

TABLE showing the value of the principal manufactures in England, in 1868, and the increase or decrease since 1867.

NAME OF MANUFACTURE	1867		1868		PERCENTAGE INCREASE OR DECREASE
	Value	Tonnes	Value	Tonnes	
Woolen Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Cotton Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Iron Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Chemical Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Metallic Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Food Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Textile Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0
Other Manufactures	1,000,000,000	1,000,000	1,000,000,000	1,000,000	0

APPENDIX A
APPENDICES.

TABLE showing the value of the principal manufactures in England, in 1868, and the increase or decrease since 1867.

the registration certificate; lead to greater accuracy in the registration records; and increase the scientific value of your reports.

The Royal College of Physicians, London, has with the other medical bodies, from the first evinced its enlightened appreciation of the importance of this branch of registration, and a committee, convened by it, of which Sir Thomas Watson was president, Dr. Sibson was secretary, have prepared a nomenclature of diseases, which has been distributed to all the medical practitioners of the United Kingdom. It only remains now to secure the universal application of the improved system by adequate administrative arrangements.

In comparing the fatal diseases of successive years, it is necessary to bear in mind that the knowledge of medical observers is undergoing changes every year, and is becoming more precise as pathology advances. Thus, heart diseases are now recognized, affections of the urinary organs, and cancers, which some years ago, would have been overlooked, or have been confounded with other maladies. In such cases it is not safe to infer that these diseases which afflict mankind are really increasing, because the numbers which medical men distinguish are augmenting. The physician will know how to interpret the ambiguous facts, and to turn them to account.

It is the duty of physicians, in recording facts respecting disease and death, to employ the same care as astronomers and meteorologists bestow on the observation of physical phenomena, and if that is done the observations will admit of the same kind of generalizations. And it must be evident, that as far as progress is concerned, these direct observations on the death, and life, and reproduction of the human race are of fundamental importance. The processes are complicated; life is enshrouded by an almost divine mystery; death is a kind of darkness; but it is a darkness which science can illumine.

I.—ZYMOTIC DISEASES.

The zymotic class comprises many forms of malady which are apparently due to organic molecules generating, developing, reproducing themselves in the substance of the higher animals. Thus the lymph of small-pox in a child contains specific molecules—*variolads*, as they may be called, which inserted in the tissues of another child develop and multiply themselves as if they possessed an independent life, and may be incidentally fatal to the natural, molecular life of that other child. These diseases fluctuate from year to year; and some like cholera are modified by temperature. Their mortality depends largely upon sanitary conditions; and is due to coincidences between their activity and the previous state of susceptibility of the population, which is at a minimum immediately after the prevalence of an epidemic eruption.

Small-pox is largely under control, inasmuch as a vaccinated population enjoys the kind of immunity, which small-pox confers against future attacks. Thus the deaths from small-pox were 7684, and 6411 in the years 1864 and 1865, and only 2513 and 2052 in the years 1867 and 1868; when it is probable that an increased proportion of the children had been vaccinated. On an average of each five years from 1850 to 1864 the deaths by small-pox to 100,000 living were 28, 20, 19; in each of the four years 1865-8 the mortality by this disease was 31, 14, 12 and 10.

The mortality by measles, 54 in 100,000 was above the average; and so was scarlet fever 102; while the mortality by the new disease, diphtheria, was 14: croup and whooping-cough were below their average.

Fever, including typhus, typhoid (enteric fever) and *typhina* (relapsing fever), is one of our deadliest enemies; it slays not only many children but adults: 41 deaths in 1000 deaths are due to fever. The mortality by fever to 100,000 living in the year was at the rate of 92; the average rate for

the 19 years ending in 1868 was 92; the highest rate attained was 111 in the year 1865; the lowest rate was 66 in the year 1860. Upon looking over Table 6. (p. 216.) it will be seen that the mortality for the sexes varies: it is higher in females under the age of 25; and after that age it is higher in males than in females. To 91 deaths there are about 781 cases of fever, each disabling a man for a month, and leaving him after recovery weak. The necessity of watching this disease and combating its ravages by sanitary measures is evident from these bare facts.

The same lesson is enforced by the Tables showing the ravages of scarlet fever and diphtheria. The number of deaths shows no signs of decrease. They have both devastated especially the dirty dwellings of the mining population of Staffordshire and Durham; the dense manufacturing districts of Lancashire, and the West Riding of Yorkshire; and the close dirty streets of the metropolis. Few homes are spared altogether.

Erysipelas, like puerperal fever, is often engendered in hospitals, where it and pyæmia are fatal after surgical operations. The disease exhibits some evidences of decline, which may be fairly ascribed to the improved arrangements to secure ventilation and cleanliness. (See Tables 9 and 13.)

The diarrhoea of the year was fatal to 29,821 persons; it has never before in any of the 17 years (1852-68) been so fatal. The water of the kingdom is in many towns more contaminated than it was formerly by the discharges of sewage into the rivers. The deaths by diarrhoea were at the rate on 100,000 living of 139: the average for the 15 years 1850-64 was 80. Diarrhoea is a common name for what is often called a symptom: the loss of serous fluids from the blood by intestinal discharges. This flux can be induced under different forms by various drugs, such as sulphate of magnesia, rhubarb, colocynth, elægium, blue pill, and calomel. Each drug produces a modified flux. Then when dysentery is epidemic it is accompanied by diarrhoea, and is not this diarrhoea a modified form of dysentery? And so it is with Asiatic cholera. Surely these diarrhoeas have in them some distinct features of which medicine should take account. Can no distinct character be perceived in the flux itself? The causes are different. Treatment to be effectual should also not be the same. It is probable that by careful study "diarrhoea" may be found to cover diseases as distinct as "fever" under which typhus, enteric fever, and relapsing fever were so long confounded, until the sagacity of Dr. Jenner and other pathologists subjected the phenomena to careful analysis.

1498 deaths were ascribed to cholera; and among them were many cases that could not have been distinguished from the Asiatic type.

The zymotic class, besides the miasmatic order of diseases, fatal to 111,106, contains three other orders much less fatal now in England, but in former ages both prevalent and destructive in some of their forms.

The enthetic order comprises syphilis, to which 1886 deaths were referred. Whether this disease is really becoming more fatal in England or not, it is impossible to say, as it is one of those diseases which it is believed have been suppressed in a considerable number of returns. If the suppression is now less than it was formerly, this will account for the increase from 1089 fatal cases in 1859, to 1886 fatal cases in 1868; otherwise we are driven to believe that the disease is growing every year more prevalent.

The twenty-two million inhabitants of England no longer suffer from the periodical famines which visited their forefathers when they numbered no more than a fifth part of the present population. This is due to the progress of agriculture and commerce—the ships, roads, and railways putting every county in communication with the whole world—and the poor law, imperfectly conceived as it is, still a kind of insurance against death by starvation. The deaths ascribed directly to privation in the

year are 96, and the numbers have ranged since 1852 from 3 to 5 in 1,000,000 inhabitants. It is true also that in a certain number of cases the fault lay with the victims themselves.

The deaths by intemperance exceeded the deaths ascribed to want: 20 in 1,000,000 in the year died of delirium tremens, and 16 of other forms of intemperance.

Thrush is the most fatal of the parasitic diseases; but 8 in 1,000,000 died of worms, hydatids, porrigo, scabies, and other forms of this order.

II.—CONSTITUTIONAL DISEASES.

At the head of the diathetic order is gout, which can often be traced to dietetic excesses, either of foods or of drinks. Where muscular exercise does not carry off the load, the urates accumulate and are deposited about the joints. The disease is the especial appanage of man, for out of 393 deaths by gout recorded 316 were deaths of men, only 77 of women; and nearly all the deaths occur at the age of 35 and upwards. The greatest number of deaths by gout are at the age of 55 to 85. Dropsy is associated with many organic affections under which it is now more frequently entered than it was some years ago. Cancer is a disease most fatal to women: the reported deaths from it have increased almost every year since the returns have been made. This is perhaps due to the fact that cancers of internal organs, formerly overlooked, are now discovered.

The tubercular diseases, including consumption, are still exceedingly fatal, but the deaths under this score, on an average of years, are decreasing. Unfortunately the mortality by bronchitis, which in its chronic stage simulates phthisis, is increased to fully a corresponding extent.

III.—LOCAL DISEASES.

This is the largest, and most fatal of all the classes of causes: under it 178,634 deaths are recorded: the nervous system and the respiratory organs were the seats of nearly equal numbers of these fatal maladies, 60,174 and 63,103: while the deaths by diseases of the organs of circulation, and of the digestive organs, were little more than a third of those numbers, namely 22,558 and 21,479. The diseases of the urinary organs are chargeable with an increasing number of deaths, namely 6,872: the deaths referred to the other orders of the class are comparatively much less numerous.

IV.—DEVELOPMENTAL DISEASES.

These diseases incidental to the processes of reproduction, development, growth, and decay, begin with premature birth, itself often the consequences of affections of the mother, but generally of diseases of the child which thus asserts its autonomy. 8,757 premature births and deaths are recorded. Then follow malformations, where the formative process is at fault. Women succumb in childbirth by various kinds of diseases. There has been some tendency to suppress the mention of childbirth, and to record only secondary affections; but there is no reason to believe that the tendency is increasing. In 22 years 72,421 mothers have died of parturition; 23,689 by metria or puerperal fever, and 48,732 by the other accidents of childbirth. The mortality was at the rate of 49 to 10,000 children born alive; in the last two years it was 44. The recent discussions on the mortality of hospitals, in which Dr. Evory Kennedy of Dublin and Sir James Simpson of Edinburgh have taken a leading part, cannot fail to have a salutary effect.

Puerperal women are not exempt from other serious diseases to which they are liable to succumb: they are more vulnerable than other women,

for they are exposed to a double danger; as the loss of either life is almost always fatal to both.

26,050 deaths of persons of 65 years and upwards from old age were recorded. The subjective symptoms of disease are confused at these advanced ages; and as all the forces of life grow feeble, the alteration of the state of the various organs is not easily detected by observers. And many very old people die without adequate medical attendance. So that it is probable many of these deaths were the consequences of latent disease. The same remark applies to the fourth order including atrophy and debility.

In the Tables pp. 120-125, the deaths of the sexes at different ages are distinguished; and the supplementary Table pp. 126-129, also deserves study, as it contains the diseases of least frequent occurrence, but often on that account of considerable interest.

There the various ways in which childbirth proves fatal are described. Thus 107 women died of puerperal mania, 33 of them under 25 years of age; 95 died of phlegmasia dolens; 343 of puerperal convulsions; 510 of flooding; 141 of placenta prævia.

V.—VIOLENT DEATHS.

The causes are complex; but they are by the nature of the case in some way evident. I have analysed them in the statistical nosology, and have pointed out the facts to be recorded under various circumstances, so as to render the coroners' informations of practical use.

The Coroners Court is one of the old institutions of the country. And it had up to a recent period, like many other institutions, not kept pace with the times. The "crown's quest" verdicts in the beginning of the reign of Queen Victoria were very much on a par with its "law" in the reign of Queen Elizabeth. Everything had fallen into hopeless routine; and the enigma of death was supposed to be solved by such formulas as "visitation of God," "natural death," "felo de se," "accident," and the like. In the Appendix to your third Report the subject was discussed in some detail.* Under the Registration Act the coroners were required to return the findings of the Juries to the Registrar; and all the verdicts thus for the first time came under review. They were not at all creditable to the intelligence of the country. They conveyed the least possible information, in the vaguest possible words. This was publicly represented. Instructions were drawn up, showing how the facts might be expressed in the simplest terms so as to serve the purposes of analysis, and to suggest measures for the removal of evils destructive to life. The Medical Witnesses Act of Mr. Wakley supplied better information in some cases. Dr. Lankester, and several of the coroners now bestow care in supplying the information required on a tolerably uniform plan. Still the information of many coroners is incomplete and unsatisfactory.

Thus in the year 38 persons are said to have been accidentally killed in mines; the kind of accident is not given. 415 males, 522 females are said to have died of burns; how this year's holocaust in England of 937 lives was offered up we are not informed by the coroners, or any other informant. Was it by clothes taking fire? Was it by the conflagration of a dwelling house? or by other agencies? The distinction is important. The means of preventing such deaths is very different in the various classes of cases. 447 males, 296 females died of scalds, in ways not distinctly stated. Then 558 males, 273 females are said to have died of "fracture," but by what means the fracture was induced, we are left in the dark. Numerous cases are still returned simply as murders, suicides, accidents, or injuries, without any information as to whether poison, or any other instrument was employed in the deed. 2752 per-

* Third Report, abstracts of 1839, pp. 75-97.

sons were returned as "drowned," of which 922 were returned as "found drowned," but whether the remaining 1830 lives were lost in bathing, by fall from ships, by shipwreck, by boats upsetting, by ice breaking, or by other means we know not. Whether the death was homicide or suicide, caused by negligence or accident—was left undetermined.

In some cases where lone men or women die in dwellings no inquests are held, and in consequence the deaths do not appear in the registers, as in those instances the coroner is the only possible legal informant. This is to be regretted; particularly as now the coroners being paid by annual salaries, and not having the same direct pecuniary interest in holding inquests as they had before the late act passed, they may be accused of a neglect of duty. When bodies are washed ashore, or are found exposed, the coroners are the legal informants; but as they often live at great distances from the registrar, it is difficult to obtain their signature, and some violent deaths may thus be missed. Again in the case of an explosion in a mine fatal to 100 or more people, the coroner, who is the legal informant, in each individual case, may only think it necessary to hold inquests on three or four bodies. The inquest, besides the loss of time to jurymen, costs, on an average 2*l.* 18*s.* 7*d.** It is thus an expensive inquiry to set in motion; and better informants on the spot where the death happens may be found in some such cases as those above noted.

To render the coroners every possible assistance in their difficult and important office, you addressed letters to them on the 10th August 1845†, and again on the 5th March 1868†. The effects of the latter will, it may be hoped, be visible in the year 1869: in the year 1868 we have seen how many deficiencies have to be deplored.

The facts, as they are returned, display so great a loss of life, as to cast all the deaths in modern battles, all the burnings of inquisitions, and all the proscriptions of imperial tyrants into the shade, as far as numbers of cruel deaths of men, women, and children are concerned. In the year, in England and Wales alone, 16,968 persons died by violence; in the five years preceding, the deaths by violence amounted to 83,853. Males are more exposed than females to the causes of these deaths, which were fatal to 12,833 males, and to 4135 females in this year: even under 5 years of age there is a difference; as 2,047 boys, 1,712 girls under 5 years of age died by violence. After that age 10,786 males, 2,423 females are killed.

Several new causes of violent death have sprung recently into operation. Thus 797 people were killed on railways; and 1,215 were killed in mines. Many men were poisoned by poisons unknown in the early ages. In modern manufactories many died of fatal accidents. Fire and gas on one side, and water on the other from the increase of navigation, have redoubled the danger from these useful friends, and redoubtable enemies under different conditions.

At first sight it might appear that civilization had augmented more than it has diminished the dangers of mankind. But upon reflection it will be found that the dangers in past ages and in uncivilized countries, from wild beasts, from famine, from factious fights, and from destructive wars of races, must have been more fatal than the dangers by which they have been to a certain extent replaced. Even now it will be found that the numbers returned as killed by horse conveyances (1331) considerably exceed the deaths by railways. Still mechanical force, steam, and chemical agency are undoubtedly new elements of danger to mankind.

Dangers from all these new sources can be greatly diminished by judicious precautions and by wise laws. Each class of cases has to be considered by itself in seeking for remedies.

* See Appendix to Twenty-seventh Annual Report, p. 187.

† See Seventh Annual Rep., pp. 315-316, and Twenty-ninth Annual Rep., pp. 198-204.

RAILWAYS.

The persons killed on railways amounted to 797; of the number 714 were males, 83 females. 34 of the persons, 21 males, 13 females were returned as killed by manslaughter; 33 out of the 34 were suffocated or burnt in the disaster at Abergele on the 21st August; 24 of the deaths, 21 of males, 3 of females were suicides: the unhappy victims threw themselves on the railways, and converted the trains into steam Juggernauts.

Taking all the 797 persons killed on railways: of 75, particulars are not given; 539 were run over on the line; 34 fell from the carriage or engine; 13 were killed by collisions; 94 by crushing; 7 by fall of heavy substances; 35 by burns.

This return differs largely from that made to the Board of Trade for the same year, of only 150 deaths in England and Wales.* The companies speak with confidence of the accuracy of their returns of passengers, 39 of whom they state were killed by causes beyond the passengers' own control, and 14 by causes referable to misconduct or want of caution. In the two previous years, 24 and 28 passengers were killed. The return of accidents to servants of companies and of contractors is said to be incomplete, because many railway companies are not required by law to report accidents to such persons to the Board of Trade. It is in this quarter that the return to the Board of Trade is most defective. It is probable that none of the railways return deaths occurring some weeks after the injury. The numbers "injured" by the English railways in 1867, as stated in the returns, was 660 to 138 deaths; in 1868, it was 528 to 150 deaths, or excluding the Abergele deaths, to 117 deaths.

Registration returns only 13 deaths by collision in 1868. In the five years 1863-7 only 82 persons were said to have been killed by collision, 31 by trains running off the line. That makes 23 deaths annually including engineers and stokers. It is probable, therefore, that the return by the companies of 105 passengers killed in three years (1866-8), or 35 annually, though understated, may serve as a basis of computation; and the number, as compared with the number of journeys, is not considerable. Thus in the year 1867, besides 84,418 season ticket holders, 250,598,982 passengers travelled by rail; and as 35 were killed on an average of the three years 1866-7-8 according to the returns, the chance of this disaster on the way to any one is represented by the fraction $\frac{1}{7,000,000}$, after correcting for season ticket holders. Hence it follows that a premium of 1-eighth of a farthing, will insure 1,000*l.* on an average journey; and taking 600 journeys a year $\cdot 072$ *l.* = 1*s.* 5*d.* will insure 1,000*l.* on any life killed during a year of average journeys. Then, as about 23 passengers are injured to one killed, by taking the duration of illness into account, we see how those ingenious persons who undertake insurance against railway accidents make their calculations and profits.†

The chances against being killed in any single journey vary with the line, and perhaps with the distance; but, if the return is correct, the general chance is more than 8,000,000 to one that a passenger will arrive at the end of the journey alive; and the chances are more than 362,000 to one against his being either injured or killed. It is probable that there is now no safer kind of locomotion than railway travelling. It is safer than riding on horseback, or in a carriage.

* Number of accidents of injury to life and limb, which have been reported to the Board of Trade during the year 1868. Parliamentary paper 162, July 1, 1869. The deaths for Scotland were 47, for Ireland 15. See page 234.

† The railway companies return 68 killed to 1557 injured by their default; the numbers injured by the passengers' own defaults is evidently wrong. It is only 16 injured to 37 killed in the three years 1866-7-8. I take the proportion from those killed and injured by the companies.

This degree of safety is only maintained by the laudable vigilance of the companies, and of their officers: and the vigilance is kept up by the heavy pecuniary fines to which they are liable for every injury or death inflicted on a passenger by their default.

Seeing the small number of accidents to passengers, it has been too readily assumed that there is no danger to passengers in railway travelling; and this saying has been quoted: "a person who wishes to put himself in the safest place possible cannot do better than enter a first-class railway carriage."

This is based on a fallacy. The rate of mortality from *all causes* is always given, like the rate of interest, so as to show the rate per cent., or 2 per 1000 *per annum*; and at the age of 30 this is 10 per 1000, at 50 it is 20 per 1000 *per annum*. The railway mortality has been calculated hitherto on the journey, which is on an average of 9.6 miles and may be of half-an-hour's duration, more or less. The rate which has been given above is, therefore, *per half-hour*; and as there are 17,520 half-hours in the common year, the rate *per annum* is 17,520 times the rate per half-hour. When the multiplication is performed it will be seen that the rate of mortality on a constant average railway-travelling population is 2 per 1000. This is an appreciable addition to the ordinary mortality of men, which ranges from 10 at the age of *thirty*, to 20 at the age of *fifty*, and to 40 at the age of *sixty-three*.

Dangers can be numerically appreciated with great exactness on a large scale, but in practice it is not customary to take into account additions or diminutions of the rate of mortality not exceeding one-10,000th part: and men every day encounter dangers of that measured magnitude without hesitation. Unless they had this sufficient amount of courage human affairs could not go on; the lion in the path would bring everything to a standstill. But when the annual rate is raised under any exceptional conditions such as railway travelling by *one*, and certainly when it is raised by *two* in 1000, the increase under those conditions cannot be entirely neglected. The railway carriage cannot be held up as a harbour of perfect safety.

But taking the railway passengers rate of mortality at 20 in 10,000 for the whole year round it is evident that a season ticket-holder who is on an average railway only an *hour* a day for 300 days adds less than one-10,000th to his risk: it is, therefore, below the degree of commonly appreciated danger. For double the time the risk may be doubled; but even this is only an addition of 2 to the ordinary risk of 150 in 10,000 from all other causes incurred by a life of the age of *fifty*. Insurance offices constantly neglect such slight additional risks in dealing with men living in different circumstances, in different professions. As the assayer of gold cannot test its fineness from alloy with any certainty beyond the 2 or 3 ten thousandth part, so it is in scientific assays of the value of human life.

It is gratifying to find that the risk to the railway passenger has continually decreased since the early observations of the years 1840-3, when the passenger encountered a risk five times as great as our computation gives; and this improvement may be in part fairly ascribed to the laws under which railway companies are liable to heavy claims from injured passengers for damages. The least want of vigilance, inefficient training of the staff, overwork, defaults in the construction of the line, defects in the engines or the carriages, lead to most disastrous consequences.* Against the divers elements of danger we have the natural anxiety of the directors, and of a very skilful body of officers to

* See Neison's contributions to vital statistics, p. 247. His paper is an excellent digest of results deducible from the Board of Trade returns down to the year 1852. In 1840-3 *sixty-one* passengers were killed in 57,617,578 "passages," or *one* in 944,550-260 passengers were injured. But the average distances travelled then were 18 miles for which allowance has to be made, as the distances are now less than 10 miles.

ensure the safety of the lives of their passengers. All their efforts in this direction are sharpened by the heavy penalties of the law. And it is easily conceivable that any relaxation of existing safeguards might lead to an immediate increase of danger to passengers, so that the deaths, injuries, and fears of travellers may become twice as great as they are now.

The "servants of companies or contractors" do not appear practically to enjoy the same legal protection as passengers, and they are killed in considerable numbers: in the year 1868 the companies returned 53, and "many companies" do not take the trouble to report such deaths to the Board of Trade, "not being required to do so by law." This is very evident, for in 1868 while 150 deaths on the railways in England and Wales are returned from all causes, to the Board of Trade, the total of such deaths distinguished in the registration returns are, after deducting 24 suicides, no less than 773! After the deduction of 53 passengers, and of 34 trespassers or persons killed at level crossings, 686 remain, who must have been chiefly "servants of the companies and contractors." No fines, we may presume, were inflicted in these cases, as the relatives would have no means of bringing actions under Lord Campbell's or any other Act. The workmen have no remedy when they are killed "by causes beyond their own control;" and their deaths in most instances are from causes under their control.

It must on these grounds and on others be admitted that the people at large, and the railway companies, have reason to be dissatisfied with the present state of the law. In the year 1867, when the railway companies returned the deaths of 28 passengers, 15 were killed by causes beyond the control of the said passengers; and 13 by "their own misconduct or want of caution," if we adopt the judgment of the companies in the matter. The persons injured in the two categories, they state, were 578 and 6, the latter evidently wrong; for that year the companies paid 322,985*l.* as "compensation for personal injury, &c.,"* This is a large sum; it is 2.4 per cent. on the 13,534,281*l.* of fare-receipts from passengers. It does not include all the legal expenses of the party injured; and we have no means of knowing the amounts or the per-centage on the sums awarded by juries.

The companies have just grounds to complain of the costs of litigation, which are probably included in the above sum, and of the uncertainty of awards, which are based on appreciations of the extent of injuries often obscure,† and of the value of men's life incomes, scarcely within the capacity of juries, or of the ordinary courts. The public have still greater ground for dissatisfaction. The families of poor men can derive little advantage from the law; and the result to the opulent is uncertain. Some railways deal with sufferers in a liberal spirit; others are said to oppose every claim by hostile litigation: here is another ground of inequality under the laws.

In endeavouring to arrive at remedies, four things have to be especially kept in view; (1) the principle that to ensure the utmost care on the part of the railway authorities loss of life or limb is to be compensated, so far as this can be equitably done, by payments in money bearing some reference to the economic value of the party injured; that (2) the railway should know beforehand the amount it may be called upon to pay; that (3) both the railway company and the person injured should be relieved from any unnecessary expense in obtaining an equitable settlement; and that (4) the tribunal for determining the extent of injury, the value of the life, and the division of blame, should be skilful and competent.

* Parliamentary Return, No. 484, 1868; what the " &c." means in the return is not clear.

† The difficulty of the surgical questions will be at once seen on referring to the Classic essay on "Railway and Street Injuries of the Nervous System, by J. E. Erichsen, Professor of Surgery in University College."

I have shown elsewhere that the economic value of men can be estimated by deducting the present value of their necessary subsistence from the present value of their future earnings. Thus, taking his wages as the basis, the value of a Norfolk agricultural labourer, at the age of 25, was found to be 246*l.**; while the value of the income of a professional man earning 300*l.* a year being 5000*l.*, the deduction of his necessary professional subsistence may reduce the money value of his life to something like 3000*l.* By neglecting this element, the values of a life are sometimes exaggerated. The compensation for injury can never exceed the value of the life; and the injuries to body and limb may be classified by a tariff, so as to bear definite proportions to the value of the whole life. The tariff would be subject to modification in singular cases which can be easily conceived; thus the loss of a finger may deprive a great violinist of his fortune.

Objections may be raised to this principle of compensation. The lives of the Queen's subjects are all equal in the eyes of the law. And no one admits that a railway company can be justified in neglecting any precaution in the case of a single passenger, be he rich or poor. The same vigilance and care are required and given in all cases. Why then should the company pay more for the life of an officer than for the life of a soldier, for the life of a judge than for the life of a solicitor, for the life of a bishop than for the life of a curate. Yet the loss or injury on a carriage full of curates might not exceed 30,000*l.*, while the loss on the life of two bishops might raise claims for a larger sum. The answer to this is that the compensation in money is to the individual, or to his family, for the pecuniary loss, to which it must therefore bear some defined proportion. Besides, as all classes are mixed up in a train, the effect of the larger fines on the railway companies is to awaken a vigilance calculated to prevent injury—and that is after all the main object—to the lives of all classes be they of small, or be they of exorbitant value. It is possible, however, and even desirable to save disputes, expenses, and uncertainty, to try and find some average minimum amount, suitable to the majority of cases, and susceptible of expansion to meet exceptional instances. This can be done on the principle of Insurance.

(1). Thus to deal with the *Cases of Death for which the railway company is exclusively liable*. Let a fixed sum be paid by the company for each passenger killed by its default, and let the sum, varying for the three classes of passengers, be fixed after careful inquiry. I assume for the moment that the sums have been determined; and that they are 136*l.* for first class, 100*l.* for second class, and 60*l.* for third class passengers.† Then the tariff of injury would be graduated on these scales: assume for the moment that on the 23 annual deaths from the companies fault the amount is 23,000; and that the rate for injuries is so graduated as to amount to an average of 300; then 519 injuries a year will cost 155,700; making with compensation for deaths 178,700. That is less by 144,285 than was paid by the English companies in 1867 as compensation for personal injury “&c.” in the latest year for which we have returns. It leaves a reserve.

Where Parliament limits the fares to meet a special purpose it may limit the compensation.

(2). The passengers killed by what the return designates their own “misconduct or want of caution” appear at first sight to have no claim; but in each of these cases a small fine should be levied, in order to enforce attention to provisions of prevention on the part of the company. Here is an illustrative case:—A solicitor (J.) enjoying an income of 2000*l.* a year is killed under these circumstances: he is startled from sleep and

* Journal of Statistical Society, March 1853, pp. 39-44. The value of the wages is 488; of the necessary subsistence 242.

† These sums are in proportion to the average fares of the three classes:—2*l.* 11*s.*; 1*l.* 5*s.*; and 9*s.*

attempts to leave the carriage as the train starts; he is stopped by a servant of the company, who is an old soldier, and acts in strict conformity with the regulations; in the struggle J. falling between the platform and the iron wheels of the carriage is crushed to death. He is found stretched on the ground, with torn clothes, and a physician has to communicate the sad intelligence to his wife, now a widow, who was awaiting his return to dinner. He was killed, as the return would say, “by his own misconduct.” But it was held by the jury, that if instead of a narrow step for the foot, the interval between the platform and the carriage had been protected, as it is in some other cases, J. could not have been crushed, his family could not have been deprived of 2000*l.* a year. Another solicitor was killed shortly after, not under the same, but under similar circumstances. The structural alteration suggested by the jury involved some expense; it was not carried out. It may possibly be inexpedient on other grounds, but it is quite certain, that if in all such cases the company were subject to a fine on the old principle of the deodand, no means would be neglected to prevent passengers being killed by such “misconduct” of their own, or by any want of precaution on the part of the company.

(3). The guards, engine-drivers, stokers, and other servants of the company, who are killed by causes beyond their own control, are justly entitled to compensation, at a settled rate. The workmen of the company or of contractors, often strong but dull, require drilling, training, and instructing against the dangers of the line. The contractors and companies could by discipline prevent many deaths, and would exert themselves more diligently in this direction if they had in every case of death or injury on the line to pay a definite fine. Some of the companies liberally contribute to the friendly societies of their servants, which should be made the universal rule. The whole of the members of such a fund, as well as the company, should be called upon to contribute at every death on the line, to give every one an interest in saving life.

(4). There is no provision to meet those extreme cases from which the companies suffer, inasmuch as the claims upon them appear practically unlimited. How much has been demanded, I know not; but 13,000*l.* it is said were paid in one case. 7000*l.*, 5000*l.*, 4000*l.*, 3000*l.*, 2000*l.*, and 1000*l.* are apparently common claims. These cases give rise to expensive litigation, and the scientific estimate of the value of a life income, on which the amount hinges, is thrown into the hands, and left to the decision, of an ordinary jury. What the result may be is a matter of chance. A trial, for a family left destitute, is a hazardous speculation. These cases will be met by the companies insuring the lives up to 5000*l.* The passenger will thus appraise his own life, and will pay a premium partly covering the risk, sufficient, with some addition from the company's reserve, to pay the sums insured wherever the passenger is killed on the line, whether by accident to the train or otherwise. Thus in three years,* 35 passengers were killed annually: 12 by their own want of caution or misconduct, 23 otherwise. This is from the companies' return. The proposal is to pay the insurance on the 12 deaths, as well as on the 23 deaths. These sums are insured by special premiums paid by the passengers; and will therefore be independent of the compensations covered by the tariff under the first head.

I may here answer a preliminary objection: “There are Railway Passengers Insurance Companies in existence, and any other insurance is unnecessary.” The answer is: these companies have no control whatever over the causes of death and injury, and the principle here upheld is that the losses on lives should be met by the parties, who can exercise a certain control over the events against which insurance is effected. Besides, these insurance companies limit their insurances to

£1000; and if the returns of the companies are complete, the insurance is curtailed of its fair proportion by a proviso, somewhat misleading, that the insurance shall extend "to such injury only as shall be caused "by some injury or accident to the train." They pay for nothing beyond the above 23 deaths; so for a third of the deaths returned they pay nothing; and the death of J. above cited under such a policy, would not have been by *accident to the train*; and had he held a policy his family would have got nothing from a Railway Passengers Insurance Company. Their general Policy even apparently does not cover all the deaths by accident on a railway, while it extends to other accidents.

An action by law is now maintainable against a person who by his *wrongful act, neglect, or default* may have caused the death of any person.* This action, under the Act, can now be brought "notwithstanding "the death of the person injured." Every such action shall be for the benefit of the wife, husband, father, mother, grand-father, grand-mother, step-father, step-mother, son, daughter, grand-son, grand-daughter, step-son, and step-daughter of the person killed. The jury may give such damages, as they think *proportioned to the injury resulting from such death to the parties respectively* for whose benefit the action is brought.

By the judicial statistics, we learn that 203 actions were brought under the Act in the year 1868; 122 of the verdicts were for the plaintiff, 3 were subject to special case or reference; 29 verdicts were for defendant, in 6 jury was discharged without verdict, in 5 a juror was withdrawn, 38 were cases of nonsuit, or were otherwise disposed of. The total amount recovered was £68,092; which if equally divided among the successful plaintiffs, taken at 124, gives an average of about £549; in 9 of the cases the damages were £1000 to £2000; 6 were £2000 to £3000; 1 was £3000 to £5000; and in 1 the damages were £9750.† 98 actions were brought for other injuries from negligence; of which 47 resulted in verdicts for plaintiff, 4 were subject to special case, and 9 to reference; £7202 were recovered, we may assume by 60 plaintiffs, or on an average £120 each. The largest damages in a single case are said to have been between £2000 and £3000.‡

The expenses of the 301 trials are not stated, but they would necessarily be large: and the dread of expense necessarily deters many executors from moving. To meet this difficulty to some extent, the Act was, in 1864, amended by 27 & 28 Vict. cap. 95, which gave other persons beneficially interested power to bring actions.

Many of these actions were brought against railway companies; but the whole amount of £75,294 recovered goes but a short way towards the compensation for personal injury as shown in the returns to the Board of Trade. There is a wide margin for law expenses, and the greater part of the residue must go to meet unlitigated claims.

(4). Any common tariff to compensate for deaths or injuries can only provide for the cases of persons of moderate fortunes; and should only be pitched to meet a part of the pecuniary damage sustained, as the fine is not vindictive but preventive, and in mitigation of a family's losses. Railway Life Insurance by the companies ensures the continuance of vigilance on their part, substitutes definite for unlimited claims, and gives families the fullest benefit free from the uncertainty and expenses of litigation.

The insurance could be most conveniently effected by annual policy tickets, to be issued by each company, but in such terms as to insure, for

* Preamble to 9 & 10 Vict. cap. 93. Lord Campbell's Act is entitled, "An Act for compensating the Families of Persons killed by Accidents." (26 Aug. 1846.)

† This was an action of "Howard v. The Great Indian Peninsula Railway Company, tried at Lewes, Sussex, on 17th July 1868, before Mr. Justice Willes. The jury found a verdict for the plaintiffs for 9,750*l.*, which they distributed thus:—to the widow 3,750*l.*, and to each of three children 2,000*l.*"

‡ Judicial Statistics, 1868. Part II, pp. 3-11.

a commensurate premium, any sum from £500 up to £5000, payable by the *company owning any railway in the United Kingdom, on which the passenger insured was killed*; and in case of injury a sum proportional to the extent of loss, always a fractional part of the sum insured, sustained by the passenger.

The risk of death on a single journey being so slight we have no coin small enough to pay a premium for £1000; but taking 600 average journeys, nearly 6000 miles for the year's travel, of an average person likely to insure, the exact premium calculated on the companies' own returns to the Board of Trade is 1*s.* 5*d.* (£.072) for £1000 on each death: take the

injuries by the same returns at 15 to each death ($\frac{524}{35}$); and let the damages for an injury be on an average 1-third of the sum insured at death; they would necessarily have a large range as the injury was slight or severe; then the premium to insure against injury would be 7*s.* 3*d.*, making 8*s.* 8*d.* in the aggregate. To settle the premium minute preliminary inquiries would have to be made into all the results of experience attained, and into the circumstances affecting the loss of value of the professional life by injuries, but for the purpose of illustration let it be assumed that 8*s.* a year will henceforward insure the passenger's life to the extent of £1000 against death or injury by any railway accident, without raising the question of default on his own or the company's part; and of this let 7*s.* be paid by the insurant, 1*s.* by the company.

The insurance might be thus worked. The passenger would take out an annual policy; the premium being 7*s.* for £1000; 35*s.* for £5000. If he take out a season ticket he will take out the insurance ticket at the same time; and in all other cases he will take his insurance ticket at the station nearest to his residence. Each railway in the United Kingdom will issue insurance tickets, and the premiums will be paid into one fund under separate accounts; and the compensations for death or injury on each railway will be written off the account of that railway which will be called upon to make up its own deficiencies. There will be many arrangements of detail necessary to insure the well-working of such a system; but it could all be brought in England under the railway clearing house system. The premium should be subject to approval by a Government office, and be so rated as to render it the interest of companies to reduce the current mortality.

I have assumed for the moment that the insurances would not be taken for more than £5000; but as sometimes larger sums are awarded it may be deemed right to insure for larger amounts; at the above rates a man of large professional income might insure £10,000 for an annual premium of £3 10*s.* The actual compensations are paid by the passengers, whose fares are fixed with due reference to the compensations as well as other charges, and the premiums for the additional sums required to meet the cases of lives of more than ordinary value would relieve the companies to a considerable extent.

Each man having appraised himself in his policy no further question of the economic value of the whole life could be raised. That would be fixed by the tariff for all uninsured cases, and by the policy of insurance in other instances. It is understood that the tariff price would be paid on every person killed by the default of any railway company, as well as the extra sum insured.

The cases of *injury* are so infinitely diversified; and so difficult to measure, that to deal with them it may be necessary to establish a special court of arbitration, consisting of a barrister, a surgeon, and an actuary, who would soon acquire experience and be able to lay down general rules for future guidance.

Under these arrangements, we may expect improved means for the prevention of deaths in travelling on railways, and fewer deaths among the servants of the companies and of the contractors. At the present time a battalion is killed every year.

DEATHS BY HORSES AND BY OTHER ANIMALS.

The number of deaths by other animals than horses, in this country, is not great in these days; and the horses kill men indirectly by throwing their riders in hunting, racing, or travelling; by kicking or by running over them. They are most frequently fatal when used as a means of conveyance. The number of persons killed by horses or other animals was 269 in the year; of whom 251 were males, and 18 were females. Of the boys 11 were under 5 years of age; 26 were 5-10; 30 were 10-15; many of these were young equestrians. The numbers afterwards decline as the youths grow skilful or cautious. Old men who persist in hunting appear to pay the penalty of persistence by frequent death.

The persons killed by carriages, omnibuses, cabs, vans, waggons, and drays include waggoners and other drivers who are not themselves carried. Other people on foot are killed by horses and drivers; the former supplying power, the latter direction. The driver only incurs danger if he upset his vehicle; but he incurs no physical danger himself by running into or running over other people, and has little to apprehend from the laws if the victims themselves are at all to blame. He has also good chances of escape altogether. The deaths by horse conveyances were at least 1331 in number.

203 PERSONS KILLED IN THE STREETS OF LONDON.

The numbers under this head are so great as to generally excite surprise. They have attained an extraordinary magnitude in recent years.*

To these deaths attention has been specially directed in the Weekly Tables since March 5th, 1864. Still they have gone on increasing. In the year 1867 the numbers were 164, in the year 1868 the numbers ran up to 203. That number killed implied about 2,900 wounded or mutilated, more or less severely.† The fatal carriages were not distinguished in the Registration Returns in 58 cases; but of those distinguished only 12 were omnibuses and 21 cabs, while 105 were vans, waggons, drays, or carts. Seven deaths were referred to horses, without any mention of vehicles. The return for the year 1869, during which continued attention was drawn to these disasters by the publication of every reported

* Dr. Johnson gives this danger no prominence in his gloomy picture of London:—

“For who would leave unbrib'd Hibernia's land,

“Or change the rocks of Scotland for the Strand?”

“There none 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.”—*Johnson's London.*

Gay, indeed, in his walk through London by night describes the perils of the streets in the last century. (*Trivia*, Book III.)

† Colonel Henderson returns 83 run over and killed in the Metropolitan Police district, and 1265 maimed or injured. In the four years March 1st, 1866, to June 30th, 1869, Colonel Fraser returns 28 killed and 654 maimed and injured in the city of London; the numbers returned by the Metropolitan Police during the same period as killed were 343, the maimed and injured 4647, making in the aggregate 371 killed and 5301 maimed and injured. One was killed to 14 injured.

case, shows a slight decline, chiefly noticeable in vans and waggons, at the end of the year. Colonel Henderson twice during the year called the attention of the police to the necessity of checking reckless and furious driving. 197 persons were apprehended and charged with the offence of furious driving in 1868; and 312 persons in 1869. The convictions in the two years were 172 and 267; the summonses applied for were 235 and 455.*

That the dangers of the streets of London are considerable is evident. The 203 deaths in this single city look large by the side of the deaths on the railways of all England. They are, when compared with the whole population of London,† below the numbers occasioning appreciated danger; but only a part of the population is exposed to risk in the streets during a part of the 24 hours; women, children, and workmen, for many hours of the day being at home, school, or work; so an exact estimate of the risk cannot be framed without an hourly census for a certain number of days. But if half a million of people are in the streets on an average during 12 hours, that will reduce the average equivalent quantity exposed to risk for 24 hours to 250,000. Then many of these people are in streets out of thoroughfares, where there are few carriages of any kind; allowing for this, the numbers actually at risk may be reduced to 100,000; among whom the mortality will be 2 in 1000 exposed to risk for a year, or the same as on the railways. But upon inspection it will be seen that the persons on the footpaths, protected by kerbstones, are exposed to no risk; and that the persons in the streets moving rapidly are in comparatively small numbers, except at crossings. They encounter there greater risks than railway travellers. The dangers of the streets have now attained a pitch which commands public attention. What are the causes of these deaths? What are the remedies?

These are manifold. It is evident, in the first place, that the railways while their circuit is incomplete, throwing into London goods of every kind, requiring rapid delivery, have largely swollen the traffic. And the heavy vans and waggons drawn by heavy horses, no longer moving at a slow pace, driven at a trot, cannot be pulled up by their drivers, often unskilful. The mass once set in motion goes on; and it is noticeable that these heavy vans have no effective drag, so that downhill the driver goes on helplessly over his victims.

What power has the police in this matter? The Metropolitan Police Act‡ declares that every person shall be liable to a penalty of *not more than 40 shillings*, who shall in any thoroughfare or public place *ride or drive furiously*, so as to endanger the life or limb of any person, or to the common danger of the passengers in any thoroughfare. Then there is Lord Campbell's Act, and the common law punishes wilful injury to life or limb. This power is evidently ineffectual. In the first place negligence and unskilful driving by a vanman is as often fatal as furious and skilful driving by a cabman. The laws do not meet the case. One of our oldest laws did meet it, and instead of being abrogated should have been adapted to the present state of things.

* Here is one of the Police Orders:—

“Tuesday, 4th May 1869.

“FURIOUS DRIVING.—Attention is called to the law respecting reckless and furious driving in the streets—2 & 3 Vict. cap. 47. sec. 54—which is to be strictly enforced.

“Special attention should be paid to all persons, especially drivers of vans and light carts, driving furiously round corners or over crossings frequented by foot passengers.”

† Population 3,126,635; deaths from the causes above referred to, in the streets 203; or 1 in 15,402.

‡ 2 & 3 Vict. cap. 47, s. 54.

The 9 & 10 Vict. cap. 62 (18 August 1846) abolishing deodands, opens with this preamble: "Whereas the law respecting the forfeiture of *chattels which have moved to or caused the death of man is unreasonable and inconvenient*;" and enacts that there shall be no forfeiture of any chattel for or in respect of the same having moved to or caused the death of man, and no coroner's jury shall find any deodand whatsoever.

Wise laws were frequently enacted by legislators of old for reasons which later ages have deservedly not respected. Thus it was with the law of deodands, which is thus declared by Bracton: "If a horse, or ox, or other animal of his own motion kill as well an infant, as an adult, or if a cart run over him, they shall in either case be forfeited as deodands; which is grounded upon this additional reason, *that such misfortunes are in part owing to the negligence of the owner*; and therefore he is properly punished by such forfeiture."*

There can be no doubt that if every van, or carriage, that killed a man in London, were forfeited, it would lead to an immediate diminution of the 200 annual deaths in the streets.

The deodand, it will be observed, did not raise the question of criminality, or even blame; but it had the effect of making every owner of a dangerous conveyance take the utmost care, by the appointment of a skilful driver and by other precautions, to prevent the "killing of infant or adult."

Here are the arguments against deodands. They were at first devoted to Holy Church, which undertook to say masses for the departed soul: this was after the reformation pronounced a superstitious use; and before that date the king had claimed deodands, and often given them away to lords of franchises. This was undoubtedly a perversion of the penalty; which should have gone to the family of the man killed, the natural inheritors of his soul's affections. Hence juries on this ground, and because they did not perceive the philosophical principle of the law, and because, often possessing waggons or carriages themselves, they sympathized with the hardships of owners, often very little to blame directly, took "upon themselves too frequently to mitigate these forfeitures by finding only some trifling thing, or part of an entire thing, to have been the occasion of the death." Hence the deodand was abolished in the year 1846, and it cannot now be revived in its old form.

Every object would be attained in the prevention of street deaths, by inflicting a fine, of a certain range, but of sufficient amount to make drivers and owners careful not to kill their fellow creatures. Perhaps fines ranging from £5 to £50 in every case would suffice, unless by going higher the cases could be withdrawn from the operation of Lord Campbell's Act. The fines should be levied on driver and owner, in proportions expressed in the judgment; and go to the families as under Lord Campbell's Act, or to the Consolidated Fund when no such relatives existed. Given to widows and fatherless children the fine would in truth be given to God.

The cause and the prevention of street accidents might with advantage be inquired into by a commission, or by some competent man. In the meantime the following points deserve attention:

1. The creation at crossings of more places of refuge.
2. The licensing of all drivers of heavy waggons and vans who drive at a trot through the streets, so that there may be some security for skill, as is now the case with the less dangerous cabmen. Such carriages to bear a licence number.

* Bract, l. 3. c. 5., cited in Law Dictionary by Sir T. E. Tomlins, 1835.

3. A police regulation to ensure the use of such drags as will enable the driver to stop instantly his carriage, at any allowed velocity.

4. The enactment of a system of moderate fines, on the drivers and owners of carriages, who kill or injure passengers in the streets; to vary with the nature of the case.

5. Spectators who witness street accidents should be ready to arrest, to take notes of, and to give evidence against offenders, in the public interests.

6. Playgrounds at the schools and in the squares will keep many children out of danger.

7. Foot passengers should consider beforehand how to cross the streets of London safely; how to be at once cool, attentive, alert. People who are deaf, short-sighted, lame, or infirm, should take especial precautions.

I have the honour to be,

Sir,

Your obedient servant,

WILLIAM FARR.

To

The Registrar General.

Note.—I have to thank four of the Railway Companies for supplying me with the following information of the amounts paid by them in compensation for personal injuries during the years 1866-68:—

	1866.	1867.	1868.
London, Brighton, and South Coast Railway	£48,744*	£33,038*	£7,637*
London and South Western Railway	4,504†	1,714	7,147
South Eastern Railway	36,791	10,108	8,988
Manchester, Sheffield, and Lincolnshire Railway‡	7,971	13,972	5,289

* These sums include 2,813*l.* in 1866, 1,429*l.* in 1867, and 252*l.* in 1866 as costs of award.

† This sum is exclusive of 7,971*l.* paid in 1866 for the Egham accident, which occurred in a previous year.

‡ The total number of accidents attended with personal injury to passengers during the three years was 294; and in 247 of the cases compensations amounting with costs to 27,232*l.* were paid. Of the total sum 17,723*l.* were paid upon official negotiation, the costs of settlement being 1,993*l.*; the amount awarded by juries was 4,603*l.*, and the costs of such litigation, &c. were 2,917*l.*

TABLE 1.—Deaths in England from Scarlatina, Cynanche Maligna, and Diphtheria, for each of the Years 1855 to 1868.*

YEARS.	TOTAL.	SCARLATINA.	CYNANCHE MALIGNA, and DIPHTHERIA.	CYNANCHE MALIGNA.	DIPHTHERIA.
1855	17,314	16,929	385	199	186
1856	14,160	13,557	603	374	229
1857	14,229	12,646	1,583	1,273	310
1858	30,317	23,711	6,606	1,770	4,836
1859	20,494	19,310	10,184	597	9,587
1860	14,517	9,305	5,212	376	4,836
1861	13,594	9,077	4,517	303	4,214
1862	19,737	14,834	4,903	341	4,562
1863	36,982	30,475	6,507	384	6,123
1864	35,164	29,700	5,464	366	5,098
1865	21,845	17,700	4,145	193	3,952
1866	14,685	11,685	3,000	226	2,774
1867	15,063	12,300	2,763	163	2,600
1868	24,925	21,912	3,013	166	2,847
Total	302,026	243,141	58,885	6,731	52,154

* Previously to 1859 Diphtheria was referred to Scarlatina. Previously to 1861 Cynanche Maligna was referred to Scarlatina; since that time to Diphtheria.

TABLE 2.—Deaths in England from Diphtheria and Cynanche Maligna, at different AGES, in each of the Years 1855-68.

YEARS.	ALL AGES.	Under 1 Year.	1-	2-	3-	4-	Under 5 Years.	5-	10-	15-	25-	35-	45-	55-	65-	75-	85-	95 and upwards.
1855	385	56	52	47	45	33	233	84	17	20	8	7	8	7	1	-	-	-
1856	603	44	62	81	54	57	298	175	65	33	8	11	6	4	3	-	-	-
1857	1583	109	138	137	152	160	696	512	224	86	31	19	8	6	-	1	-	-
1858	6006	552	741	692	695	635	3315	1897	686	361	134	80	56	42	26	7	2	-
1859	10184	873	1122	1103	1116	1081	5300	2751	1091	536	213	122	69	50	37	11	4	-
1860	5212	448	558	500	621	551	2678	1413	542	321	79	69	43	36	17	14	-	-
1861	4517	361	528	501	507	471	2368	1217	419	258	93	60	41	35	16	10	-	-
1862	4903	412	645	594	560	513	2724	1242	432	264	91	54	39	29	18	9	1	-
1863	6507	585	903	744	813	664	3709	1651	515	291	121	78	61	48	27	6	-	-
1864	5464	527	694	681	661	535	3098	1292	425	300	130	82	60	46	26	4	1	-
1865	4145	387	518	459	476	446	2286	1053	328	227	95	43	41	38	20	11	3	-
1866	3000	282	420	404	355	296	1757	706	194	135	71	44	38	27	21	6	1	-
1867	2763	317	394	325	332	250	1618	690	154	122	65	29	35	23	20	5	2	-
1868	3013	299	431	363	331	325	1749	740	200	79	60	58	45	32	34	13	3	-
Total	58,885	5,257	7,206	6,691	6,718	6,017	31,829	15,423	5,292	3,033	1,199	756	550	423	266	97	17	-

TABLE 3.—Deaths in England from Scarlatina (exclusive of Deaths by Diphtheria and Cynanche Maligna), at different AGES, in each of the Years 1855-68.

YEARS.	ALL AGES.	Under 1 Year.	1-	2-	3-	4-	Under 5 Years.	5-	10-	15-	25-	35-	45-	55-	65-	75-	85-	95 and upwards.
1855	16929	1131	2306	2700	2537	1957	10631	4523	1078	438	128	71	36	15	8	1	-	-
1856	13557	985	1930	2161	2085	1689	8830	3419	800	332	88	55	20	10	3	-	-	-
1857	12646	855	1790	2082	1988	1482	8127	3252	766	321	104	40	23	7	3	3	-	-
1858	23711	1444	3468	3980	3638	2860	15390	6160	1325	557	159	69	33	10	6	2	-	-
1859	19310	1294	2824	3062	2992	2379	12551	4937	1050	469	174	80	26	12	7	4	-	-
1860	9305	636	1378	1499	1409	1146	6068	2329	477	287	77	37	19	7	4	-	-	-
1861	9077	572	1288	1490	1423	1119	5892	2317	447	264	91	31	21	10	-	4	-	-
1862	14834	903	2158	2454	2263	1786	9569	3893	818	364	117	42	16	9	2	3	1	-
1863	30475	1761	4050	4386	4633	3842	19222	8192	1820	805	267	113	34	15	5	2	-	-
1864	29700	1778	3915	2914	2813	2140	11282	4759	958	448	158	56	23	14	7	-	-	-
1865	17700	1118	2497	2038	1835	1457	7719	2964	571	267	109	30	19	5	1	-	-	-
1866	11685	690	1741	2064	1961	1457	8093	3269	551	251	97	28	9	1	2	1	-	-
1867	12300	805	1806	2064	1961	1457	8093	3269	551	251	97	28	9	1	2	1	-	-
1868	21912	1390	3209	3533	3368	2695	14195	5939	1099	408	179	66	18	6	2	-	-	-
Total	243141	15,362	34,360	39,495	37,371	29,690	156,278	63,980	13,466	6,007	2,028	818	341	141	57	24	1	-

TABLE 4.—Deaths in each of the Counties of England from Scarlatina for each of the Years 1854-1868.

REGISTRATION COUNTIES.	DEATHS BY SCARLATINA. (See Note.)														
	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
ENGLAND & WALES	18,528	17,314	14,160	14,229	30,317	19,907	9,681	9,077	14,834	30,475	29,700	17,700	11,685	12,300	21,912
I.—LONDON	3,477	2,611	1,819	1,599	4,184	3,481	2,017	2,381	3,492	4,955	3,244	2,179	1,892	1,451	2,916
II.—SOUTH EASTERN COUNTIES.															
1 Surrey (extra-metropol.)	118	137	103	89	355	188	79	53	151	390	314	246	71	67	276
2 Kent (extra-metropol.)	444	404	393	218	651	423	259	237	297	687	709	374	130	167	399
3 Sussex	188	337	153	173	514	283	35	40	71	363	483	251	138	43	135
4 Hampshire	303	727	378	311	444	350	33	24	368	744	238	337	184	81	250
5 Berkshire	161	153	136	122	353	93	18	17	70	153	151	236	32	25	103
III.—SOUTH MIDLAND COUNTIES.															
6 Middlesex (extra-metro.)	296	164	78	59	134	157	181	55	139	345	160	85	50	71	183
7 Hertfordshire	34	145	89	22	84	90	40	26	110	411	377	92	33	35	54
8 Buckinghamshire	73	244	21	23	95	93	43	99	166	39	114	79	13	9	55
9 Oxfordshire	50	62	20	110	393	114	18	19	24	153	244	90	10	36	90
10 Northamptonshire	256	198	63	35	158	171	39	10	53	377	803	143	25	28	59
11 Huntingdonshire	28	59	29	98	33	26	17	5	10	146	61	43	29	8	7
12 Bedfordshire	69	338	143	25	95	53	26	11	30	153	382	113	32	38	63
13 Cambridgeshire	137	532	171	53	86	85	83	25	55	366	245	50	22	43	55
IV.—EASTERN COUNTIES.															
14 Essex	262	433	346	162	355	178	101	83	388	775	281	165	105	67	162
15 Suffolk	50	111	190	164	376	119	76	41	108	820	353	36	40	206	140
16 Norfolk	60	113	284	534	738	281	81	113	202	235	568	320	128	155	360
V.—SOUTH WESTERN COUNTIES.															
17 Wiltshire	191	177	74	75	239	222	60	40	116	292	260	251	54	56	53
18 Dorsetshire	83	73	70	256	375	179	61	6	42	147	138	112	295	81	64
19 Devonshire	376	564	620	527	891	391	73	75	353	778	1,054	321	77	36	60
20 Cornwall	198	290	407	425	234	153	162	165	995	572	97	13	33	33	254
21 Somersetshire	108	155	218	159	479	393	91	49	126	773	1,013	355	73	29	55
VI.—WEST MIDLAND COUNTIES.															
22 Gloucestershire	124	86	136	257	731	553	142	102	111	1,162	453	142	95	68	113
23 Herefordshire	66	83	46	73	106	34	19	7	12	39	206	48	8	1	21
24 Shropshire	303	141	77	156	196	127	148	135	234	223	147	122	37	44	142
25 Staffordshire	917	430	358	641	1,194	1,186	303	194	807	1,147	1,134	907	703	670	943
26 Worcestershire	382	192	71	105	227	316	138	40	81	353	584	193	111	101	463
27 Warwickshire	574	194	371	357	1,185	518	170	96	354	676	966	475	477	782	967
VII.—NORTH MIDLAND COUNTIES.															
28 Leicestershire	75	39	62	215	452	204	34	15	33	524	164	66	59	70	54
29 Rutlandshire	12	28	2	3	45	30	3	2	8	54	48	22	-	2	8
30 Lincolnshire	1,312	598	123	124	651	200	128	139	193	495	662	415	82	60	107
31 Nottinghamshire	516	143	71	76	752	414	76	50	68	123	467	389	76	35	257
32 Derbyshire	506	136	56	276	622	376	60	31	50	179	381	150	75	63	543
VIII.—NORTH WESTERN COUNTIES.															
33 Cheshire	336	260	269	650	568	390	229	192	400	952	393	300	553	475	775
34 Lancashire	2,189	3,058	2,651	2,761	6,226	2,337	1,143	1,259	2,793	4,580	4,854	3,634	3,150	3,115	4,445
IX.—YORKSHIRE.															
35 West Riding	1,511	1,009	1,059	1,405	2,931	2,962	1,192	475	963	2,218	3,135	2,273	870	630	1,676

TABLE 5.—Ages of the Persons who Died from Fever (Typhus, Typhia, and Typhinia) in England in the Year 1868.

—	ALL AGES.	0—	5—	10—	15—	25—	35—	45—	55—	65—	75—	85—	95 and upwds.
Persons	19,701	3600	2348	1748	3611	2372	1880	1584	1303	894	328	33	—
Males	9,573	1741	1112	741	1705	1126	987	856	663	450	176	16	—
Females	10,128	1859	1236	1007	1906	1246	893	728	640	444	152	17	—

TABLE 6.—Deaths in England from Fever in the Twenty-one Years 1848-68, and Annual Rate of Mortality to 10,000 Persons living.

AGES.	DEATHS in the 21 Years 1848-68.		AVERAGE ANNUAL RATE of MORTALITY to 10,000 Persons living at each Age.	
	Males.	Females.	Males.	Females.
ALL AGES	187,073	194,120	9.36	9.28
Under 5 Years	37,039	37,576	13.57	13.87
5—	22,410	25,303	9.38	10.60
10—	14,712	18,555	6.78	8.70
15—	32,437	35,344	8.67	9.12
25—	20,738	21,181	7.14	6.57
35—	17,345	16,645	7.59	6.64
45—	15,149	13,632	8.64	7.52
55—	13,121	12,084	11.36	10.08
65—	9,957	9,349	16.58	12.31
75—	3,750	3,921	17.22	14.09
85—	406	507	15.25	12.35
95 and upwards	9	18	8.30	9.09

TABLE 7.—Annual Number of Cases (estimated) and of Deaths by Fever in England in the Twenty Years 1848-67 and in the Year 1868.

AGES.	ANNUAL CASES. (Estimated.)*		ANNUAL DEATHS. (Returned.)		To 10,000 Persons living at each Age the Annual Number of			
					CASES. (Estimated.)		DEATHS.	
	1848-67	1868	1848-67	1868	1848-67	1868	1848-67	1868
ALL AGES	156,190	169,085	18,075	19,701	80.22	78.10	9.28	9.10
Under 5 Years	39,064	39,804	3,551	3,600	150.87	130.45	13.71	11.86
5—	31,382	32,475	2,269	2,348	138.07	128.00	9.98	9.26
10—	25,016	27,746	1,576	1,748	122.15	121.84	7.70	7.68
15—	33,184	37,341	3,209	3,611	91.50	94.52	8.85	9.14
25—	12,829	15,392	1,977	2,372	43.98	49.21	6.78	7.58
35—	6,516	7,633	1,605	1,880	28.53	30.54	7.03	7.52
45—	3,560	4,147	1,330	1,584	20.97	21.09	8.01	8.06
55—	2,509	2,736	1,195	1,303	22.39	21.95	10.66	10.45
65—	1,542	1,496	921	894	23.82	19.88	14.22	11.88
75 and upwards	588	515	412	361	21.80	18.32	15.27	12.85

* The facts from which this estimate is obtained were kindly supplied by Dr. Murchison from the records of the London Fever Hospital. (See Registrar-General's Twenty-fifth Annual Report, page 176.)

TABLE 8.—Deaths from Fever—Typhus, Typhia, and Typhinia—in England to 10,000 Persons living, and Proportional Number to 1000 Deaths, in each of the Years 1850-68.

YEARS.	Number of Deaths registered.	Deaths to 10,000 Persons living.*	Proportional Number to 1000 Deaths.
1850	15,374	8.66	43
1851	17,930	10.15	46
1852	18,641	10.41	47
1853	18,554	10.25	45
1854	18,893	10.28	44
1855	16,470	8.89	39
1856	16,182	8.60	42
1857	19,016	9.97	46
1858	17,883	9.28	40
1859	15,877	8.14	36
1860	13,012	6.63	31
1861	15,440	7.76	36
1862	18,721	9.31	43
1863	18,017	8.86	38
1864	20,106	9.77	41
1865	23,034	11.09	47
1866	21,104	10.05	43
1867	16,862	7.95	36
1868	19,701	9.17	41
Mean	17,938	9.22	41

* The mortality from Fever here given is taken from Table 12, and inasmuch as it includes a proportion of the mortality from causes not specified it differs from that given in Table 8.

TABLE 9.—Deaths by Erysipelas at different Ages in England in each of the Years 1862-68.

SEX.	YEARS.	ALL AGES.	AGES.																	
			Under 1 Year.	1—	2—	3—	4—	Total under 5 Years.	5—	10—	15—	20—	25—	35—	45—	55—	65—	75—	85—	95 & upwds.
Persons	1862	1523	458	49	36	13	7	563	29	36	43	30	70	113	143	166	182	128	20	—
	1863	1920	612	62	31	22	18	745	25	31	39	49	112	137	177	216	213	146	30	—
	1864	2104	618	55	30	15	15	733	15	22	38	61	110	171	194	274	271	180	34	1
	1865	1963	579	58	29	8	8	682	31	27	42	42	96	154	190	237	242	183	36	1
	1866	1675	527	64	26	10	10	637	35	22	33	44	73	129	146	187	159	189	21	—
	1867	1450	467	35	18	13	11	544	23	31	25	31	82	115	127	169	167	115	21	—
	1868	1952	647	60	22	13	11	753	28	20	27	45	108	139	192	200	243	169	28	—
Males	1862	790	233	22	14	9	2	280	14	19	22	16	35	51	90	97	90	70	6	—
	1863	1039	302	32	12	15	10	371	9	18	19	29	58	74	108	131	123	81	18	—
	1864	1129	309	32	14	8	9	372	10	10	19	29	56	94	100	168	160	93	18	—
	1865	1047	279	25	9	6	4	323	18	14	25	18	55	81	111	148	126	114	14	—
	1866	845	235	32	13	3	5	288	20	9	25	22	35	66	86	115	61	108	10	—
	1867	797	252	15	8	6	6	287	17	19	19	13	35	70	81	95	89	61	11	—
	1868	1032	322	27	11	8	4	372	13	9	15	22	52	82	119	122	143	73	10	—
Females	1862	733	225	27	22	4	5	283	15	17	21	14	35	62	53	69	92	58	14	—
	1863	881	310	30	19	7	8	374	16	13	20	20	54	63	69	85	90	65	12	—
	1864	975	309	23	16	7	6	361	5	12	19	32	54	77	94	106	111	87	16	1
	1865	916	300	33	20	2	4	359	13	13	17	24	41	73	79	89	116	69	22	1
	1866	830	292	32	13	7	5	349	15	13	8	22	38	63	60	72	98	81	11	—
	1867	633	215	20	10	7	5	257	6	12	6	18	47	45	46	74	78	54	10	—
	1868	920	325	33	11	5	7	381	15	11	12	23	56	57	73	78	100	96	18	—

TABLE 10.—Causes of Death registered in England in each of the Ten Years 1859-1868.

Class.	CAUSES OF DEATH.	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
	ALL CAUSES - - -	440,781	422,721	435,114	436,566	473,837	495,531	490,909	500,689	471,075	480,622
	SPECIFIED CAUSES - -	432,476	414,060	427,360	429,000	465,874	487,732	482,509	492,111	462,939	473,773
	(CLASSES.)										
I.	ZYMOTIC DISEASES -	106,645	75,849	87,986	91,539	119,731	118,825	113,948	115,972	90,989	117,356
II.	CONSTITUTIONAL - -	81,788	82,068	84,987	83,024	84,393	87,190	88,504	89,907	89,423	85,340
III.	LOCAL - - - - -	159,686	171,037	167,454	170,651	174,603	189,039	184,877	192,444	187,571	178,634
IV.	DEVELOPMENTAL - -	69,708	70,311	71,948	68,842	71,467	75,660	77,806	76,873	78,090	75,475
V.	VIOLENT DEATHS - -	14,649	14,775	14,985	14,944	15,680	17,018	17,374	16,915	16,866	16,968
	(ORDERS.)										
I.	1. MIASMATIC DISEASES -	101,699	71,304	83,324	86,881	114,538	113,051	107,650	110,059	84,985	111,106
	2. ENTHETIC - - -	1,273	1,252	1,355	1,449	1,578	1,793	1,914	1,893	1,909	2,101
	3. DIETIC - - - -	2,301	2,206	2,095	2,149	2,456	2,810	2,957	2,888	2,760	2,853
	4. PARASITIC - - -	1,372	1,087	1,212	1,060	1,159	1,171	1,427	1,132	1,335	1,296
II.	1. DIATHETIC - - -	16,433	16,404	16,233	16,412	16,651	17,392	17,437	17,482	17,520	17,039
	2. TUBERCULAR - -	65,355	65,684	68,754	66,612	67,742	69,798	71,067	72,425	71,903	68,301
III.	1. DISEASES OF NERVOUS SYSTEM - - -	54,531	55,577	55,625	55,692	57,428	59,627	60,264	61,164	60,367	60,174
	2. " ORGANS OF CIRCULATION -	17,133	18,758	18,076	18,709	19,505	22,419	22,272	22,190	22,784	22,558
	3. " RESPIRATORY ORGANS -	59,353	68,408	64,310	67,565	67,280	75,376	69,952	77,249	72,183	63,103
	4. " DIGESTIVE ORGANS - -	19,342	19,718	20,327	19,421	20,516	20,969	21,774	21,084	21,006	21,479
	5. " URINARY ORGANS - - -	4,736	4,990	5,222	5,323	5,578	6,104	6,274	6,621	6,933	6,872
	6. " ORGANS OF GENERATION -	1,199	1,118	1,129	1,227	1,219	1,294	1,241	1,241	1,316	1,258
	7. " ORGANS OF LOCOMOTION -	1,285	1,466	1,624	1,588	1,765	1,860	1,860	1,642	1,747	1,833
	8. " INTEGUMENTARY SYSTEM -	1,107	1,002	1,141	1,121	1,312	1,390	1,240	1,253	1,235	1,357
IV.	DEVELOPMENTAL DISEASES										
	1. " OF CHILDREN - - -	12,300	12,706	13,116	12,787	13,498	13,921	14,360	14,634	14,666	14,334
	2. " ADULTS - - - - -	2,314	2,233	2,168	2,198	2,508	2,607	2,576	2,596	2,461	2,437
	3. " OLD PEOPLE - - -	27,104	28,442	27,373	26,780	27,268	29,498	28,709	28,546	28,646	26,050
	4. DISEASES OF NUTRITION	27,990	26,930	29,291	27,077	28,193	29,634	32,161	31,097	32,317	32,654
V.	1. ACCIDENT OR NEGLIGENCE -	13,056	12,991	13,187	13,055	13,772	15,091	15,232	14,886	14,848	14,715
	2. BATTLE - - - - -	†	†	†	†	†	†	†	†	†	†
	3. HOMICIDE - - - -	338	377	320	418	399	412	443	480	392	461
	4. SUICIDE - - - - -	1,248	1,365	1,347	1,317	1,319	1,340	1,392	1,329	1,316	1,508
	5. EXECUTION † - - -	7	10	11	17	21	21	6	12	11	10
	VIOLENT DEATHS NOT CLASSED - - - - -	..	32	120	137	169	154	301	208	299	274
	SUDDEN DEATHS, CAUSE UNASCERTAINED -	2,821	2,894	2,697	2,778	3,008	3,321	3,173	3,585	3,506	2,945
	CAUSES NOT SPECIFIED -	5,484	5,767	5,057	4,788	4,955	4,478	5,227	4,993	4,630	3,904
I.	ORDER 1.										
	1 Small-pox - - - -	3,848	2,749	1,320	1,628	5,964	7,684	6,411	3,029	2,513	2,052
	2 Measles - - - - -	9,548	9,557	9,055	9,800	11,349	8,323	8,562	10,940	6,588	11,630
	3 Scarlatina - - - -	19,907	9,681	9,077	14,834	30,475	29,700	17,700	11,685	12,300	21,912
	4 Diphtheria - - - -	9,587	5,212	4,517	4,903	6,507	5,464	4,145	3,000	2,600	3,013
	5 Quinsy - - - - -	426	319	342	323	334	378	271	201	208	208
	6 Croup - - - - -	5,638	4,380	4,397	5,667	6,957	6,777	5,921	5,168	4,387	4,491
	7 Whooping-cough -	8,976	8,555	12,309	12,272	11,275	8,570	8,647	15,764	11,873	9,223
	8 Typhus - - - - -	15,377	13,012	15,440	13,721	18,017	20,106	23,034	21,104	16,862	19,701

† Order 2, comprising Violent Deaths in Battle, is omitted, as inapplicable to the civil population.
 ‡ The number of persons executed in the several years will not necessarily correspond with that in the same years of the "Criminal Returns," inasmuch as the executions recorded in each year in the latter are derived from the dates of conviction, while the numbers in this Table are classed under the years in which the deaths are registered.
 § The cases of angina membranacea which would now be put to diphtheria were formerly classed under the same head as scarlatina, but were distinguished in the notes.

TABLE 10.—Causes of Death registered in England in each of the Ten Years 1859-1868—continued.

Class.	CAUSES OF DEATH.	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
	9 Erysipelas - - -	1,954	1,665	1,542	1,523	1,920	2,104	1,963	1,675	1,450	1,952
	10 Metria - - - - -	1,238	987	886	940	1,155	1,484	1,333	1,197	1,066	1,196
	11 Carbuncle - - - -	236	247	193	206	237	266	265	228	235	228
	12 Influenza - - - -	1,112	1,130	746	915	919	804	596	651	607	306
	13 Dysentery - - - -	1,379	1,156	1,416	1,044	1,051	1,000	1,072	1,096	962	1,108
	14 Diarrhoea - - - -	18,331	9,702	18,746	11,112	14,943	16,432	23,531	17,170	19,851	29,821
	15 Cholera - - - - -	887	327	837	511	807	934	1,291	1,478	922	1,498
	16 Ague - - - - -	233	203	149	150	141	112	117	135	121	94
	17 Remittent Fever -	400	314	254	284	198	202	80	123	86	69
	18 Rheumatism - - -	2,124	1,998	1,982	1,943	2,175	2,559	2,530	2,338	2,256	2,503
	19 Other Zymotic Diseases	..	110	116	105	114	152	133	107	105	101
	ORDER 2.										
	1 Syphilis - - - - -	1,089	1,067	1,177	1,245	1,336	1,550	1,647	1,662	1,698	1,886
	2 Stricture of Urethra -	177	178	163	199	183	229	244	191	197	202
	3 Hydrophobia - - -	4	3	4	1	4	12	19	36	10	7
	4 Glanders - - - - -	3	4	6	4	5	2	4	4	4	6
	ORDER 3.										
	1 Privation - - - - -	52	68	63	73	54	106	74	74	109	96
	2 Want of Breast-milk -	1,017	1,002	970	1,006	1,158	1,253	1,410	1,410	1,437	1,506
	3 Purpura and Scurvy -	342	361	405	353	409	392	424	471	471	463
	4 Alcoholism { aDel.Trem.	545	457	415	471	471	592	612	487	399	439
	{ bIntemp.	345	318	242	246	364	467	437	446	374	349
	ORDER 4.										
	1 Thrush - - - - -	1,217	920	1,053	904	961	1,006	1,244	966	1,163	1,124
	2 Worms, &c. - - - -	155	167	157	156	198	165	183	166	172	172
II.	ORDER 1.										
	1 Gout - - - - -	238	268	247	284	248	309	361	359	377	393
	2 Dropsy - - - - -	8,119	7,823	7,301	7,247	7,414	7,386	7,567	7,332	7,095	6,284
	3 Cancer - - - - -	6,676	6,827	7,276	7,396	7,479	8,117	7,922	8,293	8,545	8,880
	4 Noma - - - - -	159	122	174	197	180	165	181	172	174	161
	5 Mortification - - -	1,241	1,304	1,235	1,288	1,330	1,415	1,406	1,326	1,329	1,321
	ORDER 2.										
	1 Scrofula - - - - -	2,995	2,860	3,457	3,416	3,277	3,111	2,963	2,901	2,938	2,769
	2 Tabes Mesenterica - -	4,982	4,680	5,692	5,203	5,877	5,941	6,698	6,377	6,882	6,925
	3 Phthisis - - - - -	50,149	51,024	51,931	50,962	51,072	53,046	53,734	55,714	55,042	51,423
	4 Hydrocephalus - - -	7,229	7,120	7,674	7,031	7,516	7,700	7,672	7,433	7,041	7,184
III.	ORDER 1.										
	1 Cephalitis - - - -	3,451	3,518	3,426	3,580	3,869	4,014	4,199	4,146	4,220	4,451
	2 Apoplexy - - - - -	8,631	9,181	8,795	9,136	9,721	10,322	10,215	10,297	10,406	10,611
	3 Paralysis - - - - -	9,189	9,752	9,812	9,733	9,762	10,609	10,693	10,504	10,810	10,761
	4 Insanity - - - - -	446	536	529	535	555	662	558	650	640	655
	5 Chorea - - - - -	55	66	71	52	63	73	88	63	50	66
	6 Epilepsy - - - - -	2,219	2,454	2,464	2,443	2,574	2,406	2,468	2,468	2,312	2,359
	7 Convulsions - - - -	25,954	25,205	25,423	25,236	26,008	26,382	26,722	27,431	26,258	25,897
	8 Brain Disease, &c. -	4,586	4,365	5,105	4,927	4,876	5,159	5,321	5,605	5,671	5,374
	ORDER 2.										
	1 Pericarditis - - - -	616	575	541	559	597	629	566	5		

TABLE 10.—Causes of Death registered in England in each of the Ten Years 1859-1868—continued.

Class.	CAUSES OF DEATH.	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
	ORDER 5.										
	1 Nephritis - - -	284	245	306	273	335	390	381	406	442	495
	2 Ischuria - - -	103	96	102	104	143	126	140	121	106	118
	3 Nephria - - -	1,253	1,390	1,448	1,541	1,700	1,793	1,860	2,039	2,203	2,076
	4 Diabetes - - -	480	536	537	574	551	665	689	678	680	671
	5 Stone - - -	191	179	168	196	172	184	189	193	201	213
	6 Cystitis - - -	276	299	343	342	340	383	325	393	381	463
	7 Kidney Disease, &c.	2,144	2,245	2,318	2,298	2,337	2,563	2,710	2,791	2,920	2,836
	ORDER 6.										
	1 Ovarian Dropsy - -	277	244	235	280	255	259	209	218	247	222
	2 Uterus, &c. Disease	922	874	894	947	964	1,035	1,032	1,023	1,069	1,036
	ORDER 7.										
	1 Arthritis - - -	81	68	79	70	73	89	74	70	75	82
	2 Joint Disease, &c.	1,204	1,398	1,545	1,518	1,692	1,771	1,786	1,572	1,672	1,751
	ORDER 8.										
	1 Phlegmon - - -	466	413	454	409	530	550	453	482	430	565
	2 Ulcer - - -	364	332	401	387	435	463	424	403	443	433
	3 Skin Disease, &c.	277	257	286	325	347	377	363	368	362	356
IV.	ORDER 1.										
	1 Premature Birth - -	7,432	7,642	7,610	7,706	8,121	8,339	8,791	8,943	8,990	8,757
	2 Cyanosis - - -	403	398	420	459	456	465	483	514	481	547
	3 Spina Bifida - - -	356	350	394	386	402	371	377	413	391	411
	4 Other Malformations	379	420	441	424	403	461	438	471	504	474
	5 Teething - - -	3,730	3,896	4,251	3,812	4,116	4,285	4,271	4,293	4,300	4,145
	ORDER 2.										
	1 Paramenia - - -	56	47	59	61	75	75	86	111	115	130
	2 Childbirth (see Metria)	2,258	2,186	2,109	2,137	2,433	2,532	2,490	2,485	2,346	2,307
	ORDER 3.										
	1 Old Age - - -	27,104	28,442	27,373	26,780	27,268	29,498	28,709	28,546	28,646	26,050
	ORDER 4.										
	1 Atrophy and Debility	27,990	26,930	29,291	27,077	28,193	29,634	32,161	31,087	32,317	32,654
V.	ORDER 1.										
	(ACCIDENT OR NEGLIGENCE.)										
	1 Fractures & Contusions -	5,482	5,417	5,589	5,397	5,852	6,500	6,843	6,661	6,596	6,503
	2 Gunshot - - -	104	103	120	111	108	126	112	131	124	113
	3 Cut, Stab - - -	75	81	41	54	82	115	93	97	103	103
	4 Burns and Scalds - -	2,978	3,166	3,053	2,767	2,766	2,987	2,713	2,533	2,600	2,553
	5 Poison - - -	279	240	258	232	277	274	273	278	281	279
	6 Drowning - - -	2,494	2,264	2,351	2,463	2,488	2,714	2,823	2,786	2,676	2,924
	7 Suffocation - - -	952	1,061	1,014	1,219	1,147	1,245	1,309	1,263	1,352	1,192
	8 Otherwise - - -	692	659	761	782	1,052	1,130	1,066	1,137	1,116	1,038
	ORDER 3.										
	(HOMICIDE.)										
	1 Murder & Manslaughter	338	377	320	418	399	412	443	480	392	461
	ORDER 4.										
	(SUICIDE.)										
	1 Gunshot Wounds - -	54	59	59	54	56	65	58	60	57	100
	2 Cut, Stab - - -	270	276	257	215	257	249	252	265	268	284
	3 Poison - - -	112	156	122	128	121	154	135	128	135	138
	4 Drowning - - -	208	219	225	204	245	205	230	207	228	291
	5 Hanging - - -	540	569	592	611	562	564	591	522	488	568
	6 Otherwise - - -	64	86	92	105	78	103	126	147	140	127
	ORDER 5.										
	(EXECUTION.)										
	1 Hanging - - -	7	10	11	17	21	21	6	12	11	10
	Violent Deaths (not classed)	..	32	120	137	169	154	301	208	299	274
	Sudden Deaths (Cause unascertained)	2,821	2,894	2,697	2,778	3,008	3,321	3,173	3,585	3,506	2,945
	Cause not specified or ill-defined	5,484	5,767	5,057	4,783	4,955	4,478	5,227	4,993	4,630	3,904

TABLE 11.—Causes of Death registered in England in each of the Seventeen Years 1852-1868. To 1,000,000 PERSONS LIVING, the DEATHS from each CLASS of CAUSES, and from each CAUSE.

Class.	CAUSES OF DEATH.	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
	ALL CAUSES - - -	22363	22882	23520	22659	20504	21745	23032	22323	21239	21626	21467	23053	23855	23387	23606	21983	22200
	SPECIFIED CAUSES -	22023	22526	23157	22277	20152	21447	22872	22178	21093	21490	21329	22906	23693	23234	23433	21818	22063
	(CLASSES.)																	
I.	ZYMOTIC DISEASES	5366	4940	6367	4759	4310	4901	5757	5469	3863	4424	4551	5887	5770	5489	5522	4288	5465
II.	CONSTITUTIONAL "	4637	4874	4570	4568	4224	4297	4275	4194	4182	4273	4128	4150	4237	4261	4281	4215	3974
III.	LOCAL "	7568	8132	7815	8452	7576	7925	8480	8189	8712	8420	8484	8584	9182	8903	9162	8840	8319
IV.	DEVELOPMENTAL "	3696	3820	3646	3739	3303	3599	3626	3575	3582	3619	3423	3513	3678	3746	3661	3680	3515
V.	VIOLENT DEATHS -	756	760	759	759	739	725	734	751	754	754	743	772	826	835	807	795	790
	(ORDERS.)																	
I.	1. MIASMATIC DISEASES -	5154	4723	6128	4521	4106	4681	5513	5215	3633	4191	4319	5632	5489	5184	5241	4005	5174
	2. ENTHETIC "	50	48	67	64	56	60	62	65	63	67	72	77	87	94	90	90	98
	3. DIETIC "	93	103	107	112	90	99	110	119	112	105	107	121	137	142	137	130	133
	4. PARASITIC "	69	66	65	62	58	61	72	70	55	61	53	57	57	69	54	63	60
II.	1. DIATHETIC "	942	973	916	924	832	849	871	842	836	816	816	810	845	839	832	826	793
	2. TUBERCULAR "	3695	3901	3654	3644	3392	3448	3404	3352	3346	3457	3312	3331	3392	3422	3449	3389	3181
III.	1. DISEASES OF NERVOUS SYSTEM -	2806	2845	2802	2827	2662	2705	2800	2796	2831	2797	2769	2824	2896	2902	2912	2845	2802
	2. " OF ORGANS OF CIRCULATION -	699	760	734	786	726	775	852	879	956	909	930	959	1089	1072	1056	1074	1051
	3. " OF RESPIRATORY ORGANS -	2646	3118	2856	3439	2812	3057	3399	3069	3484	3233	3358	3308	3663	3369	3678	3402	2939
	4. " OF DIGESTIVE ORGANS -	1063	1041	1036	1011	993	1005	998	1018	1004	1022	966	1008	1017	1049	1004	990	1000
	5. " OF URINARY ORGANS -	191	201	205	214	219	217	242	243	254	263	265	274	297	302	315	327	320
	6. " OF ORGANS OF GENERATION -	49	53	55	56	55	56	59	61	57	57	61	60	63	60	59	62	58
	7. " OF ORGANS OF LOCOMOTION -	64	67	81	76	71	68	60	66	75	82	79	87	90	90	78	82	86
	8. " OF INTEGUMENTARY SYSTEM -	50	47	46	43	38	42	70	57	51	57	56	64	67	59	60	58	63
IV.	1. DEV. DIS. OF CHILDREN	1361	1353	1305	1232	1203	1267	644	631	647	660	636	663	676	691	696	691	668
	2. " OF ADULTS -	132	131	116	106	100	105	110	119	114	109	109	124	127	124	123	116	113
	3. " OF OLD PEOPLE	1474	1614	1441	1606	1271	1409	1479	1390	1449	1377	1331	1340	1434	1382	1361	1350	1213
	4. DISEASES OF NUTRITION	729	722	784	795	729	818	1393	1435	1372	1473	1347	1386	1441	1549	1481	1523	1521
V.	1. ACCIDENT OR NEGLIGENCE -								649	670	662	663	649	677	734	733	709	700
	2. BATTLE* - - -								*	*	*	*	*	*	*	*	*	*
	3. HOMICIDE - - -								18	17	19	16	21	20	21	23	18	21
	4. SUICIDE - - -								66	64	70	68	65	66	64	67	64	

TABLE 11.—Causes of Death registered in England in each of the Seventeen Years 1852-68. To 1,000,000 PERSONS LIVING, the DEATHS from each CLASS of CAUSES, and from each CAUSE—cont.

Class.	CAUSES OF DEATH.	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	
I.	ORDER 1.																		
	1. Small-pox	409	174	153	136	121	206	335	197	140	66	81	293	373	309	144	118	96	
	2. Measles	326	270	505	397	379	313	481	490	487	455	487	558	404	412	521	310	541	
	3. Scarletina	1055	867	1008	935	752	746	1572	1021	493	456	738	1498	1443	852	556	580	1020	
	4. Diphtheria	22	23	19	20	22	25	32	22	16	17	16	16	18	15	13	9	10	
	5. Croup	227	202	218	239	277	277	323	289	223	221	282	342	329	285	246	207	209	
	6. Whooping-cough	448	619	532	550	490	531	604	460	436	619	610	554	416	416	751	559	430	
	8. Typhus	1041	1025	1028	889	860	997	928	814	663	776	931	886	977	1109	1005	795	917	
	9. Erysipelas	116	100	105	122	113	83	105	100	85	78	76	94	102	95	80	68	91	
	10. Metria	54	44	52	58	57	44	54	63	50	45	47	57	72	64	57	50	56	
	11. Carbuncle	13	14	16	14	13	13	13	12	13	10	10	12	13	13	11	11	11	
	12. Influenza	76	99	58	193	55	73	93	57	58	38	45	45	39	29	31	29	14	
	13. Dysentery	154	104	106	78	71	89	77	71	59	71	52	52	49	52	52	45	52	
	14. Diarrhoea	984	784	1091	689	734	1111	719	940	494	944	552	735	798	1133	818	937	1388	
	15. Cholera	77	244	1094	45	40	60	35	45	17	42	25	40	45	62	685	43	70	
	16. Ague	8	10	10	8	7	10	11	12	10	7	7	7	5	6	6	6	4	
	17. Remittent Fever	37	39	35	51	9	14	30	21	16	13	14	10	10	4	6	4	3	
	18. Rheumatism	107	105	98	117	106	89	101	109	102	100	97	107	124	122	111	106	117	
	19. Other Zymotic Diseases	..	..	..	..	..	..	..	..	6	6	5	6	7	6	5	5	5
ORDER 2.	1. Syphilis	35	34	52	51	47	50	52	56	54	59	62	68	75	79	79	80	88	
	2. Stricture of Urethra	14	13	14	12	9	10	10	9	8	10	9	11	12	9	9	9	9	
	3. Hydrophobia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	4. Glanders	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
ORDER 3.	1. Privation	3	4	5	5	4	3	3	3	3	3	3	3	5	4	5	4	4	
	2. Want of Breast Milk	33	35	40	46	37	43	52	52	49	50	57	61	68	67	68	71	71	
	3. Purpura and Scurvy	13	15	15	17	12	13	18	18	20	18	20	19	20	22	22	22	22	
	4. Alco- (a Del. Tremens holism) b Intemperance	27	28	30	29	24	25	22	23	21	23	23	29	29	23	17	20	16	
ORDER 4.	1. Thrush	69	66	65	62	58	61	64	62	46	53	45	47	49	60	46	55	52	
	2. Worms, &c.	..	..	..	..	..	..	..	..	8	8	8	10	8	9	8	8	8
II.	ORDER 1.																		
	1. Gout	12	12	13	15	14	12	13	12	14	12	14	12	15	17	17	18	18	
	2. Dropsy	547	569	511	505	436	443	454	416	399	367	360	365	359	364	349	334	293	
	3. Cancer	306	313	317	325	311	325	334	342	348	366	368	368	394	381	395	403	413	
	4. Noma	5	6	7	10	9	10	8	8	6	9	10	9	8	9	8	8	7	
5. Mortification	72	73	68	69	62	59	62	64	69	62	64	65	69	68	63	63	62		
ORDER 2.	1. Scrofula	144	151	142	161	150	146	156	154	146	174	170	161	151	143	138	138	129	
	2. Tuberc Mesenterica	262	274	307	277	253	282	290	255	238	266	259	280	289	323	304	324	322	
	3. Phthisis	2826	3034	2791	2822	2601	2627	2616	2572	2599	2811	2533	2511	2578	2587	2653	2595	2305	
	4. Hydrocephalus	463	442	414	404	388	393	372	371	363	386	350	370	374	369	354	332	335	
III.	ORDER 1.																		
	1. Cephalitis	206	200	204	187	181	178	180	177	179	172	178	190	195	202	197	199	207	
	2. Apoplexy	441	469	455	467	440	439	448	443	468	442	454	478	501	492	490	490	494	
	3. Paralysis	442	463	455	481	452	457	466	471	497	493	484	480	515	515	500	509	501	
	4. Insanity	30	26	29	27	20	21	28	23	27	27	27	32	27	31	31	30	31	
	5. Chorea	4	4	3	4	3	2	3	3	3	4	3	3	3	3	3	3	3	
	6. Epilepsy	108	117	112	115	111	115	122	114	125	124	121	127	117	119	118	109	110	
	7. Convulsions	1371	1370	1337	1345	1273	1286	1322	1330	1284	1278	1257	1279	1282	1287	1306	1293	1206	
	8. Brain Disease, &c.	204	196	207	201	182	207	231	235	248	257	245	240	251	256	267	267	250	
	ORDER 2.	1. Pericarditis	33	31	32	32	28	30	30	32	29	27	28	29	31	27	26	28	25
		2. Aneurism	15	17	17	17	18	17	18	19	19	19	19	21	23	24	21	24	26
3. Heart Disease, &c.		651	712	685	737	680	728	804	828	908	863	883	909	1035	1021	1009	1022	1000	
ORDER 3.	1. Laryngitis	60	61	62	62	69	71	75	68	59	63	73	77	78	67	61	61	66	
	2. Bronchitis	953	1237	1092	1467	1144	1341	1509	1332	1648	1558	1617	1574	1894	1754	1968	1902	1550	
	3. Pleurisy	53	47	52	62	47	46	44	47	45	45	45	46	42	41	41	41	42	
	4. Pneumonia	1196	1331	1280	1406	1204	1230	1374	1257	1287	1152	1179	1189	1189	1083	1198	995	927	
	5. Asthma	241	234	232	294	218	227	234	217	220	196	203	182	205	191	175	177	144	
	6. Lung Disease, &c.	143	153	138	148	130	142	163	148	225	225	245	241	251	232	235	226	210	
ORDER 4.	1. Gastritis	38	37	41	44	43	41	42	36	41	43	41	43	39	36	35	35	35	
	2. Enteritis	218	202	197	174	172	179	172	176	161	167	145	159	154	158	139	135	141	
	3. Peritonitis	73	70	78	75	70	74	76	80	79	79	74	80	84	79	72	74	81	
	4. Ascites	39	42	41	45	40	39	34	39	38	37	37	36	35	36	33	34	31	
	5. Ulceration of Intestines	55	56	50	47	50	47	45	40	43	43	43	42	44	41	41	44	46	
	6. Hernia	38	43	45	47	50	43	40	39	42	43	41	42	39	43	42	44	42	
	7. Ileus	61	63	67	64	63	59	57	53	60	60	54	57	56	55	56	55	58	
	8. Intussusception	14	13	14	13	15	12	12	14	12	14	12	14	12	14	14	14	14	

TABLE 11.—Causes of Death registered in England in each of the Seventeen Years 1852-68. To 1,000,000 PERSONS LIVING, the DEATHS from each CLASS of CAUSES, and from each CAUSE—cont.

Class.	CAUSES OF DEATH.	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	
I.	9. Stricture of Intestines	16	13	14	13	13	15	14	15	15	14	13	14	13	15	13	13	13	
	10. Fistula	5	6	6	5	4	5	6	5	6	6	5	4	5	4	5	5	4	
	11. Stomach Disease, &c.	121	110	110	127	125	128	143	138	146	140	136	138	133	139	140	139	141	
	12. Pancreas Disease, &c.	3	5	7	3	6	1	1	1	1	1	1	1	1	1	1	1	1	
	13. Hepatitis	89	84	82	78	76	76	70	76	68	70	68	69	69	71	67	62	63	
	14. Jaundice	72	68	69	70	76	76	62	64	64	68	64	64	70	74	75	70	71	
	15. Liver Disease, &c.	220	229	217	206	192	203	222	228	231	236	233	239	249	280	269	261	255	
	16. Spleen Disease, &c.	4	4	4	3	3	4	3	3	3	4	3	4	3	3	4	4	4	
	ORDER 5.	1. Nephritis	11	13	11	13	14	14	14	15	12	15	14	16	19	18	19	21	23
		2. Ischuria	6	6	6	6	4	5	6	5	5	5	7	6	7	6	5	5	4
		3. Nephria	32	35	42	43	51	52	57	65	71	73	77	84	87	90	97	104	97
		4. Diabetes	21	23	24	24	23	25	27	25	27	27	29	27	32	32	32	32	31
		5. Stone	12	12	10	13	12	10	10	10	9	8	10	8	9	9	9	9	10
		6. Cystitis	13	13	15	15	14	14	13	14	15	17	17	17	19	16	19	18	22
		7. Kidney Disease, &c.	96	99	97	100	101	97	115	109	115	118	113	115	125	130	133	138	132
	ORDER 6.	1. Ovarian Dropsy	10	12	12	11	11	12											

TABLE 13.—Mean Annual Rate of Mortality in England from each CLASS of CAUSES and from each CAUSE during Three Periods of Five Years; and Rate of Mortality in the Year 1868—continued.

CLASSES.	CAUSES OF DEATH.	ANNUAL DEATHS to 1,000,000 LIVING.					CLASSES.	CAUSES OF DEATH.	ANNUAL DEATHS to 1,000,000 LIVING.				
		15 Years 1850-54.	5 Years 1850-54.	5 Years 1855-59.	5 Years 1860-64.	Year 1868.			15 Years 1850-54.	5 Years 1850-54.	5 Years 1855-59.	5 Years 1860-64.	Year 1868.
III.	ORDER 1.							ORDER 8.					
	1 Cephalitis - - -	187.5	199.0	180.6	182.8	207		1 Phlegmon - - -	20.7	20.2	18.2	23.6	
	2 Apoplexy - - -	456.7	454.2	447.4	468.6	494		2 Ulcer - - -	18.2	18.4	16.4	19.8	
	3 Paralysis - - -	466.5	440.2	465.4	493.8	501		3 Skin Disease, &c. - -	14.3	11.8	15.4	15.6	
	4 Insanity - - -	27.0	29.2	23.8	28.0	31	IV.	ORDER 1.					
	5 Chorea - - -	3.3	3.6	3.0	3.2	3		1 Premature Birth - -	724.2	1043.6	737.0	392.0	
	6 Epilepsy - - -	114.7	105.8	115.4	122.8	110		2 Cyanosis - - -	18.1	14.0	18.6	21.8	
	7 Convulsions - - -	1313.3	1352.6	1311.2	1276.0	1206		3 Spina Bifida - - -	16.1	13.2	16.0	19.0	
	8 Brain Disease, &c. - -	217.3	192.4	211.2	248.2	250		4 Other Malformations - -	20.2	20.0	19.4	21.2	
								5 Teething - - -	217.0	244.2	204.4	202.4	
	ORDER 2.							ORDER 2.					
	1 Pericarditis - - -	30.6	32.6	30.4	28.8	25		1 Paramenia - - -	3.9	5.4	3.0	3.2	
	2 Aneurism - - -	18.1	16.2	17.8	20.2	26		2 Childbirth (see Metria) - -	113.7	122.6	105.0	113.4	
	3 Heart Disease, &c. - -	775.4	651.2	755.4	919.6	1000		ORDER 3.					
								1 Old Age - - -	1437.0	1493.8	1431.0	1386.2	
	ORDER 3.							ORDER 4.					
	1 Laryngitis - - -	66.0	59.0	69.0	70.0	66		1 Atrophy and Debility - -	1044.9	697.0	1034.0	1403.8	
	2 Bronchitis - - -	1344.4	1016.4	1358.6	1658.2	1350	V.	ORDER 1.					
	3 Pleurisy - - -	47.9	51.4	49.2	43.2	42		(ACCIDENT OR NEGLIGENCE.)					
	4 Pneumonia - - -	1244.1	1239.0	1294.2	1199.2	927		1 Fractures and Contusions - -				285.8	
	5 Asthma - - -	232.5	258.2	238.0	201.2	144		2 Gunshot - - -				5.6	
	6 Lung Disease, &c. - -	176.2	145.0	146.2	237.4	210		3 Cut, Stab - - -				3.8	
								4 Burns and Scalds - - -				146.8	
	ORDER 4.							5 Poison - - -				13.0	
	1 Gastritis - - -	39.9	37.2	42.6	39.8	35		6 Drowning - - -				121.8	
	2 Enteritis - - -	180.3	209.0	174.6	157.2	141		7 Suffocation - - -				56.6	
	3 Peritonitis - - -	75.5	72.4	75.0	79.2	81		8 Otherwise - - -				43.6	
	4 Ascites - - -	38.5	39.6	39.4	36.6	31		ORDER 3.					
	5 Ulceration of Intestines - -	46.5	50.8	45.8	43.0	46		(HOMICIDE.)					
	6 Hernia - - -	42.1	41.2	43.8	41.4	42		1 Murder and Manslaughter - -				19.2	
	7 Ileus - - -	60.5	63.8	60.2	57.4	58							
	8 Intussusception - - -	13.4	13.6	13.4	13.2	14		ORDER 4.					
	9 Stricture of Intestines - -	14.1	14.2	14.0	14.0	13		(SUICIDE.)					
	10 Fistula - - -	5.3	5.8	5.0	5.2	4		1 Gunshot Wounds - - -				3.0	
	11 Stomach Disease, &c. - -	129.8	118.6	132.2	138.6	141		2 Cut, Stab - - -				12.6	
	12 Pancreas Disease, &c. - -	1.7	.6	.8	.8	.5		3 Poison - - -				6.6	
	13 Hepatitis - - -	75.5	83.6	75.2	67.8	63		4 Drowning - - -				10.8	
	14 Jaundice - - -	69.1	69.6	69.6	68.0	71		5 Hanging - - -				29.0	
	15 Liver Disease, &c. - -	221.0	215.2	210.2	237.6	255		6 Otherwise - - -				4.6	
	16 Spleen Disease, &c. - -	3.6	3.8	3.2	3.8	4		ORDER 5.					
								(EXECUTION.)					
	ORDER 5.							1 Hanging - - -				.8	
	1 Nephritis - - -	13.4	11.0	14.0	15.2	23		Other Violent Deaths (not classed) - -				6.0	
	2 Ischuria - - -	5.5	5.8	5.2	5.6	5		Sudden Deaths (Cause unascertained) - -	177.2	207.2	178.2	146.2	
	3 Nephria - - -	54.7	32.0	53.6	78.4	97		Cause not specified or ill-defined - - -		214.8	149.0*		
	4 Diabetes - - -	25.4	23.0	24.8	23.4	31							
	5 Stone - - -	10.6	12.0	11.0	8.8	10							
	6 Cystitis - - -	14.7	13.0	14.0	17.0	22							
	7 Kidney Disease, &c. - -	105.1	93.8	104.4	117.2	132							
	ORDER 6.												
	1 Ovarian Dropsy - - -	12.1	11.4	12.0	12.8	10							
	2 Uterus, &c. Disease - -	44.4	41.0	45.4	46.8	48							
	ORDER 7.												
	1 Arthritis - - -	3.9	4.2	3.8	3.6	4							
	2 Joint Disease, &c. - -	68.5	62.0	64.4	79.0	82							

* Mean of 3 years.

TABLE 14.—Causes of Death in England in the Year 1868, arranged in the order of Mortality.

CAUSES OF DEATH.	Number of Deaths registered in the Year 1868.	Proportional Number from each Cause to 1,000,000 Deaths from All Causes.	CAUSES OF DEATH.	Number of Deaths registered in the Year 1868.	Proportional Number from each Cause to 1,000,000 Deaths from All Causes.
Phthisis - - -	51,423	107,869	Ulceration of Intestines - -	951	2,058
Bronchitis - - -	33,253	69,765	Hernia - - -	907	1,902
Atrophy and Debility - -	32,654	68,498	Pleurisy - - -	905	1,898
Diarrhoea - - -	29,821	62,556	Gastritis - - -	759	1,592
Old Age - - -	26,050	54,644	Diabetes - - -	671	1,408
Convulsions - - -	25,897	54,325	Ascites - - -	659	1,382
Scarlatina - - -	21,912	45,964	Insanity - - -	655	1,374
Heart Disease - - -	21,468	45,033	Hanging (Suicide) - - -	568	1,192
Pneumonia - - -	19,908	41,761	Phlegmon - - -	565	1,185
Typhus - - -	19,701	41,326	Aneurism - - -	556	1,166
Measles - - -	11,630	24,396	Cyanosis - - -	547	1,147
Paralysis - - -	10,761	22,573	Pericarditis - - -	534	1,120
Apoplexy - - -	10,611	22,258	Nephritis - - -	495	1,038
Whooping-cough - - -	9,223	19,347	Other Malformations - - -	474	994
Cancer - - -	8,880	18,627	Cystitis - - -	463	971
Premature Birth - - -	8,757	18,370	Purpura and Scurvy - - -	463	969
Hydrocephalus - - -	7,184	15,070	Murder and Manslaughter - -	461	967
Tabes Mesenterica - - -	6,925	14,526	Delirium Tremens - - -	439	921
Fracture and Contusion (Accident) - - -	6,508	13,652	Ulcer - - -	436	915
Dropsy - - -	6,284	13,182	Spina Bifida - - -	411	862
Liver Disease, &c. - - -	5,475	11,486	Gout - - -	393	824
Brain Disease, &c. - - -	5,374	11,273	Skin Disease, &c. - - -	356	747
Lung Disease, &c. - - -	4,519	9,479	Intemperance - - -	349	732
Croup - - -	4,491	9,423	Influenza - - -	306	642
Cephalitis - - -	4,451	9,337	Intussusception - - -	298	625
Teeth - - -	4,145	8,695	Drowning (Suicide) - - -	291	610
Asthma - - -	3,093	6,488	Cut, Stab (Suicide) - - -	284	596
Enteritis - - -	3,038	6,373	Stricture of Intestines - - -	281	589
Stomach Disease, &c. - - -	3,032	6,360	Poison (Accident) - - -	279	585
Diphtheria - - -	3,013	6,320	Other Violent Deaths (not classed) - - -	274	575
Sudden Deaths (Cause unascertained) - - -	2,945	6,178	Carbuncle - - -	228	478
Drowning (Accident) - - -	2,924	6,134	Ovarian Dropsy - - -	222	466
Kidney Disease, &c. - - -	2,886	5,946	Stone - - -	213	449
Scrofula - - -	2,769	5,808	Quinsy - - -	208	434
Burns and Scalds (Accident) - -	2,553	5,355	Stricture of Urethra - - -	202	426
Rheumatism - - -	2,503	5,250	Worms - - -	172	361
Epilepsy - - -	2,359	4,948	Noma - - -	161	338
Childbirth - - -	2,307	4,839	Poison (Suicide) - - -	138	289
Nephria - - -	2,076	4,355	Paramenia - - -	130	273
Small-pox - - -	2,052	4,304	Otherwise (Suicide) - - -	127	266
Erysipelas - - -	1,952	4,095	Ischuria - - -	118	248
Syphilis - - -	1,886	3,953	Gunshot (Accident) - - -	118	248
Joint Disease, &c. - - -	1,751	3,673	Cut, Stab (Accident) - - -	103	216
Peritonitis - - -	1,738	3,646	Other Zymotic Diseases - - -	101	212
Jaundice - - -	1,526	3,201	Gunshot wounds (Suicide) - -	100	210
Want of Breast Milk - - -	1,506	3,162	Fistula - - -	96	201
Cholera - - -	1,498	3,142	Privation - - -	96	201
Laryngitis - - -	1,420	2,979	Ague - - -	94	197
Hepatitis - - -	1,349	2,830	Spleen Disease, &c. - - -	85	178
Mortification - - -	1,321	2,771	Arthritis - - -	82	172
Ileus - - -	1,244	2,610	Remittent Fever - - -	69	145
Metria - - -	1,196	2,509	Chorea - - -	66	138
Suffocation (Accident) - - -	1,192	2,500	Pancreas Disease - - -	11	23
Thrush - - -	1,124	2,358	Hanging (Execution) - - -	10	21
Dysentery - - -	1,108	2,324	Hydrophobia - - -	7	15
Otherwise (Accident) - - -	1,038	2,177	Glanders - - -	6	13
Uterus Disease, &c. - - -	1,036	2,173			

Note.—The causes of 3,904 deaths were not specified. In calculating the proportional numbers they have been distributed pro ratâ over all the causes in the Table.

TABLE 15.—Deaths in England in 1868 of Women after Childbearing classed under the Diseases in Column 1., and neither referred to Childbirth nor to Metria in the Abstracts.

CAUSES OF DEATH.	ALL AGES.	A G E S.				
		15—	20—	25—	35—	45 and upwards.
Col. 1	2	3	4	5	6	7
TOTAL	671	22	114	313	211	11
CLASS I.						
Small-pox	16	1	4	8	3	-
Measles	5	1	-	2	2	-
Scarlet Fever	42	1	11	23	7	-
Diphtheria	2	-	-	1	1	-
Quinsy	2	-	-	1	1	-
Typhus	90	4	19	42	25	-
Erysipelas	10	1	-	5	3	1
Dysentery	5	-	2	2	1	-
Diarrhoea	47	7	11	20	9	-
Cholera	2	-	-	1	1	-
Ague	3	-	-	3	-	-
Rheumatism	15	1	4	6	4	-
Syphilis	4	-	1	2	1	-
Privation	1	-	-	1	-	-
Delirium Tremens	1	-	-	1	-	-
CLASS II.						
Dropsy	17	-	2	10	3	2
Cancer	3	-	-	1	1	1
Scrofula	2	-	-	1	-	1
Phthisis	124	1	19	62	41	1
CLASS III.						
Cephalitis	5	-	-	2	3	-
Apoplexy	12	-	3	5	4	-
Paralysis	4	-	-	2	2	-
Epilepsy	3	-	1	1	1	-
Brain Disease	5	1	-	1	3	-
Pericarditis	2	-	-	2	-	-
Heart Disease	64	-	11	27	23	3
Laryngitis	3	-	2	-	1	-
Bronchitis	53	1	7	19	26	-
Pleurisy	9	-	1	4	4	-
Pneumonia	38	2	8	12	15	1
Asthma	10	-	-	4	6	-
Lung Disease	15	-	2	9	3	1
Gastritis	3	-	-	2	1	-
Enteritis	2	-	-	-	2	-
Peritonitis	9	1	2	4	2	-
Ascites	1	-	-	-	1	-
Ileus	3	-	-	3	-	-
Stomach Disease	2	-	-	-	2	-
Hepatitis	5	-	1	1	3	-
Jaundice	4	-	-	3	1	-
Liver Disease	3	-	-	2	1	-
Nephria	16	-	2	11	3	-
Cystitis	2	-	-	1	1	-
Kidney Disease	7	-	1	6	-	-

TABLE 16.—Deaths in England in 1868 of Women who were returned as pregnant, classed under the Diseases in Column 1.

CAUSES OF DEATH.	ALL AGES.	A G E S.				
		15—	20—	25—	35—	45 and upwds.
Col. 1.	2	3	4	5	6	7
TOTAL	20	1	2	10	7	-
CLASS I.						
Diarrhoea	1	-	-	-	1	-
Purpura	1	-	-	1	-	-
CLASS II.						
Dropsy	1	-	-	-	1	-
Phthisis	2	-	-	1	1	-
CLASS III.						
Apoplexy	2	-	1	-	1	-
Epilepsy	1	-	-	-	-	-
Heart Disease	2	-	-	2	1	-
Bronchitis	1	-	-	-	-	-
Asthma	1	-	-	1	1	-
Lung Disease	2	-	-	1	-	-
Peritonitis	2	1	-	2	-	-
Ileus	1	-	-	1	-	-
Jaundice	1	-	-	1	1	-
Nephria	2	-	1	1	-	-

TABLE 17.—Deaths in England of Women in Childbirth in each of the Years 1847-68.

YEARS.	NUMBER OF DEATHS FROM			DEATHS OF MOTHERS TO 10,000 CHILDREN BORN ALIVE.
	METRIA AND CHILDBIRTH.	METRIA.	ACCIDENTS OF CHILDBIRTH.	
1847	3226	784	2442	60
1848	3445	1365	2080	61
1849	3339	1165	2174	58
1850	3252	1113	2139	55
1851	3290	1009	2281	53
1852	3247	972	2275	52
1853	3063	795	2268	50
1854	3009	954	2055	47
1855	2979	1079	1900	47
1856	2888	1067	1821	44
1857	2787	836	1951	42
1858	3131	1068	2063	48
1859	3496	1238	2258	51
1860	3173	987	2186	46
1861	2995	886	2109	43
1862	3077	940	2137	43
1863	3588	1155	2433	49
1864	4016	1484	2532	54
1865	3823	1333	2490	51
1866	3682	1197	2485	49
1867	3412	1066	2346	44
1868	3503	1196	2307	44
22 years 1847-68	72,421	23,689	48,732	49

TABLE 18.—Proportion of Suicides consummated to every 1,000,000 of the Population of England, 1858-68.

MEANS EMPLOYED.	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
Gunshot Wounds - - -	3	3	3	3	3	3	3	3	3	3	5
Cutting, Stabbing - - -	13	14	14	13	11	13	12	12	13	13	13
Poisoning - - - - -	6	6	8	6	6	6	7	7	6	6	6
Drowning - - - - -	10	11	11	11	10	12	10	11	10	11	14
Hanging - - - - -	30	27	30	30	30	28	27	28	25	22	26
Otherwise - - - - -	4	3	4	5	5	4	5	6	7	7	6
All Ways - - - - -	66	64	70	68	65	66	64	67	64	62	70

TABLE 19.—Deaths and Mortality in England by Burns and Scalds in the Years 1848-68.

AGES.	DEATHS				AVERAGE ANNUAL DEATHS in the 20 Years 1848-67.		AVERAGE ANNUAL RATE of MORTALITY in the 20 Years 1848-67 to 100,000 Living.		RATE of MORTALITY to 100,000 Living in 1868.	
	In the 20 Years 1848-67.		In 1868.		Males.	Females.	Males.	Females.	Males.	Females.
	Males.	Females.	Males.	Females.						
ALL AGES - - -	28,047	28,246	1,449	1,104	1,402	1,412	14.7	14.2	13.9	9.9
Under 5 Years - - -	15,675	12,872	731	570	734	644	60.3	49.9	48.2	37.6
5- - - - -	3,817	6,551	150	200	191	327	16.8	28.8	11.7	15.9
10- - - - -	1,079	1,713	51	46	54	86	5.2	8.5	4.5	4.0
15- - - - -	2,132	1,801	147	51	107	65	6.0	3.5	7.6	2.5
25- - - - -	1,768	716	138	23	88	36	6.4	2.3	9.9	1.3
35- - - - -	1,280	630	95	25	64	31	5.9	2.6	8.4	1.8
45- - - - -	829	702	53	30	41	35	4.9	4.1	5.2	3.1
55- - - - -	574	763	42	45	29	38	5.3	6.7	6.4	7.7
65- - - - -	410	1,161	24	45	20	58	7.0	16.0	8.3	9.7
75- - - - -	385	1,356	14	52	19	68	18.3	51.3	12.5	38.4
85- - - - -	94	449	4	17	5	22	39.5	112.7	32.3	85.8
95 and upwards - -	4	32	-	-	2	2	41.5	202.0	-	-

Of the 15,675 males dying of burns under 5 years of age, 1,014 were less than 1 year of age, 3,903 were 1 year and under 2, 4,089 were 2 years and under 3, 3,711 were 3 years and under 4, 2,958 were 4 years and under 5. Of the 12,872 females dying under 5 years of age, 1,020 were less than 1 year of age, 3,088 were 1 year and under 2, 3,056 were 2 years and under 3, 3,096 were 3 years and under 4, 2,612 were 4 years and under 5.

TABLE 20.—Deaths by Lightning in England in each of the Four Years 1865-68.

DIVISION.	DISTRICT.	DATE OF DEATH.	SEX.	OCCUPATION.	ALL AGES.	AGES.												
						0-	5-	10-	15-	20-	25-	35-	45-	55-	65 and upwards			
1865.																		
3	Hemel Hempstd.	17 July	Male	Labourer - - -	1	-	-	-	-	-	-	-	-	-	-	1	-	
3	Bedford - - -	24 July	Male	Labourer - - -	1	-	-	-	-	-	-	-	-	-	-	-	1	-
4	Romford - - -	24 Aug.	Male	Labourer - - -	1	-	-	-	1	-	-	-	-	-	-	-	-	-
4	Chelmsford - -	8 Aug.	Male	Labourer - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
4	Sanford - - -	22 Aug.	Male	Basket-maker -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
6	Kidderminster	25 Aug.	Male	Labourer - - -	1	-	-	-	-	-	-	-	1	-	-	-	-	-
6	Birmingham -	8 July	Female	Wife of Beerseller	1	-	-	-	-	-	-	-	-	-	-	1	-	-
*6	Stone - - - - -	8 July	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	1	-	-	-	-	-
7	Glanford Brigg	22 May	Male	Cottager - - -	1	-	-	-	-	-	-	-	-	-	-	1	-	-
7	Glanford Brigg	16 Aug.	Male	Farm Bailiff - -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
7	Ashby-de-la-Zeh.	8 July	Male	Labourer - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
7	Spilsby - - -	8 July	Female	Daughter of Labourer	1	-	-	1	-	-	-	-	-	-	-	-	-	-
7	Gainsborough -	8 July	Female	Wife of Carrier -	1	-	-	-	-	-	-	-	-	-	-	1	-	-
7	Newark - - - -	8 July	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	1	-	-	-	-	-
7	Bakewell - - -	7 July	Male	Labourer - - -	1	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Preston - - - -	22 May	Male	Servant - - - -	1	-	-	-	-	-	-	1	-	-	-	-	-	-
9	Halifax - - - -	7 July	Male	Farmer - - - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
9	Doncaster - - -	22 Aug.	Male	Agricultural Labourer	1	-	-	-	-	-	-	1	-	-	-	-	-	-
9	Pattingham - -	8 July	Male	Life Boatman - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
9	Scarborough - -	10 July	Male	Farmer - - - - -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
1866.																		
1	Kensington - -	30 June	Male	Son of Pigeon Dealer	1	-	-	-	1	-	-	-	-	-	-	-	-	-
2	Horsham - - - -	6 July	Male	Farmer - - - - -	1	-	-	-	-	-	-	-	-	-	-	1	-	-
3	Bishop Stortford	10 Aug.	Male	Shepherd - - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
4	Thingoe - - - -	4 June	Female	- - - - -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
4	Woodbridge - -	4 June	Female	Son of Labourer -	1	-	-	1	-	-	-	-	-	-	-	-	-	-
4	Norwich - - - -	22 June	Male	Gardener - - - -	1	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Witham - - - -	11 Aug.	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	1	-	-	-	-	-
5	Yeovil - - - - -	27 June	Male	Labourer - - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
5	Wincanton - -	30 June	Male	Labourer - - - -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
6	Clifton - - - -	3 Feb.	Male	Sailor (at Sea) -	1	-	-	-	-	-	-	1	-	-	-	-	-	-
6	Solihull - - - -	1 June	Male	Son of Labourer -	1	-	-	1	-	-	-	-	-	-	-	-	-	-
6	Boston - - - - -	4 June	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	1	-	-	-
7	Spalding - - - -	30 June	Female	Wife of Agricultural Labourer.	1	-	-	-	-	-	-	1	-	-	-	-	-	-
7	Spalding - - - -	30 June	Female	Daughter of Agricultural Labourer.	1	1	-	-	-	-	-	-	-	-	-	-	-	-
7	Horncastle - -	29 June	Male	Cottager - - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
7	Bingham - - - -	5 July	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	-	-	-	1
8	Wigan - - - - -	15 Sept.	Female	Waggon minder in a Coal Mine.	1	-	-	1	-	-	-	-	-	-	-	-	-	-
9	Guisborough - -	30 June	Male	Horsekeeper - - -	1	-	-	-	-	-	-	1	-	-	-	-	-	-
11	Festiniog - - -	28 June	Female	Wife of Farmer - -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
1867.																		
3	Royston - - - -	10 May	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	-	-	-	1
3	Woodstock - - -	3 Sept.	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	-	1	-	-
3	St. Neots - - -	19 April	Female	Daughter of Labourer	1	-	-	-	-	-	-	1	-	-	-	-	-	-
4	Halstead - - - -	2 July	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	-	-	-	1
4	Tunstead - - - -	1 Sept.	Female	Daughter of Labourer	1	-	-	1	-	-	-	-	-	-	-	-	-	-
4	Tunstead - - - -	1 Sept.	Female	Daughter of Carpenter	1	1	-	-	-	-	-	-	-	-	-	-	-	-
7	Caistor - - - -	30 Mar.	Male	Fisherman (at Sea)	1	-	-	-	-	-	-	1	-	-	-	-	-	-
7	Lincoln - - - -	23 July	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	1	-	-	-
7	Mansfield - - -	3 Sept.	Male	Son of Groom - - -	1	-	-	1	-	-	-	-	-	-	-	-	-	-
6	Shipston on Stour.	3 Sept.	Male	Carpenter - - - -	1	-	-	-	-	-	-	-	-	-	-	-	1	-
9	Pontefract - -	27 May	Male	Market Gardener -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
6	West Bromwich	3 Sept.	Male	Labourer - - - - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
8	Oldham - - - - -	10 July	Female	Daughter of Tailor -	1	-	-	1	-	-	-	-	-	-	-	-	-	-
9	Whitby - - - - -	5 June	Male	Boat Builder - - -	1	-	-	-	-	-	-	-	-	-	-	-	-	1
9	Saddleworth - -	3 Sept.	Male	Spinner - - - - -	1	-	-	-	-	-	-	-	1	-	-	-	-	-
10	Alnwick - - - -	13 Aug.	Male	Roadman (at Sea) -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
11	Machynlleth - -	4 Sept.	Male	Son of a Farmer - -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
1868.																		
2	Epsom - - - - -	29 May	Male	Omnibus Driver - -	1	-	-	-	-	-	-	-	-	-	-	1	-	-
2	Epsom - - - - -	29 May	Male	Beerhouse Keeper -	1	-	-	-	-	-	-	-	-	-	1	-	-	-
2	Thanet - - - - -	29 May	Male	Labourer - - - - -	1	-	-	-	-	-	-	-	1	-	-	-	-	-
4	Maldon - - - - -	31 May	Male	Son of a Maltster -	1	-	-	1	-	-	-	-	-	-	-	-	-	-
4	Maldon - - - - -	11 Aug.	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	-	-	-	1
4	Lexden - - - - -	16 July	Male	Agricultural Labourer	1	-	-	-	-	-	-	-	-	-	-	-	-	1
7	Glanford Brigg	27 April	Male	Miller - - - - -	1	-	-	-	-	-	-	-	1	-	-	-	-	-
9	Leyburn - - - -	20 June	Male	Stable Boy - - - -	1	-	-											

TABLE 21.—Railways of England and Wales in the Year 1867.
(See Parliamentary Return No. 484, Session of 1868.)

	NUMBER OF PASSENGERS (exclusive of Holders of Season and Periodical Tickets).	Average Fares* per Mile.	Receipts from PASSENGERS (excluding Season Tickets).	Estimated Number of Miles travelled.
First Class - -	27,093,001	$d. \quad \pounds$ 2'11 = '00880	£ 3,391,567	384,942,854
Second Class - -	71,720,368	1'55 = '00646	4,454,009	689,494,525
Third Class - -	151,785,613	0'93 = '00387	5,202,028	1,344,204,035
TOTAL -	250,598,982	1'29 = '00539	13,047,604	2,418,641,414

* The average here given is derived from the Fares of the 12 longest lines in England.

NOTE.—The number of holders of Season and Periodical Tickets was 84,418, and the receipts from them amounted to 486,587*l.*, or 5*l.* 15*s.* to each.

The length of line opened on 31st December 1866 was 9,701 miles.

” ” on 31st December 1867 was 10,037 miles.

Number of Trains run in the year 1867 :—

Passenger Trains - -	3,293,882
Goods Trains - -	1,930,964
TOTAL - -	<u>5,224,846</u>

Number of Miles travelled by Trains in 1867 (not including the shunting of trains and engines) :—

Passenger Trains - -	61,572,474
Goods Trains - -	60,491,467
TOTAL - -	<u>122,063,941</u>

Dividing the aggregate receipts from passengers by the number of passengers in the year 1867, it is found that each journey costs on an average *one shilling*.

On the assumption that each ordinary passenger is on the line half an hour, the whole time spent in railway travelling would amount to 14,304 years of life, or, allowing for season ticket holders, to 15,693 years of life; and as 35 deaths occurred annually in the three years 1866–8, the annual rate of mortality was equivalent to 2·1 deaths per 1000 living. The season ticket holders are here estimated to travel 233,561,760 miles on the assumption that they are charged at the rate of $0\frac{1}{2}d.$ a mile. This rate is quite conjectural, but it affects only a small portion of the passenger traffic.

The mortality is inversely as the time, and if the time of each journey exceeds half an hour the above rate will be diminished, and conversely. Thus, if the average time of each journey is *an hour* the mortality rate becomes 1·05, if a *quarter of an hour* it becomes 4·2 per 1000 per annum. Thus when the exact velocity of railway travelling is known the ratio can be corrected.

In the year 1867 the *total receipts* of the English Railway Companies amounted to 33,398,222*l.*, their *net receipts* to 16,633,702*l.*, their *total working expenditure* to 16,764,520*l.*, and the total amount paid in *compensations* for personal injury, &c. was 322,985*l.*

The following symbols in future calculations might be of use :—

data	p = passengers (more properly “passages”) in one year.	
	F = total fares received in £	”
	f = rate of fare per mile £	”
unknown	M = total mileage paid for	”
	m = miles to each “passage”	”

As f is paid for one mile : F will pay for M miles ; and $\frac{F}{f} = M =$
Total mileage paid for.

But if this M is divided by p it gives the miles to each “passage” = m .

$$\therefore \frac{F}{pf} = \frac{M}{p} = m \text{ miles to each passage.}$$

As f differs for each class separate calculations are made for the three classes, by the formula $\frac{F}{f} = M$; the sum of these values of M give the mileage for the three classes : which may be divided by the sum of the “passengers.”

If we know the average rate at which trains travel, say it is v miles an hour,

Then $\frac{m}{v} = t_1 =$ time in hours required for travelling over m miles.

In the present case let $v = 19\cdot2$ and $m = 9\cdot6$, then

$$\frac{9\cdot6}{19\cdot2} = t_1 = \frac{1}{2} \text{ hour} = \cdot5$$

Let the *time* occupied by each “passage” p be expressed in fractions of a year then $\frac{t_1}{24 \times 365} = t$; and $pt = y =$ years of life passed on the railway. An addition has to be made for the 84,418 season ticket holders, who paid 486,587*l.* ; this can scarcely exceed 1389 years of life, and may be less.

After these calculations the life at risk is equivalent to 15,693 passengers on an average constantly on the line through the year. As there are 17,520 half hours in a year, on the above assumption, each *year of life* is made by a succession of 17,520 half hour passages. Taking the annual deaths of passengers at 35, the railway mortality is at the rate of $\frac{35}{15,693} = \cdot0021$

It may be taken at 2 on an average constant railway passenger population of 1000.

TABLE 22.—Railway Passengers and Servants Killed or Injured on the Railways of England and Wales in the Three Years 1866-68.
(Extracted from Board of Trade Returns to Parliament.)

YEARS.	Deaths of PASSENGERS.			Deaths of RAILWAY SERVANTS.		
	Total.	From Company's Fault.	From own Misconduct.	Total.	From Company's Fault.	From own Misconduct.
1866 - -	24	14	10	62	15	47
1867 - -	28	15	13	62	12	50
1868 - -	53	39	14	53	14	39
Total -	105	68	37	177	41	136
Average -	35	23	12	59	14	45
	Injuries to PASSENGERS.			Injuries to RAILWAY SERVANTS.		
	Total.	From Company's Fault.	From own Misconduct.	Total.	From Company's Fault.	From own Misconduct.
1866 - -	521	515	6	70	65	5
1867 - -	584	578	6	70	51	19
1868 - -	468	464	4	56	44	12
Total -	1,573	1,557	16	196	160	36
Average -	524	519	5	65	53	12

TOTAL PERSONS returned by COMPANIES as KILLED on RAILWAYS in the Three Years 1866-68:—

Years.	Killed.	Injured.
1866 - -	134	596
1867 - -	138	660
1868 - -	150	528
Total -	422	1784

TABLE 23.—Railway Accident Compensation Cases tried in the ENGLISH COURTS OF LAW in the Year 1868.
(Extracted from the Judicial Statistics of 1868.)

	For Compensation for Personal Injuries and Compensation under Lord Campbell's Act.	For Compensation for other Injuries from Negligence.
Total Cases Tried or otherwise disposed of in Court	203	98
Verdict for Plaintiff - - - - -	122	47
Verdict for Plaintiff, subject to Special Case - - - - -	2	4
Verdict by Consent, subject to Reference - - - - -	1	9
Verdict for Defendant - - - - -	29	16
Jury discharged without Verdict - - - - -	6	1
Juror withdrawn - - - - -	5	1
Nonsuit and otherwise disposed of - - - - -	38	20
Total Amount Recovered	£68,092	£7,202
Above 5,000 <i>l.</i> - - - - -	1	—
5,000 <i>l.</i> and above 3,000 <i>l.</i> - - - - -	1	—
3,000 <i>l.</i> and above 2,000 <i>l.</i> - - - - -	6	1
2,000 <i>l.</i> and above 1,000 <i>l.</i> - - - - -	9	—
1,000 <i>l.</i> and above 500 <i>l.</i> - - - - -	18	1
500 <i>l.</i> and above 300 <i>l.</i> - - - - -	15	2
300 <i>l.</i> and above 200 <i>l.</i> - - - - -	12	2
200 <i>l.</i> and above 100 <i>l.</i> - - - - -	13	7
100 <i>l.</i> and above 50 <i>l.</i> - - - - -	15	13
50 <i>l.</i> and above 20 <i>l.</i> - - - - -	21	11
20 <i>l.</i> and under - - - - -	11	11

APPENDIX B.

REPORT TO THE INTERNATIONAL STATISTICAL CONGRESS HELD AT THE HAGUE in 1869, by WILLIAM FARR, M.D., F.R.S.

INTRODUCTION.

I PROPOSE to give some account of the progress of the question of metric weights and measures in England, and to discuss some proposals which have been made for the adoption of an international coinage. That lies at the root of comparative statistics, and until there is an international money of account one of the great objects of the Congress must remain in abeyance.

Statistical science can make little progress until its measures of value, like its other measures, are identical. The unit of population is the same; and we have now or shall soon have all lengths, areas, volumes, and weights in national returns expressing in numbers the same metric units.

The measures of value are still fallacious, misleading, and discordant. How could we reason about the figures, if countries employed metres or hectares in units, one day expanding, another day contracting. Yet the money units of countries where paper is inconvertible vary to an inconceivable extent; and the value of articles of commerce, national expenditure, and prices expressed in such paper have never any definite meaning. Where the coinage is not sustained at its standard weight, similar uncertainties spring up. And where two precious metals are coined, and are both legal tender to any extent, the fluctuating values of two metals instead of one, that is two variable measures, and where they are joined with inconvertible paper, three different measures of value come into play. The cheapest of the three denominations for the time being always regulating prices, and chasing its rivals away to other regions or uses where they happen to be appreciated. It is evident that for scientific purposes, definite weights, either of gold or of silver, not both, must be accepted as the measuring unit of value.

The Congress has rightly refused to accept definitely any existing money, as no system is based on the decimal multiples, and sub-multiples of the gram weight of silver or of gold. Holland, it is true, has the single standard; and has a decagram silver currency, which is preferable to the *five gram* franc; but the florin is '945 fine; and it is too small a unit to measure the great masses of value with which international statistics deal.

Until an international coinage is created, the Congress may use as *its statistical units of value* decagrams of gold nine tenths fine, with grams and centigrams for the subordinate units. Upon this basis the relative value of all commodities to each other can be accurately determined; and the problem of the variations in the relative value of gold itself at different times, and in different places, can be discussed in the simplest form.

The adoption of the metrical gold unit for scientific purposes will pave the way to the coinage of the decagram; and it will be an additional service to mankind if the Congress thus brings nations into agreement, and into the use of the same related units of weight, measure, value, all over the civilized world.*

In England the Standards Commission has just reported to the effect, that "the time has now arrived when the law should provide, and facilities be afforded by the Government, for the introduction and use of metric weights and measures in the United Kingdom."†

And with reference to money, these eminent authorities, observing that the metric system includes the *relation of coinage to weights and measures*, particularly in its uniform decimal scale, are of opinion that, even if the difficulties of establishing an international unit of coinage cannot be at present overcome, yet the decimalization of our system of coinage, which is in the power of the Government, would be very useful to the public.

The Royal Commission on International Coinage in their recent report do not recommend that England should merely adopt a gold coin of the value of 25 francs; but they entertain no doubt that a uniform system of coins, bringing into harmony the various standards of value and moneys of account, alike in their higher denominations and their lower subdivisions, as well as an uniform system of weights and measures, would be productive of great general advantage. To establish an international currency very difficult questions will have to be settled, and concessions made on the part of all nations; and in the opinion of this Commission the subject can be most satisfactorily dealt with "by authorized representatives of the different countries meeting in an international conference."‡

The Chancellor of the Exchequer (the Right Honourable R. Lowe), before Parliament separated, discussed the question of international coinage in an enlarged, practical spirit, and evinced the willingness of Her Majesty's Government, under just conditions, to co-operate with the other Governments of the world in realizing this grand purpose.

I.—WEIGHTS AND MEASURES.

The utility of the metrical system for all statistical purposes has been recognized at every meeting of the Congress. It is impossible to compare the statistics of the various countries of the world with each other, when the figures represent units of variable values, without an excessive amount of labour. The time has come, in the opinion of the Congress, to act decisively in this direction.

In the meantime, on the motion of M. Baumhauer, the delegate for Holland, seconded by M. David, the delegate for Denmark, the heads of statistical departments of different countries were requested to prepare tables of their weights, measures, and moneys, with the values in the units corresponding, actually in use in the principal states of the world.

* The Congress at its last sitting, invited the authors of the proposed international work to render the values in francs, and in decagrams of gold nine tenths fine. (See p. 284.)

† Standards Commission, *Second Report*, 1869.

‡ Report on International Coinage, p. xviii. The Commission consisted of Lord Halifax, the Right Honourable C. P. Villiers, the Right Honourable S. Cave, Colonel Wilson Patten, M. Longfield, LL.D., Sir John Lubbock, F.R.S., T. Baring, Esq., Baron L. N. Rothschild, J. B. Smith, Esq., T. Hankey, Esq., J. G. Hubbard, T. N. Hunt, Esq. (Governor of the Bank of England), Professor Airy (Astronomer Royal), and Professor Graham (Master of the Mint). Among other witnesses who gave valuable evidence before the Committee were Col. J. T. Smith (Master of the Mint in India), F. Hendriks, W. Newmarch, W. S. Jevons, W. Bagehot, S. Brown, Right Hon. G. J. Goschen, Sir J. Bowring, L. Mallet, C. B., Professor Leone Levi.

In compliance with this request, we have compiled from the best accessible sources the annexed tables.*

1. Money Units.

The Congress it will be recollected, fully recognizing the utility of a single money unit for the world, suggested that in the interim the units in use should be reduced to the smallest number possible; such, for example, as the franc, the dollar, and the pound sterling; that the value of these units should be rendered, by slight modifications, simple in their numerical relations to each other, and that the subordinate should be related decimally to the primary units.

The time has now come for the Congress to advance further in the settlement once for all of the monetary units.

Note.—A heavy half sovereign weighs 4 grams; consequently a fourth part of it is one gram by weight, and half crown in value. A heavy sovereign weighs 8 grams.† A decagram is 10 grams, and in gold is worth 10 half crowns. The gram is the unit of the metric system of weights.

II.—INTERNATIONAL COINAGE.

This question has since the Statistical Congress met assumed new phases. Two important proposals have been made: (1) To coin a 25 franc piece in gold $\frac{9}{10}$ ths fine, weighing 8.0646 grams; (2) to coin a piece of gold weighing exactly ten grams, worth $1\frac{1}{4}l.$ = 10 half-crowns = 25 shillings in our coinage, worth about $5\frac{1}{2}$ gold milreis in Portugal, 6 silver or gold dollars in America, 8 silver roubles in Russia, $8\frac{1}{2}$ thalers in Prussia and North Germany, 11 rigsdalers in Denmark, 12 escudos in Spain, $12\frac{3}{4}$ florins in Austria, 13 rupees in British India, 15 guldens in South Germany, 15 florins in Holland, 22 riksdalers in Sweden, and $31\frac{1}{2}$ francs in France, Belgium, Switzerland, and Italy.

1. Coinage of a sovereign containing the same quantity of fine gold as a new 25 franc gold coin: seignorage.

In 1867 an international monetary conference was held in Paris, where the Master of the Mint and Mr. Rivers Wilson attended on the part of Her Majesty's Government. At that conference were representatives from twenty states, including, among others, England, the United States, France, Italy, Prussia, Austria, and Russia. The conference decided unanimously in favour of the single gold standard, although that standard was in use at the time only in two states, England and Portugal. They also decided in favour of the standard of fineness, 9 of gold to 1 of alloy, as it is the almost "universal rule in the mints of Europe and in the United States." The common coin fixed on by the Commission was a five franc gold piece, which, with its 3 multiples of 10 francs, 20 francs, and 100 francs, is coined by France, Italy, Switzerland, and Belgium. At the special instance of Mr. S. B. Ruggles, the able delegate of the United States, the congress decided unanimously to recommend the coinage of a 25 franc gold piece, weighing 8.0646 grams, containing 7.2581 grains of fine gold and .8065 grain of alloy. The English sovereign weighs 7.9882 grams, of which

* See Tables XVI. and XVII., pp. 282-3.

† The sovereign may by tolerance of weight be 8.005 grams or 7.972; the standard weight is 7.988.

7.3225 is fine gold, .6657 gram alloy. It is only .0118 gram below the round weight of 8 *grams*.*

England to be a party to international coinage, of which the utility is self-evident, was invited to put 112.006 grains instead of 113.001 grains of fine gold into its gold sovereign. This grain of gold is worth about 2*d.*, which it has been argued may be justly taken by the Mint to cover the cost of the coinage without altering the value of the sovereign *wherever it is or shall be the current legal coin*. The evidence here was conflicting, and the validity of the argument in favour of this view is not admitted in the report of the Royal Commission over which Lord Halifax presided.

There can be no doubt that our present system of coinage is unsound in principle and unsatisfactory in practice. The Mint charges nothing for converting standard gold into sovereigns, and the expense of manufacture is thrown on the national Exchequer. Now while there are good reasons for retaining the gold coinage as a monopoly in the hands of the Crown, no sound reason whatever has been assigned for doing the work gratuitously. Why should the nation coin gold for nothing when it realizes a profit by the delivery of letters? When it charges a high seignorage on the coinage of silver, which is legal tender up to 40*s.*, and on copper coins?† The "poor man's penny"—a legal tender up to 12*d.*—pays more than the cost of coining; the gold of the bullion dealer is turned into sovereigns for nothing. In practice the Bank paying its paper in coin, justly regulates the coinage of gold, but dealers get and export sovereigns over the current weight, while the worn and light pieces are left in England. "There can be no doubt," said Sir John Herschel, then Master of the Mint, "that a large amount of British sovereigns finds its way directly or indirectly into foreign melting pots."‡ The gold coinage in the year 1853 was 11,952,391*l.*; in the year 1864 it was 9,535,597*l.*: no one imagines that this was for domestic use.§

Any person who sends the gold bar for 10,000*l.* can, it is said, get gold coined at the Mint at the rate of 3*l.* 17*s.* 10½*d.* for each ounce of standard gold; but it has to be left at the Mint an uncertain number of days, and dealers now prefer going to the Bank of England, which buys standard gold, unless it is in the form of light coin, at the rate of 3*l.* 17*s.* 9*d.* an ounce, and sells it at the rate of 3*l.* 17*s.* 10½*d.* The Bank thus gets 1½*d.* on every ounce of gold that is coined, as it can issue notes against gold whether the gold is in the Mint or in its own cellars, while a dealer might lose not only interest of money but the advantages of turns of the market during the detention of his gold at the Mint. Instead of 934½*d.* the dealer now gets 933*d.* for every ounce of standard gold; the 1½*d.* is a kind of brokerage which the Bank levies for its services; 38½*d.* on every 100*l.* of bullion converted and this may be compared to the 30*d.* or the half-crown charged by the broker for transferring 100*l.* of consols. The Bank transfers 100*l.* of bar gold into 100*l.* of money for 3*s.* 2½*d.* The Bank

* See Report in Appendix to Registrar General's 16th Report, p. 110. In the Introduction to English Life Tables, p. 29, I pointed out the facility with which the sovereign by a slight addition of alloy might be made exactly 8 grams, each gram being worth half-a-crown.

† Silver is bought by the Mint at the market price and coined at the rate of 66*s.* to the 12 oz. of standard silver, that is at 66*d.* per ounce. Now taking silver as worth on an average $\frac{1}{15}$ its weight of fine gold, an ounce is worth only 60½*d.*, consequently 5½*d.* is taken, and the seignorage is 7.75 per cent. At the present average price of copper, tin, and zinc, bronze is worth 10*d.* per lb., consequently the actual metallic value of the bronze in one penny is one farthing, the seignorage is 75 per cent. on the "intrinsic value."

‡ Appendix to Report of Royal Commission on International Coinage, pp. 325-6.

§ Large sums were coined for Australia.

takes care to make a profit by its business, and its present charge is so low as to render competition impossible. In the year 1828 the Bank gave only 3*l.* 17*s.* 6*d.* for bullion; it gave 4½*d.* less for every ounce of standard gold bullion than was contained in the coined ounce, or took more than a penny (1.15*d.*) for every sovereign coined.* Rothschild under these circumstances sent his bullion to the Mint, where in due time he got 3*l.* 17*s.* 10½*d.* of coin for every ounce of standard gold, and the Bank has since paid 3*l.* 17*s.* 9*d.* an ounce for standard gold, as at that price no one can compete with her. The Bank 4½*d.* had the same effect as a corresponding seignorage, for it made 3*l.* 17*s.* 6*d.* of coin in gold or notes worth in the mind of the seller of bullion an ounce of gold, which when coined became 3*l.* 17*s.* 10½*d.*

Seignorage is a mint charge for coining gold; and if for coining a sovereign of 113 grains of fine gold the Mint retains one grain of gold for its pains, and stamps a sovereign of 112 grains of fine gold, that charge of one grain so levied is properly called *seignorage*. If the coin of 113 grains is stamped and any sum besides is paid to the Mint for coinage, the charge so levied is described as *brassage*.

Political economists hold that seignorage should be charged; † and that within certain limits it leaves the coin of the same value as the bullion from which the cost of coining—say one grain—has been deducted. To make this clear, assume that the dealing is direct between the holder of bullion and the Mint; then take the case: A engaged on 1st February, when he could get 113 grains of fine gold converted into a sovereign gratuitously, to pay B 100 sovereigns on 1st March; but on the 2d February intervening a seignorage is charged, and one grain of fine gold is taken by the Mint for every sovereign coined in the kingdom; coinage being a monopoly he sends the same weight of standard gold necessarily before as after the imposition of the seignorage to get from the Mint 100 sovereigns, namely $113 \times 100 = 11,300$ grains. With the 100 new sovereigns he therefore equitably discharges his debt to A on 1st March in the 100 sovereigns which cost him the same amount of gold, and are of the same *current value*, as the sovereigns coined before 2d February when no seignorage was charged.

The 100 new sovereigns, containing 11,200 grains of fine gold, cost A precisely the same quantity of fine gold as 100 sovereigns, when no seignorage was charged, namely 11,300 grains. He incurs the same expense in paying 100 new as in paying 100 old sovereigns; he therefore holds them to be to him of the same value; he could pay 100 new sovereigns for 40 quarters of wheat with no more facility than he could pay 100 old sovereigns on which seignorage was not levied. Neither could any other dealer. B gets the 100 sovereigns, and he gives A no less of the commodity he sells than the contract implied; and it is evident that C could offer B no more new or old sovereigns than A offers on the ground that the sovereigns new or old differed in value; so prices would, as far as this transaction was concerned, remain unchanged. But B in possession of the new sovereigns is in the same position as A; he gets or he gives the same amount of bullion, or of any other commodity for 100 coined sovereigns as before seignorage was charged. This argument holds wherever sovereigns are the current money.

If the 100 new sovereigns are melted down into bar gold the value, acquired by the Mint manufacture, is destroyed, precisely as the value of the fashion of the gold case of a watch is destroyed under the same operation.

* *Ibid.* p. 336. The Bank charge was 0.48 per cent., it is now 0.16 per cent., so it is equal to interest at 3 per cent. for 20 days: or for 7-8 days when money is at 8 per cent., as the days vary inversely as the rates of interest.

† *Ibid.* p. 320-4.

The *fine gold* in 100 old sovereigns amounting to 11,300 grains would sell for more than the 11,200 grains of *fine gold* in 100 new sovereigns; and the values would necessarily vary with the weight of gold. The value of gold coin varies as the value of gold in any other form varies according to its usefulness and the demand for it in that particular state; therefore, if as much gold coin exists as is required at a given place and time, to coin more is a waste of labour. It is labour for which no one will pay; and then gold acquires no additional value by coinage beyond that of bullion stamped authentically as of a given fineness. With a seignorage of one grain, coin like every other article in use, has an average price, of which the seignorage constitutes a part. The dealer cannot under such a system treat the new sovereign as bullion, nor melt it down with profit, unless it becomes worth as much or more as bullion than it is worth as coin. Thus one object of the charge is attained.

As far as the future, or as any current *transaction* is concerned, contracts can be made in new sovereigns as easily as in old sovereigns; and it has already been shown that contracts to pay pounds of money after seignorage is charged can be met only by the payment of the same weight of gold as was required when coinage was gratuitously executed, while the same number of coins will retain as coin the same value and the same power in the market.

The value of money as a medium of exchange is not necessarily expressed by the cost of the material of which it is composed—by some of the witnesses before the Royal Commission called “intrinsic value.” The intrinsic value of a five-pound Bank of England note—that is the cost of the paper and the printing—is about three tenths of a penny; yet if rendered by legislation inconvertible, to-morrow, as it was in 1796, the value of the bank note as a medium of exchange and a measure of price is very different from its “intrinsic value.” So long as it is accepted by buyers and sellers as money, while the same demand for money exists, while the same amount of money is in the market, and while money exists in no other form, its utility sustains its value.

If coining were free the additional value of coined over bar gold would be determined in the market; it would be limited by the cost of production.

Under a state monopoly the charge for seignorage can be pushed much further; but if pushed beyond a certain extent it will be followed by depreciation of the standard coin.

If the mint should coin 1,000,000 sovereigns of 100 grains each, and take from the proffered 113,000,000 grains of fine gold, 13,000,000 grains for seignorage, these would leave in the bullion market the materials of 130,000 new sovereigns of 100 grains each; so that instead of 1,000,000 as many as 1,130,000 new sovereigns might be made, which must fall in value if when thrown on the market, the demand is not augmented in the same ratio as the supply.

There is therefore a limit to the amount of seignorage that can be levied without producing depreciation of the currency; and this is evinced by the rise of prices that has resulted from any large diminution of the amount of the precious metals in the coins current, just as prices rise when the same amount of labour produces greater quantities of silver or gold.

Under a seignorage of one per cent. the gold saved will probably not be coined; it will, on the estimated aggregate of 80,000,000* of coin not exceed the gold of 800,000*l.* to be added to all the other gold in the world, in the form of plate, currency, and bullion, of which it will form so small a portion that its effect on prices in the bullion market may be safely neglected, while bank notes continue everywhere in circulation, while the Bank of England holds stores of notes in the chests of its

* Estimate of Professor Jevons; Stat. Journal, vol. xxxi. p. 447.

Banking Department (27th January 1869) 9,234,395*l.*, and while the fluctuating yearly imports of gold from Australia and California amount to millions. Distributed over a few years the produce of such a seignorage would be a drop in the ocean.*

Under a mint charge the Bank will not send gold to the Mint unless the new coin is in demand, while it is allowed to issue notes or coins on corresponding amounts of bullion.

If the coinage is absolutely *gratuitous* the value of gold coins is proportional to their weight of gold; and 113 sovereigns each containing 112 grains of fine gold, are only worth as much as 112 sovereigns containing 113 grains of fine gold.† The lighter sovereign is therefore under this system depreciated; upon the other hand a *mint charge* of a grain on each sovereign coined implies a cost of 114 grains of fine gold on every sovereign of 113 grains manufactured. Under this seignorage 113 new sovereigns cost as much as 114 when the coinage is free; so an imposition of a seignorage of one grain appreciates the sovereign to that extent. But if the value of a grain is subtracted in one form (gold) and added in another (mint-work), the original value is sustained; for $113 - 1 + 1 = 113 =$ value in grains of fine gold. To maintain the “standard of value” in England unchanged the mint-charge must be deducted from the gold in the sovereign.

It was proposed to the Royal Commission to charge a seignorage of one per cent. (0.10) on the gold coin, equivalent to about $2\frac{1}{2}d.$ on the sovereign; the charge now on the £1 of silver coinage ranging from $14\frac{1}{2}d.$ to $21\frac{3}{4}d.$, from 6 to 9 per cent. according as the market price of silver is higher or lower.‡

This seignorage will suffice to pay the entire cost of a perfect system of fine coins; it will cover the bank charge; it will enable the Mint to replace the worn sovereigns, and relieve holders from an inequitable penalty; it will be an effectual cure for the “wanton though criminal melting down” of our coin, of which Locke even in his day complained; it will reduce the weight of fine gold in the English sovereign to the weight of a twenty-five franc gold piece; and, leaving the value of the currency the same as it was before seignorage was charged, will not in any way affect past or future contracts to pay or receive sums of money in England.

To liberate the nation from the cost of a gratuitous coinage—which has many inconveniences, is open to many abuses, and can be justified on no principle—seignorage must be levied; and unless it be taken in the form of a proportional deduction from the metal of which the gold coin is com-

* This chapter was written early in the year 1869.

† For evidently $113 \times 112 = 112 \times 113$ grains of gold. This is well argued by Locke in further considerations concerning raising the value of money, Works, 11th ed., 1812, vol. 5, pp. 139–207: “I have spoken of silver coin alone,” he writes about 1690, “because that makes the money of account and measure of trade all through the world; for all contracts are, I think, everywhere made and accounts kept in silver coin. I am sure they are so in England and the neighbouring countries. Silver therefore, and silver alone, is the measure of commerce. Two metals, as silver and gold, cannot be the measure of commerce both together in any country,” pp. 150, 1. He asks, whether that workmanship which can be had for nothing has or can have any value? Whether whilst the money in our Mint is coined for the owners without any cost to them our coin can ever have any value above any standard bullion? Whether, whilst our coin is not of value above standard bullion, goldsmiths and others will not * * melt that down * * ? Whether the only cure for this wanton though criminal melting down our coin be not that the owners should pay one moiety of the $16\frac{1}{2}d.$ which is paid per pound troy (of $62 \times 12 = 744$ pence) for coinage of silver which the king now pays for? Whether by this means standard silver in coin will not be worth more than standard silver in bullion? p. 199.

‡ A pound troy of standard silver is coined into 66 shillings, of which the metal is worth from 60*s.* to 62*s.*, according to the market price of silver.—T. Graham, Master of the Mint. Report of Royal Commission on International Coinage, Appendix, p. 228.

posed the value of the currency will be changed. The change advocated will be advantageous to all classes in the kingdom.

To make the sovereign and the 25 franc-piece international coins, circulating indifferently in either country as interchangeable values, the seignorage must be the same in France as in England. Some contend that the cost in France is now virtually one per cent. Upon the hypothesis that the French charge—reckoning gold taken and the interest lost by delay—should be less than the seignorage, the equilibrium would be deranged just as it would by a difference in the weight of gold. This may be made clear by putting the reasoning in the form of an equation:

$$\begin{aligned} & \text{new sovereign of 112 grains of fine gold} + 1 \cdot 18 \text{ grain for mint work} \\ & \text{and bank charge.} \\ & = \text{in value old sovereign of 113 grains of fine gold} \\ & \quad + 0 \text{ for mint work} + 0 \cdot 18 \text{ grain bank charge.} \\ & = \text{in value a 25 franc gold piece of 112 grains} \\ & \quad + x \text{ grain for mint work and charge for delay;} \end{aligned}$$

provided x be neither more nor less than 1·18 grain of fine gold.

This equation clears up the puzzling dilemma which Sir John Lubbock set before the Royal Commission,* and which they have given in their report. It is quite true that if the seignorage should be less in France than the charge to be imposed in England the value of the international coins will to that extent be reduced in England; if, on the other hand, the seignorage be really raised in France above its present charge the value of the gold coin there will be raised above its present value in that country.

I conclude then that the imposition of a mint charge to the extent proposed at the Paris conference, and its abstraction as seignorage, if the seignorage were everywhere the same in the countries of the convention, would have no sensible effect on the English sovereign as a measure of value either in those countries or in home transactions.

The amount of gold that can be taken as seignorage without affecting a coin's value as current money has a limit; it may exceed one, but can scarcely be more than three per cent; it should cover the cost of sustaining the weight, form, and purity of the metallic money, as well as of manufacturing gold coins of the finest quality as works of art. Money may thus be made an effectual means of cultivating the sense of the beautiful in art and of teaching decimal arithmetic.

We can coin the sovereign of the same weight and fineness as a 25-franc gold piece. But when that is done, will the question of coinage be settled? I say, emphatically, No. The unit of coinage will not be a unit of weight, and the change will not give us the best decimal money of account.

2. Maintenance of the coinage.

It is necessary to sustain by settled provisions the standard weight of any international money. Gold wastes away less than silver as it is unassailable by ordinary chemical agents, but it loses yearly by wear; and the less the weight, the greater the surface, the more rapid in proportion is the loss by attrition, for the same amount of work done.

No existing system grapples with the fundamental question of recoinage so as at the same time to prevent the weight of coin from falling below a minimum limit, to protect nations against the derangement of a great recoinage, and to insure the last owner from the infliction of an unjust penalty.

* On International Coinage; Report, pp. xiii, xx.

In France no law regulates the weight at which the gold coin ceases to be a legal tender; *aucune loi n'a déterminé le poids au-dessous duquel une pièce d'or perd son cours forcé.**

The United States have "no legal limit of wear." Belgium does not receive gold coins at the treasury reduced more than ·005 of their weight below their tolerance, namely, ·002. Italy has the same limit.

This precaution only repels the coin from the treasury. England now takes certain precautions; gold coins, less by ·0063 than the standard unit weight, if taken to the Bank of England, or offered to the revenue departments, are cut and cannot be reissued. The loser has, however, by paying 4*d.* a sovereign, 6*d.* for two half sovereigns, the option of getting coins of at least legal weight for his cut pieces from the Bank of England; thus at this rate the loss on sovereigns is 1½ per cent., on half sovereigns 2½ per cent. On large amounts the loss is about 1·69 per cent. on light gold; as only 77*s.* 6½*d.* an ounce is given by the Bank for the metal, and this loss of price, with the loss of metal, amounts to something like 4*d.* a 1*l.* on sovereigns and half sovereigns taken together.† It is a heavy item of loss; and in the year before last, on the light gold sent to the Bank of England, the loss of one bank came to 6,716*l.* The loss was at the rate of 0·157 per cent. (or ·001571) on all the gold sent to the bank; and 1·363 on the light gold.

Thirty-five to 40 per cent. of the sovereigns and half sovereigns paid into one bank in London were light, while of the gold coins paid into its branches 40–50 per cent. were light, and below the legal tender standard.

By the estimate of Professor Jevons, one in every third sovereign in circulation in England is below the legal weight.‡

The banks, as a general rule, have to take coin, as it is paid to their customers' accounts, at the full nominal value it had in circulation; and they are placed in this cruel dilemma: they have either to submit to a dead loss, or, knowing it is no legal tender, to circulate or keep back the light gold, at some sacrifice of interest, until it can be sent again into circulation. How this is accomplished nobody is particularly interested in clearing up. It is a mystery; but it has been ascertained that the lean kine usually find their way into the green pastures of England or the mountains of Wales, while the fat kine wander away, and fall by the pure accidents of commerce into "the melting pots" at home or abroad. Whoever wants sovereigns to send abroad, naturally procures them of at least legal weight from the Bank of England.

As 20 franc and 10 franc pieces are smaller than sovereigns, they wear away for the same work more rapidly. But of their actual state no returns have been published. The States in the convention, do not engage, it is true, to accept each others coins after they have fallen ·7 per cent (·007) below the standard weight. This is all, and this we have seen is not enough. The only certain measure for withdrawing light coin from circulation is, for each state to receive back legitimately worn coins at the initial value, and to exchange them for coin of the legal weight. No charge can then be made for recoinage; so, to be self-sustaining, the cost of renewal in perpetuity must be levied once for all on the new coin created at the time of its conversion from standard gold into money.

Under the present system the exchanges apparently give little intimation, so long as enough coin of full weight can be procured for foreign export.

Light coin must remain in circulation until public opinion calls aloud for a recoinage at great inconvenience, as well as at a heavy cost: that is the dark impending cloud. There is the alternative which is in use in

* International Coinage Report, Appendix, p. 244, and the pages following.

† See Table X., p. 277.

‡ Journal of Statistical Society, December 1868, p. 456, vol. 31.

England, where a light sovereign, after remaining an indefinite time in circulation, and after passing through a thousand hands, is delivered up at the Bank of England, and cut, the owner incurring a fine of *fourpence*, for all the loss it has incurred in metal and value, inasmuch as it is impossible to recover from each successive owner his adjusted share of the wasted coin.* The fine on two light half sovereigns is 6*d.* by the bank estimate.

There is a third course open, and it meets both the exigencies and the equity of the case. It preserves the coin perpetually in its integrity. It consists simply in charging the cost of construction and reintegration on the coin itself. It is applicable to every nation; but to show its operation, I take this country. Here if the Bank of England, instead of charging something less than a halfpenny on the metal of every sovereign before it is made, and 4*d.* on it when it is cut, levy the same sum on it at the date of its issue, say 4*d.* 38, the charge of 1*l.* 825 per cent.† by the Master of the Mint's estimate, will if invested in a coinage fund at 3 per cent. compound interest, provide for all the recoinages in perpetuity, and for the loss of gold by wear. The coin falling in only passes through the Bank and the Mint, again to be launched into circulation in all the freshness of youth. As the coin wastes and loses value yearly, the fund grows, and at the end of the period the growth on the fund balances the waste.

Colonel Smith, and Mr. Graham the Master of the Mint, one of the most eminent chemists in Europe, whose recent loss science deploras, first called attention to this view; they set down the cost of making the first sovereign at a halfpenny (or £·0021); they assume with Mr. Jevons, that at the end of 18 years,‡ the average sovereign will have fallen *below* the legal weight, and will have lost 1½*d.* of its gold (or £·0063); to replace this lost metal, and to recoin the second sovereign in succession, will cost 2*d.*; the same charge will recur on this estimate at the end of every 18 years. Now the present value of the halfpenny payable down (£·0021) and every 18 years ever afterwards, is by their estimate, reckoning interest at 3 per cent., 1½*d.* (or £·0051); and the present value of all the gold to be periodically replaced is 2½*d.* (or £·0089); the value of the whole of the two series of fines for ever is thus by their estimate nearly 3½*d.* (£·014.)§ The two half sovereigns in circulation cost apparently for coining and wear three times as much as the sovereign; for they fall below the legal weight in less than 10 years.¶ The small 20 franc and 10 franc gold coin labour under the same disadvantage.

The cost of coining varies with the quantity and the size of the pieces, so does the loss by attrition; but let it be assumed that the mean cost of coining gold, including the bank charge for loss of interest, will be at the rate of £·0027218; of restoring the lost gold £·0081378; then the present value of these periodical payments, commuted once for all, is £·01818 nearly; that is ⅓ part of the weight of gold, or one out of every 55 coins. Whether this charge, which is undoubtedly sufficient to cover the cost of sovereigns, would also cover the cost of the smaller coins, experience and expert Mint masters alone can determine.

An example will show more clearly than any description, the operation of the principle in practice.

* By the Queen's proclamation her subjects are required to "cut, break, or deface" sovereigns of less weight than 122·5 grains, half sovereigns of less weight than 61·125 grains, dated June 3d, 1842.

† $100 \times 4 \cdot 38 \text{ pence} = 438 \text{ pence} = \text{£}1 \text{ } 16\text{s. } 6\text{d.} = \text{£}1 \cdot 825$.

‡ After this was written I obtained from the Bank of England data for more accurate determinations of the rate of wear and of the cost of sustaining the coinage, but these numbers serve well enough for the argument. See Introduction to Gold Coin Circulation Tables, pp. 261-8.

§ See Jevons in article above cited, and return to Order of House of Commons, article "Gold currency," dated 28th June 1869.

Assume that 11,000,000 pieces of any kind are to be coined; I take for illustration sovereigns, merely to fix our ideas; the bar gold is sent to the mint in the exact quantity required; and the gold is returned in the shape of 11,000,000 sovereigns, at a cost of 200,000*l.*, which is paid at once to the credit of the coinage fund,

Of the 200,000*l.* there is paid
for the coinage of 11,000,000 pieces 29,940*l.*; which being deducted,
leaves 170,060*l.*; to be invested at 3 per
cent. compound interest;

and this yields of interest in 18 years 119,455*l.*

Then the coin returns for recoinage which has lost of gold 89,515*l.*;
and with the cost of the coinage = 29,940*l.*

amounts to 119,455*l.*; absorbing all the interest, but leaving 170,060*l.* still invested in the fund to maintain for ever the 11,000,000 new sovereigns in their integrity.

It is scarcely necessary to say, that in practice the pieces return at irregular intervals, and that the wear and cost vary under a great variety of circumstances. The cost I have assumed is higher than that given by the masters of the Mint. I have shown, at page 265, what the cost would be under the existing system.

It is probable that an international coinage could be well sustained under this charge; and it will be observed, (1) that in England the reduction of the standard from its exceptional scale of ⅓ fine, to that of ⅓ in general use at other mints, and unanimously adopted by the Conference in Paris, will supply out of the bar gold used in coining 11,000,000 existing sovereigns of full weight, the whole of the fine gold required to make not only the 11,000,000 sovereigns, but the 200,000 more of the new standard; so as thus to constitute the fund without any charge to the state; and as in future the holders of bar gold must send of the new standard gold the weight of 11,000,000 sovereigns; and must pay besides 200,000 sovereigns to get the 11,000,000 coined, the value of the new coin will be the same as the value of the old coin, so far as the value depends on the cost of production; for the same amount of fine gold will be sent then to the Mint as is sent now to procure the same number of sovereigns. And to each person holding a new sovereign the gold in the fund will virtually belong, as it will be there to secure him against the losses from light coin to which he is now exposed. The same reasoning will apply to ten-gram Victorias.

Under this system the price of bullion will be limited; it will fluctuate as the demand and supply of coin and of bullion respectively vary; but in the normal state 108 Victorias of *ten grams* each will purchase 110 decagrams of standard gold; and the price of 110 decagrams cannot fall for any time below 108, nor rise much above 110 Victorias, for obvious reasons. For on the one hand the holder can get 108 Victorias for 110 decagrams of standard gold from the Mint; and on the other hand if the price in coin, of bar gold rises till it touches 110, the 110 coin of full weight will contain 110 decagrams of gold; there will only then remain to give it the value of bar the cost of its conversion. If the coin is light, in this latter state of the market only, when coin is only worth its weight in bullion, can the price of bar gold rise to any extent, or until the fine metal in the 111 or more light Victorias exceeds 110 decagrams in weight. And it is only when this limit is reached under a mintage that coin can be melted with profit. When the coinage is gratuitous, that is, when bar gold is worth its weight in coin, a slight fluctuation in the price of bar gold renders it profitable to convert the coin, provided that it is of standard weight, into bullion; while worn coin is protected by its weakness and lightness from destruction.

3. How gratuitous coinage began in England.

The coinage of England has been depreciated at various times. And our famous *pound* (*libra*) wears indeed a misleading air about its look. The very name recalls its fallen condition. Instead of a loyal pound of any precious metal it now represents only the one third part of a pound troy of silver, and only $\frac{1}{46.725}$ of a pound of the present standard gold. The scales determined what a pound meant down to the reign of Edward I.; but to answer his celebrated question; "what is a pound?" in the House of Commons Sir Robert Peel had to hold up a "sovereign."

But all these things are relative, and in the presence of the International Congress, I dare venture to assert, that English money has been maintained in a state of integrity which has been rarely equalled in other states. Thus M. Denis has shown that at the French Revolution the *livre* of Charlemagne had dwindled down to a nominal *livre*, containing 1-78th part of the silver in the standard from which it was drawn. From the *livre* the franc is derived.

The reigns of the Stewarts are not the brightest in the financial history of England. And it was in the reign of Charles II. that the statute passed by which Ruding says it was enacted, that the "whole expense of coinage was to be defrayed by the State." This is only correct in a qualified sense. The statute "for encouraging of coinage" enacts, that any person whatsoever, who after December 20th, 1666, shall bring "Crown or standard gold" to the mints, shall get it assayed, melted down, coined; and shall receive in exchange for it, without any charge or diminution, a pound troy of the current coin of the same standard; the same for silver. By a special clause, not unnecessary then, the gold and silver so brought into the Mint were exempted from confiscation. The preamble as the ground of the measure asserts two things: (1.) "it is obvious that the plenty of current coins of gold and silver of this kingdom is of great advantage to trade and commerce;" (2.) For the increase of which his Majesty had been pleased out of his revenue to bear half the charge of the coinage of silver money. To prevent this charge to the King, and to encourage the coinage of gold or silver in mass or in manufacture brought from home or from abroad, they granted him certain duties upon wines, brandy wines, strong waters, vinegar, cyder or beer, "imported from any parts beyond the seas, or Scotland."

The cost of making coin had hitherto been borne by those who used coin; and none of the great sovereigns or parliaments, neither William I., Henry II., Edward I., Edward III., Elizabeth, nor Cromwell, had attempted to throw the charge of coining on any other classes of the community than the merchants or "goldsmiths," who sent the metal to be manufactured for sale. The charge for the rude gold coinage had formerly varied; but it had rarely exceeded 2.6 per cent., and remained steadily at that figure for 40 years, until it was abandoned in 1666. The nation had been plunged at the close of Clarendon's administration into a war with Holland and France; the plague and the fire of London caused disquietude; and coin was hoarded, or exported to France, Holland, and India, where gold and silver were in demand. The measure was completely unsuccessful in its object; the same dearth of money remained, as long as the circumstances continued. If free coinage encourages the birth of coins, it increases their destruction to a still greater extent. The new coins were no sooner made than they were hoarded, as they

* 18 Charles II. cap. 5. §§ I, V, and VI.

always are in times of disquietude, or melted down into plate,* or exported by "the goldsmiths and bankers," who bought dollars at 4s. 3d. a piece, and instead of sending them to the Mint, as the framers of the Act expected, sent them away as fast as they came to hand to France or to other countries, where they sold for 4s. 10d. The light coin, as happens in the present day, remained in circulation. "Of his now Majesty's coin," declaimed Lord Lucas in the House of Lords,† "there appears but very little; so that, in effect, we have none left for common use, but a little *lean coined money*, of the late three former princes." The measure of free coinage was based on a fallacy, and failed then as it has failed since. It dispatches more coins, when bullion is in demand, than it ever creates; at other times it produces no sensible effect, as bullion is always sent to the Mint when good coin is wanted, and lives where it is not superseded by paper or by light coins.

Locke condemned the system. The fallacy was seen through at the time by one of the soundest commercial writers of his age.‡

Sir Dudley North asserts that the country gentlemen were deceived at the time; rents had fallen, and they believed, he declares, by a profound mistake, that if plenty of money was made, they must have of course a share of it.§ He does not notice the protection the Act offered against the importation of spirits and beer from Scotland and Holland; though this Parliament was thoroughly alive to that aspect of the case; for immediately before the Bill passed, it had prohibited the importation of cattle from Ireland and other parts beyond the seas, by enacting that such importation is and shall be adjudged a "public and common nuisance."||

The nature of free coinage is shown by this Act; the expense under it remains, but it is transferred from the owners of bullion and coin to the shoulders of other people. The consumers of wine, spirits, cyder, beer, and vinegar then had to pay for the manufacture of the article in which "the Goldsmiths who gained by the melting trade," trafficked. For equally valid reasons the goldsmiths might have been taxed to uphold a public brewery.

* Davenant says, more plate was wrought for use in families during the years 1666-88, than had been fabricated for 200 years before. Works, vol. I. p. 370. By his estimate made in 1698, of 18,500,000*l.* in the Kingdom, there might be hoarded 9,240,000*l.*, leaving 9,260,000*l.*, with the currency of "Goldsmith's notes," to carry on the "Universal affairs of this nation," p. 441.

† February 22d, 1671, Ruding on coinage, vol. III. p. 317-8.

‡ Sir Dudley North explains the passing of the Act in his own way: "The Crown got by the coinage duty; the Goldsmiths who gained by the melting trade were advanced to the Treasury, and favorites." Life of Sir Dudley North, p. 179, cited by Ruding, vol. III. p. 315. "He was infinitely scandalised at the folly of this law, which made bullion and coined money par." The judicious Ruding says: "The inexpediency of the provisions have been proved not only by his reasoning, but by fatal experience also." vol. III. p. 372.

§ "I call to witness," says a writer, "the vast sums that have been coined in England since the free coinage was set up. What is become of it all? Nobody believes it to be in the Nation, and it cannot well be all transported, the penalties for so doing being so great. The case is plain—the melting pot devours it all. The rather, because that practice is so easy, profitable, and safe from all possibility of being detected, as everyone knows it is. And I know no intelligent man who doubts but the new money goes this way. Silver and gold, like other commodities, have their ebbs and flowings: upon the arrival of quantities from Spain, the Mint commonly gives the best price; that is, coined silver for uncoined silver, weight for weight. Wherefore it is carried into the Tower and coined. Not long after, there will come a demand for bullion, to be exported again. If there is none, but all happens to be in coin, what then? Melt it down again; there's no loss in it, for the coining costs the owners nothing.

"Thus the Nation hath been abused, and made to pay for the twisting of straw for asses to eat."

Discourses upon Trade, London, 1691, p. 18, cited in Ruding's Annals of the Coinage of Great Britain, vol. III., pp. 371-372. These discourses are ascribed in his life to Sir Dudley North.

|| 18 Charles II. c. 2.

In the year 1816 the mintage on silver coin was reimposed, and it was thus put on a sounder footing. The Mint buys silver at the market value; coins it; sells it coined at 5s. 6d. an ounce; and restores the defaced by new coin. The average cost of standard silver in the ten years 1858-67 was 5s. 1½d. an ounce, or 3·073l. per lb. troy; and the annual surplus on the silver coinage of 355,472l. was 18,304l., after providing for the annual replacement of 102,740l. of worn coin, which* weighed only as much as the silver coined in 89,012l., and had thus when withdrawn from circulation by the Bank of England, to be sent to the Mint, lost 13·362 per cent. of its original weight.

The Mint has a profit, after deducting the cost of the coinage of silver; but the gain is reduced by the loss on worn coin; of which it is only called apparently to replace a certain proportion, otherwise it might gain little by a seignorage of 7 per cent. Whatever may be the case, the principles of a first charge for making and for replacing for the future the silver coin, is sound.

Not so the coinage of gold. This metal was still to be coined for nothing. The wisdom of the authors of the Act is evident on the face of it. When it passed in 1816 the average price of the gold in a sovereign was 24s., yet the Act made it a misdemeanour, to be punished by imprisonment, to receive or pay more than 20s. for this coin, as this was declared to be "its true lawful value."† 7,137,710l. in sovereigns and half sovereigns were forthwith issued from the new Mint, but they suddenly disappeared, and the issue was stopped for nearly two years, until cash payments were resumed in 1821. This was a foretaste of what has happened since. The Mint Committee of Privy Council in the report on which the Act was based, endeavoured to fix on a rate to protect the new silver coins from "the danger of being melted down and converted into bullion when the market price of silver rises."‡ Why was not the same protection thrown over gold?

4. *Current Coins should be simple weights of the precious metals.*

Money to be a just measure of values takes for its basis a given weight of gold or of silver; and the most eligible measuring unit is a weight in common use for other purposes. It was a *pound* of standard silver, an *ounce* of silver, a *pennyweight* of silver,§ when that metal was the measure of values. The size of units of all kinds should be taken so as to express the quantities to be measured with sufficient accuracy without fractions in numbers easily comprehended by the mind. When the units are no longer simple weights they still serve as money, they are counters, and if they are called marks, napoleons, dollars, gold-francs, or any arbitrary name the connexion between value and weight of precious metal not being readily tested is easily lost. The silver, the gold, in difficult times, before the currency of notes, dwindled until it almost disappeared in debased coin. This financial legerdemain M. Michel Chevalier ascribes too exclusively to the "kings" of the middle ages, who indeed in France reduced the livre of silver to a hundredth part of that weight, and in England pared down the silver penny to a third of its original penny-

* The Mint in the 10 years 1858-67 coined 12,926,262 ounces of standard silver; of which 3,236,802, at a cost of 1,027,400l., were drawn from worn coin; while 9,689,461 ounces were bought in the market for 2,481,548l. The silver in the market cost 25611l. an ounce; the silver in the worn coin 31741l. Deduced from Return to order of the House of Commons, 18th June 1868, No. 340.

† 1816. 56 Geo. III. c. 68. s. 13. McCulloch's Commercial Dictionary, articles "Coin, Bank." Ruding on Coinage, vol. iv. pp. 148-152.

‡ The Report is published in the Annual Register, vol. lviii. p. 439-441.

§ The Anglo-Saxon penny was a pennyweight of silver: it was thus in silver nearly our threepenny piece.

weight.* He justly denounces the "despoiling doctrine" that gave "kings" the divine right to "falsify money;"† but these "kings" of the dark ages either openly reduced the weights of coins, or in them surreptitiously substituted base for precious metals; they had not at hand bank notes, which have since been discovered, are so easily manufactured in profusion, and are so readily debased by rendering them inconvertible. This financial sleight of hand is now made easy.

And unhappily the practice of circulating base money is not confined to kings nor to the dark ages. It has been practised by governments of all forms with the sanction of nearly every nation. The French Republic at its birth flooded the nation with assignats. The English legislature for twenty-six years (1797-1823), relieved the Bank of England from paying its notes in cash. At the present hour five of the great states of the world circulate debased paper money, Russia, Spain, Austria, Italy, and the United States of America. The United States paper is at this time depreciated 25 per cent., and is liable to violent fluctuations. An eloquent speech of senator Sumner sent it down at once as low as 30 per cent. An orator's breath thus carries up or down this paper money, upon which contracts turn.

Copernicus, who divined as clearly the true system of money as his genius divined the system of the heavens, opens his remarkable treatise by declaring that, innumerable as are the evils which ruin kingdoms, the following four are the most fearful,—civil war, pestilence, famine, and base money. The first three are evils evident to everybody, the evil of depreciated money is only evident to a few, who take it seriously to heart, because it does not by a blow, but imperceptibly, like a slow poison, subvert commonwealths.‡

It is impossible to exaggerate the evils of a currency of base coin, and still less of inconvertible paper; it makes the measure of value arbitrary, and renders contracts extending over any length of time difficult, if not impossible; gold is swept out of circulation, credit is sapped at its foundation; violent fluctuations in prices are inevitable as the equilibrium is unstable; stocks can have no fixed value; government securities are depreciated, as it is impossible to be certain whether the public dividends will be paid in paper worth its nominal value in gold, or in paper worth half that value, or in paper worth nothing; the creditor is at the mercy of the state debtor, which can, under the cover of inconvertible paper, hide its most flagrant delinquencies. The present unsettled credit of Europe is mainly due to the fact that the rouble in Russia, the florin in Austria, the lira in Italy, the dollar in America, are not given weights of the precious metals, but promises to pay, which, like Iago's purse, may be something or nothing, full or empty, at any distant date.

The issue of debased money, which inconvertible paper inevitably becomes, is the worst financial resource to which a nation in war can resort; it is a sweet and poisoned beverage in the hand of an athlete.

And the only remedy for this dangerous evil is economic practical education: the currency of inconvertible notes will we may hope not long be tolerated when the people understand by daily use that standard

* The Tower pound of silver—of 240 pennyweights—(= 225 Troy pennyweights) ($\frac{222}{240}$ fine) was coined into £1 of 240 pence at the Conquest; and in Elizabeth's reign (1560) the Troy pound was coined into 62 shillings = 744 pence. Since the year 1816 a Troy pound of silver has been coined into 66 shillings = 792 pence.

† La doctrine spoliatrice qu'avaient mise en honneur les rois du moyen âge, et par laquelle ils s'arrogeaient le pouvoir de falsifier les monnaies.—*Journal des Economistes*, tome xii. p. 200.

‡ *Traité de la monnaie de Copernic*, for the publication of which we have to thank M. L. Wolowski, Guillaumin et Cie., p. 48.

genuine money consists only of known weights of standard gold or silver, and find that promises to pay are snares and delusions unless they are kept. The issuing states suffer most from the currency of debased money, but they are not the only sufferers; the credit of all nations is deranged and the whole world will derive benefit from a sound international coinage to which all nations are parties.

5. *The ten-gram (decagram) of standard gold = the Victoria = the 25-shilling piece.*

The gram is a weight in daily use among the people of France, Italy, Switzerland, and Belgium; its multiples are in all their shops and houses. A coin of standard gold weighing ten grams could be appreciated and be tested by them at any time. The weight of a napoleon, of 6.4516 grams, or a 25-franc piece, of 8.0646 grams, is expressed in fractions, not easily comprehensible, while a ten-gram coin of standard gold is perfectly intelligible, and its weight is easily determinable. Under these circumstances no one can be surprised that Cobden's friend, M. Chevalier, one of the highest French economical authorities, should propose a *ten gram gold unit* as the basis of the monetary system of the world. The metric system of weights and measures will in the end be inevitably adopted, like the Arabic figures, by every civilized nation. That system is the real glory of France, which none can contest or deny, but the glory is incomplete so long as the measuring unit of value is not the gram, or the ten gram weight of standard gold.

Contracts to pay sums of money will be free, but on this plan the amounts will always be expressed in weights of gold, or in weights of silver if that metal be expressly specified in the bond. Thus the question of double standard will be solved, and the exigencies of China, India, and silver-circulating European nations may be consulted by a common silver coin in weight connected by a simple factor with the gold unit.

The ten gram gold unit of money necessarily differs from any of the units now in use; it will be a new international coin; but its scientific basis commends it to the philosophic minds of Germany, Holland, Scandinavia, and Italy; while it has accidentally strong claims on the three nations which coin the largest quantities of gold. France has in it a kind of paternal interest; it is the natural development of her scientific system of weights and measures. The English sovereign weighs almost exactly eight grams; and the passage to a ten-gram coin is easy, as the new coin decimally divided embraces two of the principal subordinate silver coins in use in England. A ten-gram gold coin is almost the exact equivalent of a six dollar American gold coin. The new scientific coin is a natural development of the English and the American coinage, corresponding in increase of weight with the increase of the existing quantity of gold and the increase in the values of commodities to be measured.

I will endeavour to show how the new unit is deduced directly from the basis of the metric system, and how readily it can be adjusted by slight variations of fineness to our own existing system of money.

All the units of the metric weights and measures are based on one fundamental unit, the metre.

The unit of weight is the *gram*, which is deduced from the weight of a cubic centimetre of distilled water at its maximum density. It would, therefore, be in strict analogy with this system to take a *gram* of standard gold as the unit of the measure of value; for then, as a cubic centimetre is the volume unit; the weight of its volume of water, the weight unit; that weight of gold, or a multiple of it, would be the unit measure of values. This would be simple, logical, and in strict accordance with the basis of the

metric system, which renders the passage from linear and superficial to cubic units, from cubic units to weights, so easy. The idea of weight is totally different from the idea of volume; but the two are connected by the intervention of water: so the idea of value is totally different from the idea of weight, but the two are connected by the intervention of standard gold. Then the unit of work—a kilogram lifted a metre in a second, and the measure of the value of that work would be alike connected with the metric system.

France could not make the gram of silver, as it was too minute in value, her prime money unit, and at the time the metric system was instituted gold was only considered a subsidiary to the silver coinage: by the law of the year XI, France made the franc of 5 grams weight, 9 tenths fine, her money unit: "5 grammes d'argent, au titre de 9 dixièmes de fin, constituent l'unité monétaire, qui conserve le nom de franc," are the words of the law. The franc remained the money unit in use until the gold discoveries threw for a time silver aside in France, which virtually has had the double standard. Debtors having the option of paying in silver or in gold, upon the assumption that 100 grams of silver are worth 6.4516 grams of gold, choose to pay in gold when that metal is depreciated, as they pay in silver when silver is depreciated. The five franc piece contains its 9-tenths of fine silver: the franc is lowered in standard now, as it contains only .835, instead of .900 fine silver. The franc is now a debased counter. The 20-franc gold piece, containing 6.4516 grams of standard gold 9-tenths fine, cannot be made in any way to square with the metric system; so that here France completely breaks down in carrying out her own sound principles into the most important of all the fields of their application. The monetary convention too, in which France was the leader, accepts the double standard, with its complications, and its incongruous assumption that gold is worth at all times $15\frac{1}{2}$ times its weight in silver. The *gold franc unit* (= 0.32258 gram) is justly pronounced by M. Michel Chevalier to be "complètement en dehors du système métrique." He adds forcibly: "En sorte qu'il serait aussi raisonnable de recommander au monde, pour l'unité de mesure des capacités, le boisseau de Winchester ou celui de Cologne."* The Paris conference of delegates of 20 states made an unanimous declaration in favour of one gold standard, of which Mr. Chevalier approves; and he himself argues in favour of a return to the ancient principle of coining a given weight of the standard metal as the unit of value. It was a *pound of silver*; it should now be a *gram of gold*, or some of its decimal multiples. The gram of gold, he says, is too small for use; the *ten gram* piece of gold would be of a convenient size. It would be a larger finer coin than the twenty franc piece: and the five gram piece as well as the two gram piece would be larger, and more convenient for use than either the *ten* or *five* franc coins. Accounts could be kept either in the gram or the ten gram unit; and their decimal submultiples, according to the magnitude of transactions.

The principal commercial witnesses before the Royal Commission, and the commissioners themselves, attach the first importance to the fact, that contracts to pay in money should imply contracts to pay fixed weights of fine gold. Now it happens that the English sovereign does weigh, as it comes from the Mint, very closely on 8 grams; it may by the tolerance indeed exceed 8 grams. By simply adding only a small fraction of a grain ($\frac{1}{5}$ grain) to the alloy, leaving the fine gold precisely in its present quantity, we get the sovereign theoretically, as it is practically, 8 grams in weight; the half sovereign 4 grams; the half of this again 2 grams, worth a crown, and consequently the gram worth half-a-crown, an old favourite.

* Journal des Economistes, Novembre 1868, pp. 185, 187. Article by M. Michel Chevalier, "De l'Establishment d'une Monnaie Universelle."

	SOVEREIGN.		25 FRANC PIECE.		VICTORIA DECA- GRAM.	AMERICAN 6 DOLLAR PIECE.
	Weight.		Weight.		Grams.	
	Grains.	Grams.	Grains.	Grams.		
Fine gold - - - - -	113·001	7·3225	112·006	7·2581	9·0000	9·0282
Alloy - - - - -	10·273	·6657	12·446	·8065	1·0000	1·0082
Standard Weight - - - -	123·274	7·9882	124·452	8·0646	10·0000	10·0314
Tolerance of Weight - - -	·257	·0166	·249	·0161	·0200	—
Fineness - - - - -	Factor of Tolerance $\frac{1}{100} =$ ·002083; fineness ·916.		Tolerance ·002; fineness ·900.		Fineness ·900	Fineness ·900
Gold in Value of the Coin - -	20s. exact value.		19s. 10d.		24s. 7d.	
Seignorage - - - - -			2d.		5d.	
			20s. 0d.		25s. 0d.	

The English Mint could any day coin 8 gram sovereigns and all their sub-divisions down to 2 grams without any difficulty, and it could go a step further by coining a 5 crown, that is a *five and twenty shilling* piece of 10 grams (.9153 fine). It will be a new guinea; a guinea amplified, beautified, and decimally divisible into convenient subordinate units. The prime gold unit will thus be enlarged as the gold in use is augmented. We should have three subordinate units; the gram (*guilder*) occupying the first decimal place, would be the equivalent of the half crown; the decigram equivalent in value to the threepenny piece, and the centigram equivalent in value to the tenth of a threepenny piece = a cent = 1·2 farthing = ·3d.: so that 5 of the new cents would be of the same value as 6 of the present farthings = threehalfpence. The money of account of all denominations would be gold. Accounts of money and weights of gold would be represented by the same figures.

100 of the grand gold coins would weigh a kilogram; and as 1000 kilograms are a metric ton, 100,000 new coins would be a metric ton of standard gold.

If the mint assay and stamp kilograms of standard bar gold so as to guarantee the fineness, these kilograms of gold will be convenient forms of bullion, available for exportation, or for deposit in banks. A thousand kilogram bars weigh a metric ton; worth, while no mintage is charged, 100,000 of the great gold coins. A *million* of these coins (= 1,000,000) would weigh ten tons of standard gold, and be worth a million and quarter pounds of the present sterling.

The multiplication of pounds sterling by ·8 converts them into the ten-gram gold coin. The specific gravity of a new sovereign is 17·58, water being *one*, and this enables us under the metric system to pass from value to weight, from weight to volume.*

Accounts are now kept in England in four units, (1) pounds, (2) shillings, (3) pence, (4) farthings. Under the ten-gram gold coinage accounts may be kept in two columns. Thus the following tables (XI. and XII.) show

* Thus a cubic metre of standard gold containing 1,000,000 cubic centimetres would be worth 1,758,000 of the new gold coins; and a metric ton of standard gold would be $\frac{1,000,000}{17·58} = 56,883$ cubic centimetres = a bar 1 decimetre deep and 8 decimetres long by 7·11 decimetres wide.

the expenditure of different countries and its proportion to the population under the two systems.

To illustrate the new *ten-gram gold coinage* I give in the annexed tables the revenues of some of the principal states of the world in their present coins, and in the proposed international coins.

The annual state expenditure of 432 million people was 456 million of these ten-gram Victorias (5 crown pieces), that is a little more than a Victoria a head, or more exactly one Victoria and 55 cents a head = one Victoria, 5 threepennies, and 5 cents = one Victoria, 5½ old English pennies. (See Tables XI., XII., and XIII., pp. 278-280.)

6. Changes in the English Coinage under the Ten-gram gold unit.

The ten-gram unit of gold .915 fine*, instead of .916 fine, would contain exactly the same quantity of fine gold as 1¼ sovereign, worth five-and-twenty shillings in the present currency; and if the Mint and Bank cost of making and sustaining the gold coinage is fixed at 15, 10, or 5 centigrams of fine gold for every decagram, the fineness will be .900 or .905, or .910: while the amount of fine gold taken as seignorage will be worth from 5d. to 3d. or to 1½d. in the present currency, which will be as much a part of the cost of production as the expenditure at the gold diggings. The cost of producing 9 grams of fine gold is expressed in our currency by 24s. 7d., so that if the Mint and Bank cost of converting ten grams of standard gold (.900 fine) into a coin, and replacing its wear, is expressed by 5d.; the value of the ten gram coin current is 25s., of which it will be the equivalent so long as the customer of the Mint has to send 915 grams of fine gold, or its equivalent in money, for every 10 coins he gets, each containing 9 grams of fine gold.

At the International Conference suggested by the Royal Commission this question of a universal standard of fineness and of seignorage could be settled; and whatever the decision may be the change will cause but slight and temporary inconvenience in this country.

7. Gold Coins.

England can at once coin the sovereign of 8 grams of standard gold with the slightest possible inconvenience, and without changing its content of fine gold. The half sovereign will weigh 4 grams. A gold crown of 2 grams might also be coined.

The only new coin necessarily required is a fine five crown gold piece of 10 grams, which would probably in time get into circulation as a sort of new guinea, even if it were not at once stamped as the international coin. Large coins are generally more popular than small coins.

Once accepted as the international unit the 10 gram piece might with advantage become the basis of a decimal money of account for England; the gram of gold, the decigram, and the centigram being the subordinate units, to be represented with some of their multiples in gold, silver, and copper coins. The English standard gold coins under this system are the coin to be called Victoria or some other name (10 grams), the sovereign (8 grams), the half sovereign (4 grams), the crown (2 grams), and lower than this it is useless to go as the coins in gold become too small for use. The sovereign and the half sovereign in England might ultimately be replaced by the gold Victoria and its half. In France the Napoleon of 20 francs, still circulating—if brought into this system—would weigh 6·400 grams; it would in due time be superseded.

* The exact fineness is .9153, but assayers cannot work to this pitch of accuracy.

8. Silver Coins.

Silver coins if they cease to be a legal tender will be under the single gold standard counters; there will be no inevitable restraint on their weight or fineness, and they need not be at first international.

In England the silver coins will represent the same proportions of the gold unit as those now in circulation; but a slight change in weight is required. The silver crown weighs 28.2759 grams .925 fine, and contains 26.155 grams of fine silver. Now the mint purchases standard silver at rates ranging from 5s. 0d. to 5s. 2d.*—say 5s. 1d.—an ounce of 31.1035 grams; so that if it coined silver without charge, the crown should weigh 30.594, the half-crown 15.297 grams. The half-crown now coined actually weighs 14.138 grams; the difference is the mint charge (1.159 gram). The fine silver in the half-crown weighs 13.078 grams. By making the half-crown exactly 15 grams and of the same fineness as the five-franc piece, namely .900, it will contain 13.500 grams of fine silver; that is, it will weigh more by exactly 0.862 gram, than the present half-crown, and it will be better, as half the addition (.422 gram) will be in fine silver. The mint will still retain under this arrangement 4.59 per cent. of fine silver—one shilling in 21—as the cost of coinage. Then the silver crown will weigh exactly 30 grams, the half-crown 15 grams, the florin 12 grams, the shilling 6 grams, the sixpence 3 grams, the threepenny 1½ gram; and there the silver coinage will stop. Five crowns will contain the same amount of fine silver (150 × .9 = 135 grams) as six five-franc pieces.† A florin will contain nearly the same weight of fine silver, 10.80 grams, as the rupee, 10.69 grams.

This is only one of the ways in which the object may be obtained of making our silver coins simple multiples of grams of standard silver by varying the fineness. The French have the standard of .900 fine for their five-franc piece, and the lower standard, .835, for the franc itself and the other silver coins. By making the half-crown of 15 grams .872 fine, it will contain the same amount of fine silver as it contains at present (13.078 grams), and the Mint will get its present profit. If the silver coin were of the same fineness as the gold, the one gram of gold would, at the common market value, purchase 15.5 grams of silver;‡ but as the expense of coining silver is necessarily greater than the expense of coining gold of the same value, the weight of fine metals in the gold and silver coinage should be in a lower ratio (say 1 to 15), to compensate for the difference in the cost of production.

9. Bronze Coin.

The silver threepenny piece represents a decigram of gold, and is the equivalent of 12 farthings of the present currency. The centigram of gold is the lowest unit of value recognized in the new system of account, and it may for the sake of brevity be called a *cent*. The United States' cent. is their lowest unit; it is worth nearly two English farthings, and is too large to express the graduated prices of articles of small value. The French centime, on the other hand, is too small a unit for general use in Europe; it is the fifth part of the lowest American unit; and only $\frac{2}{5} = .4$ of our present farthing. Now the value of the centigram of gold is the mean between the value of the American cent (2 farthings) and the French centime (0.4 farthing) = $\frac{2.0 + 0.4}{2} = \frac{2.4}{2} = 1.2$ farthing = 1 centigram

* Report on International Coinage. App., p. 228.

† In North Germany 8 dollars weigh more than 148 grams of silver, .900 fine. In South Germany 14 gulden pieces are the same weight.

‡ 7.3225 grams of fine gold in 1l. purchase 113.1950 grams of fine silver, if standard silver .925 fine is 5s. 1d. per oz. troy; consequently the ratio is 1 to 15.46.

of gold. This *cent* is a convenient low unit and is admirably suited to use all over the civilized world.*

The small centigrams of gold will be represented by bronze coin. The value of the copper coin was formerly expressed in the weight of metal, but this is no longer the case; the bronze in the English penny is worth about a farthing. The three coins in use are convenient counters; and the farthing and halfpenny are usually in accounts written as $\frac{1}{2}$ or $\frac{1}{4}$ of a penny. The ten-cent piece, now in use as a threepenny silver coin, will be conveniently supplemented by bronze coins of 1, 2, 3, 4, and 5 cents; the 5 cents being the half of the silver 10 cent piece would correspond to three halfpence of the present currency. The *cent* will supply a better graduated scale to express prices than the farthing, halfpenny, and penny, and popular demand will soon determine how many of each coin should be struck. Bronze coins of three sizes are now unnecessary, as no attempt is made to express value by weight. One type of coin—inscribed with one cent, two cents, three cents, four cents, and five cents may suffice. They will form part of the decimalized currency. I annex a scheme of the coins.

10. Coins and their Signs.

The money of account it will be borne in mind is, on the new system, in standard gold, and runs thus:

STANDARD GOLD UNITS OF ACCOUNT.				
Signs	∇	s	d	c
Victoria	-	10 grams	=	100 decigrams = 1000 centigrams.
Sol (Halfcrown) (SOLIDUS or GUILDER.)	-	1 gram	=	10 decigrams = 100 centigrams.
Denier (Threepenny) - (Denarius or Denny in short.)	-	1 decigram	=	10 centigrams.
Cent	-		=	1 centigram.

Every one of these four weights of gold may be employed as a measuring unit.

Call, after the analogy of "Guinea" the prime unit or decagram a *Victoria*, as it is the name of a principal gold field; then, where large units are required, ∇11.875 will be read 11 Victorias, 875 cents; or as we are accustomed to three units £ s. d. we may read ∇. s. c.; ∇11. 8. 75 = 11 Victorias, 8 sols, 75 cents; and on the continent where two units are preferred, 118 sols, 75 cents. For smaller sums cents alone suffice; for instance, we may say the price of a loaf of bread is 22 cents; of a pound of beef 30 cents.

Although the coined shilling only consists of eleven pennyworth of silver, it exactly represents in an account *twelve pence*, or the 20th part of a gold sovereign; and a penny, consisting of a farthing's worth of bronze, represents the value of the 240th part of a sovereign. So, under the gram system, half-a-crown in silver, weighing 15 grams, represents *one* gram of standard gold; a threepenny piece (10 cents) represents the tenth of a gram—or a *decigram* of gold; a bronze cent represents a *centigram* of gold. Value is invariably expressed in weights of standard gold, which are conveniently represented in tangible manageable silver and bronze tokens.

* "The division of the franc into 100 centimes is simply nominal" * * In accounts we find $2\frac{1}{2}$ centimes practically set down as the lowest figure; balances under this amount being ignored, and over the amount counted for the full sou." [Seyd on Exchanges, p. 691.] The new cent is = $2\frac{1}{2}$ centimes. Mr. Yates, who has done so much to promote the introduction of the metric system here, shows that there is a demand for centimes in France, Italy, and Belgium, and for smaller coins in Asia; a half centigram piece meets this case; indeed milligrams may be represented by bronze coins. [See Eleventh Report of International Association, British Branch, Appendix, page 67. Paper by James Yates, F.R.S.]

The coins may be thus described: The four fundamental units are printed in **antique** letters:

Standard Gold:

Victoria	-	-	Weighting 10 grams (a new coin).	
Sovereign	-	"	8 grams	} Existing coins to remain in circulation for a time.
Half Sovereign	-	"	4 grams	
Crown	-	"	2 grams (a new coin).	

Standard Silver existing coins to remain in circulation, and to be gradually replaced:

				Grams of Gold.	Worth
Crown	-	-	Weighting 30 grams	-	2.00
Sol (<i>Halferown</i>)	-	"	15 grams	-	1.00
Florin	-	"	12 grams	-	0.80
Shilling	-	"	6 grams	-	.40
Sixpence	-	"	3 grams	-	.20
Denier (<i>Threepenny</i>)	-	"	1.5 grams	-	.10

Bronze Coins.

				Gram of Gold.	Worth	
5 cents	-	-	One type of coin with inscribed values. It is like paper money, into which intrinsic value of material does not enter.	} Weighing 10 grams	.05	
4 cents	-	-			(V.)	.04
3 cents	-	-			(IIII.)	.03
2 cents	-	-			(III.)	.02
1 cent	-	-			(II.)	.01
½ cent	-	-	(I.)	.005		
			(½.)			

(For a time the penny, halfpenny, and farthing to be utilized).

11. Economies of a great Gold Coin.

One kilogram of standard gold is now coined into 125 sovereigns,* and into 155 Napoleons. Under the ten-gram system it will be coined into 100 Victorias. (1) The expense of coining 100 pieces is less than the expense of coining 125 or 155 pieces. (2) The new coin is easily weighed wherever metrical weights are in use, as it is a round number of grams. (3) The surface of the large coins being less for the equal weight the wear is less. (4) The size is convenient, and the trouble of counting the coins is diminished. (5) The figures in accounts are fewer, and the arithmetical labour is diminished. (6) Large sums are readily comprehended by the mind when expressed in large units. (7) The half-sovereign is convenient in some cases; but to make it the largest coin of account would, for some of the reasons assigned above, be inexpedient. The inexpediency of a ten-franc unit is still more striking. The ten franc gold unit is on many grounds preferable to the gold franc unit, as Mr. Graham pointed out; but the coin in proportion to value would cost three times as much as the decagram, it would last half as long, and it would weigh 3.2258 grams.† The unit of value would not be a unit of weight, it would be 3.2258 grams of the French standard gold. This is a fatal objection to the ten franc unit as the scientific basis of a permanent system of money.

Silver coin contrasts in all these respects unfavourably with gold coin wherever large sums are in question. (1.) To represent the same value as 100 ten-gram pieces of gold weighing a kilogram, about 15½ kilograms of silver are required; more by 6 lbs. than a quarter of a hundredweight. To weigh it in scales is a task. Silver is about 20 times as bulky as gold of the same value. Its coinage in France is 3 or 4 times as costly. (2.) It is less easily carried, kept, concealed in dangerous places and times.

* Exactly 125.1846.

† According to the Master of the Mint the cost of making a sovereign is now 3 farthings, and it falls by wear below the legal weight in 18 (really 16) years; two half-sovereigns cost 6 farthings, and fall below their legal weight in 10 (really 8) years.—*Return to Order of House of Commons, dated 28th June 1869.*

(3.) The silver worth 100 ten-gram gold pieces in France is coined into 620 five-franc pieces, and in the same proportion the trouble of coining, counting, and manipulating is multiplied. (4.) The silver dollar is subject to similar objections; and (5), inasmuch as many figures increase labour, confuse thought, and increase chances of error, the 3,100 francs corresponding to 100 ten-gram gold pieces are five times more objectionable than the dollar as the largest coin of account. The franc at one time suited the small transactions of the French peasantry, and the big five-franc piece satisfied their eye, but large gold units are required now to measure the accumulating revenues and fortunes of the French people. Of all the primary monetary units in use in Europe the franc is the least, and on that account the worst.

Silver coin might therefore among the civilized nations of Europe and America be reduced to its place as a convenient representative unit, and in all the countries which like England enjoy the single gold standard the quantity of silver in silver coin is to a certain extent arbitrary.

But silver is still the standard in several countries; in India, in China, in Germany, in Holland, and in other nations with which England has very large commercial transactions, it constitutes nearly the whole of the coined currency. Silver has frequently to be transmitted to those countries; the Bank of England has also power to issue its notes against silver bullion; it is therefore of importance to maintain our silver currency as much as possible in harmony with the currency in which silver is the standard wholly or partly. This condition is met by coining silver .900 fine, and by coining the half-crown of 15 grams standard silver, as then 5 crowns will contain the same amount of fine silver as 6 five franc pieces. The shilling containing six grams of silver, the franc if of the same fineness will contain five grams of silver. The silver rupee of India and the silver dollar admit of easy adjustments.

12. Economies of Decimal Coinage.

Several units of weight are required, and when the Roman notation was in use the advantages of connecting these units by the factor ten were not clear. It was accordingly never done in England. In troy weight four units are recognized, the grain, the pennyweight, the ounce, and the pound; 24 grains make one pennyweight, 20 pennyweights one ounce, 12 ounces one pound. The money units are based on these weights; 240 pennyweights of silver are a pound, and were so called, *libra*, the origin of our *l.* The pound sterling and the penny fell in evil days to a third of their primary weight; still 12 pence became a shilling, 20 shillings = 240 pence, = a *l.* Then the penny was halved and quartered, so there are four money units in use connected by the factors, 20, 12, and 4; thus *l.* = 20 shillings = 240 pence = 960 farthings. The clumsy Roman notation was discarded and was displaced by the beautiful Arabic notation, where each figure in a series is ten more, or a tenth less than the same figure to its right or left; hence all the transcendent achievements of modern arithmetic. Unfortunately our money as well as weight and measure units remained unaltered, and all are now in a state so chaotic as to reflect disgrace on the intelligence of England. To perform a simple sum in compound multiplication or division is beyond the powers of ninety-nine in a hundred educated men, who, on leaving school, forget the tables, which have perplexed, wearied, and wasted so many of their hours.

It is difficult to estimate the economy of time and thought through the whole of life to be realized by the substitution of units decimally related to each other in the place of the units now in use.

France, Spain, Portugal, Holland, Belgium, Switzerland, Italy, Austria, Russia, Greece, Sweden, Turkey, China, Japan, and the United States of America have all decimal moneys of account, and England would probably have already enjoyed this inestimable privilege had it not been for the

difficulties of dealing with the penny. The penny is the rock on which the late project of decimalization split. The phantom of a duodecimal notation in arithmetic deceived nobody. The price of a great number of articles is measured by the penny. Thus the price of 4 lbs. of bread is $6\frac{1}{2}d.$; mutton is $9\frac{1}{2}d.$, beef $10d.$ a pound. In all such instances the price in gold units can be expressed with great accuracy, and a slight variation of price could give rise to no inconvenience, for the prices are perpetually fluctuating; as they are regulated by supply and demand, prices could be more accurately adjusted and expressed in cents than in pence. The price of 4 lbs. of bread is $6\frac{1}{2}d.$, but what is the price of 1 lb.? That is not easily expressed. Certain articles are so constantly associated with the penny as their price that this coin is looked upon almost as an English institution. There is, for instance, the penny toll of some bridges, the penny postage, and the penny newspaper, to say nothing of many other penny articles. The price is thus expressed because the penny coin exists, just as prices in America are expressed in cents.

It is supposed by many that the slightest deviation in the price either above or below the penny will be attended with disturbance or mischief, and it is always assumed that any rise of price or fall of price must inevitably benefit or injure the buyer or the seller in the exact proportion of the fall or rise. But economists know this is erroneous. The toll of Waterloo Bridge was formerly $1d.$, it is now $\frac{1}{2}d.$, thus the toll is reduced 50 per cent. It was supposed for years by a majority of the shareholders that a reduction of the toll inevitably involved an equivalent loss, and this belief continued until the rival Hungerford Bridge was projected to take people over the Thames for a halfpenny; then the Waterloo Bridge toll was reduced. In the first weeks there was a dead loss, but when I examined the returns the receipts in halfpence exceeded the former receipts in pence although the rival bridge was in full operation. A reduction of price, whether great or small, as in the case of omnibus fares, increases the number of customers, and may either increase or diminish profits. Thus if a toll becomes two cents instead of two farthings, 3 cents or 4 cents instead of four farthings, the slight rise or fall of toll will tend to right itself in the number of passengers. 5 cents will precisely represent the same proportion of a sovereign as three halfpence.

The postage to some towns was formerly sixpence, and it was by many argued that the reduction to a penny would involve an absolute loss to the revenue exactly commensurate with the reduction, and no doubt now if the postage was reduced to 3 cents ($= 0.9d.$), that is 10 per cent., some persons would immediately, under the influence of the old fallacy, infer that the revenue would decline to that extent; persons apprehensive of loss would prefer 4 cents ($= 1.2d.$), and would by the same fallacy expect an increase of 20 per cent. in the revenue.

Then there is a second difficulty, the penny newspaper, for which battles have also been fought. The price of our newspapers now has a wide range; it runs from $6d.$ to $3d.$, $2d.$, $1d.$, and here it stopped until lately: with the $6d.$ and $3d.$ we have nothing to do as the prices are represented exactly by sixpenny or threepenny coins = 20 or 10 cents; the half of the threepenny = 5 cents, and 4 cents and 3 cents would be in the new decimal coinage at the disposal of the proprietors, who would have no difficulty in adjusting value and price. The *Echo* would probably not object insuperably to the change of two farthings into two cents, which would only be an increase of 20 per cent. on the price, and this could easily be expended on the journal.

When once the decimalized gold coin and its token pieces exist down to cents, 10 of which are worth threepence, prices of the smallest articles will be expressed with exactness for all practical purposes.

Its worshippers may be reminded that the metal in the English penny is not now worth a farthing; the penny is only a counter.

The change of the forms of calculation will present the only real difficulty, and if that prove for a time a little perplexing to veterans it will on the other hand be a pleasant path for the schoolboy to travel over; and anything that arouses common people out of their common thoughts is often attended with incalculable advantages, such for instance as the substitution of printed books for written manuscripts, the discovery of America, the revolution of prices by the influx of silver, the reformation, newspapers, the gold findings of the present day in California and Australasia. Nothing is more apt to fall into routine than trade, and our present system is deplorably characterized by its slow progress in comparison with the progress of the other arts of life. A decimalized, a new to some extent, and a scientific money of account will have the most salutary effects if it awaken trade from its routine.

13. *Economics of International Coinage.*

The value of money is, like the value of all other commodities, local: 100 pieces of gold in England may purchase a bill to entitle its owner to receive 101, or 100 pieces of the same coin in Australia. The rate of exchange where the same coins are in use is thus expressed in the simplest manner possible. The recognition of one gold coin as the international medium of exchange gives all the contracting countries the same simple *par*. But it is different where the money units are not the same: there the calculations grow so intricate as to be unintelligible to the public, and to be troublesome even to adepts. Many examples may be cited from the pages of Mr. Tait.

Traders, if trade prices of commodities are quoted in international money and measures, will have no difficulty in perceiving at a glance the state of the markets, and the currents of trade.

Travellers with international money will sustain less loss, and less discomfort than they now encounter abroad.

The relations between man and man will thus be enlarged, and multiplied, in indefinite proportions, when all things are measured, weighed, bought, and sold by the same units.

14. *The 25 franc and the 25 shilling gold unit.**

All the advantages of the decimal notation can be enjoyed under a gold unit of either of these values: but to be scientific, symmetric, international, the 25 franc coin and the sovereign must consist of exactly 8 grams of gold of the same fineness, coined under the same conditions of seignorage. Then the after passage from an 8 gram unit to the use of a 10 gram unit will be easy, and will end in a complete identification of decimal money units with metric weights of gold, as everlasting as the basis of the metric system. The inconvenience of the change though real will be transitory, and the benefit to mankind will be perpetual. By a slight sacrifice the present generation will earn the gratitude of posterity, while it will be more than repaid for its pains in the course of two or three years of its own existence.

In the metric measures, weights, and money, the trade of the world will enjoy perfect instruments, facilitating the exchange of commodities as much as the steam engine accelerates their carriage.

[15. *Basis of International Coinage.*

1. COINED DECAGRAMS of gold of the fineness expressed by .900 to be the unit measure of value, and the base of an international MONEY OF ACCOUNT. Tolerance of fineness .002; of weight .002.

* "Taking it altogether, the *shilling* is much more frequently and numerously represented in other coinages than the *franc*." Bullion and Foreign Exchanges. By Ernest Seyd, page 690, where he cites several examples.

2. The decagram, and any convenient sub-multiples of it, to be coined at the mints of each country of the convention.

3. The coinage to be self-sustaining, and the mintage to suffice to pay a fixed charge to defray the cost of coinage, and to maintain a coinage fund to replace the coins that have fallen below the standard weight $\cdot 007$ by legitimate wear.

4. The charge for this fund to be represented by $\frac{1}{5}$ of the gold coined.

5. 1 kilogram of gold to be coined into 100 decagram coins called Victorias in England, and to be written $\text{V } 100$.

6. Fifty-five kilograms of gold to be coined into $\text{V } 5500$, at a cost of $\text{V } 100$.

7. This it may be inferred from English experience will cover the whole cost of the gold coinage.

8. The kilogram to be also coined into 125 sovereigns in England and into 25-franc pieces, each of the weight of 8 grams, and containing $7 \cdot 200$ grams of fine gold.

9. The French mint under the present system having no provision for replacing the lost gold in light sovereigns, would coin out of a kilogram 124 twenty-five franc pieces each weighing $\frac{1000}{124} = 8 \cdot 064516$ grams. By coining 125, each of $\frac{1000}{125} = 8$ grams, she gets a part of the coinage fund.

10. Five gram (half-Victorias) and two gram (crowns) gold-pieces to be also coined; the other pieces to be in silver and bronze.

11. The money of account to be in decagrams or grams and centigrams of gold. The gram of gold lies midway in value between the *franc* of France and the *dollar* of the United States, which are the extreme first units of the extant silver currencies (see p. 281), and might suit France, Sweden, Holland, Austria, Spain, Prussia, and Russia as the chief unit of accounts, which would be kept by them, as now, in two columns. The gram coin of account to be named by convention. *GUILDER* is an open name, and may be appropriated, or as the *Solidus* or *Sol* of Charlemagne of 12 *deniers*, containing only one-seventh part more silver than a silver coin of $15\frac{1}{2}$ grams, is no longer in use,* the convenient name *SOL* may be adopted as the name of the gold gram money of account. $98327 \cdot 52$ *sols* could be read 98327 *sols* 52 *cents* on the continent. We should write the same sum $9832 \frac{s.}{7} \frac{c.}{52}$ to be read 9832 *Victorias* 7 *sols* 52 *cents*.

Note.—Mr. Graham, Master of the Mint, and Mr. J. T. Smith, late Master of the Calcutta Mint, estimate when 10,000,000 are coined annually, the cost of making a sovereign at $\text{£} \cdot 0021$ (a halfpenny), and the loss by abrasion in 18 years, when the sovereign in circulation falls below the legal standard at $\text{£} \cdot 0062787$ (three halfpence). Now at 3 per cent. interest, the discounted value of this sum payable at the end of 18 years is $\left(\frac{1}{1 \cdot 03}\right)^{18} \times \cdot 0062787 = \text{£} \cdot 0036881$. Two half sovereigns cost a penny for coinage, and of their weight lose in ten years $\cdot 00830671$, of which the present value is $\left(\frac{1}{1 \cdot 03}\right)^{10} \times \cdot 0083067 = \text{£} \cdot 006181$. If the sovereigns coined in value are to the half sovereigns in the proportion of 38 to 12, the cost of making and maintaining these coins will be about $\text{£} \cdot 007$ per *il*. The cost of coining at the present rate of 5,000,000 a year is $\text{£} \cdot 003$; and that would make the charge of making and maintaining the coin about $\text{£} \cdot 008$ or $2d$. per *il*.

The mintage charge for coinage should be sufficiently high to pay the cost of mintage at all times, and to replace the gold lost by wear. The coinage of a sovereign, we see, now costs 3 farthings at the mint; the bank charge is $1\frac{1}{2}$ farthings, and about 6 farthings will replace the gold lost by wear in circulation during 18 years, when it falls below the legal weight. The coinage of two half sovereigns costs about 6 farthings, and about 8 farthings replace their gold lost in ten years, when they fall below the legal weight. The Master of the Mint, and Mr. J. T. Smith, show that $\text{£} \cdot 017$, exclusive of bank charge, or $4d$. per *il*. will provide for the first coinage and permanent maintenance of our mixed circulation of sovereigns and half sovereigns. For finer coins as works of art, the cost will be greater.—See *Report relating to gold currency by T. Graham, Master of the Mint, and J. T. Smith, late Master of the Calcutta Mint*. Paper presented to House of Commons, 28th June 1869. [See subsequent Introduction to Coinage Tables.]

* At one time it was as a money of account the English shilling. (See *Doomsday*.)

INTRODUCTION TO GOLD-COIN CIRCULATION TABLES.

The sovereign and half-sovereign in circulation in England cease to be a legal tender after they fall below a certain weight, and by a royal proclamation of 1842 they are directed, when light, to be cut and withdrawn.

For various purposes it becomes important to determine in what way the wear operates in reducing two coins of different weights, circulating under these conditions.

The state of the coinage can then be appreciated.

And the cost of issuing, and of replacing the lost gold can be estimated.

All the existing sovereigns have been coined in the last 53 years, and the earliest sovereigns and half-sovereigns bear the Mint impress of 1817; and we have thus under hand the experience for a series of years of a circulation of two gold coins.

In my inquiries I have obtained much information from the various sources referred to in this paper, from Sir John Lubbock, and others. But looking to the great interest of the inquiry into the working of the English gold currency, and its international bearings, I ventured to write to Mr. Crawford, the Governor of the Bank of England, who has been good enough through Mr. George Forbes, the Chief Cashier, to place at my disposal the returns on which the following Tables are based.

From the facts in Table X., p. 277, it is seen that on a large mass of light gold coin withdrawn from circulation the loss of weight from standard weight was $1 \cdot 062$ per cent.; so $\text{£}1$ had lost rather more than $2\frac{1}{2}d. = \text{£} \cdot 01062$ of its value. Up to the loss of $\text{£} \cdot 00628$ ($1\frac{1}{2}d.$) the sovereign is current, and after that depreciation the coin is no longer a legal tender; but these coins after that point had been attained lost $\text{£} \cdot 00434$ more before they were withdrawn. Therefore, if the rate of wear was uniform, it follows that for 40 per cent. of the time they were in circulation the sovereigns were below the legal weight.

The sovereigns and half-sovereigns are separately weighed at the Bank but they are mixed up in this Table; and as they wear away at very different rates, it is right to bear in mind that 86.75 per cent. in value of $\text{£}150,000,000$ * weighed in the Bank scales in the 10 years 1859–68 was in *sovereigns*.

It will be noticed that the lightness of the coin withdrawn increased during each quinquennium, and that in the last the depreciation was $1 \cdot 16$ per cent.

If we know the number of years a series of light coins has been in circulation and the loss of weight, the annual rate of loss can be determined.

The facts in Table IX. supply data, not so numerous as might be desired, but sufficient to enable us to get approximate results, and to determine the law of waste of gold coin in circulation.

In the year 1869 of 3913.5 sovereigns weighing 1000 ozs., and withdrawn at the Bank, 5 bore the inscription 1817. Now if these sovereigns had been in circulation 52 years, and if we write 52 against each sovereign coined in the first year, and 51 against the one cut sovereign coined in 1818, and 49 against each of the 6 coined in 1820, and 48 years against each of the 30 cut in 1821, and so on to the end: then the sum of these numbers will give the number of years the sovereigns have been in circulation: dividing by that number and subtracting $\cdot 5$ the average number of years is obtained. The process is abridged by multiplying the years by the coins.

* Bank Returns.

There is some uncertainty about the precise date of coinage, and of withdrawal; but adjusting this as closely as we can it is found that these sovereigns had circulated 26.22 years; and that during the time they had lost .01052 of their original weight taken at 1.00000. But $\frac{.01052}{26.22} = .0004 =$ annual rate of waste.* By another tabular arrangement this and a great many more results of the highest interest are deducible from the same facts. But some preliminary adjustments are required, and before this past experience can be applied to the future it is necessary to turn these numbers into such others as would have been probably obtained, had the numbers coined in each year been uniform: these corrected numbers are given in a condensed form in Table VII. The numbers were thus raised from $3913\frac{1}{2}$ to 4280; but this number is arbitrary and may be raised to 10,000 if all the other numbers are raised proportionally. Further, as the numbers cut each year are irregular accidentally, they are distributed by interpolation over 50 years, as shown in the second column headed d_x of Table I. From this column, derived from and exhibiting the facts from actual observation, all the other columns were deduced. The column headed l_x is obtained by adding up the numbers in the column d_x : of which it is the sum. Thus 9995 (that is l_4) is the sum of the numbers in column d_x up to d_4 .

Of the sovereigns from the Mint a certain number after they have been issued by the Bank are melted, others are exported and never return, and a few are lost, of none of these we here take account; but of the 10,000 that we can follow to their place of doom in the Bank, column l_x shows the surviving numbers year by year of age.

It is convenient for analysis to call the time a coin has been in circulation (x) its age, and the mean time it will remain after that age in circulation, its after lifetime E_x ; its withdrawal from circulation may be called figuratively for shortness, its death.

And it may be assumed that the sovereigns d_x withdrawn in any year of their age x and under $x+1$ are withdrawn at equal intervals through that year. Then as 18 of 9995 attaining the age 4 are cut in the year following, leaving 9977 in circulation at the end of the 5 years; it follows that $9995 - \frac{18}{2} = 9986$: this is the number against P_4 in the column headed P_x . The equation of $P_x = l_x - \frac{d_x}{2}$ shows how the column P_x has been constructed: it is out of 274,809 sovereigns in circulation the numbers in the $(x+1)$ year of existence.

The column Q_x is formed by the successive addition from the bottom of the numbers in col. P_x . It represents the number of sovereigns sustained in circulation, where none are melted or lost by an annual coinage of 10,000.

The column Y_x is derived from the column Q_x , by the continual addition from the bottom of all the values $\frac{Q_x + Q_{x+1}}{2}$. At the head of the Table the Greek sigma (Σ) indicates the sum of the series up to the age x .

* Professor Jevons makes the annual rate of waste only .00035, by estimating it from the weight of circulating sovereigns, thus not allowing for the waste in light sovereigns withdrawn by the bank. By using this factor he makes the mean time in which average sovereigns remain of legal weight 18 years = $\frac{.00628}{.00035} = 18$. They really wear below the legal standard in $\frac{.00628}{.0004} = 15.7$ years, as Professor Jevons would have found had no light sovereigns been withdrawn. It is the only oversight I have discovered in his able and original paper. The waste by his Table is .0004 in the first four years.

The relation of the figures in the several columns to each other are shown by the subsequent equations; where $x = \omega$ is the last age in the Table.

$$\begin{aligned} \text{I.} \quad l_x &= d_x + d_{x+1} + d_{x+2} \dots d_{x+n-1} \dots d_\omega \\ l_x - l_{x+n} &= d_x + d_{x+1} \dots d_{x+n-1} \\ P_x &= l_x - \frac{1}{2}d_x = l_{x+1} + \frac{1}{2}d_x \\ Q_x &= P_x + P_{x+1} + P_{x+2} \dots P_\omega \\ &= \frac{1}{2}l_x + l_{x+1} + l_{x+2} \dots l_\omega \\ &= \frac{1}{2}d_x + 1\frac{1}{2}d_{x+1} + 2\frac{1}{2}d_{x+2} + 3\frac{1}{2}d_{x+3} \dots \\ &\quad (n + \frac{1}{2})d_{x+n} \dots \end{aligned}$$

Note.—This column gives the years the cut sovereigns had circulated after the age x , and when $x = 0$ it shows the average number of years the sovereigns remain in circulation:

thus $E_0 = \frac{Q_0}{l_0} = \frac{274,809}{10,000} = 27.4809$ years is the average duration of a sovereign's life under the present law.

$$\begin{aligned} Y_x &= \frac{1}{2}Q_x + Q_{x+1} + Q_{x+2} \dots Q_\omega \\ &= \frac{1}{2}P_x + 1\frac{1}{2}P_{x+1} + 2\frac{1}{2}P_{x+2} + 3\frac{1}{2}P_{x+3} \dots \end{aligned}$$

$E'_0 = \frac{Y_0}{Q_0} = \frac{4,248,961}{274,809} = 15.46$ years = the mean age of circulating sovereigns.

Note.—By an entirely different method Professor Jevons makes the mean age of sovereigns 15.35 years. *Journal Statistical Society*, 1868, p. 458.

A somewhat similar table was constructed for half-sovereigns; and the two fundamental half-sovereign columns from which all the others can be constructed are given in Table II. By adding up the column l_x another column L_x is obtained; and by adding up the new column L_x , substitutes for columns Q_x and Y_x are readily obtained: and $E_x = \frac{L_x - \frac{1}{2}l_x}{l_x} =$ mean time half-sovereigns remain in circulation after age x ; so also $E'_x = \frac{\frac{1}{2}l_x + S_{x+1}}{L_x - \frac{1}{2}l_x} = \frac{Y_x}{Q_x} =$ mean number of years they have circulated, and will circulate over age x .

$E_0 = 19.60$ years = mean time a half-sovereign remains in circulation:
 $E'_0 = 11.67$ years = mean age of half-sovereigns in circulation.

Some uses of the Tables I. and II.

The Tables show at a glance how long it is probable a sovereign, if not prematurely melted or lost, will remain in circulation after any age x : thus put $\frac{l_x}{2} = l_{x+n}$; and n being found, is the probable time a sovereign will continue to circulate: at age 10 it is 18 years for $\frac{l_{10}}{2} = \frac{9648}{2} = l_{10+18} = 4924$; at its date of issue the probable lifetime of a sovereign is between 27 and 28 years; of a half-sovereign 18 and 19 years.

$\frac{Q_x}{l_x} =$ the mean time a coin will remain in circulation after age x ;
 $\frac{Q_0}{l_0} = 27.50$ years for sovereigns; and 19.60 for half-sovereigns.

$\frac{Y_x}{Q_x} = (1)$ mean time the sovereigns of the age x and upwards have remained in circulation over age x : (2) the mean time they will continue in circulation.

$\frac{Y_0}{Q_0} =$ mean age of sovereign circulating (15.46 years); of half-sovereigns 11.67 years.

Note.—These ages of the living are deduced from the ages of the expiring coins.

$\frac{d_{x+n}}{l_x} =$ probability that a sovereign will be cut in the year following any year of age $x + n$.

Now putting i the year's simple interest of £1 and $v = \frac{1}{1+i}$ the present value of a £1 to be received at the *beginning of the year* in which a sovereign is cut is $\frac{v^0 d_0}{l_0}$, and $\frac{v^1 d_1}{l_0}$, and $\frac{v^2 d_2}{l_0}$ $\frac{v^n d_n}{l_0}$ to the last year of life.

All these values from the date of coinage are shown in Table II. as well as their sums. Hence it appears that at the date of coinage the value of £1 to be paid when every sovereign of the 10,000 is cut is £4.626; consequently the value of £1 to be paid on each sovereign is £.4626; while the value of £1 to be paid at the expiration of each half-sovereign is £.5782. See Tables II and III.

Loss of weight of coins by wear.

The Table VI. is condensed from others. An average sovereign of weight 1.0000 is taken from the facts to decrease .0004 in a year; .0008 in two years; .0010 in 2½ years; .0012 in 3 years, and so on. The weight of the sovereign then falls successively in the same times from 1.0000 to .9996; .9992; .9990, &c. But the sovereigns do not all wear equally; the amount of attrition to which they are exposed varies greatly; as will be evident on examining a good many sovereigns of the same date, and loss of gold on the light sovereigns culled increases with age, but not according to the preceding law: these losses of weight are shown in the second column from a Bank return of the weights of 1000 light sovereigns of the several ages. See Table VIII. The third column (Table VI.) shows the ascertained loss of weight on a certain number of circulating sovereigns. The same facts are shown for half-sovereigns in columns 4, 5, 6 of Table VI.

Table III. Let the loss of weight per £1.0000 on withdrawn sovereigns of each age x be w_x ; and $w_x d_x$ will be the loss in value of weight of d_x sovereigns cut at age x and under age $x + 1$; and $v^x w_x d_x$ will be the present value at age 0 of that loss. The sum of the values obtained by making x vary in this equation from 0 to 52, is the present value of the loss on the 10,000 sovereigns grown light: taken up to the date of cutting it is £46.27. For each sovereign the present value of the lost gold is $u = £.004627$; for each half-sovereign it is $u' = £.0101645$.

Now let each of the 10,000 sovereigns be replaced by another at the date the first is cut; then we know the mean value of the lost gold on what may be called sovereigns of the third generation is at their date of issue u ; but they are issued when the sovereigns of the second generation are cut: consequently the value of this lost gold of the third generation at the date when the sovereigns of the second generation are issued is πu ; and its value when the sovereigns of the first generation

are issued is $\pi\pi u = \pi^2 u$. In like manner it may be shown that the mean value of the lost gold of the fourth generation is when the first generation is issued $\pi^3 u$. And to get the value in perpetuity we have merely to sum the series $u + \pi u + \pi^2 u + \pi^3 u$

$$\begin{aligned} \text{Sum of series} &= u(1 + \pi + \pi^2 + \pi^3 \dots \pi^\infty) \\ &= \frac{u}{1-\pi} \end{aligned}$$

The same formula taking the proper figures gives the present value of all the gold required to keep up an endless succession of half-sovereigns.

Let c be the whole cost of making a coin, then $u + c$ will be the cost of making and also the value in gold which at interest will supply the average waste of gold on that coin. Thus, if the cost of making a sovereign is £.0021, and £.0046 the present value of the gold to replace the ascertained waste of metal at its withdrawal, each successive coined sovereign costs £.0067; of which the value of a perpetual recurring

succession is $\frac{1}{.5374} \times .0067 = £.01246$.

For 2 half-sovereigns, if the coinage of each costs as much as the coinage of a sovereign, the formula—

$$\frac{c + u}{1 - \pi} = \frac{2 \times .0021 + .0102}{1 - .5782} = \frac{.0144}{.4218} = .03414.$$

Thus, if the sovereign and half-sovereign remain as long in circulation as they have hitherto done the sum of £12,460 invested at 3 per cent. interest would form a coinage fund sufficient to float and sustain in perpetuity £1,000,000 in sovereigns, while £34,140 would be required to float and sustain £1,000,000 in half-sovereigns.

The longer the coins remain in circulation the more gold is required to supply the waste; that is an increase of cost; but the deferred payment has the effect of diminishing the present value; as is evident in the

equation $\frac{1 - n w}{(1 + i)^n}$, where w is the annual waste by wear out of £1; n is

the number of years wear; and $\frac{1}{1 + i}$ = the present value of £1 payable at the end of a year, when the interest of £1 in a year is i .

The following is one of the many practical applications of the Tables:

Lifetime of gold coins.

Gold is the most indestructible of all coin. The pure metal is preferred in the East; and in England the first gold coins were of great fineness. But experiment has shown that the alloys of silver and copper in the existing gold coin of Europe harden them, and protect them from attrition, either ordinary or artificial. Subject to every usage the gold in sovereigns wears away at so slow a rate, that its weight is only wasted by wear during a circulation of 2500 years; and as some of the gold of a *darec* of Darius, a *stater* of Alexander, an *aureus* of Augustus, a *rose noble* of Edward III., an *angel* of Elizabeth, a *guinea* of George III., may exist in *sovereigns* of Victoria, so the gold in sovereigns after receiving hundreds of impresses may survive thousands of years. Other substances undergo changes by chemical combinations; but gold has no affinities for the ordinary substances of the earth; and maintains its virgin purity through endless ages.

Sovereigns perish by wear, inasmuch as coins only discharge their functions legally, so long as they retain a fixed weight a little below the

standard;* and as the wear by use varies infinitely, while some remain almost intact for an indefinite time, others fall below the standard in a few years.

In England new coins remain safe in the Bank some time; but they are no sooner issued than they are exposed to several risks, which vary with circumstances. Great numbers in the first years, when they are of full weight, have rapacious enemies; they die what may be called violent deaths; and are melted, as they may now be lawfully, either in this country or abroad, as common bullion; others are exported while they are of current weight, and never return. Some are hoarded, some lost. Deducting these, the rest circulate until they are worn out; until the effigy grows dull, until the sharp lines are blunted, until the weight is sensibly depreciated. They might linger on, wasted by age, did they not meet with a happy dispatch. Every sovereign that comes to the Bank of England is weighed in a machine, which rejects all that have lost gold worth £·0063 or 1½*d.*; they are said technically to be cut, and are withdrawn from circulation. The half sovereign is legally current until 1*d.* worth of its gold is wasted. Thus a *sovereign* is current until it has lost gold worth £·0063; two *half sovereigns* float until they have lost £·0083 of their gold.

By the Tables it is seen that sovereigns wear away at the average annual rate of £·0004; consequently a coinage of sovereigns falls below current weight in 15·7 years. Half sovereigns wear away at the more rapid rate of £·0010, and a coinage falls below the least current weight in 8·3 years.† The half sovereign wears away 2½ times as fast as a sovereign.

In practice sovereigns circulate 27·5 years, half sovereigns 19·6 years before they are cut at the Bank; during 11·8 years the sovereigns, during 11·3 years half sovereigns circulate below the legal weight.

That a sovereign is cut depends on two chances; it must fall below the fixed current weight, and it must be paid into the Bank of England. Hence its existence is protracted.

Let us follow 10,000 sovereigns through the circulation until they return to the bank shears. At birth they differ slightly in weight; and if the standard weight is represented by 1·0000, the heaviest sovereign issued may by tolerance be 1·0021, the lightest ·9979; so difficult is it to coin equal weights of metal.‡ A sovereign may fall to ·9937, and still remain current; and it is found *by experience* that from some cause or other certain numbers fall below this weight in a few years, and are on that account cut; taking up the Tables (I. and VI.) it is found that at the end of 15 years 8778 remain in circulation, having an average weight of ·9943; some of the 8778 have been hoarded, others have been much used and worn perhaps unfairly: upon mustering them the heaviest might weigh 1·0021, and be therefore ·0078 above the mean weight of his contemporaries, and the lightest may be as much below the average or ·9865. Mustering them in companies arranged by weight, there would be a series

* Weight of sovereign in grams :—7·988 standard.
7·938 least current.

·050 loss.

Weight of two half sovereigns :—7·988 standard.
7·922 current weight.

·066 loss.

† $\frac{.0063}{.0004} = 15.7$ years; and $\frac{.0083}{.0010} = 8.3$ years.

‡ The tolerance of weight which was $\frac{1}{480} = .00208$ will be reduced to ·002 by the new coinage Bill.

ranging from the one extreme of 1·0021 through the centre ·9943 down to ·9865. The numbers at the two extremes would be few; they may be one or two; the numbers on each side of the centre may be equal; they would increase rapidly as they approached the centre, where the largest group would cluster. The range of weight from the sovereign of lowest weight to the *mean* would be ·0078; from the mean to the highest weight also ·0078; the extreme range being ·0156. Evidently, as the mean weight of the whole is only a shade above the current weight, nearly half of the 8778 sovereigns still circulating must be below the current weight; and we can only be surprised to find that no more than 222 are cut in the year following. Every year the mean weight of the mass grows lighter, and the range of weight greater; at the age of 30 the numbers in circulation fall to 4236, having an average weight of ·9890; which reasoning as before, implies that as there may be a sovereign of that age weighing 1·0021, there may be its counterpart weighing only ·9759. The great mass of the coins falls below the legal current weight in forty years, and in fifty years only a few relics survive in the circulation.

Reasoning upon this basis of the 8556 sovereigns attaining the age of 16, when the average weight has just fallen below the legal current weight, nearly 4278 are still above that weight; and indeed the coins range up to the full standard weight.*

Coins in circulation.

It is evident that if sovereigns continue in circulation 27·5 years, a constant annual coinage of 1,000,000 will sustain 27,500,000 in existence.

The mean normal age of sovereigns under this law is shown to be 15·5 years; the mean age of the sovereigns having a definite relation to the ages at which they expire.

If the amount of the coinage, and the lifetime of sovereigns remain invariable, the numbers withdrawn here annually must in the end equal the numbers coined annually, unless they are melted, lost, or sent for ever out of the Kingdom.

Now the number of sovereigns coined annually in 1817–1868 is known; it is £3,331,000, or in the aggregate £173,216,000. The number of half-sovereigns coined in the same years was 41,574,000; worth £20,787,000. The annual coinage then issued was £3,730,750 yearly. The total amount of light sovereigns and half-sovereigns cut at the Bank of England and its branches is about £30,000,000, so that not more than £600,000 expire annually in the arms of the Bank from which they issued. This implies a perpetual, a rapid increase of gold coin in England, if none expire elsewhere, and in other ways than wear. In effect £194,003,000 have been coined, and after deducting £30,000,000 withdrawn at the Bank of England £164,003,000 is left; and if large quantities of light coins are disposed of in other quarters a large surplus still remains unaccounted for.

Again from the Tables I, II, and IX, the number surviving in 1869 out of the respective numbers coined in each year since 1817 can be estimated, and is found to be £103,531,175 in sovereigns; £11,208,472 in half-sovereigns; or £114,739,647 in the aggregate.

That is the number that would be *in existence* in the United Kingdom in the year 1869, had none been in the interval lost, exported, or melted down.

* The average weight in grains is indeed 122·500 grains: but half the numbers are at and above that weight running up to 123·474 grains, while by way of compensation the residual half descends as low as 121·526 grains; the range being 1·948 grains.

Now, Professor Jevons by an independent method estimates in 1868 the existing amount of gold in half sovereigns at £12,000,000, in sovereigns at £68,000,000; in both coins at £80,000,000. His first estimate makes the number of *sovereigns* £78,500,000; and the last is what he conceives the corrected number. Mr. Miller, of the Bank of England, held that there could not be less than £80,000,000 of gold in the country, Mr. Jevons contends that there cannot be more. Upon the whole this appears to be a well worked out estimate. It includes £6,100,000 of gold in the Bank; of which £3,400,000 had not been issued, besides £100,000 of Australian coin. The gold coin held by the Bank (London and branches) at the beginning of 1869 was about £6,200,000, at the end of the year about £11,200,000.

The coinage of £194,000,000 issued in the 52 years (1817-68) was widely distributed over the world; and here or elsewhere, at the calculated rate of decrease, must have been reduced to £115,000,000 in round numbers; so £79,000,000 would be withdrawn at the normal rate; but the Bank of England accounts for £30,000,000. How have the remaining £49,000,000 at home or abroad been withdrawn? At the normal ages certain numbers have been lost, others, many of them of full weight probably have been withdrawn without the knowledge of the Bank, and in the East especially great numbers instead of having been withdrawn have been hoarded; now sovereigns hoarded for years or converted into ornaments are as much lost to the circulation as sovereigns withdrawn by the Bank.

Again, of the £115,000,000 which should be in circulation, there are by estimate £80,000,000 in the Bank or in circulation in the United Kingdom. Where are the other £35,000,000? Flown to a large extent, and circulating in other countries, replies Mr. George Forbes, the Chief Cashier of the Bank of England, and a keen observer of coin movements. Vanished in the melting pot, say others. The truth probably lies between the two hypotheses; coin is exported; coin is in the first years after its issue melted largely; in what proportions remains to be determined.

Mr. Forbes shows that in the 18 years 1852-69 no less than £70,555,000 of British gold was exported; £30,275,000 of it to India, China, Egypt, and the Mediterranean. As it goes and comes the same coin may figure more than once in the returns; he is unable to supply the amount of British coin imported.

TABLE I.

SOVEREIGN CIRCULATION TABLE.

Showing (1) how 10,000 Sovereigns (l_x) coined remain in Circulation, or are withdrawn (d_x) at the Bank of England; (2) how many Sovereigns (Q_x) are sustained in Circulation by an annual coinage of 10,000 (P_x and Q_x); and (3) the Years (Y_x) those Sovereigns have remained or will remain in Circulation over any age (x).

Age (the years the coins remain in circulation).	Expiring in each year of age.	Sovereigns coined and surviving at each age.	Sovereigns in circulation in each year of age.	(1) The sum of the Sovereigns in circulation of each age x and upwards; also (2) the sum of the years which l_x Sovereigns will live.	(1) The sum of the years which the Sovereigns Q_x of the age (x) and upwards will remain in circulation; also (2) the sum of the years they have circulated over age x .
		$\geq d_x$	$l_x - \frac{1}{2}d_x$	$\geq P_x$	$\geq \left(\frac{Q_x + Q_{x+1}}{2}\right)$
x	d_x	l_x	P_x	Q_x	Y_x
0	0	10,000	10,000	274,809	4,248,961
1	0	10,000	10,000	264,809	3,979,152
2	0	10,000	10,000	254,809	3,719,343
3	5	10,000	9,997	244,809	3,469,534
4	18	9,995	9,986	234,812	3,229,724
5	42	9,977	9,956	224,826	2,999,905
6	52	9,935	9,909	214,870	2,780,057
7	65	9,883	9,851	204,961	2,570,141
8	75	9,818	9,780	195,110	2,370,106
9	95	9,743	9,696	185,330	2,179,886
10	129	9,648	9,583	175,634	1,999,404
11	150	9,519	9,444	166,051	1,828,562
12	175	9,369	9,281	156,607	1,667,233
13	199	9,194	9,094	147,326	1,515,267
14	217	8,995	8,887	138,232	1,372,488
15	222	8,778	8,668	129,345	1,238,699
16	231	8,556	8,441	120,677	1,113,688
17	243	8,325	8,203	112,236	997,232
18	257	8,082	7,954	104,033	889,098
19	271	7,825	7,690	96,079	789,042
20	283	7,554	7,412	88,389	696,808
21	299	7,271	7,121	80,977	612,125
22	308	6,972	6,818	73,856	534,709
23	325	6,664	6,501	67,038	464,262
24	337	6,339	6,171	60,537	400,475
25	366	6,002	5,819	54,366	343,024
26	360	5,636	5,456	48,547	291,567
27	353	5,276	5,101	43,091	245,748
28	348	4,923	4,749	37,990	205,208
29	339	4,575	4,405	33,241	169,593
30	336	4,236	4,068	28,836	138,555
31	333	3,900	3,734	24,768	111,753
32	331	3,567	3,402	21,034	88,852
33	328	3,236	3,072	17,632	69,519
34	325	2,908	2,746	14,560	53,423
35	322	2,583	2,423	11,814	40,236
36	318	2,261	2,102	9,391	29,634
37	313	1,943	1,786	7,289	21,294
38	302	1,630	1,480	5,503	14,898
39	298	1,328	1,179	4,023	10,135
40	250	1,030	905	2,844	6,702
41	215	780	672	1,939	4,311
42	184	565	473	1,267	2,708
43	152	381	305	794	1,678
44	117	229	170	489	1,037
45	21	112	100	319	633
46	19	91	81	219	364
47	19	72	62	138	186
48	19	53	43	76	79
49	18	34	25	33	24
50	16	16	8	8	4

NOTE.—This Table is constructed from the data in Tables 3 and 9, supplied by the Bank of England. It deals only with the Sovereigns that are issued by, and returned to, the Bank. It represents the normal condition of the English Coinage under the law as at present administered, by which the Bank almost alone cuts light Sovereigns—that is, Sovereigns weighing less than 122.5 grains Troy, the standard weight being 123.274 grains; the allowed loss of weight of gold 0.774 grain, worth about $1\frac{1}{2}d.$ = £ 0.063.

TABLE II.

SOVEREIGN AND HALF SOVEREIGN VALUATION TABLES.

Age.	Numbers remaining in circulation.		Numbers Light and cut at Bank.		Discounted Values in £ of d_x or $v^x d_x$	
	l_x		d_x			
	Sovereigns.	Half Sovereigns.	Sovereigns.	Half Sovereigns.	Sovereigns.	2 Half Sovereigns.
0	10,000	10,000	0	0	·00	·00
1	10,000	10,000	0	0	·00	·00
2	10,000	10,000	0	0	·00	·00
3	10,000	10,000	5	21	4·58	19·22
4	9,995	9,979	18	50	15·99	44·42
5	9,977	9,929	42	114	36·23	98·34
6	9,935	9,815	52	170	43·55	142·38
7	9,883	9,645	65	224	52·85	182·13
8	9,818	9,421	75	274	59·21	216·30
9	9,743	9,147	95	319	72·81	250·18
10	9,648	8,828	129	358	95·99	266·39
11	9,519	8,470	150	393	108·36	283·91
12	9,369	8,077	175	420	122·74	294·58
13	9,194	7,657	199	442	135·51	300·98
14	8,995	7,215	217	457	143·46	302·01
15	8,778	6,758	222	466	142·49	299·11
16	8,556	6,292	231	469	143·95	292·26
17	8,325	5,823	243	466	147·02	281·94
18	8,082	5,357	257	468	150·96	274·90
19	7,825	4,899	271	446	154·19	254·34
20	7,554	4,453	283	429	156·69	237·53
21	7,271	4,024	299	410	160·73	220·40
22	6,972	3,614	308	387	160·73	201·97
23	6,664	3,227	325	377	164·67	191·02
24	6,339	2,850	337	377	165·78	185·46
25	6,002	2,473	366	377	174·80	180·06
26	5,636	2,096	360	377	166·93	174·81
27	5,276	1,719	353	377	158·92	169·72
28	4,923	1,342	348	377	152·10	164·78
29	4,575	965	339	377	143·86	159·98
30	4,236	588	336	26	138·43	10·71
31	3,900	562	333	26	133·20	10·41
32	3,567	536	331	26	128·54	10·10
33	3,236	510	328	26	123·66	9·80
34	2,903	484	325	26	118·96	9·52
35	2,583	458	322	26	114·43	9·24
36	2,261	432	318	26	109·72	8·97
37	1,943	406	313	26	104·85	8·71
38	1,630	380	302	26	98·22	8·46
39	1,328	354	298	26	94·10	8·21
40	1,030	328	250	26	76·64	7·97
41	780	302	215	26	63·99	7·74
42	565	276	184	26	53·17	7·51
43	381	250	152	26	42·64	7·28
44	229	224	117	26	31·87	7·08
45	112	198	21	26	5·55	6·88
46	91	172	19	26	4·88	6·68
47	72	146	19	26	4·74	6·48
48	53	120	19	26	4·60	6·29
49	34	94	18	26	4·23	6·11
50	16	68	16	26	3·65	5·93
51	0	42	0	26	·00	5·76
52	0	16	0	16	·00	3·44
Sums	279,809	201,021	10,000	10,000	4695·16	5869·40

NOTE.—The Table may be read thus :—Of 10,000 Sovereigns issued and cut at the Bank, nearly one half, or 4,923, remain in circulation 28 years; whereas, out of 10,000 Half Sovereigns, only 1,342 attained that age; in the year following 348 of the 4,923 remaining Sovereigns, and 377 of the remaining Half Sovereigns are cut. The Discounted Value at the date of issue of the 348 Cut Sovereigns was $152·10 = \frac{1}{(1·03)^{28}} \times 348$, on the assumption that the rate of Interest is 3 per cent., and that they are cut at the beginning of the 29th year, and so in like manner the value of the Cut Half Sovereigns was 164·78. For other ages the reading is similar; the sum of these values is the Discounted value at Issue of the 10,000 Cut Coins.

TABLE III.

VALUATION TABLES in Summary, showing discounted values at issue, of Gold lost by the time Coins are cut.

Age, x .	At Date of Issue.			
	Discounted Values of £1 payable when the several coins are cut.		Discounted Values in £1, of lost gold payable when coins are cut.	
	$v^x d_x$		$v^x d_x w_x$	
	10000 Sovereigns.	10000 Double Half Sovereigns.	10000 Sovereigns.	20000 Half Sovereigns.
0—5	20	64	·14	·561
5—10	265	889	1·96	9·001
10—15	606	1448	4·48	19·170
15—20	739	1403	6·04	24·030
20—25	809	1036	7·24	22·580
25—30	797	849	8·07	22·490
30—35	643	51	7·51	1·510
35—40	521	44	6·89	1·371
40—45	268	38	4·07	1·214
45—50	24	32	·57	·561
50—53	3	15		
Sums	4695	5869	46·97	103·170
Corrected Sums	4626	5782	46·27	101·645
Present Values at Issues on each.	$\pi = \cdot4626$	$\pi' = \cdot5782$	$\cdot004627$	$\cdot0101645$

The Table may be read thus :—

The Value at date of issue of £1 payable at the extinction of a Sovereign is $\cdot4626l$. (say π); of 2 Half-Sovereigns $\cdot5782$ (say π'); at the same date the value of the lost gold is for the Sovereign $\cdot004627$; for the 2 Half-Sovereigns $\cdot0101645$.

The present value of the lost gold on all the successive coinages of Sovereigns

$$\text{is } \frac{1}{1-\pi} \times \cdot004627 = \frac{\cdot004627}{\cdot5374} = \cdot0086.$$

The present value of lost gold on 2 Half-Sovereigns, or the value of the perpetuity

$$\text{is } \frac{1}{1-\pi'} \times \cdot0101645 = \frac{\cdot0101645}{\cdot4218} = \cdot02410.$$

Corrected numbers for the lower lines are obtained by adding up their respective columns, and dividing the sums by 1·015. This has the effect of giving the values on the Sovereigns and Half-Sovereigns at the time they are cut, assumed to be at equal intervals through the year, or on an average in the middle of the year.

Note.—The loss of gold on a cut sovereign is, by an unpublished Table, on an average $\cdot0107$; the weight being reduced from the standard 1·0000 to $\cdot9893$. The loss of gold on two cut Half-Sovereigns is in like manner on an average $\cdot0191$; the standard weight of the two being the same as the standard weight of the Sovereign represented by 1·0000 falls to $\cdot9809$. The sovereigns cease to be legal tender, and are liable to be cut when they have lost $\cdot00628$ of their weight; that is when the weight has fallen from 1·0000 to $\cdot99372$; half-sovereigns when the weight has fallen $\cdot00831$ from 1·0000 to $\cdot99169$.

TABLE IV.
SOVEREIGNS.

DURATION OF CIRCULATION (deduced from Table I).

Age.	Mean after-Existence of Sovereigns of age x .	Mean after-Existence of Sovereigns of age x and upwards.	Mean age of Sovereigns in circulation of age x and upwards.	Mean age when cut at the Bank	
				of Sovereigns in circulation of age x .	of Sovereigns in circulation of age x and upwards.
x	$E_x = \frac{Q_x}{l_x}$	$E'_x = \frac{Y_x}{Q_x}$	$x + E'_x$	$x + E_x$	$x + 2 E'_x$
(1)	(2)	(3)	(4)	(5)	(6)
0	27.50	15.46	15.46	27.50	30.92
5	22.50	13.34	18.34	27.50	31.68
10	18.25	11.38	21.38	28.25	32.76
15	16.78	9.58	24.58	29.78	34.16
20	11.74	7.88	27.88	31.74	35.76
25	9.11	6.31	31.31	34.11	37.62
30	6.88	4.80	34.80	36.88	39.60

The Table may be read thus :—

- Col. (2) Sovereigns issued at the Mint and returning light to the Bank remain in circulation 27.50 years.
 „ (3) Those that have been already in circulation 10 years or more will continue in circulation for 11.38 years longer.
 „ (4) The mean age of all the sovereigns in circulation is 15.46 years.
 „ (5) The mean age of sovereigns now of the age of 10 when cut will be 28.25; and the mean age, when cut, of all sovereigns now existing will be 30.92 years.

Note.—These numbers are from the Table I. corrected for inequalities in the annual coinage. The mean age of the sovereigns actually cut was 26.22 years, as the annual coinage had gone on increasing.

TABLE V.
HALF-SOVEREIGNS.
DURATION OF CIRCULATION.

Age.	Mean after-Existence of Half-Sovereigns of age x .	Mean after-Existence of Half-Sovereigns of age x and upwards.	Mean age of Half-Sovereigns in circulation of age x and upwards.	Mean Age when cut at the Bank	
				of Half-Sovereigns in circulation of age x .	of Half-Sovereigns in circulation of age x and upwards.
x	$E_x = \frac{L_x - \frac{1}{2}l_x}{l_x}$	$E'_x = \frac{\frac{1}{4}l_x + S_{x+1}}{L_x - \frac{1}{2}l_x}$	$x + E'_x$	$x + E_x$	$x + 2 E'_x$
(1)	(2)	(3)	(4)	(5)	(6)
0	19.60	11.67	11.67	19.60	23.34
5	14.71	9.81	14.81	19.71	24.62
10	11.17	8.34	18.34	21.17	26.68
15	8.80	7.33	22.33	23.80	29.66
20	7.07	6.65	26.65	27.07	33.30
25	5.77	5.89	30.89	30.77	36.78

The Half-Sovereign remains on an average in circulation 19.60 years (col. 2); the mean age of the Half-Sovereign in circulation is 11.67 years. See reading of Sovereign Table.

Note.—The L_x stands for the sum of the Half-Sovereign column l_x (Table 2) up to the age x inclusive; so $L_x - \frac{1}{2}l_x = Q_x$; and again S_{x+1} = sum of said column L_x up to L_{x+1} ; and $\frac{1}{4}l_x + S_{x+1} = Y_x$.

TABLE VI.

Loss of WEIGHT on average Sovereigns and on two average Half-Sovereigns, weighing 1.0000 at date of issue. (Weights lost correspond to the middle year of each Period.)

Age in Years.	Sovereigns.			Half-Sovereigns.		
	Loss, if Annual Decrement is constantly .0004.	Loss on Coin cut at the Bank.	Loss on circulating Coin.	Loss, if Annual Decrement is constantly .0010.	Loss on Coin cut at the Bank.	Loss on circulating Coin.
	(1)	(2)	(3)	(4)	(5)	(6)
0-5	.0010	.0074	.0010	.0025	.0086	.0032
5-10	.0030	.0074	.0030	.0075	.0102	.0082
10-15	.0050	.0074	.0048	.0125	.0133	.0132
15-20	.0070	.0082	.0066	.0175	.0172	.0182
20-25	.0090	.0090	.0084	.0225	.0219	.0232
25-30	.0110	.0101	.0101	.0275	.0265	.0282
30-35	.0130	.0117	.0119	.0325	.0296	.0332
35-40	.0150	.0132	.0136	.0375	.0312	.0382
40-45	.0170	.0152	.0154	.0425	.0320	.0432
45-50	.0190	.0238	.0171	.0475	.0328	.0482

(1.) 3,935.5 light sovereigns cut at the Bank weighed 1,000 ounces, so the average weight was .2541 oz., the standard being .2568; they had lost .0027 oz. in 26.22 years, that being their mean age; the annual loss on a unit of weight was $\frac{.0105}{26.22} = .0004$. The mean loss of weight on 1,000 taken out of the same batch was the same, and their mean age was 25 years.

(2.) This is derived from the actual weights of light sovereigns cut at the Bank in 1869; the weights being distinguished for each year of coinage extending from 1868 to 1817. The coins of 1864-8 are taken as 0-5 age, those of 1859-63 as 5 and under 10 years of age.

(4) and (5). The mean loss on 1,000 cut light half-sovereigns was .002276 oz. on the standard, .128411 oz.; or .017724 on a unit of weight; the mean age of the 1,000 coins was 17.175 years; the annual loss on a unit of weight was therefore .0010. The loss on cut coins of various ages was determined by weighing in 1869 1,000 light half-sovereigns coined in the years 1817-1865.

(3) and (6). These columns are deduced from the experiments of Professor Jevons, who weighed 434 sovereigns and 178 half-sovereigns after careful cleansing. He estimates the loss of weight taken on an average sovereign circulating at 0.0051* of its standard weight, the deficiency on the circulating half sovereign at .0110. He gives the weights of the coinages of the several groups of years, and proves that the circulating sovereigns and half-sovereigns grow lighter year by year; the sovereigns coined in 1860-67 having lost weight at the rate of .00040; and those of 12 and more years existence at a rate which may be set down at .00035. The reduced loss of weight is naturally produced in the circulating coins by the withdrawal of light ones. The half-sovereigns decreased at first at the rate of .00128, and afterwards at the rate of about .0010. From these data the loss of weight of the circulating coin of various ages was deduced.

* By our corrected Table, which makes the proportional number of sovereigns of the several ages in circulation different from those few which he happened to weigh, the loss of weight on circulating sovereigns is .0053; on circulating half-sovereigns of .0126.—(See *Statistical Journal for December 1868*, pp. 461 and 462.)

The mean weight of 3,000 sovereigns in circulation weighed at the bank was .25581 oz., the standard being .25682 oz., thus they had lost only .0039 out of a unit of standard weight and were better by about .0019 than the average. This was the effect of selection, as the owners, avoid as much as possible sending suspiciously light sovereigns to the bank.—(See *International Coinage Report*, p. 94.)

TABLE VII.

CORRECTION to show what the Proportional Numbers cut in 1869 might have probably been if the annual Coinage had been constant.

Years when coined.	Actual Numbers cut at Bank as per return.		Corrected Numbers.	
	Sovereigns.	Half-Sovereigns.	Sovereigns.	Half-Sovereigns.
1864-68	13	9	44	8
1859-63	111	154	109	152
1854-58	490	224	372	207
1849-53	759½	294	522	288
1844-48	717	148	664	191
1839-43	626	152	756	219
1834-38	277	5	683	22
1829-33	415	—	689	—
1824-28	449	10	393	22
1819-23	50	1	41	21
1817-18	6	3	7	2
Total	3,913.5	1,000	4,280	1,132

Note.—In round numbers 171,563,000 sovereigns were coined in the 51 years 1817-67.

The average number of sovereigns coined annually was therefore 3,364,000. From a table showing the numbers in 3913.5 light sovereigns cut in 1869, and coined in those 51 years, and from the numbers coined in each year; the proportional numbers were deduced which would have probably been cut had the annual coinage been constant.

Formula $a =$ mean number of coins stamped annually (3,364,000).

$n_x =$ numbers issued in each year x .

$s_x =$ numbers out of 3913.5 cut at Bank, of sovereigns coined in that year.

$s'_x =$ numbers that would probably have been cut had the same numbers been issued annually.

Formula $\frac{a s}{n} = s'_x =$ corrected number.

Through the year 1853 the numbers issued (n_{53}) were 10,600,000; of which among 3913.5 cut 329 were of that date $\therefore \frac{3,364,000}{10,600,000} \times 329 = 104 =$ corrected number. Then 41,574,000 half-sovereigns = £ 20,787,000 were coined in the 51 years 1817-67 and a similar correction was applied to the number of half-sovereigns returned out of 1,000 cut.

TABLE VIII.

Year of Coinage.	Age.	Numbers of Coins weighed.		Coins cut at the Bank.			
		Sovereigns.	Half-Sovereigns.	Weight in Grams.		Loss of Weight in Grams.	
				Sovereigns.	2 Half-Sovereigns.	Sovereigns.	2 Half-Sovereigns.
	0	1,000.	1,000.	Standard, 7.9882.	7.9882.	0.0000	0.0000
1864-68	0-5	3	9	7.9289	7.9196	0.0593	0.0686
1859-63	5-10	36	154	7.9289	7.9072	0.0593	0.0810
1854-59	10-15	122	224	7.9289	7.8823	0.0593	0.0959
1849-54	15-20	180	294	7.9227	7.8512	0.0655	0.1276
1844-49	20-25	192	148	7.9165	7.8138	0.0717	0.1744
1839-44	25-30	159	152	7.9072	7.7765	0.0810	0.2117
1834-39	30-35	91	5	7.8947	7.7516	0.0935	0.2366
1829-34	35-40	115	—	7.8823	7.7392	0.1059	0.2490
1824-29	40-45	95	10	7.8667	7.7330	0.1215	0.2552
1819-24	45-50	7	4	7.7983	7.7267	0.1899	0.2615

TABLE IX.

SOVEREIGNS and HALF-SOVEREIGNS returned as coined, compared with the relative Numbers cut of each date out of 3913·5 Sovereigns and 1,000 Half-Sovereigns.

Year.	Reputed numbers coined.*		Numbers cut at the Bank, December 1869.†	
	Sovereigns (000's omitted).	Half-Sovereigns (000's omitted).	Sovereigns.	Half-Sovereigns.
1817	3235	2080	5	3
1818	2347	1080	1	—
1819	4	—	—	—
1820	932	35	6	—
1821	9405	231	30	—
1822	5357	—	14	—
1823	617	224	—	1
1824	3768	592	11	2
1825	4200	761	130	1
1826	5724	345	223	1
1827	2267	492	82	3
1828	386	1245	3	3
1829	2445	4	85	—
1830	2388	—	77	—
1831	599	—	21	—
1832	3737	—	157	—
1833	1225	—	75	—
1834	—	134	—	—
1835	723	773	31	3
1836	1714	147	78	—
1837	1173	160	106	2
1838	2719	273	62	—
1839	504	1	19	—
1840	—	—	—	—
1841	124	509	9	21
1842	4865	2223	304	103
1843	5982	1252	294	28
1844	3000	1127	175	59
1845	3801	888	148	10
1846	3803	1064	134	47
1847	4667	983	220	14
1848	2247	411	40	18
1849	1755	845	50	32
1850	1402	180	68	8
1851	4014	774	67½	28
1852	8053	1378	245	53
1853	10598	2709	329	173
1854	3590	1125	103	—
1855	8448	1120	190	91
1856	4806	2392	121	57
1857	4496	728	59	40
1858	803	856	17	36
1859	1548	2204	17	87
1860	2556	1131	35	28
1861	7625	1131	29	23
1862	7836	—	24	1
1863	5922	1372	6	15
1864	8656	1758	11	7
1865	1450	1835	—	2
1866	4047	2059	2	—
1867	—	993	—	—
1868	1653	—	—	—
Total Number }	173,216	41,574	3913·5	1,000

* From Jevons.

† From Bank return.

TABLE X.
STATEMENT of the results of sundry Amounts of LIGHT GOLD COIN, collected in Four Periods of Five Years each, between 1850 and 1869, inclusive.

Period of Five Years.	Tale, or Nominal Amount.	Weight.	Compared with Standard Weight. Grains 123·27448 per Sovereign.		Compared with Current Weight. Grains 122·5 per Sovereign.	
			Loss of Weight.	Loss per Sovereign.	Loss of Weight.	Loss per Sovereign.
1850-1854	£ 162,000	ozs. 41,287·700	ozs. 317·436	£ 0·762	ozs. 56·050	d. 0·323
1855-1859	172,000	43,784·300	389·055	0·881	111·533	0·606
1860-1864	515,000	130,921·350	1,341·892	1·015	510·942	0·927
1865-1869	1,120,600	284,469·730	3,324·812	1·155	1,516·728	1·265
20 Years	1,969,600	500,463·080	5,373·195	1·062	2,195·253	1·042

Bank of England,
December 1869.

GEO. FORBES.

TABLE XI.

COUNTRIES.	Estimated Population.	EXPENDITURE.				COUNTRIES.
		In current Coin of each Country.	In International Ten-gram Coins.			
			On the assumption that the Expenditure is discharged in Standard Gold ('91531 fine).	Reduced Value, on the assumption that the whole of the Expenditure is in depreciated paper currency.		
	<i>Year. Population.</i>	<i>Year. Expenditure. Coin.</i>				
United Kingdom	1867 - 30,157,473	1866-7 - 67,031,000 - L's	53,624,900	—	United Kingdom.	
America, U.S.	1867 - 38,913,889	1867-8 - 723,134,025 - Dollars	122,220,000	91,550,000	America, U.S.	
France	1866 - 38,067,004	1868 - 1,981,995,692 - Francs	62,865,000	—	France.	
Prussia	1867 - 24,043,902	1868 - 159,757,064 - Thalers	18,580,000	—	Prussia.	
Austria	1866 - 35,065,949	1868 - 444,125,290 - Florins	34,782,000	30,110,000	Austria.	
Spain	1866 - 16,516,949	1867-8 - 263,946,776 - Escudos	21,763,000	?	Spain.	
Portugal	1863 - 4,350,216	1868-9 - 22,831,941 - Milreas	4,056,200	—	Portugal.	
British India	1861 - 135,634,244	1866-7 - 468,256,000 - Rupees	36,244,000	—	British India.	
Holland	1867 - 3,592,416	1867-8 - 99,175,990 - Florins	6,611,700	—	Holland.	
Russia	1863 - 77,008,448	1868 - 480,593,518 - Roubles	63,007,000	53,059,000	Russia.	
Sweden	1867 - 4,195,681	1867-8 - 41,493,121 - Riksdalers	1,813,300	—	Sweden.	
Italy	1867 - 25,404,723	1868 - 982,882,416 - Lire	31,175,000	27,109,000	Italy.	

TABLE XII.

COUNTRIES.	Years.	EXPENDITURE PER HEAD OF POPULATION.								
		Current Coin of Country.	International Money: Grams = Sols or Half-crowns in Gold.							
			On the assumption that the Expenditure is discharged in Standard Gold ('91531 fine).	On the assumption that the Expenditure is in depreciated Paper Currency.	Mean of the results in cols. 4. and 5					
Cols. 1.	2.	3.		4.		5.		6.		
United Kingdom	1866-7	2 £'s	4 shillings	5½ pence	Sols. 17	Cents. 78	Sols. 23	Cents. 53	Sols. 27	Cents. 47
(a) America	1867-8	18 dollars	58 cents	—	31	41	23	53	27	47
France	1868	52 francs	6 cents	—	16	51	—	—	—	—
Prussia	1868	6 thalers	19 silver groschen	—	7	73	—	—	—	—
(b) Austria	1868	12 florins	67 cents	—	9	92	8	59	9	25
Spain	1867-8	15 escudos	98 decimes	—	13	18	—	—	*11	86
Portugal	1868-9	5 milreis	249 reis	—	9	32	—	—	—	—
(c) British India	1866-7	3 rupees	7 annas	2 pice	2	67	—	—	—	—
Holland	1867-8	27 florins	61 cents	—	18	40	—	—	—	—
(d) Russia	1868	6 roubles	24 copecks	—	8	18	6	9	7	53
Sweden	1867-8	9 riksdalers	89 öre	—	4	32	—	—	—	—
(e) Italy	1868	38 lire	69 centimes	—	12	27	10	67	11	47

The Table may be read thus: The expenditure of France was at the rate of 16 Sols (grams) of gold (half-crowns), and 51 cents per head of population.

(a) In 1868 one gold dollar was worth 1.335 paper dollars, and 1 paper dollar was worth .74906 gold dollar. (See Seyd, p. 346.)

(b) £1 = 10.215 silver florins = paper florins 11.80. (See Seyd, p. 323.)

(c) The mint par between Calcutta and London 1 rupee = 22.6088 pence: in this Table gold rupee = $\frac{1 \text{ gold mohur.}}{15}$

(d) The half imperial which is worth in gold 16.334 shillings equal 5.15 roubles, consequently exchange equals 1 rouble = 38.175 pence; and at 77 shillings and 10½ pence per ounce, the Bank price here, it is 38.055 pence. The exchange lately stood at 32 pence per rouble, consequently a paper rouble is worth only 32 pence. (See Seyd, p. 332.)

(e) The gold at a premium ranging from 12 to 18 per cent. in 1868. (See Seyd, p. 303.)

* For Spain one tenth has been deducted for depreciation of paper.

Note.—The currencies of the United States of America, of Austria, Russia, and Italy are depreciated by the excessive issues of inconvertible paper money. Part of the expenditure incurred in paying parts of the public debt and in other ways is discharged in gold, but the greater part is paid in depreciated paper. The valuation in this Table proceeds on the assumption that the expenditure is in a currency at par, equivalent to gold of its nominal value. This is therefore a maximum value, and a minimum is obtained by reducing the value thus determined to the value in gold of equivalent amounts of depreciated paper. Thus the public estimated expenditure of the United States will not exceed 122,220,000 international ten gram gold coins, nor, as gold was at 133.5, be less than $\frac{122,220,000}{1.335} = 91,550,000$ ten gram gold coins. It would require all the skill and all the knowledge of the American Secretary of the Treasury to determine the exact values lying between those extremes. The same remark applies with greater force to Austria, Russia, and Italy. As regards Spain the depreciation of the paper varies in different localities, and the exchanges afford no help. The mean of the maximum and minimum values are inserted in Col. 6. as mere approximations.

	International Cents.	=	English Coin.
1 centigram of standard gold = 1 cent.	100 cents	=	Half-crown.
	80 cents	=	Florin.
	40 cents	=	One shilling.
	20 cents	=	Sixpence.
	10 cents	=	Threepence.

TABLE XIII.

COUNTRIES.	Years.	EXPENDITURE PER HEAD OF POPULATION			
		In the Coin of each Country.	In Inter- national Victorias or Coins of 10 Grams of Standard Gold.	In depre- ciated Paper Money.	Mean.
United Kingdom -	1866-7	2.2227 £'s	1.778		
America - - -	1867-8	18.5829 Dollars	3.141	*2.353	2.747
France - - -	1868	52.0658 Francs	1.651		
Prussia - - -	1868	6.6444 Thalers	.773		
Austria - - -	1868	12.6654 Florins	.992	*.859	.925
Spain - - -	1867-8	15.9804 Escudos	1.318		1.186 = 1-tenth de- ducted for depreciation of paper.
Portugal - - -	1868-9	5.2485 Milreas	.932		
British India -	1866-7	3.4523 Rupees	.267		
Holland - - -	1867-8	27.6071 Florins	1.840		
Russia - - -	1868	6.2407 Roubles	.818	*.689	.754
Sweden - - -	1867-8	9.8895 Riksdalers	.432		
Italy - - -	1868	38.6890 Lire	1.227	*1.067	1.147

* Factors to show what Expenditure would be on the assumption that it is all expressed—not in gold, as here is taken, but in depreciated paper money :

Factors to convert gold into paper—

1868. United States - -	$\frac{1}{1.335}$	$\lambda \bar{1}.8745187$
Russia - - -	$\frac{32}{88} = \frac{16}{19}$	$\lambda \bar{1}.9253664$
Austria - - -	$\frac{10.215}{11.800}$	$\lambda \bar{1}.9373564$
Italy - - -	$\frac{1}{1.15}$	$\lambda \bar{1}.9393022$
Spain - - -		Uncertain.

Note.— λ stands here for logarithm.

TABLE XIV.

PRIMARY COINS IN USE: Their estimated equivalents in grams of fine gold, in pounds sterling, and in ten gram gold coins .91531 fine. If this fineness is reduced by a uniform seignorage to a fineness not exceeding .900, its value as bullion will be reduced, but its value as coin will remain unchanged wherever it is the current coin and the sole standard of value.

Countries.	Coin of each Country.	Equivalents in Grams of fine Gold.	Present English Money. £	Inter- national Unit of 1 Decagram of Gold. ∇ x = .8 £ a.
<i>Proposed INTERNATIONAL COIN</i>				
	VICTORIA -	9.15310	1.250	1.000
United Kingdom - - -	Sovereign -	7.32250	1.000	.800
America - - -	Dollar -	1.54700 (a)	.211	.169
France - - -	Franc -	.29032 (a)	.040	.032
Prussia - - -	Thaler -	1.06450 (b)	.145	.116
Austria - - -	Florin -	.71684 (c)	.098	.078
Spain - - -	Escudo -	.75470 (a)	.103	.083
Portugal - - -	Milrei -	1.62610 (a)	.222	.178
British India - - -	Rupee -	.70846 (a) (d)	.097	.077
Holland - - -	Florin -	.61020 (e)	.083	.067
Russia - - -	Rouble -	1.20000 (a) (f) (g)	.164	.131
Sweden - - -	Riksdaler -	.40000 (h)	.055	.044
Italy - - -	Lira - -	.29032	.040	.032

Reference to authorities :

(a) Appendix to Report of the Royal Commission on International Coinage, p. 227.

(b) According to the Master of the Mint Fred d'or contains 6.0323 grams of fine gold: a thaler has been taken at 5 $\frac{3}{4}$, equal to one Fred d'or.

(c) It has been assumed that 10.214 Austrian silver Florins equal £1 (English).

(d) The silver rupee, calculated at the par of exchange, is worth .753648 grams of gold. (See Seyd.)

(e) A guilder, taken at 20*d.* English, equals .6102 in grams of fine gold; 20 guilders make 12.204 grams. The Master of the Mint makes a double William 12.112.

(f) The Master of the Mint states that the half imperial of 5 roubles contains 6 grams of fine gold.

(g) The value of a gram of fine gold is £.1365654, consequently the value of 1.200 grams is equal to .16387848 = 3.27757*s.* = 39.3308*d.* The par of exchange between London and St. Petersburg is 38.175*d.*

(h) The Master of the Mint makes a gold ducat contain 3.400 grams of fine gold. A gold ducat contains 8 $\frac{1}{2}$ rix dollar pieces, consequently one rix dollar would contain 4-tenths of a gram of gold.

Note.—Where the double standard now prevails, as in France and the United States, or the silver standard, as in Holland, Germany, and Scandinavia, the values in gold cannot be precisely expressed.

TABLE XV.
ENGLISH AND FOREIGN WEIGHTS AND MEASURES.

ENGLAND.	METRIC SYSTEM.	PRUSSIA and DENMARK.	AUSTRIA.	RUSSIA.
1 Mile	1.6093149 Kilometres.	0.213649 Meile.	0.2121242 Meile.	1.508571 Werst.
1 Foot	3.0479449 Decimetres.	0.9711361 Fuss.	0.9642010 Fuss.	1.000000 Foot.
1 Acre	0.404671 Hectare.	1.584941 Morgen.	0.7030732 Wiener Joch.	0.3704082 Dessätine.
1 Square Foot	0.09289969 Sq. Metre.	0.9431053 Q. Fuss.	0.9296836 Q. Fuss.	1.000000 Sq. Foot.
1 Quarter	2.9058638 Hectolitres.	5.2906368 Scheffel.	4.7278056 Metze.	11.090952 Tschetwerik.
1 Bushel	3.63232976 Decalitres.	0.6613296 Scheffel.	0.5909757 Metze.	1.386369 Tschetwerik.
1 Gallon	4.54041245 Litres.	3.967977 Quarts.	3.210627 Maass.	3.696985 Stooft.
1 Cwt.	0.508024 Quintal.	0.9874577 Centner.	0.9071754 Centner.	3.101371 Pud.
1 Lb. Avoirdupois.	0.4535926 Kilogramme.	0.9698245 Pfund.	0.8099781 Pfund.	1.107632 Pfund.

Note.—The English weights and measures and their metric equivalents in Tables I, II, and III, have all been revised by and are inserted on the authority of the Warden of the Standards, Mr. H. W. Chisholm. [See Second Report of Standards Commission, Appendices VI. and VII.] The Prussian, Austrian, and Russian equivalents in Table XV. have been taken from "Sammulung Mathematischer Tafeln," by Dr. J. A. Hülse.

TABLE XVI.
METRIC AND ENGLISH WEIGHTS AND MEASURES.

METRIC SYSTEM.	ENGLISH EQUIVALENTS.
LENGTH.	
1 Kilometre	{ 0.6213824 Mile. 1093.633056 Yards.
1 Metre	{ 1.0936331 Yards. 3.2808992 Feet. 39.37079 Inches.
1 Decimetre	3.937079 Inches.
1 Centimetre	0.3937079 Inch.
1 Millimetre	0.03937079 Inch.
SURFACE.	
1 Square Kilometer	0.38611608 Square Mile.
1 Hectare	2.47114316 Acres.
1 Are	119.6033262 Square Yards.
1 Square Metre	{ 1.196033262 Square Yards. 10.76430 Square Feet.
LIQUID and DRY.	
1 Kilolitre	220.244308 Gallons.
1 Hectolitre	{ 22.02443 Gallons. 2.7530548 Bushels.
1 Litre*	{ 0.2202443 Gallon. 0.880977 Quart. 1.761954 Pints.
SOLID.	
1 Cubic Metre	{ 1.30802151 Cubic Yards. 35.3165807 Cubic Feet.
WEIGHT.	
1 Metric Ton	{ 0.98421 Ton. 2204.62125 Lbs. Avoirdupois.
1 Metric Quintal	{ 1.96841 Cwt. 220.46212 Lbs. Avoirdupois.
1 Kilogramme	{ 2.204621 Lbs. Avoirdupois. 2.679227 Lbs. Troy.
1 Gramme	15.432349 Grains Troy.

* The litre is here determined by comparing the weight of distilled water contained in the litre with that in the imperial gallon (10 pounds).

TABLE XVII.
ENGLISH AND METRIC WEIGHTS AND MEASURES.

ENGLISH SYSTEM.	METRIC EQUIVALENTS.
LENGTH.	
1 Mile	1.6093149 Kilometres.
1 Yard	0.91438348 Metre.
1 Foot	3.0479449 Decimetres.
1 Inch	2.539954 Centimetres.
SURFACE.	
1 Square Mile	2.599894 Square Kilometres.
1 Acre	0.404671 Hectare.
1 Square Yard	0.83609715 Square Metre.
1 Square Foot	{ 0.09289968 Square Metre. 9.289968 Square Decimetres.
1 Square Inch	6.45136632 Square Centimetres.
LIQUID.	
1 Gallon*	4.54041245 Litres.
1 Quart	1.135103 Litres.
DRY.	
1 Quarter	2.90586 Hectolitres.
1 Bushel	36.32330 Litres.
SOLID.	
1 Cubic Foot	{ 0.028315 Cubic Metres. 28.315311 Cubic Decimetres.
1 Cubic Inch	16.386180 Cubic Centimetres.
WEIGHT.	
1 Ton	1.016048 Metric Ton.
1 Cwt.	0.508024 Quintal.
1 Lb. Avoirdupois	0.4535926 Kilogramme.
1 Lb. Troy †	0.37324195 Kilogramme.
1 Ounce Troy	31.103496 Grammes.
1 Grain Troy	0.06479895 Gramme.

* The standard measure of capacity as well for liquids as for dry goods not measured by heap measures shall be the Gallon, containing 10 lbs. avoirdupois weight of distilled water weighed in air at the temperature of 60° of Fahrenheit's thermometer, the barometer being at 30 inches.

† The Pound Tower = 5400 grains Troy = .34991433 kil. was in use down to 18th of Henry the VIII. It was the same as the Cologne Pound, and one-sixteenth part less than the Troy pound. See Ruding on Coinage, Vol. I, p. 18.

DECISION OF THE HAGUE CONGRESS IN FAVOUR OF EXPRESSING VALUES FOR STATISTICAL PURPOSES IN FRANCS AND IN DECAGRAMS OF GOLD 9-TENTHS FINE. (*Extract from Official Report.—First Section.*)

(The decagram of gold is worth very nearly 25s.)

M. FARR. J'ai l'honneur de vous soumettre encore la proposition suivante : *Qu'en ce qui concerne les monnaies, les auteurs des divers travaux veuillent bien étudier la question s'il convient de donner les valeurs en décagramme d'or dont neuf-dixièmes de fin.*

M. LE PRÉSIDENT. Nous avons déjà décidé que nous donnerions les valeurs en francs.

M. FARR. Le Congrès a adopté le système métrique et nous sommes tous d'accord à cet égard. Mais pour les monnaies il ne pouvait en être de même. On a recommandé à divers gouvernements de modifier en quelques points leur système monétaire afin d'obtenir des rapports très-simples entre les monnaies des différents pays. Ainsi l'Angleterre frapperait un souverain ayant la même quantité d'or fin qu'une pièce de vingt-cinq francs en France ; l'Amérique rendrait aussi le dollar comparable au franc, et ainsi de suite, afin d'avoir toujours un rapport facile entre les diverses monnaies.

Cette question a produit beaucoup d'agitation en Angleterre. On y a proposé de diminuer le poids de l'or du souverain et de lui donner le poids de la pièce de vingt-cinq francs. Cette proposition a été faite lors de la convention de Paris. Dans cette convention, où vingt États divers se trouvaient représentés, on a décidé qu'on adopterait l'or comme étalon commun, en proposant pour point de départ la pièce d'or de cinq francs. M. Michel Chevalier a fait une proposition que je crois très-importante, celle de prendre comme unité monétaire le décagramme d'or. * * * * (See previous pages.)

M. WOŁOWSKI. Nous ne saurions discuter ici la question monétaire. Ce n'est pas une de ces questions qu'on puisse introduire dans un Congrès au moment où l'on est près de se séparer. C'est un grave problème sur lequel il y a beaucoup à dire.

Mais M. Farr nous fait une proposition plus simple à l'égard de laquelle je crois qu'il n'aurait pas eu besoin d'entrer dans la discussion de la question monétaire. Il s'agit d'un moyen d'évaluation pour le monde scientifique, qui s'occupe du rapprochement des différentes données statistiques ; il demande que l'on prenne pour ces évaluations une unité monétaire qui serait le décagramme d'or. Quelle que soit mon opinion sur le fond de la question monétaire, au sujet de laquelle je n'aurai peut-être pas le bonheur de me rencontrer avec M. le docteur Farr, je ne m'oppose pas à l'adoption du décagramme d'or comme unité convenue pour les évaluations statistiques.

Je crois inutile d'entrer dans le fond de la question et de parler des résolutions qui ont pu être prises provisoirement de tel ou tel côté. Je me borne à donner mon adhésion, restreinte dans ces termes, à la proposition de M. le docteur Farr.

M. VISSCHERS. J'appellerai l'attention sur une brochure très-intéressante qui vient de paraître à Berlin et qui est due à M. Eug. Nothomb, fils du ministre plénipotentiaire de Belgique. Cette brochure rentre tout à-fait dans les idées de M. Farr, et je crois qu'il est bon de la signaler ici.

M. LE PRÉSIDENT. Je mets aux voix la proposition de M. Farr.

M. RUGGLES. Je propose d'ajouter que, quant aux États-Unis de l'Amérique du Nord, on prendra pour unité le dollar.

M. LE PRÉSIDENT. Nous avons déjà décidé que chacun pourrait indiquer les valeurs en monnaie de son pays, mais qu'on ferait en même temps la réduction en francs.—(*La proposition de M. Farr est adoptée.*)

Note.—The United States of America and all the chief States of Europe were represented at this meeting of the International Statistical Congress, which sat under the Presidency of the Home Minister of the Netherlands. M. de Baumhauer presided over this section.

APPENDIX C.

REMARKS SUBMITTED TO THE CONSIDERATION OF THE ROYAL SANITARY COMMISSION BY THE REGISTRAR GENERAL OF ENGLAND AND WALES.

*General Register Office, Somerset House,
6th July 1869.*

Having perused the memorial and memorandum presented to Her Majesty's late Government asking for the appointment of this Royal Commission, I see that the first points referred to as requiring reformation relate to my department.

I therefore take the liberty of proposing to make the following general statement.

Although the registration of births is not so complete as is desirable there are not many deaths that remain unrecorded, inasmuch as burial must follow death, and when, previous civil registration of death not having been effected, the officiating minister buries a corpse without being furnished at that time with a certificate that the death has been recorded in the civil register, he must under a penalty of 10*l.* give notice to the registrar of the fact, and thus the registration of deaths is nearly complete, as coroners also send to the registrar, to be recorded, the verdicts of juries in cases where inquests have been held.

So also the registration of marriages is complete, every marriage almost without any exception being forthwith recorded and attested by at least five signatures, the parties married signing, and the officiating minister or the civil registrar and two witnesses.

With respect to births, I am sorry to say that registration is not complete, and I see no machinery that can be devised to make that perfect, for, although baptism and vaccination ought quickly to follow, they do not necessarily do so, and there is no speedy subsequent act, like burial after death, or like circumcision among Jews and Mahometan males, which can be used for making registrars acquainted with every birth that occurs.

The statute may make it imperative under a penalty for parents to give notice, and that would be a great improvement, but in densely populated districts that law, like many others, may be evaded with impunity and, where secrecy is desirable, as in many cases of illegitimate births, I know of no means of forcing all parents to give notice ; in large towns no registrar, however painstaking, zealous, and inquisitive, can ascertain every birth that occurs, if notice is designedly neglected to be given and if concealment is determined upon.

It may be taken for granted that almost all deaths are registered, and it will not be supposed that many are omitted when I state that in this part of Great Britain alone I register nearly 1400 deaths every day, and that during the last 30 years about 13 millions of names of the deceased in England and Wales have been indexed ; the indexes at Somerset House of the names of all born, married, and died since 1837 being 40 millions.

Civil registration of death is effected by a person who was present at death or who was in attendance, who informs the registrar of the particulars to be recorded, attesting by his signature in the register the truth of his statement ; if he wilfully makes any false statement of any one particular he is liable to the pains and penalties of perjury, civil registration being a more serious and important matter than the ecclesiastical registration of baptisms and burials, where there is no penalty for a wilfully false statement.

Amongst other particulars is recorded the cause of death, and in the first years of registration these fatal diseases were very incorrectly entered.

Medical practitioners, however, were invited by the Royal Colleges of Physicians and of Surgeons of London, and by the Society of Apothecaries in 1837 to furnish written statements of fatal diseases to be given to informants for entry in the register.

After some years' experience I found that these causes of death were still badly recorded, and in 1845 I circulated amongst the whole of the medical profession in England and Wales a printed statistical nosology explaining the best mode of recording causes of death, and I also issued, and I continue to do so to the present time, books containing printed certificates to save medical men time and trouble in filling up written statements, and I ordered that in the register books of deaths a distinction should be made in cases where a written statement was produced by the informant from a legally qualified medical practitioner by appending in the same column the word "*certified*," and in cases where no such cause of death was recorded under the hand of a properly qualified practitioner the words "*not certified*" are to be added to the fatal diseases.

In many instances they are now well registered; in other instances medical men refuse to take the trouble of writing certificates of fatal diseases, and consequently there are still sometimes lamentably senseless and useless statements made by ignorant and uneducated informants. For although in Scotland by a later statute medical men are compelled under a penalty to furnish these written certificates, they are not in England and Wales.

The Scotch think this a great hardship, but myself, considering the privileges enjoyed by legally qualified medical practitioners, and seeing that in using the knife and in administering poisons they have free scope and no limit to their discretion, having every credit given them for the exercise of the highest skill although death may not be arrested, and being seldom subjected to investigating inquiry as to the precise treatment of their patients, differing in this respect from quacks, herbalists, &c.; I cannot see that there is any hardship in a medical man being required to state the disease which in his opinion killed the patient who died under his treatment.

If a general practitioner thinks that he ought to be paid for filling up the printed certificate with which I furnish him, let him in his last account sent to the representatives of the deceased, after the last box of pills, the last lotion, the last narcotic, add the charge of half-a-crown or a few shillings for written statement of cause of death.

Practically, although in London and in some large towns a great percentage of fatal diseases is well recorded, many causes of death in many parts of England and Wales are registered in an unsatisfactory manner.

This arises from three causes,—1st. Medical men decline to take the trouble of giving written statements. 2d. Some medical men abstain from stating in direct terms the exact disease, being desirous of not hurting the feelings of mourning relatives who dislike such words recorded and made public as mania, syphilis, hydatids, scrofula, &c. 3d. Many persons do not employ in their last illness legally qualified medical practitioners.

As a remedy, it appears from the proceedings of the British Medical Association, that, generally speaking, it is the desire of pure physicians, pure surgeons, and general practitioners, that a large number of their profession should be appointed to public offices, and that in all cases where their services before death have not been in requisition, one of their body should in all parts of England and Wales enter those families and, before burial or civil registration be permitted, inspect the corpse and investigate and report the cause of death.

I do not suppose that this Royal Commission will be prepared to recommend that every person who is ill *must* seek the attendance of a legally qualified medical practitioner. However desirable the British Medical Association may naturally consider such a course to be, I can hardly think

they wish to make it penal by statute to consult a chemist, a homœopath, an herbalist, a bonesetter, or to have no advice at all, as is the custom with a sect calling themselves "*Peculiar People*," who hold strange opinions upon this point, and whose privilege to act upon those opinions was confirmed last year in a court of law. I have known bonesetters and unqualified practitioners, like Harrup of Brighton, and Hutton of Watford, and Melville of Newcastle-on-Tyne, far superior in their special art to some country doctors; and 30 years ago I myself employed one with great success. At that time in Cumberland there was a family of them of the name of Denison of Stainton, noted for their skill, keeping three horses and perpetually called upon to scour the country professionally in a circle of 50 miles round their residence. I have known pure surgeons *secretly* recommending that they should be consulted.

I have lately seen a case where a man after a severe accident was said to have sprained his shoulder; he suffered much for two years, during which time he was perpetually consulting the most eminent pure surgeons and pure physicians in England, all of whom failed to do him any good or to afford him any relief. He got gradually worse and lost almost entirely the use of his arm, being unable even to write, when he consulted a bonesetter, who immediately saw the real nature of the injury, knew how to treat it, and in a very short time entirely cured him. This same bonesetter has lately, within my knowledge, cured two other persons who had been lame and suffering for years, and had derived no benefit from the advice of the most distinguished legally qualified medical practitioners.

The proposal above referred to and suggested for the consideration of this Royal Commission would, in my opinion, cause in many instances great and needless additional distress to grieving families, and in some cases be considered an intolerable hardship in this free country.

It would also cause heavy expenditure, for it would be necessary to nominate to public offices many hundreds of medical men. A zealous sanguine statist tells me he considers 50,000*l.* annually paid to these doctors a mere trifle, compared to the advantages the public will derive from their services. And in widely spread extensive districts, in Wales for instance, and in the Northern Counties, funerals would be unnecessarily and most inconveniently delayed in cases where beyond doubt no inquiry was needed, and where there had not existed an iota of suspicion that anything improper had occurred previous to the decease.

A coroner in Somersetshire who belongs to the medical profession, when deaths occur from natural causes and the deceased have not been attended by legally qualified medical practitioners, announces his intention of *always* holding inquests, however unnecessary they may seem to be, and however hurtful to the feelings of the relatives and friends of the deceased. I consider this an arbitrary and cruel proceeding on the part of this medical coroner, his object being thus to compel every one, however poor, when ill, to seek the advice of members of his own profession.

There have been instances where medical practitioners have, on the report of designing relatives, believed that death has ended the suffering of their patients, whose recovery they despaired of, and without personally ascertaining the fact, trusting the statements made to them, they have given written certificates of the cause of death for insertion in the register, when actually the persons reported dead were still alive!

I do not now recognize certificates from medical men when they state that they "*have been informed*," or that "*they believe*" that their patient is dead. I must have the fact positively reported by them as having actually occurred, I presume, within their own personal knowledge, or on such evidence as they know they can give entire credence to.

There have also been instances where entries of deaths entirely fictitious have been made, registrars being deluded by false statements of in-

formants, sometimes supported by forged certificates as to the fatal diseases purporting to be signed by medical practitioners.

But what can prevent such cases occurring, when the astute minds of men like Barber and Fletcher are devoted to iniquity of this sort, sufficiently skilful to deceive and rob even the Bank of England, who in these matters are notorious for their caution?

Although these flagitious cases, when exposed and tried in courts of law, are much adverted to, and tend to bring discredit on the system of civil registration of deaths, it occurs to thoughtful minds, with the exception of these few cases above referred to—not many out of the 13 millions of deaths recorded since 1837—how well and how quietly, and with what little trouble these millions of deaths are recorded from day to day in registers carefully indexed and accessible to the public in the immediate neighbourhood, placed in fireproof repositories in 650 different register offices spread over every part of England and Wales; and then again with copies of these registers concentrated in the spacious vaults of Somerset House, again carefully indexed, in order that the public at short notice may obtain in the Metropolis sealed copies, which the statute makes evidence of the entry without further or other proof. Of these certified copies I gave in 1868 about 15,000.

I maintain that the system of civil registration, introduced and organized by Earl Russell 33 years ago, has been found generally to answer well. I do not claim for it perfection, being myself aware of two or three, or perhaps more points, respecting which I can indicate to Her Majesty's Government that reformation is desirable; but upon the three points connected with my department which the memorialists prominently represent as objectionable, I do not advocate the changes they desire to introduce.

First, I am averse to their proposal, that in every district there should be medical officers appointed to investigate causes of death in every case where legally qualified medical practitioners had not been in attendance, and that no funeral should be allowed to take place, and no civil registration of death be effected, without the sanction of such medical officer, not only in towns but in secluded hamlets and in remote cottages.

Secondly, I object to the proposal, that I am to become acquainted with and record every attack of disease which assails each individual of the 22,000,000 inhabitants of this part of Great Britain, infants, adults, and aged, from which they recover—a national registration of all diseases not fatal.

Thirdly, I am opposed to the project, that still-born children should be registered.

I well know how great is the demand for statistics in this age, and that learned and distinguished statisticians are numerous, who earnestly devote their time to the study of returns and tables, and calculations of averages and estimates upon every imaginable subject, and that there are many associations who spend pleasant days in social meetings in various cities, in discussing the results obtained and published by their coadjutors.

But I did not expect to live to see the day that I should be called to appear before a Royal Commission and asked to register all the complaints which do not kill but only annoy and afflict the 22,000,000 of inhabitants of England and Wales. I had thought that with respect to diseases not proving fatal the information already obtained would have been deemed sufficient to satisfy the most inquiring of minds as we have the reports of hospitals, dispensaries, infirmaries, lunatic asylums, reformatories, prisons, workhouses, army and navy hospitals, all of which might be tabulated and published, amounting, it is said, to five millions of separate cases annually, and we read of the results obtained under the Contagious Diseases Act, and are made acquainted from week to week through the medical journals with peculiar cases occurring in private practice.

How are my registration officers to perform this proposed duty? Where is the line to be drawn? Nearly 800,000 women every year in England and Wales bear children; is each of these cases to be particularly recorded with their varying specialities? And are the ailments of these hundreds of thousands of newly born infants to be registered? Are inquiries to be made and facts recorded respecting the catarrhs and headaches, and indigestions many people occasionally suffer from?

When the registrars have noted the puerperal cases and the infantile diseases not proving fatal, they will have a delicate and a difficult task when they intrude their inquiries into the complaints of adults.

I suppose they are to make use of the new nomenclature of diseases printed in five languages lately published by the Royal College of Physicians of London.

That learned body have spent 10 years in its composition, and 60 distinguished persons, celebrated for their peculiar qualifications for preparing and bringing to completion so important and valuable a work, have devoted their time and attention to it. It is to be hoped that, like the new pharmacopœia, this remarkable nomenclature of diseases will be in the hands of every medical practitioner and every registrar of births and deaths, and soon be generally used.

In ascertaining some of the common ailments of adults careful treatment and great tact will be necessary. In large towns, for instance, how difficult it will be in cases of syphilis in males to ascertain whether it is primary or secondary, or whether only gonorrhœa simplex should be recorded with full detail of all accompanying distressing symptoms. Then, with regard to females, how are my registrars without making most annoying inquiries to become acquainted with every case of hystericalgia, or chlorosis, or dysmenorrhœa?

Again, how tedious will be their task when they investigate the complaints that we the aged and infirm are suffering from; what afflicting details will be recorded of our rheumatism, our gout, our sciatica, our failing memory, our infirmity of gait, our blindness, our deafness, our weakened limbs and joints, our diseased circulation, our gravel, our dyspepsia, our amentia, our stone, and our many various sufferings before we reach the end.

Whatever my successor may be equal to I consider that I cannot undertake to execute in a satisfactory manner this proposed new duty with respect to the registration of cases of disease not proving fatal.

Then as to the third point which the learned and accomplished members of the British Medical Society and the Social Science Association bring forward as a deficiency to be remedied in my department, that at present still-born children are not registered.

I am of opinion that neither with respect to marriages, nor births, nor deaths are we in this land of liberty to be hampered and perplexed with all the annoying requirements which are forced upon the people in those European states where the code Napoleon is introduced.

There are some minds dwelling on the subject of miscarriages, abortions, children born dead, who would like to know by means of statistical returns how many there are of such occurrences in every year, in every month, on every day.

I have never yet heard of any real useful object to be gained by this inquiry. We know from printed reports how it is conducted in Paris, where in the four months of March, April, May, June 1868 returns were published respecting—

3	fœtuses	between	1	and	2	months.
21	"	"	2	and	3	months.
48	"	"	3	and	4	months.
108	"	"	4	and	5	months.
144	"	"	5	and	6	months.

Many more at 7, 8, and 9 months. The sex of some, as might be expected, could not be determined, and with respect to 377 others born dead in those four months the exact period of gestation could not be ascertained and recorded.

In Paris in 12 months ending 30th June 1868, 4387 still-born children were registered. Looking at the difference of population according to that proportion the number in England and Wales in each year would be about 50,000, nearly a thousand every week.

Moreover, every one would be subject to the inquiry; princesses and peeresses, prostitutes and paupers, and the persons whose duty it would be to make these searching investigations are not always the best qualified. Registrars of births and deaths are not nominated by me but are elected by Boards of Guardians, men of all ranks and professions, from clergymen of the Church of England to tailors and publicans. Fancy a curate forced by statute to make this inquiry of a pauper prostitute, or a rough mannered beershop keeper or farrier asking a delicate duchess how many months after conception her abortion had taken place?

I consider these inquiries as to the exact period of gestation most indelicate and disgusting, and I see no compensating advantage to be derived from them; they would seriously injure our earnest attempts to obtain a complete and perfect registration of all children born alive.

Many respectable modest women would dread these nasty investigations and would look with horror on the visit of the inquisitive registrar. Myself, I should prefer being compelled by Act of Parliament to register the birth of every living calf, or every living foal, or even a living colt the foal of an ass rather than the miscarriages and abortions of women, and the entry into the world of dead human fetuses, many of which are in a state of decomposition. A latent scintillula of usefulness might probably exist in recording the births of live animals, and it would certainly be a novelty, agreeable to some, to have a list of all the asses in England and Wales, the number of whom may be found to be greater than perhaps some people expect. For the above reasons, therefore, which I fear I have stated at too great length, I urgently deprecate the adoption of the three changes in my department which these learned societies press on the notice of this Royal Commission. My opinions are fixed and not to be shaken, and taking a practical view of the three proposed measures I consider them, however well they may look upon paper, neither wise, just, or beneficial, but on the contrary undesirable, Utopian, and unattainable.

But I must humbly add that it sometimes occurs to me that I may be wrong and the memorialists right, for, when most positive, we are sometimes most wrong; at all events I rest satisfied that the whole subject will be well considered and investigated by this Royal Commission, and a right judgment ultimately arrived at.

If it be decided that Parliament should be invited to enact that a record should be made of cases of diseases not proving fatal and of stillborn children, I think that that inquiry would be best conducted under the able superintendence of the medical officer of health attached to the Lords of the Privy Council.

Finally, I must remark that the establishing of civil registration in 1837 was considered necessary from the negligent manner in which parochial registers were made and preserved by ecclesiastics, and because registers kept by non-conformists were not considered of value as evidence in courts of law, and with a view to centralize in the Metropolis the records of these events, simple in their nature, but immediately important to the persons concerned, affecting in many respects the interests of their kinsmen, their neighbours, and the community at large.

For all the rights of succession to property depend on the legitimacy of birth, the validity of marriage, and proof of death. From inability to produce a register of the marriage of his father and mother a British peer

was lately prevented from taking his seat in the House of Lords for many months.

The events I speak of used in early days to be recorded by the monk in his cartulary, and by our Protestant forefathers in the family Bible; now hundreds of thousands of these events are annually recorded in England and Wales on evidence which, if it be false and given wilfully, is punishable as perjury; and printed indexes are prepared in each quarter of the year rendering to the public easy access to 40 millions of names for legal purposes.

This was the great object which the legislature had before them in establishing 32 years ago this system; and whatever blame may be attributed to my department by the learned societies who have pressed upon Her Majesty's government this inquiry, and by witnesses who have been examined by this Royal Commission, I claim not for myself but for the distinguished head of the statistical branch, Dr. W. Farr, the credit of supplementing the information to be derived from this enormous accumulation of recorded events, and making known the results in returns and reports which are popular and really useful, showing practically the advantages the public derive from attention to drainage, dwellings not too crowded, access to pure water; in returns giving immediate daily publicity as to the exact locality where epidemics rage, when pestilence and cholera visit the country; in returns from which life tables have been framed showing how in former days Insurance Companies exacted from the public premiums too high, not calculated on the proved rate of mortality amongst the people.

The learned societies I allude to may find fault with my department and the medical profession may be urgent advocates for the appointment of hundreds of their body to official positions in every part of the country; but whatever well considered changes and reforms may be made in my office hereafter by my successor, who will be superior to me in ability, (and several changes and several reforms I know to be advisable), I hope without unduly magnifying and extolling my position I may have the satisfaction of thinking that I have not presided over the General Register Office during the last 27 years fruitlessly, inasmuch as evidence constantly reaches me that in every country in Europe and throughout America and all our colonies our labours are highly appreciated, as affording more extended and more useful information upon such subjects than is given in any other country in the world.

GEORGE GRAHAM,
Registrar General.

INDEX OF DISTRICTS.

[The following Index furnishes a reference to the *Number* of each DISTRICT in the topographical arrangement adopted in the Tables of Abstracts contained in the Report, the numbers running consecutively from 1 to 623.* In forming the alphabetical arrangement the principle is adopted of placing compound names in the order in which they are pronounced: thus, East Ashford will be found under the letter E, and not under A, as Ashford, East.]

For names of Towns, such as Chester, Leamington, Torquay, &c., which are not found in this "Index of Districts," see the "Index of Sub-districts" (page 297) and "Index of certain Towns" (page 307).

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[In this alphabetical arrangement the principle is adopted of placing the Sub-Districts (or Registrars' Districts) having compound names in the order indicated by the usual pronunciation of those names; thus, East Grinstead will be found under the letter E, and not under G as "Grinstead, East;" St. James under the letter S, and not as "James, St." The number against each Sub-District, in the third column, refers to the order in which it appears in the arrangement of the Districts in the Tables of Abstracts; thus, Abbey Holme (569; 2) is the 2d Sub-District of the Wigton District, No. 569.]

SUB-DISTRICT.	DISTRICT.	No.	SUB-DISTRICT.	DISTRICT.	No.	SUB-DISTRICT.	DISTRICT.	No.
A								
Abbey	Bath	326; 3	Ardleigh	Tendring	203; 5	Basford	Basford	438; 3
Abbey Holme	Wigton	569; 2	Ardsley	Wakefield	503; 7	Basingsstoke	Basingsstoke	116; 1
Abbots Bromley	Uttoxeter	374; 2	Ardrwick	Chorlton	471; 2	Bassingham	Newark	442; 2
Abbotsbury	Weymouth	274; 4	Arkholme	Lancaster	485; 7	Bathaston	Bath	326; 7
Abbots Langley	Watford	145; 4	Arncliffe	Settle	488; 5	Bathwick	Bath	326; 2
Aberdare	Merthyr Tydfil	582; 4	Arnold	Basford	488; 5	Batley	Dewsbury	502; 2
Aberdaron	Pwllheli	619; 3	Artillery	Whitechapel	22; 1	Battersea	Wandsworth	32; 2
Aberford	Tadcaster	514a; 1	Arundel	Worthing	90; 3	Battle	Battle	77; 3
Abergavenny	Abergavenny	578a; 3	Ashborne	Ashborne	447; 3	Battlefield	Atcham	359; 6
Abergele	St. Asaph	613; 2	Ashburton	Newton Abbot	283; 4	Bawdeswell	Mitford	242; 3
Abergwessin	Builth	599; 1	Ashby-de-la-Zouch	Ashby-de-la-Zouch	414; 3	Bawtry	Doncaster	510; 5
Aberystwith	Bedwelty	578b; 1	Ashford	West Ashford	62; 2	Beaconsfield	Amersham	148; 5
Abingdon	Aberystwith	597; 2	Ashley	Clifton	330; 2	Beaminster	Beaminster	277; 4
Abthorpe	Abingdon	123; 2	Ashover	Chesterfield	448; 1	Beaumaris	Bangor	621; 1
Accrington	Towcester	165; 1	Ashton-in-Makerfield	Wigan	465; 7	Beccles	Wangford	226; 2
Action	Haslingden	477; 5	Ashton Town	Ashton-under-Lyne	474; 2	Beckley	Rye	75; 2
Addingham	Brentford	134; 5	Askrigg	Ashton-under-Lyne	474; 2	Bedale	Bedale	535; 1
Alberbury	Skipton	489; 6	Aslackby	Askrigg	537; 1	Bedford and Cardington	Bedford	179; 5
Albrighton	Atcham	359; 4	Aspull	Bourn	422; 2	Bedford and Kempston	Bedford	179; 5
Albury	Shiffnal	357; 1	Aston Clinton	Wigan	465; 2	Bedlington	Morpeth	558; 2
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Alcester	Alcester	405; 2	Atherstone	Sleaford	426; 5	Begelly	Narberth	590; 6
Aldbrough	Richmond (Yrks.)	539; 4	Atherstone	Atcham	359; 7	Beighton	Rotherham	509; 1
Aldbrough	Skirlaugh	522; 3	Atherstone	Atherstone	397; 1	Belbroughton	Bromsgrove	392; 2
Aldeburgh	Plomesgate	224; 5	Atherton	Leigh	467; 4	Belford	Belford	560; 1
Aldeby	Loddon	238; 1	Attercliffe	Sheffield	508; 6	Belgrave	St. George Hanover-sq.	3; 3
Alderbury	Alderbury	263; 1	Attleborough	Wayland	241; 1	Bellingham	Bellingham	557; 1
Alderley	Macclesfield	453; 8	Audenshaw	Ashton-under-Lyne	474; 3	Belper	Belper	446; 3
Aldgate	Whitechapel	22; 7	Audley	Newcastle-under-Lyme	369; 3	Bennington	Boston	425; 2
Aldington	East Ashford	63; 1	Aughton	Ormskirk	464; 2	Bennington	Newark	442; 4
Aldridge	Walsall	380; 4	Axbridge	Axbridge	324; 4	Bentham	Settle	488; 1
Alford	Spilsby	430; 5	Axminster	Axminster	279; 2	Bere Regis	Wareham	273; 4
Alfreton	Belper	446; 5	Aycliffe	Darlington	540; 2	Berkeley	Thornbury	332; 3
Allendale	Hexham	555; 3	Aylesbury	Aylesbury	151; 2	Berkhampstead	Berkhampstead	147; 1
Allerston	Pickering	530; 4	Aylesford	Malling	55; 1	Berwick	Berwick	561; 2
All Saints	Birmingham	394; 9				Berwick Street	Westminster St. James	6; 3
All Saints	Hastings	76; 2	B			Bettwsycoed	Llanrwst	614; 2
All Saints	Maldon	202; 3	Bacton	Tunstead	230; 4	Beverley	Beverley	518; 2
All Saints	Newcastle-on-Tyne	552; 4	Bainton	Driffild	523; 3	Bewdley	Kidderminster	384; 5
All Saints	Northampton	168; 2	Bakewell	Bakewell	440; 1	Bexhill	Battle	77; 1
All Souls	Marylebone	7; 1	Bala	Bala	616; 1	Bexley	Dartford	50; 1
Almondsbury	Huddersfield	497; 7	Baldock	Hitchin	141; 1	Bibury	Northleach	341; 1
Almondsbury	Thornbury	332; 1	Balsham	Linton	188; 3	Bicester	Bicester	159; 2
Alnwick	Alnwick	559; 2	Bampton	Tiverton	293; 6	Bickerstaffe	Ormskirk	464; 1
Alphington	St. Thomas	281; 8	Bampton	Witney	161; 2	Bideford	Bideford	297; 1
Alresford	Alresford	113; 2	Banbury	Banbury	163; 4	Bidford	Alcester	405; 4
Alston	Alston	564; 1	Bangor	Bangor	621; 2	Biggleswade	Biggleswade	180; 2
Alston	Preston	482; 4	Banham	Guilfeross	240; 1	Billesdon	Billesdon	410; 1
Altarnon	Launceston	301; 1	Banwell	Axbridge	324; 3	Billingham	Sleaford	426; 1
Alton	Alton	114; 1	Barford	Bedford	179; 7	Billingshurst	Petworth	88; 1
Alton	Cheadle	373; 1	Barham	Bridge	64; 2	Billington	Blackburn	480; 1
Altrincham	Altrincham	454; 2	Barking Town	Romford	197; 3	Bilston	Wolverhampton	379; 7
Alverstokey	Alverstokey	97; 1	Barmbrough	Doncaster	510; 2	Bilton	Bramham	514b; 3
Alverthorpe	Wakefield	503; 6	Barmouth	Dolgelly	617; 2	Binbrook	Louth	431; 3
Ambleside	Kendal	575; 1	Barnack	Stamford	421; 2	Bingham	Bingham	443; 1
Amersham	Amersham	148; 3	Barnard Castle	Teesdale	543; 2	Bingley	Keighley	494; 1
Amesbury	Amesbury	262; 2	Barnet	Barnet	136; 2	Binstead	Alton	114; 2
Amlwch	Anglesey	623; 4	Barnoldswick	Skipton	439; 3	Birkenhead	Birkenhead	460b; 1
Ampthill	Ampthill	181; 2	Barnsley	Barnsley	505; 2	Birtle	Bury	469; 4
Amroth	Narberth	590; 3	Barnstaple	Barnstaple	295; 1	Bishop Auckland	Auckland	542; 1
Amwell	Clerkenwell	15; 2	Barrow	Barrow-upon-Soar	416; 1	Bishops Cannings	Devizes	256; 1
Ancoats	Manchester	473; 1	Barrowden	Uppingham	420; 3	Bishops Castle	Clun	353; 2
Andover	Andover	118; 3	Barton	Barton-upon-Irwell	470; 2	Bishops Frome	Bromyard	350; 2
Anston	Worksop	436; 3	Barton	Glanford Brigg	433; 3	Bishops Lydeard	Taunton	315; 5
Antony	St. Germans	302; 1	Baschurch	Ellesmere	362; 4	Bishops Tawton	Barnstaple	295; 6
Appleby	East Ward	573; 1				Bishopstone	Wilton	265; 2
Appleton Roebuck	Bramham	514b; 1				Bishop Stortford	Bishop Stortford	139; 3
Appleton-upon-Wisk	Northallerton	534; 1				Bishops Waltham	Droxford	110; 1

Table with 6 columns: SUB-DISTRICT, DISTRICT, No., SUB-DISTRICT, DISTRICT, No. Lists various sub-districts and districts with their corresponding numbers.

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Table with 6 columns: SUB-DISTRICT, DISTRICT, No., SUB-DISTRICT, DISTRICT, No. Lists various sub-districts and districts with their corresponding numbers.

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SUB-DISTRICT.	DISTRICT.	No.	SUB-DISTRICT.	DISTRICT.	No.	SUB-DISTRICT.	DISTRICT.	No.
West Sheffield.	Sheffield	508; 1	Wimbledon.	Kingston	47; 1	Wootton Bassett	Cricklade	251; 1
West Sunderland.	Sunderland	549; 4	Wimborne.	Wimborne	271; 3	Wootton Wawen	Stratford-on-Avon	404; 5
West Worcester	Worcester	387; 1	Wincanton.	Wincanton	320; 3	Worfield	Bridgnorth	356; 3
West Wycombe	Wycombe	150; 3	Winchester.	Winchester	109; 3	Workington	Cockermouth	570; 3
West Wymer	Norwich	234; 5	Windsor.	Windsor	131; 2	Worksop	Worksop	436; 1
Wetheral	Carlisle	568; 1	Wing.	Leighton Buzzard	183; 2	Worlington	Mildenhall	216; 1
Wetherby	Wetherby	492; 1	Wingham.	Eastry	71; 2	Worsbrough	Barnsley	505; 4
Weymouth	Weymouth	274; 2	Winkleigh.	Torrington	296; 2	Worsley	Barton-upon-Irwell	470; 1
Whalley	Clitheroe	479; 5	Winlaton.	Gateshead	551; 4	Worth	East Grinstead	82; 3
Wheatley	Headington	157; 1	Winslow.	Winslow	152; 1	Worthys	Winchester	109; 2
Whickham	Gateshead	551; 3	Winterbourne.	Amesbury	262; 3	Wortley	Kirkstall	500a; 1
Whitby	Whitby	531; 2	Winterton.	Glanford Brigg	433; 2	Wortley	Wortley	506; 4
Whitchurch	Cardiff	581a; 1	Winwick.	Warrington	466; 2	Wotton-under-Edge.	Dursley	333; 1
Whitchurch	Whitchurch (Salop).	363b; 1	Wirksworth.	Belper	446; 6	Wragby	Horncastle	429; 1
Whitchurch	Whitchurch (Hants).	117; 1	Wisbech.	Wisbech	193; 2	Wray	Lancaster	485; 5
Whitchurch	Bridport	278; 3	Witchampton.	Wimborne	271; 2	Wrenbury	Nantwich	458; 4
Whitchurch	Whitechapel	22; 5	Witham.	Witham	206; 2	Wrexham	Wrexham	611; 4
Whitechapel North	Whitechapel	22; 4	Witheridge.	South Molton	294; 1	Writtle	Chelmsford	200; 3
Whitecross Street	St. Luke	16; 3	Withern.	Louth	431; 1	Wrotham	Malling	55; 3
Whitehaven	Whitehaven	571; 2	Withyham.	East Grinstead	82; 1	Wuerdle	Rochdale	476; 8
Whitford	Holywell	610; 1	Witley	Hambledon	42; 1	Wybunbury	Nantwich	468; 1
Whitkirk	Kirkstall	500a; 4	Witney	Martley	386; 2	Wye	East Ashford	63; 3
Whitley	Pontefract	504a; 2	Witton	Witney	161; 3	Wyke	Westhampnett	91; 2
Whitmore	Newcastle-under-Lyme.	369; 1	Wiveliscombe	Blackburn	480; 7	Wymondham	Forehoe	235; 2
Whitstable	Blean	66; 3		Wellington (Somers.)	314; 1			
Whittlesey	Whittlesey	192; 1	Wivenhoe.	Lexden	205; 1			
Whitwick	Ashby-de-la-Zouch.	414; 4	Woburn.	Woburn	182; 1			
Whitworth	Rochdale	476; 10	Woking.	Woking	39; 1			
Whixley	Great Ouseburn	492a; 2	Wokingham	Wokingham	128; 1			
Wickford	Billericay	199; 3	Wolsingham	Weardale	544; 3			
Wickhambrook	Risbridge	211; 2	Wolstanton.	Wolstanton	370; 1			
Wickham Market	Plomesgate	224; 3	Wolverhampton Eastern.	Wolverhampton	379; 5			
Wigan	Wigan	465; 3	Wolverhampton Western.	Wolverhampton	379; 4			
Wiggenhall	Downham	247; 1	Wolverley.	Kidderminster	384; 2			
Wigton	Blaby	411; 1	Wombourn.	Wolverhampton	379; 2			
Wigton	Wigton	569; 1	Wombridge	Wellington	365; 3			
Wilford	Basford	438; 7	Woodbridge and Wilford.	Woodbridge	223; 3			
Willenhall	Wolverhampton	379; 6	Woodbridge Out.	Woodbridge	223; 4			
Willesden	Hendon	135; 3	Woodbury	St. Thomas	281; 3			
Willingham.	Chesterton	186; 1	Woodchurch	Wirral	460a; 3			
Willingham.	Gainsborough	434; 5	Woodstock.	Woodstock	160; 2			
Williton	Williton	313a; 3	Woodton.	Loddon	238; 3			
Wilmslow	Altrincham	454; 1	Wooler.	Glendale	562; 2			
Wilsden	Bradford (Yrks.)	499; 9	Woolwich Arsenal	Woolwich	36b; 3			
Wilton	Wilton	265; 1	Woolwich Dock-yard.	Woolwich	36b; 2			

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TOWNS of which the Names differ from those of the District and Sub-district in which they are respectively situated.

NAME OF TOWN.	SUPERINTENDENT REGISTRAR'S DISTRICT.	SUB-DISTRICT.	Number of District and Sub-district.
Aberavon	Neath	Margam	584; 1
Bacup	Haslingden	Newchurch	477; 1
Barrow	Rochdale	Whitworth	476; 10
Bedworth	Ulverston	Dalton	486; 4
Blackpool	Foleshill	Foleshill	399; 1
Bognor	Fylde	Poulton-le-Fylde	483; 3
Brandon	Chichester	South Bersted	92; 3
Chatham	Thetford	Methwold	249; 1
Chester	Medway	Rochester and Gillingham	54; 1, 2
Church (Lanc.)	Great Boughton	Chester Castle	459; 2
Claycross	Blackburn	Chester Cathedral	459; 3
Crewes	Chesterfield	Oswaldtwisle	480; 5
Dalish	Nantwich	Ashover	448; 1
Dereham	Newton Abbot	Wybunbury	458; 1
Devonport	Mitford	Teignmouth	283; 1
Droylesden	East Stonehouse	East Dereham	242; 4
Fleetwood	Stoke Damerel	Comprises the whole of the Sub-districts.	288; 1
Godmanchester	Ashton-under-Lyne	Audenshaw	289; 1-5
Gosport	Fylde	Poulton-le-Fylde	474; 3
Great Malvern	Huntingdon	Huntingdon	483; 3
Guiseley	Alverstokey	Huntingdon	176; 4
Heckmondwike	Upton-on-Severn	Alverstokey	97; 1
Hounslow	Wharfedale	Hanley	388; 1
Ironbridge	Dewsbury	Yeadon	493b; 1
Llandudno	Brentford	Liversedge	502; 4
Llanidloes	Madeley	Isleworth	134; 1
Maidenhead	Conway	Madeley	358; 2
Melcombe Regis	Newtown	Creuddyn	622; 2
Middlesborough	Cookham	Llanidloes, Upper and Lower	607; 1, 2
New Brighton	Weymouth	Bray and Cookham	129; 1, 2
Redditch	Stockton	Upway and Weymouth	274; 1, 2
Seaham Harbour	Guisebrough	Yarm	541a; 1
Sheerness	Birkenhead	Kirkleatham	532; 3
Sidmouth	Bromsgrove	Wallasey	460b; 3
Slough	Alcester	Tardebigg	392; 3
Southport	Easington	Studley	405; 1
Southwold	Sheppey	Easington	546; 1
Stalybridge	Honiton	Minster	69; 1
Staveley	Eton	Ottery St. Mary	280; 2
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Widnes	Leigh	Eckington	448; 4
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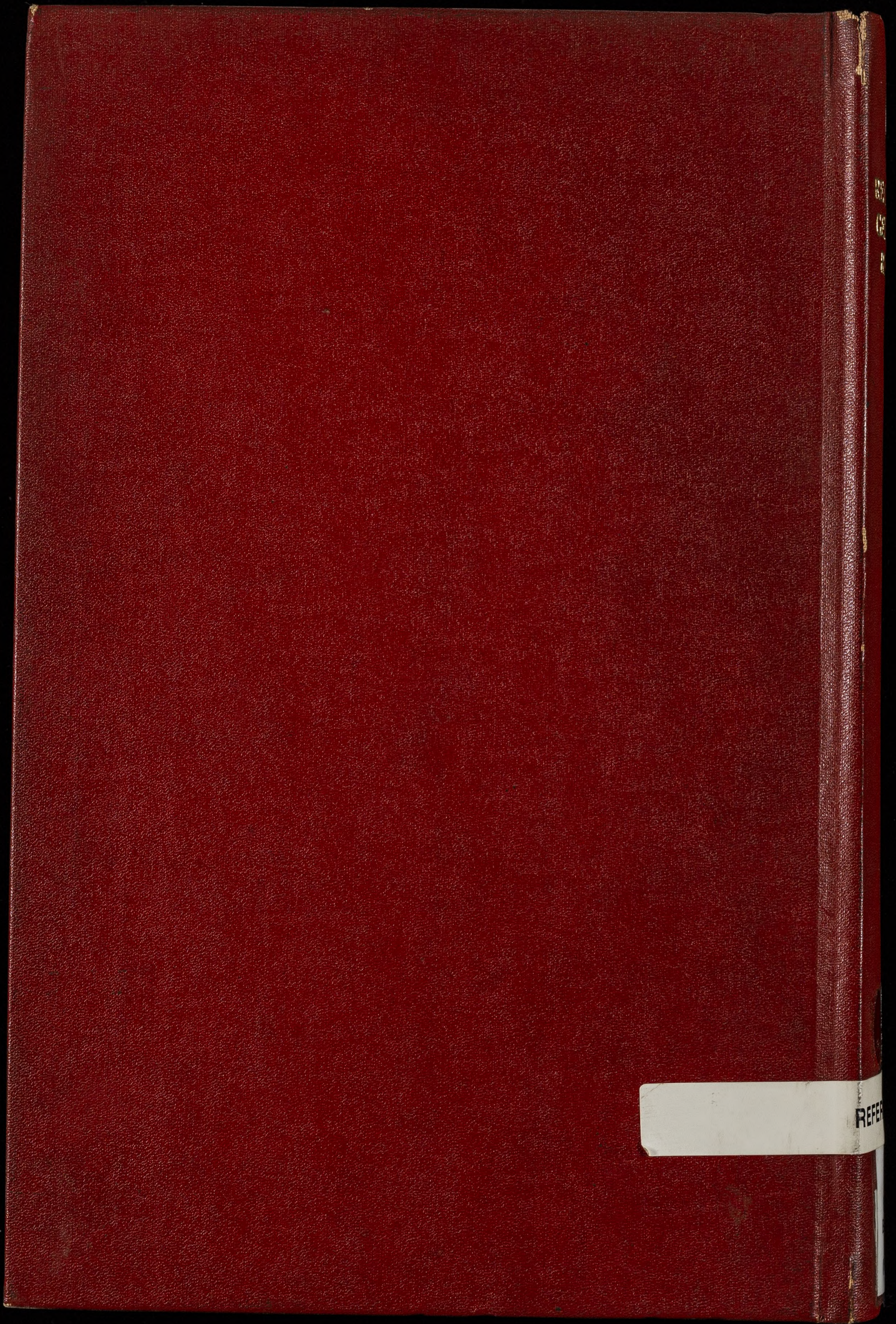
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