy in appearing to challenge them, he could not help stating that he thought Mr. Walford had been unfortunate in the selection of the State of Michigan as a representative State, or as a test of what he wished to bring out in his paper. It was said with regard to Michigan: "It is away from the seaboard, and yet has water communication by the lakes; its pursuits are almost entirely agricultural." Now in that he must differ from the reader of the paper, because although greatly agricultural, Michigan was, more strictly speaking, in one sense at any rate, a manufacturing State. It was largely a lumber field, and the pursuits of the people were largely those of sawyers, millers, and lumber men. He would refer to one other point, and that was to the paragraph which said: "The causes of this long continued increase in the proportion of violent deaths from all causes and to the population, are not far to seek; they have increased in our mechanical arts and with our social appliances; they seem in truth to be increased almost in the ratio of our civilisation." Now he (the speaker) thought they would all join most heartily in re-echoing the sentiment expressed by Mr. Walford that this was not a pleasant reflection, and it would be worth while if some of the Fellows with an assiduity such as the compiler of this paper had shown, could set to work to find out what those causes were mainly attributable to. With regard to intemperance which had been adverted to by Dr. Balfour, they all knew that violent deaths were largely attributable to that cause. He thought, if he might offer an opinion on the subject, that would prove one of the most interesting subjects of the inquiry. There had undoubtedly been a great decrease in the number of absolute deaths from violence since the reform movement began in regard to temperance.

The PRESIDENT (James Caird, Esq., C.B., F.R.S.), in expressing the general feeling of the Society, had to offer Mr. Walford a most cordial vote of thanks for the excellent paper which he had read. He thought it would be of lasting benefit in the investigation of this important subject, and did credit to the Statistical Society. He entirely coincided with Mr. Walford and the other speakers, as to the fact that too little was made of the census returns. It was a great opportunity offered for gaining a knowledge, not only of the increase of the population, or its decrease in some quarters, but it might also be made more the means of ascertaining an improvement or the reverse in many social and other conditions of the people. He hoped that the special difficulty experienced by Mr.

Walford in his investigations would be obviated by a greater uniformity in the future in collecting the statistics of the three kingdoms.

Mr. CORNELIUS WALFORD, after acknowledging the vote of thanks accorded to him, briefly criticised the remarks of the various speakers. Dealing first with Mr. Harding, he quite admitted the force of that gentleman's observations with regard to the zeal of some agents in pushing their business, and it did happen that when accidents arose the importance of insurance was greatly magnified, and the sum paid by the insurance companies was held up as an example of liberality, and people flocked into them frequently, and too quickly, having accidents of a not dissimilar character. There were cycles in many things connected with human life, and in this matter of accidents, he had come to the conclusion, after several opportunities for observation, that there were actual cycles in it. With regard to sub-cycles, he could not say how much was due to the force of example, and how much to fraud and to influences that were not capable of being measured in any way. As to medical certificates, he had known too much about the discreditable way in which doctors sometimes lent themselves to claims made upon insurance companies, not only in accident, but in life companies and friendly societies. And he was sorry to say coroners were often more lax than the doctors, if possible. The real object of a coroner's inquiry was to ascertain the true cause of death, but when a number of neighbours of the person killed sat as a jury, some of them knowing that the life of the deceased was insured, he was sorry to say that the evidence was very often considerably coloured not to say distorted by the fact. This tendency, however, could be largely obviated if the coroners would only do their duty in ascertaining the true causes of death, and by being doubly careful where it transpired that the life was insured, for in such cases even a real motive for suicide sometimes appeared, certainly for creating injuries which sometimes terminated fatally. If judicial care were taken in the 28,000 coroner's inquiries annually conducted in England, Wales, and Ireland, they would as a rule have justice done, and the truth established; whereas now a coroner's inquiry was too often a means of misrepresentation, and even of direct fraud. Mr. Lionel Cohen had spoken as to legislative interference, and he (the speaker) did not think that the Employers' Liability Act was the best thing that could have been done by Parliament, for the small employers of labour stood to be ruined by its operations, while the larger employer was much more likely to obtain an annual average of results. It was for the sake of the small employers of labour that he wished to tabulate statistics on which insurance contracts might be based, and so furnish relief and protection where it was most needed. Referring to Mr. Neison's remarks about his inquiry last year, the speaker thought it was unnecessary for him to follow them, inasmuch as they were confirmatory on the whole of the conclusions which his own experience over a long series of years had enabled him to arrive at—a circumstance which was very gratifying to him, knowing as he

did Mr. Neison's wide information on the subject. He begged to refer Dr. Balfour to the commentary on Table D in his paper, where he had given a large amount of facts on the subject of death by poisoning. It was a subject that required very careful and elaborate investigation. He quite agreed with Dr. Balfour that a great proportion of the deaths in Ireland from intemperance happened amongst old people, that was to say over 50. What Mr. Humphreys said in regard to the decline of violent deaths was quite true, and he was glad of it, as they must all be, because it did seem a cruel waste of life that those who were engaged in the most useful occupations should have their lives sacrificed in the way they did. The falling off in the number of deaths had no doubt arisen from several circumstances, and he was bound to say that many of these causes were the result of legislation. The effect of the Factory Act of 1861, which required that in workshops and mills all machinery should be protected, was noticeable in the following year, and had been seen ever since. The same could be said of one or two other Acts. Mr. Walford concluded by thanking Mr. Hepple Hall for his suggestions about Michigan, although he was still under the impression, from what he had seen in passing through it on several occasions, that it was much more of an agricultural State now than it had been in earlier periods, and it probably was these earlier periods which Mr. Hall had in his mind. He had given the statistics of America generally, taking the country as a whole, not having detailed returns, but having the statistics of Michigan in detail, he had hoped he was on safe ground.
