Deaths in childbed : a preventable mortality : being the Milroy lectures delivered at the Royal College of Physicians, 1904 / by W. Williams.

DEATHS IN CHILDBED

A PREVENTABLE MORTALITY

To
Dr W. J. Parsons
with the writers compliments
—a—

A New Venture
after 1914

DEATHS IN CHILDBED

A PREVENTABLE MORTALITY

DEATHS IN CHILDBED

A PREVENTABLE MORTALITY

BEING THE

MILROY LECTURES

DELIVERED AT THE ROYAL COLLEGE OF PHYSICIANS

1904

BY

W. WILLIAMS, M.A., M.D., D.P.H. Oxon.

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Reprinted from THE LANCET, June 18 and 25, and July 2 and 9.

LONDON

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136, GOWER STREET, W.C.

1904


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TROPICAL MEDICINE

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The Milroy Lectures

ON

DEATHS IN CHILDBED: A PREVENTABLE MORTALITY.

LECTURE I.

Delivered on Feb. 25th.

Mr. President and Gentlemen,—My first duty is to thank the Council of the College for having conferred upon me the honour of electing me to deliver the Milroy lectures for the year.

In my capacity as medical officer of health, at first in an agricultural area and afterwards in a mining and industrial county, it has been my duty to investigate on several occasions the epidemic prevalence of puerperal fever. As some of the conclusions arrived at during the earlier years of my investigation seemed startling I have been led to extend it and to include the causes of death that are incidental to childbirth. By studying the circumstances which are injurious or fatal to parturient women one may justly hope to contribute to some extent to removal of the evils which shorten their lives and to the improvement of the race generally. I have selected as my subject "Deaths in Childbed: a Preventable Mortality," for the following amongst other reasons: 1. It is a dark, deep, and continuous stream of mortality which has been running through our statistics since the commencement of registration—indeed, from the most remote periods—without showing any signs of abatement and occasionally overflowing its banks, producing epidemics with most disastrous results. 2. It is a mortality which is to a great extent preventable, as evidenced in the enormous improvement which has of late years marked the records of lying-in institutions generally and under conditions where precautionary measures are strictly observed. *Then, if preventable, why not prevented?* 3. It

is a mortality which has been exceptionally high among the women of Wales, in whose health and safety I am greatly interested, and with the mode of life, social relations, and conditions of the existence of whom I am fairly well acquainted. 4. It is high time that some serious attempt should be made by the legislature, the medical profession, and all concerned to put an end to such a painful sacrifice of mothers which stealthily but surely takes place annually. 5. It is a subject closely associated with preventive medicine and which equally concerns the general practitioner and the medical officer of health. I have marshalled at some trouble a formidable array of figures and facts which cannot fail to convince the most callous that it is our duty to use all endeavours to protect the valuable lives of the mothers of England and Wales, over 4000 of whom die annually in childbirth, about half of that number falling a prey to the ravages of puerperal fever which is, to a very great extent at least, a preventable disease. I wish I could designate it as an absolutely preventable disease. Some have done so, yet occasionally a few cases do occur which are difficult to trace to any definite source of infection.

What are the causes of death in childbed? These have been classified by the Registrar-General and others into two groups—(1) puerperal septic diseases and (2) accidents of childbirth—and I propose to adhere to this method. The terms "metria" and "puerperal fever," formerly employed to designate cases of death belonging to the first group, are no longer to be used. Phlegmasia alba dolens, an obviously infectious disease, was up to 1900 included in the tables with diseases of parturition. In the new tables issued by the Local Government Board and the schedules of the causes of death issued in 1901 by the Incorporated Society of Medical Officers of Health the term "puerperal fever" is to include pyæmia, septicæmia, sapræmia, pelvic peritonitis, and peri- and endo-metritis occurring in the puerperium. Under "accidents of childbirth" are included: abortion, miscarriage, puerperal mania, puerperal convulsions (including puerperal nephritis and puerperal uræmia), placenta prævia, flooding aud accidental hæmorrhage, and other accidents of pregnancy and childbirth (to include puerperal thrombosis and embolism, sudden death, extra-uterine pregnancies, obstetrical operations, and retained placenta). It is with these causes of death in childbirth that I am mostly concerned. There are reasons to doubt, however, whether the returns with respect to deaths incidental to parturition are yet complete.

Childbirth and childbed.—Whenever parturition or miscarriage has occurred within one month before the death of the patient the Registrar-General requires that the fact shall be certified even though childbirth may not have contributed to the fatal issue. By childbed is meant that period of a woman's life during and immediately following the

act of parturition and during which women are especially liable to various diseases peculiar or incidental to childbirth. Its length varies in different cases from a few weeks to a few months or longer and is determined in ordinary circumstances by (1) the physical condition and health of the parturient woman; and (2) the care, skill, and attention extended to her during labour. There are many other diseases known which terminate fatally or are accelerated by childbirth and these may be divided into pre-existing diseases and acute diseases. The most common pre-existing diseases of long standing that terminate fatally in childbed are (according to the Registrar-General), in the order of their fatally: chronic Bright's disease, phthisis, syncope (weak heart), bronchitis, valvular disease, and anæmia. The most common acute diseases ending fatally in childbed are pneumonia, acute nephritis, influenza, acute bronchitis, scarlet fever, diphtheria, enteric fever, &c. I do not propose on this occasion to deal with these, except in so far as scarlet fever, diphtheria, and enteric fever sometimes complicate the process of childbirth. I propose to deal with the subject under the following subheadings: 1. The causes of deaths in childbirth. 2. The incidence of mortality in chilbirth in (*a*) England and Wales 1847–91 (55 years) and from 1881 to 1900 (20 years); (*b*) the registration counties of England and Wales from 1848 to 1891 (54 years, and from 1881 to 1900 (20 years); (*c*) the registration counties of Wales, especially Glamorgan, Monmouth, and Salop; and (*d*) some large towns, industrial and mining centres. 3. The analysis of the causes of this mortality. 4. The mortality statistics of some maternity hospitals. 5. The etiology of puerperal fever. 6. The prevalence of epidemics of puerperal fever personally investigated and recorded by others. 7. The way in which women, especially of the poorer classes, are attended during labour. 8. The movement for insuring better training, registration, &c., of midwives. 9. The Midwives Act, 1902: (*a*) an epitome of it; (*b*) Central Midwives Board, its establishment, *personnel*, duties, regulations and suggestions just issued; and (*c*) the administration of the Act and other preventive measures. In other words, I propose to deal with the subject in its statistical, etiological, and preventive aspects. I also intend to endeavour to prove by means of statistics fairly handled and extending over considerable periods and having reference to a large number of births that the mortality in childbirth has remained undiminished, that puerperal septic diseases are to a very great extent preventable, that deaths from "accidents of childbirth" are controllable or to a considerable extent preventable, and to point out the means whereby these ends may be secured.

Puerperal septic diseases.—In the earlier reports the term "metria" is made use of up to 1850 and for many years after

that date. The term "puerperal fever" was made use of for the first time in 1850 and it is often continued up to the present, but in a circular letter to medical practitioners by Dr. John Tatham they are advised to abandon it altogether. The separate forms of septic infection given in the "new list of causes of deaths as used in the annual reports of the Registrar-General of England and Wales" are puerperal septicæmia, puerperal septic intoxication, puerperal pyæmia, phlegmasia alba dolens, puerperal fever (not otherwise defined), or puerperal septic diseases. Although the exact nature of the morbid conditions thus designated is even now a subject of controversy, yet the fever with symptoms of acute and general blood poisoning to which women in childbirth are peculiarly liable has symptoms of a sufficiently definite character, such as high temperature, quick pulse, furred tongue, fœtid or suppressed lochia and milk, &c., to admit of its classification under this heading and clear differentiation from any other causes of death in childbirth.

Accidents of childbirth.—Under this heading are contained deaths from "the various mishaps of childbirth," some of which will always be inevitable but a considerable proportion of which prove fatal in the absence of proper obstetric assistance and skill.

Table I. gives statistical information in regard to the mortality in childbirth in England and Wales for a period of 55 years (1847 to 1901) and contains the latest obtainable figures. The death-rates are based on the proportion of deaths to registered births and not on the population, as in corresponding rates for other diseases. We have in this method a more accurate gauge of the amount of the mortality, which if not absolutely correct is more nearly so than any calculation based upon an always variable population. Of course, miscarriages and stillbirths are not included, as the law does not compel the registration of those births known as stillbirths, so that the mortality in childbirth following such births is not included. Dr. J. R. Kaye in a paper entitled "Certification and Registration of Deaths —the Urgent Need for Improvement," which appeared in the *Journal of State Medicine* for June, 1902, wrote :—

Stillbirths.—One of the most glaring and most dangerous defects of our Registration Acts, and the most loudly calling for reform, is the omission to compel the registration of those officially known as stillbirths. Can anything be more extraordinary than that, in this educated twentieth century, any woman, no matter her character, if she elects to call herself a midwife, is at liberty to issue a certificate for the burial of children who are born still or otherwise on her undefined certificate? Why should our maternal mortality records (imperfect though they be), upon which so much time and labour has been expended, be impaired, and why should the *compulsory contribution* (the death certificate) of the registered medical practitioner be further degraded by the acceptance of worthless information from unqualified sources?

What do Tables I. and II. prove? They do not prove very much. They show that the mortality from puerperal septic diseases reached its maximum point during registration times in 1874 when it was 3·63 per 1000; the year 1898 comes next with 3·30 per 1000. From 1874 and 1875 to 1881 the mortality was again much the same as it was before 1874. In 1881, 1882, and 1883 the mortality rate increased considerably, and this increase has continued to the present time, and was particularly high in 1892, 1893, and 1894. As far as accidents of childbirth are concerned, the mortality-rate varied from the highest in 1847 (4·5 per 1000) to the lowest in 1886, 1887, and 1889 (1·9 per 1000). Indeed, since 1874 (3·30 per 1000) there has been little or no decrease in the death-rate. It will be remembered that the year 1893 was exceptionally dry and that the mortality from enteric fever and diarrhœa was higher than in any previous year since 1884. Immediately before 1874 the death-rate from puerperal septic diseases was not particularly high, but from 1881 to 1900—a period of 20 years—there has been a higher sustained mortality than in any previous and corresponding period. During the years in question it was highest in 1893 (3·30 per 1000), the year immediately preceding the most severe outbreaks of influenza. It was lowest in 1898 (1·84 per 1000). It was not until the Public Health Act of 1872 (decreeing the appointment of medical officers of health) became generally adopted that certification of the causes of deaths by medical men was turned to scientific account, but the Registrar-General has issued most valuable reports since 1839 and it is to these reports that we are indebted for the "sheet-anchor of the public health service," the Public Health Act of 1875.

In 1874 the Registration Act was placed upon the statute book which made it incumbent on medical men to furnish certificates of the causes of deaths of all patients who died whilst attended by them. The Registrar-General in his thirty-eighth annual report for the year 1875 writes:—

The mortality of the mothers of England and Wales, notwithstanding the progress of the obstetrical art, was higher in 1874–75 than it has been since 1847.

It was about 1874, in consequence of [the Public Health Act of 1872, that it became incumbent upon local authorities in all parts of England and Wales outside the metropolis to appoint medical officers of health and it was then for the first time that the greater number of rural districts at least came under medical supervision.

The rise in the mortality from puerperal septic diseases which began after 1881 may be partly explained by the fact that it was in 1881 that the Registrar-General for the first time (with a view of making the returns of deaths in childbirth more complete in cases where the certificates of deaths were not satisfactorily filled up) commenced the practice of sending out letters of inquiries to all practitioners who had

TABLE I.—*Mortality in Childbirth in England and Wales 1847–1901 (a period of 55 years).*

Year.	Registered births of children born alive.	Deaths.			Death-rate to 1000 children born alive, from		
		Puerperal septic diseases and accidents of childbirth.	Puerperal septic diseases.	Accidents of childbirth.	Puerperal septic diseases and accidents of childbirth.	Puerperal septic diseases.	Accidents of childbirth.
1847	539,965	3226	784	2442	5·97	1·45	4·52
1848	563,059	3445	1365	2080	6·12	2·42	3·70
1849	578,159	3339	1165	2174	5·78	2·02	3·76
1850	593,422	3252	1113	2139	5·48	1·88	3·60
1851	615,865	3290	1009	2281	5·34	1·64	3·70
1852	624,012	3247	972	2275	5·20	1·56	3·64
1853	612,391	3060	792	2268	5·00	1·30	3·70
1854	634,405	3009	954	2055	4·74	1·50	3·24
1855	635,043	2979	1079	1900	4·69	1·70	2·99
1856	657,453	2888	1067	1821	4·39	1·62	2·77
1857	663,071	2787	836	1951	4·20	1·26	2·94
1858	655,481	3131	1068	2063	4·78	1·63	3·15
1859	689,881	3496	1238	2258	5·07	1·79	3·28
1860	684,048	3173	987	2186	4·64	1·44	3·20
1861	696,406	2995	886	2109	4·30	1·27	3·03
1862	712,684	3077	940	2237	4·32	1·32	3·00
1863	727,417	3588	1155	2433	4·93	1·59	3·34
1864	740,275	4016	1484	2532	5·43	2·00	3·43
1865	748,069	3823	1333	2490	5·11	1·78	3·33
1866	753,870	3682	1197	2485	4·88	1·59	3·29
1867	768,349	3412	1066	2346	4·44	1·39	3·05
1868	786,858	3503	1196	2307	4·45	1·52	2·91
1869	773,381	3283	1181	2102	4·24	1·53	2·71
1870	792,787	3875	1492	2383	4·89	1·88	3·01
1871	797,428	3935	1464	2471	4·98	1·81	3·09
1872	825,907	3803	1400	2403	4·60	1·70	2·90
1873	829,778	4115	1740	2375	4·96	2·10	2·86

TABLE I.—*continued.*

Year.	Registered births of children born alive.	Deaths.			Death-rate to 1000 children born alive, from		
		Puerperal septic diseases and accidents of childbirth.	Puerperal septic diseases.	Accidents of childbirth.	Puerperal septic diseases and accidents of childbirth.	Puerperal septic diseases.	Accidents of childbirth.
1874	854,956	5927	3108	2819	6·93	3·63	3·30
1875	850,607	5064	2504	2560	5·95	2·94	3·01
1876	887,968	4142	1746	2396	4·66	1·97	2·69
1877	888,200	3443	1444	1999	3·88	1·63	2·25
1878	891,906	3300	1415	1885	3·70	1·59	2·11
1879	880,359	3340	1464	1876	3·79	1·66	2·13
1880	881,643	3492	1659	1833	3·94	1·88	2·08
1881	883,642	4227	2287	1940	4·78	2·58	2·20
1882	889,014	4524	2564	1960	5·09	2·89	2·20
1883	890,722	4508	2616	1892	5·06	2·94	2·12
1884	906,750	4647	2468	1879	4·79	2·72	2·07
1885	874,970	4449	2420	2029	4·98	2·71	2·27
1886	903,866	3877	2078	1799	4·72	2·39	1·99
1887	886,331	4160	2450	1710	4·69	2·8	1·9
1888	879,868	4160	2386	1774	4·73	2·49	2·01
1889	885,944	3585	1852	1733	4·05	2·09	1·95
1890	869,937	4255	1956	2299	4·89	2·24	2·62
1891	914,157	4787	1973	2814	5·24	2·15	3·06
1892	897,957	5194	2356	2838	5·78	2·62	3·16
1893	914,542	5950	3023	2927	6·51	3·30	3·19
1894	890,289	4775	2167	2608	5·36	2·43	2·92
1895	922,291	4219	1849	2370	4·57	2·00	2·56
1896	915,309	4561	2053	2508	4·98	2·24	2·74
1897	921,693	4250	1836	2414	4·61	1·99	2·62
1898	923,265	4074	1707	2367	4·41	1·84	2·56
1899	928,646	4326	1908	2418	4·66	2·05	2·63
1900	927,062	4454	1941	2514	4·81	2·09	2·71
1901	927,807	4394	2079	2315	4·73	2·24	2·49

used the terms "peritonitis," "pyæmia," "septicæmia," &c., in registering the deaths of women of the child-bearing age. It is certain that such a practice (which has been continued up to the present time) has led to the inclusion under the heading of "puerperal fever" of a number of deaths that would otherwise not have been classified as such, and doubtless the increased mortality from this cause is more apparent than real. I am perfectly willing to make full allowance for this and to concede that the sustained increase of the mortality in childbirth, especially puerperal fever (puerperal septic diseases) during the last 20 years may be at least partly accounted for in this way. When this is

TABLE II.—*The Important Features of the Foregoing Table.*

England and Wales.	Death-rate per 1000 births.		
	Total deaths in child-birth.	Deaths from puerperal septic diseases.	Deaths from accidents of childbirth.
Average of 5 years from 1851–1855	4·9	1·5	3·4
,, 5 ,, 1856–1860	4·6	1·5	3·0
,, 5 ,, 1861–1865	4·8	1·6	3·2
,, 5 ,, 1866–1870	4·6	1·5	3·1
,, 5 ,, 1871–1875	5·4	2·4	3·0
,, 5 ,, 1876–1880	3·9	1·7	2·2
,, 5 ,, 1881–1885	4·9	2·8	2·1
,, 5 ,, 1886–1890	4·5	2·4	2·1
,, 5 ,, 1891–1895	5·4	2·5	2·9
,, 5 ,, 1896–1900	4·6	2·0	2·6
,, 1 year 1901	4·7	2·2	2·4

granted we are still face to face with the fact that the child-birth mortality has not at all diminished in the past 20 years; on the contrary it will be noticed in glancing over the above tables that this mortality for the years 1892, 1893, and 1894 was 5·78, 6·51, and 5·36 per 1000 respectively, and that 6·51 per 1000, the rate for 1893, is the highest on record since the commencement of a system of registration. Moreover, the mortality rates per 1000 from puerperal fever and accidents of childbirth for these years are correspondingly high, viz. :—

	1892.	1893.	1894.
Mortality in childbirth	5·78	6·51	5·36
Puerperal fever	2·62	3·30	2·43
Accidents, &c.	3·16	3·19	2·92

Therefore it will be seen that the mortality in both groups

has remained undiminished up to the present. How can this anomaly be explained in view of the enormous advances made in surgery, of the adoption of aseptic and antiseptic precautions in normal midwifery practice, of the reduction of mortality in childbirth that has occurred in the case of lying-in hospitals and under other conditions, and of the improvements in sanitary conditions generally that have taken place during this period? There is only one way of possibly explaining this increase and if we are justified in answering (though on this point I have no information) that some of the amended death certificates sent in response to the circulars of the Registrar-General would otherwise have altogether escaped registration under the heading of childbirth, we are also justified in believing that the general death-rate of childbed mortality, apparently stationary, or very nearly so, for the last 40 years, has in reality declined somewhat and "that in spite of what I fear must be admitted—viz., that the advance of civilisation does not at all tend to decrease the perils incidental to the physiological function of childbirth." There is, however, no getting away from the fact that during the last 20 years, when a more accurate registration has been adopted, upwards of 40 per cent. of the total childbed mortality has been caused by septic diseases. It will further be seen that this undiminished mortality has been sustained for a period of 20 years and that the sources of fallacy are not confined to one or to a few years. It will be noticed also that this period (1881–1900) of undiminished mortality in childbirth coincides with a period in which enormous strides have been made in all matters pertaining to sanitation generally and with a period of improved certification of the causes of death in connexion with childbirth. It is highly probable, therefore, that this undiminished mortality is the direct result of the improved certification and that it is more apparent than real. It has been proved without a doubt that during recent years the mortality in lying-in institutions generally—both in their internal and external departments—has also decreased to the vanishing point, so that we are forced to the conclusion that this undiminished and sustained mortality takes place outside maternity hospitals—i.e., in general practice—and that the conditions under which women are confined outside of these institutions have not shared to an equal degree the improvements effected in their internal and external departments.

Before proceeding to investigate the causes at work in sustaining this persistently high mortality it would be useful to consider its geographical distribution. The various registration counties in England and Wales present marked differences in reference to death-rate from childbed mortality and I have therefore decided to consider each registration county on its own merits (Table III.); on a former occasion I have worked out the statistics from 1848 to 1894, and for the purpose of these lectures I have done so up to 1901.

TABLE III.—*Mean Mortality Rates per 1000 for a Period of 54 Years (1848–1901) in each Registration County.*

Division and registration county.	Puerperal septic diseases.	Accidents of child-birth.
I. London—		
London	2·1	2·3
II. South Eastern—		
Surrey	1·9	2·6
Kent	1·6	2·3
Sussex...	1·3	2·6
Hants	1·7	2·6
Berks	1·7	2·8
III. and IV. South Midland—		
Middlesex	1·9	2·6
Herts	1·7	2·7
Bucks	1·5	2·9
Oxfordshire	1·6	2·7
Northants...	1·9	2·5
Hunts	1·3	2·3
Bedfordshire	1·7	2·7
Cambridgeshire	1·5	2·4
V. East—		
Essex	1·5	2·3
Suffolk	1·4	2·4
Norfolk	1·9	2·7
VI. South-Western—		
Wilts	1·7	3·1
Dorset...	1·3	2·8
Devon	1·6	2·6
Cornwall	1·2	3·1
Somerset	1·6	2·7
VII. West Midland—		
Gloucestershire	1·8	2·7
Herefordshire	1·8	3·3
Salop	2·0	3·1
Staffordshire	2·0	2·6
Worcestershire	1·9	2·6
Warwickshire	1·7	2·4
VIII. North Midland—		
Leicestershire	1·7	2·4
Rutlandshire	1·3	1·9
Lincolnshire	1·5	2·7
Notts	1·9	2·6
Derbyshire	2·1	3·1

TABLE III.—*continued.*

Division and registration county.	Puerperal septic diseases.	Accidents of child-birth.
IX. North-Western—		
Cheshire	2·2	3·2
Lancashire	2·3	3·1
X. Yorkshire—		
West Riding	2·1	2·9
East Riding	1·7	2·5
North Riding	1·8	3·0
XI. Northern—		
Durham	2·1	2·9
Northumberland	2·2	2·9
Cumberland	2·1	2·9
Westmorland	1·8	2·6
XII. Welsh—		
Monmouthshire	2·0	3·6
South Wales	2·2	3·7
North Wales	2·1	2·2

The foregoing figures show that the death-rate from puerperal septic diseases (per 1000 registered births) ranges from 2·3 to 1·2 in the various counties thus :—

TABLE IV.—*Death-rate from Puerperal Septic Diseases in Registration Counties.*

Lancashire ... ... 2·3

Cheshire ... ...
Northumberland
South Wales ... } 2·2

London ... ...
Derbyshire ... ...
West Riding ...
Durham ... ...
Cumberland ...
North Wales ... } 2·1

Salop ... ...
Staffordshire ...
Monmouthshire } 2·0

Surrey ... ...
Middlesex ... ...
Northants ... ...
Norfolk ... ...
Worcestershire ...
Notts ... ... } 1·9

Gloucestershire ...
Herefordshire ...
North Riding ...
Westmorland ... } 1·8

Hants ... ...
Berks ... ...
Herts ... ...
Bedfordshire ...
Wilts ... ...
Warwickshire ...
Leicestershire ..
East Riding... ... } 1·7

Oxfordshire... ...
Devon ... ...
Somerset ... ...
Kent ... ... } 1·6

Bucks ... ...
Cambridgeshire...
Essex ... ...
Lincolnshire ... } 1·5

Suffolk ... ... 1·4

Sussex ... ...
Hunts ... ...
Dorset ... ...
Rutland ... ... } 1·3

Cornwall ... ... 1·2

The mean death-rate per 1000 for England and Wales is 1·8. Lancashire heads the list with 2·3 and is closely followed by Cheshire, Northumberland, and South Wales with 2·2; London, Derbyshire, West Riding, Cumberland, and North Wales with 2·1; Salop, Staffordshire, and Monmouthshire, with 2·0; Surrey, Middlesex, Northants, Norfolk, Worcestershire, and Notts with 1·9, all of which are above the mean for England and Wales (1·8). Cornwall has the lowest rate—1·2 per 1000—and Sussex, Hunts, Dorset, and Rutland come next with 1·3; Suffolk has 1·4; Bucks, Cambridgeshire, and Essex have 1·5; Kent, Oxfordshire, Devon, and Somerset, 1·6; and Hants, Berks, Herts, Bedfordshire, Wilts, Warwickshire, Leicestershire, and East Riding, 1·7.

That there is a marked difference in the various rates is obvious, but we are not justified at this stage in drawing any conclusion from the figures before us, for even the circumstances which obtain in various localities only a few miles apart in the same county are vastly different, as I hope to prove later. However, as a general rule it would seem that the rate was highest in the western counties, especially in the hilly districts, or roughly in those counties, west of a line drawn from the mouth of the Severn to that of the Tees.

The death-rate from accidents of childbirth ranges from 3·7 to 1·9 per 1000 registered births, thus :—

TABLE V.—*Death-rate from Accidents of Childbirth in Registration Counties.*

South Wales ...	3·7	Berks	2·8	Northants	2·5
Monmouthshire...	3·6	Dorset		East Riding... ...	
Herefordshire ...	3·3	Herts	2·7		
		Oxfordshire... ...			
Cheshire	3·2	Bedfordshire ...		Cambridgeshire...	2·4
Lancashire	3·1	Somerset		Suffolk	
		Gloucestershire...		Warwickshire ...	
Wilts	3·1	Lincolnshire ...		Leicestershire ...	
Cornwall		Norfolk...			
Salop		Sussex	2·6	London...	2·3
Derbyshire		Surrey		Kent	
North Riding ...	3·0	Hants		Hunts	
		Middlesex		Essex	
Bucks	2·9	Devon			
West Riding ...		Staffordshire ...			
Durham		Worcestershire ...		North Wales ...	2·2
Northumberland		Notts			
Cumberland ...		Westmorland ...		Rutland	1.9

In these statistics a much wider difference between the two extremes is observed and the death-rate is above the mean for England and Wales (2·7 per 1000) in Berks, Bucks, Wilts, Dorset, Cornwall, Herefordshire, Salop, Derbyshire, Cheshire, Lancashire, West Riding, North Riding, Durham, Northumberland, Cumberland, Monmouthshire, and South Wales. It is below the average in London,† Surrey, Kent, Sussex, Hants, Middlesex, Northants, Cambridgeshire, Norfolk, Hunts, Essex, Suffolk, Devon, Staffordshire, Worcestershire, Warwickshire, Leicestershire, Rutland, Notts, East Riding, Westmorland, and North Wales. It will be observed also on examining the figures of the various registration counties that they vary to a considerable extent and thus suggest that the extent and intensity of the causes at work are different at different times and that the accidents of childbirth are, at least to a certain extent, controllable. So far the figures do not prove much but they do show that the mortality from puerperal septic diseases is more evenly distributed than is the mortality from accidents of childbirth and that no diminution has occurred in either case. Both rates are similar in that they are highest in the Welsh and North-Western counties.

Having failed to arrive at any definite conclusion (except that the mortality under each subheading has remained undiminished) by studying the mortality in childbirth during a period of 54 years I now propose to confine my attention to the period of 20 years from 1881 to 1900. This period coincides with the time that has elapsed since the introduction of antiseptics into surgical work, with a period during which great advances have been made in sanitary matters, and with the more reliable certification of the causes of death. (Fig. 1.)

Before 1881 (when the circular letter to medical men already referred to was sent out by the Registrar-General for the first time) it is probable that many deaths in childbirth, especially from the puerperal septic diseases, escaped registration as such. In support of this statement I quote the words of the Registrar-General in his forty-seventh annual report :—

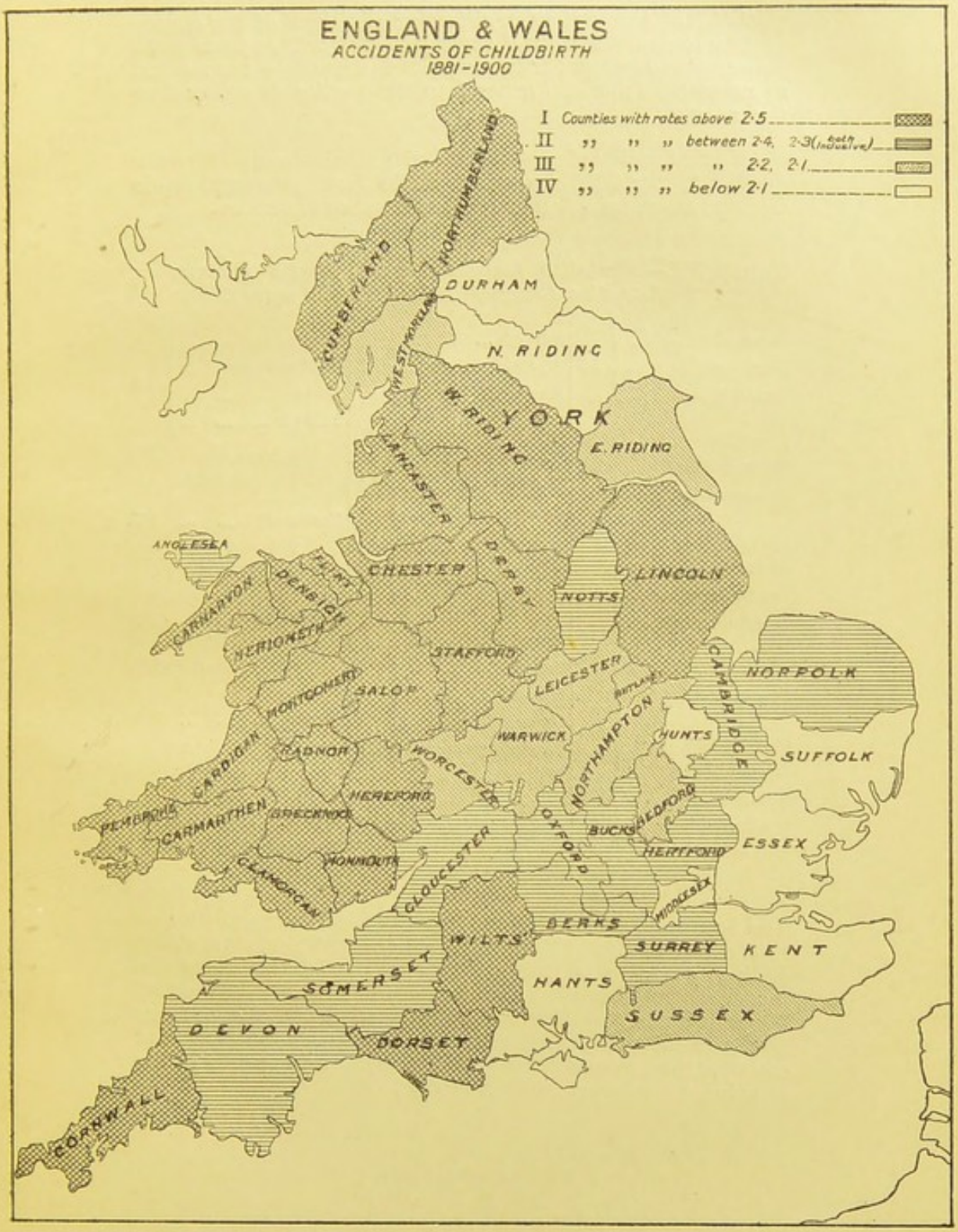
> **Out of 453 cases of married women whose deaths were returned in 1884 simply as due to peritonitis or septicæmia, it was found on inquiry that no less than 156 were cases of a puerperal character.**

So we may rightly assume that the figures given after 1881 are nearer the truth than are any that appeared before. During this period of 20 years I propose to deal with the mortality in childbirth in the various registration counties of England and Wales, in some large towns, industrial and mining centres, and in some country districts, and to examine more in detail the statistics for Wales, Monmouthshire, Herefordshire, and Salop, and still more in detail the

FIG. 1.


ENGLAND & WALES
PUERPERAL FEVER
(1881-1900)
I Counties with rates above 2·5
II " " " between 2·5, 2·3 (both inclusive)
III " " " " 2·2, 2·0
IV " " " below 2·0
NORTHUMBERLAND
CUMBERLAND
DURHAM
WESTMORLAND
N. RIDING
W. RIDING
YORK
E. RIDING
LANCASTER
ANGLESEA
CARNARVON
DENBIGH
FLINT
CHESTER
DERBY
NOTTS
LINCOLN
MERIONETH
STAFFORD
MONTGOMERY
SALOP
LEICESTER
RUTLAND
NORTHAMPTON
CAMBRIDGE
NORFOLK
RADNOR
WARWICK
HUNTS
SUFFOLK
CARDIGAN
WORCESTER
HEREFORD
PEMBROKE
CARMARTHEN
BRECKNOCK
OXFORD
BUCKS
BEDFORD
ESSEX
MONMOUTH
GLAMORGAN
GLOUCESTER
HERTFORD
MIDDLESEX
BERKS
WILTS
SURREY
KENT
SOMERSET
HANTS
SUSSEX
DEVON
DORSET
CORNWALL

FIG. 2.


ENGLAND & WALES
ACCIDENTS OF CHILDBIRTH
1881-1900
I Counties with rates above 2·5
II " " " between 2·4, 2·3 (both included)
III " " " " 2·2, 2·1
IV " " " below 2·1
CUMBERLAND
NORTHUMBERLAND
DURHAM
WESTMORLAND
N. RIDING
W. RIDING
YORK
E. RIDING
LANCASTER
ANGLESEA
CARNARVON
DENBIGH
FLINT
CHESTER
DERBY
NOTTS
LINCOLN
MERIONETH
STAFFORD
LEICESTER
RUTLAND
NORFOLK
MONTGOMERY
SALOP
CAMBRIDGE
CARDIGAN
RADNOR
WARWICK
NORTHAMPTON
HUNTS
SUFFOLK
WORCESTER
PEMBROKE
HEREFORD
CARMARTHEN
BRECKNOCK
OXFORD
BUCKS
BEDFORD
ESSEX
GLAMORGAN
MONMOUTH
GLOUCESTER
HERTFORD
MIDDLESEX
BERKS
WILTS
SURREY
KENT
SOMERSET
HANTS
SUSSEX
DEVON
DORSET
CORNWALL

statistics of the various registration divisions of the county of Glamorgan during the same period; for it appears more reasonable to endeavour to arrive at the truth by the method of reasoning from the general to the particular rather than the reverse.

An examination of the figures given below shows that the death-rate per 1000 registered births from puerperal septic diseases range from 3·0 to 1·4 in the various counties.

TABLE VI.—*Mortality from Puerperal Septic Diseases in Registration Counties, 1881–1900 (20 years).*

Lancashire	3·0	Surrey	2·2	Bucks	1·8
North Wales ...		Warwickshire ...		Bedfordshire ...	
South Wales ...		North Riding ...		Essex	
				Suffolk	
Cheshire	2·8	London	2·1		
Westmorland ...		Berks			
Monmouthshire...		Middlesex			
		Cumberland ...		Cornwall	1·7
West Riding ...	2·6	Devon	2·0		
Notts	2·5	East Riding... ...			
Derbyshire		Durham		Herts	1·6
Northumberland					
		Kent	1·9		
Norfolk	2·4	Sussex			
Herefordshire ...		Hants			
		Oxfordshire... ...		Dorset	1·5
Northants	2·3	Cambridgeshire...			
Gloucestershire ...		Wilts			
Salop		Somerset			
Staffordshire ...		Leicestershire ...		Hunts	1·4
Worcestershire ...		Lincolnshire ...		Rutland	

The figures in Table VI. show that the death-rate was highest in the Welsh, North-Western, Northern, and Yorkshire (West Riding) counties to the west of a line drawn from the mouth of the Tees to the estuary of the Severn. In the first 20 counties in the list the rates were above the average (2·1 per 1000) for England and Wales; in the next four counties they were the same as the mean rate; while in the remainder they were below that rate.

The death-rate from accidents of childbirth ranges from 3·3 to 1·7 per 1000 registered births, as may be seen from Table V. (Fig. 2.)

TABLE VII.—*Mortality from Accidents of Childbirth in Registration Counties, 1881–1900 (20 years).*

South Wales ...	3·3	Oxfordshire ...	2·4	Sussex	2·2
North Wales ...		Devon		Bedfordshire ...	
Cornwall	3·0	Gloucestershire ...		Worcestershire ...	
Monmouthshire ...		Notts		Warwickshire ...	
Cheshire	2·9			Leicestershire ...	
Cumberland ...				Rutlandshire ...	
		Surrey	2·3	East Riding	
Dorset	2·6	Berks		Westmorland ...	
Herefordshire ...		Herts		Northants	2·1
Salop		Bucks		Kent	2·0
Derbyshire		Cambridgeshire ...		Hants	
Lancashire		Norfolk		Suffolk	
West Riding ...		Somerset		North Riding ...	
Northumberland				Hunts	1·9
Wilts				Durham	
				Middlesex	1·8
Staffordshire ...	2·5	Mean for England and Wales ...	2·4	Essex	
Lincolnshire ...				London	1·7

The above figures tend to show that the rate is highest in the Welsh division, in Cornwall, and in all probability in the more agricultural districts of these counties, whereas the rates are lowest in London and in the counties immediately surrounding it.

I now come to consider the statistics of the Welsh counties together with Monmouthshire. I include the latter because one would naturally expect to have very similar figures for this county as for Glamorgan, for the physical and industrial conditions of its western valleys and in the more agricultural portions of the eastern part of it are almost identical with the conditions which obtain in the mining valleys and the agricultural Vale of Glamorgan respectively. I also include the county of Salop of which I have a fair personal knowledge, and although it may be considered as entirely an agricultural county and in this respect similar to several of the Welsh counties, yet its physical features are entirely different. The absence of any high mountains renders it entirely different from most of the agricultural counties of Wales, especially those that border upon it.

Wales, Monmouthshire, and Salop.

Although the mortality-rates from both puerperal fever and accidents of childbirth seem to be excessively high in the North Wales and South Wales groups of counties yet it is quite possible that these rates are not high throughout the 12 constituent counties, and in order to arrive at the truth it is essential to give figures for each of these counties for the period 1881–1900, the same as has been done for each of the English counties, and unless this is done comparison is impossible. Indeed, it has always puzzled me to make out why it is that the Registrar-General has never given the same prominence to the Welsh counties in his valuable reports as has been given to far less important and smaller English counties.

Having a fair knowledge of the general and local features of each of the Welsh counties, together with Monmouthshire and Salop, I propose to give the figures for each of these counties and further to deal in detail with the various registration districts and large towns in the county of Glamorgan with a view of throwing some light if possible on the conditions of female life and other circumstances which determine these differences. Glamorgan is a typical example of a county where the conditions of life in many of its to-day thickly populated coal-mining valleys were, 30 to 40 years ago or less, those of a purely agricultural and parsely populated county.

Wales.

The position of North Wales and South Wales as compared with England and Wales, from 1848–1900 and from 1890–1900, will be learnt from the following tables :—

Table VIII.—*Mortality in Wales compared with England and Wales.*

—	Deaths per 1000 for 53 years (1848–1900).			Deaths per 1000 for 20 years (1881–1900).		
	Puerperal septic diseases.	Accidents of childbirth.	Childbed (all causes).	Puerperal septic diseases.	Accidents of childbirth.	Childbed (all causes).
North Wales... ...	2·1	2·2	4·3	2·9	3·5	6·4
South Wales... ...	2·2	3·7	5·9	2·8	3·6	6·4
England and Wales	1·8	2·7	4·5	2·1	2·4	4 5

TABLE IX.—*The Comparative Number of Mothers Dying in Childbed for periods of 53 Years and 20 Years respectively.*

—	53 years (1848–1900).			20 years (1881–1900).		
	Puerperal septic diseases.	Accidents of childbirth.	Childbed (all causes).	Puerperal septic diseases.	Accidents of childbirth.	Childbed (all causes).
North Wales	1 in 476	1 in 454	1 in 232	1 in 344	1 in 285	1 in 156
South Wales	1 in 454	1 in 270	1 in 169	1 in 357	1 in 277	1 in 156
England and Wales	1 in 555	1 in 370	1 in 222	1 in 476	1 in 416	1 in 222

That is to say, there died annually from puerperal fever for the period of 53 years one out of 555 mothers confined in England and Wales as compared with one mother in every 476 in North Wales, and one in 454 in South Wales, whilst during the same period there died in England and Wales from the accidents of childbirth one in 370, as compared with one in 454 in North Wales and one in 270 in South Wales during the same period. Again, during 20 years 1881–1900 in England and Wales there died from puerperal fever one in every 476 women confined as compared with one in 344 in North Wales and one in 357 in South Wales, whilst during the same period there died in England and Wales from the accidents of childbirth one in 416, as compared with one in 285 in North Wales and one in 277 in South Wales. It will be further noticed that the mortality from puerperal septic diseases for both these periods is very much the same in the North Wales and the South Wales groups of counties, whereas the mortality from accidents of childbirth for the 53 years (1848–1900) is considerably higher in South Wales than in North Wales, or as 1·7 is to one. Again, during the period of 20 years (1881–1900) the mortality from puerperal septic diseases is much the same in North Wales and South Wales, whereas the mortality from accidents of childbirth is only slightly higher in South Wales than in North Wales. Moreover, it will be seen that the mortality-rates from puerperal septic diseases and accidents of childbirth are respectively 1·8 and 2·7 for the 53 years and are 2·1 and 2·4 for the 20 years' period, so that the mortality-rate from puerperal septic diseases has increased from 1·8 to 2·1 per 1000 and the mortality-rate from accidents of childbirth has diminished from 2·7 to 2·4 per 1000, thus making the total mortality-rate of 4·5 per 1000 the same for both periods.

The following table (Table X.) gives statistical information for each Welsh county for a period of 20 years (1881–1900).

TABLE X.—*Showing the Annual Death-rate per 1000 from Puerperal Septic Diseases and Accidents of Childbirth in the Welsh Counties during the Period 1881–1900 (20 years).*

Year.	North Wales.											
	Montgomeryshire.		Flintshire.		Denbighshire.		Merionethshire.		Carnarvonshire.		Anglesea.	
	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.
1881 ...	1·7	4·1	1·4	2·8	1·7	3·4	2·3	5·1	4·0	4·3	1·1	3·2
1882 ...	6·9	4·6	5·6	4·9	2·0	4·0	2·4	4·8	2·5	2·8	4·0	4·0
1883 ...	2·9	1·9	3·0	2·3	3·2	6·2	2·5	6·0	3·9	2·2	4·4	1·1
1884 ...	4·8	2·8	3·7	1·4	2·4	2·1	2·0	3·1	4·0	3·4	4·1	*Nil.*
1885 ...	4·5	3·0	1·1	0·6	5·0	3·6	5·9	0·5	4·8	5·1	2·1	4·2
1886 ...	0·5	3·5	4·2	2·5	2·7	3·6	3·7	4·2	1·8	3·6	2·1	1·0
1887 ...	1·0	2·6	1·6	0·8	2·1	3·4	6·3	1·6	4·3	1·8	3·2	2·1
1888 ...	3·1	2·6	3·3	4·1	8·0	3·0	6·1	2·8	3·6	1·8	0·0	2·3
1889 ...	1·0	2·1	2·5	1·7	2·5	4·1	2·2	4·4	1·9	2·9	0·0	2·2
1890 ...	1·7	5·3	1·7	2·6	3·6	7·0	2·9	5·2	3·9	6·9	3·7	2·5
1891 ...	1·1	2·2	2·4	4·8	2·0	6·0	4·3	6·7	3·1	4·0	3·3	6·6
1892 ...	1·8	5·9	0·8	5·7	2·6	5·3	4·2	5·4	1·9	4·2	3·5	3·5
1893 ...	2·7	3·2	4·7	0·7	3·2	4·6	4·0	4·5	3·4	3·4	3·2	2·1
1894 ...	4·9	4·9	3·1	3·9	3·9	6·2	5·3	4·7	4·9	4·0	2·4	1·2
1895 ...	1·8	4·2	3·0	2·3	4·1	5·3	4·0	4·6	1·8	4·5	1·0	4·3
1896 ...	3·0	1·8	2·5	3·3	3·2	4·8	2·8	3·4	4·9	4·6	0·0	2·3
1897 ...	4·0	2·0	0·8	2·6	2·4	4·6	8·2	4·7	2·1	5·4	2·3	2·3
1898 ...	1·2	4·8	0·8	4·2	2·6	4·5	2·7	4·3	1·7	3·8	3·3	3·3
1899 ...	1·8	4·8	4·2	5·0	3·5	4·1	3·5	5·2	1·1	4·4	3·3	0·0
1900 ...	1·2	3·7	3·3	3·3	1·8	6·5	3·5	4·7	1·4	3·7	1·1	1·1
Mean for 20 years	2·5	3·5	2·6	2·9	3·1	4·6	3·9	4·2	3·0	3·8	2·4	2·4

A. = Puerperal septic diseases. B. = Accidents of childbirth.

Year.	South Wales.											
	Glamorganshire.		Carmarthenshire.		Pembrokeshire.		Cardiganshire.		Brecknockshire.		Radnorshire.	
	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.
1881 ...	4·1	3·0	2·1	2·9	2·7	2·3	2·7	7·1	3·7	5·5	1·7	5·2
1882 ...	3·1	2·5	3·2	3·8	1·9	3·5	3·5	3·5	4·1	2·3	1·9	1·9
1883 ...	2·5	2·9	2·7	2·7	1·5	3·9	5·0	3·3	5·4	2·4	—	3·9
1884 ...	3·0	2·4	2·8	1·7	2·7	2·3	4·2	3·3	0·6	1·2	2·0	6·0
1885 ...	3·2	3·5	1·9	4·4	1·5	4·5	3·4	2·9	2·4	3·0	1·9	3·8
1886 ...	3·5	2·8	3·5	2·1	3·5	2·0	4·3	3·9	1·2	1·2	3·8	1·9
1887 ...	3·3	2·4	4·3	3·4	3·3	2·6	6·6	1·3	5·6	3·7	9·8	0·0
1888 ...	3·8	2·4	3·9	1·9	0·8	1·6	2·6	1·3	4·4	5·1	1·9	3·8
1889 ...	2·1	3·1	3·1	2·9	1·2	2·1	4·9	2·2	1·3	2·6	2·1	2·1
1890 ...	3·1	3·4	3·1	2·5	0·8	3·0	1·4	5·3	3·2	3·9	0·0	6·6
1891 ...	4·1	3·9	1·9	1·3	3·0	3·4	2·9	7·9	1·9	6·3	0·0	0·0
1892 ...	3·3	4·3	3·3	2·4	1·7	3·9	3·3	3·3	3·9	4·5	4·6	4·6
1893 ...	4·8	3·9	5·9	4·3	5·0	2·5	8·9	4·6	1·2	3·6	0·0	10·5
1894 ...	2·3	3·7	3·8	2·7	0·9	3·1	4·4	3·4	2·6	4·6	0·0	6·9
1895 ...	2·2	3·3	2·6	4·2	2·2	4·5	2·0	5·1	2·5	5·0	5·9	11·9
1896 ...	2·7	3·6	2·9	2·6	1·8	3·6	3·6	6·1	3·2	3·9	6·0	5·1
1897 ...	2·4	3·5	1·1	2·7	2·2	6·7	2·0	3·1	1·2	2·5	1·7	0·0
1898 ...	3·2	3·4	1·9	5·9	2·2	4·5	4·0	7·1	1·9	3·1	1·6	0·0
1899 ...	2	3·5	3·1	3·9	0·9	2·7	2·0	4·6	0·6	5·3	0·0	1·7
1900 ...	3·1	3·6	3·6	5·5	1·4	5·7	3·9	4·5	3·9	6·6	1·7	5·3
Mean for 20 years.	3·1	3·2	3·0	3·1	2·0	3·4	3·7	4·1	2·7	3·8	2·3	4·0

A. = Puerperal septic diseases. B. = Accidents of childbirth.

Arranging the counties in the order of their death-rates, those with the highest coming first, we get the following results :—

TABLE XI.—*Counties arranged in Order of Death-rates.*

Puerperal septic diseases.		Accidents of childbirth.	
Merioneth	3·9	Denbigh	4·6
Cardigan	3·7	Merioneth	4·2
Denbigh	3·1	Cardigan	4·1
Glamorgan	3·1	Radnor	4·0
Carnarvon	3·0	Carnarvon	3·8
Carmarthen	3·0	Brecknock	3·8
Brecknock	2·7	Montgomery	3·5
Flint	2·6	Pembroke	3·4
Montgomery	2·5	Glamorgan	3·2
Anglesea	2·4	Carmarthen	3·1
Radnor	2·3	Flint	2·9
Pembroke	2·0	Anglesea	2·4
Mean for Wales	2·8	Mean for Wales	3·5
Mean for England and Wales	2·1	Mean for England and Wales	2·4

The death-rate from puerperal septic diseases is excessively high in Merionethshire and Cardiganshire, two typical instances of purely agricultural and mountainous districts containing old-fashioned market towns, some fashionable seaside resorts, and the quarry districts of Festiniog and neighbourhood. Denbighshire, Glamorgan, Carnarvon, and Carmarthenshire come next ; these may be described as scattered mining and hilly agricultural districts, the most typical mining county being Glamorgan. Brecknockshire, Flintshire, Montgomeryshire, and Anglesea follow and these may be described as mostly agricultural and flat counties. The death-rate is lowest in Radnorshire and Pembrokeshire, two typical agricultural and somewhat flat counties. The rate for all except Pembrokeshire is above the average for England and Wales. The death-rate from accidents of childbirth is highest in Denbighshire, Merionethshire, Cardiganshire, and Radnorshire ; then come Carnarvonshire, Brecknockshire, and Montgomeryshire ; followed by Pembrokeshire, Glamorgan, Carmarthenshire, Flintshire, and Anglesea. The rate is above that for England and Wales in all the counties except Anglesea, the rate for which county coincides with the general rate.

In the following table the Welsh counties are arranged according to density of population :—

TABLE XII.—*Welsh Counties in order of Density of Population and Death-rates.*

—	Density of population. (Acres to a person.)	Comparative increase or decrease per cent.
Glamorganshire	0·6	+25·1
Flintshire	2·0	+ 5·7
Carnarvonshire	2·9	+ 7·3
Denbighshire	3·4	+10·2
Anglesea	3·4	+ 0·9
Carmarthenshire	4·4	+ 3·6
Pembrokeshire	4·4	− 0·4
Cardiganshire	7·1	− 3·9
Merionethshire	8·7	− 0·1
Montgomeryshire	9·0	− 5·3
Brecknockshire	8·1	+ 5·0
Radnorshire	13·3	+ 6·7
England and Wales	1·2	+12·1

It follows, therefore, that the death-rate from puerperal septic diseases is above the mean (2·1 per 1000) for England and Wales in all the Welsh counties except Pembrokeshire. With respect to accidents of childbirth the death-rate is above the mean except in Anglesea. Glamorgan is the only county that may be termed "densely populated"—i.e., with less than one acre to a person—while the remainder may be termed "sparsely populated."

From a consideration of the above figures it does not seem that the density of population is a factor of much importance in determining puerperal mortality ; on the contrary, the mortality from puerperal fever and from accidents of childbirth show a marked tendency to prevail in those counties where the only features in common between them are that they are mountainous, hilly, and sparsely populated, and that consequently locomotion is tedious and medical assistance is difficult to obtain in time. On the other hand, the mortality seems to be generally lowest in the flatter counties.

I now give the figures for the counties of Monmouth, Salop, and Hereford.

TABLE XIII.—*Showing the Annual Death-rate per 1000 from Puerperal Septic Diseases and Accidents of Childbirth in the Counties of Monmouth, Salop, and Hereford during the Period 1881–1900 (20 years).*

Year.	Monmouthshire.		Salop.		Herefordshire.	
	A.	B.	A.	B.	A.	B.
1881	3·5	2·5	2·0	2·5	2·7	2·7
1882	2·3	2·3	2·4	3·2	4·3	3·3
1883	1·5	2·1	4·2	2·4	2·4	1 9
1884	3·2	2·5	2·1	3·3	3·5	2 8
1885	4·7	2·8	3·6	3·7	3·7	0·9
1886	2·7	0·9	3·9	2·4	0·9	1·5
1887	3·7	1·9	3·1	1·5	3·1	2·3
1888	2·4	2·4	3·3	1·4	2·2	2·5
1889	2·2	2·6	2·0	2·7	0·9	1·0
1890	2·2	3·9	2·5	2·3	1·4	2·9
1891	2·2	4·0	1·4	3·9	0·0	3·6
1892	2·5	3·3	2·0	2·9	3·1	3·4
1893	5·2	4·1	1·5	3·8	4·4	5 1
1894	3·2	3·6	2·3	3·2	1·7	3·0
1895	2·2	3·4	0·8	2·5	2·2	2·2
1896	2·9	4·1	2·5	3·5	2·9	3·6
1897	2·6	3·7	2·1	3·6	3·7	3·0
1898	1·5	3·4	1·8	2·4	1·7	4·2
1899	1·8	3·4	1·9	2·0	3·2	2·4
1900	4·1	4·5	1·6	1·6	1·9	1·9
Mean for 20 years	2·8	3·0	2·3	2·7	2·4	2·7
Mean for England and Wales	2·1	2·4	2·1	2·4	2·1	2·4
Glamorganshire ...	3·1	3·2	3·1	3·2	3·1	3·2

A. = Puerperal septic disease. B. = Accidents of childbirth.

The above figures are what was expected. Those for Monmouthshire as nearly as possible correspond with those

for Glamorgan and the physical and industrial conditions of the two counties are almost identical. Again, the figures for Salop and Hereforshire are practically the same and practically also the same as those for the flat and agricultural counties of Wales such as Anglesea, Flintshire, and others. These figures tend to bear out the truth of my former remarks.

The Registration County of Glamorgan.

This registration county had according to the census enumeration of 1901 a population of 866,250, considerably over one half of the population of Wales. It covers 576,537 statute acres. The increase in its population has been phenomenal, as the following figures will show :—

Year.	Population.	Year.	Population.
1801	70,879	1861	317,752
1811	85,069	1871	397,157
1821	120,073	1881	511,433
1831	126,612	1891	687,218
1841	171,188	1901	866,250
1851	231,849		

The county is divided by nature into a northern hilly country, "the Hills," cold, wet, and sterile ; and a southern low-lying country, "the Vale of Glamorgan," or the "Garden of Wales," milder in climate and more fertile. The former is severed from the latter by steep slopes where the coal measures crop out in the south of the mineral basin. The hills are mining districts, while the lower grounds, or the Vale of Glamorgan and Gower, are purely agricultural and sparsely populated. The surface of the coalfields may be looked upon as a great plateau with an elevation of from 600 to 1200 or more feet above the sea level and intersected by a series of more or less parallel valleys excavated to a depth of from 500 to 600 feet below its general level and at the bottom of which run rapid streams. The valleys in the eastern region—the Rhymney, the Taff, and their tributaries the Rhonddas and the Cynon—trend, as a general rule, towards the south-east ; those of the middle—the Ely, the Ogmore, the Garw, and the Llynvi—to the south ; while those of the western region—the Avon, the Neath, the Tawe, and the Loughor—trend towards the south-west. They are generally narrow and deep, opening upon the "Vale" or the Bristol Channel, and they offer great facilities for mining and the carrying away of minerals along the railroads and canals which are constructed along most of them. All the coal-miners are in the hills and their valleys where I shall show that puerperal mortality is exceptionally high.

On analysis Table XIV. shows that the mortality rate from puerperal fever for 1881–1900 exceeds the average for England and Wales very considerably except in the

FIG. 3.

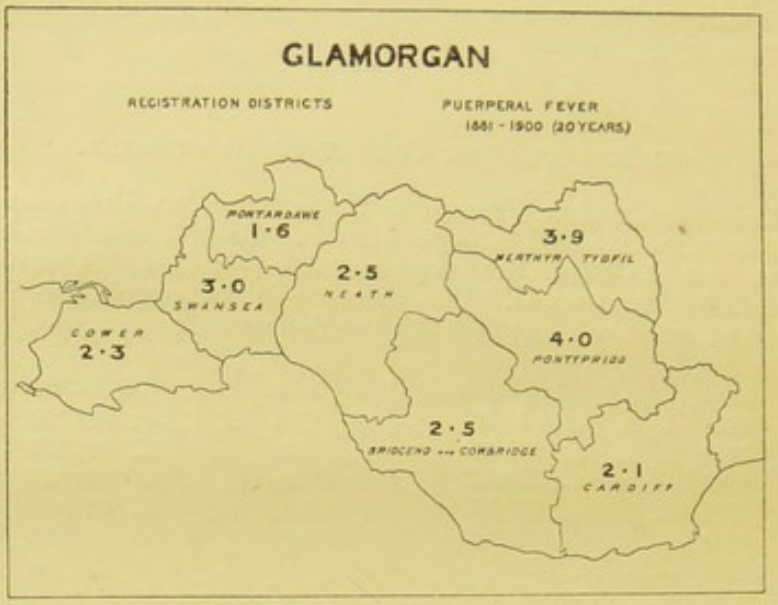
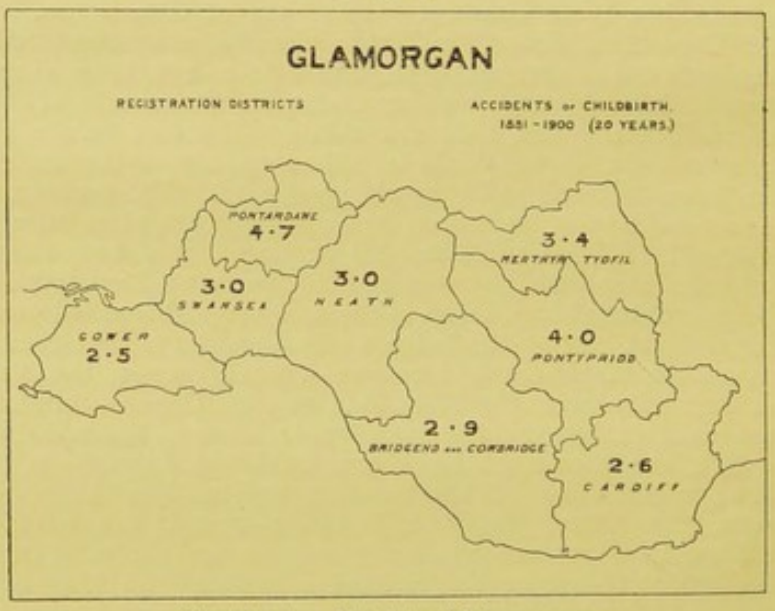


FIG. 4.



Registration districts of Glamorgan.

registration districts of Pontardawe, Cardiff, and Gower. (Fig. 3.) The mortality rate from accidents of child-

TABLE XIV.—SHOWING THE ANNUAL DEATH-RATE PER 1000 FROM PUERPERAL SEPTIC DISEASES AND ACCIDENTS OF CHILDBIRTH IN THE COUNTY OF GLAMORGAN DURING THE PERIOD 1881–1900 (20 YEARS).

Year.	Registration districts.															
	Cardiff.		Pontypridd.		Merthyr Tydfil.		Bridgend.		Neath.		Pontardawe.		Swansea.		Gower.	
	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.
1881 ...	3·2	3·2	6·5	3·6	6·1	3·0	2·2	1·5	2·0	2·0	2·6	6·5	2·9	2·6	0·0	3·0
1882 ...	1·4	2·6	5·7	3·5	2·8	1·9	2·3	3·8	2·4	2·4	1·4	0·0	3·4	2·1	2·7	2·7
1883 ...	1·8	2·0	3·6	3·8	2·5	3·4	0·7	0·0	2·1	2·1	1·4	5·6	3·4	3·7	3·1	0·0
1884 ...	1·2	1·8	4·9	4·0	4·8	3·2	2·1	2·1	2·0	1·0	0·0	2·9	2·6	1·3	3·2	6·4
1885 ...	1·9	4·0	4·4	3·7	4·7	3·1	2·6	3·3	1·6	5·2	2·8	2·8	2·5	2·5	3·2	3·2
1886 ...	2·2	3·3	4·1	3·1	5·9	3·0	2·7	0·7	3·5	2·5	1·4	1·4	2·5	2·2	9·6	3·2
1887 ...	1·8	2·2	5·0	3·9	4·6	1·6	0·7	4·1	3·9	0·5	0·0	1·4	1·0	2·0	6·3	3·1
1888 ...	2·3	1·4	4·6	2·7	5·4	3·5	8·8	3·3	0·5	2·1	2·9	4·3	4·0	2·4	7·4	0·0
1889 ...	1·6	3·0	2·0	3·3	2·7	2·9	3·2	2·0	1·1	2·1	0·0	4·5	2·9	3·6	3·1	0·0
1890 ...	1·7	3·0	4·1	3·8	1·7	4·6	5·4	3·0	3·1	3·6	2·6	2·6	3·9	2·8	8·9	0·0
1891 ...	1·8	3·3	5·1	5·4	6·4	4·3	4·3	4·9	4·6	2·9	1·3	4·1	3·7	2·9	0·0	3·2
1892 ...	2·7	4·1	3·5	5·4	4·7	4·8	8·0	3·1	4·2	2·9	2·4	7·2	4·0	3·9	0·0	3·1
1893 ...	3·3	3·2	5·0	5·2	7·7	2·9	6·5	2·0	5·6	5·6	2·2	12·2	3·3	2·6	0·0	0·0
1894 ...	1·6	2·4	3·3	4·2	4·1	4·3	3·3	2·7	0·0	5·1	1·1	4·6	2·5	3·8	0·0	7·5
1895 ...	1·2	2·6	3·8	3·7	1·6	4·8	1·4	4·2	3·3	3·8	0·0	1·1	2·4	2·1	0·0	0·0
1896 ...	1·7	1·9	4·5	4·2	2·9	4·6	2·4	2·8	2·9	2·1	0·0	4·6	2·3	6·6	0·0	3·3
1897 ...	2·7	2·4	2·0	5·0	2·0	2·7	3·3	4·7	1·2	2·4	3·2	6·6	3·2	2·6	0·0	6·5
1898 ...	3·8	1·6	2·3	3·7	3·8	4·4	3·2	1·8	1·2	3·6	4·2	8·4	4·5	5·0	0·0	3·2
1899 ...	1·8	1·8	2·9	4·3	2·4	4·8	2·4	4·4	3·3	3·3	1·1	5·6	1·3	4·1	0·0	3·1
1900 ...	2·7	3·2	3·5	4·0	2·7	2·0	4·7	5·1	1·6	5·7	3·2	8·5	4·4	3·0	0·0	0·0
—	2·1	2·6	4·0	4·0	3·9	3·4	3·5	2·9	2·5	3·0	1·6	4·7	3·0	3·0	2·3	2·5

A. = puerperal septic diseases. B. = accidents of childbirth.

birth exceeds that for England and Wales in all the registration districts and very considerably so in five of these eight districts. (Fig. 4.) The highest death-rate from puerperal septic diseases occurred in the Pontypridd and Merthyr district and the highest death-rate from accidents of childbirth in Pontardawe and Pontypridd. The figures also for the various years show considerable variations and it is noteworthy that no deaths from puerperal septic diseases occurred in Pontardawe during 1884, 1887, 1889, 1895, and 1896, or in Gower during 1881 and ten consecutive years from 1890. There were no deaths from accidents of childbirth in Pontardawe in 1882 and in Gower during 1883, 1888, 1889, 1890, 1893, 1895, and 1900. Although some 140,000 of the population live in what are termed rural districts it is not more than from 20,000 to 30,000 that live under true rural circumstances and these are the people of Gower, Vale of Glamorgan, and of the Neath and Pontardawe districts partly. I have no separate figures for the Vale of Glamorgan, which includes portions of several sanitary districts, mixed industrial and agricultural.

The Cardiff registration district has an acreage of 77,655 (0·3 acre to a person) and includes the county borough of Cardiff (estimated population 176,313), Penarth (14,228), and Barry (27,030) urban districts, together with the very extensive rural district of Llandaff and Dinas Powis, which is a scattered industrial and agricultural district with a population of 20,047. Its sanitary condition may be described as satisfactory and confinements are attended generally by medical men and midwives. Trained midwives can be had when required and there is no difficulty whatever in securing medical assistance if and when required except in the more rural portions of it. It has been estimated that over half the confinements of Cardiff have been attended by midwives but no reliable figures can be given, whereas in residential towns within the area, such as Llandaff, Penarth, and Llanishen, nearly all confinements are attended by medical men and trained midwives. In Cardiff there are about 60 or more women who hold themselves out as midwives and practise for gain and the number of midwives for the whole registration district—viz., Cardiff, 60; Barry, 22; Penarth, 6; and Llandaff and Dinas Powis, 9—making a total of about 97. It may be further stated that the district is flat but somewhat undulating and that locomotion is easy. Here the mortality from puerperal septic diseases coincides with that for England and Wales, whilst that from "accidents of childbirth" is somewhat higher.

The Pontypridd registration district has an acreage of 50,457 (0·3 acre to a person) and includes the important urban districts of Pontypridd (population 32,319), (Rhondda (122,310), and the rural district of Llantrisant and Llantwit Vardre (11,844). The first and second districts are

situated on both sides of the River Taff in its long, narrow, deep, and tortuous valley, bounded on either side by high mountainous ridges. The river now contains but little sewage but considerable amount of coal-dust, giving it an inky appearance. The water-supply, which is surface-collected and brought from a distance, is satisfactory although occasionally in dry seasons it is short. In both districts there are a few congested localities and in the latter some cellar dwellings. In both cases there is a considerable amount of overcrowding of persons in houses resulting from the habit of taking in lodgers. By far the most insanitary conditions in these districts which have been allowed to remain are the presence along the banks of the river near public roads and dwellings of enormous deposits of decomposing house refuse, and although the authorities concerned have been for many years discussing the advisability of erecting various refuse destructors and other remedies still these exist and continue to emit malodorous and unquestionably dangerous gases. I cannot prove definitely that typhoid or puerperal fever cases can be traced directly to these but I strongly suspect that they act as foci of infectious disease and that those who have the misfortune of living in their vicinity are rendered more susceptible to these diseases. These two districts may be described as essentially mining districts. There is yet another district making up this registration district—viz., Llantrisant and Llantwit Vardre. This contains a few and very old dilapidated villages and a few typical mining localities. Indeed, it may be described as a scattered mining and agricultural area. The water-supplies are satisfactory, the roads are good, and the means of locomotion are sufficient and available. There is no difficulty in obtaining medical aid in a short time. Throughout the registration district by far the majority of confinements are attended by untrained and ignorant midwives and comparatively few are attended by the medical men who are in charge of the various colliery practices. On referring to Table XIV, it will be seen that the average death-rate from puerperal fever and accidents of childbirth are exceedingly high.

The Merthyr Tydfil registration district has an acreage of 65,805 (0·4 acre to a person) and includes the urban districts of Merthyr Tydfil (population 69,228), Aberdare (43,357), Mountain Ash (31,093), and the so-called rural district of Gelligaer and Rhigos (18,169). The district ccmprises portions of three important mining valleys—viz., the Rhymney, the Taff, and the Cynon, and along each of them runs a river bearing the same name and containing but very little sewage matter. The district of Merthyr Tydfil may be described as containing a large number of congested areas and many very dilapidated back-to-back, back-to-earth, and cellar dwellings, without through ventilation and over-crowded. The outlying localities are in a more satisfactory sanitary condition. The water-supply, which is

surface-collected from the Old Red Sandstone, is both good and plentiful. Most of the houses are drained and connected with the public sewer constructed over 30 years ago. Aberdare is in a fairly good sanitary condition, but here again there are a few congested areas along the river banks and here and there throughout the district will be found some back-to-earth and cellar dwellings without through ventilation. The water-supply is good and plentiful, being surface-collected and obtained from the Old Red Sandstone. Mountain Ash is a typical mountain district situated in the same valley as Aberdare. The majority of the houses are of recent construction but there are several insanitary spots where the drains and sewers are defective and neglected. The water-supply, which is surface-collected, is good and plentiful.

Gelligaer and Rhigos district is situated in the Rhymney Valley on one side of the river and contains several typical mining villages, some of which are old. All the centres are sewered or being sewered. The water-supply is short during dry weather. Throughout the whole of this registration district there is no difficulty whatever in summoning medical aid. By far the majority of confinements are attended by unskilled and untrained midwives. On referring to Table XIV. it will be seen that the death-rates from puerperal fever and the accidents of child-birth are excessively high.

The Bridgend registration district has an acreage of 110,571 (1·6 acres to each person) and is situated partly in the Vale of Glamorgan and partly in mining valleys of Mid-Glamorgan. It includes the old market town of Bridgend (population 6063), Cowbridge (1202), a small seaside resort called Porthcawl (1872), an extensive agricultural area, together with the mining districts of Maesteg (15,012) and Ogmore and Garw (19,907). These mining centres are situated in narrow valleys, especially the Garw, where some few years ago puerperal fever was epidemic. In these valleys there occurred an epidemic of this malady in 1892–93. To this I shall refer presently. Bridgend and the valleys above it are now being sewered but the river up to the present has been the sewer of the locality and its condition in all probability was associated with the perennial prevalence of typhoid fever at Bridgend. The water-supply for all these places is fairly satisfactory. The majority of confinements are attended by untrained and unskilled midwives and few only, except in the older towns, by medical men. There is but little difficulty in obtaining skilled medical assistance at short notice. On reference to Table XIV. it will be seen that the mortality from "puerperal septic diseases" is excessively high, while that from "accidents of childbirth" is above the average.

The Neath registration district has an acreage of 87,811 (1·2 acres to a person) and includes the old towns of Neath (population 13,732), Briton Ferry (6961), Aberavon (7553), Margam (9014), Glyncorwg (6450), and Neath rural district

(27,343), the last named being mostly rural in character but also containing several mining villages of recent growth. The sanitary condition of Aberavon, Briton Ferry, and Neath is unsatisfactory and there are a large number of courts, alleys, and areas in the two latter which are liable to become flooded and where the houses are overcrowded upon area and with persons. The water-supply is inadequate. The majority of confinements here are attended by unskilled and untrained midwives and there is no difficulty except in the outlying farmhouses in procuring skilled medical assistance at short notice.

Pontardawe registration district has an acreage of 34,000 (1·6 acres per person) and is conterminous with the Pontardawe rural district. It is much smaller in extent and population than the other registration districts, consequently the figures given, although extending over 20 years, are not quite so reliable. It includes several important industrial and mining centres and there are practically in it no congested areas. The water-supply is good and abundant and in nearly all instances the sewage is not stored in cesspools but taken away on land or disposed of otherwise. The death-rate from puerperal fever is below the mean for England and Wales, but that from accidents of childbirth is by far the highest in the county. Indeed, for one year, 1893, it amounted to 12·2 per 1000, in 1900 to 8·5, and in 1898 to 9·4, figures which almost approach those recorded in lying-in hospitals about 100 years ago. I have no explanation to offer for this, for there is no difficulty in procuring skilled medical assistance at short notice. I may mention, however, that many young women are employed at the tinplate works.

The Swansea registration district has an acreage of 36,056 (0·2 acre per person) and comprises the county borough of Swansea (population 95,133) and the scattered mining and agricultural district of Llangyfelach (29,989). The sanitary condition of the rural portion is far from being satisfactory and none of the populous mining centres are sewered. The water-supply is inadequate and unsatisfactory. There are no congested centres and but little overcrowding of persons. The majority of confinements are attended by unskilled and untrained midwives. The death-rates from puerperal fever and accidents of childbirth are considerably above the average.

The Gower registration district has an acerage of 41,110 (3·6 acres to a person) and includes the purely agricultural area of Gower (population 7266) and the small seaside resort of Oystermouth. There are no congested areas and the whole peninsula is a flat but undulating country. There is no difficulty in getting skilled medical assistance at short notice. Midwives attend the majority of confinements.

Below are given similar figures for the county boroughs of Cardiff and Swansea and the urban districts of Merthyr Tydfil and Rhondda, all situated in Glamorganshire in four

different registration districts. The figures given extend over ten years.

TABLE XV.—*Showing the Annual Death-rate per 1000 from Puerperal Septic Diseases and Accidents of Childbirth for the County Boroughs of Cardiff and Swansea and the Urban Districts of Rhondda and Merthyr Tydfil during the period 1891–1900 (ten years).*

Year.	Cardiff.		Swansea.		Rhondda.		Merthyr Tydfil.	
	A.	B.	A.	B.	A.	B.	A.	B.
1891	0·06	4·7	3·3	3·0	6·0	Not known.	2·5	5·9
1892	0·0	4·6	1·8	3·1	3·8		3·4	7·2
1893	0·5	3·8	3·6	3·0	4·8		9·3	4·4
1894	0·6	2·1	1·6	5·1	4·5		3·4	3·9
1895	0·18	1·6	1·8	2·4	2·8		3·5	3·9
1896	0·5	2·5	1·9	4·3	4·8		1·2	2·5
1897	0·9	2 0	2·0	2·3	2·4		2·4	2·4
1898	1·6	2·8	2·3	3·4	0·9		1·6	6·0
1899	0·9	2·0	0·3	3·4	3·9		1·6	4·2
1900	0·7	4·7	4·2	2·1	2·0		2·2	3 0
Mean	0·59	3·0	2·2	3·2	3·5		3·1	4·4

A. = puerperal septic diseases. B. = accidents of childbirth.

A consideration of the foregoing remarks leads me, so far as the county of Glamorgan is concerned, to the following conclusions: 1. Puerperal fever often, though by no means as a general rule, selects for its ravages the most insanitary localities. 2. Our large and fair-sized towns show much the same mortality as similar towns in other parts of the kingdom. 3. In our densely populated mining valleys the mortality from puerperal fever is very high (Pontypridd, Merthyr, and Bridgend registration districts). This I unhesitatingly attribute, in a great measure, to unskilled and ignorant midwives. 4. The mortality from accidents of childbirth is only slightly higher than that for England and Wales, is unevenly distributed, and highest in a few of the mining valleys. In none of these places is there any difficulty of procuring skilled medical assistance at short notice.

What, then, are the circumstances and conditions of female life that determine these differences? In other words, what is the explanation that these mortality-rates are

higher in Wales than elsewhere? Can a remark that the Registrar-General made 20 years ago in one of his reports be true? "In North Wales, where the mothers are left to nature or to unskilful old women, the mortality is double that of London, and 9·4 mothers die to 1000 children born." I must admit that there is a great deal of truth in this remark, but I will not have it that our old women are more ignorant and less skilful than any other old women. It is well within my knowledge that most of the confinements among the poorer women are attended by untrained women in the country districts of Merionethshire and Cardigan; in fact, in all the country districts, villages, and small towns of Wales; and, from my experience in Glamorgan, which I shall shortly relate, I can prove without a doubt that they often spread puerperal fever broadcast and are often not interfered with. Can there be any other explanation of this high mortality in Wales? The conditions of life consequent upon the physical features of the country, especially in North Wales, often make it impossible to obtain skilled assistance in time; and if any assistance is to be obtained it is from untrained midwives or friends or neighbours who in such districts are often compelled to undertake this serious responsibility. Is there anything in the natural temperaments of the women of Wales that renders them more susceptible to the infection of puerperal fever or to succumb in childbed than other women? This I am unable to answer, but I firmly believe that at least a partial explanation of this high mortality is to be found in the conditions of their life, for hard is the lot of women in the agricultural districts of Wales and it is no wonder that they flock to our large towns. Farm servants, and even farmer's wives, work as hard as, or even harder than, the men. In the summer months they are continually to be seen, even when pregnant, hard at work in the harvest field and in winter attending to the cattle and sheep. Again, their food is of the poorest quality—in a word, they have to work too hard and do not get enough nourishment. This, I am convinced, has much to do with the prevalence of phthisis in these localities, and does it not often lessen their power of resistance to the inroads of any disease and render them more likely to succumb to the accidents of childbirth? This is not the case in our mining districts where wages are high and nourishing food is plentiful. Many times has my heart bled when called upon to attend these poor women in the wretched hovels which they often have to live and to die in. What wonder is it that they succumb in their travail, especially when left to nature, to the ignorant midwife, or to friends or neighbours,

Some Large Towns and Industrial and Mining Centres.

I have thought it desirable to extend my inquiries by including some of the large towns of the country and for this purpose, as details are only obtainable separately from the reports of the Registrar-General, in the case of some few towns I have, through the kindness of the respective medical officers of health, been furnished with the returns for the last 10 years (1891–1900). This was done by sending out a circular letter asking for information for each year under the following headings so as to obviate errors as much as possible: 1. Number of registered births. 2. Deaths from puerperal fever (to include deaths due to pyæmia, septicæmia, sapræmia, pelvic peritonitis, perimetritis, and endometritis occurring in the puerperium). 3. Deaths from accidents of childbirth (to include abortion, miscarriage, puerperal mania, flooding, accidental hæmorrhage, puerperal thrombosis, and other and ill-defined accidents of childbirth and pregnancy). 4. Number of puerperal fever cases notified. I have worked out the mortality-rates from

Table XVI.—*Mortality Rates per 1000 Registered Births during the Period 1891–1900 (10 years).*

Stockport	4·0	Mean for England and Wales (1881–1900)	2·1	Brighton	1·1
Huddersfield ...	3·6			Plymouth	1·1
Oldham...	3·5			Rotherham	1·1
Rhondda	3·5	Manchester... ...	2·0	Birmingham ...	1·0
Merthyr Tydfil ...	3·1	Croydon	1·9	Leeds	1·0
Salford	3·1	London...	1·8	Bolton	0·8
Birkenhead... ...	2·8	Bristol	1·8	Southampton ...	0·7
St. Helens	2·7	Burton-on-Trent	1·8	Sunderland... ...	0·6
Coventry	2·6	Sheffield	1·8	Tottenham	0·5
Portsmouth... ...	2·4	Hull	1·7	Leicester	0·5
Derby	2·4	Handsworth ...	1·6	Cardiff	0·5
Halifax	2·2	South Shields ...	1·3	Newcastle-on-Tyne	0·2
		Bradford	1·2		
		West Ham	1·1		

the returns thus obtained and although I feel some hesitation in making use of them there can be no doubt about the deaths from puerperal fever; if the figures err at all they are below and not in excess of the truth. With regard to the deaths from accidents of childbirth they are more likely to be inaccurate than the others, but deaths classed under this heading are practically the same as they have been for the 20 years immediately preceding with the exception of the year 1901 (with which I do not deal). "Phlegmasia alba dolens" is now classed among the puerperal septic diseases instead of among accidents of childbirth. (Table XVI.)

These rates vary enormously and are difficult for me to explain. It will be noticed, however, that the districts where they are above the mean are industrial and mining centres. Beyond this I cannot go at present.

TABLE XVII.—*Accidents of Childbirth.*

Stockport	5·8	Sheffield	3·2	Manchester	2·4
Bradford	4·6	Rhondda	3·1	Mean for England and Wales (1881–1900	2·4
Cardiff	4·4	Birmingham ...	3·0		
Merthyr	4·4	Bolton	3·0		
St. Helens	4·3	Derby	2·9	Hull	2·3
Rotherham	4·3	Salford	2·8	Burton-on-Trent	2·1
Newcastle-on-Tyne	4·3	South Shields ...	2·8	Birkenhead	2·1
		Portsmouth ...	2·7	Handsworth ...	2·0
Huddersfield ...	4·1	Bristol	2·6	London	1·9
Halifax	4·1	Leicester	2·6	Croydon	1·7
Plymouth	3·3	Sunderland	2·5	Southampton ...	1·6
Oldham	3·2				

Here again the high rates are confined to mining and industrial centres. It would be interesting to investigate how far the various occupations in which females are employed influence the death-rate from accidents of childbirth. The figures which I have given show that the deaths in childbirth in England and Wales have remained undiminished and that this mortality shows no signs of diminution.

Puerperal septic diseases.—What, then, are the causes of this condition of affairs? Is it because the midwives who attend the majority of confinements in those districts where the rates of mortality are highest are ignorant and unskilled in the work? Is it because aseptic and antiseptic precautions are not rigidly observed always in general midwifery practice as it is in the departments (internal and external) of lying-in hospitals and under other conditions? Or is it unnecessary interference with the natural course of labour? I unhesitatingly answer that midwives have played a very important part in the causation of this sustained high mortality both from puerperal septic diseases and from accidents of childbirth. This I propose to prove later. The untrained and unskilful of them—and they are by far in the majority—have no knowledge whatever of the true meaning and application of aseptic and antiseptic measures and are unable to diagnose dangers and consequently have no idea when to send for medical assistance until it is often too late. The late Dr. R. Milne Murray attributed this high rate to the misuse of anæsthesia and to the ridiculous parody which in many practitioners' hands stands for the use of antiseptics. He observes: "The use which has been made of two of the greatest blessings of humanity has converted them into little

else than a curse. ..... Before the days of anæsthesia interference was limited and obstetric operations were at a minimum, because interference of all kinds increased the conscious suffering of the patient." How far the misuse of anæsthesia and antiseptics is borne out by facts I have no knowledge. Others attribute this high mortality from puerperal septic diseases to the want of aseptic and antiseptic precautions. On such a statement I am not in a position to give an opinion as to what the general practice of the accoucheur is, but later, when discussing the mortality in lying-in hospitals and under other conditions, I hope to be able to show what has been accomplished by the rigid observance of all aseptic and antiseptic precautions. Others, again, attribute the high mortality from puerperal sepsis to "unnecessary interference with the natural course of labour." But in spite of all our increased knowledge of sepsis, how is it that the mortality from puerperal sepsis is still so high?

Dr. Peter Horrocks, in a paper of his recently published, said: "My answer to this question is that there is too much interference with the natural course of labour, too much douching and examination of the parturient women, and that even yet the majority of medical men have not fully realised that, on the one hand, on making a vaginal examination of a woman in labour, or just after labour, or doing any manipulative work that may be needful, the process of hand sterilisation should be as elaborate as if they were about to do an abdominal section and, on the other, that unless they take the greatest care after such hand sterilisation they will get the examining finger soiled by germs from their own clothes, the bedclothes, or the patient herself."

Professor J. W. Byers puts it thus: "In our ideal obstetric practice we aim at having an aseptic patient, nurse, and medical attendant and all our precautions, such as keeping the several parts of the parturient, our own hands, as well as those of the nurse, and all obstetric instruments and appliances aseptic, the greater employment of external examination, the limitation of the vaginal douche only to acquire information which cannot be obtained by abdominal palpation, the not allowing the labour to be too prolonged, and the immediate suturing of any wounded parts,—I say all these precautions are taken with a view of preventing sepsis."

To make assurance doubly sure a great number of obstetric physicians strongly recommend the systematic adoption of antiseptics immediately before, during, and after labour. The supporters of the systematic use of antiseptics, whether they are indicated or not, do not assume that any case that comes before them is aseptic, for they may find too late that their assumption has been unfounded. They believe in prevention rather than cure; indeed, the best cure of most cases of puerperal septic disease is their prevention.

Dr. P. R. Cooper has observed: "Personally I feel very strongly that we have no right in any case merely to assume asepticity when we have in our power, if we only use them, the means 'to make assurance doubly sure' by a thorough and logical application of aseptic and antiseptic principles in our midwifery work."

Dr. G. E. Herman in a paper on the Prevention of Puerperal Fever in General Practice observes: "How can puerperal fever be prevented? The answer is by keeping aseptic germs from the patient. Some people try to do this by asepsis—that is, by simple cleanliness—and are confident that their precautions cannot fail. Others add to this antisepsis—i.e., the use of germicides, to kill any germs that cleanliness may fail to wash away. A prudent man insures his house although he does not think that anyone will set it on fire, and in like manner a prudent accoucheur will use antiseptics when he can do so without harm, even though they may be sometimes unnecessary."

Accidents of childbirth.—The prophylaxis of the accidents of childbirth opens up a wide field of labour where a great deal can be done, and with the help of the work of those who have gone before us it can be claimed that for every obstetrical complication which can arise, with only, perhaps, one exception, we have at our disposal a procedure with which it can be met—that, in fact, there is scarcely a peril that can beset a woman in travail out of which we have not the means of rescuing her. There are accidental conditions, such as grave disorders of the nutritive apparatus, of the heart, lungs, kidneys, &c., which produce complications with which obstetric medicine is at present powerless to deal.

Dr. Milne Murray has also written: "But for all else (save, perhaps, eclampsia) we profess to have a remedy, provided always we are intrusted with the care of the patient in reasonable time. Malpresentation, malposition, deformed pelvis of whatever degree, hæmorrhage of whatever sort, rupture of the uterus, each and all have their appropriate treatments, which have been tested times and times again and have stood the test with unqualified success. This, then, is the profession, and the reasonable profession, made by the obstetrician to-day, armed as he should be with an accurate knowledge of obstetrics and with anæsthetics and the technique of antiseptic surgery."

Professor Byers, in his address on Obstetrics delivered at Cheltenham, urges medical practitioners to give much more attention to patients who are pregnant, and especially in the case of those looking forward to their first confinement. "A pregnant woman," says he, "when she engages a doctor to attend her should be examined as carefully as if she were an applicant for life insurance; in this way he may at an early

date detect a flaw in some of her organs (heart, kidneys, lungs, &c.), the knowledge of which may lead him to adopt a judicious prophylactic treatment. We must instruct our pregnant patients on such questions as diet, exercise, management of the secretions, and a most careful examination of the urine should be made from the fourth month onward, not merely for the presence of albumin, but in reference to its amount and the reduction of urea. In this way a form of toxæmia (eclampsia) so fatal to mother and child may from its early detection be warded off, for it must be admitted that in the majority of cases the treatment of eclampsia, like post-partum hæmorrhage, is its prevention." In the case of multipari an accurate history of previous pregnancies and labours is of the utmost importance. It would ill become me to endeavour to point out in any detail how the various conditions may be guarded against, but that such is the case there can be no doubt. A medical man who knows his patient can do a great deal to ward off many of the causes of the accidents of childbirth; even if he has no previous knowledge of the patient much can be accomplished provided always that he is sent for in time. In future midwives will only have to undertake cases of normal labours, and when any complication arises or danger is indicated it is their duty to send at once for a medical practitioner and at the same time to give their reasons for so doing. Sometimes it is difficult to get medical assistance, and there is no wonder that the accidents of childbirth are generally more frequent in sparsely populated rural districts where medical assistance is difficult to obtain in a reasonable time. That the many deaths caused by accidents of childbirth include a considerable number of avoidable cases is evident from the fact that in some of the large towns where rickets and other diseases which give rise to some of the most fatal accidents of childbirth are confessedly more common the rate of mortality from accidents of childbirth is considerably less than in rural districts where the reverse would have been anticipated. The explanation possibly lies in the fact that skilled medical assistance can be obtained at a short notice.

Mortality in Maternities or Lying-in Hospitals.

"How can the dangers of child-bearing, which have been attributed to various causes, be alleviated?" This question was asked over a century ago (and it is also asked now), and seeing how destitute of comforts, means, and medical assistance, and how abandoned and repudiated by society many of the married and single women about to be confined were, the thought occurred to some benevolent persons that they might be received and delivered in hospitals, and their answer to the above question was, "By the establishment of maternity hospitals," and what seemed more likely to be the means of saving those women in travail from peril than

the maternity? Unfortunately, in a very few years experience proved that the assemblage of child-bearing women under one roof and under the conditions there existing gave rise to fatal epidemics of child-birth fever and the mortality was almost invariably in excess of the mortality in detached dwellings; indeed, the mortality became in some instances excessive, in other instances appalling, and the inscription, "Lasciate ogni speranza voi ch'entrate" ("All hope abandon ye who enter here") would have been as appropriate over their open doors as it was over the gloomy underworld of the Italian poet. Seeing how disastrous some of these epidemics were some medical men at once came to the conclusion that no help was to be expected from maternities; others, however, were more hopeful of seeing this mortality reduced by the progress of the art of obstetrics and the solution of various other problems, including a better knowledge of the mechanism of labour. Among the former class was Dr. Le Fort and among the latter Dr. Matthews Duncan. Later (1870) Dr. Le Fort, who assiduously collected existing statistics of lying-in hospitals, asserted as a general result of his inquiries that "the mortality of women delivered at home was one in 122 and the mortality of women delivered in hospital one in 29." This Dr. Duncan, in his book entitled "Mortality of Childbed and Maternity Hospitals," pronounced an erroneous statement. Dr. Duncan arrived at the conclusion that not fewer than one in every 120 women delivered at or near the full time died within the four weeks of childbed. This statement was received with astonishment and incredulity and Dr. W. Farr, who had in 1856 declared the mortality in childbed in England and Wales to be one in 189, denounced Dr. Duncan in good round terms as an alarmist. Before his death, however, Dr. Farr came so nearly accepting Dr. Duncan's estimate as to allow that one woman in 129 died in childbed.

Miss Florence Nightingale, the lady who had done so much good in other directions, directed her attention to the question of lying-in hospitals and she fully realised that educated midwives as well as physicians were required in order to secure the best chances of living to mother and child and that young mothers themselves required instruction and special care to insure their living natural lives so as to save themselves and offspring during confinement. Miss Nightingale, in her notes on lying-in institutions, the production of which was evidently suggested to her by the failure the committee of the fund made to establish a training school for midwives in King's College Hospital, shows that with every care 27 poor women, or one in 29, died out of 781 delivered, and she shows besides the reason why. She established one capital fact under the head of "Military lying-in management," and it is this: Ordinary women have no need of long nursing after lying-in; it is all over in a few days after retirement and delivery in a rude compartment of a hut."

Her description of two camp hospitals, as they were called, was as follows :—

> The Shorncliffe Hospital is an old wooden hut of the simplest construction, with through ventilation. It is situated on rising ground close to the sea and facing it, so that the sea breeze sweeps right through it. It is scarcely more than a makeshift and here are the results. Up to December, 1869, there had been 702 deliveries in the hut, among which there was one death from scarlet fever and one from hæmorrhage, besides two deaths following craniotomy. There was not a single case of any puerperal disease. In Colchester, from 1865 to 1870, there had been 252 registered deliveries and no deaths. In the Colchester wooden hut the patient is received into a separate compartment, of which there are four, where she is delivered and remains until she is discharged to quarters. It is very rarely indeed, if ever, that the four compartments are occupied simultaneously. The average stay is ten days, the average number of deliveries a year 50. This hut does not form part of a hospital. It is a separate establishment solely for lying-in women, as such accommodation should always be.

After quoting the above Dr. Farr wrote :—

> When we consider the want of adequate accommodation in large towns for the wives of working men it must be evident that a certain number of them would find great comfort in being able to retire, as the soldier's wife does, into a hut for a few days until their trouble is over and for this surely arrangements might be made to enable them to pay beforehand by instalments. The natuary, clean and ventilated, armed with proper appliances, and a midwife on the spot, would be of more use than the mortuary. It would no doubt succeed in the end if sufficiently distributed in the right quarters about towns, but as its use would have to be taught it would be some time before it could, as it should, be self supporting. The Peabody Fund might give the natuary a trial by building a few suitable houses and letting them on easy terms.

The above are excellent results—954 deliveries without a single death from a septic disease. It will also be noticed that the following conditions existed—viz., through and thorough ventilation, absolute cleanliness or asepsis, and perfect rest and seclusion—each patient being received into a separate compartment where she was delivered and remained until discharged to quarters. It is further to be noted that the hut did not form part of the hospital ; it was a separate establishment for lying-in women as such accommodation should always be. The natuary, it is observed, was clean and ventilated and armed with proper appliances, with a midwife on the spot. These, indeed, were ideal lying-in hospitals.

Instruction in midwifery is of remote origin and in answer to a question by Dr. Farr in 1875, "Are the women instructed in midwifery?" the committee of the Society of Infant Mortality replied: "Answers in the negative are being received from all parts of the country, with the exception of Glasgow and Sheffield." From several districts the replies indicated not merely the want of any special education but gross ignorance and incompetence and a complete inability to contend with any difficulties that might occur. The committee noticed that in London many women were practising who had received a certain amount of instruction at the various institutions. Thus a very large

number of the mothers were attended by midwives, some instructed and others incompetent to deal with any ordinary cases of difficulty. A large proportion of the mothers were attended by physicians, surgeons, and apothecaries; some at the head of their art in Europe and others skilful and unskilful in various degrees. Dr. Pitman, the then registrar of the Royal College of Physicians of London, said: "To the best of my belief the College included midwifery as one of the subjects of its examinations as early as 1815." The Licentiates of the Apothecaries' Society of London have been examined in midwifery since 1850. At the Royal College of Surgeons of England the midwifery licence was conferred for the first time in December, 1852.

Maternity hospitals are of remote origin and many were in existence before the registration of births and deaths was even thought of. Goethe begins his autobiography by observing that through the unskilfulness of the midwife he was born for dead and only after the manifold efforts of those around him saw the light in 1749. His misadventure, it is said, so impressed his grandfather, Textor, the mayor, that he introduced an obstetrician and instituted or restored the school of midwifery in Frankfort, and what had been Goethe's danger proved a means of safety to the city. The Royal Maternity Charity was founded in London in 1757. The Queen Charlotte's Lying-in Hospital, London, was instituted in 1752, rebuilt in 1856, and incorporated by Royal Charter in 1885; a new wing was added in 1886 and the hospital was further enlarged in 1889. It is licensed according to Statute 13, George III., cap. 82. There are 38 lying-in hospitals in Great Britain. Queen Charlotte's Hospital, London, is the only one which approaches the three great Irish maternities. It holds a Royal Charter for the express purpose of training, examining, and certifying midwives. The charter of the Rotunda Lying-in Hospital, Dublin, was granted over 140 years ago, that of the Coombe Lying-in Hospital, Dublin, was granted in 1867, and the National Lying-in Hospital, Dublin, received its charter in 1903. The objects of Queen Charlotte's Lying-in Hospital are: (1) to deliver all married women both in hospital and at their own homes; (2) to deliver all deserving single women in the hospital with their first child only; and (3) the training of medical pupils, midwives, and monthly nurses. Indeed, the object of all maternities is to extend to destitute and poor women the necessary assistance, attendance, and nursing during childbirth.

Dr. R. Boxall in his "Antiseptics in Midwifery" (1894) observes:—

> It is not many years ago, owing to the ease with which the disease (puerperal fever) could be spread, under the then existing conditions, the mortality and illness from blood-poisoning in our lying-in hospitals even reached appalling proportions, and so far exceeded what was then supposed to be the case in all obstetric practice generally, that demands were made, and not altogether unreasonably, for the extinction of such institutions. Indeed, similar experience befell most of the lying-in hospitals, the deaths at times became so appalling that they had to be closed for disinfection and other purposes.

TABLE XVIII.—*Showing the Number of Patients delivered in the Hospital from 1857 to 1902 inclusive, with the Number of Deaths and the Rate of Mortality.*

Year.	Number delivered in hospital.	Number of deaths.	Proportion of deaths to deliveries. 1 in–	Rate of mortality per 1000.
1857	245	3	81 7	12·2
1858	341	3	113 6	8·8
1859	320	27	11·8	84·4
1860	256	18	14·2	70·3
1861	369	20	13·4	54·2
1862	351	17	14·1	48·4
1863	386	6	60·4	15·5
1864	384	13	29·5	33·9
1865	225 (6 months)	9	45·0	40·0
1866	408	7	58·2	17·2
1867	412	7	58·8	17·0
1868	464	5	92·8	10·8
1869	414	7	59·1	16·9
1870	484	6	80·6	12·4
1871	452	7	64·5	15·2
1872	433	12	36·1	27·7
1873	416	15	27·7	36·1
1874	443	9	49·2	20·3
1875	394	9	43·8	22·8
1876	416 (9 months)	19	21·9	45·7
1877	466	6	77·6	12·9
1878	592	9	65·9	15·2
1879	333 (6 months)	16	20 6	48·0
1880	602	2	301·0	3·3
1881	669	10	66·9	14·9
1882	692	10	69·2	14·4
1883	663	9	78·5	13·6
1884	775	5	155·0	6·45
1885	857	6	142·8	7·0
1886	885	8	110·6	9·0
1887	962	2	481·0	2·1
1888	865	2	432·5	2·3
1889	995	1	995·0	1·0
1890	892	4	223·0	4·48
1891	942	4	237·2	4·24
1892	972	7	138 9	7·2
1893	1009	6	168·1	5·9
1894	1079	8	134·8	7·4
1895	1124	6	168·1	5·9
1896	1151	10	115·1	8·68
1897	1101	0	0 0	0·0
1898	1112	3	370 6	2·6
1899	1150	5	230·0	4·3
1900	1183	8	147·9	6 7
1901	1284	4	321·0	3·1
1902	1271	5	254 2	3·9
Total ...	31239	375	80·6	12 0

I propose here to give in some detail the mortality statistics of two important lying-in hospitals and the midwifery department of a London hospital—viz.: Queen Charlotte's Lying-in Hospital, London, founded in 1752; the General Lying-in Hospital, London, founded in 1765; and the midwifery department of a London hospital with a medical school attached.

Queen Charlotte's Lying-in Hospital—Internal Department.

In Tables XVIII. and XIX. are given the results of a search which I was permitted to make into the reports and records of this hospital, together with (1) the number of patients delivered in the hospital from its rebuilding in 1857, including the number of deaths and the rate of mortality; and (2) the number of patients delivered at their own homes.

Table XIX.—*Showing the Number of Patients delivered at their Own Homes from 1882 to 1902 (inclusive).*

Year.	Number delivered at own homes.	Number of deaths.	Proportion of deaths to deliveries 1 in—	Rate of mortality per 1000.
1882	780	2	390·0	2·5
1883	827	2	413·5	2·4
1884	884	4	221·0	4·5
1885	998	3	332·6	3·0
1886	1,106	3	368·6	2·7
1887	1,196	2	598·0	1·6
1888	1,151	2	575·5	1·7
1889	1,179	1	1179·0	0·8
1890	1,070	0	0·0	0·0
1891	1,148	0	0·0	0·0
1892	1,133	3	377·6	2·6
1893	1,206	0	0·0	0·0
1894	1,318	4	329·5	3·0
1895	1,370	1	1370·0	0·7
1896	1,122	2	561·0	1·7
1897	1,124	1	1124·0	0·8
1898	1,070	1	1070·0	0·9
1899	1,011	3	337·0	2·9
1900	971	1	971·0	1·0
1901	1,026	3	342·0	2·9
1902	1,204	1	1024·0	0·8
Totals... ...	22,894	39	587·1	1·7

It will be seen that the above tables include the deaths from all causes. No particulars as to the cause of death

could be found before 1876 and in the external department before 1898. Table XVIII. shows a death-rate from all causes varying from 84 or 1 in 11 to *nil* per 1000 deliveries. The rate was uniformly high until 1884; after that date it has shown a considerable variation from 8·68 in 1896 to 1 and *nil* in 1889 and 1897 respectively. The mean rate for the period 1884–92 was 4·7. There is no record either of the number or causes of death among those delivered at their own homes before 1882. From 1882–1902 the death-rate from all causes has varied but slightly—i.e., from 4·5 to 0·0. The mean rate for the period of 21 years was 1·7, which is extremely satisfactory and much lower than the rate in the internal department, but this is not to be wondered at when one remembers that the majority of the worst cases are brought into the hospital long after labour commences and that a large number undergo some of the major operations, as will be seen from the following table :—

TABLE XX.—*Showing the Mortality after Major Operations at Queen Charlotte's Lying-in Hospital.*

Year.	Operations.									
	Induction.	Version.	Forceps.	Craniotomy.	Embryotomy.	Cæsarean section.	Porro's operation.	Symphysiotomy.	Total	Deaths (maternal).
1895 ...	5	4	22	3	—	1	—	1	36	—
1896 ...	31	9	115	—	—	—	—	—	155	7*
1897 ...	14	12	121	5	—	—	—	—	152	—
1898 ...	22	10	164	9	—	—	—	—	205	1†
1899 ...	11	10	110	3	—	4	—	—	138	1‡
1900 ...	15	9	159	6	1	9	—	1	200	5
1901 ...	15	4	150	4	1	2	—	—	176	2§
1902 ...	28	8	152	5	—	7	—	—	200	—
Totals	141	66	993	35	2	23	—	2	1262	16

* Four after version (placenta prævia; contracted pelvis). Two after forceps (ante-partum hæmorrhage; ruptured cervix). One (?) after forceps (Bright's disease).

† After craniotomy. ‡ After version (placenta prævia case).

‖ One after induction. Two after forceps (phthisis and pulmonary embolism). Two after Cæsarean section.

§ After version (collapse and placenta prævia).

The table shows that during the eight years 1895–1902 1262 operations were performed with 16 deaths in all. This is equivalent to a death-rate of 12·6 per 1000 deliveries.

One is further struck with (1) the high death-rate before every closure of the hospital; (2) the low death-rate after each reopening; and (3) the permanent low death-rate

(with a few exceptions) that has been maintained since 1883. In Table XXI. are given the deaths from septic and non-septic causes from 1876–1903 together with particulars recorded of each death.

On examining the figures in Table XXI. it will be seen that during the period of 28 years (1876–1903) 25,207 deliveries took place, resulting in 77 deaths from septic causes. This is equivalent to a death-rate of 3·0 per 1000. It will be further seen that the number of deaths from septic causes has kept uniformly low, with one or two exceptions, since 1883. From 1883–1903 21,437 deliveries took place, resulting in 37 deaths from septic causes. This is equivalent to a death-rate of 1·7 per 1000. During the last ten years 11,620 deliveries took place, resulting in 17 deaths from septic causes. This is equivalent to a death-rate of 1·4 per 1000. During the period 1857–1903 the hospital had to be closed on three occasions—viz., in 1865 for six months, in 1876 for nine months, and in 1879 for six months on account of epidemics of puerperal septic diseases. The following are abstracts from the hospital reports :—

An epidemic occurred in the hospital of so severe and fatal a nature that it became necessary to close the wards for several weeks in order that they might be thoroughly disinfected. This has been carefully done, a more complete system of ventilation has been adopted, ... thoroughly disinfecting their beds, bedding, and clothes by the apparatus erected by the hospital, that a recurrence of so great a calamity may be prevented in future.

The frequency of the occurrence of blood-poisoning in general hospitals has been lessened by the application of scientific remedies, and there is no reason why in lying-in hospitals also, the same success may not be obtained.

Before 1898 no record could be found of the deaths from septic causes in the external department but after that date the particulars found are given in Table XXII.

TABLE XXII.—*Showing the Number of Deliveries and of Deaths from Septic Causes for the Quinquennial Period, 1898–1902.*

Year.	Deliveries.	Deaths.	Remarks.
1898 ...	1070	1	Serious complications not due to septicæmia.
1899 ...	1011	3	Two of these septicæmia.
1900 ...	971	1	Cerebral embolism.
1901 ...	1026	3	One septicæmia, two ante-partum hæmorrhage.
1902 ...	1204	1	Consumption.
Totals	5282	9	—

So that among 5282 deliveries there were three cases of septicæmia, which is equivalent to a death-rate of 0·5 per 1000, an exceedingly satisfactory result.

TABLE XXI.—SHOWING THE DEATHS FROM SEPTIC AND NON-SEPTIC CAUSES IN QUEEN CHARLOTTE'S LYING-IN HOSPITAL SINCE 1876.

Year...	1876 (9 mths)	1877	1878	1879 (6 mths)	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
Deliveries	416	466	592	333	602	669	692	663	775	857	885	962	865	995	892
Deaths from septic causes	*s.t.y.* 11	*s.n.* 4	—	*s.* 14	*s.* 1	*s.z*$_1$. 4	*s.* 6	*z*$_1$. 1	*s.* 3	*s.* 3	*s.* 2	*s.* 2	*s.* 1	*t.* 1	*y.* 2
,, ,, non-septic causes	*b.l.* 2	*a.i.* 2	*b.i.n.* 9	*g.o.* 2	*g.* 1	*i.p.n.* 3	*d.i.n.* 4	*b.* 2	*f.h.* 3	*g.h.* 2	*b.h.p.* 3	—	*j.* 1	—	*h.k.* 2
Cause not recorded	6	—	—	—	—	3	—	6	—	1	3	—	—	—	—
Total deaths	19	6	9	16	2	10	10	9	6	6	8	2	2	1	4

TABLE XXI.—*continued.*

Year	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903 (9 mths)
Deliveries	942	972	1009	1079	1124	1151	1101	1112	1150	1183	1284	1271	1165
Deaths from septic causes	*u.* 1	*s.* 2	*s.* 2	*s.w.x.* 5	*s.* 1	*s.t.* 3	—	*s.* 1	*s.u.* 2	*u.x.* 2	—	*z.* 2	*v.* 1
,, ,, non-septic causes	*d.g.j.* 3	*c.g.h.* 3	*c.h.m.* 4	*d.g.* 3	*c.h.j.* 4	*d.i.g.l.n.* 7	—	*h.o.* 2	*a.l.o.* 3	*c.e.j.n.p.* 6	*c.h.i.l.* 4	*d.h.* 3	*h.o.* 5
Cause not recorded	—	2	—	—	1	—	—	—	—	—	—	—	—
Total deaths	4	7	6	8	6	10	—	3	5	8	4	5	6

a, Acute œdema of lung. *b*, Old-standing disease (including internal affections and chest affections). *c*, Phthisis (including general acute tuberculosis). *d*, Morbus cordis. *e*, Intracranial tumour. *f*, Apoplexy. *g*, Bright's disease (including albuminuria, uræmia). *h*, Eclampsia (including convulsions). *i*, Exhaustion (including feeble women, and collapse after operations for contracted pelvis). *j*, Pulmonary embolism. *k*, Clot in heart. *l*, Placenta prævia. *m*, Placenta prævia, post-partum hæmorrhage). *n*, Post-partum hæmorrhage (including ruptured uterus and hæmatocele). *o*, Accidental hæmorrhage (including concealed accidental hæmorrhage and hæmophilia). *p*, Pneumonia. *q*, Pneumonia and pericarditis. *r*, After Porro's operation. *s*, Septicæmia (including sepsis and puerperal fever and septic endometritis). *t*, Pyæmia. *u*, Peritonitis (including acute and general). *v*, Appendicitis and peritonitis. *w*, Emphysema and peritonitis. *x*, Suppurative endometritis; uræmia. *y*, Bursting of suppurating ovarian cyst (including ruptured abscess of ovary). *z*, Infective endocarditis. z_1, erysipelas.

GENERAL LYING-IN HOSPITAL, LONDON—INTERNAL DEPARTMENT.

In the following tables are given the figures showing the mortality-rates for different periods at this institution :—

TABLE XXIII. (Ferguson).—*Showing Number of Deliveries and Deaths during a Period of Twelve Years (1827 to 1838 inclusive).*

—		1827	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	Total.
January	A	—	2	9	3	—	2	—	—	2	4	3	9	34
	B	—	0	3	0	—	0	—	—	2	0	0	8	13
February	A	—	2	7	—	—	—	—	—	2	6	—	—	17
	B	—	0	2	—	—	—	—	—	1	4	—	—	7
March ...	A	1	—	3	2	—	—	2	—	—	6	—	8	22
	B	0	—	1	2	—	—	0	—	—	2	—	6	11
April ...	A	3	—	1	1	4	1	1	3	2	6	3	9	34
	B	0	—	0	0	1	1	0	0	2	2	1	6	13
May ...	A	4	4	—	—	1	—	2	—	5	2	2	—	20
	B	1	0	—	—	1	—	2	—	2	0	1	—	7
June ...	A	—	3	—	—	—	1	2	—	6	4	—	—	16
	B	—	1	—	—	—	0	1	—	3	0	—	—	5
July ...	A	—	3	—	—	—	2	—	—	—	—	—	—	5
	B	—	0	—	—	—	0	—	—	—	—	—	—	0
August	A	—	3	1	—	—	—	—	—	—	—	—	—	4
	B	—	1	0	—	—	—	—	—	—	—	—	—	1
September ...	A	2	8	—	—	—	—	1	—	—	—	1	—	12
	B	0	2	—	—	—	—	0	—	—	—	0	—	2
October	A	—	4	—	—	—	2	—	—	5	—	—	—	11
	B	—	0	—	—	—	0	—	—	0	—	—	—	0
November ...	A	—	—	—	1	2	—	—	4	2	—	—	—	9
	B	—	—	—	0	0	—	—	4	0	—	—	—	4
December ...	A	—	8	3	—	2	—	1	2	2	3	—	—	21
	B	—	3	0	—	0	—	0	1	0	1	—	—	5
Totals ...	A	10	37	24	7	9	8	9	9	26	31	9	26	205
	B	1	7	6	2	2	1	3	5	10	9	2	20	68

A = attacked. **B = died.**

The hospital was closed in February, 1838, and was again closed from April to November, 1838.

From the above table it will be seen that one in every three died from puerperal fever.

TABLE XXIV. (Boxall).—*Showing Number of Deliveries, Deaths, and Death-rate during Different Periods.*

Period.	Deliveries.	Deaths.	Average death-rate from all causes.
1838–1860 ...	5833	180	1 in 32½ or 30·85 per 1000.
1861–1879 ...	3773	64	1 in 57⅞ or 16·96 per 1000.
1880–1887 ...	2585	16	1 in 161½ or 6·18 per 1000.
1888–1892 ...	2364	9	1 in 262⅔ or 3·80 per 1000.

TABLE XXV. (Williams).—*Showing Deliveries, Deaths, and Death-rate during a Period of Eleven Years.*

Period.	Deliveries.	Deaths.	Average death-rate from all causes.
1893–1903 ...	5766	27	1 in 213⅓ or 4·66 per 1000.

TABLE XXVIII.

Period.	Deliveries.	Deaths.	Death-rate.
1880–1892	4948	10	1 in 494·8 or 2·0 per 1000.
1893–1903	5766	3	1 in 1922·0 or 0·5 per 1000.

Unqualified medical students have occasionally been blamed for being the cause of the spread of puerperal septicæmia and for the occurrence of other deaths in childbed, but the above figures will, I think, exonerate them and this is really why I include them. Here is an instance where 18,256 women were delivered and attended by medical students alone and the results are truly remarkable—viz., a death-rate of 0·6 per 1000 deliveries, or 1 in 1659. On reference to Table XXI. it will be seen that four cases of septicæmia and one of pyæmia occurred in the year 1898. On inquiry I find that these deaths occurred in four different months—viz., May, one (pyæmia); September, one (septicæmia); November, two (septicæmia; and December, one (septicæmia). Now, as the clerks are

Summarising the results in Tables XXVI. and XXVII. we arrive at the following figures for puerperal sepsis.

TABLE XXVI.—SHOWING THE DEATHS FROM SEPTIC AND NON-SEPTIC CAUSES IN THE GENERAL LYING-IN HOSPITAL, LONDON, FROM 1880–1892.

Year	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892
Deliveries	230	172	325	341	334	395	383	404	497	484	430	463	490
Deaths from septic causes	*a.* 1	—	*d.e.* 2	*g.h.i.* 3	*j.* 1	*k.* 1	—	—	*q.r.* 2	—	—	—	—
,, ,, non-septic causes	*b.c.* 2	—	*f.* 1	—	—	*l.m.n.* 3	*o.* 1	*p.* 1	—	*s.t.u.v.* 4	*w.* 1	*x.y* 2	—
Total deaths	3	—	3	3	1	4	1	1	2	4	1	2	—

a. Septicæmia, abscess in uterine wall. *b*, Pneumonia, syphilitic ulceration of larynx. *c*, Puerperal eclampsia. *d*, Pyometritis, peritonitis, septic phlebitis. *e*, Purulent peritonitis, suppurating pelvic cyst (craniotomy). *f*, Puerperal mania. *g*, General septic infection. *h*, Septic phlebitis, acute endocarditis. *i*, Pelvic abscess, pyolymphangitis, perimetritis. *j*, Pyometritis, septic phlebitis, acute endocarditis. *k*, Septic phlebitis and general pyæmia. *l* and *m*, Advanced pulmonary phthisis. *n*, Mercurialism and morphism. *o* and *p*, Puerperal eclampsia. *q*, Sloughing of soft parts, parametritic abscess. *r*, Hospital gangrene. *s*, Hæmorrhage (accidental and post-partum). *t* and *u*, Accidental hæmorrhage. *v*, Exhaustion, prolonged labour, chronic nephritis (Cæsarean section). *w*, Exhaustion, prolonged labour, cancer of uterus (Cæsarean section). *x*, Rupture of uterus, prolonged labour, hydrocephalus. *y*, Syncope, unavoidable hæmorrhage, heart disease.

Deliveries = 4948. Deaths from septic causes = 10 in 13 years.

Total deaths are equivalent to a rate of 5·0 per 1000 deliveries. Deaths from *septic causes*, 2·0 per 1000 deliveries.

TABLE XXVII.—SHOWING THE DEATHS FROM SEPTIC AND NON-SEPTIC CAUSES IN THE GENERAL LYING-IN HOSPITAL, LONDON, FROM 1893 TO 1903.

Year	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903
Deliveries	527	535	535	508	520	548	560	500	497	480	556
Deaths from septic causes	—	—	—	*u.v.* 2	—	—	—	—	—	—	*t.* 1
,, ,, non-septic causes	*a.b.* 2	*a.c.d.e.* 4	*f.* 1	—	*g.* 1	*h.i.j.k.l.* 5	*b.m.n.* 3	*o.* 1	*a.b.p.q.* 4	*r.* 1	*a.s.* 2
Total deaths	2	4	1	2	1	5	3	1	4	1	3

a, Puerperal convulsions. *b*, Phthisis. *c*, Pelvic abscess burst into bladder. *d*, Placenta prævia. *e*, Inflammation of bowels and kidneys, *f*, Exhaustion. *g*, Sudden fit tenth day. *h*, Ruptured uterus. *i*, Acute general tuberculosis. *j*, Acute yellow atrophy of liver. *k*, Hæmorrhage, placenta prævia, and fibroid. *l*, Convulsions, abscess of liver, and gall-stones. *m*, Accidental hæmorrhage. *n*, Cerebral apoplexy, convulsions. *o*, Epileptiform convulsions (cephalotripsy). *p*, Cystitis and tuberculous kidneys. *q*, Acute lobar pneumonia. *r*, Exhaustion, contracted pelvis. *s*, Post-partum hæmorrhage. *t*, Peritonitis (forceps—decapitation). *u*, Septicæmia, placenta prævia. *v*, Septicæmia (repeated attempts with forceps before admission). (The last three cases were sent into hospital from the out-patient department.)

Deliveries = 5766. Deaths from septic causes = 3 in 11 years.

The deaths from septic causes are equivalent to a death-rate of 0·5 per 1000 deliveries. This is, indeed, a wonderful result and shows a vast improvement upon the death-rate from septic causes in the preceding 13 years.

TABLE XXIX.—SHOWING THE PUERPERAL MORTALITY IN THE OUT-PATIENT DEPARTMENT OF THE GENERAL LYING-IN HOSPITAL, LONDON, FROM 1880 TO 1902.

Year	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
Deliveries	630	610	729	808	741	852	866	882	911	1091	1055	1248	1291	1527	1624	1782	1833	1845	1791	1667	1787	1887	1889
Deaths from septic causes	—	—	—	—	—	—	*a.* 1	—	—	*d.* 1	—	*a.* 1	—	—	—	—	—	—	—	—	—	—	—
,, ,, non-septic causes	—	—	—	—	—	—	*b.* 1	—	—	*c.* 1	—	—	—	*e.* 1	*e.* 1	*f.* 1	*g h.* 2	—	*i.j.* 2	—	—	—	*k.l.m* 3
Cause not recorded	—	—	—	1	—	2	—	—	2	—	1	—	—	4	—	—	—	—	—	—	—	—	—
Total deaths	—	—	—	1	—	2	2	—	2	2	1	1	—	5	1	1	2	—	2	—	—	—	3

a, Septicæmia. *b*, Heart displaced through congenital deficiency in pericardium into pleural cavity during fit of vomiting. *c*, Pneumonia *d*, Peritonitis. *e*, Hæmorrhage. *f*, Exhaustion and pneumonia. *g*, Convulsions (baby unborn). *h*, Acute bronchitis—starvation. *i*, Eclampsia *j*, Accidental hæmorrhage. *k*, Bronchitis and pneumonia. *l*, Pleurisy and pneumonia. *m*, Influenza and pneumonia.

Deliveries = 29,346. Length of time 23 years. Deaths from septic causes = 3.

The total deaths are equivalent to a death-rate of 0·8 per 1000 deliveries. The deaths from septic causes are equivalent to a death-rate of 0·10 per 1000 deliveries. These, indeed, are wonderful results.

only on duty for one month at a time the deaths could not have occurred in the practice of one student. In the case of pyæmia no examination per vaginam was made, the child being born as the student entered the house and the mother being in a state of great destitution. In the two cases of septicæmia that occurred in November birth had taken place before the arrival of the accoucheur. The women delivered by these students were inhabitants of three of the lowest districts in the metropolis. One of the districts has been described thus : " Very overcrowded, with narrow

TABLE XXX.—*Showing the Number and Nature of Operations and the Number of Deaths at the General Lying-in Hospital, London, from 1898 to 1903.*

Year.	Forceps.	Embryotomy.	Craniotomy.	Induction.	Version.	Rotation.	Deaths (maternal).
1898	62	—	6	19	1	3	3*
1899	69	1	5	16	6	2	1†
1900	64	—	4	19	5	1	1‡
1901	50	2	3	24	4	—	3‖
1902	38	2	4	13	5	1	1§
1903	58	2	5	10	11	2	3¶
Totals ...	341	7	27	101	32	9	12

* Two after forceps (one spontaneous rupture of the uterus and accidental hæmorrhage, and one comatose when sent in). One after craniotomy (died on the eighth day; no cause found; post mortem non-septic).

† After rotation ante-partum hæmorrhage (four and a half pints).

‡ After craniotomy (convulsions).

‖ Two after forceps (one phthisis and one cystitis and tuberculous kidneys). One after craniotomy (eclampsia).

§ After craniotomy (syncope).

¶ One after embryotomy (peritonitis). One after version (placenta prævia). One after craniotomy (eclampsia ; convulsions).

streets, old and tumbled down houses, and very dirty. People poor and very poor, also dirty and very dirty. Some of them are fairly clean considering their surroundings. As a rule there are several families even in the smallest houses, and it is not uncommon to find husband and wife with three or four children living in one room, and with three, four, or half a dozen in the next room. The children sleep on various kinds of beds, including boxes. There are several large blocks of

model dwellings in this district, and in these the people are in a much cleaner condition. Most of the cases are English." In the second district a somewhat similar condition of things prevailed and here there were more blocks of dwellings and the people were cleaner. In the third district conditions were better and there were few blocks of buildings. A large number of Italians lived there. The husbands of the women so attended included labourers of all descriptions, carmen, hawkers, &c., and many of them seemed to be always out of work. A large number of women had to work for their children and husbands as well.

Such instances as the above could be multiplied almost indefinitely, but they all point in the same direction, and the experience of the above-named lying-in institutions is not at all exceptional. Those who desire to pursue this subject further I would refer to the excellent contributions of Dr. C. J. Cullingworth, Dr. H. F. Champneys, Dr. Boxall, and others. It is the same, I understand, in all lying-in hospitals where aseptic principles have prevailed, both at home and abroad, but I have no figures to prove this statement.

Dr. Boxall, in his "Antiseptics in Midwifery," when dealing with the mortality at the General Lying-in Hospital, London, observes :—

Since 1879, when the institution was reopened, the service has been conducted on aseptic principles. Mark the difference in the mortality then. The value of adaptation of Listerian measures to obstetric practice is evident from the decline in the death-rate which ensued.

Tables XXVI. and XXVII., giving the cause of each fatality since the hospital was reopened, show at a glance that it is mainly by the elimination of septic causes that improvement has been effected. He further remarks :

It will be observed, moreover, that the advantage gained at the outset has since been still further improved upon. The secondary improvement followed upon the increased experience in the use of antiseptic measures and their more perfect application since their first adoption. For instance, in the early part of 1884, corrosive sublimate solution was substituted for carbolic and Condy's fluid as the general antiseptic employed with very marked benefit. Since that time (1884–1892) only three deaths have taken place from septic causes among 3778 patients delivered, and none during the last four years (1889–1892). I may mention, however, that these fatalities were the result of dearly bought experience. One death took place when sublimate douche solutions of weaker strength were tentatively employed and the remaining two in which salufer douching was tried instead of sublimate.

By far better results have been obtained during the last decade at this lying-in hospital, and the deaths from septic causes at this institution have only amounted to 0·5 per 1000 deliveries. The precise nature of the antiseptic measures to which these wonderful results have been due varies in different institutions, and varies also in the same hospital from year to year. It will therefore serve no purpose to attempt to describe them and their use in detail, for the object at which they all aim is the same. As to the best

TABLE XXXI.—SHOWING THE DEATHS FROM SEPTIC AND NON-SEPTIC CAUSES IN CONNEXION WITH A WELL-KNOWN LONDON HOSPITAL WITH A MEDICAL SCHOOL ATTACHED, FROM 1893 TO 1903.

Year	1893 (11 months)	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903
Deliveries	1613	1636	1523	1719	1750	1718	1740	1758	1674	1587	1538
Deaths from septic causes	*s.* 2	*s.* 1	—	—	—	*s.t.* 5	—	*s.* 1	*s.* 1	*s.* 1	—
,, ,, non-septic causes	*f.h.* 3	*l.p.* 2	*p.q.* 2	*d.j.k.* 3	*e.* 1	*e.j.* 2	*b.p.* 2	*i.* 1	*c.d.m.n.* 5	*a.g.l.n.p.* 6	*c.* 1
Total deaths	5	3	2	3	1	7	2	2	6	7	1

a, Cerebral symptoms, probably mania. *b*, Morbus cordis. *c*, Syncope. *d*, Phthisis. *e*, Acute bronchitis. *f*, Pneumonia. *g*, (?) Uræmia. *h*, Eclampsia. *i*, Convulsions. *j*, Placenta prævia. *k*, Ante-partum hæmorrhage and post-partum hæmorrhage. *l*, Post-partum hæmorrhage. *m*, Accidental hæmorrhage. *n*, Ruptured uterus and carcinoma. *p*, Pulmonary embolism. *q*, Enteric fever. *s*, Septicæmia. *t*, Pyæmia.

Deliveries = 18,256. Deaths from septic causes = 11.

The deaths from all causes represent a death-rate of 2·13 per 1000 deliveries. The deaths from septic causes represent a death-rate of 0·6 per 1000 deliveries. Concerning the deaths in the foregoing table it may be pointed out that the following 11 cases were admitted to the hospital where the patients died. Five cases of septicæmia, one of pyæmia, two of phthisis, one of eclampsia, one of pneumonia, and one of pulmonary embolism. In one case showing cerebral symptoms, probably melancholia, the patient died on the twentieth day, after being discharged apparently well and being under the care of the parish medical officer.

methods of effecting this object, there is, as I have already said, some difference of opinion.

I will now refer briefly to the death-rate from septic causes at the external department of Queen Charlotte's Hospital, at the external department of the General Lying-in-Hospital, London, and at the midwifery department of a London hospital. In the first of these during the period of five years 1898–1902 there were 5282 deliveries and three deaths. This is equivalent to 0·5 per 1000 deliveries. In the second, during a period of 23 years (1880–1902) there were 29,346 deliveries and three deaths only. This is equivalent to 0·10 per 1000 deliveries, or 1 in 10,000—a wonderful result. In the third, during a period of 11 years (1893–1903),there were 18,256 deliveries and 11 deaths. This is equivalent to 0·6 per 1000 deliveries. Excluding the three deaths of women when the child was born before the student arrived the death-rate becomes 0·4 per 1000 deliveries. Since it is possible in the external departments of lying-in hospitals and in the midwifery department of a large London hospital, as has been demonstrated, to obtain by means of aseptic and antiseptic precautions such wonderful results as these, surely we have a right to expect equally good results in midwifery practice generally. In the case of the external department of Queen Charlotte's and the General Lying-in Hospitals the women are attended and nursed in their own homes by trained and skilled midwives. In the case of the London hospital referred to the women are attended in their own homes by unqualified medical students. The only difference between the conditions under which these women are confined and those confined in private practice generally is that the midwives are trained and skilled in their work and can procure medical assistance whenever necessary and at short notice, whereas the large majority of midwives who attend labours on their own responsibility are neither trained nor skilled and, moreover, they possess no knowledge whatever of the true meanings and the application of asepsis and antisepsis. When, therefore, the time arrives when all midwives will be trained and skilled we have a right to expect equally good results in private practice generally, provided medical assistance, if and when required, can be obtained at short notice.

Mortality at Different Ages or the Relation of Age to the Mortality from Puerperal Septic Diseases and Accidents of Childbirth.

Deaths in childbirth happen in many ways and different causes operate with variable force at different periods. It has been estimated that the number of women at different ages bearing children are as follows: From 15 to 25 years only 1 in 16 bears a child in the year and at 45 years of age

and upwards the proportion is inconsiderable, while at the ages of from 25 to 35 years 1 in every 4 women bears a child in the year, and at 35 to 45 years of age the proportion is 1 in 6. Therefore, the ages from 25 to 35 years represent the period of life in which British women bear the greatest number of children and it is calculated that the mortality of women at that age from all causes is nearly 1 per cent. On this subject important information is found in a letter addressed by Dr. Farr to the Registrar-General in 1864 and published in the appendix to that officer's seventeenth and other annual reports—viz., the twentieth, twenty-first, twenty-second, and thirtieth. In this letter Dr. Farr asks, "What is the danger of death by childbirth among women of different ages who bear children during the year?" This is a difficult question which is of practical importance both in medical science and in the business of life insurance. The defect in the English schedule, which as yet contains no column for the ages of the parents of the children registered, renders it impossible to answer this question with precision. It will, however, be useful to obtain an approximate answer and this we have been able to give by determining the probable proportion of women who bear children at each age from the Swedish returns and by applying the fraction expressive of this proportion to the English women living in 1851 at the corresponding age the probable number of them who become mothers every year is determined. The total number thus determined for the year 1851 is 609,845, while the actual average number of the births in the seven years by the returns was 603,045. It is thus evident that the estimate differs to no great extent from the facts and it may be assumed that the births, corrected for twins, triplets, and stillborn children, in England would represent nearly 609,845 child-bearings. The following sets of tables extracted from the data supplied by Dr. Farr show the mortality from puerperal fever and from accidents of childbirth for different periods. It will be unphilosophical, however, to draw from these tables even a presumption as to influence of age on the mortality from septic diseases until careful consideration had been made of *all* the influences, besides age, having a bearing upon it, such as primiparity, multiparity, the number of preceding pregnancies, and so forth. To make a satisfactory comparison of the mortalities of women of different ages it is necessary to compare with one another masses of women of different ages in each successive pregnancy. They are given, however, for what they are worth and will doubtless be of some value.

TABLE XXXII.—*Showing Estimated Number of Women Bearing Children, Deaths from Puerperal Fever, and Death-rate for 1848–1854 (seven years).*

Ages.	Estimated number of women bearing children.	Deaths from puerperal fever.	Annual mortality from puerperal fever per 1000 mothers.
15–25	107,440	2085	2·77
25–35	328 720	3401	1·48
35–45	166,140	1791	1·54
45–55	7.545	86	1·63
15–55	609,845	7363	1·72
1855–1856 (two years).			
15–25	107,440	609	2·69
25–35	328,720	942	1·36
35–45	166,140	565	1·62
45–55	7,545	27	1·72
15–55	609,845	2143	1·67
1855–1857 (three years).			
15–25	107,440	841	2·46
25–35	328,720	1302	1·24
35–45	166,140	797	1·51
45–55	7,545	42	1·75
15–55	609,845	2982	1·54
1855–1858 (four years).			
15–25	107,440	1146	2·50
25–35	328,720	1777	1·27
35–45	166,140	1078	1·52
45–55	7,545	49	1·52
15–55	609,845	4050	1·55
1855–1859 (five years).			
15–25	107,440	1502	2·60
25–35	328,720	2362	1·34
35–45	166,140	1360	1·52
45–55	7,545	64	1·52
15–55	609,845	5288	1·61

TABLE XXXIII.—*Showing Estimated Number of Women Bearing Children, Deaths from Puerperal Fever, Accidents of Childbirth, and Death-rates for 1848–1854 (seven years).*

Ages.	Estimated number of women bearing children, 1851.	Deaths from puerperal fever.	Deaths from accidents of child-birth.	Annual rate of mortality from puerperal fever per 1000 mothers bearing children.	Annual rate of mortality from accidents of child-birth per 1000 mothers bearing children.
15–25	107,440	2,085	2,940	2·77	3·91
25–35	328,720	3,401	6,378	1·48	2·77
35–45	166,140	1,791	5,568	1·54	4·79
45–55	7,545	86	380	1·63	7·20
15–55	609,845	7,363	15,266	1·73	3·58
		1855–1867 (13 years).			
15–25	116,474	4,023	5,731	2·66	3·78
25–35	368,487	6,624	11,880	1·38	2·48
35–45	192,979	3,533	10,493	1·41	4·18
45–55	8,623	156	604	1·39	5·39
15–55	686,563	14,336	28,708	1·61	3·22

TABLE XXXIV.—*Showing Estimated Number of Women Bearing Children and Causes of Death at Various Ages, for 1855–1857 (three years).*

Ages.	Estimated number of women bearing children, 1851.	Deaths.				Annual rate of mortality from "accidents of childbirth" per 1000 mothers.			
		Placenta prævia and flooding.	Puerperal mania.	Puerperal convulsions.	Rupture of uterus.	Placenta prævia and flooding.	Puerperal mania.	Puerperal convulsions.	Rupture of uterus.
15–25	107,440	127	52	295	10	0·68	0·28	1·58	0·05
25–35	328,720	458	119	213	44	0·91	0·24	0·42	0·09
35–45	166,140	561	42	106	46	2·22	0·17	0·42	0·18
45–55	7,545	35	4	6	2	2·82	0·32	0·48	0·16
15–55	609,845	1181	217	620	102	1·23	0·23	0·65	0·11
		1855–1858 (four years).							
15–25	107,440	166	72	390	12	0·69	0·30	1·61	0·05
25–35	328,720	632	169	270	61	0·95	0·25	0·40	0·09
35–45	166,140	784	95	152	56	2·29	0·17	0·44	0·16
45–55	7,545	48	4	8	2	2·91	0·24	0·48	0·12
15–55	609,845	1630	340	820	131	1·28	0·24	0·64	0·10
		1855–1859 (five years).							
15–25	107,440	220	102	481	16	0·74	0·35	1·63	0·05
25–35	328,720	806	215	342	78	0·97	0·26	0·41	0·09
35–45	166,140	1014	80	183	61	2·37	0·19	0·43	0·14
45–55	7,545	61	4	11	3	3·07	0·20	0·55	0·15
15–55	609,845	2101	401	1017	158	1·33	0·25	0·64	0·10

Remarks.—Flooding increases rapidly with age and so does rupture of the uterus. The organs wear out. Puerperal convulsions are much more fatal in the first period (from 15 to 25 years of age). The muscular irritability is greatest. Puerperal mania is probably of most frequent occurrence in the first period but most fatal in the last period.

LECTURE II.

Delivered on March 1st.

The Etiology of Puerperal Fever.

Mr. President and Gentlemen,—Puerperal fever has been common to lying-in women in all ages and climates and is described by Hippocrates 430 B.C., the first writer on the art of healing. Hippocrates, who contributed excellent clinical histories of the disease, did not only consider it as a dangerous disease but as a mortal one.

> "Morbus hic lethalis, et paucæ effugere possunt;
> Si mulieri pregnanti fiat in utero erysipelas, lethale est,"

and such were the views expressed by Celsus and Galen. Arabian physicians, such as Avicenna, as well as the physicians of the Middle Ages, have nothing more to say than that women in childbed sometimes took fever which led to their death. The medical writers of the sixteenth and seventeenth centuries go rather more into particulars. According to Hirsch it was Willis who first looked upon it as a disease which was different from other febrile processes, and he gave it the name of "febris puerperarum," and he went so far as to connect its origin with laceration of the uterus during labour and to refer it to a "miasma venenatum." By one writer the obstetric art was described as "only fit for fools and old women," and it was practised by them mostly until the establishment of a College of Physicians in London in 1518. In 1560 Thomas Raynold published his "Byrth of Mankinde." From the time of Thomas Raynold to that of Ströther, who wrote in 1716 and first termed it puerperal fever, many eminent men have written about puerperal fever, but their views differed but little from those of former writers. Thomas Cooper (1766) looked upon the disease as a truly dangerous and perplexing malady and considered that it proceeded generally from violent affections of the mind, such as grief, despondency, and the like.

With the exception of the statement that the disease was epidemic at Thasos in the time of Hippocrates the earliest epidemiological notice is one relating to the Hôtel Dieu of Paris in 1746, when it is said that of 20 patients who were seized with the disease scarcely one escaped. It is also pointed out that the hospital was crowded with patients at the time, an unusually large number of them being cases of wounds, and the ventilation of the wards was extremely defective and it is expressly stated that the lying-in department was directly over the wards occupied by the surgical

cases. In 1830 Cruveilhier writes to the same effect on the epidemic of the Paris Maternité.

Hulme (1772) declared that the disease should be equally dreaded with the plague itself but did not consider it infectious. Denman (1788), according to Hirsch, was the first to allege that childbed fever was sometimes carried by medical men and midwives who had been in attendance on puerperal fever patients to other lying-in women.

In 1779–82 puerperal fever prevailed in an epidemic form at Aberdeen.[1] We are told in connexion with this epidemic that it prevailed principally among the lower classes of women but that women in the higher walks of life were not exempted; that it extended to the suburbs and contiguous country, where it proved as fatal as in the heart of the city. About 80 cases were attended by Gordon himself. To use his own words: "This disease seized such women only as were delivered or visited by a practitioner, or taken care of by a nurse, who had previously attended patients with the disease. In short, I had evident proof of its infectious nature and that the infection was as readily communicated as that of small-pox or measles and operated more speedily than any other infection with which I am acquainted." The infection was carried by a midwife to the country parishes of Nigg and Fintray and there also spread alarmingly.

The fever was epidemic in Leeds and its vicinity in 1809–12 and William Hey, jun., in his treatise on the epidemic tell us that it prevailed principally among the poorer classes of women but in the beginning it affected chiefly those in the higher stations of life and in its progress they were equally liable to its attacks. Its origin and spread could not be traced to any climatic conditions and it prevailed equally in both hot and cold weather. Dr. Hey writes: "It is somewhat remarkable that I have scarcely known an instance, in my own practice, of this disease coming on after præternatural delivery, or even a particularly hard labour. I do not mean to imply that such cases were more exempt from it than others, but so it has happened; and the fact shows that it was independent of anything untoward in the labour. It has, on the contrary, most frequently occurred, within the compass of my experience, after the most easy and most natural labour." This is entirely in accord with my own observations. I have known a medical man to go straight from a puerperal fever case to a confinement where the operation of turning was necessary. He introduced his hand into the uterus and the patient made a good recovery and was not infected with puerperal fever.

Armstrong (1813–14), in his description of the epidemic in Northumberland, Durham, &c., writes: "It is a singular fact that in whatever place the fever in question occurred it was

[1] Gordon's Essay on Puerperal Fever at Aberdeen.

principally limited to the practice of one accoucheur in the place." He further remarks: "This complaint, as it was presented to me, generally occurred about 24 to 30 hours after delivery. It did not seem to depend upon any difficulty of labour for in most of the women in whom it occurred parturition was remarkably easy. The first case at Sunderland occurred in January, 1813, and by the spring of the same year the disease had assumed formidable proportions." 43 cases occurred from Jan. 1st to Oct. 1st and of these 40 were treated by one medical man or his assistant, the remainder having been seen by three different accoucheurs. At Chester-le-Street, about nine miles from Sunderland, several cases occurred to a certain medical man, whilst a Mr. "N." of the same place only met with a solitary instance now and again. One accoucheur lost seven patients in a town not far from Newcastle-on-Tyne, and it is stated that the disease was confined to the patients of that practitioner and in the preceding year in like manner to those of one midwife in Newcastle itself. In May, 1813, the disease appeared at Alnwick and was confined to the practice of two medical men. Though one midwife who had a considerable increase of business had not a single case of the disease, another midwife, however, who had been about two days in the house of a lady dying from puerperal fever, went into a district about eight miles away and there delivered several women, nearly the whole of whom were attacked by puerperal fever. In this particular the epidemic strikingly corresponded with that of Dr. Gordon in Aberdeen, for he distinctly mentions that the disease occurred to certain individuals, whilst it was entirely unknown in the practice of others living in the same neighbourhood and he naturally attempted to account for this singular circumstance that the practitioner conveyed the contagion from patient to patient. The fever existed for more than two years in different parts of Durham and Northumberland. The epidemic really commenced in the neighbourhood of Stockton-on-Tees in 1811 and it spread to Newcastle-on-Tyne and Sunderland, afterwards to Chester-le-Street, and lastly in and about Alnwick. During its prevalence a great number of women died from the disease, but the number is not given and Dr. Armstrong says, "and this I was creditably informed, every patient perished who was not bled in the beginning."

Armstrong was of opinion that puerperal fever was different from "the weed," "after pains," and "hysterites." The symptoms are very well described by him: "Abdominal pain or soreness, anxious breathing, unusual frequency of pulse, increased temperature, anorexia, prostration of the vital and voluntary powers, with an unnatural condition of the excrements are among the chief of the pathognomonic signs of the puerperal fever." It is well known that unmarried women do not recover so well as married women, the mental irritation attendant upon their

condition considerably increasing the febrile excitement and thus accompanying the danger. Armstrong dealing with prevention says: "When puerperal fever is epidemic the accoucheur should make it a point of duty to have the apartment of the woman whom he is engaged to attend properly cleaned and ventilated before confinement; to prevent nurses and other persons who have been in contact with those affected from waiting upon or going near any patient about to be delivered; to pay the most scrupulous regard to the cleanliness of his own person, using daily ablutions of the whole body and frequent changes of linen and dress."

Ferguson in 1839 gave his observations during 12 years on 205 cases under his care at the General Lying-in Hospital, London (Table XXIII.). He classifies puerperal fever into four groups, the fourth of which is most dangerous, and he observes: "When this fourth form of puerperal fever is prevalent and characteristic of the epidemic 1 in every 3 dies in the London hospitals under any treatment and if the complications be many this mortality will be still increased, and the most judicious and the most humane act is to shut up these receptacles forthwith." Such, indeed, was the experience of William Hunter who used to say of puerperal fever cases: "Treat them in what manner you will at least three out of every four will die." Such was the experience of those who witnessed its plague-like ravages in the continental hospitals and such was that of Ferguson who was of opinion that this form of puerperal fever existed in hospitals alone. Ferguson further observes: "I believe that the single chamber of the pauper is more wholesome than the spacious ward of the hospital patient; while in private practice, among the well-housed and well-nourished, the milder forms are the commonest." This was also the opinion shared by most others at that time.

It would be interesting to give other instances, such as those recorded by Storrs (1842) in connexion with the Doncaster epidemic; by Blackmore (1831) in reference to an epidemic at Plymouth; by Simpson (1851) in connexion with some fatal cases at Edinburgh; Litzmann (1841–42) in connexion with an epidemic at Halle; and by Martin (1856); Schulten (1859); Netten Radcliffe (1865) in connexion with the Crickhowell epidemic; and so on. All these point in the same direction and should serve to impress upon us that the question of personal responsibility cannot be too strongly urged upon midwives and medical men.

It was Semmelweiss (1846) who founded the doctrine of the septic nature of puerperal fever by observing the frequency with which it followed the exposure of puerperal women to cadaveric putrefaction. It was this observation of Semmelweiss and the analogies of puerperal and surgical fevers first pointed out by Simpson, together with the investigations of Pasteur, Davaine, Rindfleisch, Koch, and others on the part played by micro-organisms in disease that led up to Lord Lister's system of antiseptic surgery.

According to Priestley [2] it was Stadfelt of Copenhagen (1865) who first applied antiseptic method to puerperal uses in the maternity hospital of that town. He used carbolic acid; but later Tarnier in Paris introduced corrosive sublimate as being a more efficacious germicide. Guided by the progress of antiseptic surgery a new departure was inaugurated in Germany and then commenced aseptic, as distinguished from antiseptic, midwifery. The antistreptococcic serum when further elaborated may become an important factor in the prevention as well as in the cure of puerperal fever.

I will now relate some of my experiences in connexion with epidemics of puerperal fever which I was fortunate enough to have the opportunity of investigating. I was appointed medical officer of health of Glamorgan in December, 1892, and arrived in time to investigate an epidemic of this malady which had been for some time raging in two adjoining valleys included in the Garw and Ogmore urban district and situated in the centre of our coalfields. The valleys in question run north and south and are typical Glamorgan mining valleys—long, crooked, deep, and narrow. Their higher parts are densely populated on both sides of the black and highly polluted streams that run through each of them. Most of the houses are newly built and 16 or 18 years ago there was only an occasional farmhouse to be seen. The ridges of mountains on either side rise to a height of from 800 to 1200 feet above the sea level. The population of the two valleys numbers some 14,000, consisting for the most part of colliers and their families, with some tradesmen and artisans to minister to their wants. The houses are built of good quarried stone and are dry and comfortable in the majority of cases. There are but a few privies, most of the houses having been in recent years supplied with pans and syphons, and connected with the public sewers. The water-supply is good and plentiful. The incidents of the epidemic were briefly as follows.

Puerperal fever had been prevalent in this district for many years; it is said to have been endemic in the Garw Valley. The number of cases that were reported or came to the knowledge of the medical officer of health for the period 1889–March 1st, 1893, were in—

Year.	Number of cases.	Recovered.	Died.
1889	9	4	5
1890	10	7	3
1891	14	12	2
1892	16	8	8
1893 (Jan. 1st to March 1st)	18	10	8

so that during January and February, 1893, 18 cases occurred and eight proved fatal. In 1892 the number of cases was 16, with eight deaths; in 1891 14 cases with two deaths; in 1890, ten cases with three deaths; and in 1889,

[2] Transactions of the International Congress of Hygiene and Demography, 1891.

TABLE XXXV.—SHOWING THE INFECTIOUS SICKNESS AND MORTALITY IN THE GARW VALLEY FROM 1889 TO MARCH 1ST, 1893.

Year and locality.	Population census, 1881.	Population estimated.	Registered births.	Small-pox.	Scarlet fever.	Diphtheria.	Membranous croup.	Typhus.	Enteric or typhoid fever.	Relapsing.	Continued.	Puerperal.	Cholera.	Erysipelas.	Measles.	Whooping-cough.	Diarrhœa or dysentery.
1889... ... ... Ogmore Ward	6,893	—	—	0	80(19)	0	0	0	16(6)	0	0	4	0	0	0	30(5)	4(3)
Garw Ward				0	180(28)	0	0	0	8	0	0	5(5)	0	0	84	20(3)	100
1890... ... ... Ogmore Ward	6,893	12,500	548	0	12(2)	0	0	0	19(5)	0	0	8(3)	0	3	(8)*	(8)*	(4)*
Garw Ward				0	175(14)	0	0	0	4	0	0	2	0	1(1)	(2)*	(3)*	(1)*
1891... ... ... Ogmore Ward	13,080	13,080	605	0	27(2)	0	0	0	6	0	0	8	0	2	(1)*	(2)*	
Garw Ward				0	32(2)	0	0	0	5(1)	0	0	6(2)	0	0	(14)*	(10)*	(2)*
1892... ... ... Ogmore Ward	13,080	15,080	675	0	23(2)	0	0	0	36(8)	0	0	6(3)	0	2(1)	(1)*	(1)*	
Garw Ward				0	41(5)	0	0	0	14(1)	0	0	10(5)	0	12(1)	—	—	(2)*
Jan. 1st, 1892, to March 1st, 1893 ... Ogmore Ward	—	—	—	—	—	—	—	—	—	—	—	8(4)					
Garw Ward	—	—	793	—	—	—	—	—	—	—	—	26(12)					

NOTE.—The number of deaths in each case is given in brackets. * No return of cases.

nine cases with five deaths; making, in four years and two months, 67 cases, with 41 recoveries and 26 deaths. From Jan. 1st, 1892, to March 1st, 1893, 34 cases occurred; of the 26 in the Garw Valley, 12 were fatal; and of the eight in the Ogmore Valley, four were fatal. During this period (14 months) there were 793 births registered, showing a death-rate of 20·1 per 1000 registered births as compared with a mean rate of 2·5 for England and Wales. Table XXXV. shows the number of other infectious diseases that occurred in the district from 1889 to March 1st, 1893.

TABLE XXXVI.—*Giving Particulars of Cases of Puerperal Fever at Pontcymmer in the Garw Valley, from May, 1892, to March 1st, 1893.*

Initial of patient.	Date of confinement.	Primipara or multipara.	Midwife.	Duration of illness.	Results.	Remarks.
	1892.					
S.	May 14th.	M.	Mrs. P.	4 weeks.	R.	Fatal scarlet fever next door. House clean.
R.	,, 23rd.	P.	,,	4 weeks.	D.	—
L.	June 13th.	P.	,,	7 days.	D.	—
D.	,, 23rd.	P.	,,	9 days.	D.	Scarlet fever a few yards away.
R.	July 10th.	M.	,,	—	R.	—
E.	Sept. 17th.	P.	,,	—	R.	—
H.	Oct. 31st.	M.	Mrs. T.	9 days.	D.	Drainage defective.
W.	Nov. 7th.	?	Stranger.	4 weeks.	D.	—
D.	,, 29th.	?	Mrs. S.	—	R.	Drainage defective.
D.	Dec. 6th.	M.	Mrs. P. 2.	—	R.	,, ,,
J.	,, 7th.	M.	,,	—	R.	,, ,,
J.	,, 15th.	M.	Mrs. P.	—	R.	Scarlet fever in the house a short time previously.
R.	,, 23rd.	M.	Mrs. T.	7 days.	D.	Disease developed the second day. Erysipelas upon the baby and a man in the same house.
	1893.					
E.	Jan. 1st.	P.	Mrs. P.	—	R.	Overflowing closet in the basement.
Ll.	,, 7th.	M.	Mrs. T.	—	R.	Insanitary surroundings.
D.	,, 20th.	M.	Mrs. P.	—	R.	—
—	March 3rd.	P.	Mrs. P.2.	3 days.	D.	Drainage defective.
S.	,, 3rd.	—	Mrs. R.	—	D.	Insanitary closet in the basement.

TABLE XXXVII.—GIVING PARTICULARS OF CASES OF PUERPERAL FEVER AT BLAENGARW, IN THE GARW VALLEY, FOR A PERIOD OF TWO YEARS.

Initial of patient.	Date of confinement.	Primipara or multipara.	Midwife.	Duration of illness.	Results.	Remarks.
	1891.					
D.	March 3rd.	M.	Mrs. Ll.	3 weeks.	R.	Miner's wife. House clean. Natural labour. Second day rigor and temperature 102° F. Third day temperature 104°. Severe abdominal pain and tenderness. Temperature normal on the twelfth day. Mrs. Ll. also attended another case at the same place, which also made a good recovery. Medical man present at the birth of the child.
G.	,, 8th.	M.	Mrs. T.	8 days.	D.	Natural labour. Rigor third day. No abdominal tenderness. Lochia sweet. Death eighth day. Temperature 108° F. No source of infection could be traced. House clean.
J.	Nov. 21st.	M.	Mrs. T.	2 weeks.	D.	Wife of grocer. House clean. Natural labour. Rigor seventh day. Temperature varied from 102° to 104° F., but at last went up to 107° a little before death. Cause of death, peritonitis.
	1892.					
M.	May 28th.	P.	Mrs. Ll.	4 weeks.	R.	Instruments used. Severe post-partum hæmorrhage. Rigor third day; temperature 105° F. same evening. Slight abdominal pain and tenderness. Discharge foul.
J.	Nov. 16th.	P.	Mrs. T.	7 days.	D.	Age 23 years. Easy labour. Rigor second night. Temperature 103° F., with abdominal tenderness and censation of lochia. None of the usual sources of infection could be traced.
B.	,, 17th.	P.	Attended by a medical man.	7 days.	D.	Aged 21 years. Easy labour. Rigor second night and temperature of 102·5° F.; great tenderness over uterus and foul lochia although she had been washed with antiseptic lotions. This case was peculiar for its terrible and persistent vomiting. Her father, who lived in the same house, was then suffering from a large wound of the leg. House clean.
M.	Dec. 20th.	M.	Mrs. T.	—	R.	Forceps delivery. Rigor and high temperature on the fourth day which yielded to usual treatment.
M.	,, 24th.	P.	Mrs. Ll.	7 days.	D.	Easy labour. Age 20 years. Fifth day rigor, high temperature (104° F.), tympanites, and abdominal tenderness. Lochia, although profuse, were very foul; green vomiting. Died on the seventh day; hyperpyrexia. The midwife in this case had attended a fatal case about a fortnight before this one, but in the interval had, so she said, thoroughly washed and boiled all her clothes at the wish of a medical man.
H.	,, 30th.	M.	Mrs. R.	14 days.	R.	Forceps delivery. Rigor and high temperature on the third day. Temperature normal on the fifth day.
D.	,, 31st.	P.	Mrs. Ll.	14 days.	D.	Miner's wife. Natural labour. Progressed favourably till Jan. 7th, when she sat up in bed to nurse the child. Rigor following morning, with a temperature of 102° F. Great swelling and abdominal tenderness. Temperature 102°. Jan. 14th, temperature 107°. Death took place from peritonitis. House very clean. Slight post-partum hæmorrhage.
	1893.					
W.	March 4th	P	Her mother.	—	R.	Easy labour. Rigor and high temperature on the second day. History of erysipelas in the same house 12 months previously.

Of the 18 cases at Pontcymmer (Table XXXVI.) seven were primiparæ and five of them were fatal. Nine were attended by the same midwife and of these three were fatal. In six instances the drains were defective; in two the surroundings were insanitary.

Of the 11 cases at Blaengarw six were primiparæ, of whom four died. Four cases were attended by one midwife and four by another. Of the six that proved fatal all were natural and easy labours, and three, at least, were in young women. (Table XXXVII.)

TABLE XXXVIII.—*Giving Particulars of Cases at Nantymoel and Tynewydd (almost adjoining), in the Ogmore Valley.*

Initial of patient.	Date of confinement.	Primipara or multipara.	Midwife.	Duration of illness.	Results.	Remarks.
	1892.					
A.	June 6th.	—	Mrs. A. W.	—	R.	—
B.	,, 8th.	—	Mrs. H. L.	—	R.	—
C.	August 2nd.	—	Mrs. L.	—	D.	The midwife in this instance was suspended for three months but had since attended 30 cases without ill effects.
D.	Oct. 10th.	—	Mrs. H. L.	—	R.	—
E.	Nov. 10th.	—	,,	—	D.	—
F.	,, 13th.	—	,,	—	D.	Mrs. H. L. was stopped attending for six weeks, but she afterwards attended three cases without ill effects.
	1893.					
J.	Jan. 8th.	—	,,	—	D.	—
H.	,, 21st.	—	,,	—	D.	Mrs. H. L. was stopped attending for nine weeks but had since attended six cases without ill effects.
I.	,, 27th.	—	Mrs. A. W.	—	R.	—
K.	,, 27th.	—	,,	—	R.	—

The Nantymoel cases (Table XXXVIII.).—D. was confined in a house where the whole family, six in number, had suffered from scarlet fever. The last was convalescent

at the time of her confinement. On the second day symptoms of puerperal septicæmia were developed with a high temperature and foul discharge. The uterus was washed with a solution of perchloride of mercury and in a week the patient was convalescent and made a good recovery. About six weeks afterwards E. was delivered of twins. There was a severe rigor on the second day accompanied by a high temperature. In a few days symptoms of peritonitis developed and the patient died on the eighth day. She was attended by H. L.

Three days after the death of E., F. was confined in the same street and attended by the same midwife (H. L.). A rigor occurred on the second day with signs of peritonitis on the third. She rapidly got worse and died on the sixth day. During the interval between the first and second cases (above recorded) H. L. attended several cases without any signs of septicæmia. After the third case she was debarred from attending for six weeks. At the end of six weeks she attended another case. This patient was very ill three days before her confinement and died three days after delivery from violent peritonitis. Four days afterwards H. L. attended another woman who made a good recovery in due time. This same midwife went on attending confinements for three weeks without any ill effects until she attended H. This patient had a rigor on the second day, with a temperature of 101° F. On the morning of the third day the temperature was 102°, and by 4 o'clock of the same day the temperature was 107°. She became unconscious and died at 7 o'clock the same evening. After the above case the midwife was debarred attending up to March, 1893.

During the same period of about five months, A., I., and K. were attended by A. W., another local midwife. All these recovered. This midwife had attended many cases since and without any ill effects. During the same period, and indeed during the year, several cases of confinement occurred and were attended by three different midwives, where a slight rise of temperature was manifested, but they recovered. Influenza was prevalent at the time. It was a very common occurrence in this practice to have slight cases of the so-called puerperal fever, but generally they were easily controlled by antipyretics and disinfecting injections, or, in fact, without any treatment whatever.

The notable features of the Ogmore cases were that : (*a*) the fatal cases (at Nantymoel) were attended by the midwife H. L. ; (*b*) all the cases attended by the midwife A. W. recovered ; and (*c*) during the interval between the first and second fatal cases H. L. attended several cases without the slightest ill effects. The midwife A. W. did not cease attending cases for even a day and, whilst H. L. was abstaining, A. W. probably attended a case daily on an average. Two of her cases were severe puerperal fever and both of the patients recovered.

The above statements show that puerperal fever has prevailed to an abnormal extent in this district for some years —that it was endemic and never entirely absent from the locality. I was informed by some of the oldest practitioners in the Garw Valley that cases of this disease have occurred there at intervals for 13 years and that it is, like typhoid fever, indigenous in some of the localities. I have given an outline of the sanitary condition and local peculiarities of the district, and I would only add that the two valleys are totally distinct and separated by high hills of Penant sandstone and that there is no intercourse between the midwives of the one and those of the other. Notwithstanding this fact the disease has been prevalent in both valleys.

It is well known that defective sewerage and typhoid fever go hand-in-hand. This is clearly exemplified by the fact that Pontycymmer (in the Garw Valley) and Tynewydd (in the Ogmore Valley), the most insanitary spots throughout the district, suffer the most from typhoid fever. I should also mention that these localities are the most densely populated. It is possible, if not probable, that there might exist a close relationship between puerperal fever and of insanitary atmosphere, containing sewer gases, arising from untrapped and badly ventilated drains or sewers or from the soil which is often damp and boggy and impregnated with excrement and decomposing vegetable matter. Of this I cannot speak.

Again, scarlet fever is believed by some to have intimate relationship with outbreaks of puerperal fever. Scarlet fever has been prevalent in these valleys for years, but the accompanying tables do not conclusively show the connexion, if any, that exists between it and puerperal septicæmia. I have notes of several cases where confinements have happened in houses at the time infected with scarlet fever and the experience of one of the medical practitioners (which coincides with my own) may be summarised thus : 1. That the majority of cases confined in houses infected with scarlet fever escape entirely. 2. That occasionally the mother takes scarlet fever but does not develop any puerperal symptoms such as rigors, high temperature, abdominal tenderness, fœtid lochia, &c., and generally recovers.

The following are noticeable facts also : 1. That not a single case of diphtheria had been reported to the medical officer of health during the last five years. Indeed, I am informed that the disease is not known in these valleys. 2. That primiparæ are more liable to be attacked than multiparæ. Out of 12 instances in which primiparæ suffered there were 8 fatal cases, whilst out of 14 where multiparæ suffered there were only 4 fatal cases. 3. That the fever more readily attacks, and is more fatal in, cases of easy and natural labours. 4. That the above statistics and history of cases do not afford conclusive evidence of the relationship, if any, between this disease and other zymotic diseases, such as erysipelas, measles, whooping-cough, and diarrhœa.

5. That a number of cases attended by infected midwives escaped entirely. 6. That the infection in this disease is most subtle, persistent, and portable, and more difficult to get rid of than in almost any other disease, or probably appears to be so, owing to the susceptibility of the puerperal woman to such an infection. 7. That all the fatal cases in one locality were attended by one and the same midwife. 8. That midwife P. attended six cases within a space of four months and that three of these (primiparæ) terminated fatally.

I have already mentioned that nearly all the confinements in this and similar districts in the county are attended by midwives—professed midwives, as they are called, whose knowledge of sanitation, antiseptics, and infection is *nil*. I have interviewed a few of the above midwives who frankly admitted that they were ignorant that they might have been the means whereby the disease was spread, and that up to a recent date the necessary precautions against the spread of the disease were not observed for the simple fact that they were ignorant of the danger connected therewith. Such a condition of affairs is not unique—viz., that midwives spread puerperal fever broadcast and are not interfered with. Even local authorities require to be looked after. Until recently neither the bedding, clothing, nor rooms of puerperal cases, whether fatal or otherwise, were in any way disinfected. Here, again, such a condition of affairs is not unique and I can point to districts where no disinfection whatever is practised or when attempted it is a sham, and a very dangerous sham.

In connexion with this epidemic I made the following recommendations to the sanitary authority in whose district it occurred. They were carried out with the result by now that scarcely ever does a case of puerperal fever occur.[3] 1. That each midwife after attending a case of puerperal fever should not be allowed to attend another confinement for two months. 2. That the bedding and clothing of each puerperal patient should be destroyed by burning, and that the bedrooms should be properly disinfected by competent persons. The authority possessed no disinfecting apparatus. 3. That until the midwives are better instructed, trained, and registered, the disease must go on in such a neighbourhood as this.

Do not these facts show that the fever, whatever its origin may have been, was spread by these midwives? The fact that puerperal fever results from the attendance of females who have been engaged in laying out and ornamenting the cadavera of persons who died from infectious maladies is well exemplified by the following cases which were reported

[3] You must not think that I am not a believer in antiseptics—far from it. I made the recommendation because I believed that no one would take the trouble to instruct these midwives how to disinfect themselves.

to me in 1893 by Mr. T. J. Dyke, medical officer of health of Merthyr.

1. Cases attended by midwife Alpha : (*a*) M. W., aged 40 years, became ill through eating decomposed tinned salmon. She died on April 18th ; the cause of death was certified as "peritonitis." Her body was laid out by the above midwife. (*b*) E. I., aged 38 years, was confined on April 19th and was attended by the same midwife. She was notified as being ill of puerperal fever and died on May 5th. The residences of these two persons were in the same locality in a healthy open street on the hill-side. The sanitary arrangements and water-supply were good.

2. Cases attended by midwife Beta : (*a*) E. D., aged 38 years, who was confined on April 10th, was attended by this midwife. She was notified as being ill of puerperal fever. On the 15th she died and on the 18th the body was laid out by midwife Beta. (*b*) E. L., aged 30 years, was confined on April 19th, being attended by midwife Beta. She was notified as being ill of puerperal fever and died on April 22nd. The body was laid out by midwife Beta. (*c*) C. T., aged 23 years, was confined on April 28th, being attended by midwife Beta. She was notified as being ill of puerperal fever on the 30th and died on May 3rd. The body was laid out by midwife Beta.

The residences of the last three persons were a considerable distance from all those attended by midwife Alpha. The sanitary arrangements and water-supply were good. The midwives were warned not to attend cases until their clothing and persons had been disinfected. These warnings were disregarded and I do not consider them sufficient.

It is recorded in *Public Health* in 1893 that one man lost three wives from puerperal fever and when the case was investigated it was found that all three were confined in the same bed which had not been disinfected. I once traced a case to an infected bed where a child suffering from scarlet fever had died six months previously and which had *not* been disinfected in the meantime. Neither the medical attendant nor midwife had been near a case of this or any other fever for months. Once I came across a midwife with a sloughing ulcer on her leg in attendance on a patient suffering from puerperal fever and I should not be surprised, though I cannot prove it, that the disease had its origin in this ulcer. I have seen women confined on several occasions in scarlet-fever and diphtheria-stricken houses without any untoward symptoms whatever. In 1889 I wrote a short article[4] in which I gave it as my opinion that this was the *rule* and so far I have had no occasion to alter it. I could adduce other similar instances in abundance but it is unnecessary and tedious.

[4] Brit. Med. Jour., 1889.

The Bacteriology of Puerperal Infection.

The bacteriological aspect of the question of puerperal infection at first sight appears simple and such indeed it may be when an obvious source of infection can be detected and the absence of imperfect application of antiseptic and aseptic measures is coincident with such infection. A few cases of puerperal fever occur from time to time in which the source (external) of infection is incapable of detection and the untoward event is usually put down to infection during the praxis of the medical attendant or his assistants. On the other hand, cases occur especially among the lower classes when the conditions are such that the marvel is that puerperal infection is not the uniform complication of the puerperium, and this the more when the poly-microbic origin of the infection is considered. The first question that arises for discussion in a consideration of infections of the genital tract of the lying-in woman is, How far does the genito-urinary tract show evidence of infection before delivery? As regards the urethra Savor found this passage to be sterile in but 27 per cent. of pregnant women and in from 35 to 40 per cent. of non-pregnant women.

The staphylococcus albus was present in half the infected cases, and in 6 per cent. of infected pregnant women virulent streptococci were found in some cases appearing for the first time after delivery, though there were no clinical symptoms coincident with their appearance. Menge and Krönig, from an examination of the vaginal and cervical secretions in the pregnant and non-pregnant, express the opinion that under normal conditions the vagina, cervix, uterus, and tubes are sterile in pregnant and non-pregnant women, and that the puerperal uterus under normal conditions is absolutely free from micro-organisms and that the converse is a pathological condition.

Döderlein, Franque, and Ott support Menge and Krönig and insist on the sterility of the uterus, cervix, and upper portion of the vagina, ascribing such a condition to the bactericidal action of the fluid secretions present, which obtains immunity from infection for these parts under normal conditions. For a successful infection of the genital tract to take place during the puerperium it is laid down that such must result from the introduction of germs from without, those organisms which may already be present at the vaginal orifice representing types which are attenuated by the action of the lochial secretion as it flows away. Such a view can but have a good effect, apart from its correctness, by making it of the first importance to pursue an aseptic procedure in all measures that may be required during parturition and the puerperal period. On the other hand, Stahler and Winckler, Burckhardt, and Jeannin, especially the latter, have found that in the normal lying-in woman the lochial secretion as taken from the cervix or

uterus may contain pathogenetic germs without giving rise to clinical symptoms. Jeannin, as a result of a review of the work of others and from his own work, comes to the conclusion that at birth the uterus is always sterile, but that under certain pathological conditions (endometritis) an infection may be present which, comparatively quiescent during the period of gestation and giving rise to pathological changes in the placenta, may after delivery run a more acute and fatal course. He further states "that after delivery, for normal cases, the sterility of the uterus persists for at most a few days and certainly not after the first week of the puerperium. Auto-infection is always possible from the lower portion of the genital tract since under normal conditions this portion harbours a microbic flora that may under suitable conditions give rise to an infective process by transport to the exposed uterine surface. A serious source of infection is from the intestinal tract which during the lying-in period must play an important part in reinfecting the vulvo-vaginal portion." It is probable that Jeannin takes a more exaggerated view of the degree of uterine infection than one would be disposed to accept; it seems to err as much on one side of the question as those who on the other side insist on the sterility of the puerperal genital tract. It would not be unjustifiable to take up an intermediate position and to admit a certain very low percentage of cases of auto-infection which, however, is much higher than would correspond to the incidence of puerperal fever or the secondary local inflammatory complications that arise during the puerperium. The discrepancy between the admitted percentage of non-sterile uterine surfaces and the percentage of local or general infections that occur may with reason be placed to the credit of the antiseptic precautions of the accoucheur and the well-trained nurse, and in part to the different degrees of susceptibility to infection of various individuals.

The successful reduction of the percentage incidence of puerperal fever will depend on how far antiseptic and aseptic measures are carried out in a systematic manner, though however thorough it may be the personal equation in a very few cases must not be forgotten. Auto-infection plays a part in some cases and infection from without in others, and although the infection cannot be traced in all cases there can be no question that the strictest asepsis in all local procedures should be practised on the part of the practitioner and septic conditions should be treated by the application of antiseptic treatment. The final word on the question as to what is the most scientific way of dealing with the puerperal period has been spoken—asepsis and antisepsis; the other question as to how the infection arises in *all* cases may be left for future work.

LECTURE III.

Delivered on March 3rd.

Preventive Measures.

Mr. President and Gentlemen,—Notwithstanding the precautionary measures adopted in general midwifery practice, the alarming fact that 4000 mothers are annually lost in England and Wales still stares us in the face. What, then, is our duty in respect of this high puerperal mortality? Are we to trust to the repetition of *Abracadabra* as extolled by Sammonicus, or are we to go to bed and dream about it as directed by Galen? This we have tried long enough and naturally without any beneficial result. This same question was asked many years ago and it occurred to some benevolent persons that the solution of the problem was in the establishment of lying-in hospitals, where women—poor, destitute of comfort and means, as many are at their own homes—should be received and delivered. These institutions after many years of anxious trial have answered admirably and it is to means similar to those which have been found efficacious in diminishing the mortality in them that recourse must be had to procure a similar reduction in general practice. To use the significant and beautiful sentence penned by the late Mr. T. W. Thompson of the Local Government Board, "Such improvement can only be brought about by a *full* appreciation of *all* that is known of the etiology of the disease and an adequate sense of the responsibility on the part of *all those* brought into relation with the lying-in chamber." Dr. Cullingworth has strongly advocated the more general use of antiseptics in private practice and has particularly urged that every practitioner should recognise his individual responsibility in this matter. To bring about this diminution of mortality is a work in which various sections of the community must take part, such as the parturient women themselves, the midwife and medical attendant *in particular*, the medical officer of health, the sanitary inspector and public bodies such as local sanitary authorities and county councils, and the legislature.

Young women about to become mothers require instruction and special care, for by leading a natural life in conformity with the laws of health they often save both themselves and offspring, for few women in advanced pregnancy can stand

the hard work to which, alas, they are too often exposed. Although childbirth is a physiological process and in favourable circumstances (where the mother has been previously taken care of) is attended with little danger, yet every childbearing woman looks for some help in her travail; but many, even in these enlightened days, are left to nature or to ignorant midwives.

Women in all ages and countries have done much noble work as midwives and as nurses—the mother of Socrates was a midwife, "brave and burly." A large proportion of mothers have been from time immemorial attended by midwives, and educated midwives as well as medical men are required to secure the best chance of life to the mother and to the child. This is a natural and excellent arrangement, as midwifery is a business for which intelligent women are admirably fitted. Until lately, and even now in some places, it was assumed that midwives were born and not made and their training was entirely left to chance. At the present time it rests on very unsatisfactory foundation, although systematic instruction has been imparted to them in some quarters. A very common cause of death in childbed is simply "the want of skilled assistance" and a mother's life often hangs on a simple act which can be easily performed by any intelligent woman who knows her work. In the absence of this the mother dies. There is scarcely a person whose life, or whose mother's life, might not at one time have depended upon the skill of a midwife. Newton had a narrow escape; and Goethe begins his autobiography by saying that through the unskilfulness of a midwife he was born for dead and that only after manifold efforts on the part of those around him he saw the light of day. It is true that a medical man can be called in, but in scattered and mountainous districts he is not always at hand when danger is imminent. To discover danger a knowledge of its sources is required and those of us who have come in contact with midwives of the Sarah Gamp type are well aware that ignorance does not diminish their self-confidence. No one who has reflected upon this subject, and certainly no one who has had practical acquaintance with it, will contend that the annual loss in England and Wales of over 4000 mothers in childbed is not deplorable. Certainly nothing should prevent those that have the public health at heart from giving this subject their most attentive consideration. This matter has not received the attention it deserved either at the hands of the legislature or at those of public authorities. The provisions of the Midwives Act, 1902, will, in my opinion, meet the case to a great extent, but I would suggest that the training of midwives is a typical form of technical education and is a work that ought to be undertaken by county councils. Certainly, in some way or other, assistance should be forthcoming to help intelligent women to fit them to render "first aid" to their sisters in travail. The utility of a recognised body of

educated midwives acquainted with the plain doctrines of health and capable of rendering assistance during labour would be incalculable to the community at large. I do not mean that midwives should displace medical men in any way, where such can be obtained, but they should be in a position to render valuable aid before the arrival of the practitioner and to carry out his instructions faithfully as to the administration of remedies, the use of the syringe and catheter, general cleanliness, the warming and ventilation of the room, the diet, and a thousand and one other acts on which the health and life of the mother depend. The medical officer of health and the sanitary inspector can also render great help towards diminishing this mortality. The infected premises should be visited as soon as possible and as soon as the case is over all sanitary defects should be remedied, the house should be fumigated, and the clothing of the midwife, the soiled linen, and the like of the patient should be passed through a disinfector or, failing this, be destroyed. The midwife should undergo thorough antiseptic ablution, especially of such parts as the finger nails, that are the most likely to retain infection. This is impossible in districts where disinfectors have not been provided, and they are many. It therefore becomes incumbent upon local authorities to procure such, and none should be considered fully equipped unless it has a bath-room and dressing-room in connexion with it. Before the medical officer of health can be expected to accomplish these duties the tenure of his office must be secure and his salary must be adequate.

There are other avenues—now more or less shaded or obscured by the midwives question—along which some of our efforts might well be directed. Every girl among the poor and artisan classes should be taught the elementary principles of nursing and hygiene. The establishment of lying-in institutions should be encouraged in these localities and the parturient poor induced to become patients over their confinements. It is true that the guardians of the poor provide a lying-in ward in their workhouse infirmaries; and there are scores of women in poor circumstances who would gladly enter a maternity but refuse the lying-in ward of the workhouse because of the *stigma pauperis* connected with it and accept the alternative of remaining at home, to be there—may be, in the heart of unhealthy influences—attended by unskilled women and often to face the risk of being fatally infected. The dissemination of elementary knowledge of the nature indicated might well be encouraged by our county councils and local authorities and this matter is engaging the attention of the Glamorgan county council with a view to secure the better training of midwives. I have endeavoured to show that a very large number of poor women who are unable to obtain the services of medical men are attended in childbirth by midwives alone; how often it is that fatal results, and even epidemics, follow ignorance on their part of the means to prevent infection, and their

inability to diagnose danger in time; and I feel convinced that this mortality in childbed among the poorer classes can be very materially diminished in the several ways I have indicated, especially if they are attended by sober and intelligent women, acquainted with the plain doctrines of health, and possessing an elementary knowledge of midwifery.

Before dealing with the Midwives Act it would be well to give a very brief epitome of the various steps taken that brought it about. I am indebted to contributions and notes prepared by Mr. F. R. Humphreys, honorary secretary to the Midwives Bill Committee, for the particulars contained in the following historical sketch. He who would wish to write anything like a complete history of these steps would have to ransack the history of England and to search the records of Church and State for centuries in order to obtain the ups and downs of the Guild of Midwives. I do not propose, however, to refer to the past except so far as it is necessary to explain the condition of affairs that has caused the postponement in England of legislation which was secured by nearly every other European nation many years ago. Before the time of Henry VIII. the medical profession was controlled by the Church and the bishops licensed physicians, surgeons, apothecaries, and midwives alike, but when the faculty began to manage these matters midwives were ignored. At this time there was no clear difference between the branches of medicine, surgery, and midwifery, and it was after the formation of the Royal College of Physicians of London in 1518 that the change was brought about. In 1541 an Act uniting barbers and surgeons was passed. In 1618 Dr. Peter Chamberlen entreated James I "that some order may be settled by the State for the instruction and civil government of midwives," and it was his son, who was physician to three kings and queens of England, that moved the Court to organise midwives into a company This was effected by the Royal College of Physicians and Dr. Chamberlen alluding to the arguments of his opponents says: "The objection infers this much—because there was never any order for instructing and governing midwives therefore there must never be. Because multitudes have perished therefore they must perish. Because our forefathers have provided no remedies, nor knew any, therefore we must provide none, though we know it. If all our forefathers had subscribed to this argument there had never been beginning to those conveniences we now enjoy, and we had been left to the world's first ignorance and nakednesse." From that day to this proposals have continued to be made from time to time for the instruction and government of midwives, and during the seventeenth century Harvey began his work of raising midwifery into the comparative light which he created.

It was after the invention of the obstetric forceps in the seventeenth century that men-midwives began to take up

the work in earnest and by the middle of the eighteenth century their number and notoriety had so increased that the competition between them and midwives actively commenced, and gradually midwives fell into disrepute, and men-midwives gained a stronger position in the mind of the profession and the public. The death of Princess Charlotte of Wales and her unborn son, a death which led to the ascent of the late Queen Victoria to the throne, did much to accentuate this progress and for the first time in our history a Queen of England was attended in her confinement by a man. The control of the Church over midwives seems to have died out by this and from that time there has been no legal control over them up to the passing of the Midwives Act. The dawn of scientific midwifery was accompanied by efforts of a more or less spasmodic and half-hearted nature to raise the status of midwives and when lying-in hospitals were first established these efforts became more and more continuous and firm and many proposals were from time to time made, stimulated doubtless by the fact that nearly every country in Europe had by this time framed enactments dealing with the instruction and supervision of midwives. In 1813 the Society of Apothecaries appealed to Parliament to legislate on this question but it failed. Unhappily Parliament was so prejudiced against midwives then and long afterwards that "the committee of the House of Commons would not allow any mention of female midwives." Professional feeling also against man-midwifery had assumed a strong character and the Royal College of Physicians of London passed a by-law prohibiting any person practising midwifery admission to its Fellowship. "The Obstetrical Society"—the ancestor of the present one—was then started and the object which it adopted as its basis was "the amelioration of the political position of the male and female midwives" and petitions by it were addressed to the Royal College of Physicians of London, the Royal College of Surgeons of England, and the Society of Apothecaries, asking them to coöperate to restrict the indiscriminate practice of midwifery, with the result that the Society of Apothecaries alone was found to be willing to undertake an examination in midwifery but had no legal power to do so. Notwithstanding this it at once presented a memorial to the Home Secretary, praying that it and the Royal College of Surgeons of England (which had already fallen in line with them) should be given the necessary power to institute examinations in midwifery and making it penal for any *man* to practise midwifery unless he was a legally qualified physician, surgeon, or apothecary. Eventually the society succeeded in establishing an examination in midwifery and in the admission of obstetric practitioners to the Fellowship of the Royal College of Physicians of London and to the Council of the Royal College of Surgeons of England. After these its first successful attempts on behalf of the male members of the obstetric profession, the

society quietly died out, although its original scheme contemplated the remoulding of the midwives as well.

In 1843 the Royal College of Surgeons of England inserted a clause in its new Charter rendering any Fellow practising midwifery ineligible for the Council. In 1861 the Royal College of Physicians of London established the diploma of Licentiate and made midwifery a compulsory subject, and it was also about this time that the present Obstetrical Society held its inaugural meeting when numerous references were made to the uneducated and uncontrolled condition of women who were allowed to practise midwifery and to the unhappy lot of their patients, and to the excessive mortality in childbirth that was taking place throughout the country. Miss Florence Nightingale took up the question and succeeded in having a lying-in ward opened at King's College Hospital for the supply of material on which to instruct midwives. The juxtaposition of the lying-in cases with the wards containing pyæmia, &c., resulted in a terrible loss of maternal life and the ward had to be closed in 1867. I have already quoted the words used by this benevolent lady in her description of the Shorncliffe and Colchester maternities. About this time the higher education of women also began to be discussed and the first profession to which they tried to gain access was that of medicine, and after many years they succeeded as they eventually do in most matters. This question of sex militated against any progress being made in the different questions of the education of midwives, but in 1864 was started "the Female Obstetrical Society," its objects being : (1) to promote the employment of educated women in the practice of midwifery and the treatment of diseases of women and children ; (2) to provide facilities for studying midwifery similar to those given to men ; and (3) to establish a recognised board of examiners. At its second annual meeting a resolution was passed complaining of "the utterly unregulated state of female practitioners and the great public inconvenience and frequent loss of life which occurred for want of properly qualified and scientifically trained midwives." During the discussion Dr. Farr is reported to have said that "he believed that the medical profession, however, much as they might oppose female doctors, would be glad to see educated young midwives take the place in every district of ignorant old women, and that he hoped to see the day when less than five women die out of every 1000 delivered of children." Dr. Farr's prophecy has been fulfilled.

In 1869 Dr. Farr suggested to the Obstetrical Society the investigation of the causes of infantile mortality, and a committee was appointed and a paper of questions was sent to each Fellow, whereby it was ascertained that "though in small towns the percentage of poor women attended by midwives was not more than 5 per cent. to 10 per cent. ; in the large provincial towns and in the villages from 30 per cent. to 90

per cent. of the confinements were in the hands of women. Thus, for example, in East London 30 per cent. to 50 per cent. of the women had no doctor, and in the mining districts 90 per cent." (On comparing these returns with others obtained a few years ago by the Midwives Institute it seems that out of 4000 confinements 2500, or 62 per cent., were attended by midwives.) At this time the qualified medical man was not required to qualify in midwifery and only a few examining bodies granted such diplomas and the profession was opposed to a partially qualified woman entering it. Dr. Farr had been for years continually calling attention in his letters in the Appendices of the Registrar-General's Reports to the excessive mortality from puerperal fever that was taking place. Dr. Farr observes: "The deaths by childbirth were 2275, besides 972 by metria in the zymotic class, making 3247 deaths in the aggregate. One mother died in 192 children born alive." And the physician will, from the same facts, see how much art has to accomplish before the 3000 English mothers who perish annually in giving birth to their offspring can be spared. Natural and adventitious difficulties are in the way but they may in many cases be overcome, for "in sorrow" and not in death thou shalt bring forth children, that is the law of nature (fifteenth report). "The death of young women in child-bearing points to some of the dangers to be guarded against and many of the remaining dangers would be removed by a class of educated midwives" (seventeenth report). In the report of 1856 Dr. Farr presents matters as a little more hopeful and says: "The mortality in childbirth continues to decrease in England and Wales; the birth of every 10,000 living children was the death of 60 mothers in 1847 and of 44 in 1856; thus 16 are now saved in every 10,000 children born. This happy result encourages its cultivators to redouble their exertions" (nineteenth report). "This branch of medicine is cultivated in the present day with extraordinary zeal by men of superior quality; and a society recently has been formed for the cultivation of this important work" (twentieth report). Dr. Farr evidently refers to the formation of the Obstetrical Society. "Many men die of hernia, many women in childbed, who might have been saved by surgical skill" (twenty-seventh report). In the report for 1867 attention is called to (1) the infectious nature of puerperal fever; (2) its connexion with erysipelas and scarlet fever; and (3) to work in the dissecting room, &c., and to the deaths of child-bearing women in towns and country districts. "In towns they are more exposed to puerperal fever; in the country many probably perish from want of skilful help." "Nothing in England approaches the fatality of mothers in Wales, where they must be greatly mismanaged." Further on he refers to the discussion going on in medical circles on the excessive mortality in lying-in hospitals. "Cases in country are in the hands of midwives and men who are sometimes skilful by

nature but often are not versed in the art as it is now practised by the skilful. Educated nurses as well as physicians are required to secure the best chance of life of mother and offspring" (thirtieth report). "Thus the contagion of scarlet fever in some cases lights up puerperal disease which has not yet been distinguished from puerperal fever. So does erysipelas and so perhaps do other diseases. The dangers of a general hospital to puerperal women have been revealed by recent experience. Students cannot study in the dissecting-room and at the same time practise midwifery without risk. Nurses are often the medium of the disease, nothing is more fatal than any of the forms of dirt and uncleanliness in the lying-in chamber. When fever comes on disinfectants should be strenuously used. By the greater attention this subject will attract now its full importance is precisely known we may hope to see a great diminution in the risks of childbirth." Here Dr. Farr refers to the closure of the lying-in ward at King's College Hospital and probably to the discovery of Semmelweiss (1847) and specially to the excessive mortality that was annually taking place in our lying-in hospitals. In this year Queen Charlotte's Lying-in Hospital had to be closed on account of an epidemic of a se ere and fatal nature lasting for many months.

In 1868 the General Medical Council advised increasing the courses of lectures in midwifery at the various medical schools, so that every student should attend at least 20 cases, and, further, that they should have received instruction in the special diseases of women and children. In 1869 the Obstetrical Society did not actively take up the question of the education of midwives (because probably some of its prominent members believed all midwives to be a mistake and would be soon superseded by men) when Dr. Graily Hewitt spoke of the value of the society as a school of obstetric medicine and said, "It is indeed a question whether it be not the duty of the society to take steps for obtaining some legislative enactment to check the licence which existed in relation to the employment of midwives, many of them quite unskilled and uneducated." About this time a school was established at Sir Patrick Dun's Hospital, Dublin, for the training of midwives attached to the regiments in the English army. This was a great success; six months' training was given, each midwife had to attend from 30 to 70 cases, to attend lectures, and to pass an examination. The establishment of this examination seems to have been a turning point in the whole matter. In 1870 the council of the Obstetrical Society passed a motion in favour of the institution of a voluntary examination for midwives but it was not until 1872 that the scheme of such an examination was presented to the society and passed unanimously. The examination was "to consist of practical testing of the competency of the candidates to practise as midwives and the possession on their part of such

an amount of knowledge as would enable them to recognise the presence of difficulties and the necessity for at once procuring competent professional aid for their patients."

In 1872 the General Medical Council passed two motions :—

1. That a committee be appointed to consider and report whether the General Medical Council has power to make rules for the special education of women, such as may entitle them to obtain a qualification to be certified by the Council and that the committee do report for that purpose whether such qualifications (if any) should be granted.
2. What are the most desirable means for educating, examining, and certifying in respect to them, with special reference to midwifery, the management of medical institutions, dispensing, and nursing.

In 1873 the above committee reported that the Council "had not the power to give qualification or to make a special examination for women"; it recommended that in any future Bill for the amendment of the Medical Act a clause should be introduced giving power to the Council to register the qualifications of women acting as midwives, dispensers, and superintendents of medical institutions. In the same year the council of the Obstetrical Society referred the matter of examination and registration of midwives to a committee which reported thus: "The Obstetrical Society of London having had repeatedly and urgently brought before its notice the sacrifice of human life and health occasioned by the practice of ignorant midwives has already instituted an examining board for testing the knowledge of women desiring to follow the calling of a midwife and has granted certificates to those who have satisfied the examiners." In the same year Mr. Ernest Hart was asked by the President of the Local Government Board to draw up a scheme for the regulation and education of midwives. The matter was then brought before each separate branch of the British Medical Association and a subcommittee was appointed to consider and to modify, if it thought fit, the scheme of the Obstetrical Society. In 1875 a Government return—"Laws and Regulations with Reference to Midwives Abroad"—was obtained and this stimulated matters considerably. In 1877 the Duke of Richmond's Medical Bill contained a clause which purposed to legislate for the registration of midwives in England and Wales but this portion of it was dropped as it was feared it might cause confusion between midwives and medical men. In 1882 a Bill was drafted by the British Medical Association but it was never presented to Parliament. In 1889 the General Medical Council resolved :—

That this Council regards the absence of public provision for the education and supervision of midwives as productive of a large amount of grave suffering and fatal diseases among the poorer classes and urges upon the Government the importance of passing into law some measure for the education and registration of midwives.

The first Midwives Bill (1890) was promoted by the Midwives Institute, but it was withdrawn on the under-

standing that a select committee should be formed to consider the whole subject. This committee sat on several occasions but reported without hearing any evidence. The result was that a second Midwives Bill was introduced in July, 1890, and this was reported to a select committee. In April, 1891, the Royal College of Physicians of London appointed a committee to consider this Bill and in the report which was issued the conviction was expressed that legislative action was desirable in order to secure the due education, examination, and registration of midwives and recommended that a Parliamentary subcommittee should be asked for before which the whole subject might be investigated. On June 17th, 1892, a select committee of the House of Commons reported as follows :—

> Your committee have sat six times and have taken most valuable and important evidence from medical men and practitioners in various spheres of practice both in favour of, and opposed to, the registration of midwives. This evidence has shown that there is at present serious and unnecessary loss of life and health and permanent injury to both mothers and child in the treatment of childbirth and that some legislative provision for improvement and regulation is desirable. They also had evidence showing that there is a wide field for training midwives now unused connected with parish infirmaries and home practice in populous places. Their inquiries have been cut short by the approaching early dissolution of Parliament and they therefore report the evidence and recommend a continuation of the inquiry in the next session of Parliament.

In August, 1893, another similar committee reported thus :—

> Your committee have sat four times and have taken most valuable and important evidence, which, with that given last year at six sittings, includes that of distinguished medical men and women in various spheres of practise, both in town and country, and also from trained and experienced midwives from many districts. Your committee are of opinion that a large number of maternal and particularly infant deaths, as well as a serious amount of suffering and permanent injury to women and children, is caused by the inefficiency and want of skill of many of the women practising as midwives, without proper training and qualifications. They find that amongst the poor and working classes both in the country and in towns the services of properly trained midwives have been eminently successful and of great advantage to the community. As proved by the evidence before your committee, the services of midwives are a necessity and consequently every precaution should be taken to discourage the practice of women who are ignorant and unqualified. Your committee are of opinion that by legislative enactment no woman should be allowed to call herself or practise as a midwife except under suitable regulations, but that the term "registered midwife" should be protected and restricted to those who have been properly trained and who alone should be placed on the "Midwives Register," and that the vested interests of untrained midwives should be efficiently protected by inserting in any future Bill a clause to the effect that any woman who produces evidence that she is in practice as a *bonâ fide* midwife at the time of the passing of the Act shall without formal registration be allowed to continue her calling under the term "midwife" alone but shall not be permitted to assume any other title whatsoever. Your committee therefore recommend that a system of examination and registration of midwives should be established and that for the purpose of admission and examination of women desiring to act as midwives the General (Medical) Council shall be invited to frame rules for regulating: (1) the admission to the

Register either by (*a*) practice or (*b*) examination, or by both; (2) the conditions of admission to such examination; and (3) the conditions of such examinations. These rules and regulations shall in the opinion of your committee be subject to confirmation by the Privy Council, and in the event of the General Council failing to make such rules as the Privy Council can confirm your committee recommend that the Privy Council shall invite some other medical body or forthwith cause rules and regulations proposed in the foregoing paragraph to be framed for the purposes required and that such rules shall take effect as if they had been made by the General Council and confirmed by the Privy Council. Your committee also recommend that the duty of carrying out locally the provisions of the Act that will be required should be placed in the hands of the county councils. They are also of opinion that greater facilities for the study of midwifery should be provided in workhouses and lying-in hospitals.

In conclusion your committee desire to refer to the apprehension expressed by certain witnesses belonging to the medical profession, lest their interests might be injuriously affected by an improvement in the status of midwives. The great preponderance, however, of medical and other evidence, having regard to both the authority and number of witnesses, was to a contrary effect. Your committee therefore, whilst giving due consideration to the expression of such fears, believe that the suggested injury is not likely to prove serious and they are of opinion that medical men will not only be relieved of much irksome and ill-paid work, but also that improved knowledge on the part of midwives will induce them to avail themselves more frequently, and at an earlier stage than at present, of skilled medical assistance in time of emergency and danger. On this point your committee had substantial evidence.

Lord Balfour introduced a Bill to the House of Lords in 1895. Then came the Midwives Bill of 1898 which followed the lines suggested by the select committee. By this time there was a consensus of opinion that reform could only be effected by legislation. Objections were raised to the Bill by certain members of the profession who urged that all pregnant women should be attended by medical practitioners and who held that no midwives should be created but be allowed to disappear gradually and that monthly nurses should be better trained and take the place of midwives. Others opposed the Bill as they believed it would lead to increase of abortion and infanticide and would endanger the lives of pregnant women and children and interfere with the training of the medical students to practise midwifery. This Bill, however, was not passed and it was followed by one in 1900 by Mr. Tatton Egerton, and the Midwives Bill 1902, which culminated in the Midwives Act 1902. The object of this Bill is "to secure the better training of midwives and to regulate their practice." It was brought in by Lord Cecil Manners, Mr. Tatton Egerton, Mr. Schwann, Mr. Parker Smith, Sir Savile Crossley, Mr. Eugene Wason, Mr. Tennant, and Mr. Heywood Johnstone. Evidence was given which fully proved that it was useless and impolitic to attempt to do away with midwives. It is not the midwives themselves that are to be blamed—it is the medical profession that should be blamed, and I am always sorry when I hear midwives maligned as "Gamps" and other disrespectful appellations, and although untrained, unskilled, and unconversant in the principles of aseptic and antiseptic

measures as the majority of them are, yet I firmly believe that most of them have done their duty to the best of their skill and ability, and that they have rendered valuable aid to women in travail when medical assistance could not be got in time I can bear my personal testimony. It is clearly therefore our duty certainly not to malign them but to thank them for the good work they have done in the past and endeavour in the future to raise their status, for it will be better for them, for us, and certainly to our country at large. The half a million poor women who cannot afford medical aid in their labour, who are annually confined in England and Wales, I venture to speak for them, hail with delight the passing of the Midwives Act. On the other hand, it must be said that the late appearance of such an Act is partly due to the attitude assumed by midwives and to the unreasonableness of their own requests at one time. The medical profession has for years been like a house divided against itself on this question, the one portion making all endeavours to procure efficient instruction and training for midwives, the other taking equally strong measures toward their extinction. After a long time, however, the latter class seeing that the majority of their colleagues and the country at large would not do without midwives gave in, or shall I say were conquered, and it is to be sincerely hoped that all members of the profession will unite hands and efforts in making this Act a success throughout the land, especially in country districts.

The Midwives Act, 1902.

This Act was passed on July 31st, 1902, and came into operation on April 1st, 1903. It does not apply to Scotland and Ireland. 1. The chief objects of the Act are: (*a*) to secure the better training of midwives; and (*b*) to regulate their practice.

Although one of the chief objects of the Act is to "secure the better training of midwives," yet neither the Act nor the rules framed by the Central Midwives Board make any provision whatever or even suggestions how this end may be attained and unless county councils and other local supervising authorities, or private benevolence, with or without the assistance of State funds, come to the rescue, I fear that, as was recently stated in The Lancet by an experienced medical man, that "our midwives, though under control, will still for a long time be the worst trained and the most ignorant in Europe"; or, as Miss J. Wilson (a member of the Central Midwives Board) puts it: "This is not surprising when we remember the training abroad is not only thorough but is given practically free by the State or the community. The supply of candidates therefore in foreign countries presents no difficulty; a small but fixed salary is also guaranteed to the midwife in

thinly-populated and remote districts and preference in training in some places is given to pupils who intend to practise among the poor. In England and Wales we must hope that private and public benevolence will take the place of State funds, with the advantage which seems essential to our national satisfaction—which is unknown in foreign countries—of combining voluntary interest with State control and effort. If, however, the work of training is to be adequate to meet the demand the subject should first receive careful preliminary discussion, deliberation, and forethought. Such work to be effectual should be undertaken as a national duty to meet a national need.

There are many schemes already before the public and I will only add mine as a foundation for debate. My views would run somewhat on these lines. I should like to see the formation of a national council for training, the principal functions of which would be to map out the country with a view to the best organisation for training and the provision for midwives, aided by local knowledge; to collect funds; to found training scholarships under approved conditions of binding midwifery probationers for a special period of work in poor districts; to utilise as far as possible our present hospitals; to give grants to districts to help to support a midwife; and, later, to found itself, or to help to support, a national maternity hospital in which the training should be on the best possible lines, specially for midwives for the poor. Considerable funds would be required and the undertaking should combine the best knowledge and experience available and should include the heads of those urban and rural maternity societies which have already done such invaluable work in training midwives for the service of the poor. In short, I should like to see such a council do for midwives' work in England and Wales what has been done in the United Kingdom for nursing by the Queen Victoria Jubilee Institute. I venture to express a hope that if such a council is formed it will not only train midwives but will arrange that their knowledge is maintained and improved. This is a most important part of the system abroad and it is desirable for the maintenance of a high standard of work."

Personally I am sanguine that the training of midwives will be undertaken by county councils and other public bodies. The late Dr. W. N. Thursfield put the matter in a nutshell when in 1893 he wrote: "Public bodies in various parts of the country are providing facilities for the technical training of women in almost every branch, from cooking to music. Training in obstetric nursing would, in some respects, be a typical form of technical training as it would be affording instruction of a kind otherwise out of the reach of those instructed and the skill acquired might be expected to supply a local need and find local employment. Efficient training in obstetric nursing cannot, however, be carried out locally in places most need-

ing it, as to be efficient it must be at some institution where what would otherwise be the individual experience of a lifetime can be concentrated in the experience of a few weeks. Certainly in some way subsidies, to assist suitable women desirous of such training, ought to be forthcoming and if such provision is outside the province of public bodies here is an opportunity for the munificence of private philanthropy." The Glamorgan county council has given to the Midwives Act considerable attention and has delegated its powers without restrictions to an executive subcommittee, with its medical officer as executive officer. The question of the training of midwives is now under the consideration of the education committee and I have reason to believe that a training centre or centres will be established, either by the county council alone or jointly with other bodies, for giving instruction to young women who desire to become midwives, provided they undertake to obtain the certificate of the Central Midwives Board and to practise for some time within the county, as many young women who may desire to take up this work may not be in a position to defray the expenses incurred. I am endeavouring to persuade my county council to include the training of midwives under the term technical instruction and to offer a few scholarships a year to encourage deserving young women to take up the work. With regard to the work of supervision, it is probable that a female inspector or inspectors will soon be appointed.

Many women, however, during recent years, anxious to become efficient midwives, have been trained at our lying-in institutions and elsewhere and have obtained certificates to the effect that they possess the knowledge necessary to fit them for their responsible work but before the passing of this Act it was permissible for any women with or without a good moral character and without having received any instruction whatever to undertake the conduct of any case together with the after-treatment of mother and infant. With a view of obtaining some guarantee that every woman who habitually and for gain practised as a midwife had received and profited by a regular prescribed course of training the Act was passed, chiefly in the interests of the poor. The kernel of the whole Act is contained in Sections 1 and 2 which may be summarised thus: (*a*) From and after April 1st, 1905, it will be illegal for any woman not being certified under the Act to style herself a midwife; (*b*) from and after April 1st, 1910, it will be illegal for any woman habitually and for gain to attend women in childbirth (otherwise than under the direction of a qualified medical practitioner) unless she is certified under the Act; and (*c*) up to the end of March, 1905, women holding certain certificates mentioned in the Act and approved by the Central Midwives Board may claim to be certified. Again, women who can satisfy the Central Midwives Board that they have been in practice for at least one year prior to

July 31st, 1902, and that they bear a good character, may claim to be certified under the Act. Candidates not included in one of these classes will be required to pass the examination of the Central Midwives Board before obtaining a certificate.

2. The chief provisions of the Act are: (*a*) the constitution of a Central Midwives Board having certain powers and prescribed duties to perform; and (*b*) the constitution of local supervising authorities whose powers and duties are definitely stated. Provisions are also made for the punishment of offences under the Act and for appeal from any court of summary jurisdiction to the court of quarter sessions. The Central Midwives Board has been constituted and consists of five medical men, three ladies, and one Member of Parliament (appointed by the Association of County Councils).

3. The duties and powers of this Board are: (*a*) To frame rules—(1) regulating its own proceedings; (2) regulating the issue of certificates and the conditions of admission to the Roll of midwives; (3) regulating the course of training and the conduct of examinations and the remuneration of examiners; (4) regulating the admission to the Roll of women already in practice as midwives at the passing of the Act; (5) regulating, supervising, and restricting within due limits the practice of midwives; (6) deciding the conditions under which midwives may be suspended from practice; and (7) defining the particulars required to be given in any notice under Section 10 of the Act. (*b*) To appoint examiners. (*c*) To decide upon the places where, and the times when, examinations shall be held. (*d*) To publish annually a Roll of midwives who have been duly certified under the Act. (*e*) To decide upon the removal from the Roll of the name of any midwife for disobeying the rules and regulations from time to time laid down under the Act by the Central Midwives Board or for other misconduct, and also to decide upon the restoration to the Roll of the name of any midwife so removed. (*f*) To issue and to cancel certificates. The Central Midwives Board has been formed according to the provisions of the Act, Section 3 (1), (2), (3), and rules under Section 3 (I.) have been framed and approved by the Privy Council for a period of three years.

The councils of a county or county borough throughout England and Wales become the local supervising authorities over midwives within the respective areas and their duties are: (1) to exercise general supervision over all midwives practising within their area; (2) to investigate charges of malpractice, negligence, or misconduct on the part of any midwife and, should a *primâ-facie* case be made out, to report to the Central Midwives Board; (3) to suspend any midwife from practice if such suspension appears necessary in order to prevent the spread of infection; (4) to report to the Central Midwives Board the name of any midwife convicted of an offence; (5) to supply the secretary of the

Central Midwives Board with the names and addresses of all midwives who during the preceding year have notified their intention to practise and to keep a current copy of the Roll of midwives accessible at all reasonable times to public inspection; (6) to report to the Central Midwives Board the death of, or any change in the name and address of, any midwife; and (7) to give due notice of the effect of the Act to persons at present using the title of midwife.

With regard to the constitution of the Central Midwives Board I have one remark to make, and it is this: Would it not have been expedient to have nominated one person on this Board to represent the Incorporated Society of Medical Officers of Health, which in the past has rendered valuable services to the community in the prevention of disease and which in the future will probably be expected to advise as to the best methods of carrying into effect the various provisions of the Act? This is at least a matter worthy of further consideration. I am pleased that there are on this important Board three ladies whose sacrifices and efforts on behalf of the women of England and Wales are well known and that one person has been appointed to represent the Association of County Councils. According to Section 2 any woman who can satisfy the Board that she has been in *bonâ-fide* practice for one year before 31st July, 1902, can claim to be certified, provided that she bears a good character, and I fear that the majority[1] of our midwives will obtain their certificates in this way and among them many that are illiterate, unable to read, to write, and to keep the necessary books and records, much less to take the temperature, apply antiseptics, &c., and perform other duties that will be required of them. I feel sure that the Central Midwives Board, having no idea of how the question of the training of midwives would be taken up in the country at large, is experiencing a great difficulty in this connexion, anxious on the one hand not to admit any but competent persons to the Roll of midwives but on the other somewhat afraid that there would not be a sufficient supply of midwives up to 1910. Unquestionably this class of untrained midwife will form a serious problem in the working of the Act. Individually many of them have done useful work but there are a large number whose self-confidence is only equalled by their ignorance. Up to April 1st, 1905, *any* woman may practise as a midwife but after this date *no* woman shall be allowed to call herself a midwife or any name suggesting competence unless she has earned it by training and obtained an acknowledged certificate, but she will be able to practise with impunity up to April 1st, 1910.

Then the final step comes into operation, for from April 1st, 1910, no woman uncertified under the Act shall habitually

[1] At the end of January, 1904, the total number enrolled by the Central Midwives Board was 1600; of these 1079 were *bonâ-fide*.

and for gain attend women in childbirth, excepting as the friendly assistant in emergency. We have therefore the period from now to 1910 (six years), as pointed out by Mrs. Heywood Johnstone, in which "to review the whole situation and prepare for the change, so that, when the 'Gamp' and all her train of death, sorrow, and suffering passes from our midst, the dawn of a better state of things shall culminate in a sufficient supply of trained midwives who have been taught to care for mother and infant and who will be bound to call in the doctor in cases of disease and abnormality before they have drifted beyond the reach of medical skill." The untrained midwives (and excellent women some of them are) will, ere this has elapsed, have rapidly decreased in number or passed away and the younger ones will either get the requisite training or not care to take up a profession so soon to be condemned. Mrs. Heywood Johnstone further observes: "Are we creating a vacuum? Are we to let the law become a dead-letter? Shall the labour of those who have toiled so hard become void, or worse than void, in a *new form* of suffering to the poor women who cannot afford, and yet imperatively need, assistance in their confinements?" The same lady further says: "I am sure it will not be so." Indeed, I am not at all sure that it will not be so unless the matter is strongly and prominently brought before county councils and other authorities by medical officers of health and others having at heart the interests of our poor women. Doubtless in the case of the 26 county councils and a large number of county borough councils this will be the case but what about the remaining county councils which have not appointed medical officers of health to advise them in these and similar matters? and, above all, what about the small district councils? The horizon is very dark and at present I cannot detect a silver lining to it. I am aware that great activity has been aroused in some quarters regarding the important questions of the training of midwives and that the number of trained midwives are increasing rapidly, not to speak of district nursing associations that are multiplying throughout the country where poor women can obtain the combined assistance of nurse and medical man.

I agree with the suggestion of the Central Midwives Board that a few women conversant with the need of the poor of districts in question should be on every local supervising authority and it is with their aid that we can hope to accomplish what we have in view, for it is within their power to render substantial public service by preparing themselves for the work and combining experience, tact, and sympathy with a sense of public duty. Much remains to be done. "Organisation is necessary that we may bring together the women that wish to be trained, the institutions competent to train them, and the many parishes crying out for help that do not know how to manage and organise and in some instances sorely need pecuniary assistance. A

thorough enquiry should be made in each county that we may know what foundations we have to work upon, and this should be followed by suggestions and consultations as to the best means to give practical help in all these details and for this I cannot emphasise too strongly how important it is to obtain assistance of those experienced both in the training and the supply of midwives and in the needs of the poor, especially the rural poor." I have made such inquiries in the administrative county of Glamorgan with the following results :—

Number of midwives	about 700.
,, ,, trained midwives	,, 70.
Percentage of confinements attended by midwives in colliery districts... ...	80 per cent. in mining districts.
Deaths in childbirth	53 in 1902.
Institutions where midwives may be trained	None except Cardiff union infirmary.
Infant mortality rate	Very high, average for 1892-1902 = 188 per 1000 births.
Early marriages	This is the rule in the mining districts.

I now come to the question of the constitution of local supervising authorities and the duties they are expected to perform. According to Section 8 county and county borough councils are the local supervising authorities, but according to Section 9 they may delegate their powers (with or without restrictions or conditions) to: 1. A committee appointed by them and consisting either wholly or partly of members of the council (and the provisions of subsections 1 and 2 of Section 82 of the Local Government Act, 1888, shall apply to every committee appointed under this section and to every council appointing the same and women shall be eligible to serve on any such committees). 2. District councils. I am in full agreement with the following "suggestions to county and county borough councils" recently issued by the Central Midwives Board, viz :—

1. The Central Midwives' Board suggests to the county councils the advisability of *retaining* the administrative duties assigned to them under the Midwives Act, 1902, as far as possible in the hands of a committee directly appointed by themselves. This will not only secure for the county council more adequate control over the expenditure but will tend also to prevent the possibility of local rivalries and jealousies interfering with the carrying out of the provisions of the Act.

2. The Board suggests further that the health committee of the county council would form a suitable committee to act as the local supervising authority with power to add to its number from outside the council or otherwise. In counties where no county medical officers of health have been appointed it is suggested that a special medical officer be appointed to advise the committee.

3. It is further suggested that supervision should be regarded as in least in part a medical duty and that the medical officer of health, or the medical adviser specially appointed, should be empowered to act as the executive officer of the committee.

4. The Board suggests to county and county borough councils that this being a matter almost solely affecting women the local supervising authority should, as sanctioned by the Act, include in any committee it may appoint one or more women conversant with the needs of the poor of the district.

I agree that, where the county council has already appointed a medical officer of health, this officer should be the person to advise the county council in this matter, for the supervision required is rightly regarded as, at least in part, a medical duty. I further agree that this committee should be constituted as suggested. With regard to counties where there are no county medical officers it is suggested that a special medical adviser be appointed to advise the committee. Such a suggestion is very vague and it must have been most difficult for the Board to have made any suggestion at all. Who is the medical adviser to be and what must be his qualifications? Is he to be one of the medical officers of health within the county? We are not told but I am of opinion that great difficulties will be experienced in persuading county councils to appoint such an officer and I am also of opinion that it would be undesirable and impolitic to appoint a medical officer of health who is also in practice, for such an arrangement would be likely to lead to difficulties arising through friction with his colleagues. Where there are whole-time medical officers of health in a county it appears to me that such a person or persons should be appointed medical adviser or advisers. A county council is not bound to appoint a medical adviser and if it does not the carrying out of the Act must be left to the district councils of the area.

I am strongly of opinion that none of the administrative powers conferred on county councils by this Act should be delegated to district councils for the following amongst other reasons. 1. If the county councils delegated their powers without restrictions or conditions to district councils and the result proved unsatisfactory it would be difficult, if not impossible, to recall them. 2. If these powers and duties are delegated the medical officers of health would probably be the executive officers to these district councils, and it appears very undesirable that he or they (if also in general practice) should in his own district and amongst his own patients be the censor of the conduct and capabilities of the midwives within the area. For a similar reason it seems undesirable that district councils should be called upon to investigate charges of malpractice, negligence, or misconduct, or to suspend any midwife from practice. Many shades of opinion would be imported into every inquiry and it would be difficult to exclude the influence of personal feeling and bias. 3. It is most desirable that the Act should be administered with the greatest uniformity possible, but if the powers and duties are delegated to district councils this end would not be secured. 4. Further, it must be borne in mind that any

expenses incurred by a district council in the execution of any powers or duties delegated to them under the Act, shall, to any amount not exceeding such sum as may be prescribed by the county council, be repaid to such district council as a debt by the county council, and until the Act has been in operation for some time it will be impossible for the county council to estimate with any accuracy the expenses incurred in a given district.

The midwife is permitted to attend normal labours only and in every emergency she is compelled to send for a qualified medical practitioner, and as everything will depend on her ability to recognise in time any danger and abnormality in either mother or child it is very important for her training to be thoroughly efficient. It is the duty of the Central Board to regulate the course of training and the conduct of examinations. As Dr. W. J. Sinclair has remarked: "A midwife must no longer trifle with a woman's life or health because she hopes that some vaguely comprehended abnormality may right itself without help or because she fears to expose her ignorance to the medical practitioner and to the family of her client. She will find it injurious to her interests to temporise with puerperal sepsis until the patient is moribund, or at least beyond the reach of therapeutic measures; she will not dare to conceal the worst injuries of parturition until remote operations are rendered necessary; she will no longer treat ophthalmia of the new born until the infant must inevitably become blind or give frivolous advice with regard to skin affections which signify a fatal or a curable malady according to the time and method of treatment."

The Central Midwives Board has power to cancel as well as to issue certificates. "No woman certified under this Act shall employ an uncertified woman as her substitute." This is a much needed reform and it entirely forbids the practice of employing substitutes in any shape or form, and will put an end to the abuse of employing ignorant women to do the nursing after the labour is over.

The midwife of the future will not be authorised to grant any medical certificate or any certificate respecting the stillborn. The question of the registration of stillbirths has long been ripe for discussion. The Registration of Births and Deaths Act, 1874, permitted burials of stillborn children to be carried out on the declaration of a midwife or any other person present at the birth. This has undoubtedly led to much social scandal and a fruitful source of undetected crime. The number of stillbirths is at present unknown, but in future the midwife's record must show the number of these cases, and in this way the number occurring in a certain area can be ascertained. Stillborn children are too easily disposed of and many evils and irregular practices are hidden which ought to be investigated. The deaths, stillbirths, and cases of puerperal fever and other infectious disease must be notified

to the local supervising authority. No midwife shall undertake the duty of laying out the dead or follow any occupation that is in its nature liable to be a source of infection. The local supervising authority should therefore be thoroughly conversant with the homes of all their midwives and the work which they undertake between cases.

The duty of reporting to the local medical officer of health any notifiable disease rests with the medical attendant as heretofore. It is most desirable also that the medical attendant should be compelled to make a similar notification, on the payment of a reasonable fee, *at once* to the medical adviser of the local supervising authority, because this is the only means whereby the executive officer can obtain the information promptly, and unless it is obtained promptly it is of but little use. In the county of Glamorgan, through the courtesy of the local medical officers of health, I receive weekly notifications, but they are not compelled by law to supply this information. The records of the midwife will show the number of fever cases which have occurred in her practice and the name of the medical man who assisted her ; they will show the past record of parturient women should such information be required on some future occasion and the midwife must send a copy of this record to the executive officer. After attendance upon a patient suffering from puerperal fever or other infectious illness the midwife must disinfect herself and her appliances, and have her clothing thoroughly disinfected before going to another case. The local supervising authority may suspend a midwife if such suspension appears necessary to prevent the spread of disease. I consider it desirable that the medical adviser should be empowered by the committee to act promptly and at his discretion in a matter where immediate action is imperative. In Sweden a midwife must abstain from practice for a week after attending puerperal fever and live as much as possible in the open air. I consider that the question of the disinfection of midwives, their clothes, and their appliances is of the utmost importance and that no one should be certified unless they have a thorough practical knowledge of what disinfection means. I hope very shortly to see every sanitary district or groups of districts in Glamorgan supplied with isolation hospitals and in connexion with each such hospital the sanitary committee has insisted on having (1) an efficient disinfecting apparatus and (2) a discharging block, where without coming near any of the nursing staff or patient in the hospital it can be arranged that a midwife can have a disinfecting bath. I can distinctly trace several cases of puerperal fever to the neglect of disinfecting soiled beds and bedding by local authorities, and I am speaking definitely when I say that disinfection is at the present undertaken in a very half-hearted and deficient manner by some sanitary authorities.

A candidate for the certificate of the Central Midwives

Board must have reached a sufficient standard of general education to enable her to keep the books and to prepare the records required of her. She must be not under 21 and not over 35 years of age, must have undergone a certain training, and produce a certificate of good moral character. As to training required she must have, under satisfactory supervision, attended and watched the progress of not fewer than 20 labours, making abdominal and vaginal examination during the course of labour and personally delivering the patient. She must have nursed 20 lying-in women during the ten days following labour. She must have attended a sufficient course of instruction and pass an examination, partly written and partly oral, in : 1. The elementary anatomy of the female pelvis and generative organs. 2. Pregnancy and its principal complications, including abortion. 3. The symptoms, mechanism, course, and management of natural labour. 4. The signs that a labour is abnormal. 5. Hæmorrhage, its varieties and treatment of each. 6. Antiseptics in midwifery and the way to prepare and to use them. 7. The management of the puerperal patient, including the use of the clinical thermometer and the catheter. 8. The management (including the feeding) of infants and the signs of the important diseases which they may develop during the first ten days. 9. The duties of the midwife as described in the regulations. 10. Obstetric emergencies and how the midwife should deal with them until the arrival of the medical man. This will include some knowledge of the drugs commonly needed in such cases and the mode of their administration. 11. Puerperal fever, its nature, causes, and symptoms ; the elements of house sanitation ; the disinfection of person, clothing, and appliances. She must also show acquaintance with the ordinary subjects of elementary education.

With regard to the use of drugs there exists a great difference of opinion but the rules state that she "must enter in a book all the occasions on which she is under the necessity of administering any drug, whether scheduled as a poison or not, the dose, and the time, and cause of its administration." I am very doubtful whether such drugs as opium, morphine, and others should be placed at the discretion of thousands of unqualified persons who are only certified for attendance on normal cases of labour, involving the safety of the public. To possess some knowledge of house sanitation is very necessary, for midwives conversant with the elements of hygiene and the meaning of antiseptic and aseptic precautions will be able to render help to their patients in putting in order their houses, especially the lying-in room. They will be able to teach the value of personal cleanliness and doubtless their work in promoting reform in these directions will have a wide and wholesome influence. "Interest has been recently manifested by the activity of many Members of Parliament by the introduction of projects for remedial legislation and

by the work of many associations, and I think it is not too much to hope that indirectly the silent work of educated midwives will prove a wholesome stimulus to the higher classes of society and arouse their sympathy in the great work of improving the dwelling-houses of the labouring classes of our country."

The practical work—i.e., attendance on labour, &c.—must be done under the supervision of a registered medical practitioner or by the chief midwife of institutions recognised by the Board. The certificate to the effect that the applicant has been in *bonâ-fide* practice for at least 12 months prior to July 31st, 1902, and that she is trustworthy, sober, and of good moral character, must be signed by a justice of the peace, minister of religion, registered medical practitioner, or other person acceptable to the Board. I venture to suggest that such a certificate should be signed by two persons, one of whom *must* be a registered medical practitioner.

In the directions to midwives it will be seen: 1. No midwife shall undertake the duty of laying out the dead or follow any occupation that is in its nature liable to be a source of infection. I take it that the last sentence includes the nursing of persons suffering from erysipelas, septicæmia, infectious disease, &c. The duty of enforcing such a clause devolves on the local supervising authorities and there will be a great scope for doing efficient work in this direction. 2. Every midwife must enter in a book particulars of all drugs she uses. 3. She must send for the medical man at once in all cases of abortion, illness of patient or child, or any abnormality occurring during pregnancy, labour, or lying-in. The possession of important technical knowledge is included in the ability to detect these conditions, and hence the value of the required training. 4. Every midwife sending for a registered medical practitioner must state in writing the conditions of the patient and the reason of the necessity for advice. 5. When the death of mother or child or a stillbirth occurs where a registered medical practitioner is not in attendance the midwife shall as soon as possible after the occurrence report to the local supervising authority. It would be wise to insist before admitting any woman to the roll of certified midwives that she has been properly vaccinated.

The records that midwives must keep include: (1) a register of cases; (2) the occasions of sending for medical help; and (3) a case-book with further detail. A copy of (2) must be sent to the local supervising authority within 12 hours. Such records will be most useful for further reference and may be the means of enabling the midwife or the medical attendant to prevent at some future confinement some of the "accidents of childbirth" in the parturient which frequently end fatally.

Regarding the duties of the local sanitary authority the rules read thus: "Whenever a midwife has been in attend-

ance upon a patient suffering from puerperal fever or from any other illness supposed to be infectious she must disinfect herself and all her instruments and other appliances to the satisfaction of the local sanitary authority and must have her clothing thoroughly disinfected before going to another labour. Unless otherwise directed by the local supervising authority, all washable clothing should be boiled and other clothing should be sent to be stoved (by the local sanitary authority) and then exposed to the open air for several days." The difficulty of disinfection will be a serious one in many rural districts in agricultural counties where means for disinfection and isolation have yet to be provided.

The duties of the supervising authorities begin when the midwife has been certified. The whole tenor of the Act is against anything like inquisition and it appears to me that the work of supervision could be best undertaken in part by female inspectors. The duties included under Section 8 (2)—i.e., the investigation of charges of malpractice and suspending any midwife—would be the special work of the committee appointed to carry into effect the provisions of the Act. The duties included under Section 8 (3), (4), (5), (6), and (7) should be intrusted to the executive officer.