Report upon the public health and sanitary condition of the Parish of St. Mary, Battersea during the year1896.

The Vestry of the Parish of St. Mary, Battersea.

REPORT

UPON THE

PUBLIC HEALTH & SANITARY CONDITION

OF

The Parish of St. Mary, Battersea,

DURING THE YEAR 1896,

BY

W. H. KEMPSTER, M.D.,

MEDICAL OFFICER OF HEALTH.

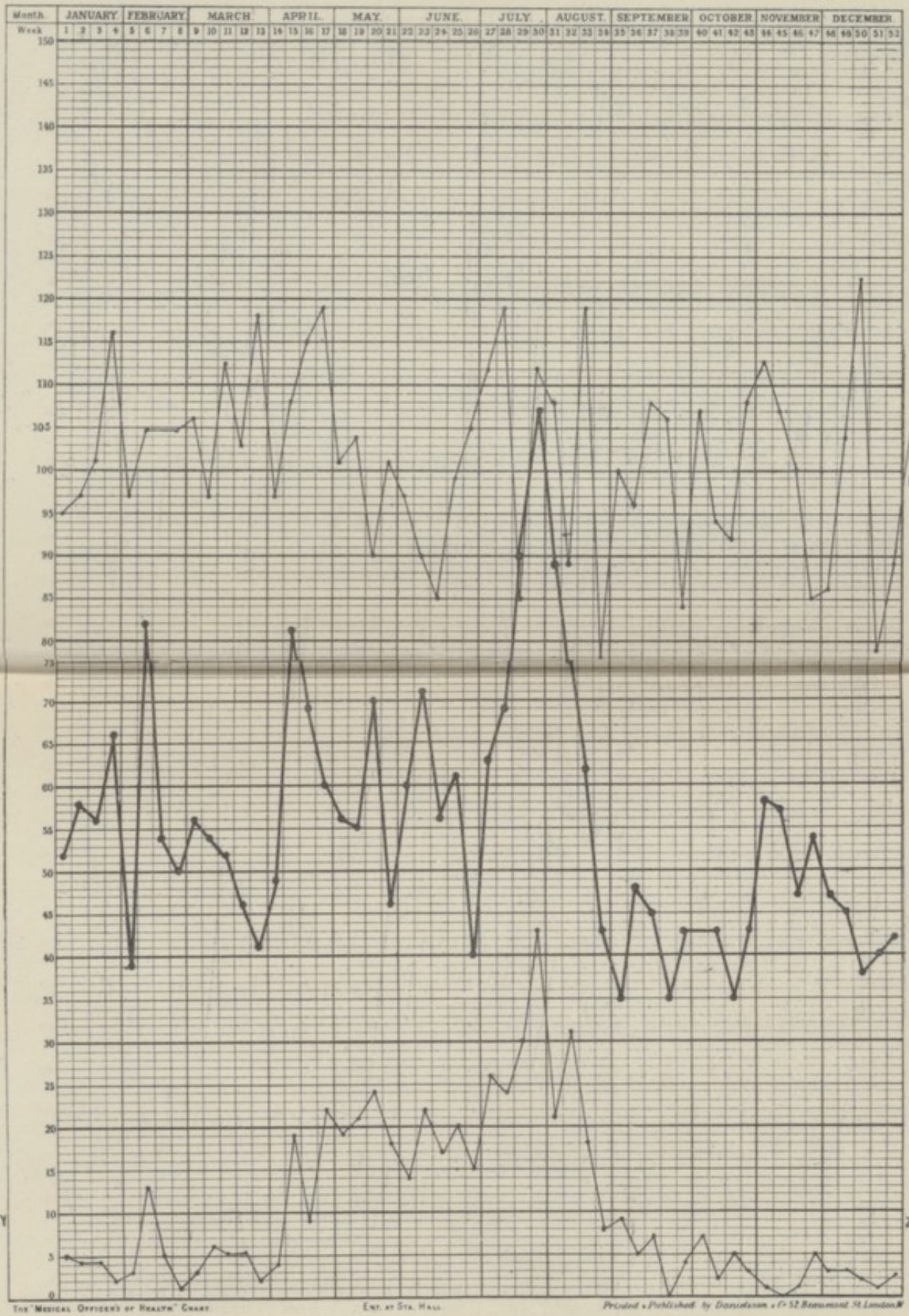
Treasurer of the Incorporated Society of Medical Officers of Health and President of the Metropolitan Branch.
Fellow and Member of Council of the Royal Institute of Public Health.
Fellow of the Obstetrical Society.
Member of the Society of Arts and the Sanitary Institute.

1897.


30
JUL

The Vestry of the Parish of St. Mary, Battersea.

Chart indicating number of Births and Deaths registered weekly as occurring within the Parish during the year 1896



The "Medical Officer's of Health" Chart. Ent. at Sta. Hall. Printed & Published by Davidson & Co 52 Beaumont St. London W.


30
64
JUL

To the Vestry of the Parish of St. Mary, Battersea.

GENTLEMEN,

The Census taken on March 29th, 1896, shewed that the increase of population in the preceding five years had not quite kept pace with that which prevailed during the last few inter-censal periods; in fact, since 1871-81 the rate of increase has uniformly decreased, the probable reason of which is that nearly all the available building land in the parish has been covered.

The following are the particulars of the last three census enumerations, the number of inhabited houses, of persons, and of inhabitants per house being given for the several wards into which the parish is at present divided.

	CENSUS 1881.			CENSUS 1891.			CENSUS 1896.		
	Inhabited Houses.	Population.	No. of Inhabitants per House.	Inhabited Houses.	Population.	No. of Inhabitants per House.	Inhabited Houses.	Population	No. of Inhabitants per House.
Ward 1 ...	2,665	23,667	8·9	3,327	27,899	8·3	3,442	29,178	8·4
„ 2 ...	5,120	37,011	7·2	6,748	50,087	7·4	6,846	52,653	7·7
„ 3 ...	4,536	31,652	6·9	5,457	40,217	7·3	5,705	43,119	7·5
„ 4 ...	2,284	14,932	6·5	5,247	32,255	6·1	6,428	40,165	6·2
Totals ...	14,605	107,262	7·3	20,779	150,458	7·2	22,421	165,115	7·4

The next table gives particulars of the population in relation to the houses in each ward of the parish.

CENSUS 1896.

Wards.	Houses.				Population.		
	Inhabited.	Empty.	Occupied by day only	Building.	Male.	Female.	Total.
No. 1 ...	3,442	48	39	14	14,967	14,211	29,178
„ 2 ...	6,846	101	84	5	26,279	26,374	52,653
„ 3 ...	5,705	74	79	—	21,637	21,482	43,119
„ 4 ...	6,428	272	61	153	17,939	22,226	40,165
Whole Parish	22,421	495	263	172	80,822	84,293	165,115

This table shews that there were, at the date of the 1896 census, 22,421 inhabited houses in the parish, four hundred and ninety-five empty, two hundred and sixty-three used for business purposes only and not inhabited at night, and one hundred and seventy-two building. It may be safely assumed that most of the empty houses have since been occupied, as well as the houses which were then building, with the exception of some of the flats recently erected, there being a demand for houses in Battersea at present exceeding that of any previous period.

The persons were eighty thousand eight hundred and twenty-two males; eighty-four thousand two hundred and ninety-three females, and a total population of one hundred and sixty-five thousand one hundred and fifteen. As the census of eighteen hundred and ninety-one shewed a population of one hundred and fifty thousand, four hundred and fifty eight, it follows that the increase was fourteen thousand, six hundred and fifty seven, or an average increase of two thousand, nine hundred and thirty-one per annum.

It will be necessary, in order to calculate the birth, death and other rates to arrive at the mean or average population of the year 1896, which is obtained by adding a proportionate number, one fourth of the year's increase of population, so as to shew the population estimated to exist on the middle day of the year, which is one hundred and sixty-five thousand, eight hundred and forty-seven. It will be observed that this is less than the estimated mean population for 1895, the difference in rates however being only a decimal fraction of 1·0 per thousand.

The mean population of the Metropolis for the year 1896, as deducted from the census of that year, was 4,421,955.

The births registered in London in the year were 135,796, which calculated upon the mean population given above is equal to 30·7 per thousand. The births in Battersea registered during the year were 5,358 in number, which, in a mean population of 165,847, will shew a birth rate of 32·3 per thousand for the year.

The deaths registered in London during 1896 numbered eigthy-three thousand five hundred and eleven, with a consequent death rate of 18·6 per thousand. The number of deaths registered in Battersea during the year was two thousand nine hundred and forty-one, equal to a death-rate of 17·7 per thousand; but if this be corrected by deleting the deaths of two hundred and sixty-six non-parishioners, and adding the deaths of three hundred and nineteen Battersea residents in outlying institutions of the Metropolis, the total deaths would be raised to two thousand nine hundred and ninety-four, giving on the mean population for 1896 a corrected death-rate of 18·0 per thousand.

Table A. This table is compiled in all sanitary districts under the express direction of the Local Government Board, for the purpose of securing uniformity of tabulation in all parts of the country, of the important particulars contained therein. It is at the same time expressly stated that the Medical Officer of Health of any district is at liberty, in addition, to continue to use any other form of tabulation which, in his opinion, illustrates more fully the sanitary condition of the district for which he acts. For purposes of comparison with the vital statistics of the past forty years, since the year 1856, other tables which have been employed in this parish are also given herewith, and will be found denoted by numbers, those of the Local Government Board being denoted by the letters A. and B.

In Table A. will be found particulars of mortality in the various Registrar's districts and public institutions which are also treated as separate districts. They comprise the Registrar's districts of East and West Battersea, and the following public institutions, situated within the parish, viz.:—Wandsworth and Clapham Union Infirmary, Bolingbroke Hospital, Westminster Union Schools, Emanuel School, and the Masonic School for Girls.

The broad grouping of ages is under and above five years of age, so as to clearly define the mortality of each of these periods

TABLE A of Deaths during the Year 1896 in the Metropolitan Sanitary District of Battersea, classified according to Diseases, Ages and Localities.

Names of Localities adopted for the purpose of these Statistitics; Public Institutions being shewn as separate localities. [a]	Mortality from all causes, at subjoined Ages.							[i]	Mortality from subjoined causes, distinguishing Deaths of Children under 5 Years.																		
									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
													Fevers.																	
	At all ages. [b]	Under 1 year. [c]	1 and under 5 [d]	5 and under 15 [e]	15 and under 25 [f]	25 and under 65 [g]	65 and upwards [h]		Small Pox.	Scralatina.	Diphtheria.	Membranous Croup.	Typhus.	Enteric or Typhoid.	Continued.	Relapsing.	Puerperal.	Cholera.	Erysipelas.	Measles.	Whooping Cough.	Diarrhœa and Dysentery.	Rheumatic Fever.	Phthisis.	Bronchitis, Pneumonia, &c.	Heart Disease.	Influenza.	Injuries.	All Other Diseases.	Total.
East Battersea ...	1134	430	246	54	43	246	115	Under 5	...	...	16	2	...	1	...	...	...	...	1	75	56	83	...	2	135	2	1	22	280	676
								5 upwards	...	1	7	1	...	4	...	...	1	...	3	3	1	3	3	78	90	45	11	26	181	458
West Batttersea ...	1300	465	224	54	43	347	167	Under 5	...	...	17	1	...	...	...	...	...	...	2	90	75	48	...	1	142	2	...	20	291	689
								5 upwards	...	4	5	1	...	5	...	...	2	...	2	5	3	6	3	90	111	76	9	28	261	611
Infirmary, St. John's Hill	481	42	21	7	23	210	178	Under 5	...	...	...	...	...	...	...	...	...	...	...	10	2	24	...	...	3	...	...	2	22	63
								5 upwards	...	...	...	...	...	1	...	...	1	...	6	...	...	5	7	71	49	56	1	7	214	418
Bolingbroke Hospital	22	...	1	2	2	13	4	Under 5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	..	1
								5 upwards	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	11	8	21
Westminster Union Schools.	3	...	3	...	...	...	...	Under 5	...	...	...	...	...	..	...	...	...	...	...	2	...	...	...	...	...	...	...	...	1	3
								5 upwards																						
Masonic School, Battersea Rise ...	1	...	...	1	...	...	...	Under 5																						
								5 upwards	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Emanuel School, Battersea Rise ...	...	...	...	...	...	...	...	Under 5																						
								5 upwards																						
Totals ...	2941	937	495	118	111	816	464	Under 5	...	...	33	3	...	1	...	...	...	...	3	177	133	155	...	3	280	4	1	45	594	1432
								5 upwards	...	5	12	2	...	10	...	...	4	...	11	8	4	14	13	239	251	178	21	72	665	1509
The subjoined numbers have also to be taken into account in judging of the above Records of Mortality.																														
Deaths occurring outside the District of Persons belonging thereto.	319	44	58	39	19	133	26	Under 5	...	20	19	...	...	...	...	...	...	...	2	1	2	1	...	1	16	...	....	5	35	102
								5 upwards	...	7	13	...	...	6	...	...	...	...	...	1	1	1	22	22	21	...	21	102	217
Deaths occurring within the District of Persons not belonging thereto.	266	23	19		12	109	102	Under 5	...	...	...	...	...	...	...	...	...	...	...	7	2	11	...	...	1	...	...	2	19	42
								5 upwards	...	...	...	...	...	...	...	...	...	...	3	...	...	2	3	28	25	34	...	18	111	224

of life, more especially the infantile ages under five, as the greatest waste of life has occurred in the past at the early years, and although great improvement has taken place in this respect during the last few years, still much remains to be done in this direction. For instance, five hundred and nine out of a total of one thousand four hundred and thirty-two deaths under five years were from Zymotic diseases, a proportion which ought to be largely diminished. This, however, shews a great diminution compared with former years. Particulars of the other ages at death are also given in this table.

The two thousand nine hundred and forty one persons, including non-parishioners, who died in the parish during 1896, would give a gross death rate of 17·7 per thousand per annum, viz.:—

East Battersea	1,134
West Battersea ... ... (excluding public institutions)	1,300
Wandsworth and Clapham Union Infirmary—	
(*a*) Parishioners	239
(*b*) Non-parishioners	242
Bolingbroke Hospital—	
(*a*) Parishioners	11
(*b*) Non-parishioners	11
Westminster Union Schools—	
(*a*) Parishioners	—
(*b*) Non-parishioners	3
Masonic School—	
(*a*) Parishioners	1
(*b*) Non-Parishioner	—
Total ...	2,941

Deaths occurring within the parish, of persons not belonging thereto :

In the Union Infirmary	242
In the Bolingbroke Hospital	11
In the Westminster Union Schools ...	3
Elsewhere	10
Total ...	266

Deaths occurring outside the parish, of persons belonging thereto :

Union Workhouse, Wandsworth	7
General and Special Hospitals	195
Metropolitan Asylums Board Hospitals ...	59
County and other Lunatic Asylums... ...	46
Elsewhere (including River Thames) ...	12
Total ...	319

Table I. This table contains details of the deaths of Battersea parishioners in Metropolitan public institutions without the parish. The disease from which death ensued, the sex, age, and particular class of institution are herein indicated, as well as the localities in which other parishioners lost their lives or were found dead, which latter require no comment, the causes of death being set out in the table.

The particulars of deaths of non-parishioners dying within the parish will be found in Table IX. and following tables.

TABLE I.

Deaths of Battersea Parishioners in Public Institutions of the Metropolis.

DISEASE.	Totals.	Sex.		Age.							Institutions.				Elsewhere.
		Males.	Females.	Under 1 year.	1 to 5 years.	All under 5.	5 to 15 years.	15 to 25 years.	25 to 65 years.	65 and upwards.	Union Workhouse.	General and Special Hospitals.	Asylums Board Hospitals.	County and other Lunatic Asylums.	
I.—ZYMOTICS.															
Small Pox ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scarlatina ...	27	11	16	1	19	20	7	...	...	...	...	2	25	..	...
Diphtheria & Membranous Croup	32	12	20	2	17	19	12	1	...	...	...	4	28	...	...
Typhus Fever ...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...
Enteric ,, ...	6	4	2	...	...	...	3	...	3	...	...	4	2	...	...
Continued Fever ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Relapsing ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cholera ...	...	...	...	...	...	...	.	...	...	...	...	...	...	...	...
Erysipelas ...	2	...	2	2	...	2	...	...	...	...	...	2	...	...	...
Measles ...	1	...	1	...	1	1		...	...	...	...	1	...	...	...
Whooping Cough...	3	1	2	.	2	2	1	...	...	...	...	3	...	...	.
Diarrhœa ...	2	2	...	...	1	1	...	...	...	1	...	1	...	1	...
Other Zymotics ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total Zymotics... ...	73	30	43	5	40	45	23	1	3	1	...	17	55	1	..
Rheumatic Fever...	1	1	...	...	.	...	...	...	1	...	...	1	...	...	...
Ague	...	...	...	...	.	...	.	...	...	...	...	...	...	...	...
Phthisis	23	15	8	..	1	1	3	4	15	...	...	20	...	3	..
Tubercular ...	13	8	5	1	3	4	2	3	4	...	...	13	...	...	...
Respiratory ...	28	17	11	8	8	16	...	1	8	3	1	24	1	2	...
Circulatory ...	21	13	8	...	...	...	3	...	15	3	3	15	...	1	2
Nervous	50	34	16	4	1	5	3	3	31	8	1	15	1	32	1
Cancer	15	8	7	...	.	...	...	...	13	2	...	14	1	...	...
Violence... ...	26	19	7	2	3	5	2	3	15	1	...	20	...	...	6
All Other Diseases	69	44	25	24	2	26	3	4	28	8	2	56	1	7	3
Totals ...	319	189	130	44	58	102	39	19	133	26	7	195	59	46	12

The twelve deaths recorded as having occurred "elsewhere" are here definitely located:

Male	...	Greenland Dock, Rotherhithe.
Female	...	Borrodaile Road, Wandsworth.
Male	...	Dempster Road, Wandsworth.
,,	...	On way to St. Thomas' Hospital.
Female	...	Railway Station, Notting Hill Gate.
Male	...	River Thames.
,,	...	H. M. Prison, Wandsworth.
,,	...	Old Bond Street, W.
,,	...	Signal box, Earls Court Station.
,,	...	Fleet Street, City.
,,	...	Lower Kennington Lane.
Female	...	Fairford Grove, Lambeth.

Table I. shews that three hundred and nineteen Battersea parishioners died in outlying public institutions, in addition to the two hundred and thirty nine dying in the Union Infirmary, (*vide* Table VIII) eleven in the Bolingbroke Hospital, and one at the Masonic Girls School, making a total number of five hundred and seventy deaths in public institutions. During the year 1895 five hundred and fifty six deaths similarly occurred.

Tables II. and III., give in tabular form the weekly returns of the District Registrars of Births and Deaths for East and West Battersea respectively, and include the deaths of all persons within the parish and in public institutions, whether parishioners or not. They shew the incidence of births and deaths at the various periods of the year, being grouped in quarters for that purpose, with additional particulars as to causes of death to be found in Table IV.

It is shown by these tables that the births and deaths exhibited an unusual uniformity during the several quarters of the year, the result doubtless of the mild winter and spring, during which seasons the mortality is frequently considerably in excess of that of the others.

TABLE II.

BIRTHS AND DEATHS IN EAST BATTERSEA, 1896.

Week ending:—	BIRTHS.			DEATHS.		
	Males.	Females.	Total.	Males.	Females.	Total.
4th January 1896.	25	18	43	4	14	18
11th " "	23	21	44	9	11	20
18th " "	21	21	42	10	7	17
25th " "	35	14	49	16	9	25
1st February "	23	19	42	8	5	13
8th " "	26	24	50	16	21	37
15th " "	23	28	51	9	16	25
22nd " "	32	18	50	11	10	21
29th " "	20	26	46	6	12	18
7th March "	24	18	42	11	14	25
14th " "	28	21	49	12	10	22
21st " "	19	29	48	6	7	13
28th " "	34	28	62	10	7	17
1st Quarter ...	333	285	618	128	143	271
4th April "	29	19	48	15	5	20
11th " "	25	21	46	12	8	20
18th " "	34	24	58	13	14	27
25th " "	28	28	56	9	15	24
2nd May "	26	18	44	6	11	17
9th " "	29	25	54	7	15	22
16th " "	23	25	48	11	13	24
23rd " "	26	25	51	13	8	21
30th " "	22	21	43	8	12	20
6th June "	26	17	43	12	12	24
13th " "	20	23	43	16	11	27
20th " "	18	23	41	13	13	26
27th " "	25	22	47	10	9	19
2nd Quarter ...	331	291	622	145	146	291

Births and Deaths, East Battersea, 1896—*continued.*

Week ending :—	BIRTHS.			DEATHS.		
	Males.	Females.	Total.	Males.	Females.	Total.
4th July, 1896	24	23	47	12	17	29
11th ,, ,,	32	22	54	15	12	27
18th ,, ,,	25	22	47	19	13	32
25th ,, ,,	26	24	50	20	22	42
1st August ,,	26	22	48	18	17	35
8th ,, ,,	23	14	37	13	12	25
15th ,, ,,	31	34	65	10	13	23
22nd ,, ,,	19	20	39	10	6	16
29th ,, ,,	22	23	45	7	7	14
5th September ,,	23	20	43	7	8	15
12th ,, ,,	28	25	53	11	12	23
19th ,, ,,	21	20	41	4	7	11
26th ,, ,,	17	25	42	9	6	15
3rd Quarter ...	317	294	611	155	152	307
3rd October ,,	26	20	46	9	9	18
10th ,, ,,	23	25	48	5	10	15
17th ,, ,,	30	20	50	8	8	16
24th ,, ,,	32	24	56	13	11	24
31st ,, ,,	24	27	51	13	17	30
7th November ,,	25	24	49	11	9	20
14th ,, ,,	20	17	37	9	7	16
21st ,, ,,	21	24	45	14	12	26
28th ,, ,,	18	19	37	9	12	21
5th December ,,	26	18	44	10	3	13
12th ,, ,,	28	31	59	2	7	9
19th ,, ,,	20	20	40	3	8	11
26th ,, ,,	15	19	34	9	8	17
2nd January, 1897	31	22	53	17	12	29
4th Quarter ...	339	310	649	132	133	265
Whole Year ...	1,320	1,180	2,500	560	574	1,134

TABLE III.

BIRTHS AND DEATHS IN WEST BATTERSEA, 1896.

Week ending :—	BIRTHS.			DEATHS.		
	Males.	Females.	Total.	Males.	Females.	Total.
4th January, 1896	26	26	52	18	16	34
11th ,, ,,	22	31	53	19	19	38
18th ,, ,,	24	35	59	26	13	39
25th ,, ,,	33	34	67	20	21	41
1st February ,,	30	25	55	10	16	26
8th ,, ,,	26	29	55	26	19	45
15th ,, ,,	27	28	55	16	13	29
22nd ,, ,,	36	19	55	14	15	29
29th ,, ,,	26	34	60	20	18	38
7th March ,,	32	23	55	14	15	29
14th ,, ,,	34	29	63	17	13	30
21st ,, ,,	30	25	55	21	12	33
28th ,, ,,	29	27	56	10	14	24
1st Quarter ...	375	365	740	231	204	435
4th April ,,	27	22	49	11	18	29
11th ,, ,,	33	29	62	32	29	61
18th ,, ,,	32	25	57	26	16	42
25th ,, ,,	28	35	63	19	17	36
2nd May ,,	30	27	57	21	18	39
9th ,, ,,	30	20	50	17	16	33
16th ,, ,,	20	21	41	22	24	46
23rd ,, ,,	25	25	50	22	23	45
30th ,, ,,	21	33	54	11	29	40
6th June ,,	24	23	47	16	31	47
13th ,, ,,	20	22	42	15	14	29
20th ,, ,,	28	30	58	20	10	30
27th ,, ,,	32	26	58	10	11	21
2nd Quarter ...	350	338	688	242	256	498

Births and Deaths in West Battersea, 1896—*continued.*

Week ending :—	BIRTHS.			DEATHS.		
	Males.	Females.	Total.	Males.	Females.	Total.
4th July, 1896	32	23	55	18	16	34
11th ,, ,,	35	30	65	22	20	42
18th ,, ,,	21	17	38	36	19	55
25th ,, ,,	33	29	62	40	25	65
1st August ,,	27	33	60	28	26	54
8th ,, ,,	18	29	47	27	23	50
15th ,, ,,	26	28	54	19	15	34
22nd ,, ,,	22	16	38	14	13	27
29th ,, ,,	21	34	55	12	9	21
5th September ,,	35	18	53	20	13	33
12th ,, ,,	29	26	55	10	12	22
19th ,, ,,	45	20	65	7	17	24
26th ,, ,,	20	22	42	10	18	28
3rd Quarter ...	364	325	689	263	226	489
3rd October ,,	33	28	61	14	11	25
10th ,, ,,	21	25	46	11	17	28
17th ,, ,,	26	16	42	10	9	19
24th ,, ,,	25	27	52	11	8	19
31st ,, ,,	30	32	62	14	14	28
7th November ,,	29	29	58	16	21	37
14th ,, ,,	30	33	63	14	17	31
21st ,, ,,	16	24	40	12	16	28
28th ,, ,,	25	24	49	18	8	26
9th December ,,	37	23	60	15	17	32
12th ,, ,,	33	30	63	17	12	29
19th ,, ,,	26	13	39	18	11	29
26th ,, ,,	36	18	54	16	9	25
2nd January, 1897	22	30	52	14	15	29
4th Quarter ...	389	352	741	200	185	385
Whole Year ...	1,478	1,380	2,858	936	871	1,807

TABLE IV.

Quarterly and Annual Summaries of Births and Deaths.

Battersea. 1896.	Births	Deaths	Deaths: Under 1 Year	Deaths: Above 60 Years	Small Pox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Fever	Diarrhœa	Cholera	Violence	Inquests	Public Institutions (including Non-Parishioners.
1st Quarter E ...	618	271	95	36	...	6	...	9	18	...	1	...	14	33	...
W ...	740	435	90	131	...	4	3	8	15	...	3	...	14	42	140
2nd Quarter E ...	622	291	95	30	...	45	...	4	25	1	10	...	15	33	...
W ...	688	498	132	96	...	89	...	4	46	...	4	...	20	44	108
3rd Quarter E ...	611	307	160	24	...	25	1	5	11	1	70	...	3	16	...
W ...	689	489	213	91	...	14	...	5	17	2	71	2	21	36	145
4th Quarter E ...	649	265	80	49	...	2	...	8	3	3	5	...	16	39	...
W ...	741	385	72	123	...	...	1	7	2	4	3	...	14	35	114
Whole Year E ...	2500	1134	430	139	...	78	1	26	57	5	86	...	48	121	...
W ...	2858	1807	507	441	...	107	4	24	80	6	81	2	69	157	507
Totals	5358	2941	937	580	...	185	5	50	137	11	167	2	117	278	507

The Births and Deaths during the various quarters in the whole parish are here set out :—

	Births.	Deaths.
1st quarter	1,358	706
2nd ,, ...	1,310	789
3rd ,, ...	1,300	796
4th ,, ...	1,390	650
Total	5,358	2,941

Table V. contains a veritable sanitary history of the parish of Battersea since 1856, the year in which modern sanitation first came into existence under the provisions of the Metropolis Local Management Act of 1855, and by which sanitary authorities, in the form of Vestries and District Boards, the latter consisting of small parishes grouped together, were first constituted for London as a whole.

TABLE V.

COMPARATIVE STATISTICS OF BIRTHS, MORTALITY, &c.

Year.	Mean Population for Year.	Births.	Birth Rate.	Deaths.	Death Rate.	Zymotic Deaths.	Natural Increase.
1856	15,069	536	36·2	320	21·2	45	216
1857	15,970	582	36·0	343	21·4	46	239
1858	16,872	562	33·3	380	22·5	100	182
1859	17,774	685	38·5	394	22·1	96	292
1860	18,676	680	36·4	399	21·3	62	281
1861	19,582	750	38·3	505	25·7	112	245
1862	23,108	784	33·9	491	21·2	106	293
1863	26,635	1.042	39·1	522	19·5	86	520
1864	30,161	1,140	37·7	669	22·1	129	471
1865	33 688	1,357	40·2	785	23·3	177	572
1866	37.145	1,386	37·3	1,002	26·9	244	384
1867	40,741	1,734	42·5	870	21·3	122	864
1868	44,267	1,975	44·6	1,046	23·6	194	929
1869	47,749	2,096	43·8	1,121	23·4	247	975
1870	51.320	2,170	42·2	1,375	26·7	404	795
1871	54,847	2,220	40·4	1,472	26·8	463	748
1872	60,244	2,349	38·9	1,202	19·9	220	1,147
1873	65,614	2,659	40·5	1,307	19·9	205	1,352
1874	70,984	2,865	40·3	1 387	19·5	238	1,478
1875	76.354	3,080	40·3	1 724	22·5	307	1,356
1876	81.704	3.455	42·2	1,745	21·3	340	1,710
1877	87,094	3,481	39·9	1,725	19·8	280	1,756
1878	92 464	3,748	40·5	1,803	19·4	322	1,945
1879	97,834	4 001	40 8	1,980	20·2	355	2,021
1880	103,204	4,095	39·6	2,040	19·7	383	2,055
1881	108.342	4,452	41·8	2 033	18·7	381	2,419
1882	112,661	4.504	39·9	2,214	19·6	353	2,190
1883	116,980	4,711	40·2	2,344	20·0	369	2.367
1884	121,299	5 275	43·4	2,569	21·1	568	2,706
1885	125,618	4,654	37·0	2,566	20·4	432	2,088
1886	129,937	5,140	39·5	2,477	19·0	398	2,663
1887	134,256	5,186	38·6	2,451	18·2	502	2,735
1888	138,565	5,061	36·5	2,187	15·7	363	2,874
1889	142,884	5,161	36·1	2,240	15·6	366	2,921
1890	147,203	5,105	34·6	2,854	19·3	543	2,251
1891	151,190	5,237	34·6	2,619	17·3	398	2,618
1892	154,121	4,990	32·3	2,692	17·4	473	2,298
1893	157,052	5,225	33·2	2,801	17·8	564	2,424
1894	159.984	5 024	31·4	2,404	15·4	468	2,620
1895	162,915	5,264	32·3	2,901	17·8	491	2,363
1896	165,847	5 358	32·3	2.941	17·7	608	2,419

This parish at that time consisted of a congeries of small villages, between which extended market gardens ; the inhabitants and dependents of some few dozens of large houses, the residences chiefly of merchants, with the workers at the market gardens, constituting the principal population. It will be observed that the population was then but 15,069, and at the census of 1861, had but reached the number of 19,582. The birth rate was then a little higher than now. The death rate, however, although the population was very sparse, was much higher than at present. It has been laid down as an axiom that mortality increases in direct proportion to the density of population, and it is the aim of modern sanitation to limit or prevent such increase. That the same parish, of course with the same superficial area, should, with a ten-fold population have a reduced instead of an augmented death rate, shews that the authority having charge of the sanitation, which includes the health condition and duration of lives of the inhabitants has performed its public duties in an exemplary manner.

Tables VI., VII., VIII., and IX., with addendum, contain particulars of the mortality respectively of East Battersea, West Battersea, and in the Union Infirmary, giving separately parishioners and non-parishioners, and in the addendum of the other public institutions situated within the parish. These tables have been used from 1856, and are continued for purposes of comparison with former years as well as being the basis upon which all the other mortality tables are founded.

TABLE VI.

STATISTICS OF MORTALITY.

EAST BATTERSEA.		Total Deaths from each Class of Disease, &c.	Sex.		Age.							Social Position			
Population (Census) 1896, 71,730.			Males.	Females.	Under 1 year.	1 to 5 years.	All under 5.	From 5 to 15 years.	From 15 to 25 years.	From 25 to 65 years.	65 years and upwards.	Nobility, Gentry, &c.	Professional Class, Merchants, Bankers, &c.	Middle and Trading Class, Shopmen, Clerks, &c.	Industrial and Labouring Class.
Estimated mean population for middle of 1896, 71,958.															
I. Zymotic.	Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	78	42	36	19	56	75	3	...	...	...	...	...	1	77
	Scarlet Fever	1	1	...	...	...	...	1	...	...	...	...	...	...	1
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever	5	3	2	1	...	1	2	1	1	...	...	...	...	5
	Puerperal Fever	1	...	1	...	...	...	...	...	1	...	...	...	...	1
	Diphtheria	26	14	12	2	16	18	7	...	1	...	...	...	3	23
	Whooping Cough	57	27	30	20	36	56	1	...	...	...	...	...	4	53
	Erysipelas	4	3	1	...	1	1	...	1	1	1	...	...	1	3
	Diarrhœa, Dysentery & Cholera	86	45	41	67	16	83	...	...	2	1	...	...	2	84
	Influenza	12	5	7	...	1	1	...	1	7	3	...	...	1	11
	Other Zymotic Diseases	5	3	2	1	2	3	...	...	2	...	...	...	1	4
	Total of Zymotic Diseases	275	143	132	110	128	238	14	3	15	5	...	...	13	262
II. Constitutional.	Gout	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Rheumatism	3	2	1	...	...	...	...	...	3	...	...	...	...	3
	Cancer & other Tumour	25	4	21	...	...	...	...	...	17	8	...	...	...	25
	Other Constitutional Diseases	5	4	1	4	...	4	...	...	1	...	...	...	...	5
	Tubercular. Phthisis	80	33	47	...	2	2	5	19	50	4	...	...	3	77
	Tubercular. Other Tubercular Diseases	68	40	28	38	16	54	6	4	4	...	...	...	1	67
III. Local.	Nervous	75	35	40	17	20	37	4	...	21	13	...	1	5	69
	Circulatory	47	23	24	2	...	2	5	3	23	14	...	2	2	43
	Respiratory	225	109	116	70	65	135	9	6	53	22	1	...	8	216
	Digestive	71	29	42	34	11	45	1	3	18	4	...	...	3	68
	Urinary	23	12	11	...	...	...	1	...	19	3	...	1	4	18
	Generative	9	...	9	...	...	...	...	3	6	...	...	...	...	9
	Locomotory	1	1	...	...	...	...	1	...	...	...	...	...	...	1
	Integumentary	...	...	...	...	...	...	...	...	...	...	...	...	...	...
IV. Developmental.	Premature Birth, &c.	137	80	57	137	...	137	...	...	...	...	...	...	6	131
	Old Age	41	15	26	...	...	...	...	...	1	40	...	1	6	34
V.	Violence	48	30	18	18	4	22	8	1	15	2	...	...	2	46
VI.	All other Diseases	1	...	1	...	...	...	...	1	...	...	...	...	1	...
	Totals	1134	560	574	430	246	676	54	43	246	115	1	5	54	1074

TABLE VII.

STATISTICS OF MORTALITY.

WEST BATTERSEA.	Total Deaths from each class of Disease.	Sex.		Age.							Social Position			
Population Census) 1896, 93,385.		Males.	Females.	Under 1 year.	From 1 to 5 years.	Total under 5 years.	From 5 to 15 years.	From 15 to 25 years.	From 25 to 65 years.	65 years and upwards.	Nobility and Gentry.	Professional Class, Merchants, Bankers, &c.	Middle and Trading Class, Shopmen, Clerks, &c.	Industrial and Labouring Classes, &c.
Estimated mean population or middle of 1896, 93,889.														
I. Zymotic. Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Measles	95	48	47	24	66	90	5	...	...	...	...	...	...	95
Scarlet Fever	4	4	...	...	...	...	4	...	...	...	...	...	...	4
Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	5	2	3	...	...	...	2	...	3	...	...	...	1	4
Puerperal Fever	2	...	2	...	...	...	...	...	2	...	...	...	1	1
Diphtheria	24	12	12	2	16	18	6	...	...	...	...	...	2	22
Whooping Cough	78	39	39	36	39	75	3	...	...	...	...	...	7	71
Erysipelas	4	1	3	1	1	2	...	...	1	1	...	...	2	2
Diarrhœa, Dysentery & Cholera	54	20	34	43	5	48	...	...	3	3	...	...	2	52
Influenza	9	5	4	...	...	...	...	...	7	2	...	1	...	8
Other Zymotic Diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total of Zymotic Diseases	275	131	144	106	127	233	20	...	16	6	...	1	15	259
II. Constitutional. Gout	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rheumatism	3	...	3	...	...	...	...	1	2	...	...	...	...	3
Cancer & other Tumours	47	12	35	...	...	...	...	1	31	15	1	1	5	40
Other Constitutional Diseases	12	8	4	7	...	7	1	1	3	...	...	...	1	11
Tubercular. Phthisis	91	48	43	...	1	1	...	25	63	2	...	1	6	84
Tubercular. Other Tubercular Diseases	57	24	33	33	16	49	3	1	3	1	...	...	...	57
III. Local. Nervous	94	44	50	25	21	46	6	2	29	11	...	2	7	85
Circulatory	78	39	39	2	...	2	8	2	50	16	...	...	8	70
Respiratory	253	150	103	100	42	142	5	4	71	31	1	2	12	238
Digestive	64	29	35	24	9	33	7	1	19	4	...	3	4	57
Urinary	36	18	18	...	1	1	1	2	23	9	...	...	4	32
Generative	12	...	12	...	...	...	...	...	12	...	...	...	...	12
Locomotory	1	1	...	...	...	...	...	1	...	...	...	...	...	1
Integumentary	...	...	...	...	...	...	...	...	...	...	...	...	...	...
IV. Developmental. Premature Birth, Low Vitality, and Congenital Defects	153	82	71	153	...	153	...	...	...	...	...	2	12	139
Old Age	73	32	41	...	...	...	...	...	2	71	4	2	11	56
V. Violence	48	36	12	15	5	20	3	2	22	1	...	...	1	47
VI. All other Diseases	3	...	3	...	2	2	...	...	1	...	...	...	...	3
Totals	1300	654	646	465	224	689	54	43	347	167	6	14	86	1194

TABLE VIII.

STATISTICS OF MORTALITY.

Wandsworth and Clapham Union Infirmary. [Parishioners,] 1896.		Total Deaths from each Class of Disease, &c., in the Sub-District.	Sex.		Age.							Social Position			
			Males.	Females.	Under 1 year.	From 1 to 5 years.	All under 5 years.	From 5 to 15 years.	From 15 to 25 years.	From 25 to 65 years.	65 years and upwards.	Nobility and Gentry.	Professional Class, Merchants, Bankers, &c.	Middle and Trading Class, Shopmen, Clerks, &c.	Industrial and Labouring Classes.
I. Zymotic.	Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	3	1	2	3	...	3	...	...	...	...	...	...	...	3
	Scarlet Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever	1	1	...	...	...	...	...	...	1	...	...	...	...	1
	Puerperal Fever	1	...	1	...	...	...	...	...	1	...	...	...	...	1
	Diphtheria	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Erysipelas	3	2	1	...	...	...	...	...	2	1	...	...	...	3
	Diarrhœa, Dysentery & Cholera	16	11	5	10	3	13	...	...	2	1	...	...	...	16
	Influenza	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Other Zymotic Diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total of Zymotic Class	24	15	9	13	3	16	...	...	6	2	...	...	...	24
II. Constitutional.	Gout	2	...	2	...	...	...	...	...	1	1	...	...	...	2
	Rheumatism	4	3	1	...	...	...	...	3	...	1	...	...	...	4
	Cancer & other Tumours	18	7	11	...	...	...	...	1	10	7	...	...	...	18
	Other Constitutional Diseases	2	...	2	1	...	1	...	...	1	...	...	...	...	2
	Tubercular. Phythisis	43	30	13	...	...	...	1	3	39	...	...	...	...	43
	Tubercular. Other Tubercular Diseases	3	2	1	...	1	1	1	...	1	...	...	...	...	3
III. Local.	Nervous	22	13	9	1	...	1	...	...	18	3	...	...	...	22
	Circulatory	23	14	9	...	...	...	...	3	13	7	...	...	...	23
	Respiratory	27	19	8	2	...	2	2	1	13	9	...	...	...	27
	Digestive	11	8	3	1	1	2	1	...	4	4	...	...	...	11
	Urinary	10	7	3	...	...	...	1	1	7	1	...	...	...	10
	Generative	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Locomotory	2	1	1	...	...	...	...	...	2	...	...	...	...	2
	Integumentary	...	...	...	...	...	...	...	...	...	...	...	...	...	...
IV. Developmental.	Premature Birth, Low Vitality and Congenital Defects	1	1	...	1	...	1	...	...	...	...	...	...	...	1
	Old Age	44	19	25	...	...	...	...	...	2	42	...	...	...	44
V.	Violence	3	2	1	...	...	...	...	...	2	1	...	...	...	3
VI.	All other Diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Totals	239	141	98	19	5	24	6	12	119	78	...	...	...	239

TABLE IX.

STATISTICS OF MORTALITY.

Wandsworth and Clapham Union Infirmary. [Non-Parishioners,] 1896.	Total Deaths from each Class of Disease, &c., in the Sub-District.	Sex.		Age.							Social Position			
		Males.	Females.	Under 1 year.	From 1 to 5 years.	Total under 5 years.	From 5 to 15 years.	From 15 to 25 years.	From 25 to 65 years.	65 years and upwards.	Nobility and Gentry.	Professional Class, Merchants, Bankers, &c.	Middle and Trading Class, Shopmen, Clerks, &c.	Industrial and Labouring Class.
I. Zymotic. Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. Zymotic. Measles	7	4	3	...	7	7	...	...	...	...	...	...	...	7
I. Zymotic. Scarlet Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. Zymotic. Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. Zymotic. Enteric Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. Zymotic. Puerperal Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. Zymotic. Diphtheria	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. Zymotic. Whooping Cough	2	...	2	1	1	2	...	...	...	...	...	...	...	2
I. Zymotic. Erysipelas	3	3	...	...	...	...	...	1	1	1	...	...	...	3
I. Zymotic. Diarrhœa, Dysentery & Cholera	13	10	3	9	2	11	...	...	2	...	...	...	...	13
I. Zymotic. Influenza	1	1	...	...	...	...	...	...	1	...	...	...	...	1
I. Zymotic. Other Zymotic Diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total of Zymotic Diseases	26	18	8	10	10	20	...	1	4	1	...	...	...	26
II. Constitutional. Gout	...	...	...	...	...	...	...	...	...	...	...	...	...	...
II. Constitutional. Rheumatism	3	3	...	...	...	...	...	1	...	2	...	...	...	3
II. Constitutional. Cancer & other Tumours	11	6	5	...	...	...	...	...	4	7	...	...	...	11
II. Constitutional. Other Constitutional Diseases	6	3	3	5	1	6	...	...	...	...	...	...	...	6
II. Constitutional. Tubercular. Phthisis	28	24	4	...	...	...	...	1	24	3	...	...	...	28
II. Constitutional. Tubercular. Other Tubercular Diseases	4	4	...	...	1	1	...	2	1	...	...	...	...	4
III. Local. Nervous	17	6	11	...	...	...	1	...	13	3	...	...	...	17
III. Local. Circulatory	33	16	17	...	...	...	...	3	16	14	...	...	...	33
III. Local. Respiratory	25	13	12	...	1	1	...	1	9	14	...	...	...	25
III. Local. Digestive	7	5	2	1	...	1	...	1	1	4	...	...	...	7
III. Local. Urinary	17	9	8	...	...	...	...	...	10	7	...	...	...	17
III. Local. Generative	1	...	1	...	...	...	...	1	...	...	...	...	...	1
III. Local. Locomotory	1	1	...	...	...	...	...	...	1	...	...	...	...	1
III. Local. Integumentary	...	...	...	...	...	...	...	...	...	...	...	...	...	...
IV. Developmental. Premature Birth, Low Vitality, Congenital Defects	7	1	6	7	...	7	...	...	...	...	...	...	...	7
IV. Developmental. Old Age	49	16	33	...	...	...	...	...	4	45	...	...	...	49
V. Violence	6	4	2	...	2	2	...	...	4	...	...	...	...	6
VI. All other Diseases	1	...	1	...	1	1	...	...	...	...	...	...	...	1
Totals	242	129	113	23	16	39	1	11	91	100	...	...	...	242

Particulars of deaths in Public Institutions within the Parish other than the Wandsworth and Clapham Union Infirmary.

PARISHIONERS.

Bolingbroke Hospital		Female 47 years	Cancer
,,	,,	Male 45 years	Kidney disease
,,	,,	Male $2\frac{9}{12}$ years	Accident—burns
,,	,,	Male 51 years	Suicide—cut throat
,,	,,	Female 84 years	Accident—run over
,,	,,	Male 24 years	Suicide—shot
,,	,,	Male 65 years	,, —poisoning
,,	,,	Female 13 years	Accident—run over
,,	,,	Female 52 years	Cancer
,,	,,	Female 63 years	Accident—fracture of skull
,,	,,	Male $6\frac{9}{12}$ years	Accident—run over
Masonic School		Female 11 years	Brain

NON-PARISHIONERS.

Bolingbroke Hospital		Female 54 years	Cancer
,,	,,	Female 48 years	Caves of spine
,,	,,	Male 49 years	Respiratory
,,	,,	Male 33 years	Accident—fracture of skull
,,	,,	Female 57 years	Digestive
,,	,,	Female 45 years	Heart Disease
,,	,,	Male 20 years	Accident—fracture of skull
,,	,,	Male 68 years	,, —run over
,,	,,	Male 39 years	Kidney disease
,,	,,	Male 36 years	Accident—fracture of skull
,,	,,	Female 69 years	Cancer
Westminster Union Schools		Female 1 year	Brain
,,	,,	Female 2 years	Measles
,,	,,	Female 3 years	,,

Ages at Death.

The deaths under one year during 1896 were nine hundred and thirty-seven in number, equal to a death-rate of one hundred and seventy-four per thousand births. The total deaths at all ages under five years were one thousand four hundred and thirty-two, being two hundred and sixty-seven per thousand births.

Of the deaths under one year, two hundred and ninety-eight were from premature birth, malformation, or low vitality at birth, nearly one-third of the total number of deaths recorded at that age.

All deaths under five years, the infantile period of life, were equal to forty-eight per cent. of the total deaths. This is an improvement which has been maintained during recent years; formerly sixty per cent. of the total deaths were usually under five years, showing an immense saving of infantile life, which can only be ascribed to the improved sanitation which has prevailed in this parish for many years.

At the other extreme of life, three hundred and sixty-two persons died above sixty-five years of age, including the deaths of aged parishioners in the Union Infirmary, where the deaths of one hundred aged non-parishioners also took place. In public institutions outside the parish twenty-six Battersea people died above sixty-five years, making a total of three hundred and eighty-eight parishioners dying at this advanced age.

Table B. This, the second table prescribed by the Local Government Board, contains particulars of the population, births, notifications of infectious disease in the several localities and various public institutions (themselves treated as separate localities), situated within the parish, and the cases of infectious disease removed from their homes in these several localities for treatment in the Metropolitan Asylums Board isolation hospitals. The cases of erysipelas are mostly removed to the Infirmary of the Wandsworth and Clapham Union, situated on St. John's Hill, within the parish, as also cases of puerperal fever, other hospitals not providing accommodation for these two diseases.

It will be observed that the several localities and institutions have populations assigned to them. The out-door districts of East and West Battersea have populations based upon the ascertained increase of population during the last inter-censal period, while the institutions have the census populations of 1896 given.

TABLE B of Population, Births, and of New Cases of Infectious Sickness coming to the knowledge of the Medical Officer of Health, during the Year 1896 in the Metropolitan Sanitary District of Battersea, Classified according to Diseases, Ages and Localitities;

Names of localities adopted for the purpose of these statistics. Public Instituions being shown as separate localities.	Population at all ages.		Registered Births.	Aged under 5 or over 5.	New cases of Sickness in each Locality coming to the knowledge of the Medical Officer of Health.											Number of such Cases removed from their homes in the several localities for treatment in Isolation Hospital.										
					1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11
									FEVERS.											FEVERS.						
	Census. — 1896.	Estimated to middle of 1896.			Small Pox.	Scarlatina.	Diphtheria.	Membranous Croup.	Typhus.	Enteric or Typhoid.	Continued.	Relapsing.	Puerperal.	Cholera.	Erysipelas.	Small Pox.	Scarlatina.	Diphtheria.	Membranous Croup.	Typhus.	Enteric or Typhoid.	Continued.	Relapsing.	Puerperal.	Cholera.	Erysipelas.
(a)	(b)	(c)	(d)	(e)																					
East Battersea	71,730	71,958	2,500	Under 5	...	195	82	8	...	4	...	...	...	...	13	...	124	32	4	...	2	...	...	...	...	...
				5 upwards	3	507	144	6	...	63	1	...	6	...	123	1	353	54	1	...	29	...	...	4	...	10
West Battersea	91,928	92,432	2,858	Under 5	...	113	59	6	...	...	...	...	...	...	4	...	49	25	...	...	...	...	...	...	...	...
				5 upwards	5	278	115	4	...	42	...	...	4	...	101	3	145	24	...	...	16	...	...	2	...	8
Wandsworth and Clapham Union Infirmary ...	708	708	...	Under 5	...	4	...	...	...	...	...	...	...	...	1	...	4	...	...	...	...	...	...	.....		
				5 upwards	...	5	...	...	...	1	...	...	...	...	20	...	5	...	...	...	...	...	...	...		
Bolingbroke Hospital ...	39	39	...	Under 5																						
				5 upwards		1											1									
Westminster Union Schools...	183	183	...	Under 5																						
				5 upwards		8											8									
Masonic School, Battersea Rise	316	316	...	Under 5																						
				5 upwards																						
Emanuel School, Battersea Rise	211	211	...	Under 5																						
				5 upwards			2								1											
Totals	165,115	165,847	5,358	Under 5		312	141	14		4					18		177	57	4		2					
				5 upwards	8	799	261	10		106	1		10		245	4	512	78	1		45			6		18

TABLE X.

Particulars of Infectious Cases Notified during the year 1896.

	Small Pox	Scarlatina	Diphtheria	Membranous Croup	Typhus Fever	Enteric Fever	Continued Fever	Relapsing Fever	Puerperal Fever	Cholera	Erysipelas	TOTALS.
Cases Notified.	8	1111	402	24	...	110	1	...	10	...	263	1929
Deaths at Home.	...	5	45	5	...	11	...	...	3	...	14	83

TABLE XI.

Particulars of Cases of Infectious Disease removed to Hospital.

	Small Pox	Scarlatina	Diphtheria	Membranous Croup	Typhus Fever	Enteric Fever	Continued Fever	Relapsing Fever	Puerperal Fever	Cholera	Erysipelas	TOTALS
Cases removed to Hospitals.	4	689	135	5	...	47	...	...	6	...	18	904
Deaths in Hospital.	...	27	32	...	...	6	...	...	1	...	2	68

Below will be found a synopsis of the notifications received during the year, with removals to hospital :—

	Notified.	Removed to Hospital.
Small Pox	8	4
Scarlatina	1,111	689
Diphtheria	402	135
Membranous Croup ...	24	5
Typhus Fever	—	—
Enteric Fever	110	47
Continued Fever ...	1	—
Relapsing Fever ...	—	—
Puerperal Fever ...	10	6
Cholera	—	—
Erysipelas	263	18
	1,929	904
Ages :—		
Under 5 years	489	240
5 years and upwards ...	1,440	664
	1,929	904
Where occurring :—		
East Battersea	1,155	614
West Battersea	731	272
Union Infirmary ...	31	9
Bolingbroke Hospital ...	1	1
Westminster Schools ...	8	8
Masonic School	—	—
Emanuel School ...	3	—
	1,929	904

The various Hospitals to which the cases were removed are as follows:—

Asylums Board Hospitals.
Victoria Hospital.
St. Thomas's Hospital.
St. George's Hospital.
London Fever Hospitals.
Wandsworth & Clapham Union Infirmary.

Small-Pox. Eight cases of Small-Pox were notified during 1896; of these, four were not genuine cases of the disease, but of other diseases difficult to differentiate in the early stages.

13th Feb.	Male	28	53, Candahar Rd.	Admitted A. B. Hosp.
8th June	Male	32	44, Doddington Gr.	,, ,,
13th ,,	Male	20	8, Dashwood Rd.	Removed to A. B. Hospital.
22nd ,,	Female	16	1, Darien Rd.	
22nd ,,	Male	19	,, ,,	Returned *not* S.-Pox
27th ,,	Male	36	58, Hope St.	Admitted A. B. Hosp.
11th July	Female	30	70, ,, ,,	,, ,,
4th Aug.	Male	8	37, Dashwood Rd.	Removed A. B. Hosp. Returned *not* S.-Pox.

Four cases were removed to the Metropolitan Asylums Board Hospital Ships, all of whom recovered. They had all been vaccinated in infancy.

As there have been complaints that persons suffering from this and other infectious diseases have been conveyed in public conveyances, the following notice has been issued to those concerned, such as cabmen and conductors of tram cars and omnibuses.

The Vestry of the Parish of St. Mary, Battersea.—Notice to owners of public conveyances, drivers, &c.—The Vestry of the Parish of St. Mary, Battersea, desire to draw the attention of the public to sec. 70, of the Public Health (London) Act, 1891, which enacts that it shall not be lawful for any owner or driver of a public conveyance knowingly

to convey, or for any other person knowingly to place in any public conveyance a person suffering from any dangerous infectious disease, or for a person suffering from any such disease to enter any public conveyance, and if he does so he shall be liable to a fine not exceeding £10; and if any person so suffering is conveyed in any public conveyance, the owner or driver thereof as soon as it comes to his knowledge shall give notice to the Sanitary Authority, and shall cause such conveyance to be disinfected, and if he fails to do so he shall be liable to a fine not exceeding £5, and the owner or driver of such conveyance shall be entitled to recover in a summary manner from the person so conveyed by him or from the person causing that person to be so conveyed a sum sufficient to cover any loss and expense incurred by him in connection with such disinfection.

A chamber has been provided at the Vestry's Depôt, Culvert Road, where conveyances can be disinfected free of charge.

The Metropolitan Asylums Board will remove in one of their ambulances any person suffering from infectious disease to places other than the Board's hospitals upon application and payment of the sum of five shillings. In the case of inability to pay such sum application should be made to the Public Health Department of the Vestry, by whom such removal will be effected.

Scarlet Fever. One thousand one hundred and eleven notifications of this disease were received, and six hundred and eighty-nine of the less effectively isolated cases removed to hospitals of the Metropolitan Asylum Board, and to the London Fever Hospital, leaving four hundred and twenty-two which were treated at home. The deaths in hospital, to which the worst type of cases is generally removed, was twenty-seven, or just four per cent. of cases, while of the cases treated at home, the majority of which were of a very slight nature, involving perhaps only scarlatinal sore throat, rather over one per cent. died.

One thing is certain that the generally improved sanitary conditions, including early removal of cases which could not be effectively isolated, have reduced the mortality of this disease to a remarkable extent.

Diphtheria and Membranous Croup.

Diphtheria was notified in four hundred and two cases and Membranous Croup in twenty-four, a total of four hundred and twenty-six. They are grouped together as it is impossible to distinguish them practically. One hundred and forty cases were removed to hospital, many in a dying condition, for the sake of having tracheotomy performed as a last resort. Thirty-two of these latter cases died, giving a hospital mortality of just under twenty-three per cent. Of the cases treated at home two hundred and sixty-two in number, eighteen died equal to 7·6 per cent. This disease appears to have become endemic in the Metropolis.

Enteric and other Fevers.

One hundred and ten cases of Enteric Fever were notified during the year in addition to one of relapsing and ten of Puerperal Fever. Of the Enteric cases forty-seven were removed to hospital with a mortality of six equal to thirteen per cent. Of the sixty-three cases treated at home, eleven died equal to a mortality of seventeen per cent. The difference in favour of hospital treatment lies in the fact that the diet is strictly regulated there, many deaths arising at home from injudicious feeding with solids before the bowels are fitted for their reception, ulceration of the bowels being usual in this disease. One death occurred among the six cases of Puerperal Fever removed to hospital. Of the four remaining at home three died.

Erysipelas.

For some reason this disease has increased during the last few years in the Metropolis. During 1896 two hundred and sixty-three cases were notified, of these eighteen were removed to hospital, of whom two died. Of the two hundred and forty-five remaining at home fourteen died. Those removed were admitted into the Wandsworth and Clapham Union Infirmary in the majority of instances. The term Erysipelas covers so many degrees and forms of inflammatory affections, that no further discussion of the subject would be profitable.

TABLE XII.

Particulars of the Prevalence of Notifiable Infectious Disease in the several Sanitary Districts.

Sanitary Districts.	New Cases Coming to Notice.											Number of such Cases Removed to Isolation Hospitals.										
	Small Pox	Scarlatina	Diphtheria and Membranous Croup	Typhus Fever	Enteric Fever	Continued Fever	Relapsing Fever	Puerperal Fever	Cholera	Erysipelas	Totals	Small Pox	Scarlatina	Diphtheria and Membranous Croup	Typhus Fever	Enteric Fever	Continued Fever	Relapsing Fever	Puerperal Fever	Cholera	Erysipelas	Totals
No. 1	2	266	62	...	24	1	...	1	...	56	412	...	189	26	...	9	...	...	...	...	4	228
,, 2	1	288	165	...	26	...	...	4	...	60	544	1	202	49	...	11	...	...	3	...	6	272
,, 3	1	178	103	...	11	...	...	2	...	49	344	1	92	31	...	9	...	...	2	...	4	139
,, 4	...	149	39	...	25	...	...	1	...	40	254	...	76	11	...	9	...	...	1	...	1	98
,, 5	4	163	31	...	16	...	...	...	...	47	261	2	107	17	...	7	...	...	...	...	2	135
,, 6	...	67	26	...	8	...	...	2	...	11	114	...	23	6	...	2	...	...	...	...	1	32
Whole Parish	8	1111	426	...	110	1	...	10	...	263	1929	4	689	140	...	47	...	...	6	...	18	904

Table XII. is an entirely new table shewing the incidence of notifiable disease in the different sanitary districts, and, taking into consideration the numerical differences of population, the numbers are more equal than may appear at first sight.

Diarrhœa. One hundred and sixty-seven fatal cases were registered from this cause alone, the majority being hand-fed infants. To reduce this mortality the Health Committee has for some years issued the following handbill during the hotter months, when disorders of the digestive tract are most prevalent. It is hoped that much good has been done and many lives saved by this means, as a notable diminution in the number of fatal cases has always been manifest after its issue.

PRECAUTIONS AS TO DIARRHŒA.

In consequence of the prevalence of Diarrhœa amongst young children, more especially those brought up by hand, the Vestry as the Sanitary Authority acting under the advice of their Medical Officer of Health, beg to direct the attention of Parents and others having care of young children to the great advisability of boiling all water and milk used for feeding such children.

Care should be taken as to the sound condition of every article of food for children, anything not fresh being withheld. Fruit especially should not be given if in the slightest degree decomposed.

Cleanliness of person and dwellings with frequent flushing of house drains is of the greatest value.

Disinfectants in case of illness are supplied free of charge on application to the Public Health Department, Town Hall Road, between the hours of 9 a.m. and 5 p.m., and on Saturdays, between 9 a.m. and 1 p.m.

Measles. The number of cases which occurred during the earlier months of 1896 cannot be ascertained, as this, the most fatal of all zymotic diseases, still remains non-notifiable. The number of fatal cases became so grave that I was directed to re-issue a bill giving the public instructions as to the necessary precautions to be observed during an epidemic of this disease, and they are here appended. One hundred and eighty-five fatal cases were recorded during the year, the number during 1894 having been one hundred and fifty-one, and during 1895 ninety-nine.

PRECAUTIONS TO BE OBSERVED

DURING THE

EPIDEMIC OF MEASLES.

The Vestry, as the Sanitary Authority for the Parish, and as advised by the Medical Officer of Health, desire to direct the attention of parents and others to the importance of checking the spread of Measles, which is now prevalent in an epidemic form and is causing much mortality by complications, such as Bronchitis and Pneumonia.

All children suffering from Measles, even in the earliest stage, before the eruption appears, should be isolated from others. The first symptons of Measles are running at the eyes and nose, with repeated sneezing and a puffy appearance of the face and eyelids and, a few days after, the appearance of the rash which is raised and red or purplish in colour.

The child should be kept in bed from the first appearance of the symptons until the rash has finally disappeared, in order to avoid the danger of lung complications, which are the real causes of death, uncomplicated measles not being usually fatal. Medical aid should be sought in every case where difficulty of breathing is observed.

Disinfectants in a dilute form should be freely used in every case of measles in a warm bath at the onset and termination of the disease, and to sponge the face and other parts during the illness.

In case of inability to obtain suitable disinfectants the same will be supplied, free of charge, on application to the Public Health Department, Town Hall Road, Lavender Hill.

The epidemic of measles was accompanied and followed as usual by deaths from various respiratory disorders. From Whooping Cough alone one hundred and forty deaths (one hundred and thirty-seven at home, and three in hospital) were registered, a large majority complicated by Measles. Thus from the two diseases combined three hundred and twenty-five deaths occurred, comparing most unfavourably with a total of one hundred and fifty-one deaths from all the notifiable zymotic diseases, an unanswerable argument in favour of the compulsory notification of all infectious diseases, they, in the prenotification period, being said to be equally intractable to supervision and modification, an idea which the greatly diminished case mortality demonstrates to be incorrect.

Influenza. The mortality from this disease diminished during the year under report from ninety-two, in 1895, to forty-five, in 1896. The enormous number of deaths from diseases of the respiratory organs was no doubt increased by the prevalence of Influenza, mild cases being very prevalent. During the greatest prevalence of Influenza the Health Committee have on several occasions issued the following

PRECAUTIONS AGAINST INFLUENZA.

The Vestry of the Parish of St. Mary, Battersea, as the Sanitary Authority and as advised by the Medical Officer of Health, in consequence of the renewed prevalence of Influenza,

desire to direct the attention of the public to the extremely infectious character of the disease, and to point out that to the exposure of those in an infective condition from Influenza, by neglect to isolate themselves during the period of such infective condition, the spread and maintenance of the disease is chiefly due. It is probable that the breath of those so affected is the principal medium by which infection is conveyed.

The early symptoms of Influenza are chiefly chills and shivering, accompanied by great muscular weakness and prostration, often amounting to inability to stand or move, with pains in the spine or other parts of the body. It is desirable that persons thus affected should at once go to bed and there remain until convalescence is established in order to avoid the dangers of Pneumonia or Bronchitis, which are the chief complications to be feared, as likely to lead to fatal results.

Early recourse to medical assistance is desirable in every case, both for the determination of the real nature of the disease and for the prevention of the more serious complications.

A most important memorandum has been issued by the Medical Officer of the Local Government Board, and been produced as the result of questions in Parliament, addressed to Ministers, on the subject of a very fatal outbreak at the end of 1894 and beginning of 1895, and is here set out.

MEMORANDUM ON EPIDEMIC INFLUENZA.

Influenza became epidemic in England in the winter of 1889-90; it recurred in epidemic form in the spring of 1891, and was maintained up to June of that year; a third epidemic took place in the winter of 1891-92, and after a minor recrudescence in the spring of 1893, a fifth prevalence on a wide scale took place in the winter of 1893-94. England is now passing through

a sixth epidemic period. Two detailed reports have been issued by the Board on the subject. The first was Dr. Parsons, "On the Influenza Epidemic of 1889-90," with an introduction by Sir George Buchanan, M.D., F.R.S., the Board's Medical Officer at that date. The second was a "Further Report on Epidemic Influenza, 1889-92," by Dr. Parsons, with papers on the Clinical and Pathological aspects of the Disease, by Dr. Klein, F.R.S., and an introduction by myself.

A "Provisional Memorandum upon Precautions advisable at times when Epidemic Influenza threatens, or is prevalent," was also drawn up by me in January, 1892, and was issued by the Board to local sanitary authorities.

The further study made by the Medical Department as to the natural history of Influenza, and as to its clinical and bacteriological characteristics, goes to show that it is a disease against which it is most difficult to apply measures of prevention with any substantial prospect of success.

Influenza is highly infective from person to person; its infectious quality is often manifested before the disease is fully recognised; its incubation period is one of the shortest of all infectious diseases; it varies so much in intensity that many cases are never diagnosed at all; one attack confers no marked immunity against another; and the infection is largely eliminated by means of the lungs, the sputa of the sick being invariably charged, during the acute stage of the disease, with its pathognomonic micro-organism. The disease calls primarily for measures of isolation and of disinfection, but there are difficulties in making any such measures universally applicable. Wherever they can be carried out, the following precautions should, however, be adopted:—

1st. The sick should be separated from the healthy. This is especially important in the case of first attacks in a locality or a household.

2nd. The sputa of the sick should, especially in the acute stage of the disease, be received into vessels containing disinfectants. Infected articles and rooms should be cleansed and disinfected.

3rd. When Influenza threatens, unnecessary assemblage of persons should be avoided.

4th. Buildings and rooms in which many people necessarily congregate should be efficiently aerated and cleansed during the intervals of occupation.

It should be borne in mind that the liability to contract Influenza, and also the danger of an attack, if contracted, are increased by depressing conditions, such as exposure to cold, and to fatigue whether mental or physical. Attention should hence be paid at epidemic periods to all measures tending to the maintenance of health, such as the use of clothing of suitable warmth, and a sufficiency of wholesome food.

Persons who are attacked by Influenza should at once seek rest, warmth, and medical treatment, and they should bear in mind that the risk of relapse, with dangerous complications, constitutes a chief danger of the disease.

R. Thorne Thorne.

Local Government Board,
Medical Department,
March 6th, 1895.

It will be perceived that the contents of the above memorandum are in accord with the precautions issued by this parish early in 1894, and now re-issued for the guidance of the public.

Table XIII. illustrates the epidemic or zymotic mortality for the past eleven years with the resulting death rates. The number of deaths from each class of disease is shewn. The zymotic death rate for 1896 was 3·6 per thousand persons, being a fractional point above 1895, which was 2·9, being about equal to the decennial zymotic rate, and largely composed of deaths from Measles and other infantile diseases.

TABLE XIII.

Comparative Table of Zymotic Mortality during the past 11 years.

	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896
Small Pox	...	...	...	...	...	...	...	...	...	...	...
Measles	70	82	87	104	159	37	90	90	151	99	185
Scarlet Fever ...	14	68	25	12	10	10	15	17	5	10	5
Diphtheria	9	23	22	21	27	35	28	90	67	60	50
Enteric, &c., Fevers...	23	17	13	15	21	19	8	14	13	15	11
Whooping Cough ...	104	112	119	81	146	104	100	115	77	52	137
Epidemic Diarrhœa...	152	175	75	112	121	104	99	120	93	151	169
Other Zymotic Diseases	26	25	22	21	59	89	133	118	62	104	45
Total Deaths from Zymotic Diseases...	398	502	363	366	543	398	473	564	468	491	602
Zymotic Death Rate	3·0	3·7	2·6	2·5	3·6	2·6	3·0	3·5	2·8	2·9	3·6
Death-rates from all Diseases	19·0	18·2	15·7	15·6	19·3	17·3	17·4	17·8	15·4	17·8	17·7

Table XIV. shews the non-zymotic mortality for the year 1896 and the ten preceding years. Although the population has considerably increased during the period the deaths do not vary greatly from year to year, showing a relative decreasing mortality, which may be reasonably credited to improved conditions of existence, which is in reality all-round sanitation. But for the prevalence of Influenza and diseases caused by and unfavourably influenced by it, there can be no doubt that a great diminution in this class of disease would be shewn, and such diminution may be anticipated from the steady application of good public health measures.

TABLE XIV.

Comparative Table of all non-zymotic cases of Deaths during the past 11 years.

	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896
Tubercular, including Phthisis	439	367	342	334	320	285	237	355	304	353	374
Of Brain, Nerves, &c.	289	280	223	212	261	195	259	213	211	334	211
Of the Heart, &c. ...	159	128	113	108	148	141	183	159	173	213	182
Of the Respiratory Organs, excluding Phthsis	584	528	474	391	618	572	635	653	471	623	531
Of Digestive Organs...	96	86	113	100	118	122	112	127	197	114	154
Of Urinary Organs ...	31	53	24	39	34	49	72	60	57	56	88
Of Organs of Generation	14	19	6	14	15	16	15	14	12	7	22
Of Joints, Bones, &c.	20	30	9	3	4	7	2	3	6	—	5
Premature Birth, Low Vitality, Malformation, &c.	175	202	175	205	206	238	256	295	273	332	298
Of Uncertain Seat Cancer, Syphilis, Dropsy, &c. ...	106	105	79	96	70	89	233	130	114	108	122
Age	99	88	57	52	71	74	122	103	118	128	207
Violence	63	63	56	60	77	60	81	102	70	102	117
Constitutional ...	5	...	...	...	...	2	12	23	20	40	28
TOTAL ...	2080	1949	1671	1614	1942	1850	2219	2237	1936	2410	2339

Inquests. During the year 1896, 319 cases came under the notice of the Coroner. In forty-one of these cases he decided that no further inquiry was necessary, and they are marked in the Registrar's Returns as "submitted to Coroner," which is considered sufficient to authorise registration.

In the other 278 cases inquests were held with the following verdicts of the respective juries:—

From Natural Causes			161
From Accidental Causes:—			
Scalds	3		
Burns	2		
Run over on railroads and highways ...	16		
Suffocated in bed with parents	20		
Injuries	2		
Falls, &c.	26		
Drowned	4		
Blow on head	1		
Want of attention at birth	2		
Suffocated	5		
	—		81
From Homicidal Causes:—			
Suicide—Hanging	3		
Cut throat	3		
Shot	4		
Drowning	1		
Poisoning	4		
	—		15
Murder—Asphyxiation	4		
Strangulation	1		
	—		5
Justifiable Homicide—Shot	1		
	—		1
Open Verdicts:—			
Found Drowned	4		
Injuries	5		
Alcoholism	3		
Self Neglect	2		
Poisoning	1		
	—		15
Total ...			278

Twenty deaths were due to suffocation whilst in bed with parents, the dates and days of the week being as follows:

30th January	Thursday	12th August	Wednesday.
2nd February	Sunday	18th September	Friday.
3rd ,,	Monday	5th October	Monday.
23rd ,,	Sunday	18th ,,	Sunday.
20th March	Friday	20th ,,	Tuesday.
30th ,,	Monday	25th ,,	Sunday.
7th April	Tuesday	25th ,,	Sunday.
21st ,,	Tuesday	7th December	Monday.
12th May	Tuesday	25th ,,	Friday.
14th June	Sunday	25th ,,	Friday.

Differently arranged:—

Sunday	6
Monday	4
Tuesday	4
Wednesday...	1
Thursday	1
Friday	4
Saturday	—
	20

Social Position of Persons Dying During 1896.

	Number.	Per Cent.
Nobility and Gentry ...	7 ...	0·2
Professional Class	19 ...	0·6
Middle and Trading Classes...	142 ...	4·9
Industrial and Labouring Class	2,773 ...	94·3
	2,941	100·0

Water Supply for London.

This most important subject, more especially with reference to the health and sanitary condition of the inhabitants of this vast metropolis, among whom of course are included the many thousands of persons who are inhabitants of Battersea, is now engaging the attention of Parliament. The water companies have bills in the House of Commons and the London County Council has introduced

measures giving it control over the water supply. In my report for last year the subject was very fully discussed, and as the matter is one involving as it does the expenditure of many millions of the public money as well as the health and lives of the community, and in which every public man should take a strong personal interest, a condensed account of the present position of the question is again given.

This most important subject has been under consideration by a Royal Commission which sat during 1892 and 1893. The Chairman was Lord Balfour of Burleigh; Sir Archibald Geikie, Professor Dewar, Dr. Ogle, Mr. Mansergh, Mr. Hill, and Sir George Bruce constituted the Committee, all men of eminence and selected for their intimate knowledge of the subject. No Commissioner was in any way connected with either of the London Water Companies, and Mr. Mansergh is the Engineer who is now bringing water to Birmingham from Wales, while Mr. Hill is supplying Manchester from Thirlmere.

The witnesses examined include nearly one hundred of the leading sanitarians and engineers, together with representatives of the great public bodies of the Metropolis and elsewhere, the Local Government Board, the London County Council, the Corporation of London, and the various Water Companies and others having interests in the Water Supply of the Metropolis.

Briefly reviewing the inquiry, the main question referred to and considered by the Commission was whether the water of the Thames and Lea Valleys was good, and whether enough of it could be obtained for the London of the future without injury to the interests of other districts in those watersheds. They find, as the Companies always maintained, that "the water as supplied to the consumer in London is of a very high standard of excellence and of purity, and that it is suitable in quality for all household purposes," and also that the Thames and Lea Valleys may, without prejudice to the claims or material injury to the interests of districts outside the area of Greater London, be made

to supply more than double the present population of the Metropolis with 35 gallons per head daily.

The Commissioners recommend that the inspection of the River Thames should be more thoroughly done than it is at present, and that increased provision should be made, in the form of reservoirs for avoiding the taking in of water while the river is in a state of flood. Of all the sites that have been suggested to them as suitable for reservoirs they consider none in the Thames Valley so reliable as can be found upon the London clay, only a short distance above the Hampton intakes. From the Thames, when required, may be taken 300,000,000 gallons a day; from the Lea, 52,500,000 gallons; from wells in the Lea Valley, 40,000,000 gallons; and from wells in the Kent Company's district, 27,500,000 gallons; besides a further considerable quantity, should it ever be wanted, from the Valley of the Medway and the country to the east of it.

The Commission, as might be expected, deal with the question broadly, without committing themselves to details. It would be going beyond the duty of useful criticism to discuss some of the interesting scientific, though minor, points upon which the Commissioners adopted views adverse to those of some of the distinguished witnesses who appeared before them. There are, however, in the enquiry two points which rather hang upon one another, and about which we wish the Commission had told us a little more. These are:—

(1) The effect which might be expected upon the Thames of taking double the present quantity of the water from the river during periods of drought.

(2) The amount of storage space to be provided above the intakes in order to make the taking of any more of this water unnecessary.

The conclusion of the Commission is most distinct that there is ample supply of water derivable from the Rivers Thames and

Lea, from wells in the chalk in the Lea Valley, and also in the district of the Kent Water Works Company, which will be sufficient to meet the requirements of London for fifty years to come. As to the purity of these supplies, the chemical and bacteriological evidence of Dr. Frankland, Dr. Odling, Professor Crookes, Professor Ray Lankester, Dr. P. F. Frankland and others, is most satisfactory; and no evidence submitted as to impurity could stand the test of the investigations and inquiries of the Commissioners. In their report, however, they very properly advise that further efforts shall be made to keep pollution of all kinds out of the Rivers, and maintain their purity in every possible way.

Conclusions.

The Commissioners then state that—

"We are strongly of opinion that the water as supplied to the consumer in London is of a very high standard of excellence and of purity, and that it is suitable in quality for all household purposes. We are well aware that a certain prejudice exists against the use of drinking water derived from the Thames and the Lea, because these rivers are liable to pollution, however perfect the subsequent purification, either by natural or artificial means, may be. But, having regard to the experience of London during the last thirty years, and to the evidence given to us on the subject, we do not believe that any danger exists of the spread of disease by the use of this water, provided that there is adequate storage, and the same is efficiently filtered before delivery to the consumers.

"With respect to the quantity of water which can be obtained within the watersheds of the Thames and the Lea, we are of opinion that, if the proposals we have recommended are adopted, a sufficient supply to meet the wants of the Metropolis for a long time to come may be found without any prejudice to the claims, or material injury to the interests, of any district outside the area of Greater London. We are of opinion that an

average daily supply of 40,000,000 gallons can be obtained from wells and springs in the chalk of the Lea Valley without affecting any material interests, but that, if this quantity be exceeded, it is probable that the springs and wells in the parts of the Valley immediately adjacent to the wells and all the districts farther down the Valley may be injuriously affected.

"From wells in the chalk area on the south side of the Thames, in the district of the Kent Company, we are of opinion that a daily average supply of 27,500,000 gallons may be obtained. We think it of very great importance that distinct obligations should be laid upon any company or Local Authority which is allowed to pump water from the chalk for purposes of public supply to keep accurate observation of the effect of their operations on the level of the water in the wells from which they pump, and return the results to the Water Examiner under such regulations as may be framed.

"The great difficulty which we have had to encounter has been in getting accurate and reliable information as to the actual effect of the operations now carried on. The importance of procuring this will increase each year as the limit of what can be taken from any district with safety is gradually being reached. From the River Lea we are of opinion what with adequate additions to the present system of storage 52,500,000 gallons may be taken daily. We are of opinion that, by the construction of storage reservoirs in the Thames Valley, at no great distance above the intakes of the Companies, it will be possible to obtain an average daily supply of 300,000,000 gallons without taking in any objectionable part of the flood water. The average daily flow of the Thames at Teddington Weir, adding the water taken by the Companies, is about 1,350,000,000 gallons per day. It will thus be seen that, when 300,000,000 gallons are taken, there will be left to flow down into the tidal portion of the river an average daily quantity of not less than 1,000,000,000; and we think that regulations could be framed under which the quantity

we suggest could be taken, not only without reducing the flow of the river on the rare occasions of exceptional drought to the present minimum, but in such a way as to secure that the volume of water left in the river at these times should be substantially greater than it is under existing conditions.

"To our minds, one great advantage of such a scheme of storage reservoirs is that it can be carried out progressively to meet the increasing demands for water; and should the population not grow so rapidly as we have thought it right to contemplate, the extensions may be from time to time deferred as successive decennial enumerations reveal that the ratio of increase is remaining stationary or even falling. From the sources and by the methods we have mentioned, a daily supply of 424,000,000 gallons can, in our opinion, be obtained. This is a sufficient quantity to supply 35 gallons per head to a population of 12,000,000 persons, which is about three-quarters of a million in excess of what the total population of Greater London, together with the outlying parts of Water London, will have become in 1931 even if the ratio of increase in the last decennial period from 1881 to 1931 is fully maintained. We are further of opinion that a large supply of water might be obtained from the chalk area east of the Kent Companies' district in the basis of the Medway, and in the district further east, without any risk whatever of damage to that area."

THE LONDON COUNTY COUNCIL AND ITS VIEWS UPON THE WATER SUPPLY.

Of these witnesses examined whose evidence was directly adverse to the reservoir and storage schemes put forward by the Companies, that of Mr. A. R. Binnie, M. Inst., C.E., Chief Engineer to the London County Council, was the most important. Mr. Binnie's evidence was to the effect that the supply that could

be drawn from the Thames and the Lea was wholly insufficient to meet the future wants of Greater London; and he stated that, in his opinion, deeper storage reservoirs in the Thames Valley were impracticable, and, further, that any large increase in quantity pumped from the chalk formations would only ultimately diminish the amount of surface water in the various contributory streams, and therefore could not be reckoned on for increasing the supply.

The Water Committee of the London County Council issued a memorandum by its Chairman and a series of reports by the principal officers of the Council on the report of the Royal Commission on the Metropolitan Water supply by which it will be seen that the conclusions of the Royal Commission are controverted to a certain extent. An admirable synopsis of the views of the London County Council and its chief officials appeared in the *British Medical Journal*, which is here closely followed.

The Want of Finality in the Commission's Recommendations.

Mr. Basset Hopkins, the Chairman of Committee, in his memorandum, insists strongly on the narrowness of the scope of the inquiry by the Royal Commission, and points out that mischievous consequences may follow, and the Council may be grievously hampered in its action if people accept the idea that the report was the result of an all-embracing investigation of the general subject. The real question which is of most interest to Londoners is—what is the best course for London to pursue under the circumstances? But this never entered into the reference to the Commission, and in considering their report it has constantly to be borne in mind that whatever they say in support of the prospective sufficiency (for forty years only) of the watersheds of the Thames and Lea has no bearing on the real question whether new gathering grounds ought not to be sought for outside that area altogether.

Considerable stress is laid on the shortness of the term of forty years to which the Commission have limited their forecast. The capacity of the Thames and Lea watersheds as sources of supply may be expected to have reached, or nearly reached, their limit about the year 1931, and then it will be impossible any further to delay turning to some outside source. By that time, however, the best gathering grounds in the country, which "are already being rapidly taken possession of by other municipalities," may be lost to us. In regard to this, one has to bear in mind the long time which is required for the execution of the vast works necessary in large water schemes, and Mr. Binnie, the Council's chief engineer, says plainly that the people of London, "will, at some not very distant date (probably twenty years hence) have to contemplate the exhaustion of the supplies which can be obtained in the Thames Valley," and the necessity of looking elsewhere for an increased supply.

"One of the greatest blots upon the finding of the Royal Commission" is that "it can in no way be considered a final settlement of the case." This limitation of forecast to forty years is all the more curious in view of the fact that two members of the Royal Commission, giving evidence before the House of Lords on the Birmingham water scheme, gave much longer periods as the time for which estimates should be made, Mr. G. H. Hill stating that provision for a large town should be for a period of not less than 50 years, and Mr. James Mansergh, the engineer to the scheme, indicating that he calculated his supply for some sixty-four years, and on that basis laid out the works which the Corporation of Birmingham are now carrying out.

The Effect of Dry Seasons.

Mr. Binnie shows in a striking way the difference between averages and actualities in regard to the flow of water down a river bed. The Royal Commissioners contemplating taking 300 million gallons from the Thames daily, trusting to the fact that the average daily flow at Teddington weir is about 1,350 million

gallons; but Mr. Binnie shows that during certain dry months the total average flow would often only slightly exceed the amount of water required by the Companies, and in such a case as that of September, 1893, the total flow would not come up to the requirements. If the extreme minimum flow per twenty-four hours is taken, the difficulty of providing a supply both for the River and the Metropolis is still more apparent.

Tests Not to be Relied on.

There is a good deal of common sense in some of the remarks in the reports about the safety, or otherwise, of polluted waters. Mr. Binnie draws attention to the fact that "the Royal Commissioners received, although they do not quote it, some very strong evidence from one of the highest authorities, namely, Sir G. Buchanan, M.D., F.R.S., late Chief Medical Officer to the Local Government Board." This evidence was to the effect that neither chemical nor bacteriological tests were to be relied on as to the purity of water, that we did not know how small an amount of morbific material, if it gained access to the water, might set up disease, and that the way to gain information as to purity and safety was to search out the conditions surrounding water courses and water services. Asked what would be his treatment of the water if it were found to be polluted, he could only answer that "there was nothing for it but either to boil the polluted water, or else to leave it alone."

In face of such evidence from such an authority we turn with interest to the paragraphs in Mr. Binnie's report summarising the pollutions of the Thames water, which the Commission thinks good enough for London. It seems that at the census of 1891 there was a population of 1,056,415 persons draining into the river above the intakes, and that in the last thirty years this population had increased from 816,814 to its present number. That, however, gives but a poor idea of the increase which is going on in the urban population living on the banks of the Thames and its Tributaries, many of these towns having more

than doubled their size in thirty years. "Besides this human population there are probably 1,600,000 animals inhabiting the above area." Consequently it is clear that if the Thames is to be retained as a source of water supply, the people of London must drink the more or less clarified excreta of this vast population.

The Quality of Present Sources of Supply.

Mr. Shirley Murphy, Medical Officer of the London County Council, confines his observations to that portion of the report of the Royal Commission which relates to the quality of the present sources of supply. The Royal Commission had before it evidence, he says, which showed that the rivers from which the Water Companies draw their supplies receive from the towns, situated on their banks at varying distances above the intakes sewage effluents, which, after treatment of the sewage, either by filtration through land or by chemical processes, enter smaller rivers. In addition to these, numerous pollutions from smaller populations discharging into cesspools and ditches reach, untreated, the streams at times of heavy rainfall. Such sewage must not infrequently contain the excremental matter of persons suffering from typhoid fever and may not improbably in the future, contain from time to time the excreta of persons suffering from cholera. The virus of both these diseases has been found by past experience to have been disseminated by water and to have produced fatal results in persons drinking such water.

Not only are these diseases known to be waterborne, but experience has shewn that a very small amount of the excremental matter of persons suffering from them is capable under favourable circumstances of infecting vast volumes of water.

In the present state of knowledge on such matters we are driven back to much the same opinion as that held by the late Sir George Buchanan, who said that he did not think that it was possible, either by chemical, microscopical, or bacteriological

processes, to say when a water was or was not injurious, and that there was no way of arriving at a solution of this question except by inspecting the sources of supply, and seeing if they were or were not polluted. According to this criterion London river water stands absolutely and hopelessly condemned.

Although very little is definitely said on the subject, the impression which the perusal of the report leaves upon the mind is that the whole control of the water supply, from the sources to the final delivery to the consumer, should be in the hands of one authority, and that the time has arrived when competing companies, the result of private enterprise, should no longer be left in possession of a monopoly of the primary necessity of existence.

At the time of writing the water bills brought forward by the London County Council for acquiring the undertakings of the various companies supplying water to the metropolis have been wrecked for the session of 1897, as upon one being defeated in the House of Commons by a decisive majority, the rest were perforce withdrawn. The whole subject will have to be earnestly reconsidered. In the meantime London waits.

Since writing above, the Government have intimated that a Royal Commission would be appointed to consider the whole subject of the Metropolitan Water Supply, together with the report of the London Water Commission, and the President of the Local Government Board, in answer to a question in the House of Commons, stated that the terms of the reference would direct the Commission to inquire and report (1) whether, having regard to financial considerations, and to the present and prospective requirements as regarded water supplied within the limits of the supply of the Metropolitan Water Companies, it was desirable, in the interests of the ratepayers and water consumers, that the undertakings of the water companies should be acquired and managed, either (*a*) by one authority, or (*b*) by several authorities, and, if so, what should be the authority or authorities,

and to what extent physical severance in regard to supply of the several companies should take place. They would also be asked to say—(1) whether any division within the limits of supply of the companies was practicable and desirable, and if so what were the legal powers necessary to give effect to any such arrangement; and (2) if the undertakings were not so acquired, whether additional power of control should be exercised by the local or other authorities; and, if so, what those powers should be; and (3) whether it would be practicable to connect any two or more of the different systems of supply of the eight Metropolitan Companies; and, if so, by whom and in what proportion should the cost of connection be borne, and what were the legal powers necessary.

During the year under report little or no legislation from a purely sanitary point of view came under the consideration of Parliament, other matters blocking the way.

Public Health (London) Act, 1891.

The procedure of the Sanitary Department is almost entirely based upon the provisions of the Public Health (London) Act, 1891, which consolidated and amended the various Acts under which the Sanitation of London had been previously carried out. It contained also many valuable provisions which had hitherto only been extra Metropolitan and contained in the Public Health Act, 1875, under which provincial Sanitary Authorities had effected great improvement in the Sanitation of their districts. A condensed synopsis of its provisions here will be useful for reference.

Sec. 1 provides for house to house inspection by the Sanitary Authority, for which additional Inspectors with separate and smaller districts have been appointed within the last few years.

Sec. 2.—A nuisance must be abated that is *dangerous* or likely to be *dangerous* to health. Under the Metropolis Management and other Acts it was necessary to prove actual *injury* to health.

Sec. 3 provides that information of a nuisance may be made to the Sanitary Authority, who shall serve intimation to parties responsible.

Sec. 4.—The most essential difference between the procedure under the Public Health (London) Act, 1891, and the various other preceding Acts, is that formerly if a notice to abate a nuisance from the Sanitary Authority was not complied with, proceedings had to be commenced before a justice and evidence produced to satisfy him that a nuisance *injurious* to health existed when, if satisfied that such nuisance existed and was *injurious* to health an order would be made for the abatement of the same. If this order was disregarded and the necessary works not executed it was necessary to commence fresh proceedings to recover penalties. The Sanitary Authority under this section itself considers the matter and makes orders, if necessary suing for penalties for non-compliance therewith.

Absence of proper water-fittings is constituted a nuisance under section 4, and by section 5 a house may be closed for this reason. The authority can specify works and insist upon the carrying out of the same under the latter section, and now does so in a large proportion of cases.

Secs. 5, 6 and 7 contain provisions for orders, penalties and appeals, and enables the Sanitary Authority itself to carry out necessary works in default of responsible owner, &c. Sec. 11 provides for recovery of expenses and costs consequent thereon, and Sec. 13 enables the Authority to take action in the first instance in the higher Courts should it think fit.

Under Sec. 14 an important proviso is introduced, as a Sanitary Authority has power to take proceedings for the abatement of nuisances arising in the district of another authority should the nuisance injuriously affect the inhabitants of their own district.

Sec. 15 renders liable to a penalty of £5 any person wilfully injuring or destroying any closet or sanitary apparatus, and will probably be useful in restraining persons from wantonly damaging fittings.

Bye-laws are to be made by the authority for the prevention of nuisances or keeping of animals so as to be a nuisance or injurious to health, and as to paving yards.

The London County Council has made Bye-laws under the following sections which are now operative:—

Sec. 16-1.—Removal of fœcal matter.
,, Removal and disposal of refuse.
,, Cleansing and filling up of cesspools and privies.

Sec. 39-1.—Water closets and soil pipes.
,, Ashpits.
,, Receptacles for dung, cesspools, &c.

The Vestry has made Bye-laws under the undermentioned Sections of the Act:—

Sec. 16.—Prevention of nuisances.
,, 39.—Keeping of water closets.
,, 50.—Cleansing of cisterns.
,, 94.—Houses let in lodgings.

These are in active operation, and can be obtained at the office of the Sanitary Department by any ratepayer desiring a copy.

There are other bye-laws which *may* be made by the Sanitary Authority, and which are now under consideration. They are:—

Sec. 66. Removal to hospital of infected persons. This is now effected under the provisions of the various acts and regulations of the Metropolitan Asylums Board.

Sec. 88. Bye-laws for the Mortuary. Regulations are in existence for the control of the Mortuary-keeper under which the Mortuary has hitherto been regulated.

Sec. 95. Tents and vans. Bye-laws were made by the District Board some years since, which have been acted on until the present time.

By Secs. 23 and 24 the control of smoke nuisances other than in private dwellings is placed under the Sanitary Authority instead of the Police, and has considerably increased the work of the Sanitary Department.

Work-shops, Work-places and Factories are also placed under the supervision of the Sanitary Authority with certain duties as to giving notice to the Factory Inspector when children, young persons, or women are employed. It is also the duty of the Authority to see that proper and separate accommodation is provided for each sex.

Sec. 47 provides that a medical officer of health or sanitary inspector shall examine all articles intended for the food of man if unsound, and shall seize the same and obtain an order from a Justice for its destruction. The fine is raised to a maximum of £50 for every animal or parcel of food condemned, and should a person be so convicted twice in twelve months the Court may order a notice of the facts to be affixed to his premises for a period not exceeding twenty-one days. Should a person find himself in the possession of unsound food he himself may give notice to the Vestry, who must remove the same as trade refuse and this procedure would seem to relieve him of the penalties mentioned.

Sec. 48 contains the important provision that a newly-erected dwelling-house must not be occupied until a certificate has been obtained of the Sanitary Authority to the effect that a proper and sufficient supply of water exists. This section seems to be now more generally understood and imposes much work on the Sanitary Department. The following sections 49, 50, 51, 52, 53 and 54, apply *inter alia* to water supply generally.

Secs. 55, 56 and 57 re-enact, as elsewhere stated, the provisions of the Infectious Disease (Notification) Act.

Secs. 59, 60 and 61 require the authority to make provisions for the disinfection of clothing, &c., which provision has been duly made by the Vestry. The subsequent sections provide that infectious refuse shall not be treated so as to be dangerous to the public health, and drescribe penalties on persons letting houses or apartments in which infectious disease has occurred without having the same properly disinfected and obtaining a certificate thereof, which certificate is given to applicants free of charge on application to the Sanitary Department. Other important provisions for the prevention of the spread of infectious disease follow in subsequent sections; but they have long been in operation in this parish. In fact, it may be said generally that the methods of Sanitary procedure which may have gradually evolved in this parish during the last twenty years, have been adopted by the framers of the Act as its basis.

Provision is made for Mortuaries and post-mortem examinations; such has existed in Battersea for many years. The Mortuary accommodation is, however, becoming somewhat inadequate for the needs of this ever increasing parish, and it is proposed to partially rebuild and enlarge the Mortuary, so as to render it, what it was for many years—a model of what such a building should be. Originally said to be the best arranged Mortuary in London, other parishes, in a commendable spirit of emulation,

have improved upon it until we are at the present time somewhat short of the standard of excellence. The plans of the Surveyor, if carried out, will provide a building far in advance of the majority of Metropolitan Mortuaries, but there is a difficulty in obtaining the necessary additional land.

Customs and Inland Revenue Acts, 1891.

This Act, which is simply an extension of the provisions of the Customs and Inland Revenue Act, 1890, exempting houses structurally fitted in the opinion of the Medical Officer of Health for occupation as separate tenements at an annual rental not exceeding £20 from the liability to house duty. The 1891 Act raises the amount to £40 annual rental. These Acts have added much to the duties of the Medical Officer, as personal inspection is imperative and certain forms of certificate have to be sent by him to the Surveyor of Taxes. Many hundreds of tenements have been inspected and certified since the Act came into force in January, 1891, and many flats are now being built and converted in the parish in order to obtain exemption or abatement of the house duty. The numbers inspected yearly from 1890, in which two hundred and forty-three were inspected, and after the execution of necessary works re-inspected and certified were for 1891, one hundred and nineteen; for 1892, one hundred and sixty-five; for 1893, two hundred and one; for 1894 and 1895, each ninety-one; during 1896, one hundred and twenty; being a total of one thousand and thirty tenements.

Table XV. sets out the character and forms of sickness under the care of the District Medical Officers of the parish poor during 1896. As the districts have been entirely reconstructed and increased in number during the year from three to five, no comparisons can be usefully gone into, as in former years.

TABLE XV.

Sickness and Mortality amongst the Parish Poor during the year 1896.

ZYMOTIC OR EPIDEMIC DISEASES.													
BATTERSEA.	Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	Enteric & other Fevers.	Erysipelas.	Puerperal Fever or Metria.	Diarrhœa, Dysentery, or Cholera.	Influenza.	Other Zymotic Diseases.	TOTAL.	GRAND TOTALS OF CASES AND DEATHS FROM ALL DISEASES.
CASES ...	...	91	26	16	42	1	19	...	94	55	9	353	
DEATHS ...	...	2	...	...	1	...	...	...	1	...	...	4	

OTHER DISEASES.												
BATTERSEA.	Diseases of the Tubercular Class.	Of Brain, Nerves, &c.	Of Heart.	Of Respiratory Organs.	Of Digestive Organs.	Of Kidneys.	Premature Birth, Low Vitality, Malformation, &c.	Age.	Violence.	All other Diseases.	TOTAL.	
CASES ...	91	140	24	752	118	6	4	128	101	2058	2422	3775
DEATHS ...	5	1	1	6	1	1	1	2	1	3	22	26

The total number of cases attended was three thousand seven hundred and seventy-five. The total of deaths while under care was twenty-six, but this would arise from the more severe and, therefore, more fatal cases being sent into the Union Infirmary, where a great number of deaths occurred, as shewn in Table VIII.

TABLE XVI.

Battersea Vaccination Returns, January to December, 1896.

Registration Sub-District.	Number of Births returned in the Birth List Sheets—1895.	Nos. of those births duly entered by the 31st January, 1895, in Cols. 10, 11, and 13, of the Vaccination Register. (Birth List Sheets), viz.:—					No. of Births which on, the 31st January, 1897, remained unentered in the Vaccination Register on account.			Number of those Births remaining on 31st January neither duly entered in Vaccination Register (Col. 3, 4, 5, and 6 of this Return) nor accounted in the Report Book.
		Col. 10, successfully vaccinated.	Col. Insusceptible of vaccination.		Col. 13, Dead unvaccinated.		Postponement by Medical Certificate.	Removed to Districts their vaccination officers of which have been apprised.	Removed to places unknown.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
East Battersea	2470	1563	17	...	245	...	155	12	218	260
West Battersea	2817	1868	19	...	298	...	181	10	168	273
Totals ...	5287	3431	36	...	543	...	336	22	386	533

The above Table is self-explanatory.

Royal Commission on Vaccination.

In the year 1889, a Royal Commission was appointed to enquire and report as to—

(1.) The effect of vaccination in reducing the prevalence of, and mortality from, Small-Pox.

(2.) What means, other than vaccination, can be used for diminishing the prevalence of Small-Pox; and how far such means could be relied on in place of vaccination.

(3.) The objections made to vaccination on the ground of injurious effects alleged to result therefrom; and the nature and extent of any injurious effects which do, in fact, so result.

(4.) Whether any, and, if so, what means should be adopted, for preventing or lessening the ill effects, if any, resulting from vaccination; and whether, and, if so, by what means, vaccination with animal vaccine should be further facilitated as a part of public vaccination.

(5.) Whether any alterations should be made in the arrangements and proceedings for securing the performance of vaccination, and, in particular, in the provisions of the Vaccination Acts with respect to prosecutions for non-compliance with the Law.

The Commissioners appointed were the following:—Farrer, Baron Herschell, Sir James Paget, Sir Charles Dalrymple, Sir William Guyer Hunter, Sir Edwin Henry Galsworthy, William Scovell Savory, Charles Bradlaugh, John Syer Bristowe, William Job Collins, John Stratford Dugdale, Michael Foster, Jonathan Hutchinson, James Allanson Picton, Samuel Whitbread, and Frederick Meadows White, Esqrs. On the death of Mr. Bradlaugh, John Albert Bright, Esq., was appointed in his place.

During the succeeding years the Commissioners issued several interim reports containing the evidence taken before them. The final report was issued in 1896, and contains the conclusions at which the Commissioners arrived, in three separate reports. The majority report signed by all the Commissioners, except Mr. Picton and Dr. Collins, with separate reports on side issues by Sir W. Guyer Hunter and Mr. Jonathan Hutchinson, and a further note of reservation by Mr. Whitbread, Mr. Bright, Dr. Collins, and Mr. Picton. All these will be found on subsequent pages, with a dissentient report by Dr. Collins and Mr. Picton, giving the views of the extreme opponents of vaccination following.

The report of the Commissioners is as follows, the exact words of the report being here given. The only portions omitted are those which did not apply to the metropolis.

We have held 136 meetings for the examination of witnesses, and have examined 187 witnesses. In addition to this, we have caused important investigations to be conducted for our assistance.

On the eighteenth occasion on which we met, we were invited to make a personal examination of two children who were alleged to have suffered from the effects of vaccination. Some of the members of the Commission, at the request of their colleagues, made the desired examination. It was felt, however, that it would be neither practicable nor expedient to pursue the same course in other cases in which injury from vaccination was alleged. Authority was accordingly obtained from the Treasury to secure the services of competent observers to make such investigations as might be called for. A large number of cases of alleged injury from vaccination brought to the notice of the Commission have thus been the subject of careful investigation.

(A.) As to the effect of vaccination in reducing the prevalence of, and mortality from, small-pox.

The first of the questions submitted to us by Your Majesty is as to 'the effect of vaccination in reducing the prevalence of, and mortality from, small-pox.' This is obviously a fundamental question. It has been strenuously maintained by some that vaccination has not had, and indeed, could not have had, any effect in controlling the spread of Small-Pox or in diminishing its virulence. They insist that the notion that it is, to any extent, a protection against Small-Pox rests on no scientific basis, that there is no relation between vaccinia and variola, and therefore no reason why those who have been subjected to vaccination should enjoy any immunity from, or protection against Small-Pox. They insist, further, that, as a matter of experience, it is not

proved that any such protection or immunity has been enjoyed by the vaccinated. The latter is manifestly the more important point. If the facts which have been accumulated, when fairly and impartially viewed, do really show that the vaccinated are either less liable to be attacked by Small-Pox, or if attacked suffer less severely, than the unvaccinated, any theory which rests on the basis that there is no possible connexion between vaccination and susceptibility to Small-Pox must evidently be regarded with distrust. If the protective effect of vaccination be thus estab-tablished, then, even if the relation of vaccination to Small-Pox could not be explained, nor the reason why or the manner in which it affects human susceptibity to Small-Pox contagion, elucidated, it would still be quite reasonable to accept and act upon the conclusions to which experience directed us. The reason why the introduction of a particular drug into the human body produces certain phenomena may be incapable of explanation, but that it operates to produce these phenomena may be none the less certain. If, then, it be shown that vaccination has a protective influence against Small-Pox, or modifies the character of the disease, it is not necessary for the purpose of the inquiry upon which we are engaged to determine what is the true theory by which the effect is to be accounted for. To embark on such a scientific inquiry in any detail would be beyond the scope of our functions. If, again, experience does not warrant the assertion that vaccination tends to prevent the spread or mitigate the effects of Small-Pox, it is obviously immaterial whether this was *à priori* to be expected. At the same time, as it has been asserted with much confidence that science forbids a belief in the protective influence of vaccination, we have not thought it right to abstain altogether from dealing with this question. We shall, however, for the reasons we have given, discuss it much less in detail than the question what inferences ought to be drawn from the facts accumulated by the history of vaccination and Small-Pox in the period, now nearly a century, during which vaccination has been in use.

The practice, however, of inoculating with the matter of Cow-Pox, or Vaccination as it was subsequently called, may be considered as dating from the publication of the 'Inquiry into the Causes and Effects of the Variolæ Vaccinæ,' of Edward Jenner, published in the summer of the year 1798. The practice rapidly spread, and prevailed widely in this country and other parts of Western Europe during the first quarter of the present century. It was, beyond all question, so adopted in the genuine belief that it afforded protection against Small-Pox. Two questions at once present themselves. First, upon what was this belief founded; and, secondly, does the history of Small-Pox mortality from the time when the practice of vaccination became prevalent, support the view that it has such a protective influence?

Vaccinia or Cow-Pox is a disease affecting milch cows and marked by an eruption on the udder and teats. The disease can be communicated from the cow to man. Dairymen and maids engaged in milking cows affected with Cow-Pox are apt to have sores of a special kind on their hands or elsewhere, the development of the sores being frequently accompanied by febrile symptoms. There can be no doubt that, in a certain number of cases at all events, such sores are the local manifestations of Cow-Pox; the virus from the eruption on the cow being introduced into some scratch or other imperfection in the skin of the milker and there producing its local effects, accompanied more or less by general symptoms.

In the treatise to which reference has been made Jenner records in the first place a number (19) of cases in which a person who had accidentally taken Cow-Pox from the cow, had never had Small-Pox and appeared incapable of taking that disease; the insusceptibility being shown on the one hand by the failure to contract the disease after ample exposure to contagion, such as nursing and attending to or even sleeping with persons suffering from Small-Pox.

Jenner further recorded in the same treatise how he had, in

1796, inoculated a healthy boy of eight years of age in the arm with Cow-Pox matter taken from a sore on the hand of a dairy-maid who had been infected with the disease by milking cows suffering from Cow-Pox. He describes the appearances subsequently presented by the wounds, and states that, six weeks afterwards, the results of inoculating the boy with variolous matter were those commonly seen to follow the inoculation of persons who had previously had the Cow-Pox or the Small-Pox; that is to say, the 'variolous test' showed the boy to be insusceptible to Small-Pox. Some months afterwards the boy was again inoculated, but no sensible effect was produced on the constitution. Jenner then relates that subsequently, in the spring of 1798, he inoculated a child, and obtained a similar result with matter taken directly from the nipple of a cow infected with Cow-Pox; from the pustule on the arm of this child he inoculated another, and from this again several, and from one of these latter a fourth in succession, and then a fifth. To three of these the 'variolous test' was applied, and it is stated with the same results.

In January, 1799, Woodville, having found Cow-Pox to be present in a 'dairy' at Gray's Inn Lane, inoculated seven persons at the Small-Pox Hospital with matter from one of the cows at the "dairy," and other persons with matter from sores on a dairymaid employed at the same place, who had become infected from the cows. From these cases he inoculated in succession others at the Hospital, eventually to the number of many hundreds, and thus established the stock of what has been spoken of as "Woodville's lymph." Pearson also at the same time occupied himself with the question of inoculation with the Cow-Pox, writing a pamphlet about it. Woodville and he distributed to many persons in this country and abroad quantities of the lymph from the Hospital; and this was the beginning of the more general practice of vaccination, for Jenner's stock of lymph, the results of which he had described in his treatise, had come to an end.

Although Woodville's 'Hospital lymph' appears to have been widely distributed by himself and by Pearson, and thus to have been the source of the lymph used in various places in the early days of vaccination, it was not the only source even in those days. Pearson also obtained lymph from Cow-Pox at a dairy in the Marylebone Road, and used this 'in certain situations,' which may be presumed to include places elsewhere than in the Hospital. He also speaks of having obtained lymph from the cow from a third source. Jenner again, who received and used some of Woodville's Hospital lymph, also obtained lymph from some other courses; for instance, from a cow at a Mr. Clark's farm in Kentish Town. Further, Woodville, in 1800, speaks of his having at various times procured the vaccine virus as produced in different cows, which, when used at the Hospital, produced the same effects as the Gray's Inn Lane lymph.

The view that Cow-Pox protects against Small-Pox thus put forward by Jenner, and supported by Woodville and Pearson, speedily attracted great attention among both the profession and the general public. Controversies, as might be expected, arose both on the main point whether protection was really afforded and on various subsidiary points; but, within a very short time, the new doctrine found general acceptance in England.

In 1800 a declaration of adhesion to the doctrine was issued with the signatures of many of the leading physicians and surgeons of London, and to this in the following year many others added their names. In various large cities the resident medical men made known collectively their approval.

In 1802 a Committee of the House of Commons made a report on the utility of the discovery of the protective power of Cow-Pox, and upon Jenner's claim to be considered as the discoverer. A number of witnesses of extensive experience in the profession were examined. It is important to notice that the Committee not only stated the result of the evidence to be favourable to the protective effect of vaccination, but that vaccine

inoculation 'introduces a milder disorder in the place of the inoculated 'Small-Pox, which is not capable of being communicated by contagion.'

If vaccination have the protective influence alleged, in view of the extent to which we have shown that it was practised in the first quarter of the present century, its fruit ought to be seen in a diminution of the mortality from Small-Pox during that period. This brings us to the second of the two questions which we have said presented themselves. Does the history of Small-Pox mortality since vaccination was introduced afford warrant for a belief in its protective effect? This, of course, involves an inquiry into any other possible causes affecting the amount of Small-Pox mortality. We enter then upon the first stage of this inquiry, confining our attention for the present to the period we have indicated.

It becomes necessary at the outset to consider the subject of Small-Pox mortality and its prevalence prior to the introduction of vaccination, and especially during the latter part of the eighteenth century, the period immediately prior to its introduction.

The early history of Small-Pox, like that of many similar diseases, is obscure, is subject to much debate, and, save perhaps on one point, is of antiquarian interest only.

The records of the eighteenth century show that the disease was very prevalent in Western Europe during the whole of that century; we shall discuss the history of the disease during that period in some detail presently. The records of the seventeenth century also show that Small-Pox was a very common disease during that century; this especially the case as regards the latter half of the century. The statistics which exist with respect to Geneva, and various scattered statements, further show that Small-Pox was a well-known disease in the sixteenth century, but except for the records which are said to exist of severe

epidemics in Iceland taking place as early as 1241, as we go further back the evidence as to the existence of the disease becomes less and less clear, and indeed debateable, depending as it does largely on the interpretation of incidental statements in various medical and other writings. There seems, however, to be adequate proof of the prevalence of Small-Pox in the East, in Asia Minor and other countries, even in the earlier centuries of the Christian era.

A view very generally taken teaches that Small-Pox, introduced from the east, began to be common in western Europe during the fifteenth century, though perhaps existing still earlier, that it increased during the sixteenth and seventeenth centures, especially the latter, and that it was very prevalent during the eighteenth century. It will be desirable not to discuss this view at length, but to confine our attention to the history of the disease in the seventeenth and eighteenth centuries.

Quite apart from all calculations, the Bills clearly show that from 1629 onwards, throughout the remainder of that century and the whole of the next, very many persons died in London from Small-Pox. During the latter half of the seventeenth century the yearly deaths fell below 500 on eight occasions only. The return of one year, 1666, conspicuous for the smallness of the number of deaths (38 only) is intelligible when it is remembered that this is the year succeeding that of the Great Plague. The Bills also show that in both centuries the disease had an epidemic character, the returns of certain years being much greater than those of others. In many instances the epidemic increase is marked in one year only, the returns of the succeeding year being, as a rule, low, but not unfrequently the epidemic lasted over two or more years; and this appears to have occurred more frequently in the eighteenth than in the seventeenth century. Indeed, the variations of the numbers are, as a rule, more abrupt in the latter than in the former period.

When we turn to the important question of the mortality

from Small-Pox, that is to say, the proportion of deaths to the number of persons living, we are met with the difficulty of the population not being exactly known. As already stated, it has been calculated that the population in 1685 was 530,000. On the basis of this datum, the average yearly death-rate of, or *mortality* from Small-Pox in the ten years around this date, namely, in the years 1681-90, was 3·139 per thousand; the mortality from all causes of death being 42·2 per thousand. Similarly in the ten years 1746-55, on the calculation that the population in 1750 was 653,900, the yearly mortality from Small-Pox was 3·044; that of deaths from all causes 35·5 per thousand. Taking the same calculations as to population we find that in years when the deaths from Small-Pox were very high, the mortality from Small-Pox, both in the seventeenth and eighteenth centures, was frequently 3, 4, 5, or even more per thousand. Even if we take the years in the eighteenth century in which the returns of deaths from Small-Pox were the lowest, viz., 1702, 1753, 1782, we find, still using the above calculations, the mortality from Small-Pox 0·6, 1·2, and 1·0 respectively, and in 1797, using the census of 1801, the death-rate was 0·7. And in most of the years of that century the mortality from Small-Pox was either not far below, or very distinctly above, 2 per thousand. All this means, even when every allowance is made for the insecurity of the calculations, that the mortality from Small-Pox in London was, during the eighteenth century, very high. This is a broad conclusion which may be considered as definitely proved.

Thus Daniel Bernouilli, writing in 1760-5, takes as one of the bases of his circulation the datum (arrived at by means of various records in various places) that Small-Pox carries off the thirteenth or fourteenth part of each generation; or in other words, that the deaths from Small-Pox are about one-thirteenth or one-fourteenth of the deaths from all causes. The same author uses another datum obtained in a similar way, namely, that the eighth or the seventh part of those attacked die of it. From this, it follows that something like 40 per cent. of those

born died without having Small-Pox. Since of these so dying a large number died at an early age, the number of those dying in adult and in advanced age without ever having had the disease would be much less. And in this sense, probably, must be read the statement of Haygarth, which he gives without supplying the data on which it is based, namely, that 'some persons are incapable of infection by the Small-Pox.' The 'proportion of mankind thus exempted has been observed to amount to 1 in 20;' that is to 5 per cent. The persons here referred to are probably those who lived to an advanced age without taking Small-Pox, though exposed to infection and possibly (for Haygarth wrote in the inoculation period) subjected to inoculation.

The records of the London Small-Pox Hospital from 1746 to 1763 showed a fatality of 28·3 per cent., and it has been stated that during the last 25 years of the last century 32 per cent. of those admitted succumbed to the disease.

One character of the Small-Pox in the eighteenth century (and there is nothing to prove the state of things before the eighteenth century to have been different) is brought out in all the records in which the ages are given, namely, the large proportion of the deaths contributed by the very young. Thus, in Chester, in the epidemic of 1774, all the 202 deaths were of those under ten years, and a quarter of them under one year. In Warrington in 1773 all the deaths were of those under nine years. In Kilmarnock, of the 622 deaths occurring between 1728 and 1763, the ages of nine not being given, only seven were of those above ten years. The burial registers for the graveyard of St. Cuthbert's, Canongate, and Buccleuch Street, Edinburgh, show that during the years 1764—83 the proportion of deaths from Small-Pox of those below the age of ten years, to every thousand deaths from that disease at all ages, was 993. Indeed in all records of epidemics in which the ages are given, the mortality was mainly amongst infants. It is also seen in the larger records, covering periods, including both epidemic years

and years which were not epidemic, as in those of Geneva (1580—1760), which show that the feature was apparent earlier than the eighteenth century, in those of Sweden (1774—1800) and in those of other places. Incidental references in various writings show that the fact was recognised at the time; thus Haygarth observes that in Chester in the years 1772—1777, of those under ten years, 'half as many die of the Small-Pox as of all other diseases;' and this feature of Small-Pox is assumed in the calculations of Bernoulli referred to above.

The first quarter of the 19th century was characterised in this and other countries by a striking decrease of Small-Pox.

In the London Bills of Mortality the returns of Small-pox for the year 1800 are 2,409. This was the last return so high as 2,000. From thence onward, the number of deaths from Small-Pox fell, especially after 1810, reaching in 1818 so low a figure as 421; the fall being irregular and marked by epidemics as in 1812, 1817, and 1825. This decline is all the more striking since during this period the population of London, within the limits of the Bills, increased from 746,233 in 1801 to 1,180,292 in 1831. As has been already urged the Bills were imperfect, and there is ground for believing that during this quarter of the century the imperfections were greater than in former times. This is confirmed by the fact that the returns of the total deaths, in spite of the increased population, were on the whole not greater, in many years even less, than in the preceding century. Making every allowance for the effects of improved sanitary conditions, this feature of the returns may be taken as evidence of their imperfection. Still, in spite of their imperfect character, the Bills show that during this quarter of the century, a striking change took place in Small-Pox in London.

What was the cause, or what were the causes, of this marked decline of Small-Pox in the first quarter of the nineteenth century? Was it due to the introduction of vaccination, or is it to be otherwise explained?

One effect of the introduction of vaccination was a very great decrease in the practice of inoculation, which had become very prevalent during the later part of the previous century. And the view has been put forward that, the prevalence of inoculation having greatly increased the amount of Small-Pox, the diminution of Small-Pox in question was the result of the decrease of inoculation.

The practice of inoculation for the Small-Pox, that is, the artificial introduction of the virus into the system by the insertion of fluid from a variolous pustule into wounds of the skin made for the purpose, began definitely in England towards the end of the first quarter of the eighteenth century. Attention was directed to the latter by letters from Timoni, of Athens (dated 1713), and Pylarini, published in the twenty-ninth volume of the 'Philosophical Transactions' (1716), and especially by a letter from Lady Mary Wortley Montagu in 1717. Though there are indications that in Great Britain and Ireland, as in other countries, some sort of inoculation had occasionally been practised at a much earlier date, the first clearly recorded case in England is that of the daughter of Lady Mary Wortley Montagu (whose son had sometime before been inoculated at Constantinople), inoculated by Maitland, in London, in April, 1721. Other cases soon followed in England, and about the same time the practice was also introduced in other countries of Western Europe, and into the United States of America, namely, at Boston.

It was found that the attacks induced by inoculation were, as a rule, milder and very much less fatal than the attacks of the 'natural' disease, the fever and constitutional disturbance being less and of shorter duration, and the eruptive pustules much fewer; the number of these varied, being commonly a dozen or two, sometimes only two or three, sometimes a hundred or more. In some cases there was no eruption at all, the effect being limited to constitutional disturbances and to changes in the wounds of inoculation themselves; it was maintained that in such cases the

disease had really been taken, and immunity against a subsequent attack secured, as in cases of natural Small-Pox, or of inoculated Small-Pox manifesting itself in an eruption of pustules

In England the practice of inoculation at its introduction, though much lauded and strongly urged by some, was bitterly opposed by others. Moreover, the initial enthusiasm in favour of it soon declined, so that in the years 1730-40 very little inoculation seems to have been practised. About 1740, however, a revival appears to have taken place; in 1746 an Inoculation and Small-Pox Hospital was started in London; and during the whole of the latter half of the eighteenth century the practice may be said to have been very general. It was especially so during the last quarter of the century, the increase being at least largely due to the 'improved methods' of inoculation introduced by one Sutton in 1763 and known as 'the Suttonian method.'

This method, carried out by Sutton himself and his immediate associates, as well as in a more or less modified form by Dimsdale and others, had for its object the securing that the attack induced by inoculation, while remaining a veritable attack of Small-Pox and so bringing immunity against future attacks, should be as mild as possible; that the constitutional disturbance should be slight and of short duration; that the eruptive pustules should be few, or even absent altogether; and that a fatal issue, the somewhat frequent occurrence of which had, in the early days, been a great obstacle to the spread of the practice, should be rendered at least very rare indeed, if not impossible. Concerning the essentials of the method, which Sutton attempted to keep a secret, there has been much discussion; they seem to have consisted partly in a proper care or regimen of the patient before, during, and after the inoculation, partly in the mode of inserting the virus, and partly in making use of the fluid of the variolous vesicle at a relatively early stage.

There can be no doubt that between the years 1770—1780 inoculation was very widely practised in England, and there is

no evidence to show that any marked decline in the practice took place during the remainder of the century. But the distribution of the practice was very unequal. It was much more common among the rich, or at least, among the well-to-do, than among the poor, though many benevolent efforts were made 'to extend its advantages' to the latter. Again, in some districts, as in Essex and Herts, the home of Sutton and Dimsdale, and in Yorkshire, the practice was very widespread. On the other hand, parts of Kent and Sussex are quoted by Haygarth in 1793 as having been practically free from inoculation, and similar statements as to the paucity of inoculation in this or that district are made by other writers of about the same period.

There are no records giving exact information as to the amount of inoculation practised in London, but, seeing that it was favoured by the rich, and that on the other hand opportunities for the poor were afforded by the Inoculation Hospital, we may, perhaps, conclude that the practice was at least very general.

What influence, then, had the practice on the prevalence of, and on the mortality from, small-pox, during the latter half, and especially during the latter quarter, of the eighteenth century?

Since an inoculated person was infectious, each inoculation was a source of danger to those, not protected by a previous attack, who came into the company of, or even near, the inoculated person during the attack; and this danger was increased by the fact that the mild character of the inoculated disease permitted, in many cases at least, the patient to move about among his fellows. Moreover, as Haygarth, himself a zealous advocate of inoculation in a systematic regulated manner, points out, the beneficial results of inoculation had robbed the disease of its terrors to so great an extent that the rich and powerful no longer made the efforts which they formerly did to prevent its entrance into, or its spread in, their neighbourhood, and thus favoured its spread among the unprotected poor; so that inoculation, 'though eminently useful to the rich appeared to be injurious to the poor.'

Adding, therefore, together the cases of inoculated Small-Pox, and the cases of natural Small-Pox of which the inoculated cases were in one way or other the cause, it seems probable that inoculation did tend to increase the *prevalence* of Small-Pox; but there are no recorded data to show that this really was the case, and this supposed influence may have been counter-balanced by other influences.

The general conclusion which may be drawn seems to be that inoculation had a double influence, one favourable, the other unfavourable, as regards Small-Pox; and, owing to the conflict between these two influences, it produced but little effect upon the prevalence of or mortality from Small-Pox.

There is no adequate evidence that inoculation did increase the mortality from Small-Pox. There was certainly, so far as the evidence goes, no such increase of Small-Pox, coincident in point of time with the increase of inoculation, as to justify the decrease of the latter being considered the main cause of the marked decline of the former. Nor is there sufficient even to show that it was a distinct subsidiary cause.

It is to be observed that some opponents of vaccination, whilst insisting that the decline in Small-Pox mortality in the first quarter of the present century was due to the discontinuance of the practice of Small-Pox inoculation, have contended that what was supposed to be vaccination during that period was in reality inoculation with Small-Pox virus. It is obvious that these theories are mutually destructive. If the so-called vaccination was in truth Small-Pox inoculation and the latter practice increases the prevalence of Small-Pox, the disease should have increased and not diminished during the period under review.

Another view has been put forward attributing the decline in question to the improvement of sanitary conditions.

The question how far the behaviour of Small-Pox in the

eighteenth century and earlier was influenced by sanitary conditions, is one rendered difficult by the lack of exact information. We may distinguish between overcrowding as one insanitary condition and all other insanitary conditions, such as lack of cleanliness and the like. *A priori* we should expect that a dense population, especially one of great internal movement, and one in continual interchange with surrounding populations, by offering greater facilities for the conveyance of contagion, would lead to a greater amount of Small-Pox. London was a conspicuous instance of the above, and the apparent greater prevalence of Small-Pox in London than in the provinces may be attributed to these causes; but it would appear that the increase was felt, as indeed would, *à priori*, seem probable, rather in the constant presence of Small-Pox to a considerable amount at all times than in the mortality of the epidemics when these occurred.

It may be urged against the view that the decline of Small-Pox was due to improved sanitary conditions, in the first place, that, admitting the introduction of sanitary improvements, no evidence is forthcoming to show that during the first quarter of the nineteenth century these improvements differentiated that quarter from the last quarter, or half, of the preceding century in any way at all comparable to the extent of the differentiation in respect to Small-Pox. In the second place, admitting *à priori* that crowded dwellings tend to increase the liability to contagion, and so the prevalence of the disease, while other insanitary conditions tend in addition to increase the fatality among those attacked, so that insanitary conditions as a whole must tend to increase the mortality from Small-Pox; no evidence is forthcoming which distinctly shows that the dependence of the prevalence of, or the mortality from, Small-Pox, on the lack of sanitary conditions, was a feature of the history of Small-Pox during the eighteenth century.

Moreover, it must be remembered that the decline in Small-Pox mortality was observed in Western Europe in countries

where the sanitary conditions were widely different. Whatever may have been the sanitary improvements during the first quarter of this century in England and some other countries, there seems no ground for supposing that throughout Western Europe the period was marked by great changes in the direction of improved sanitation. Indeed, in many countries, down to a recent period, in some, it may perhaps be said, even to the present time, insanitary conditions have continued to prevail.

There is no proof that sanitary improvements were the main cause of the decline of Small-Pox under discussion. And no adequate evidence is forthcoming to show to what extent such improvements may be considered as a subsidiary cause.

The decline in question followed upon the introduction of the practice of vaccination. The records of Western Europe and the United States show that, in all places whence returns were obtained, the introduction of vaccination was followed by a decline of Small-Pox ; the decline becoming especially apparent after the lapse of such time as may be supposed to be necessary for the due spread of the practice.

Moreover, the spread of the practice and the decline of the disease do not stand as two phenomena simply following the same course, but without any tie joining the two. The experimental evidence offered at the time, namely, that the class of vaccinated persons did not take Small-Pox by way either of exposure to natural contagion or of inoculation, as the unvaccinated did, connects the two and points to the spread of the practice as the cause of the decline.

It has been suggested that the decline was due to some general unknown conditions, which have been spoken of as 'cosmic' or 'secular.' It has been urged that such general 'cosmic' conditions led, on the one hand, to the spread of Small-Pox in Europe during the seventeenth and especially during the eighteenth centuries, and, on the other hand, conversely to its

decline in the beginning of the nineteenth century. The possibility of such general 'cosmic' conditions influencing Small-Pox cannot be denied; but at present, at all events, the appeal to such conditions is the result, not of positive knowledge, but of our inability to explain the phenomena otherwise. Moreover, it is not certain that the relative paucity of Small-Pox in Europe before the seventeenth century was not apparent rather than real, being due merely to absence of information; if so, there is no necessity to seek in 'cosmic' influences the cause of the supposed later increase.

In attempting to judge of the decline in question being due to such 'cosmic' influences, we are met with the difficulty that exact records of the prevalence of Small-Pox during the period under discussion are wanting in respect to countries where vaccination was not practised. But such information as is available goes to show that in the countries where vaccination did not become general, Small-Pox prevailed in the first quarter of the nineteenth century very much as it had prevailed in the eighteenth. Thus, in Egypt vaccination was not introduced until 1827, and up to that time Small-Pox was extremely prevalent; the decline, which in Western Europe was marked during the first quarter of the century, appears to have been absent there. Again, in America, though in the early days of vaccination, efforts were made to spread the practice among the native tribes, these (especially the tribes of the West) remained unvaccinated, and among them the ravages of Small-Pox in the first quarter of the nineteenth century are described as of extreme severity. So in Brazil, vaccination, though introduced early, was not carried on with the same energy as in Europe, and here severe epidemics of Small-Pox occurred. There is no adequate evidence of a decline in unvaccinated countries like that which took place in vaccinated countries, and there is no sound reason for attributing the latter to any theoretical 'cosmic' influences.

Upon the whole, then, we think that the marked decline of

Small-Pox mortality in the first quarter of the present century affords substantial evidence in favour of the protective influence of vaccination.

It has been urged that the decline was too great to have been due to the amount of vaccination which prevailed. It has been shown, however, that the amount which was carried out was very considerable, and the argument that such an amount was insufficient to produce the decline in question is based on the premiss that such an amount of vaccination would at the present day be considered wholly insufficient protection. But it must be borne in mind that in the countries so often mentioned a large proportion of the population were protected by previous attacks of Small-Pox, either natural or inoculated; only a portion of the population needed the protection claimed for vaccination. And if the vaccination in the early years of the century was as general as we have seen reason to think it was, that, added to the protection afforded by previous attacks of Small-Pox, may be regarded as adequate to have produced the decline in question.

Of course, as years went on, the proportion of the population immune through previous Small-Pox became, owing to the mere decline of Small-Pox, continually less and less, as the large number who had had the Small-Pox in the previous century gradually died out. After the first quarter of the century, that part of the population which depended for immunity on vaccination alone, became, in the absence of serious epidemics, greater and greater; and an amount of vaccination adequate to afford great protection in the earlier years ceased to be adequate for the latter years. But this brings us to the periods succeeding the first quarter of the century, which will be considered hereafter.

We have dealt thus with the evidence afforded by the first quarter of the present century, because it constituted a convenient epoch for inquiring whether mortality from Small-Pox had shown signs of diminution in the period immediately succeeding the introduction of vaccination, and not because the close of that

quarter of a century was in any respect a dividing line. So far as England is concerned a new epoch commenced in 1837. There was nothing to distinguish the phenomena observable between 1825 and 1837 from those of the preceding years of the century, and the only mortality statistics in our possession relating to those intervening years became not more but less accurate and satisfactory.

In the year 1837, however, the present system of registration of deaths commenced in England, so that from that period more exact statistics of Small-Pox mortality are available. In Scotland a similar system of registration was not initiated until 1855, and in Ireland until 1864. In the latter country, however, information with reference to the mortality in preceding years was, prior to the registration of deaths, acquired when the decennial census was taken. This practice commenced at the period of the census in 1841.

Before proceeding to inquire what light the records of Small-Pox mortality in England, Scotland, and Ireland, during the years when more accurate information has existed as to Small-Pox mortality, throws upon the question of the effect of vaccination, it will be convenient to make a brief statement of the laws which have been from time to time passed with reference to that practice. This is important, because it has been argued that a connexion may be observed between the diminution of Small-pox in the epochs subsequent to the different Acts passed by the Legislature, for the purpose of encouraging or compelling vaccination, and the increase of vaccination which would naturally result from those enactments.

Although the House of Commons had made grants to Jenner in 1802 and 1806, and annual grants to the National Vaccine Establishment, which was founded by Royal Warrant in the following year, no statute was passed dealing with the matter until the 23rd July, 1840. On that day the Act 3 and 4

Victoria, chapter 29, entitled 'An Act to extend the practice of vaccination,' received the Royal Assent.

By that Act the Guardians and Overseers of every Parish or Union in England and Wales were empowered, and they were thereby directed to contract with their medical officers or with any legally qualified medical practitioners for the vaccination of all persons resident in such Unions or Parishes respectively. Payments were to be made dependent on the number of persons who, not having been previously successfully vaccinated, should be successfully vaccinated by the contracting medical officer or practitioner. In making their arrangements Guardians and Overseers were, by section 2, to conform to regulations made by the then existing Poor Law Commissioners, who had power conferred on them for the purpose.

By the eighth section of this statute inoculation of the Small-Pox was declared to be illegal and the use of it was made penal.

In the next year, on the 21st June, 1841 (4 and 5 Victoria, chapter 32), there was supplementary legislation (1) charging the expenses of carrying out the Act of 1840 on the poor rates and (2) enacting that 'the vaccination, or surgical or medical assistance incident to the vaccination of any person resident in any Union or Parish, or of any of his family, should not be considered parochial relief,' nor should he, by reason 'of such vaccination or assistance be, deprived of any right or privilege or be subject to any disability or disqualification whatever.'

These Acts were repealed by the Consolidation Act of 1867, but the Act of 1840 is important historically as being the first of the series of Acts relating to vaccination; and especially so because of the terms of the eighth section forbidding inoculation; and, again, because it not only speaks of vaccination itself, but of surgical or medical assistance incident to the vaccination, which contemplates the duty of providing the surgical

or medical assistance which the operation might render necessary or expedient, and the necessary expenditure in respect thereof.

It is to be further observed that in the legislation of 1840 and 1841 there was no compulsion on parents or others to procure or to submit to vaccination. The services of the vaccinator were to be provided, and he was to vaccinate all who might choose to come to him for that purpose. It is not clear whether re-vaccination was contemplated. Although there is a difference in the language of sections 2 and 6 relating to England and Wales and Ireland respectively, yet it is probable that, looking to the mode of payment provided in section 1, a second vaccination was not contemplated by the Act.

At the suggestion of the Epidemiological Society, which had been formed in 1850, Lord Lyttelton introduced into the House of Lords the measure which afterwards passed into law on the 20th August, 1853, without opposition or division. This was really the first measure for compulsory vaccination. It is entitled 'An Act to extend and make compulsory the Practice of Vaccination.' It applied only to England and Wales.

The principal provisions of this Act were as follows:—The Guardians and Overseers, when the Parishes were not in union, were required, subject to the approval of the Poor Law Board, to divide their Unions and Parishes into convenient districts (section 1) for the purpose of giving increased facilities for the vaccination of the poor. They were to appoint a convenient place for the attendance of the vaccinator, and to give notice of place and time when he would attend to vaccinate, and to inspect the progress of the vaccination. The vaccinations were limited to those persons only who had not already been successfully vaccinated. It seems, therefore, that re-vaccination was not contemplated by this Act.

The second section contains the compulsion. It was enacted that within *three* months of the birth the father or mother,

or, in the event of their death or inability, the person in charge of the child, within *four* months, should take the child to the appointed vaccinator, unless such parent or person should have obtained a certificate of previous vaccination from some other practitioner; and the vaccinator was required thereupon, or as soon after as it might be conveniently and properly done, to vaccinate the child. It was enacted by the third section, 'Upon the eighth day following vaccination the father, &c., shall take or cause to be taken the child to the vaccinator for his inspection that he may ascertain the result of the operation.' By the fourth section it was provided that the vaccinator was to give a certificate of successful vaccination to the father, &c., and to transmit a duplicate to the Registrar of Births and Deaths of the Sub-District in which the vaccination was performed. Section 5 made provision for children who, in the opinion of any medical officer or practitioner, were not in a fit and proper state to be successfully vaccinated. In such a case the medical officer or practitioner was to deliver a certificate to that effect, which was to remain good for two months, and to be renewable from two months to two months until the child should be considered fit for vaccination, when it was to be taken to be vaccinated. So long as the certificate or its renewal should last, it was a sufficient defence against any complaint against the father, &c., for non-compliance with the Act.

Then followed provisions as to the duties of the Registrar. The Registrar of the Sub-District was to keep a register of persons whose successful vaccination certificates had been transmitted to him by the vaccinator. By section 9 the Registrar was required on or within seven days from the registration of the birth of a child to send to the father, &c., notice in a given form, to take care that the child should be vaccinated, and of the time and place of the attendance of the vaccinator; and it was enacted that if after such notice the father, &c., of the child should not cause the child to be vaccinated, or should not on the eighth day after vaccination take, or cause to be taken, the child for inspection, then the father,

&c., should forfeit a sum not exceeding 20s. These penalties were recoverable before two Justices according to 12 Vict. c. 43., and paid into the funds for the relief of the poor.

The statute just referred to, though repealed, is notable by reason of a legal decision upon it, which probably gave rise to an amendment of the law by a subsequent statute, out of which difficulties arose which will be shortly referred to. In the case of Pilcher *v.* Stafford, reported 4 Best and Smith, 775: 33 L.J. (M.C.) 13, the Defendant had on the 18th February, 1863, been convicted and fined 2s. 6d. on an information and summons brought before Magistrates by the Registrar for a breach of this Act, in not having, after notice and within three months of the birth, taken his child to the appointed vaccinator for vaccination. Subsequently, the child not having been vaccinated, the Registrar brought a fresh information and complaint for the same cause. The Justices dismissed the information because they held that the offence of not taking the child to be vaccinated within the three months was a single definite offence, and that the Defendant, having been once convicted and fined for this offence, it was contrary to law to convict and fine the Defendant a second time for the same offence.

The Court of Queen's Bench (Cockburn, Chief Justice, and Blackburn and Mellor, Justices) on this ground decided against the Registrar, and confirmed the decision of the Magistrates.

The Act of 1867 (30 & 31 Vict. cap. 184) besides being a consolidating statute introduced some important additional provisions. The sections which it is important to notice contained the following provisions:—Sections 1 and 3 dealt with the division of the county into Vaccination Districts. This was to be done by the Guardians under the control of the existing Poor Law Board, to which body, in 1871, by virtue of the statute before referred to, the Local Government Board succeeded. The contracts and their form were also to be subject to the approval of the Poor Law Board. The Privy Council were authorised to pay to the Public

Vaccinators additional sums to those which the Guardians and Overseers had to pay under their contracts. The intention of this clause appears to have been to enable the Privy Council to reward the Public Vaccinators for good and successful work, and to stimulate their diligence and care in the performance of their duties. The following clause increased the remuneration to be allowed to Public Vaccinators to not less than 2s. where the vaccination was performed at more than a mile, but less than two miles, from the residence of the vaccinator, and to not less than 3s. where the vaccination was performed at a distance exceeding two miles.

"By the eighth section provision for the encouragement of re-vaccination was specifically made by Parliament. The Privy Council was authorised to issue regulations in respect of the re-vaccination of persons who might apply to be re-vaccinated; and in that case the Guardians were required to pay fees for successful re-vaccinations performed in accordance with such regulations of an amount equal to two-thirds of the primary vaccination fees. It would appear from the language of this section that the wording of some existing contracts had included re-vaccination. By the eighth section, however, it was enacted that these contracts should not apply to re-vaccination upon the Act coming into operation.

The 16th section enacted as to every child born in England that within *three* months after the birth of such child, or where by reason of the death, &c., of the parent, any other person should have the custody of such child within three months after receiving such custody, the parent or such person should take it or cause it to be taken to the Public Vaccinator . . . or should within such period cause it to be vaccinated by some medical practitioner. If the child were brought to a Public Vaccinator in compliance with the conditions in the Act he was required to vaccinate the child.

By section 17 it was enacted that upon the same day in the week following, in cases in which the operation was performed by the Public Vaccinator, the parent or person must again take the

child to the vaccinator or his deputy, so that he might inspect the child and ascertain the result of the operation, and, if he should think fit, take from such child lymph for the performance of other vaccinations; in the event of the vaccination having been unsuccessful, the parent or other person was required, if the vaccinator so directed, to cause the child to be forthwith again vaccinated.

By section 27 a new and important provision was made with reference to the enforcement of the Act. This provision was repealed by the Act of 1871, and another scheme of legislation adopted, to which future reference will be made. By this section it was enacted—'The Registrar of each District shall, within one week after the first day of January and the first day of July in each year, make a list of all cases in which certificates of vaccination have not been received by him during the preceding half year, and shall submit the same to the next meeting of the Guardians for whom he acts, and the said Guardians shall forthwith make enquiries into the circumstances of the cases, and if they find that the provisions of the Act have been neglected, shall cause proceedings to be taken against the persons in default.'

This section imposed a duty on the Guardians to prosecute, and section 28 provided for their expenses, and authorised them to pay any officer appointed by them to prosecute persons charged with offences against the Act or otherwise to enforce its provisions. Provision for the appointment of such officers had been made by the Act of 1861, 24 & 25 Vict., c. 59, and their appointment was afterwards by the Act of 1871 made compulsory.

By section 29 it was provided as follows:—'Every parent or person having the custody of a child who shall neglect to take the child or cause it to be taken to be vaccinated, or after vaccination to be inspected, and shall not render a reasonable excuse for his neglect, shall be guilty of an offence, and be liable to be proceeded against summarily, and upon conviction to pay a penalty not exceeding 20s.' This clause was in substance a

re-enactment of the clause in the Act of 1853 (section 9) upon which the case of Pilcher *v.* Stafford was decided, but it is important to refer to it again in connexion with the changes of the law contained in other sections of the Act.

A point of some importance has been raised with reference to the construction of section 29. It will be observed that it provides that every parent or person having the custody of a child who neglects to have the child vaccinated 'and shall not render a reasonable excuse for his neglect' shall be guilty of an offence and be liable to be proceeded against, and upon conviction to pay a penalty. It has been contended that this points to the reasonable excuse being rendered before proceedings are taken. There is much to be said for this contention. The parent 'guilty of an offence' and 'liable to be proceeded against' is one who neglects and shall not render a reasonable excuse for his neglect. The section does not say that the parent who, without reasonable excuse, neglects to have his child vaccinated, shall be guilty of an offence, as one would expect if the intention were that the excuse should be rendered to the magistrate as a defence when proceedings have been instituted. The section is certainly so framed as to afford countenance to the contention we are considering. On the other hand, no body or person is indicated to whom an excuse can be rendered before the proceedings are instituted. There is no machinery provided for hearing and adjudicating upon excuses at that period and for giving a certificate that a reasonable excuse has been rendered to serve as a bar to further proceedings. On the whole, then, although it is not for us to express an opinion on the legal construction of the clause, which is very unhappily framed, it would probably be construed as intending that the excuse should be rendered to the tribunal before which proceedings for the neglect to vaccinate are pending.

We now come to the much-discussed section 31. It seems probable that section 31 was enacted for the very purpose of supplementing the provisions of section 29. Its purpose seemed to be to enable those who prosecuted (and this duty had by

section 27 been imposed upon the Guardians) to follow the parent responsible for the vaccination so long as the child remained unvaccinated, and by penalties to compel the parent to do what, according to the law, was his duty. Nevertheless, no conviction could take place under this section without a previous order of a magistrate, and the first step in the transaction was to inform the magistrate and obtain a summons to the parent to appear with the child before him. Thereupon, when the parent appeared absolute discretion was left to the magistrate before whom the case was brought. He might or might not make the necessary order. If he did not, no further penalty could be inflicted. If he did, and it was obeyed, no penalty could follow. But if he did, and it was disobeyed, one penalty alone could be inflicted for the disobedience. A further order must be made, and that order disobeyed before another penalty—not for disobedience to the first—but to the second order, could be inflicted. This is evident from the words of the section. The magistrate 'may, if he thinks fit'—words of absolute discretion—make an order for vaccination; and there is nothing in the section to bind the magistrate's discretion to refrain from making an order should he for any reason come to the conclusion that it was expedient to do so. The words of the section seem purposely framed to leave the discretion to the magistrate. It is true that if the order was once made and disobeyed, without the justification of one or other of the two matters of excuse mentioned in the section, the disobedience must be punished and the parent prosecuted (the words are 'shall' be proceeded against), but the discretion was to be exercised before the order was made, and this discretion is left to the magistrate.

Accordingly it was held in the case of Allen and Worthy, reported L.R. 5, Q.B. 163, that, notwithstanding the principle laid down in Pilcher *v.* Stafford a second conviction could follow disobedience to a second order under the section just referred to. Lord Chief Justice Cockburn said, 'I think that the intention of the Legislature was not simply that a penalty should be imposed

on a person once for all if he omitted to do that which, in the view of the Legislature, public health and safety required, but that a penalty might be imposed so long as disobedience to its enactments continued. I, therefore, hold that the powers given by section 31 are not confined to one order and one conviction, but that the proceedings may be repeated *toties quoties* so long as disobedience continues.'

There is no doubt that those magistrates who, in the exercise of their discretion, made repeated orders in respect of the same child, were, in the opinion of many, mistaken, and harsh results often followed, and the evidence of this, which was brought before them, doubtless led to the recommendation in the Report (dated 23rd May, 1871) of the Select Committee of the House of Commons on the Vaccination Act (1867), that no more than two penalties or one full penalty should be imposed in respect of the same child.

The Act of 1867 remained unaffected by subsequent legislation until the 1st January, 1872, when the Vaccination Act, 1871, came into force.

Meanwhile a Select Committee had been appointed to inquire into the working of the Act of 1867, and this Act of 1871 was introduced into the House of Commons by Mr. Forster, its chairman. The Act was entitled 'an Act to amend the Vaccination Act, 1867,' and was to be construed as one with it.

A change of importance was made by the fifth section which rendered the appointment and payment of officers to prosecute and to enforce the provisions of the Acts obligatory upon the Guardians, whereas it had theretofore been permissive only. These officers were to be called Vaccination Officers. They were to perform all the duties imposed on the Registrars by the principal Act, except giving the notices to the parents within seven days of the registration of the births under section 15 of the Act of 1867.

By section 8 it was provided that every Registrar of Births and Deaths for any place should once at least transmit to each Vaccination Officer a return of all births and deaths of infants under twelve months of age, which, since the date of the last return had been registered by him. Section 9 deals with re-vaccination. It enacts that when the operation of re-vaccination is performed gratuitously by a Public Vaccinator on the application of any person, he shall deliver to such person a notice requiring him to attend for inspection, and if that notice is not complied with such person is rendered liable to pay to the Guardians a fee of 2s. 6d.

Section 10 imposes a fine of 20s. on any person who prevents a Public Vaccinator taking lymph from any child as provided by section 17 of the principal Act. Section 11 imposes a similar penalty on any parent who fails to produce a child when required by summons under section 31 of the principal Act. By the same section any complaint may be made and any information laid at any time not exceeding twelve months from the time when the matter of complaint or information arose, and not subsequently. This is a new provision as to limitation. There is a further provision as to re-vaccination in section 13 granting fees to the medical officer of the Union if, while attending as such medical officer upon a Small-Pox patient, he either (1) vaccinates a person who has never been vaccinated or had Small-Pox, or (2) re-vaccinates any person who is resident in the same house with the person sick of the Small-Pox, and has never been re-vaccinated, being of the age at which public re-vaccination is paid for to a Public Vaccinator under the regulations for the time being of the Privy Council.

By the joint effect of the Vaccination Act, 1874, the fifth section of the Vaccination Act, 1871, and the Local Government Act, 1871, the Local Government Board was clothed with the same powers with respect to the Guardians and Vaccination Officers in matters relating to vaccination as the Poor Law

Board possessed with regard to Guardians and Officers of Guardians in matters relating to the relief of the Poor, and had power to make rules and regulations, and it was enacted that all enactments relating to such powers and to such orders, rules, and regulations by the Poor Law Board should apply, mutatis mutandis, to the Local Government Board, including rules, orders, and regulations prescribing the duties of Guardians and their Officers in relation to the institution and conduct of the proceedings to be taken for enforcing the provisions of the Vaccination Acts of 1867 and 1871, and the payment of the costs and expenses relating thereto; and rules, orders, and regulations under the Act of 1874 were to be deemed to be made under section 5 of the Act of 1871.

By the machinery thus introduced, provision was made in substitution for that contained in the 27th section of the Act of 1867, which was repealed by the Act of 1871; that section, as has been pointed out, imposed upon the Guardians the duty of prosecuting cases brought to their knowledge by the Registrar. The new machinery gives power to the Local Government Board to regulate this matter among others, and they have acted on this power.

The Bill, as introduced by Mr. Forster, the Chairman of the Select Committee, contained a clause (1) so framed as to carry out the recommendation in the Report as to repeated prosecutions in the case of the same child. This was struck out in the House of Lords, the amendment being carried by eight votes against seven. When the Bill was returned to the Commons Mr. Forster, at that period of the session, felt compelled to accept the amendment, being anxious to pass the Bill.

One other point remains for notice arising under the Act of 1871. It is provided by section 11 that the defendant in any proceedings under the Acts of 1867 and 1871 may appear by any member of his family, or by any person authorised by him in that behalf.

Such are the provisions of the Acts which have from time to time been passed with direct reference to the subject of vaccination. The legislation is founded on the assumption of its efficacy, and that its advantages are so manifest that it is the duty of the State to enforce it even by the imposition of penalties for its neglect.

It is obvious that the most important part of the work rests with the public authorities, to whom the vaccination of the population has been entrusted, subject to the general control of the central authority.

Details of the mode in which the vaccination law of Scotland is administered will be found in the evidence of Mr. John Skelton, then Chairman of the Board of Supervision. Both the statute law and the method of administration differ very materially from those which prevail in this country. Some of the points of difference in the two systems have so material a bearing upon questions submitted to us for report that it will be well here to call attention to them. An official vaccinator is appointed by each Parochial Board. Beyond the vaccination of paupers and the children of paupers, however, his duty is confined to vaccinating defaulters. The great majority of vaccinations in Scotland are performed by private medical practitioners at the expense of the parent or guardian. In all cases in which certificates are not received by the Registrar of compliance with the requirements of the Act, the names are inserted in a list of defaulters sent every six months to the Parochial Board. It then becomes the duty of that Board to see that these defaulters are vaccinated. They go through the list transmitted to them, and notify to the parent or guardian of each child that its name is contained in the list, and that if not privately vaccinated it will be vaccinated by the official vaccinator. The Parochial Board issue an order to the vaccinator to vaccinate the persons named in the list not less than 10 days nor more than 20 after the date of the notice to the parent or guardian. A large number of the defaulters are

privately vaccinated in consequence of these notices before the visit of the official vaccinator. If this has not been done the vaccinator calls on each of the defaulters and offers to vaccinate. If the parent's consent is obtained the child is vaccinated; if consent is refused, a certificate is given stating the fact and the ground of refusal. Any other reason for not vaccinating a child such as insusceptibility, previous vaccination, or condition of health, is also embodied in a certificate. The power conferred upon local authorities under the Public Health Act by section 57 of that Act to afford gratuitous vaccination appears to be exercised chiefly when epidemics are present within the district of the local authority. A house-to-house visitation is often made by medical men appointed for the purpose, and a large number of re-vaccinations are thus effected. The distinguishing feature of the Scotch system which deserves special attention is that the operation is carried out in almost all cases at the house where the vaccinated person is residing. The official vaccinator visits the case there after an interval of eight days to see whether the operation has been successful. Although he pays no visit in the interval, he would often be sent for if any untoward symptoms presented themselves, inasmuch as the official vaccinator is in ninety-nine cases out of a hundred the officer whose duty it is to afford medical assistance to the poor.

These details are here given, because it has been proposed that the method of securing vaccination in England be assimilated to that adopted in Scotland. It must be remembered that the populations of large English Cities cannot be rendered so favourably disposed to domicilliary visits by the public vaccinator as in the more sparsly populated districts in Scotland, where nearly every person would be known personally by the public vaccinator.

The following table shows the mortality from Small-Pox in England and Wales during each of the years in 1838-1842 and 1847-1894. The figures for the years 1843-1846 are not available.

*Mortality from Small Pox in England and Wales during years 1838-42 and *1847-94.*
(The figures for the years 1843-46 are not available).

Year.	Population.	Number of Deaths from Small-Pox (with those returned as from Chicken-Pox).	Deaths from Small-Pox (with those returned as from Chicken-Pox) to every 100,000 living.
1838	15,287,699	16,268	106
1839	15,514,255	9,131	59
1840	15,730,813	10,434	66
1841	15,929,492	6,368	40
1842	16,130,326	2,715	17
1843	16,332,228	Causes of death not abstracted by Registrar-General.	
1844	16,535,174		
1845	16,739,136		
1846	16,944,092		
1847	17,150,018	4,227	25
1848	17,356,882	6,903	40
1849	17,564,656	4,644	26
1850	17,773,324	4,665	26
1851	17,982,849	6,997	39
1852	18,193,206	7,320	40
1853	18,404,368	3,151	17
1854	18,616,310	2,808	15
1855	18,829,000	2,525	13
1856	19,042,412	2,277	12
1857	19,256,516	3,936	20
1858	19,471,291	6,460	33
1859	19,686,701	3,848	20
1860	19,902,713	2,749	14
1861	20,119,314	1,320	7
1862	20,371,013	1,628	8
1863	20,625,855	5,964	29
1864	20,883,889	7,684	37
1865	21,145,151	6,411	30
1866	21,409,684	3,029	14
1867	21,677,525	2,513	12
1868	21,948,713	2,052	9
1869	22,223,299	1,565	7
1870	22,501,316	2,620	12
1871	22,788,594	23,126	102
1872	23,096,495	19,094	82
1873	23,408,556	2,364	10
1874	23,724,834	2,162	9
1875	24,045,385	952	4
1876	24,370,267	2,518	10
1877	24,699,539	4,395	18
1878	25,033,259	1,970	8
1879	25,371,489	631	3
1880	25,714,288	754	3
1881	26,046,142	3,231	12
1882	26,334,942	1,439	5
1883	26,626,949	1,056	4
1884	26,922,192	2,363	9
1885	27,220,706	2,936	11
1886	27,522,532	368	1
1887	27,827,706	593	2
1888	28,136,258	1,142	4
1889	28,448,239	106	·4
1890	28,763,673	111	·4
1891	29,082,585	140	·5
1892	29,405,054	554	2
1893	29,731,100	1,584	5
1894	30,060,763	928	3

Mortality from Small-Pox in London during years 1838-94, including deaths in Metropolitan Asylum Board Ships (outside Metropolis) for the last 11 years.

Year.	Population.	Number of deaths from Small-Pox.	Deaths from Small-Pox to every 100,000 living.	Year.	Population.	Number of Deaths from Small-Pox.	Deaths from Small-Pox to every 100,000 living.
1838	1,766,169	3,817	216	1867	3,085,971	1,345	44
1839	1,802,751	634	35	1868	3,131,160	597	19
1840	1,840,091	1,235	67	1869	3,176,308	275	9
1841	1,878,205	1,053	56	1870	3,221,394	973	30
1842	1,917,108	360	19	1871	3,267,251	7,912	242
1843	1,954,041	438	22	1872	3,319,736	1,786	54
1844	2,033,816	1,804	89	1873	3,373,065	113	3
1845	2,073,298	909	44	1874	3,427,250	57	2
1846	2,113,535	257	12	1875	3,482,306	46	1
1847	2,202,673	955	43	1876	3,538,246	736	21
1848	2,244,837	1,620	72	1877	3,595,085	2,551	71
1849	2,287,302	521	23	1878	3,652,837	1,417	39
1850	2,330,054	499	21	1879	3,711,517	450	12
1851	2,373,081	1,062	45	1880	3,771,139	471	12
1852	2,416,367	1,159	48	1881	3,824,980	2,367	62
1853	2,459,899	211	9	1882	3,862,956	430	11
1854	2,503,662	694	28	1883	3,901,309	136	3
1855	2,547,639	1,039	41	1884	3,940,042	1,236	31
1856	2,591,815	531	20	1885	3,979,160	1,419	36
1857	2,636,174	156	6	1886	4,018,666	24	.6
1858	2,680,700	242	9	1887	4,058,565	9	.2
1859	2,725,374	1,158	42	1888	4,098,860	9	.2
1860	2,770,181	898	32	1889	4,139,555	0	0
1861	2,815,101	217	8	1890	4,180,654	4	.1
1862	2,860,117	366	13	1891	4,222,157	8	.2
1863	2,905,210	1,996	69	1892	4,264,076	41	1
1864	2,950,361	547	18	1893	4,306,411	206	5
1865	2,995,551	640	21	1894	4,349,166	89	2
1866	3,040,761	1,391	46				

In order to make the figures in the above table comparable throughout, we are obliged to include with the deaths returned as from Small-Pox those returned as from Chicken-Pox, the Registrar-General not having distinguished between such returns in his abstracts for the years 1838-1842 and 1847-1854.

In this connexion, however, the inclusion or exclusion of deaths returned as from Chicken-Pox makes no material difference; the number of deaths at all ages so returned being but small, in comparison with the deaths at all ages returned as from Small-Pox, except as regards the years 1889, 1890, and 1891, when the Small-Pox mortality was very small.

Had the number of deaths returned as from Chicken-Pox been large enough to affect to any material extent the figures in the table, we should have excluded these deaths so far as we were able, though we think it possible and even probable that some of them may have been mistaken cases of Small-Pox.

It is highly improbable that the number of such cases was considerable, seeing that, since deaths from Chicken-Pox have been separately recorded, the number of them has been small and approximately the same, year by year, whether Small-Pox was prevalent or not.

There exist no figures, comparable throughout the period 1838-1894, by which we can measure the extent to which, at one time as compared with another, the practice of vaccination prevailed in England and Wales in those years. That there has been, speaking generally, during that period a large spread of the practice is beyond doubt.

We have given an account of the legislation from time to time enacted to this end, and we shall therefore merely recapitulate

here the dates of the principal Acts of Parliament relating to the practice of vaccination in England and Wales which have come into force during this period.

In 1840-1 the means of vaccination was provided at the expense of the Poor Rates for every person in England and Wales.

In 1853 the practice of vaccination was made compulsory in regard to children born in England or Wales after the 1st August, 1853, and penalties were imposed for non-compliance. The provisions for this purpose then enacted were found in working to be very imperfect; and, indeed, the obligation to be vaccinated remained little more than nominal down to the date of the appointment of paid Vaccination Officers. At the same time, however, the fact that the law required vaccination within a prescribed period from birth no doubt increased the spread of the practice.

In 1867, the laws relating to vaccination in England and Wales were consolidated and amended; and the provisions then enacted, as regards those Unions where the power given to appoint paid Vaccination Officers was exercised, were such as to make effective the obligation to be vaccinated. In many Unions, however, this power was not at once exercised.

From the evidence taken by the Select Committee of the House of Commons in 1871, it appears that of 260 Unions inspected by the Medical Department of the Privy Council in the course of the year 1870, two years and more after the Act of 1867 had come into force, 121 were reported as not having at the date of inspection appointed

Vaccination Officers, and 127 as having made such appointments, there being no report on the point as to the remaining 12 Unions (Appendix No. 15 to the Committee's Report); and in May, 1871, Dr. Seaton informed the Committee that there were still a great many Unions in which Vaccination Officers had not been appointed (Question 5,499).

In 1871 the Act of 1867 was amended by making the appointment of paid Vaccination Officers compulsory in all Unions, by simplifying and improving the arrangements for the registration of vaccination, and in other ways. The effect of the amending Act towards increasing the spread of vaccination would be thus more marked in Unions where the power to appoint paid Vaccination Officers had not before its enactment been exercised; but the amendment of the law as to the registration of vaccination was such as to render it, in every Union, less likely that the obligation to be vaccinated would be evaded.

The records kept under the Vaccination Act of 1871, and tabulated by the Local Government Board, show the amount of primary vaccination performed within a certain period of birth, of children whose births were registered in England or Wales during the years 1872-1893. The following table gives the figures :—

Year.	Births registered during Year.	Of the Children whose Births were registered during the Year given in the First Column, by the 31st January in the Year next but one following that Year there were:						
		Successfully vaccinated.	Certified as insusceptible of Vaccination.	Had Small-Pox.	Died unvaccinated.	Vaccination postponed by Medical Certificate.	Remaining	The Children not finally accounted for (including cases postponed) being Per Cent. of Births.
1872	821,856	698,137	1,693	905	78,594	42,527		5·1
1873	826,508	704,666	942	86	80,512	4,264	36,038	4·8
1874	854,787	727,065	920	96	85,325	5,677	35,704	4·8
1875	850,354	722,466	838	38	86,673	5,914	34,425	4·7
1876	887,694	763,277	848	107	84,930	5,528	33,004	4·3
1877	887,947	766,824	926	118	79,497	6,681	33,901	4·5
1878	891,743	760,982	840	44	87,936	6,475	35,466	4·7
1879	880,222	756,835	742	26	78,478	6,670	37,471	5·0
1880	881,652	750,203	859	46	87,361	5,930	37,253	4·9
1881	883,744	765,162	1,017	81	77,471	6,302	33,711	4·5
1882	889,082	763,525	993	45	81,498	7,598	35,423	4·8
1883	890,780	762,080	1,012	93	81,955	8,110	37,440	5·1
1884	906,581	764,975	1,363	81	90,134	8,693	41,335	5·5
1885	894,263	757,714	1,278	42	83,686	9,323	42,220	5·8
1886	903,846	754,059	1,278	20	90,774	10,187	47,528	6·4
1887	886,198	733,980	1,556	27	87,827	10,402	52,406	7·1
1888	879,813	719,103	1,888	12	83,287	12,282	62,701	8·5
1889	885,909	707,161	1,758	2	88,995	13,366	74,627	9·9
1890	875,188	682,560	1,672	2	91,768	13,615	85,571	11·3
1891	914,079	693,117	1,806	9	96,351	13,823	108,973	13·4
1892	890,695	663,657	1,983	26	92,490	13,278	119,261	14·9
1893	914,557	661,513	3,394	39	102,442	13,845	133,324	16·1

From these figures it may be inferred that, as regards those children whose births were registered during each of the years 1872-1883, the proportion primarily vaccinated remained practically the same. The effect of the opposition to the practice of vaccination, which in some parts of the country has grown of recent years (though to some extent at all events it has existed in England during the whole period now dealt with), is shown by the gradual diminution of the proportion primarily vaccinated in the case of children whose births were registered in England or Wales during each of the ten years 1884-1893. The diminution of this proportion did not, of course, necessarily result at once in a diminished proportion of the population who had, at some time in their lives, been vaccinated.

The materials before us do not allow us to make any numerical statement of the proportion, as time went on, during the period 1838-1894, of the population of England and Wales who had at some time been vaccinated. So far as we can judge of the effect of the efforts made during that period to extend the practice of vaccination, the proportion of the population who had at some time been vaccinated has steadily grown, though with no even rate of increase, during the years from 1840 onwards, down to a recent date at all events. The rate of increase was greater in 1853, and the few years immediately following it, than in previous years, and again expanded, still more considerably, in the years from 1868 to 1872, and perhaps in some few succeeding years.

Speaking generally of the period since 1838, there has been, as the table given on p. 000 clearly shows, a marked though irregular decline in the death-rate from small-pox.

It may be well, too, to note at once a striking feature of this decline. During the period 1838-1894 the decline in the death-rate at all ages from Small-Pox has not been shared alike by the population at every age. While the decline in the death-rate of the population under ten years of age has been even more

marked than the decline shown by the table in p. ooo in the death-rate at all ages, there has been amongst the population over ten years of age a far less marked decline or, at certain of the higher ages, an actual increase in the death-rate. We shall have presently (pp. ooo-ooo) to discuss fully this question of the altered age incidence of fatal Small-Pox, both in England and Wales and in Scotland and Ireland.

We have dealt so far with the evidence afforded by the statistics of the mortality from small-pox at different epochs in view of the spread or continued practice of vaccination. It seems to us scarcely possible to deny that, speaking generally of the British Isles, a more vaccinated population has exhibited a diminished mortality from small-pox. It was not, of course, to be expected that this should be seen year by year, or that the correspondence should be exact, even assuming vaccination to be the principal cause of this diminished mortality. We have already pointed out that small-pox tends at times to become epidemic, *i.e.*, to spread more readily than at other times. The occurrence of the conditions, whatever they may be, which cause the disease to be thus epidemic have, of course, no relation to the state of the population as regards vaccination, even conceding to the full that it has a protective effect. The only result of wide-spread vaccination, in a case where small-pox became epidemic, could be to render the extent of the epidemic more limited, and its fatality less than it would otherwise be. All that we should anticipate then would be a general correspondence over a long series of years between a vaccinated condition of the people and a diminished mortality from small-pox.

In considering whether vaccination has been the principal cause of the decline, we must inquire whether the other causes suggested by those who deny the efficacy of vaccination will satisfactorily account for it.

It is said that the decline has, in the main, been due to changes in the general conditions of life in the different parts of

the United Kingdom, apart from the spread of the practice of vaccination; amongst other things, to improvement of sanitary conditions.

It is beyond doubt than an infectious disease like small-pox is, other things being equal, more likely to spread in towns than in country districts, and more likely to spread in crowded town districts than in others not so densely populated; so that we should expect a lessened proportion of over-crowded dwellings, by diminishing the opportunities for contagion, to check the prevalence of the disease and consequently to render its mortality less.

On the other hand it is certain that, during the period of the decline, there has been in England and Wales and in Scotland, though not in Ireland, a large increase of the population; so that the density of the population in two out of these parts of the United Kingdom, taking each of them as a whole, has been increasing.

And it is equally certain, and probably far more important, that in all of them, during the period of the decline, there has been a continually growing proportion of the population living in the towns, and particularly in the larger towns.

This growth of the proportion of the population living in towns has been a condition tending to an increased prevalence of, and mortality from, small-pox.

There has also been, during the period of the decline, another change in the conditions of life, affecting all three countries, which would seem, at all events on *a priori* grounds, to have largely tended to an increased prevalence of small-pox; namely, the enormous and continued extension of movement among the population, and of communication with other countries, following the increasing facilities for such movement and communication.

We have already pointed out that on *a priori* grounds it is

reasonable to think that improved sanitary conditions would tend to diminish the fatality of, and so to a corresponding extent the mortality from, small-pox. And there can be no doubt that the period with which we are dealing has been characterised by an improvement of this description. There has been better drainage, a supply of purer water, and in other respects more wholesome conditions have prevailed.

We have seen, then, that if some changes have occurred tending to diminish mortality from Small-Pox, other changes have been simultaneously in progress tending in the contrary direction. We do not think it possible to strike the balance between the two, and assert that it would tell in favour of a smaller mortality. In saying this, we do not mean to indicate an opinion that sanitary improvements have been without an effect on Small-Pox mortality, but only that, when all the changes which have occurred are considered, it cannot be asserted that they afford an adequate explanation of the diminished mortality from Small-Pox.

If, however, improved sanitary conditions were the cause of the mortality from Small-Pox becoming less, we should expect to see that they had exercised a similar influence over almost all other diseases. Why should they not produce the same effect in the case of Measles, Scarlet Fever, Whooping Cough, and, indeed, any disease spread by contagion or infection, and from which recovery was possible? Why should they not lead to these diseases also prevailing less, and to those attacked by them being better able to combat the disease?

We have had put before us no satisfactory answer to these questions. It has, indeed, been urged that whilst the diseases we have just mentioned almost exclusively affect children, Small-Pox largely attacks adults. We cannot feel that this circumstance is of much weight. It must be remembered that in former days Small-Pox was more fatal to children than to any other class. But apart from this, we fail to see why improved sanitary

conditions should enable children (and as we have said it is amongst them that the diminution of Small-Pox mortality has been greatest) to escape attacks of Small-Pox and overcome the disease rather than to escape from and overcome any of the other diseases to which we have referred.

In the case of Measles, there has not been during the period in question any diminution in the mortality corresponding with that displayed in the case of Small-Pox.

The following table shows the mortality from Measles in England and Wales during each of the years 1838-1842 and 1847-1894. The figures for the years 1843-1846 are not available :—

Year.	Deaths from Measles to every 100,000 living.	Year.	Deaths from Measles to every 100,000 living.
1838	43	1867	30
1839	71	1868	53
1840	59	1869	46
		1870	34
1841	43		
1842	54	1871	41
1843	Causes of death not abstracted by Registrar-General.	1872	37
1844		1873	32
1845		1874	52
1846		1875	26
1847	51	1876	41
1848	40	1877	37
1849	31	1878	31
1850	40	1879	36
		1880	48
1851	52		
1852	32	1881	28
1853	27	1882	48
1854	50	1883	35
1855	39	1884	42
1856	37	1885	53
1857	31	1886	43
1858	48	1887	59
1859	49	1888	35
1860	48	1889	52
		1890	44
1861	45		
1862	48	1891	44
1863	55	1892	46
1864	40	1893	37
1865	41	1894	39
1866	51		

We find, indeed, as regards England and Wales, that though the death-rate from Measles was higher in the three years 1838, 1839, and 1840, than it has been in any three consecutive years since, there has been no material decline in that death-rate during the years 1838-94.

The following table shows the mortality from Scarlet Fever and from Diphtheria in England and Wales during each of the years 1838-1842 and 1847-1894. We are unable, for the earlier years included in the table, to separate those causes of death :—

Year.	Deaths from Scarlet Fever to every 100,000 living	Deaths from Diphtheria to every 100,000 living	Year.	Deaths from Scarlet Fever to every 100,000 living	Deaths from Diphtheria to every 100,000 living
1838	38		1867	57	12
1839	67		1868	100	14
1840	126		1869	124	12
1841	89		1870	145	12
1842	79		1871	82	11
1843	Causes of death not abstracted by Register-General.		1872	52	9
1844			1873	56	11
1845			1874	105	15
1846			1875	85	14
1847	86		1876	69	13
1848	118		1877	59	11
1849	75		1878	75	14
1850	75		1879	69	12
1851	76		1880	68	11
1852	104		1881	55	12
1853	85		1882	52	15
1854	100		1883	47	16
			1884	40	19
1855	89	2	1885	23	16
1856	71	3	1886	22	15
1857	65	8	1887	28	16
1858	121	34	1888	23	17
1859	98	52	1889	24	19
1860	49	26	1890	24	18
1861	45	23	1891	17	17
1862	73	24	1892	19	22
1863	148	32	1893	24	32
1864	142	26	1894	17	29
1865	84	20			
1866	55	14			

We do not think it necessary to burden our report with similar details in reference to the mortality from Whooping Cough during the period under discussion. It will be sufficient to say that there has been no decline in the mortality from that disease corresponding with the decline in Small-Pox mortality.

Great stress has been laid on the fact that the records of the Registrar-General show that the mortality returned under the head "fevers" has very largely diminished. But it is notorious that in comparatively recent years the nomenclature and classification of diseases where fever is present have undergone great changes, owing to improved diagnosis. In the case of many such diseases where the cause of death was formerly returned merely as "fever," it is now attributed to some other disease separately specified. The apparent diminution is therefore not entirely a real one. Changes in nomenclature and classification, however, cannot wholly explain the diminution in the number of deaths returned as due to fever, though they prevent exact quantitative comparison such as can be made in the case of diseases like Small-pox, Measles, &c. The mortality from fevers has undoubtedly decreased largely. In considering the relation of this decrease to improved sanitary conditions, it is important to advert to the nature of these sanitary improvements. They may be broadly classed as follows:—(*a*) Drainage, including in the term the removal of moisture from damp and swampy places, and the adequately rapid and effectual removal of the excreta of the bowels and the kidneys. (*b*) Ventilation of dwellings or the rapid and effective renewal of the air surrounding the inhabitants. (*c*) Lighting of dwellings. The means taken to secure this also entail greater ventilation; the two go together, but besides this the effect of light on organisms or microbes, to which contagia seem analogous, would lead one to suppose that increased light, at least sunlight, tended to destroy contagia. (*d*) A supply of pure water for drinking purposes. (*e*) Personal cleanliness. This, apart from its influence on general health, would have a tendency to render an individual less likely to receive contagion,

and less likely to convey it to another. (*f*) The increased general recognition, during the last 10 or 20 years especially, of contagion as the source of certain diseases, and increased knowledge of the means of avoiding its spread, may be recognised as a sanitary improvement of no slight value. It is obvious that these sanitary changes are not calculated to effect even all zymotic diseases in the same manner and to the same extent. The chief fevers are (1) Malarial Fevers, (2) Typhus, (3) Typhoid. There is much uncertainty concerning the fever classed as "simple continued," nor does this appear ever to have contributed largely to the returns. Now, Malarial Fevers are directly dependent on the development of the contagia in swamps and marshes; when these are adequately drained the fevers disappear. Typhus Fever, which seems to have furnished the largest share of "fevers" in the last and in the beginning of this century, is found to prevail in connection with overcrowding in dark ill-ventilated dwellings, combined with deficient nutrition. When these conditions cease, the fever disappears, and Typhus has thus become almost unknown in this country at the present day. Typhoid Fever is directly dependent on the contagia furnished by the excreta of one case being introduced into the alimentary canal. Where, by means of adequate drainage and personal cleanliness, this is prevented, the disease is prevented also. In the case of each of these fevers, then, there are special circumstances developing the disease which sanitary improvements tend directly to remove. There is no like feature in the case of Small-Pox. It resembles Measles in this, that the spread of it is not connected with any particular sanitary fault, as distinguished from those general conditions which tend to the spread of infectious disease. There is no evidence in the history of Small-Pox, either before or during the nineteenth century, to connect outbreaks of that disease in a special way either with imperfect removal of excreta, or with lack of air and light, or with deficient food, or with lack of personal cleanliness. Moreover, the general tendency of sanitation to lower the prevalence and the fatality of the disease is largely neutralised both in the case of Small-Pox and Measles by the greater facility

of intercourse. Whilst, then, there is ample reason to regard the decrease in the case of Typhus and Typhoid Fever (and it may, perhaps, be said of fever generally) as the result of improved sanitary conditions, since each of these is specially dependent on conditions which sanitary improvements have removed, there is no adequate reason to attribute the decrease of Small-Pox in the nineteenth century to a similar cause, though we fully recognise that sanitary improvements have had an effect in reducing the mortality from Small-Pox as from the other diseases to which we have just been referring. This view is strongly confirmed by the fact that, in spite of sanitary improvements, the mortality from Measles and Whooping Cough has remained undiminished, and the diminution in the mortality from Scarlet Fever has only been apparent in comparatively recent years.

It has been maintained that the decline in Small-Pox mortality is largely due to more frequent and systematic attempts to isolate those suffering from Small-Pox. We think an answer to this contention is to be found in the fact that, as we shall presently show, it is only in quite recent years that there has been any systematic practice of isolating Small-Pox patients, and that it has been confined even then to a very limited number of localities. The fact to which we are about to call attention in greater detail than hitherto, that the decline in the deaths from Small-Pox is found almost exclusively among those of tender years, appears also to militate against the contention. The risk of contagion is not confined to children. Adults also are subject to it. If a better system of isolation had been a main cause of the reduced mortality, we should have expected to see it operate in the case of adults as well as of children. At the same time we are far from thinking, as will appear when we come to deal with that subject, that the efforts at isolation which have characterised recent years have been without a beneficial effect on Small-Pox mortality.

A study of the age incidence of Small-Pox mortality is very

instructive. In connexion with this point it is necessary to bear in mind that experience has led to the conclusion that whatever be the protective effect of vaccination it is not absolutely permanent; the most convinced advocates of the practice admit that after the lapse of nine or ten years from the date of the operation, its protective effect against an attack of Small-Pox rapidly diminishes, and that it is only during this period that its power in that respect is very great, though it is maintained that, so far as regards its power to modify the character of the disease and render it less fatal, its effect remains in full force for a longer period and never altogether ceases. The experience upon which this view is founded is derived almost exclusively from the case of infantile vaccination. It has been supposed by some that the transitory character of the protection results from changes connected with the growth from infancy to adult years. Whether this be so or not, we have no means of determining.

No doubt when Jenner drew the attention of the public to the value of vaccination, he believed that a single successful inoculation of vaccine matter secured absolute immunity for the future from an attack of Small-Pox. It is certain that in this he was mistaken. It may well be doubted whether the anticipation was a reasonable one. No such immunity is secured by an attack of Small-Pox, though there are few who would maintain the proposition that it is without protective influence against another attack. *A priori* there would seem to be no sound ground for expecting that vaccinia would afford more potent protection than Small-Pox itself. The extent of the protection afforded (assuming that there is some protective influence) could only be determined by experience. It soon became apparent that Jenner had, in the first instance, over-rated the effect of vaccination. That he should thus have over-estimated it is not to be wondered at, when the tendency to be unduly sanguine, which besets the discoverer of any new prophylactic, and, indeed, every discoverer, is borne in mind.

The fact has been already noted that in the eighteenth

century (and there is no satisfactory evidence that there was a difference in this respect in earlier centuries) Small-Pox was fatal chiefly to children; indeed, in particular local epidemics of which we have records, the mortality was confined entirely, or almost entirely, to that class of the population. Adults were at that time very largely protected by a previous attack of Small-Pox. Children were then the only class, for the most part, unprotected. During the present century this cause of protection has largely diminished; it is now only a very small section of the community which enjoys protection thus acquired. If, then, vaccination be most potent in its effect during the first few years after the inoculation of the vaccine matter, we should expect to find the conditions which formerly existed reversed—children would be the best, adults the worst protected class.

Applying ourselves now to the statistics on this head, we find a remarkable change in the age incidence of Small-Pox mortality. The following table exhibits the change which has taken place in this respect. For the years 1848-54 cases of Chicken-Pox are unavoidably included, there being no means of distinguishing them. This, of course, tends to increase unduly the share of mortality borne by the earlier age periods, but the information which we possess with reference to Chicken-Pox mortality since mortality from that disease has been separately recorded, enables us to say that the error thus introduced cannot seriously affect the comparison. From 1855 onwards Chicken-Pox has been uniformly excluded, so that from that date there is nothing to affect it.

England and Wales: Deaths from Small-Pox at certain age periods to 1,000 deaths from Small-Pox at all ages.

——	Under 1.	1-5	5-10	10-15	15-25	25-45	45 and upwards.
1848-54 ...	251	426	130	33	75	67	18
1855-59 ...	231	328	144	37	117	112	31
1860-64 ..	237	313	108	42	123	133	44
1865-69 ..	231	314	103	33	126	145	48
1870-74 ..	143	169	140	58	200	224	66
1875-79 ...	112	129	113	72	218	266	90
1880-84 ...	113	122	98	68	216	286	97
1885-89 ...	112	81	54	51	229	344	129
1890-94 ...	166	117	50	26	131	338	172

The first point calling for notice is that in the period 1855-59, as compared with the earlier period, there was a considerable diminution in the share of Small-Pox mortality borne by those between one and five years of age. In the earlier period it was 426, in the latter 328. As regards those under one year of age, the share fell from 251 to 231. It must, of course, be remembered that whatever the prevalence of vaccination amongst children the age period under one year will always contain a considerable unvaccinated class. We are naturally led to inquire whether there is anything in the history of vaccination to account for the remarkable change we have adverted to. In the year 1853 vaccination was made compulsory, and though no sufficient means were provided for rendering the law effectual, it cannot be doubted that it was calculated to increase vaccination in the subsequent years.

The next marked change is seen in the quinquennium 1870-74. The proportion of Small-Pox mortality borne by those under one year of age decreased from 231 to 143, and of those between one and five years of age from 314 to 169. We have already called attention to the fact that in 1867 power was given to the Guardians to appoint Vaccination Officers, and that advantage was taken of this from time to time by different Unions, though a large number remained without such officers until after 1871, when their appointment was made compulsory. There can be no doubt that the effect of this legislation was to cause an increasing extension of the practice of vaccination in 1868 and subsequent years, and very largely to increase the amount of vaccination in and subsequently to the year 1871. The effect of this would be at once felt in the earliest age-periods, and at a period correspondingly later in the succeeding age periods. We have already pointed out the marked change in the incidence below five years of age in the quinquennim 1870-74, and it will be seen that in subsequent quinquennia there was a diminished incidence in the age-periods 5-10 and 10-15, and later still in the period 15-25. During the last quinquennium there

has been some increase in the incidence of the disease in the first two life-periods. This has been coincident with some diminution in the practice of vaccination.

The following table shows the death-rates in England and Wales from Small-Pox per million living during the seven years from 1848-54, and for each decennium since that period. It is to be remembered that, as already stated, the deaths for the years from 1848-54 include those from Chicken-Pox as well as Small-Pox :—

——	Under 5.	5-10.	10-15.	15-25.	25-45.	45 and upwards.
1848-54 ...	1,514	323	91	110	69	24
1855-64 ...	788·8	209·5	68·7	118·9	87·8	36·2
1865-74 ...	782·5	333·2	142·3	267·2	220·7	87·5
1875-84 ...	127·8	62·9	46·4	82·4	76·6	33·9
1885-94 ...	50·2	14·9	11·1	24·0	31·6	19·0

It is right to observe that there must have been among those whose age exceeded 10 a certain number who had been re-vaccinated. The effect of this operation would be to restore protection, if protection there be, and to place the re-vaccinated in a somewhat similar relation to those of the same age who had been once vaccinated, as vaccinated children bear to unvaccinated. It is not possible to ascertain the number of re-vaccinated persons in the class over 10 years of age in the two epochs respectively. But it seems clear that the mass of the people were not at either epoch re-vaccinated, and we do not think that the number of the re-vaccinated was sufficiently large to affect materially the value of any inferences to be drawn from the contrast to which we have directed attention. We may observe, however, that in discussing the effect of vaccination the question of re-vaccination will have to be considered, and that any phenomena exhibited by the class of re-vaccinated persons, when compared with those of a similar age who have only been vaccinated in infancy, have a similar relevancy to the contrast afforded in the case of vaccinated and unvaccinated persons of a similar age.

In London there had been a considerable falling off in the amount of vaccination for some years prior to 1892. In 1883 the per centage of births left unaccounted for (including, as before, the postponed cases) was 6·5. It was not materially different in the following year. In 1885 it had increased to 7 per cent.; in 1886 to 7·8; in 1887 to 9 per cent.; in 1888 to 10·3 per cent.; in 1889 to 11·6 per cent.; in 1890 to 13·9 per cent,; and in 1891 to 16·4 per cent. Taking these years together, the per centage left unaccounted for is 9·9. The per centages we have given are derived, of course, from a very large number of births, so that the increase in the number appearing thus to be left unvaccinated is very considerable. Thus in the year 1883 the number unaccounted for was 7,816, whilst in 1891 it was 19,806. There seems to be no doubt, therefore, that, so far as regards the class under 10 years old, London compared unfavourably as regards the amount of vaccination both with Warrington and Sheffield.

It has been suggested that Small-Pox is specially amenable to improved sanitary conditions, and that this appears from the influence which they have in diminishing the proportion in which those under five years of age die of Small-Pox in healthy districts as compared with towns, where the sanitary conditions are inferior. In proof of this reliance is placed on a comparison of two tables of mortality, showing of what diseases and at what ages a million live-born children might be expected to die, which appeared in a supplement to the 35th annual report of the Registrar-General, the one derived from a Liverpool life-table and the other from a life-table for certain selected "healthy districts" in different parts of England and Wales. The tables were, in the main, based on the experience of the years 1861-1870, and, of course, assume that the conditions which then obtained would remain unchanged. It is quite true that it appears from these tables that whilst in Liverpool the per centage of deaths from Small-Pox expected under five years of age was 63·5, in "healthy districts" it was only 25·5. But in order to judge whether this difference (so far as it really represents a different

incidence of fatal Small-Pox on the ages under and over five) can be attributed to the superior sanitary conditions of what are termed the "healthy districts," it is necessary to define what is meant by sanitary conditions, and also to see how the case stands with regard to other diseases. A supply of pure water, good drainage, sufficient light and air and cleanliness, these and the like are usually regarded as the elements which render one area superior to another in its sanitary condition. Different areas may be better or worse in these respects or some of them, and this superiority may largely influence zymotic disease.

But in relation to diseases of this class, there are other respects in which a great town differs from rural districts. In the former, a large population is collected in close proximity, whilst in rural districts the population is scattered over a wide area, and the people collected in close proximity are comparatively few in number. The necessary effect of this, as we shall presently show, is that the cases of zymotic disease would be more numerous in the former area than in the latter districts, and that, as regards certain zymotic diseases, a larger proportion of the deaths would occur under five years of age.

In the outbreak of Small-Pox in London in 1892-3, of the vaccinated under 10—110 were attacked, none of whom died. Of the unvaccinated of a similar age, 228 were attacked, of whom 61 died, or 26·7 per cent. Of the vaccinated over 10 years of age, 1,643 were attacked, of whom 39 died, or 2·3 per cent. Whilst of 181 unvaccinated of a similar age who were attacked, 38 died, or 20·9 per cent.

Mr. Marson's observations, made during 32 years in respect of 19,467 cases at the Small-Pox Hospital, showed a fatality among the unvaccinated of 36·5 per cent., whilst the highest death-rate amongst those having vaccination marks, viz., those having one vaccination cicatrix only, was 12·8 per cent. We shall have to revert to his figures presently, when considering the

question whether various degrees of vaccination differ in their protective effect.

Dr. Gayton furnished us with the results of an examination of 10,403 cases at the Homerton Hospital between tne years 1873 and 1884. The deaths amongst the vaccinated (in which class are included those said to be vaccinated, but who had no marks) were 869 out of 8,234, or 10·5 per cent.; the deaths amongst the unvaccinated 43·4 per cent., the numbers being 938 out of 2,169.

So far, we have made no discrimination as regards the age of the persons attacked. Out of the total number of 1,807 deaths, 700, *i.e.*, 38 per cent., were under 10 years of age. The fatality of the vaccinated under 10 was 10·4, being 137 out of 1,306. The deaths among the unvaccinated of a similar age were 563 out of 1,187, or a fatality of 47·3 per cent. If the cases of children under one year of age be excluded, the figures are as follows:—In the vaccinated class, 1,286 cases with 130 deaths, or a fatality of 10·1 per cent.; in the unvaccinated class, 1,032 cases with 465 deaths, or a fatality of 45 per cent.

Over the age of 10, the fatality of the vaccinated was 10·5, being 732 out of 6,928. The death-rate of the unvaccinated of a similar age was 38·1, being 375 out of 982.

Mr. Sweeting put before us statistics relating to 2,584 cases at Fulham Hospital between the years 1880 and 1885. Of these 428 died, or 16·5 per cent. The deaths among the vaccinated (in which class are included, as with Dr. Gayton's tables, those said to be vaccinated, but who bore no marks) were 263 out of 2,226, or 11·4 per cent. The deaths amongst the unvaccinated were 165 out of 358, or 46 per cent. Discriminating again with reference to the age of the persons attacked. Of 202 under 10 years of age in the vaccinated class 16 died, or 7·9 per cent. Of 168 of a similar age in the unvaccinated class 78 died, or 46 per cent. The fatality of the vaccinated over 10 years of age was 12.2, being

247 out of 2,024. Of the unvaccinated of a similar age, 87 out of 190, or 45·7 per cent., died.

It has been urged against these statistics that, even though every effort were made to classify the cases correctly, the classification was still open to error, inasmuch as persons might be brought to the hospital with the eruption of confluent Small-Pox upon them, which would prevent the marks even of efficient vaccination being visible. It is true that this might be so in some cases, but both Dr. Gayton and Mr. Sweeting assert that it could have happened very rarely. We do not think that it could make such a difference as to modify substantially the contrast exhibited in the fatality amongst the vaccinated and unvaccinated classes.

Inasmuch as the vaccinated class includes, both in the case of Dr. Gayton's and Mr. Sweeting's tables, a considerable number who, though said to be vaccinated, showed no marks, it may be interesting to observe what was the fatality in that class when dealt with separately. It contained in all probability a certain proportion of unvaccinated persons. The fatality in this doubtful class in Dr. Gayton's table was 27·1 per cent., being 352 out of 1,295. Eliminating these cases from the total number hitherto treated as vaccinated, the result shown is a fatality of 7·4 per cent., being 517 out of 6,939.

Dealing with Mr. Sweeting's statistics in the same manner, we find the fatality in the doubtful class to be 33 per cent., being 88 out of 266, whilst in the vaccinated class, eliminating these doubtful cases, it is 175 out of 1,960, or 8·9 per cent. It will thus be seen that there is a somewhat striking correspondence in the death-rate shown by this doubtful class in the two cases, and that in each case that death-rate was considerably higher than the fatality in the vaccinated, but considerably lower than that in the unvaccinated class.

We proceed to consider the explanations of the contrast

between the fatality of Small-Pox in the case of the vaccinated and the unvaccinated, which have been suggested by those who deny that it is due to vaccination. It has been said, and this is the main argument employed, that the unvaccinated are mostly to be found in the poorer and more neglected classes of the population, who would on that account be constitutionally weaker, and less able to resist an attack of Small-Pox, and to escape a fatal result. Speaking generally, this may be to some extent true, though it is not so at all times and in all places. There are facts stated in the reports we have so often quoted, especially those relating to Warrington, Dewsbury, Leicester, and Sheffield, and in the evidence with reference to the last-named town, which seem to show that the explanation suggested cannot be the correct one. In the report on the Warrington epidemic, as we shall see immediately, it is expressly stated that the vaccinated and unvaccinated were of the same class, and lived in the same houses and in the same manner. Moreover, the persons admitted into the Homerton and Fulham Hospitals were for the most part, whether vaccinated or unvaccinated, of the pauper class, or of the class immediately above it. It is not conceivable that in this section of the population the presence of vaccination or its absence should indicate so marked a difference of constitutional strength as to account for the difference of Small-Pox fatality which we are now considering. It is further to be observed that, taking the statistics of the six towns, in the case of the vaccinated aged 1-10 the fatality was 2·8 per cent., in the case of the unvaccinated of a similar age it was 30·3 per cent., whereas in the case of those over 10 years the fatality in the case of the vaccinated was 5·4 per cent., in the case of the unvaccinated 34·3. It will be seen, therefore, that the disparity in the death-rate of those classed as vaccinated and unvaccinated was greater nearer the date of vaccination than it was at a later period. The same phenomenon is observable in the hospital statistics. We do not think it possible, then, to accept the suggestion that there were more of the poor in the unvaccinated than in the vaccinated class as a sufficient explanation of the contrast we have been con-

sidering. The difference of fatality in the two classes is, in our opinion, far too great to be thus accounted for, and the suggested explanation does not explain all the phenomena. We should think it much more reasonable to conclude that the remarkable difference of fatality was due to vaccination, even if it were only in that respect that the two classes differed in their relation to Small-pox. But this is not the case. There are other points of distinction between the two classes. We are about to discuss the differences they exhibit both in liability to be attacked by Small-Pox and in the type of the disease from which they suffer. And the bearing of these facts upon the question whether the smaller fatality in the vaccinated class is due to vaccination, which is obviously important, will afterwards be considered.

Another explanation given of the greater fatality which characterises the unvaccinated class has been that, inasmuch as the unvaccinated class includes those whose vaccination has been postponed for medical reasons, there would be amongst its number a larger proportion of children of delicate constitution who would on that account be more likely to succumb to an illness. With reference to this argument, it is to be observed in the first place that the number of those whose vaccination is postponed for medical reasons is but small, and in the next place that the postponement by no means necessarily shows that the child is of a delicate constitution. It often results from the presence of some ailment to which young children are subject, and which affects the strong no less than the weak. But besides this it must be remembered that those whose vaccination is postponed are frequently vaccinated at a later period, and thus pass from the class of the unvaccinated to that of the vaccinated. Giving due weight to these considerations, we find it impossible to believe that the cause suggested can account to any material extent for the difference to which we have been adverting between the fatality among children under 10, observed in the classes of vaccinated and unvaccinated. It must always be borne in mind that the difference is not a narrow one, it is not measured by a

small per centage. A broad margin might be allowed for error without the force of the argument derived from the contrast being seriously diminished.

The next point for consideration is the question whether the evidence shows that vaccination has a protective effect against an attack of Small-Pox. We have lately been considering whether it affords any protection against death from the disease in persons attacked by it. The question with which we have now to deal obviously presents greater difficulty in arriving at accurate results. The liability to attack depends on contact with or proximity to sources of infection. When an epidemic of Small-Pox visits a town, the liability to infection of the inhabitants of different parts of the town may differ widely. Those who are residing in a house where a person is suffering from Small-Pox are subject to a risk which does not attach to persons living in a house not so invaded. On the other hand, persons moving about the town, or congregating for purposes of business or pleasure may come in contact with sources of contagion, so that the risk of contagion is, of course, not confined to those who are living in a house where Small-Pox is present, though it may be greater in the case of this class than of the rest of the community. These considerations appear to have been kept in view by the medical men who have dealt with the matter in their reports on the local epidemics to which we have so often referred.

In his report upon the outbreaks in London during 1892 and 1893 Dr. Luff has not entered into the question of the rate of attack among the unvaccinated as compared with the vaccinated. His report, nevertheless, affords some data for such a comparison. Of a total number of 2,353 cases as to which he obtained information there were 409 unvaccinated persons, or 17·3 per cent. It is not likely that the percentage of unvaccinated persons, whether in London or in the districts specially effected, was as great as this.

Dealing with the age period 0—10, there were 358 attacks.

Of the persons thus attacked, 228 were unvaccinated, or a percentage of 63·7.

It is not open to doubt that this was greatly in excess of the percentage of unvaccinated persons under 10 years of age in London or in any part of it.

Turning now to the statistics of Small-Pox in London hospitals supplied by Dr. Gayton and Mr. Sweeting, we find that the percentage of unvaccinated persons treated in the Homerton Hospital was 20·8; the numbers being 2,169, out of 10,403. Of children under 10 years of age the number of unvaccinated admitted was 1,187, out of 2,493, or 47·6 per cent.

At the Fulham Hospital 358 was the number of admissions of unvaccinated persons, out of a total of 2,584, the percentage being 13·8.

Out of the total number of 370 children under 10 years of age admitted to the hospital 168, or 45·4 per cent., were unvaccinated. It will be remembered that all those who were said to be vaccinated, even if they showed no marks of it, were excluded from the unvaccinated class.

When these figures are examined they show a proportion of unvaccinated persons, especially children, admitted to the hospital which it is impossible to believe corresponded with the proportion of unvaccinated persons existing in the population of London or of any district of it.

It has been suggested that the inmates of these hospitals were drawn from the poorer class of the population, and that in that class there would be a larger proportion of unvaccinated persons than in the population at large. This, probably, is so to some extent. But it seems to us quite inadequate as an explanation of the very large proportion of unvaccinated children admitted to the hospitals. When the returns of vaccination in London are examined it will be seen that the children not finally

accounted for between the years 1872 to 1884 had only ranged from 9·3 of the births in 1874 to 5.7 in 1881, the average for those 13 years being but 7·4.

Our attention has been called to the fact that the proportion of vaccinated patients admitted to the Highgate Small-Pox Hospital has often been as high as 94 or 95 per cent. And it has been suggested that this indicates an attack-rate in London in the class of vaccinated persons quite as high as that prevailing in the case of the unvaccinated. The experience at the Highgate Hospital certainly differs greatly from that of either Homerton or Fulham. The test was a larger one in point of number at the two latter hospitals than at the former. Moreover, the fact mentioned in the preceding paragraph must be borne in mind. In London the absence of vaccination is to found chiefly in the poorer classes of the population. The inmates of the Highgate Hospital belonged in part to a more prosperous class. In that class the cases of non-vaccination would be very rare. Moreover, those who were admitted by contract with the Guardians of different Unions came from areas outside London. It will not do, therefore, to estimate what was the proportion of vaccinated and unvaccinated persons in the population of London when considering whether the unvaccinated contributed more than their share of the Inmates of the Highgate Hospital.

We think, taking it all together, that the evidence bearing upon the question whether the vaccinated are less liable to be attacked by Small-Pox than the unvaccinated, points to two conclusions; first, that there is, taking all ages together, less liability to attack among the vaccinated than among the unvaccinated, and next, that the advantage in this respect enjoyed by vaccinated children under 10 years of age is greatly in excess of that enjoyed at a more advanced period of life.

It is alleged that vaccination not only diminishes the risk of attack by small-pox and the fatality of that disease, but that it

renders the type of the disease in the vaccinated less severe than it would have been had they remained unvaccinated.

Small-pox differs greatly in the degree of its severity. It may be an illness of a very serious character, entailing grave after consequences, or it may be a comparatively trifling ailment. The most severe forms of the disease have been termed malignant or hæmorrhagic. Next in severity comes the confluent type, which is also of a very serious character. The mildest species of the disease has been termed varioloid, or sometimes simply "mild." Between the confluent and the mild or varioloid come in order of severity the coherant and the discrete types.

Quite apart from the danger of a fatal termination to the illness, it is obviously a matter of great importance to those who suffer from the disease that its type should in their case be of a mild rather than of a severe character, not merely because the illness is in the one case trifling and in the other painful and prolonged, but because evil consequences such as pitting of the countenance often follows in the one case which in the other are absent. It is important, then, to test the validity of the assertion that vaccination has this beneficent influence, and that for two reasons. If it can be established it would show, first, that vaccination carries with it this distinct advantage independently of the others we have been considering; and next, it would add support to the view that vaccination has an influence upon the disease of small-pox, a point which has been contested. Let us inquire, then, what light the evidence throws upon the claims thus advanced in favour of vaccination.

He divides the cases into "very mild," "discrete," "severe discrete," "confluent," and "hæmorrhagic." The cases in the latter class are very few in number, and it will be more convenient to class them with the confluent cases.

The number of cases in which the type of disease was discriminated was 2,353, of whom 1,944 were vaccinated or doubtful and 409 unvaccinated.

Of the 1,944 vaccinated cases—

108, or 5·6 per cent., were very mild.
1,622 ,, 83·4 ,, ,, discrete.
32 ,, 1·6 ,, ,, severe discrete.
182 ,, 9·4 ,, ,, confluent.

Of the 409 unvaccinated cases—

2, or 0·5 per cent., were very mild.
142 ,, 34·7 ,, ,, discrete.
64 ,, 15·6 ,, ,, severe discrete.
201 ,, 49·1 ,, ,, confluent.

Separating now children under 10 years of age :—

Of the 130 vaccinated cases—

30, or 23·1 per cent., were very mild.
83 ,, 63·8 ,, ,, discrete.
4 ,, 3·1 ,, ,, severe discrete.
13 ,, 10·0 ,, ,, confluent.

Of the 228 unvaccinated cases—

1, or 0·4 per cent., was very mild.
84 ,, 36·8 ,, were discrete.
45 ,, 19·7 ,, ,, severe discrete.
98 ,, 43·0 ,, ,, confluent.

In London, a classification of the types of disease renders comparison less easy. If, however, the severer class be composed of the severe discrete and the confluent, the milder class as before consisting of the mild and discrete, the result is as follows :—

——		Milder.	Severer.
London	Vaccinated ...	89·0	11·0
	Unvaccinated	35·2	64·8

If the proportion which the mild bear to the severe cases in those under 10 years of age be examined, it will be seen that in the vaccinated class the ratio of the milder type is much greater

than at all ages; indeed, the proportion of severer cases is in all the towns quite insignificant.

Before passing to another branch of the subject it will be well to take account of the bearing upon one another of the facts relating to the fatality, the attack-rate, and the type of the disease of Small-Pox, which we have been considering. Between the facts with which we have been concerned when investigating the fatality of Small-Pox, and those which have engaged our attention when considering the type of the disease, the connexion is obvious and intimate.

In each of these cases we have had to deal with the same classes of vaccinated and unvaccinated persons—indeed, we may say with the very same persons—we have already pointed out that it is more than improbable that on a division of the persons who suffered from Small-Pox, into two such classes the fatality should be so strangely different, unless there were something in the condition of the one class which differentiated it from the other, and rendered those within it less liable to suffer fatally from the disease. What is to be said when it is found that, apart from the fatality of the disease, its type in the two classes also differs, and perhaps even more widely than its fatality does, and that the milder type distinguishes the same class which exhibits the smaller fatality? That this should be a mere chance coincidence is incredible when it is observed that the phenomenon is uniform not only in the case of epidemics in five different towns, but in the case of the same epidemic in different parts of the same town. The facts surely afford strong corroboration of two propositions; first, that a classification was, on the whole, accurately made in these cases of persons whose condition in relation to Small-Pox differed from one another; and, secondly, that this difference of condition was due to vaccination.

We cannot but lay stress on the force of the facts relating to the fatality, the attack-rate, and the type of the disease, in the vaccinated and unvaccinated classes, when considered in combina-

tion with one another. So far as can be ascertained, there was nothing materially to distinguish the two classes, except that the one contained, with some possible exceptions, unvaccinated persons only, whilst the other consisted, certainly for the most part, of vaccinated persons; unless it be, as suggested, that the unvaccinated class comprised a larger proportion of weakly persons. We have already expressed our opinion that this suggested distinction is not an adequate explanation of the very different fatality in the two classes if that phenomenon stood alone. It appears to us in no way to account for the difference in the attack-rate and type of the disease which equally distinguishes these same classes. Though a stronger constitution may enable a patient better to battle against the disease, and so avoid a fatal result, than a weaker one, we are not aware of any evidence that strength of constitution would determine the type of the disease. We believe that confluent cases are frequently found in those whose constitution is strong, and mild cases in those who are not of robust health. Nor, again, is there any ground for asserting that if both came equally within the reach of contagion a person of good physique would escape its influence, while another less robust would be attacked by the disease. And yet the distinction between the vaccinated and unvaccinated is as marked, or even more marked, when the attack-rate and type of disease are studied than when the fatality of the disease is in question.

In dealing with the comparison between the attack-rate and fatality of the classes of vaccinated and unvaccinated persons, no distinction has hitherto been drawn in respect of the quality or character of the vaccination. Many (though not a large number proportionately) have been included in the vaccinated classes whose arms bore no marks of vaccination. In the case of some of these the operation of vaccination may have been performed without success. If vaccinia did not result from the operation, it could, of course, have no more effect than if it had never been performed. Amongst those whose bodies showed by the marks they bore that vaccination had undoubtedly been successful, the

number of cicatrices varied from one to four and upwards. The cicatrices differed also in size. They have also been distinguished according as they exhibited, or did not exhibit, foveation. The question whether the protection afforded by vaccination differs in proportion as it has been, more or less thorough has been made the subject of investigation.

Dr. Gayton, in his analysis of the cases of the Homerton Hospital already referred to, furnishes the following particulars:—

Of 592 persons with 1 good mark, 22 died, or 4·1 per cent.
„ 649 „ „ 2 „ marks, 22 „ 3·3 „
„ 518 „ „ 3 „ „ 12 „ 2.3 „
„ 389 „ „ 4 or more good marks, 6 died, or 1·5 per cent.

The following table gives the results derived from Mr. Sweeting's observations at the Fulham Hospital, divided according to the age periods 0 to 10, and over 10 years of age:—

—	One Mark.			Two Marks.			Three Marks.			Four & over Four Marks.		
	Cases.	Deaths.	Death Rate.	Cases.	Deaths.	Death Rate.	Cases.	Deaths.	Death Rate.	Cases.	Deaths.	Death Rate.
0—10	21	1	4·76	29	1	3·45	37	0	0	53	0	0
Over 10 years of age	384	41	10·68	509	46	9·04	459	37	8·06	396	19	4·80
At all ages ...	405	42	10·37	538	47	8·73	496	37	7·45	449	19	4·23

With regard to the area of the marks, Mr. Sweeting gives the following information:—

—	More than ½ square inch Total Area.			Less than ½ square inch total Area.		
	Cases.	Deaths.	Death Rate.	Cases.	Deaths.	Death Rate.
0—10	0	0	—	11	0	0
Over 10 years of age	60	3	5 per cent.	240	40	16·6 per cent.

Dr. Thorne Thorne handed us a table founded (*a*) on information given in the 36th volume of the Medico-Chirurgical Society's Transactions by Mr. Marson, as the result of his observations made during the years 1836 to 1851 on 3,094 cases of post-vaccinal Small-Pox, and (*b*) on data derived from Mr. Marson's evidence before the Vaccination Committee of 1871, based on a further experience of 10,661 such cases, and covering the years 1852 to 1867.

Cases of Small-Pox classified according to the Vaccination Marks borne by each Patient respectively.	Percentage of Deaths in each Class respectively; Uncorrected.		Percentage of Deaths in each Class respectively; Corrected.	
	1836-51.	1852-67.	1836-51.	1852-67.
1. Stated to have been vaccinated, but having no cicatrix	25·5	40·3	21·7	39·4
2. Having one vaccine cicatrix ...	9·2	14·8	7·6	13·8
3. Having two vaccine cicatrices ...	6·0	8·7	4·3	7·7
4. Having three vaccine cicatrices ...	3·6	3·7	1·8	3·0
5. Having four or more vaccine cicatrices	1·1	1·9	0·7	0·9
Unvaccinated	37·5	35·7	35·5	34·9

Taken together, the number of cases, classified according to the marks found on the patients, is very considerable; it exceeds 20,000. Apart from Mr. Marson's cases the number is 6,839. Dealing with this number, they being all cases in which the observations were made in very recent years, and dividing into classes according to the number of marks, we obtain the following result :—

1 mark,	1,357	cases with	85	deaths, or	6·2	per cent.
2 marks,	1,971	,,	115	,,	5·8	,,
3 ,,	1,997	,,	75	,,	3·7	,,
4 ,,	1,514	,,	34	,,	2·2	,,

Dr. Gayton, in his evidence, stated that, in the analyses which he gave of the cases at the Homerton hospital, when he found one good mark and some imperfect marks, he ignored the imperfect marks and only recorded the good one. As the basis of his calculations was not precisely the same as that adopted in the other cases, it may be well to see how the figures would stand if Dr. Gayton's cases be eliminated. We should then have 4,754 cases, distributed as follows:—

1 mark,	828	cases, with	63	deaths, or	7·6	per cent.
2 marks,	1,322	,,	93	,,	7·0	,,
3 ,,	1,479	,,	63	,,	4·2	,,
4 ,,	1,125	,,	28	,,	2·4	,,

We think it is of importance to ascertain the effect of combining in this way the information obtained from different observers. The greater the number of cases in which the comparison can be made, the less opportunity is there for the undue influence of any accidental circumstance, and consequently the higher is the value of the result.

Upon the whole, then, the evidence appears to point to the conclusion that the greater the number of marks the greater is the protection in relation to Small-Pox enjoyed by the vaccinated person. This further indication also seems to be afforded, that whilst the distinction in this respect between those with one and those with two marks is not very great, there is a very marked contrast between those with four or even with three marks as compared with those with either one or two.

The subject of re-vaccination, to which we have already alluded, is obviously one of great importance. If vaccination

exercises a protective influence which diminishes in its effect after the lapse of some years, it is of moment to ascertain whether that influence can be restored by a repetition of the vaccine operation. Moreover, if it should be found that re-vaccinated persons are more favourably situated with reference to an attack of Small-Pox than unvaccinated persons or than persons vaccinated only in infancy, this would obviously have a direct bearing on the disputed question whether vaccination has a protective influence.

Unfortunately, it is not possible to obtain any statistics shewing the amount of re-vaccination in this country generally. It is certain that it varies greatly in different towns, and the amount is probably not anywhere large, in proportion to the number of the population who have passed the age of childhood. The proportion of re-vaccinated persons to the population almost certainly increases in any town immediately after it has been visited by an epidemic of Small-Pox. A panic then arises which leads many people to resort to vaccination.

In speaking of re-vaccination it is necessary to distinguish between cases in which the operation has been performed without result and cases of successful re-vaccination. It is only when the vaccine virus has induced vaccinia that a person can properly be called re-vaccinated. The term is, however, often applied where the attempt to re-vaccinate has failed. In that case the subject of the operation has acquired no more protection by the process than if re-vaccination had never been attempted. No doubt the want of success shews, if the operation has been thoroughly performed, that the person is at the time insusceptible to the virus, and, it may be, to the virus of Small-Pox also. But this condition of insusceptibility is not necessarily permanent, and it is impossible to predicate how long it may last. Moreover, experience shows that where re-vaccination has led to no result, a repetition of the process after a lapse of a few days only may produce the normal features of successful re-vaccination. A single unsuccessful attempt at re-vaccination cannot therefore be

regarded as an indication of insusceptibility unless of the most transient nature. Where re-vaccination is not successful, this may be due on the one hand to insusceptibility produced by the previous vaccination, or, on the other hand, to impotency of the operation caused by the imperfection of the lymph used or by want of skill on the part of the operator. Where re-vaccination, unsuccessful at the first attempt, is successful when the operation is repeated after a short interval, there is strong reason for thinking that the want of success was due to the latter and not to the former cause.

If a re-vaccination is unsuccessful it ought not from that fact to be taken for granted that immunity is certain, but the operation should be repeated once or even twice, as in the case of failure of primary vaccination in infants.

In London Dr. Luff reported the number of attacks of re-vaccinated persons to have been 108, with four deaths, showing a fatality of 3·7. The fatality shown amongst vaccinated persons above the age of 10 in the same epidemic was 4·2. The fatality amongst the unvaccinated of a similar age was 20·9.

The character of the disease in the re-vaccinated class was reported to be mild in 101 cases and severe in seven.

Dr. Gayton gives the following facts as regards Small-Pox among the hospital staff at the Homerton Small-Pox Hospital. From 1st February, 1871, the date when the hospital opened for the reception of patients, to the end of 1877, 366 persons had been employed in the hospital. All of these were re-vaccinated on commencing duty, with the exception of an assistant nurse, who was not brought under Dr. Gayton's notice for some reason until after she had been in the wards. This woman in a fortnight was down with the Small-Pox, and passed through a severe attack, but recovered. Dr. Gayton was unable to give the exact number employed in the years subsequent to 1877, but he thought it might be fairly estimated that an equal number were engaged

in the work. There was only one person attacked among these, she had not been re-vaccinated. A third case occurred, in which a nurse engaged in the hospital was attacked. She was sent into a ward on 27th February, 1880, after being re-vaccinated. On 3rd March, the operation, being evidently a failure, was repeated. On 7th March, however, she presented symptoms of Small-Pox.

In the Small-Pox Ship-Hospitals of the Asylums Board during the 12 years, 1884-95, among the attendants (doctors, nurses and servants), varying in numbers from below 50 during the year to a little over 300, cases of Small-Pox have occurred in three years only, in 1884, in 1892, and in 1893; in all the other years there were no cases at all. In 1884, with 283 attendants employed, there were four cases; in 1892, two cases among 138 attendants; in 1893, six cases among 320 attendants. It is a striking fact that in all these years there should have been so few attacks of the disease amongst so many persons who were in a remarkable way exposed to contagion, for the exposure to contagion in a Ship-Hospital is very great. It is to be observed that in one of these cases the disease appeared within three days of her entering the Hospital; in another nine days, in four others ten days, and in four others twelve to fifteen days after they joined the staff. None of the recorded cases appear to have been re-vaccinated successfully prior to the period of incubation of the Small-Pox, though the operation was in all cases attempted shortly after joining.

Mr. Sweeting gives the following statistics on the same point with reference to the Western Hospital, formerly the Fulham Hospital:—The total staff, during the time the Hospital has been in use, is stated by him to 'have been 362, of whom one half, roughly speaking, were habitually employed in the wards. Of the 362, 48 had had Small-Pox before they came into the Hospital. Of 314 persons who had never had the Small-Pox, seven contracted the disease. Two of these seven had not been re-vaccinated on entering the Hospital, owing to some oversight.

Two were unsuccessfully re-vaccinated, one of these being a case of second Small-Pox; another was not re-vaccinated early enough, as the operation was not performed until the fifth day; and in the other two cases there is no record of any result. These occurred in his predecessor's time. The total staff employed in ambulance duty was 42. Of this number only one took the Small-Pox. He was not re-vaccinated, his arrival not having been reported. He contracted the disease thirteen days after he arrived on duty.

Mr. Marson, surgeon to the Highgate Small-pox Hospital, giving evidence before the Select Committee, stated that during the preceding 35 years no nurse or servant at the hospital had been attacked with Small-Pox. Since then, up to the present time, one case only, that of a gardener, has occurred, so that there is now a record of nearly sixty years with one case only. Of the 137 nurses and attendants who have been taken on since May, 1883, 30 had had Small-Pox previous to their entering the service. (Some of these were patients in the hospital, engaged as nurses or ward maids after their recovery.) All the others were re-vaccinated upon entering the service, with the exception of the one case, the gardener who took the disease.

Typhoid Fever cannot fairly be compared with Small-Pox, since the mode of contagion is different. Nor are there records available as to the hospital staff specially in care of Typhoid Fever or of Diphtheria patients as there are in the case of Small-Pox. But if the cases of ordinary contagious diseases, such as Scarlet Fever and Diphtheria, be taken together, and even if Typhoid Fever be included, a striking contrast is afforded by the returns of the Metropolitan Asylums Board between the attendants in the hospitals treating these diseases, and those in the Small-Pox and Ship-Hospitals mentioned above. This is shown in the following table :—

Year.	Metropolitan Asylums Board's Fever Hospitals.			Metropolitan Asylums Board's Small-Pox Hospital-Ships.		
	Number of attendants employed either temporarily or otherwise in the course of the year.	Of whom, there contracted Scarlet-Fever, Diptheria or Typhoid during the year.		Number of attendants employed either temporarily or otherwise in the course of the year.	Of whom, there contracted Small-Pox during the year.	
		Number.	Proportion.		Number.	Proportion.
1884	Figures not available.			283	4	1.4 per cent.
1885				240	0	0 ,,
1886				110	0	0 ,,
1887	1,103	37	3·4 per cent.	55	0	0 ,,
1888	Figures not available.	35	—	46	0	0 ,,
1889		42	—	53	0	0 ,,
1890	1,312	53	4 0 per cent.	64	0	0 ,,
1891	1,160	68	5·9 ,,	64	0	0 ,,
1892	1,652	121	7·3 ,,	138	2	1·4 ,,
1893	2,175	121	5·6 ,,	320	6	1·9 ,,
1894	2,182	111	5·1 ,,	289	0	0 ,,
1895	2,514	116	4·6 ,,	274	0	0 ,,

Making every allowance on the one hand for the mixed character of the cases in the Fever Hospitals, and on the other hand for doubts about the re-vaccination of some of the staff at the ship-hospital, it is clear that Small-Pox stands apart from all the other contagious diseases in relation to attacks among the staff.

We have further evidence with regard to the postal service. Sir Charles Dilke, speaking in June 1883, made the following statement about those employed in that service in London:— "In the case of persons permanently employed in the postal service in London, averaging 10,504, who are required to undergo vaccination on admission, unless it has been performed within seven years, there has not been a single death from Small-Pox between 1870 and 1880, which period included the Small-Pox epidemic, and there have been only 10 slight cases of the disease. In the telegraphic department where there is not so complete an enforcement of vaccination there have been only 12 cases in a staff averaging 1,500 men." When it is remembered how many of the persons so employed become subject in a degree exceeding

that of the population at large to the risk of contagion, and that the period referred to included that of the epidemic in London of 1870-2, when there were so many attacks of and deaths from Small-Pox, the statement is certainly noteworthy.

We have not been able to obtain information bringing the statistics given above down to the present date. We have been furnished, however, with the following particulars:—

Year.	General Post Office		
	Number of established officers employed.	Number of cases of Small-Pox.	Number of deaths from Small-Pox.
1891	47,264	*None.*	*None.*
1892	54,198	2	*None.*
1893	58,311	4	*None.*
1894	60,490	11	1

It is noteworthy that, in the year 1892, 12 officers were absent from duty on account of the presence of small-pox in their houses; in 1893, 44; and in 1894 as many as 53.

It should be mentioned that a study of the facts observed by the medical men who have investigated recent epidemics tends to the conclusion that the re-vaccination induced by the existence of an epidemic of Small-Pox has played no small part in checking the spread of the disease and narrowing its limits. It seems to have been a very important factor in controlling the epidemic.

Summing up, then, the evidence on the subject of re-vaccination so far as regards this country, we find that particular classes within the community amongst whom re-vaccination has prevailed to an exceptional degree have exhibited a position of quite exceptional advantage in relation to Small-Pox, although these classes have in many cases been subject to exceptional risk of contagion. We find, further, taking the evidence as a whole, that in the population at large re-vaccinated persons seem to be

in a position much more advantageous not only than the un-vaccinated, but than adults who have only been vaccinated in infancy.

There is another conclusion suggested by the evidence to which we ought to advert, for it is of importance. Where re-vaccinated persons were attacked by or died from Small-Pox, the re-vaccination had for the most part been performed a considerable number of years before the attack. There were very few cases where a short period only had elapsed between the re-vaccination and the attack of Small-Pox. This seems to show that it is of importance in the case of any persons specially exposed to the risk of contagion that they should be re-vaccinated, and that in the case even of those who have been twice vaccinated with success, if a long interval since the last operation has elapsed, the operation should be repeated for a third, and even for a forth time.

Much criticism has been applied to the writings of Jenner, and of other early advocates of the practice of vaccination, and strenuous efforts have been made to shew that their observations cannot always be relied on, and that their reasoning was at times unsound. This appears to us, even if it were established, to be of little importance as a guide to the conclusion which ought to be arrived at on the question whether vaccination affords any protection against Small-Pox. We have now in our possession the experience of more than half a century, during which facts relating to the effect of vaccination upon Small-Pox have been carefully recorded. If a study of this experience taught us that vaccination had not exercised any beneficial influence as a protection against Small-Pox, that the ravages of the disease were as great in the case of the vaccinated as of the un-vaccinated, and that no difference could be observed in the manner in which it treated the two classes, we could have no faith in vaccination as a prophylactic, however apparently accurate the observations of Jenner and his associates, or however apparently conclusive their

reasoning. If, on the other hand, the reasonable conclusion, from an experience of more than half a century of the practice of vaccination, be that the vaccinated show less liability to attack by the disease of Small-Pox, or when attacked, suffer less fatally or severely, these facts cannot be displaced by showing Jenner and his associates erred in some respects both in their observations and in the conclusions they founded upon them. It would, in our opinion, in that case, have been proved that however mistaken they may have been in other respects, they were right at least on this cardinal point, that the vaccinated enjoyed a position in relation to Small-Pox superior to that of unvaccinated persons. We think it would be as little reasonable to reject the conclusion to which the experience of vaccination led us, because Jenner and other early advocates of the practice made mistakes, as it would be to believe in its protective influence on account of the credit which seemed due to their judgement or observations, in spite of the lessons to the contrary taught by a lengthened experience of the practice. In saying this, we must not be supposed to admit that all the criticisms to which Jenner and his associates have been subjected are sound, or to give our adhesion to them; we have desired only to point out why it seems to us of comparatively little importance whether they be so or not, and to assign to them their true place among the considerations which ought to guide us in determining the question whether or no vaccination has a protective influence.

We proceed, then, to sum up the evidence bearing upon the question whether vaccination has any, and, if so, what protective influence in relation to Small-Pox, and to state the conclusions at which we have arrived.

We find that the period which immediately followed the introduction of the practice of vaccination was characterised in all countries in which the practice prevailed by a marked though irregular diminution of Small-Pox mortality, and that this diminution of mortality, when compared with the century

preceding vaccination, has continued in those countries down to the present time. We think this statement of the case is accurate, notwithstanding that the present century has witnessed epidemics of considerable severity, even in countries where vaccination has largely prevailed. There has always been in those countries a class, more or less numerous, of unvaccinated persons who would, of course, be no less subject to the disease than if their neighbours, like themselves, had remained unvaccinated. Moreover, if it be true that experience has taught that the protective effect of vaccination diminishes in force, or for some purposes may even disappear, after the lapse of, say, ten years from the date of the operation, there will be many of the vaccinated class liable to be attacked, and to suffer more or less from the disease, even conceding the protective effect of vaccination. We cannot think, therefore, that the fact that epidemics have from time to time occurred, and that deaths from Small-Pox continue, ought reasonably to be accepted as a proof that Small-Pox is uninfluenced by vaccination. In referring to the experience of the period which followed the introduction of vaccination, we are, of course, speaking generally. We have already considered the extent to which causes other than vaccination may have contributed to the diminished mortality from Small-Pox.

We observe next that there has been in the United Kingdom a remarkable change in the age-incidence of Small-Pox. The change does not appear to have been confined to this country, but we limit our remarks to it, because we have not as precise information on the point in the case of other countries. This change in the age-incidence appears, on the whole to have become increasingly marked as the infantile population came to be more completely vaccinated. On the other hand, we have seen that where vaccination has been neglected or practically abandoned, a Small-Pox epidemic has been characterised by a very large mortality among children, when compared with the mortality exhibited in a well-vaccinated place visited by an epidemic of the

same disease. This affords support to the view that vaccination is of protective value against a fatal result in the case of persons attacked by Small-Pox, and that its protective power is greatest during the early years after vaccination has been performed. We are unable to see that any satisfactory explanation has been given of the phenomenon now under consideration except that just indicated. We are indeed quite unable to appreciate the bearing of some of the circumstances which have been put forward as explaining it. As to others, such as improved sanitation, we have already pointed out that they do not really afford any explanation of the phenomenon when viewed, as it must be, in connection with the age-incidence and mortality found to prevail in the case of other diseases.

There is further strong evidence that where attacks of Small-Pox occur the fatality is far less in the case of the vaccinated than of the unvaccinated, and that this difference is much more marked in the first 10 years of life than at a later period. We have given full effect to all the considerations which have been urged with the view of showing that the division into vaccinated and unvaccinated cannot be relied on as accurate. We quite admit that absolute accuracy may not have been obtained in any of the instances in which this discrimination has taken place, but looking at the matter fairly as a whole, we cannot but believe that the division may for all practical purposes be regarded as substantially accurate. Indeed, for the most part it would seem to err, if at all, in representing the vaccinated class as comparing less favourably than it really ought with the unvaccinated, for all cases of doubtful or alleged vaccination have been included in the vaccinated class, and whatever errors there may have been in erroneously placing vaccinated cases in the unvaccinated class, we think that they are counterbalanced by errors in the opposite direction. We think the improbability extreme, indeed it seems to us to reach the point of incredibility, that the fatality in classes of persons discriminated on different occasions by so many different observers, only on the ground that vaccination was

believed to be present in the one and absent in the other, should always show so very wide a divergence, unless there were some real difference in the liability to a fatal attack of those included in the one class as compared with those comprised in the other.

We can see nothing to differentiate them in this respect, save that the one class possessed, while the other did not, the protection of vaccination, unless it be the circumstance suggested that the unvaccinated were drawn from a more neglected, and therefore from a less robust portion of the population. We have already given our reasons for thinking this explanation quite insufficient to account for the phenomenon.

We notice further that the same classes of vaccinated and unvaccinated persons, which display when attacked by Small-Pox so marked a contrast in the fatality of the disease, manifest a contrast no less marked in the type of the disease from which they suffer, viewed in relation to its severity or mildness. Here again, unless vaccination be regarded as the determining cause of the difference, it would remain to us, after considering all the explanations which have been vouchsafed, an unsolved mystery.

The next point forced on our attention is the greater liability to attack, which the evidence shows to exist in the case of the unvaccinated than of the vaccinated. We are, of course, again confronted by the possibility of error in the classification, but the same test was applied in dividing into the two classes those who inhabited the invaded houses as in making a similar division in the case of the individuals attacked. It is possible, too, that the inhabitants of the invaded houses included in the two classes were not all equally within the reach of contagion, but any error in this respect is just as likely to have affected the vaccinated as the unvaccinated class. When the numbers dealt with are considered, and it is remembered that the classification was made in different towns, and always with the same result, we do not think this source of possible error can be regarded as serious.

When we find again that, both as regards the type of the disease and the attack rate, the contrast is specially noticeable in those under 10 years of age, and that the explanations proposed are even less deserving of weight when applied to these phenomena than when regarded as a reason for the difference in the fatality of the disease in the two classes, the conclusion that vaccination exercises an influence in relation to Small-Pox, specially potent during the early years after the operation, to which, as we have already indicated, other considerations point, receives strong confirmation.

We see no reason for hesitating to adopt the conclusions to which we should otherwise be led, or to doubt the accuracy of the facts to which we have been adverting, on account of the objection, even if it be well founded in fact, that the fatality among the unvaccinated at the present day exceeds that experienced before the era of vaccination. We have already pointed out that in the statistics of modern times, with which we have been dealing, the fatality among the unvaccinated varied greatly, and it is by no means established that there were not as great variations in the pre-vaccination days.

We have still to notice two other groups of facts bearing upon the question. We have shown that there is evidence that where vaccination has been most thorough, the protection appears to have been greatest. It may be that on this point the force of the evidence is less than on some of those just alluded to; nevertheless, it cannot be left out of sight, or regarded as of no importance, when we are seeking an answer to the question whether vaccination has a protective influence, or is altogether ineffectual.

The fact that the re-vaccination of adults appears to place them in so favourable a condition, as compared with the unvaccinated—and that, too, even when they are subjected to specially grave risk of contagion, and we take this to be established as a fact—affords further confirmation of the conclusions

suggested by the evidence which we have already passed under review.

We have hitherto, save for a cursory reference to the bearing of some of the facts upon one another, treated the various tests which have been applied to ascertain whether vaccination has a protective effect separately and independently. We have found that in each case the result of the test has been to suggest an affirmative answer to the question. In order to estimate the value of the evidence aright, it is necessary to consider in conjunction all the tests which have been adopted, and the results which they exhibit. They are, it is true, independent of one another, and have been separately applied in a number of cases. But the greater the number of tests employed, and the greater the number of cases to which they are applied, the more certain is it that the play of chance, or the influence of other causes, will be excluded, and the more safely may the conclusions to which they lead be acted upon. The cumulative force of a number of independent pieces of evidence, all pointing in the same direction, is very great indeed. Even if a more or less plausible answer could be suggested in the case of each one of them standing alone, the cumulative force of the testimony might still be irresistible. We think those who have denied the efficacy of vaccination have often lost sight of the circumstance that investigations, which have followed so many different roads, have all led to the same end.

We have not disregarded the arguments adduced for the purpose of showing that a belief in vaccination is unsupported by a just view of the facts. We have endeavoured to give full weight to them. Having done so, it has appeared to us impossible to resist the conclusion that vaccination has a protective effect in relation to Small-Pox.

We think—

1. That it diminishes the liability to be attacked by the disease.

2 That it modifies the character of the disease, and renders it (*a*) less fatal, and (*b*) of a milder or less severe type.

3. That the protection it affords against attacks of the disease is greatest during the years immediately succeeding the operation of vaccination. It is impossible to fix with precision the length of this period of highest protection. Though not in all cases the same, if a period is to be fixed, it might, we think, fairly be said to cover in general a period of nine or ten years.

4 That after the lapse of the period of highest protective potency, the efficacy of vaccination to protect against attack rapidly diminishes, but that it is still considerable in the next quinquennium, and possibly never altogether ceases.

5. That its power to modify the character of the disease is also greatest in the period in which its power to protect from attack is greatest, but that its power thus to modify the disease does not diminish as rapidly as its protective influence against attacks, and its efficacy during the latter periods of life to modify the disease is still very considerable.

6. That re-vaccination restores the protection which lapse of time has diminished, but the evidence shows that this protection again diminishes, and that, to ensure the highest degree of protection which vaccination can give, the operation should be at intervals repeated.

7. That the beneficial effects of vaccination are most experienced by those in whose case it has been most thorough. We think it may fairly be concluded that where the vaccine matter is inserted in three or four places, it is more effectual than when introduced into one or two places only—and that if the vaccination marks are of an area of half a square inch, they indicate a better state of protection than if their area be at all considerably below this.

(*B.*) *As to the objections made to vaccination on the ground of injurious effects alleged to result therefrom; and the nature and extent of any injurious effects which do, in fact, so result.*

We proceed to address ourselves now to another subject submitted to us, viz., "the objections made to vaccination on the ground of injurious effects alleged to result therefrom; and the nature and extent of any injurious effects which do, in fact, so result."

This is obviously a matter of great importance. Not only has the utility of vaccination been denied, but it has been asserted that mischievous effects have been due to it, resulting in personal injury and in the loss of life. If the practice has been productive of substantial benefit in limiting the ravages of Small-Pox, and mitigating the severity of the disease, the fact that vaccination may lead in certain cases to personal injury or death, would, of course, not be a conclusive argument against its use. Danger of personal injury, and even of death, attends many of the most common incidents of life, but experience has shown the risk to be so small that it is every day disregarded. A railway journey or a walk in the streets of any large town certainly involves such risks, but they are not deemed serious enough to induce anyone to refrain from that mode of travelling or from frequenting the public streets. And to come within the region of therapeutics, it cannot be denied that a risk attaches in every case where chloroform is administered; it is nevertheless constantly resorted to, where the only object is to escape temporary pain. The admission, therefore, that some risk attaches to the operation of vaccination, an admission which must without hesitation be made, does not necessarily afford an argument of any cogency against the practice, if its consequences be on the whole beneficial and important, the risk may be so small that it is reasonable to disregard it. Everything depends, then, upon the extent and character of the risk.

Those who have assailed vaccination on the ground of the

evil consequences which are said to flow from it, have adopted two lines of attack. They have asserted that evidence of its mischievous influence is to be traced in an increase in the number of deaths from certain specified diseases, corresponding with a spread of the practice of vaccination, of which increase vaccination was, they alleged, really the cause. They have further insisted that evidence of the evil effects it produces is furnished by an examination of particular cases in which it has been found that injury or death has resulted from the operation.

We shall examine in the first place the contention, that the records of mortality, show an increase in the deaths from certain diseases during periods of extensive vaccination, when compared with those when the practice was less in use, and that it may be fairly inferred, from this comparison, that vaccination was the cause of that increase.

It is to be observed, that the diseases selected for such a comparison by the opponents of vaccination have not always been the same. In 1877, a return was obtained by an Order of the House of Commons, showing the deaths from 14 diseases at three periods, viz., 1847-1853, 1864-1867, 1868 to 1875; these periods having been regarded as distinguished from one another by a progressive advance in the number of vaccinated persons, especially children. The diseases were, Tabes Mesenterica, Diarrhœa, Bronchitis, Pyæmia, Skin Disease, Syphilis, Convulsions, Cholera, Diphtheria, Pneumonia, Atrophy and Debility, Whooping Cough, Erysipelas, Scrofula.

The first six of theses diseases showed an increasing, the next four a decreasing, mortality, whilst the remaining four exhibited an irregular mortality, there being in three cases an increase in the second period, and a decrease in the third, and in another case a decrease in the second, but a slight increase in the third, when, however, the mortality was not so high as in the first period. When all the diseases were taken together, there

appeared to be in the aggregate an increasing mortality. Some found in this circumstance, evidence of the malign influence of vaccination. Such a conclusion is manifestly untenable. There was no more reason for attributing to vaccination the increase of mortality in the case of those diseases where the mortality had grown, than there was for asserting that to its beneficent influence was due the decrease of mortality in those cases in which the mortality had become less. The hypothesis that it caused the mortality in some instances to grow, and in other instances to decrease, and that it was responsible for the balance of increase shown on an aggregation of the two, does not merit serious attention. It is not as if all the diseases in the class showing an increasing mortality were such as could be deemed capable of being affected by vaccination, whilst those included in the class with a decreasing mortality, were in a different category. Two of the diseases included in this latter class, viz., Convulsions and Pneumonia, have been regarded in particular cases, even on recent occasions, as having had their origin in vaccination.

Dr. Ogle, in statistics drawn from the Reports of the Registrar-General for England and Wales, points out that the line of reasoning which had been considered by some sufficient to show that vaccination has produced in those who have been subject to it, serious diseases, would equally serve to show that it has rendered them largely exempt from other diseases no less serious. He gives, as an example, the mortality from Phthisis, Pneumonia, Convulsions, and from causes not ascertained or stated too vaguely for classification, and shows that, in each case, there has been a large decrease of mortality during the period from 1874 to 1891. He does not, of course, suggest that vaccination has been the cause of this decrease, but he asks, and we think the question a pertinent one, why it should be credited with the increase of diseases which have increased, and not equally be credited with the decrease where the mortality has diminished.

We will refer now specifically to the principal diseases, an

increase in the mortality from which is at the present day charged against vaccination. Before doing so, it will be well to enquire whether infant mortality has shown an increase during the period into which we are enquiring. Vaccination is, in the vast majority of cases co-incident in point of time with this stage of life. If, then, it is the parent of other diseases, and has substantially augmented the number of deaths due to them, we should expect to see some effect produced on infant mortality as a whole, yet it is clear that the mortality of infants in the first year of life, as measured by the proportion of their deaths to births, has not increased at all during the times when infant vaccination has been increasing. The figures show that from 1838 to 1842 the annual infantile death-rate to one thousand births was 152; from 1847 to 1850 it was 154; in the million births in Leicester on the one hand, and in England and Wales on the other. The Registrar-General has supplied us with the means of comparing the deaths in the period 1863-1867 with those in the period 1883-1887. We have already seen that the latter years were marked by a great decrease in the practice of vaccination amounting at last to a practical disuse of it. If vaccination were, to any serious extent, a cause of syphilis, we should have expected to see some evidence of it in these comparative records of the mortality of infants under one year of age. Yet we find that whereas in England and Wales there was as between the former period and the latter an increase in the infant mortality from syphilis in England and Wales of 24·7 per cent. only, the increase between the same periods in Leicester was no less than 69·3 per cent. This does not, of course, imply any connection between the disuse of vaccination and the increase of infantile syphilis. It does, however, conclusively rebut the argument of those who seek to connect the increase of mortality from syphilis with the practice of vaccination.

It has been observed that the comparison is made between Leicester, which is an urban population, and the whole of England and Wales, which would comprise a large rural population. This

is no doubt true, but it is true for both periods alike. It does not appear to us materially to vitiate the comparison for the purpose of disproving the allegation that the great increase of syphilis during the last twenty years is due to vaccination.

Even if it can be shown that in some instances syphilis has been inoculated by vaccination, the conclusion would still remain that this cannot have been so to any substantial extent.

We take next Cancer. There can be no doubt that the mortality from Cancer shown by the registered causes of deaths has considerably increased in recent years. This disease is, it must be remembered, one to which persons of advanced years are specially subject. The young are seldom its victims. And the increase of mortality from it has, for the most part, affected adults and principally old people. There has been an actual decrease in the mortality from the disease of those under five years of age.

It may well be that in some cases vaccinated children have suffered fatally from Erysipelas who, but for the operation of vaccination, would not have been attacked by the disease. This is a point we shall have to consider presently. But the evidence is, in our opinion, conclusive to show that there has not been during the last forty years any material increase of deaths from Erysipelas owing to vaccination.

Passing on to tabes mesenterica and scrofula, we find that the mortality from these diseases, as returned to the Registrar-General, shows an increase during the last forty years. On the other hand, the mortality from allied diseases, such as Hydrocephalus and Phthisis shows a decrease. Some part, and it is impossible to say how much, of this increased mortality in the case of the two first-named diseases, and of the decrease in the two last-named, is apparent only and not real, and results no doubt from better diagnosis leading to a transfer of cases from one class to another. On this point again it is useful to resort to the experience of Leicester. The increase of deaths under one year

from tabes mesenterica and scrofula per million births in Leicester during the years 1883-87, as compared with the years 1863-67, was 25·8 per cent. A similar comparison for England and Wales shows a per-centage of 26·8 per cent.

We do not find any facts to warrant the assertion that the increased mortality from tabes mesenterica and scrofula, or any part of it, was due to vaccination.

Without encumbering our report with the details relating to Pyæmia, Bronchitis, Diarrhœa, and Skin Diseases, which are all said to have increased owing to the mischievous influence of vaccination, we may confidently say that there is no evidence to justify the statement. It is, however, worth while pointing out that comparing, as before, the period of 1883-87 with the period of 1863-67, the increase of deaths under one year of age from Diarrhœa and Dysentery in Leicester was 4·2 per cent., whereas in England and Wales it was 0·5 per cent. A similar comparison in respect of Bronchitis shows the increase in Leicester to be 112·8 per cent., in England and Wales 73·3 per cent. It seems clear that as regards general infantile mortality Leicester has not gained by its avoidance of vaccination. Whilst in England and Wales the mortality of children under one year of age had between the periods selected for comparison decreased 7·5 per cent., in Leicester the decrease was only 2·8 per cent.

Upon the whole, then, we think that the evidence is overwhelming to show that, in the case of some of the diseases referred to, vaccination cannot have produced any effect upon the mortality from them, and that it has not in the case of any one of them increased the mortality to a substantial, we might even say an appreciable, extent.

When we pass to a consideration of the evidence that personal injury or death has resulted from vaccination, the questions which present themselves do not admit of the same simple solution as those with which we have just been dealing. The cause of death,

or the nature of an illness, is sometimes obscure, and even if its nature be known, it may be difficult to ascertain with certainty what has been its origin. We shall have to make further reference presently to the difficulties which must needs be encountered in the investigation upon which we are engaged. As we have already stated, it is not open to doubt that there have been cases in which injury and death have resulted from vaccination.

In the years 1859-67 the deaths returned as due to erysipelas after vaccination varied from 2 to 13; the annual average being 6·8. From 1868-71 inclusive they varied from 9 to 24; the annual average being 18·0. From 1859-71 the population of England and Wales had increased from 19 to 22 millions. In addition to this there can be no doubt that the number of children vaccinated increased very much between 1868 and 1871, as compared with the previous period, owing to the legislation of 1867. Of course, the greater the number of the vaccinated amongst the children born in any given period the greater, *cæteris paribus*, would be the number of cases of erysipelas after vaccination, without any necessary connection between the two. The same remark applies to the period between 1872 and 1880, when the cases returned as erysipelas after vaccination varied from 16 to 39; the annual average being 28·5. The Act of 1871 undoubtedly increased largely the number of infantile vaccinations in this period as compared with that which preceded it. In subsequent years erysipelas after vaccination was not separately recorded, being included under the heading "cow-pox and other effects of vaccination." There were 283 such cases in the years 1881-1885.

During the years 1886 to 1891 the cause of death was in 279 cases certified as connected with vaccination. Many of these cases were the subject of special inquiry by the Local Government Board. We have had before us a summary of the reports made to the Board of the results of such inquiries, prepared for us by Dr. Acland and Dr. Coupland. The reports referred to cover the period from the 1st of November, 1888, to the 30th of November,

1891. We have ourselves, in many instances, instituted independent inquiry.

The cases in which the death has been certified as connected with vaccination cannot all be regarded as cases in which there was the link of causation between them. Indeed, the medical men whose certificates associated the two did not always intend to indicate that the disease which ended in death had its origin in vaccination. There have, no doubt, been other cases in which, although the illness which ended fatally was engendered by vaccination, there has been no mention of it in the certificate of death. Whether these are sufficient in number to counterbalance, or more than counterbalance those in the other category, the evidence does not enable us to say.

Taking for the moment the 279 deaths during the years 1886 to 1891, certified as connected with vaccination, to have been really so connected, how does this figure compare with the number of vaccinations effected during the same period. The number of primary vaccinations during the years 1890 and 1891 were not put before us by Dr. Ogle; they had not then been published. He stated, however, that in the years 1881 to 1889, inclusive, the number of deaths certified as connected with vaccination was 476. During those years there were 6,739,902 primary vaccinations, showing the proportion of one death to 14,159 primary vaccinations. There is, no doubt, that for the years 1886-91, it was not substantially different. For the reasons stated in the preceding paragraph it is not possible to fix with absolute certainty the number of deaths connected with vaccination.

Since the first of June, 1889, we have, from time to time, been informed from various sources of cases in which death or non-fatal injury has been alleged or suggested to have been caused by, or otherwise connected with vaccination with a view to their investigation, and since the 14th of February, 1891, the Local Government Board have immediately informed us of all such cases brought to their notice. In March, 1892, the Home Office addressed a circular

letter to coroners throughout England and Wales, requesting that in all cases where they received information that the death of any person, on whose body they proposed to hold an inquest, had been alleged to have been caused by, or to have had any connection with, vaccination they would communicate immediately with the Commission.

From all sources 421 cases in which death or non-fatal injury has been alleged or suggested to have been connected with vaccination, have been brought to our notice, from 1st June, 1889, to 1st July, 1896. These 421 cases, however, include 19 groups of connected cases, each of which has only been counted as one in arriving at that number. The individual cases included in these groups amount to about 150. Some of these 421 cases were investigated and made the subject of reports by medical inspectors of the Local Government Board. We received reports with reference to a large number of them from medical men appointed by ourselves. In a few cases the nature of the allegation or suggestion rendered it unnecessary, in our opinion, to make any inquiry into the case. In a considerable number we sought for further information, and after we had considered the further facts thus acquired there appeared to be no necessity for an investigation by the medical men who assisted us by personally inquiring into cases of alleged injury from vaccination.

We have not any means of ascertaining in what number of cases some other disease has supervened on vaccination as a consequence of it, without producing a fatal result. We are able, however, to form some judgment upon this point by observing the number of non-fatal cases to which our attention has been called. We do not mean to suggest that we have been informed of all cases of this nature which have occurred during the last six years. There have very likely been many cases which have not come to our knowledge, where the Inflammation set up has been more than usual, and some where a slight attack of Erysipelas has resulted. But when we consider that the fact that we were engaged upon

this inquiry has been thoroughly well known, and that active organisations and zealous individuals were at work, searching out cases in which the results of vaccination have been abnormal, with a view to bring them under our notice, and that some of those which we were asked to investigate turned out to be of a trifling or unsubstantial nature, we think we are able to form a fairly accurate estimate of the amount of injury which can be plausibly attributed to vaccination. A consideration of all the circumstances has led us to the conclusion that, as regards the non-fatal cases with which we are now dealing, serious injury cannot have resulted in any considerable number of cases.

An examination of the analysis of the fatal maladies connected with vaccination during the period 1886 to 1891, made by Dr. Ogle, shows that Erysipelas is credited with almost one-half of the total number of deaths. To these a considerable number is to be added, where inflamed arms occurred, but in which the disease did not receive the name of Erysipelas, though it was probably allied to it. Next in number comes the class, which includes Pyæmia, Septicæmia, and Blood Poisoning. If this class be added to cases of Erysipelas, and maladies allied to it, they account altogether for two-thirds of the cases in which the cause of death has been connected with vaccination. An examination of the particulars of the cases of alleged deaths and injury from vaccination, to which our attention has been called during the last six years, shows that the death or injury has been attributed in the great majority of cases to one or other of these diseases, and chiefly to Erysipelas.

It must not be forgotten that the introduction into the system of even a mild virus, however carefully performed, is necessarily attended by the production of local inflammation and of febrile llness. If these results did not in some measure follow, the practice would probably fail in its protective influence. As a rule, the inflammation and illness are of a trifling character; in exceptional cases, however, they may exhibit more severity, and,

as certain facts submitted to us in evidence have shown, there are cases, though these are rare, where a general eruption may follow vaccination.

In order to determine how far the risk of Erysipelas is a necessary incident of vaccination, what is the extent of that risk, and how it may best be avoided, it is necessary to consider the various circumstances which may occasion Erysipelas and allied diseases in the case of vaccinated children. It is established that lymph contains organisms, and may contain those which, under certain circumstances, would be productive of Erysipelas. It is, therefore, possible that some contagious material (the specific virus of erysipelas, for instance) may be conveyed at the time of vaccination, owing either to its presence in the lymph employed, or to its being conveyed by the vaccinator himself, or by those with whom the child comes in contact at the time of vaccination. We believe that the cases in which the virus is conveyed at the time of vaccination are rare. It has, however, in some instances, been clearly established, the immediate occurrence of Erysipelas in several co-vaccinees making it practically certain that some virus was conveyed at the time of the operation. In some instances, where this has been the case, and there is every reason for believing that the contagion was conveyed through the medium of the lymph; it is, nevertheless, in evidence that the vaccinifer did not display anything more than a slightly inflamed arm. The scrupulous avoidance of inflamed arms in vaccinifers will do much to reduce the risk of conveying erysipelas, in the act of vaccination (a risk which, as we have seen, has been proved to be a very slight one), but it is possible it would not wholly remove it.

Where the contagious matter which produces Erysipelas, or blood poisoning, has not been conveyed at the time of vaccination, the disease must have resulted, when it afterwards displays itself, from a subsequent introduction or development of the poison. It is not always easy to determine whether vaccination has been the cause of, or has contributed to, subsequent

Erysipelas or blood poisoning. Erysipelas is a common disease in infancy, and not unfrequently leads to death. The evidence of Dr. Ogle shows that nearly two thousand per million die of Erysipelas during the first three months of life, and that the mortality rapidly declines as the age advances. Quite apart, then, from vaccination there is nothing remarkable in the occurrence of Erysipelas in the case of an infant. The disease is obviously contracted in the majority of cases from some other source. Where a child has been in good health prior to vaccination, and is seized with any malady after it, it is not unnatural that the two occurrences should be connected together, as cause and effect by those who have not a wide experience of the liability to be attacked by the disease independently of vaccination. It is a common fault too readily to connect together, as cause and effect, occurences which follow one another in point of time. There can be no doubt that this tendency has sometimes been the reason why, without any real connexion between the two, subsequent illness has been believed to have its origin in vaccination. The apparent connexion of the two may be a mere chance coincidence.

Illustrations of this have not been wanting. It has sometimes happened that circumstances have led to the vaccination being, on the day appointed for the operation, postponed to a later date. A troublesome skin disease has shortly afterwards manifested itself, which would certainly have been believed to have been caused by the vaccination if it had taken place at the appointed time.

In many of the cases which we have had to investigate, where vaccination has been followed by Erysipelas, the disease has been present in the immediate vicinity, it cannot therefore be asserted with certainty that in such cases the child would have escaped Erysipelas if it had not been vaccinated. Erysipelas may be acquired without any lesion. We do not intend to represent that the wound made in vaccination may not cause an attack of Erysipelas, where, if there were no lesion, there would be no such

attack, but only to suggest that caution is necessary, and that it would be an error to refer all cases of Erysipelas, or allied diseases, occurring after vaccination to that operation as their cause.

There can be no doubt that even very slight wounds may lead to Erysipelas. It has been induced by scratches from pins, abrasions from the dress and other injuries, in themselves most trivial.

We propose to call attention to some of the features which have been observed in the cases we have investigated where Erysipelas has ensued upon, and in all probability been connected with, the act of vaccination. We have already said that in some of these cases, erysipelas was prevailing in the neighbourhood, and sometimes even in the immediate vicinity of the vaccinated child. In a considerable number it was reported that the condition of the premises in which the child was living was extremely insanitary. In some it was manifest that there had been a lack of care and attention on the part of the mother or other person in charge of the child. Not unfrequently the wound was in contact with and rubbed by articles of dress very likely to cause inflammation, and cream and other substances were applied to the wounds under circumstances which made the process a source of danger. There were instances in which persons in the habit of nursing a vaccinated child were suffering themselves at the time from running sores, which were very likely the source of contagion. In some cases, too, where the vaccinated vesicles had been opened on the eighth day, Erysipelas manifested itself at a time which suggested that it had been acquired at a date subsequent to this opening of the vesicles. *A priori*, this would appear to be a source of danger by rendering an attack of erysipelas more probable if the child came within the reach of contagion. The evidence, however, is not conclusive that Erysipelas has, owing to this cause, appeared more often than it would have done if the vesicles had remained unopened. There is an opinion abroad

that the taking away of lymph on the eighth day of itself causes some risk of inflammation of the arm. This, however, has not been confirmed by any evidence before us, and it is probable that it is almost wholly an imaginary danger.

The evidence given in reference to cases in which one or other of the maladies classed as Scrofula has been supposed to have had its origin in vaccination, has usually been of a very vague and inconclusive character. Scrofula is a disease chiefly of childhood, and, being very common, there is nothing to cause surprise in the fact that occasionally children may show its presence in a manner likely to excite suspicion that it was due to vaccination. It may, indeed, easily be the fact that vaccination, in common with Chicken-Pox, Measles, Small-Pox, and other specific Fevers, does occasionally serve as an exciting cause of a scrofulous outbreak. It may, however, not unreasonably be suspected that in all such cases a latent predisposition was already present. The chain of causation is so complicated that it is impossible in isolated cases to arrive at any satisfactory conclusions. To attempt any analysis of the evidence on this subject comprised in Appendix IX. and the various Reports which we have already issued would serve no useful purpose. It must be sufficient to say that after careful consideration of the whole evidence there appears to be no reason whatever to believe that the practice of vaccination tends in any material degree to increase the prevalence of this class of disorders.

Precisely the same arguments as those just used are applicable to the chronic skin diseases, chiefly of the type of Eczema, which are so often, by the public, attributed to vaccination. Of these numerous supposed instances have been brought before us and the medical men whose assistance we have had. It is to be freely admitted that vaccinia, like varicella, does occasionally cause an irritable condition of the skin which may last long, but it is exceedingly improbable that it is responsible for any substantial increase in the number of chronic skin diseases in children.

No sufficient evidence whatever in support of such a conclusion has been brought before us.

Amongst the inconveniences connected with vaccination is the production of contagious forms of eruption, such as have been classed under the names of porrigo and impetigo contagiosa. These eruptions are not attended with any risk to life, nor by any permanent injury to health, and they are usually curable by simple measures. References to these eruptions have been made by many witnesses. Their occurrence has no doubt not unfrequently caused prejudice to the practice of vaccination.

As has been already stated, the occurrence of a febrile illness is the desired result of vaccination. To that illness the term vaccinia is applicable, and it may sometimes be attended by an eruption. It is in evidence that vaccinators in the early years after the introduction of the practice, were familiar, not only with severely inflamed arms, but with the frequent occurrence of general eruptions. Familiar as they were with the horrors of Small-Pox itself, they thought very lightly of events which in the present day would cause much complaint and would excite opposition. The greater care now exercised in vaccination, and possibly above all, the much diminished risk of variolation at the same time, have reduced to a very small number indeed the occurrences referred to. Still it has not been found possible wholly to prevent them, and not only do vaccinators still meet occasionly with inflamed arms and Erysipelas, but now and then a case occurs of severe eruption attended by Fever, which may end in death. These cases occur exclusively in primary vaccinations and in young infants. They are so infrequent that no well-characterised examples have been brought under the notice of the medical men who have assisted us. A few which had occurred in former years have, however, been the subjects of evidence. These cases may be placed in two groups, one in which the vaccination sores proceed normally, but a general eruption, possibly gangrenous, occurs and a second in which the pocks

inflame, and are attended by satellites, and a more limited eruption, possibly due only to external contagion, is produced. Of the first, only a single example is to be found in the reports (Case 31 : not fatal) before us, but of the second there have been several. One of the most definite of these latter is the case ably and fully reported in the evidence of Dr. Fyson and Dr. Frederick Taylor. In that instance a child previously in good health, and vaccinated with calf-lymph by means of a needle which had never been used before, died about six weeks afterwards with severely ulcerated arms, and ulcers in several parts of the body and limbs. No precaution had been neglected, and the event could only, as in other similar cases, be attributed to what is known as idiosyncrasy on the part of the child, a peculiarity of health attended by exceptional susceptibility to the specific virus of vaccinia.

Nothing has produced so deep an impression hostile to vaccination as the apprehension that syphilis may be communicated by it. It was at one time doubted whether syphilis could result, and it was even confidentially asserted that it could not. The fact that this was possible had been fully established, and was generally acknowledged by the medical profession before we commenced our enquiries. Our work has, therefore, chiefly been to ascertain the extent and character of the risk and the means of its prevention. As a general summary of the evidence on this matter, it may be stated that nothing in the least novel has been elicited, and that no hint has been given of the occurrence of any recent *series* of vaccination-spyhilis cases in British practice.

In 1856, an extensive investigation undertaken by the Board of Health, under the direction of its Medical Adviser, resulted in the expression of an opinion that there was no proof that syphilis could be communicated in the practice of vaccination. Mr. Simon had issued circular letters of enquiry very widely, and although a few of his respondents had answered cautiously, none had been able to produce convincing facts, and a large majority had expressed entire credulity. Amongst the latter were Sir Thomas

Watson, Sir Charles Locock, Sir Benjamin Brodie, Mr. Acton, Mr. Marson, Mr. Ceely and Sir William Jenner. Facts which were, not long after the issue of Mr. Simon's report, brought before the profession, and which were carefully investigated, made it certain that the negative conclusion which had been arrived at was a mistaken one, and from that time no doubt can have been entertained by any that it is possible to convey syphilis in the act of vaccination. In reference to the frequency of this, the report just referred to is still, however, of high importance. It is impossible to believe that an event concerning the possibility of which almost the leaders of the profession were in 1856 incredulous can be otherwise than extremely rare.

Before proceeding to speak of the facts, or supposed facts, as to syphilis due to vaccination, which have been brought before the Commission, it is necessary to advert to the difficulties of the inquiry. The phenomena of syphilis may be closely approached by those of other disorders, and even when the nature of the malady is evident beyond doubt, there remain numerous sources of fallacy which have to be cleared away before the conclusion can be accepted that the disease has been caused by vaccination.

The very close resemblance in certain very rare cases of the results of vaccination, whether with calf-lymph or humanized lymph, to those attributed to syphilis (a resemblance so close that it has caused in a few cases a difference of opinion whether the disease was syphilis or vaccinia) has led to the expression by Dr. Creighton of the opinion that there is some essential relationship between the two diseases. This, however, is a point of speculative, almost it might be said of transcendental pathology, upon which for practical purposes it is useless to enter. It must be sufficient to remark that, whatever may be the relationship alluded to, it exists, if it exists at all, equally between Small-Pox and syphilis as between vaccination and syphilis. For all practical purposes variola and vaccinia are both wholly distinct from syphilis, and their differences are, with the rarest exceptions,

easily recognised. They are alike in being attended by affections of the skin and mucous membranes, and exceptionally by disease of the bones, eyes, and other parts, but in all these it is a question of resemblance and not of identity with which we have to deal.

Among the 279 deaths referred to vaccination as a cause during the period 1886-1891, five were attributed to Syphilis. Except in cases where an inquest is held, these records are based simply on the certificate given by the medical attendant who certified the cause of death, but who had not necessarily attended the patient during the course of illness which terminated fatally. Practically all the deaths referred to vaccination as a cause during the years 1889, 1890, and 1891, and some of those so referred during the last two months of the year 1888, have been investigated and reported upon by Medical Inspectors of the Local Government Board. It appears that all the five cases attributed to Syphilis after vaccination, during the longer period 1886-1891, were among the cases so reported upon. We have studied these reports and we are satisfied that in none of the five cases is there sufficient evidence to show that the death resulted from Syphilis caused by vaccination. One of them was the Leeds case, to which we shall refer immediately. As regards the others, with perhaps one exception, there is abundant reason for believing that they were not cases of Syphilis at all.

But besides these five deaths, there were amongst those alleged or suggested to have been connected with vaccination, which were investigated and reported upon by Medical Inspectors of the Local Government Board, eight cases in which, in the course of the investigation, some suspicion of Syphilis was raised in connexion with the illness which terminated fatally. In none of these eight cases, however, is there evidence of any value to show that Syphilis was communicated by vaccination.

Two or three other isolated cases have been brought to our notice which witnesses believed to be examples of this occurrence, but in none of them were the facts such as in our opinion to

justify us in concluding with any degree of confidence that the belief expressed had been sustained. On the other hand, a large amount of negative evidence had been offered. Witnesses who had been engaged through long series of years in the very extensive practice of vaccination, bore testimony to their never in their own sphere of observation having witnessed or heard of any case in which the suspicion of Vaccination-Syphilis had occurred.

At the same time it is not to be forgotten that a natural reluctance to register deaths as due to Syphilis may have prevented some cases where recently vaccinated persons have died from that disease from being made public.

Only a few items of the evidence produced before us appear to require special notice; among these, the most prominent is what has been known as the "Leeds case," upon which we have heard the evidence of Mr. Ward, Mr. Littlewood, and Dr. Barrs. The witnesses named regarded it as a case of Syphilis, conveyed by vaccination, but all of them admitted that the course of events was most unusual. We have carefully investigated this case, and notwithstanding the opinion formed by the witnesses, there appears good reason to doubt whether it was one of Syphilis. The case was made the subject of careful inquiry by Dr. Barlow on our behalf, who shared the doubt we have expressed. The view taken by the Medical Inspector of the Local Government Board who in the first instance investigated the case was that it was a case of hereditary Syphilis. It seems certain, however, that the parents of the child whose death was in question were not in any way affected by Syphilis. The vaccinifer also appeared to be free from any taint of that disease, and its family history confirmed this view. The co-vaccinees from the same lymph also exhibited no trace of Syphilis. These facts of themselves make out a strong case against that having been the nature of the disease. Coupled with the fact that it could not have been communicated by the vaccinator himself, they seem to render it practically impossible that Syphilis was the cause of death. If

the symptons exhibited had in all respects corresponded with those which are known to characterise Syphilis, the proper inference might have been that there was some error in ascertaining the facts of the case. But it is beyond question that the course of events was very different in some respects from that experienced in undoubted cases of syphilis, and we think the true conclusion is that it was not a case of that disease. It may probably be classed with a few others as examples of gangrene and blood poisoning, the direct result of vaccination, which are not to be explained by supposing the introduction of any Syphilitic or other poison. Fortunately, such cases are extremely rare, so much so that the witnesses concerned knew of no case precisely parallel.

The evidence given by Dr. Robert Lee and Dr. Coutts, the former, physician of the Ormond Street Hospital for Children, and the latter, formerly a resident medical officer to the same institution, may be taken as relating to one and the same case. Both these witnesses testify to the abundant occurrence of the ordinary forms of congenital Syphilis in the practice of that institution. Each of them mentions one single case in which it was believed that Syphilis was communicated in vaccination and that the vaccination sore became a chancre. Although it is not established in evidence that these witnesses were speaking of the same case, it is almost certain that they were, as Dr. Coutts expressly states that the child was Dr. Lee's patient. Neither of the witnesses knew more of the case than its earliest stages, and both were subjected to questions the answers to which left much doubt as to the correctness of the diagnosis. Whilst, however, Syphilis cannot by any means be said to have been proved, the case must stand as one of reasonable suspicion, and Dr. Coutts' statement that another infant (not seen) vaccinated from the same source was said to have suffered in a similar way gives some support to Dr. Lee's opinion. It is of much importance to note that out of an experience of 30,000 children, at an institution beyond all others likely to attract cases of this kind, this was the

only example of supposed transmission of Syphilis in vaccination which Dr. Lee had ever known.

In considering those cases specially investigated by medical men on our behalf, we have as a rule the advantage of definite and adequate information. We have already mentioned that in the Leeds case, upon which we heard evidence, we had the benefit of Dr. Barlow's assistance; and we need not further discuss that case. Amongst the others investigated by medical men on our behalf were two cases in which death was apparently certified as from Vaccino-Syphilis. The first of these two deaths was registered, in 1892, as due to "Vaccinia Syphilitica; Marasmus," but it subsequently appeared that the medical man who certified the death had not intended to state that it resulted from Syphilis caused by vaccination. In explanation of his certificate, he said: " . . . . . the meaning I intended to convey was 'vaccinia,' *i.e.*, a general eruption over the body exactly like the vaccination pocks occurring in an infant the subject of congenital syphilis"; and a careful inquiry by Dr. Acland elicited overwhelming evidence in support of the view that the case was one of inherited Syphilis. The second of the two deaths was registered, in the present year, as due to "vaccination of Syphilis." A thorough investigation showed that the case was certainly not one of Syphilis caused by vaccination, and in all probability not one of Syphilis at all.

Two other cases, both fatal, were reported to us in which children whose vaccination had undoubtedly been followed by serious illness were believed to have been subjects of inherited Syphilis. Both cases were very carefully investigated by Dr. Acland on our behalf. In neither of them is there any evidence that Syphilis was communicated by vaccination. Probably both children were, as at first surmised, subjects of inherited syphilis.

Besides these deaths, there were amongst those alleged or suggested to have been connected with vaccination, which were investigated and reported upon by medical men on our behalf, ten

cases in which, in the course of the investigation, some suspicion of Syphilis was raised in connexion with the illness which terminated fatally. In none of these ten cases, however, is there evidence of any value to show that Syphilis was communicated by vaccination; possibly five of them were cases of inherited syphilis. The other five were certainly not cases of Syphilis at all.

Turning now to the *non-fatal* cases investigated by medical men on our behalf, we have had brought to our knowledge with a view to such investigation twenty-six non-fatal cases where Syphilis was alleged to have been, or as to some few of the cases *possibly* to have been, communicated by vaccination. One of these twenty-six cases could not be traced by the medical men whom we asked to investigate it. It had been reported to us, with twenty-one of the other twenty-five cases, by a gentleman whose only information as to the case, obtained from a relative of the child's, was that "the child had a frightful arm, and broke out badly everywhere, and was a very long time of getting better." The remaining twenty-five cases were, however, carefully investigated on our behalf, some by Dr. Barlow, some by Dr. Acland, and fifteen of them by those gentlemen jointly. In twenty-four of the twenty-five there is no evidence that Syphilis was communicated by vaccination; indeed, none of the twenty-four were cases of Syphilis at all. In the remaining case it appears that there was some ground for the allegation, though it is by no means proved that syphilis was communicated by vaccination, or even that the case was one of syphilis at all. The case, brought to our notice in 1892, was that of a boy born in 1880 and vaccinated in the following year. When examined on our behalf in September, 1892, he presented no unmistakable signs of having suffered from syphilis, either inoculated or inherited. The length of time which had elapsed, and the absence of any record, made it impossible to trace the source of lymph. The history of the boy's illness is extremely uncertain, but upon the whole, if it can be relied upon at all, it tends to render some support to the view that Syphilis was communicated by vaccination or by contamination of the vaccination wounds.

Besides the non-fatal cases to which we have just referred, there were amongst those investigated by medical men on our behalf, in which non-fatal injury had been alleged or suggested to have been caused by vaccination, 13 cases in which in the course of the investigation some suspicion of Syphilis was raised in connexion with the illness which followed vaccination. In none of these 13 cases, however, is there evidence of any value to show that Syphilis was communicated by vaccination; one was a case of inherited Syphilis, and the other 12 were not cases of Syphilis at all.

The evidence offered to us would lead to the belief that whilst with ordinary care the risk of communication of Syphilis in the practice of arm-to-arm vaccination can for the most part be avoided, no degree of caution can confer an absolute security. The rejection as vaccinifers of young infants, say below four months of age (in whom Congenital Syphilis may be as yet undeclared), and of adults (in whom the disease may possibly have been recently acquired) are precautions which would probably shut out almost the whole of the risk. The outbreaks of Syphilis in connexion with vaccination which have been mentioned to the Commission (all of which had been previously published) have occurred chiefly in arm-to-arm vaccination amongst soldiers, or from the use as vaccinifers of young infants the offspring of parents whose history was not known to the vaccinator. It must, however, be admitted that neither the examination of the vaccinifer if taken alone, and without a knowledge also of the parents, nor the most scrupulous avoidance of any visible admixture of blood with the lymph, are in themselves, however valuable, sufficient absolutely to exclude risk. The evidence given by Dr. Husband, of the Vaccine Institution of Edinburgh, established the fact that all lymph, however pellucid, does really contain blood cells. Absolute freedom from risk of Syphilis can be had only when calf-lymph is used, though where the antecedents of the vaccinifer are fully ascertained, and due care is used, the risk may for practical purposes be regarded as absent.

It is obvious that the employment of calf-lymph only would wholly exclude the risks as regards both Syphilis and Leprosy. Respecting the latter disease, however, there appears to be reason to doubt whether any risk exists, and at any rate it does not concern the British population. Even in Leprosy districts the employment of English human lymph would be, so far as Leprosy is concerned, as safe as that from the calf. The risk of Syphilis, although real, is an exceedingly small one, even when humanized lymph is employed, and may probably be wholly avoided by care in the selection of the vaccinifer. As regards all the other dangers, whether of severe illness or temporary inconvenience, the two forms of lymph appear to stand on the same level. The instances of inflamed arms, of Erysipelas, of Vaccinia Maligna, and Eczematous eruptions are not more common after the use of human lymph than after that from the calf. Some of the best qualified witnesses who have afforded us their assistance have expressed a deliberate preference for arm-to-arm vaccination, believing that the advantages of calf-lymph are more imaginary than real.

A careful examination of the facts which have been brought under our notice has enabled us to arrive at the conclusion that, although some of the dangers said to attend vaccination are undoubtedly real and not inconsiderable in gross amount, yet when considered in relation to the extent of vaccination work done they are insignificant. There is reason further to believe that they are diminishing under the better precautions of the present day, and with the addition of the further precautions which experience suggests will do so still more in the future.

We put the use of calf-lymph in the forefront because, as we have said, this would afford an absolute security against the communication of Syphilis. Though we believe the risk of such communication to be extremely small where humanized lymph is employed, we cannot but recognise the fact that however slight the risk, the idea of encountering even such a risk is naturally

regarded by a parent with abhorrence. We think, therefore, that parents should not be required to submit their children to vaccination by means of any but calf-lymph, but this should not preclude the use of humanized lymph in case they so desire.

So long as the State, with a view to the public interest, compels the vaccination of children, so long even as it employs public money in promoting and encouraging the practice, we think it is under an obligation to provide that the means of obtaining calf-lymph for the purpose of vaccination should be within reach of all. We have no hesitation, therefore, in recommending that steps should be taken to secure this result. Whether the duty of providing calf-lymph should be undertaken by the Local Goverment Boards in the several parts of the United Kingdom, or whether some other method would be more advantageous, can be better determined by those who have had practical acquaintance with the working of the vaccination laws.

In connexion with this subject, our attention has been drawn to the experiments recently made by Dr. Copeman as to the effect of the storage of vaccine lymph in glycerine. The conclusions at which he arrives are that the addition of glycerine, whilst it leaves the efficacy of the lymph undiminished or even increases it, tends to destroy other organisms. If it be the fact that the efficacy of the lymph remains unimpaired, its storage in glycerine would largely diminish the difficulties connected with the use of calf-lymph, which are inseparable from calf to arm vaccination. The investigation has not yet reached a point at which it is possible to pronounce with certainty whether the anticipated results would be obtained. And it was at one time suggested that the introduction of glycerine was likely to be mischievous. The question is one a further investigation of which is obviously desirable.

If lymph is to be preserved in glycerine, due care would be requisite to ensure its purity and the absence of contamination in its introduction. We think that, whether mixed with glycerine or not, each tube should contain only sufficient lymph for the vaccination of one person.

(D.) As to what means, other than vaccination, can be used for diminishing the prevalence of Small-Pox; and how far such means could be relied on in place of vaccination.

Another question upon which we are asked to report is, what means, other than vaccination, can be used for diminishing the prevalence of Small-pox; and how far such means could be relied on in place of vaccination.

The means other than the inoculation of Small-Pox and Cow-Pox, which have been referred to by witnesses as being capable of diminishing the prevalence of Small-Pox, are such means as have been employed against infectious diseases generally; they may be summarised as—1. Measures directed against infection, *e.g.*, prompt notification, isolation of the infected, disinfection, &c., 2. Measures calculated to promote the public health, the prevention of overcrowding in dwellings or on areas, cleanliness, the removal of definite insanitary conditions, &c.

It will be well to commence with a brief statement of the growth of our knowledge on the subject of isolation as a means of dealing with infectious or contagious diseases. We have already adverted to the fact that Small-Pox is highly contagious, and that contagion from those suffering from it is the means by which the disease is propagated.

Although reference to infection appears in some of the Arabian writers, the contagiousness of Small-Pox attracted little attention in this country and in Western Europe until the 18th century. Sydenham (1624-1689), though he refers to the contagiousness of Small-Pox, did not dwell upon the matter, and did not regard it as so important an element in the spread of the disease as some peculiar constitution of the atmosphere to which he attributed epidemics. Boerhaave was the first at the commencement of the 18th century distinctly to formulate the now generally accepted doctrine that Small-Pox arises only from contagion.

In 1720, Mead drew up an elaborate system of notification, isolation, disinfection, &c., in view of a threatened invasion of the

plague, but no attempt to deal with Small-Pox in a similar fashion appears to have been made until the last quarter of the 18th century. This was in all probability largely due to the adoption of inoculation as the recognised defence against Small-Pox, and the acceptance of Sydenham's doctrine of epidemic causation may have exercised an influence in the same direction.

Prior to the year 1866 there was no provision made by law for enabling sanitary authorities to establish hospitals for infectious diseases and thus to promote the isolation of such cases. The only institutions of that description then existing were the result of private effort. So far as regards Small-Pox there was, practically speaking, no provision for its treatment by means of isolation.

The Sanitary Act of 1866 empowered, though it did not compel, local authorities throughout England and Wales, Scotland, and Ireland, to provide or to join in providing isolation hospitals for the use of the inhabitants of their districts. There was further legislation on the subject by the Public Health Act, 1875; the Public Health (London) Act, 1891; the Public Health (Scotland) Act, 1867; and the Public Health (Ireland) Act, 1878, into the details of which it is not necessary to enter. The most recent Act relating to the matter is the Isolation Hospitals Act of 1893, which applies to the small towns and rural districts of England and Wales.

In London, the local authorities to whom the power to provide isolation hospitals was given by the Sanitary Act of 1866 were, in the City, the Commissioners of Sewers, and in other metropolitan districts the Vestries or District Boards. With few exceptions, these authorities did not exercise the powers conferred on them, and, speaking generally, it may be said that the Sanitary Act of 1866 had practically no effect in London as regards the provision of hospital accommodation for Small-Pox. Some few of the metropolitan workhouses, however, had infectious wards attached in which cases of Small-Pox were treated, and the guardians of

some of the Unions sent cases by arrangement to the Small-Pox Hospital at Highgate. This institution, which had been established in 1746, was extended in 1850 so as to provide accommodation for about 100 Small-Pox patients. It remained down to the year 1870 the only Small-Pox Hospital in London.

The obvious difficulty and danger attending the treatment of persons suffering from Small-Pox in the same institutions in which other destitute persons are practically forced to reside led to the enactment of certain provisions of the Metropolitan Poor Act of 1867, and to the issue under that Act of an order of the Poor Law Board virtually uniting the whole metropolis into one district for the purpose, amongst others, of providing hospital accommotion for paupers suffering from Small-Pox.

Although the Metropolitan Asylums Board had power to provide hospital accommodation for paupers only, they found it practically impossible to confine the inmates of their hospital to this class, owing to the epidemic which prevailed at and after the time when their first hospital was opened in December, 1870.

In 1879, by the Poor Law Act of that year, power was given to the Metropolitan Asylums Board to contract with the local authorities for the reception into the Board's hospitals of any persons suffering from Small-Pox or other dangerous infectious disorder within their districts, but it was not until 1889 that express power was given to the Asylums Board by the Poor Law Act of that year to admit persons reasonably believed to be suffering from Small-Pox who were not paupers.

It will thus be seen that the hospitals of the Asylums Board have been practically the only isolation hospitals available for London, though to some extent the Highgate Hospital has served the same purpose.

After the hospitals established by the Metropolitan Asylums Board had been employed for some time for the reception of

persons suffering from Small-Pox, attention was called to the fact that the number of cases of the disease in the neighbourhood of the hospitals was apparently in excess of the number found in streets further removed from them, and a suspicion was aroused that the hospitals were themselves causing a spread of the disease. There had appeared, according to Dr. Thorne, to be ground for believing that in the case of two provincial hospitals, one at Maidstone and the other at Stockton, the inhabitants of dwelling-houses in their neighbourhood had suffered owing to proximity to these institutions. In consequence of the suspicion which existed as to the influence of London hospitals in spreading the disease, a careful investigation was made for the Local Government Board by Mr. Power of the circumstances relating to the Fulham Small-Pox Hospital. In the result, he came to the conclusion that the Fulham Hospital, with all its advantages of site and construction, and with the many excellences of its administration, had, by dissemination of Small-Pox material through the atmosphere, given rise to an exceptional prevalence of Small-Pox in its neighbourhood.

The matter was felt to be of so much importance that a Royal Commission was appointed to consider the prevention and control of epidemic infectious diseases in London and its neighbourhood.

The Commission arrived at the conclusion that it "appeared clearly established," by the experience of the five hospitals maintained by the Asylums Board for small-pox patients, that "by some means or other the asylum hospitals in their present shape, cause an increase of Small-Pox in their neighbourhoods." They accordingly recommended that these hospitals, which, in their judgement, should be no longer used to anything like the extent they then were for cases of Small-Pox, should become, in the main, Fever Hospitals, and that mild and convalescent cases of Small-Pox should be provided for in two or three more country hospitals, it being apparently thought impracticable to remove acute cases to such hospitals.

Towards the end of the year 1883 the Metropolitan Asylums Board, who had already made some use of a hospital camp at Darenth, and a hospital ship, the "Atlas," moored at Greenwich, for the treatment of Small-Pox patients, decided to make important changes in its method of dealing with London Small-Pox.

The "Atlas" hospital ship was moved to Long Reach, about 20 miles below London Bridge, and well without the metropolitan area, and re-opened in February 1884; the hospital camp at Darenth was re-opened early in the following month; in June of the same year a second hospital ship, the "Castalia," was opened alongside the "Atlas," and a second hospital camp opened at Darenth; and from February to October, 1884, the cases of Small-Pox received by the Board were dealt with in the following manner:—Cases of Small-Pox were received at first at three, and afterwards at six, intra-urban hospitals and there treated—(in May the hospitals at Hampstead and Fulham had been re-opened for this purpose, and a sixth hospital hired at Plaistow, just beyond the metropolitan boundary, but in a populous district)—but the number of cases under treatment in each intra-urban hospital at any one time was not allowed to exceed 50, mild and convalescent cases being thence transferred from time to time to the hospital ships and camps, where their treatment was continued; after the middle of June mild cases of Small-Pox were also received on the hospital ships directly from their homes. Complaints, however, again arose that some of the six intra-urban hospitals, and even that the hospital camps at Darenth, were spreading Small-Pox in their vicinity, legal proceedings being instituted with reference to the use of the latter; and from October, 1884, though the Board continued for a time to follow the same method of dealing with cases of Small-Pox, but the number of cases under treatment in each intra-urban hospital at any one time was not allowed, as a rule, to exceed 25.

Finally, in July, 1885, the Metropolitan Asylums Board decided thenceforward to treat, in the first instance, on the

hospital ships, all cases of Small-Pox received by the Board, unless the condition of the patients made their removal to the ships dangerous; and the Boards arrangements, well designed and well carried out, for the conveyance of patients thereto, have since been found to admit of practically the whole of the cases being taken to the ships. As a relief to the hospital ships in times of Small-Pox epidemics, the Board erected in 1888-9, and extended in 1893-94, at Darenth, on a site near that before used for the hospital camps, a hospital primarily intended for cases convalescent after Small-Pox, which was so used during the later part of the Small-Pox outbreak of 1892-94. The Metropolitan Asylums Board have also provided, since 1881 a partial, and since 1889 a complete, ambulance service for London Small-Pox; and so well has the service, which formerly was an undoubted means of infection, been carried on by the Board that it may, in this connexion at least, be taken that no spread of infection has occurred from the Board's ambulances.

We have already directed attention to the fact that it was, practically speaking, not until 1871 that hospital accommodation was provided in London, which rendered possible the removal from their home of persons suffering from Small-Pox, and we have detailed the measures adopted from time to time for that purpose.

As these facilities were augmented, the proportion of cases treated in the Metropolitan Asylums Board's hospitals steadily increased :—

Years.	Number of Deaths from Small-Pox registered in London, or (of London Residents) in the Metropolitan Asylums Board's Hospitals situated outside London.	Number of Deaths from Small-Pox in the Metropolitan Asylums Board's Hospitals.	Deaths in Metropolitan Asylums Board's Hospitals—Per Cent. of Total Deaths.
1871-2 - -	9,643	3,020	31
1881 - -	2,373	1,431	60
1893 - -	206	180	87

The deaths shown by the table in the last of these years are not those which occurred in the hospitals during that year, but the deaths of patients who, during that year, were admitted to the hospitals. This does not, however, detract from the importance of the figures as evidence of the great increase in the proportion of Small-Pox cases treated in the hospitals.

The Royal Commission, to which we have referred, in their Report made in July, 1882, contrasted the amount of Small-Pox in London with that which had occurred in England generally. It will be well to bring such a comparison down to the present time and to notice the features which it presents.

The following table affords a comparison between the mortality in London and that in England and Wales with the metropolis excluded, the deaths being those from Small-Pox to every 100,000 living. The figures are taken for the five years 1838-2, and from 1847 onwards in decennial periods, the figures for the years 1843-6 not being procurable.

	Mean annual Deaths from Small-Pox to every 100,000 living.	
	England & Wales, excluding London.	London.
1838-42 - - -	54·5	77·1
1847-56 - - -	23·6	34·6
1857-66 - - -	20·0	26·8
1867-76 - - -	22·5	41·9
1877-86 - - -	3·3	27·4

It will be seen that during the second and third periods, there was a great reduction of mortality both in England, excluding the metropolis, and in London; though it must be remembered that 1838-42 includes 1838, in which there was a considerable epidemic. The great epidemic wave of Small-Pox which swept over the

country in 1870-1, and which made itself felt in almost every part of Europe, naturally produced a sensible effect on the mortality of the next decenium, but it is to be noted that its effect was much more serious in London than outside the metropolis. The mortality there, though raised higher than in the previous decennium, did not reach the point at which it stood in the decennium before that. In London, on the other hand, the mortality largely exceeded that of the two previous decennia. Again it is to be observed that though in the next decennium the mortality fell, both in England generally and in the metropolis, the fall was very different in its extent; outside the metropolis it was vastly greater than within it. It is only since the year 1885 that the condition of London has been at all comparable as regards the amount of Small-Pox mortality with the rest of the country. The corresponding figures for the years 1887-94 to those given above are as follows :—

	England & Wales, excluding London.	London.
1887-94 - - -	2·0	1·0

In the Report of the Royal Commission of 1881, already alluded to, suggestions were made with regard to notificatian and isolation which have since been largely carried into effect. As we have said, it was considered proved that the existing Small-Pox Hospitals had caused a spread of the disease in their neighbourhood. We cannot but think that this may in some measure account for the greatly increased mortality from Small-Pox in London during the 1871-72 epidemic as compared with the rest of the country. It is true that the statistics relating to England and Wales outside the metropolis include those of other large towns where the same evil was present, but it probably did not exist then in so aggravated a form, and the effect may be neutralised by the statistics relating to smaller towns and rural

districts with which they are combined. This idea has been suggested to us, as the result of the inquiry, how it has come about that whilst the metropolis, in the decennium 1867-1876 and again down to 1885, compared so unfavourably with the rest of the country, the condition has since that date become so entirely changed? We think it is impossible to attribute this change to vaccination. There is no reason to suppose that the position of the metropolis in respect to vaccination has, since the year 1885, become superior to the rest of England and Wales; rather the other way, as the decrease in infantile vaccination has been greater during the last few years than in the rest of England and Wales. The change, therefore, must be due to some other cause.

We have no difficulty in answering the question, what means other than vaccination can be used for diminishing the prevalence of Small-Pox? We think that a complete system of notification of the disease, accompanied by an immediate hospital isolation of the persons attacked, together with a careful supervision, or, if possible, isolation for sixteen days of those who had been in immediate contact with them, could not but be of very high value in diminishing the prevalence of Small-Pox. It would be necessary, however, to bear constantly in mind as two conditions of success, first, that no considerable number of Small-Pox patients should ever be kept together in a hospital situate in a populous neighbourhood, and secondly, that the ambulance arrangement should be organised with scrupulous care. If these conditions were not fulfilled, the effect might be to neutralise or even do more than counteract the benefits otherwise flowing from a scheme of isolation.

The question we are now discussing must, of course, be argued on the hypothesis that vaccination affords protection against Small-Pox. Who can possibly say that if the disease once entered a town, the population of which was entirely or almost entirely unprotected, it would not spread with a rapidity of which we have in recent times had no experience, or who can

foretell what call might then be made on hospital accomodation if all those attacked by the disease were to be isolated? A *priori* reasoning on such a question is of little or no value.

We can see nothing, then, to warrant the conclusion that in this country vaccination might safely be abandoned, and replaced by a system of isolation. If such a change were made in our method of dealing with Small-Pox, and that which had been substituted for vaccination proved ineffectual to prevent the spread of the disease (it is not suggested that it could diminish its severity in those attacked), it is impossible to contemplate the consequences without dismay.

To avoid misunderstanding, it may be well to repeat that we are very far from underating the value of a system of isolation. We have already dwelt upon its importance. But what it can accomplish as an auxiliary to vaccination is one thing, whether it can be relied on in its stead is quite another thing.

Our attention has been drawn to the circumstance that outbreaks of Small-Pox have not unfrequently had their origin in the introduction of the disease to common lodging-houses by tramps wandering from place to place. In view of this we make the following recommendations:—

(i.) That common shelters which are not now subject to the law relating to common lodging-houses should be made subject to such law.

(ii.) That there shall be power to the local authority to require medical examination of all persons entering common lodging-houses and casual wards to see if they are suffering from Small-Pox, and to offer a reward for prompt information of the presence of the disease.

(iii.) That the local authority shall have power to order the keeper of a common lodging-house in which there has been Small-Pox to refuse fresh admissions for such time as may be required by the authority.

(iv.) That the local authority should be empowered to require the temporary closing of any common lodging-house in which Small-Pox has occurred.

(v.) That the local authority shall have power to offer free lodgings to any inmate of a common lodging-house or casual ward who may reasonably be suspected of being liable to convey Small-Pox.

(vi.) That the Sanitary Authority should give notice to all adjoining Sanitary Authorities of the occurrence of Small-Pox in common lodging-houses or casual wards.

(vii.) That where the disease occurs the Public Vaccinator or the Medical Officer of Health should attend and vaccinate the inmates of such lodging-houses or wards, except such as should be unwilling to submit themselves to the operation.

In connection with the subject with which we have been dealing we may advert to the suggestion that the vaccination and the Sanitary Authority should in all cases be identical. It has been pointed out that whilst the isolation of patients in hospitals and otherwise is provided for by the Sanitary Authority the extent of the provision requsite to deal with an outbreak of an epidemic of Small-Pox may depend upon the degree in which the vaccination laws have been enforced. More hospital accommodation may be required where vaccination has been neglected than where the vaccination laws have been complied with. It is contended that sanitation and vaccination, concerning as they both do the health of the people, should be under the jurisdiction of a single authority, and that the Sanitary Authority is the appropriate one for that purpose. Indeed, the advantage of placing in the same hands the supervision of vaccination and of the other measures designed to prevent the spread of disease are so great and obvious that the proposal to do so deserves most serious consideration.

At the same time, we fully recognise the importance of achieving it as far as possible, and we should regard with favour such changes as would render the amalgamation of the vaccination and sanitary authorities feasible, or indeed any steps taken in that direction, even although they should only partially effect the object in view.

(E.) As to whether any alterations should be made in the arrangements and proceedings for securing the performance of vaccinations, and, in particular, in those provisions of the Vaccination Acts with respect to prosecutions for non-compliance with the Law.

From the views which we have expressed on the subject of vaccination, and on the absence of proof that any practical alternative exists which could be relied on to accomplish the same results if vaccination fell into disuse, it follows that we are of opinion that the State ought to continue to promote the vaccination of the people. Nor are we prepared to recommend that the State should cease to require vaccination, and trust entirely to a voluntary adoption of the practice.

It will be well at the outset of our discussion of this subject to advert to the nature of the compulsion at present employed, to secure compliance with the law requiring that children should be vaccinated within a limited time after their birth.

When vaccination is spoken of as "compulsory," it is only meant that, in case a child is not vaccinated as prescribed by law, a pecuniary penalty is imposed which may be followed by distress and imprisonment. The liability to this penalty no doubt in many cases leads to vaccination, where it would otherwise be neglected; but, whether the penalty be enforced once or repeatedly it does not compel vaccination in all cases. If a parent is content to pay the penalty, his child remains unvaccinated; there have been not a few cases in which repeated penalities have been thus paid. Vaccination could be made really compulsory only by taking the child from the parent and vaccinating it against his

will, if he would not himself procure or consent to its vaccination. It is necessary to bear this distinctly in mind in considering the modifications of the present law which have been proposed. There may be some who would consider it both justifiable and expedient for the State thus to take the matter into its own hands, and effectually ensure the vaccination of the entire population. We do not stop to inquire whether it would be justified in adopting such a method, for we are satisfied that no such measure, if proposed, would have any chance of acceptance; indeed, few even of the most ardent advocates of vaccination have hitherto made such a proposal. Nor, again, do we think that a proposal to substitute for the pecuniary penalty now imposed a more stringent form of punishment, such as imprisonment, would have any greater chance of acceptance.

If, then, the only kind of compulsion available is to attach some pecuniary penalty to the neglect of vaccination, the question to be determined is what form of law, based on penal provisions of this description, will secure the largest number of vaccinated persons. That this is the question to be solved has, we think, sometimes been lost sight of. In our Fifth Report we recommended that repeated penalties should no longer be enforced. Our proposal has been subjected to criticism, on the ground that it would enable a person to break the law, and to purchase immunity by the payment of a single penalty. But there is no difference in principle, whether immunity can be purchased by the payment of one or of several penalties. If the cases in which vaccination was omitted would be less in number, supposing one penalty only were enforced instead of many, the end which the Legislature sought to accomplish in enacting the compulsory vaccination law would be better attained. To secure that vaccination should be as widespread as possible is, we think, the object to be kept primarily in view. When an answer has been found to the question, what scheme which is within practicable limits would best conduce to that end, the form which legislation should take will, in our opinion, have been ascertained.

We have alluded to the mode in which pressure is at present exerted to secure vaccination; we must now direct attention to the machinery by which the law is enforced.

It is for the local authorities to put the law in motion. In England and Wales the guardians have been in the main an elected body, necessarily reflecting the views of those by whose votes they obtain their office. In some districts, guardians have been elected from time to time, solely because they have pledged themselves not to prosecute those who fail to have their children vaccinated. The enactments under which the guardians are the authority to enforce the vaccination laws contain no provision dealing with the case in which they neglect or refuse to do so. By a Statutory Order, made by the Local Government Board, the duty of enforcing these laws has been cast upon the Guardians, and in the case of the Guardians of the Keighley Union a *mandamus* was issued by the Court of Queen's Bench commanding them to perform this duty. In default of obedience, they were committed to prison. After a short incarceration, they were let out on bail. When subsequently brought before the Court to answer for their contempt, they were released on entering into their own recognizances to come up for judgment when called upon. By the terms of the recognizance they were bound while guardians to do nothing in disobedience to the Vaccination Acts, or to cause their operation to be in any way disturbed. The proceeding proved, however, quite ineffectual so far as vaccination was concerned. The same course was pursued afterwards as before. There is no process open for constraining guardians to enforce the vaccination law except a *mandamus* resulting in their committal to prison in case they refuse to obey the command of the court. Experience has shown that when the guardians represent a local community opposed to vaccination, this method of putting pressure upon them is inoperative to promote it.

The necessity of proceeding to enforce a penalty, or at all events repeated penalties, arises for the most part in cases where the parent objects to have his child vaccinated, and not in cases

of mere neglect or indifference. It is important to consider how it has come about that whereas in many parts of the country there is no serious objection to vaccination, in other places the objection is so acute and widespread that the opponents of the practice are enabled to elect gaurdians pledged to abstain from enforcing it. We believe that it has largely arisen from the attempt to compel parents to vaccinate their children who conscientiously believe that vaccination is of little or no advantage as a protection against Small-Pox, and that it involves a serious risk of injury to the health of the vaccinated child. Symptoms of injury following vaccination, and really or apparently connected with it, have occurred in the case, it may be, of an elder child of the same parent, or in the case of a neighbour's child; this immediately arouses hostility to vaccination, and induces the parent to resolve that his child shall remain unvaccinated. If the attempt be made to compel a parent, in this attitude of mind, to have his child vaccinated, it meets with determined opposition, and, where the penalty is repeated, the hostility is often intensified without any progress being made towards the vaccination of the child. Such a parent has often become a focus of hostility to the vaccination laws; his neighbours and friends take his side; he is regarded as a martyr; and he and they frequently become active agitators against the vaccination laws. There are, indeed, a central association and local associations which advocate the abolition of compulsory vaccination, and denounce the practice altogether; but it is local circumstances, such as we have described, which stimulate the creation of these local associations and give them their vitality, and which add to the force of the central association. It is often said that the opposition to vaccination is the work of agitators. This may be true; but the agitation, though it may be afterwards intensified from without, in our belief, has its origin, almost invariably, in a particular locality. It is this, we think, which accounts for the phenomena to which we have called attention that the acute opposition to vaccination is confined to a limited number of localities, and that it seems usually to spread from a local centre.

"We are now in a position to state the reasons which led us to recommend that repeated penalties should no longer be enforced; indeed they will be apparent from what we have already said.

"We do not doubt that the fact that penalties may be repeated secures in some cases the vaccination of children who would otherwise remain unvaccinated; but we believe that the irritation which these repeated prosecutions create, when applied in the case of those who honestly object to have their children vaccinated, and the agitation and active propaganda of anti-vaccination views which they foster in such cases, tend so greatly to a disuse of the practice, in the district where such occurrences take place, that in the result the number of children vaccinated is less than it would have been had the power of repeated prosecution never existed or been exercised. This seems to us to be the crucial question. A law severe in its terms, and enforced with great stringency, may be less effectual for its purpose than one of less severity and which is put in force less uncompromisingly. When this is the case it cannot be doubted that the law which appears less severe is really the more effective. The ultimate object of the law must be kept in view. The penalty was not designed to punish a parent who may be considered misguided in his views and unwise in his action, but to secure the vaccination of the people. If a law less severe, or administered with less stringency, would better secure this end, that seems to us conclusive in its favour.

"If, then, we cannot look with any certainty to a change of the authority whose duty it is to enforce the law as a means of securing vaccination in those districts where it has already fallen into disuse, it obviously follows that every endeavour should be made so to frame and to administer the law that opposition to vaccination should not spread to other districts, and that it should cease or diminish in those parts of the country where it at present prevails.

"It is to be hoped that our Report will stimulate belief in the efficacy of vaccination, that it will remove some misapprehensions and reassure some who take an exaggerated view of the risks connected with the operation, as well as lead to a more ready enforcement of the law by local authorities.

We desire to call attention again to the recommendation, which we made in our fifth interim report, that persons committed to prison by reason of the non-payment of penalties imposed under the vaccination laws, should no longer be treated as criminals. We stated in that report our reasons for this recommendation, to which we still adhere. If, however, the changes in the compulsory provisions of the vaccination laws which we have suggested were adopted, the matter would lose much of its importance.

We have had the misfortune to lose by death several of our colleagues. Mr. Bradlaugh died at an early stage in the inquiry, and was replaced as a member of the Commission by Mr. Bright. Sir William Savory and Dr. Bristowe died at a later period, and their places have not been filled. We are deeply sensible of the valuable assistance in the preparation of this Report of which death has thus deprived us.

All which we humbly submit for Your Majesty's gracious consideration.

(Signed) HERSCHELL.
JAMES PAGET.
CHARLES DALRYMPLE.
W. GUYER HUNTER.
EDWIN H. GALSWORTHY.
JOHN S. DUGDALE.
M. FOSTER.
JONATHAN HUTCHINSON.
FREDERICK MEADOWS WHITE.
SAM. WHITBREAD.
JOHN A. BRIGHT.

BRET INCE,
Secretary.

August 1896.

The undersigned do not find themselves able to go so far in recommending relaxation of the law as is suggested. We think that in all cases in which a parent or guardian refuses to allow vaccination, the person so refusing should be summoned before a magistrate, as at present, and that the only change made should be to permit the magistrate to accept a sworn deposition of conscientious objection, and to abstain from the infliction of a fine.

We are also of opinion that, in spite of the difficulties as set forth, a second vaccination at the age of twelve ought to be made compulsory.

W. GUYER HUNTER.
JONATHAN HUTCHINSON.

We, the undersigned, desire to express our dissent from the proposal to retain in any form compulsory vaccination.

We cordially concur in the recommendation that conscientious objection to vaccination should be respected. The objection that mere negligence or unwillingness on the part of parents to take trouble might keep many children from being vaccinated would be largely, if not wholly, removed by the adoption of the Scotch system of offering vaccination at the home of the child, and by providing for medical treatment of any untoward results which may arise.

We therefore think that the modified form of compulsion recommended by our colleagues is unnecessary and that in practice it could not be carried out.

The hostility which compulsion has evoked in the past toward the practice of vaccination is fully acknowledged in the Report. In our opinion the retention of compulsion in any form will, in the future, cause irritation and hostility of the same kind.

The right of the parent on grounds of conscience to refuse vaccination for his child being conceded, and the offer of vaccination under improved conditions being made at the home of the

child, it would in our opinion be best to leave the parent free to accept or reject this offer.

SAM. WHITBREAD.
JOHN A. BRIGHT.
W. J. COLLINS.*
J. ALLANSON PICTON.*

** Note.—Dr. Collins and Mr. Picton sign the above note of reservation, though they have not signed the Reports. An abridged statement of their grounds of dissent from the Report follows:—*

Statement by Dr. Collins and Mr. Picton of the Grounds of their Dissent from the Commission's Report.

We entirely agree with the Report of our colleagues in so far as it shows the great change of professional and scientific opinion since vaccination first engaged the attention of the Legislature, and since the passing of the first compulsory Act, in 1853. We hold with them that the prophylactic power of vaccination has been at least exaggerated, and that dangers incidental to the practice, though at one time denied, "are undoubtedly real and not inconsiderable in gross amount." We gladly added our signatures to theirs in support of the Commission's interim report recommending the abolition of repeated prosecutions, and also that recalcitrants against the vaccination laws should no longer be subjected to the same treatment as criminals. We now desire, also, if compulsion in any form is to be maintained, to support their final recommendations for the relief of conscientious non-conformity with the law. We also gladly endorse the precautions they recommend with the object of preventing avoidable dangers in connexion with the operation. There is no difference among us on these points; so far as these recommendations go the Commission is absolutely unanimous. We feel, however, that the evidence not only justifies but requires a more complete reconsideration of the present state of the law, as well as of the methods adopted in dealing with Small-Pox. For this purpose it

is necessary to review in some detail the history of Small-Pox and the various preventive measures which have at different times been in vogue, and to scrutinise the grounds on which one alone of these preventive measures has been relied upon to the exclusion of others. We desire also to give reasons for thinking that other more effective and practicable (as well as less objectionable) modes of stamping out Small-Pox, or protecting communities from its introduction, are available. We venture to think that the report of our colleagues, in the preparation of many portions of which we have borne our part, has approached the consideration of the behaviour of Small-Pox, and the means of preventing it, too exclusively from the standpoint of vaccination, and that too little attention has consequently been accorded to sanitary organisation, prompt notification and isolation, measures of disinfection and cleanliness, and healthy conditions of living, which we believe to be of the first importance in preventing and controlling outbreaks of Small-Pox.

In 1710, for the first time since the Bills of Mortality had been compiled, more than 3,000 deaths were ascribed to Small-Pox in London, or 127 per 1,000 deaths from all causes. The prevalence of the disease led to many speculations as to possible means of deliverance from it. The orthodox teaching of propagation by "epidemic constitution of the atmosphere" was not calculated to inspire sanitary precautions, or the separation of the sick from the whole. Mead's work on the prevention of contagions, primarily directed against a threatened invasion of plague, was not written until 1720. On the other hand there were reports from the Levant, where Small-Pox had been long endemic, that by a method of "engrafting" the disease artificially it might be robbed of its terrors. As far as the epidemiological history of Small-Pox can be followed back in Asia and Africa, we find records of the popular practice, in some form or other, and often with religious associations, of the artificial induction of the disease. Even in Wales and Scotland, and in Western Europe, some kind of popular tradition of a similar practice has been traced by some authorities.

Whatever credit may attach to the introduction of the practice of inoculation into this country is, however, due to Lady Mary Wortley Montague. During her residence at Pera, while her husband was Ambassador to the Porte, Lady Mary learnt that it was there the fashion "to take Small-Pox by way of diversion as they take the waters in other countries." In a letter, dated 1717, she announced her attention of submitting her son, aged five, to the operation, and added, "I am patriot enough to take pains to bring this useful invention into fashion in England." Her son was accordingly inoculated by a Greek woman, under the supervision of Mr. Charles Maitland, Surgeon to the Embassy, and he passed favourably through the disease. Lady Mary returned to London, and in the spring of 1721 had her younger child inoculated by Maitland. The operation, which was satisfactory, was witnessed by three physicians, as well as several ladies and persons of distinction. In August, 1721, inoculation was tried experimentally on six criminals at Newgate, and the practice was encouraged by the Court.

While the effects in most of the early cases appear to have been mild, a few terminated fatally, and the practice became for a while less popular. After 1740, however, inoculation was revived, and, in the modified form of Dimsdale and Sutton, was widely adopted in many parts of the United Kingdom. In 1746 an inoculation hospital was started in London, and in most of the large provincial towns the new practice was encouraged by the clergy, as well as the leading medical practitioners, "and in 1754 the Royal College of Physicians of London pronounced its authoritative sanction of what was no longer a speculative novelty." The resolution of the College was:—"The college having been informed that false reports concerning the success of inoculation in England have been published in foreign countries, think proper to declare their sentiments in the following manner, viz.:—That the arguments which at the commencement of this practice were urged against it have been refuted by experience; that it is now held by the English in greater esteem, and

practised among them more extensively than ever it was before; and that the College thinks it to be highly salutory to the human race." From this date to the end of the century inoculation was widely diffused, though to varying degrees, in different districts; the practice doubtless paved the way for the later acceptance of vaccination. The latter came to replace the former method, and by the Act of 1840, sec. 8, the practice of inoculation became a penal offence.

Now the practice of inoculation was based on the belief that one attack of Small-Pox protected from subsequent attack those who recovered. And it was argued that the artificially-inoculated disease, though usually far less severe than the natural disease, yet afforded a similar immunity. It is neither necessary nor profitable to discuss at any length the various theories that have been advanced to account for such immunity; suffice it to say there exists, and has always existed, a belief, shared by medical writers, that in the case of many infectious diseases one survived attack affords a certain amount of protection against a second attack.

The earlier writers on Small-Pox appear to have held that second attacks of the disease undoubtedly, occurred and not unfrequently. The view that second attacks of Small-Pox occurred was held by Sydenham, also by Diemerbroek, who observed that the eruption was more severe in second attacks than the first. The case of Louis XV. has been often quoted; he had a first attack at fourteen, and died of a second at sixty-four. During the inoculation period the possibility of second Small-Pox was emphatically denied by several writers. After the introduction of vaccination the controversy which took place over its relative merits when compared with those of inoculation brought to light numerous instances of second Small-Pox in the same individual. Jenner collected more than a thousand cases of the kind. Moore says, "For some years the periodical and other medical publications teemed with cases of Small-Pox occurring

twice." At the present time cases of second attacks of the disease are usually met with in every outbreak of any extent, and it would seem reasonable to conclude that the protection afforded by a previous attack, though considerable, is by no means absolute. Moreover, experience, though of limited amount, appears to show that no mitigating influence is exerted by the first upon a second attack, should it occur.

Notwithstanding the extensive practice of inoculation, or, as has been alleged, in consequence of it, Small-Pox continued throughout the eighteenth century to be endemic in London, and severely epidemic, often at frequent interval in many towns and villages in this country and abroad. During the latter half of the century attention was called by many writers to the serious evil to society of partial and indiscriminate inoculation. It was shown that, whatever advantages might result to the inoculated by way of protection from attack, the practice had frequently been the means of introducing the disease into towns and villages that were previously free from it, and that it could only be worked at an intolerable cost of life.

Attention was also, about this time, called to the restrictive influence which might be exerted upon outbreaks of Small-Pox by separating the sick from the healthy. The part played by contagion in the propagation of epidemics had, since the adoption of inoculation, come to be clearly recognised, and measures were suggested for stamping out Small-Pox on the lines of methods employed against the plague.

Some, like Haygarth, suggested the combination of general and systematic inoculation at stated intervals with measures of isolation. Others, like Rast, Faust, and Cappel, advocated hospital isolation of the infected, and regarded inoculation as not only superfluous, but dangerous, and opposed in principle to the proper method of exterminating the infectious poison.

It was at this juncture that the value of the Cow-Pox as a

protection against Small-Pox attracted attention. It could be inoculated, like the Small-Pox, from one person to another, but unlike the latter it was stated to be not communicable by infection. If it afforded protection against Small-Pox without spreading the disease, opinion was evidently ripe for the substitution of the one practice for the other, for inoculation had come to be regarded about this time, not merely as a troublesome affair to those who submitted to it, but as a serious evil to society. Henceforth, the controversy over the Cow-Pox absorbed almost exclusively the attention of those concerned for the prevention of Small-Pox, and for a long while little was heard of any means other than vaccination, such as isolation, &c., for the suppression or restriction of the disease.

From such records and statistics as are available it would appear that Small-Pox was more prevalent and the mortality from it was greater, especially in large towns, during the 18th century than it had been in the 17th. It is also true that, speaking broadly, the present century compares favourably with the last; the disease has not been the scourge that it then was. Prior to 1838, when official registration of the causes of death in this country began, the longest series of figures, and those which have been most often quoted, are the London Bills of Mortality. The following figures are taken from a table put in by Sir J. Simon, which was compiled by Dr. Farr, wlth due regard to the many sources of error which these Bills admittedly contain:—

Annual Death Rates in London per 100,000 living at Seven different Periods during the Years 1629-1835, from—

——	All Causes.	Small-Pox.	Fever.
1629-35	5,000	180	636
1660-79	8,000	417	785
1728-57	5,200	426	785
1771-80	5,000	502	621
1801-10	2,920	204	264
1831-35	3,200	83	111

There was evidently a great improvement in the health of London, as measured by the fall of the death-rate from all causes, from its highest point in the Plague period, to a rate of about one-half or one-third of what it had been. A great improvement took place between the middle of last century and the earlier years of the present. Dr. Farr, remarking on these figures, says:—

"The diseases of London in the 16th century still prevail in unhealthy climates; not only the diseases and the manner of death have changed in this metropolis, but the frequency and fatality of the principal diseases have diminished.

"Small-Pox attained its maximum mortality after inoculation was introduced. The annual deaths of Small-Pox registered 1760-79 were 2,323; in the next 20 years, 1780-99, they declined to 1,740; this disease, therefore, began to grow less fatal before vaccination was discovered; indicating, together with the diminution of fever, the general improvement of health then taking place. In 1771-80 not less than 5 in 1,000 died annually of Small-Pox; in 1801-10 the mortality sank to 2, and in 1831-5 to 0·83.

"Fever, exclusively of the Plague, has progressively subsided since 1771; *Fever has declined nearly in the same ratio as Small-Pox.* In the three latter periods of the table the deaths from fever decreased as 621 : 264 : 111; from Small-Pox as 502 : 204 : 83."

We think these figures suggest that the fall of the death rates from Fever and Small-Pox were associated in cause as well as in time with the improvement in the public health which the fall in general mortality indicates. It is possible that inoculation as practised in London in the latter part of last century, prevented an earlier or greater reduction in Small-Pox than actually took place. Among the influences at work in the last quarter of the 18th century which would tend to counteract any injurious influence of inoculation were the progressive rooting out of Small-Pox from our prisons, the sanitary improvements in our towns,

the growth of what has been termed the "new humanity," which made the care of the sick and the protection of the public health against noxious agencies matters of public concern and active philanthropy, influences for good with which the names of Howard and of Cook and of Haygarth are honourably and eternally associated.

Since Dr. Farr compiled the figures which we have quoted above, we have five completed decades of registration statistics, and extracting for London the death rates to the same scale from all causes, from Small-Pox, and from Fever, we obtain the following :—

ANNUAL DEATH RATES in LONDON per 100,000 living from :—

——	All Causes.	Small-Pox.	Fever.
1841-50	2,500	40	97
1851-60	2,400	28	88
1861-70	2,400	27	90
1871-80	2,240	45	37
1881-90	2,037	14	21

We are, therefore, led to the conclusion that the great fall in the Fever death rate since the middle of last cnntury in London is a real and substantial one, that it is in all probability due to greater sanitary activity, and that a fall of about the same amount has, during the same period, taken place in Small-Pox mortality, and we are unable to agree that it is not largely due to similar causes.

This is, in fact, what we find when we examine such figures as are available for determining the influence of inoculation on the prevalence of and mortality from small-pox, as, for instance, the London Bills of Mortality. Whether we consider the horribly insanitary conditions with the attendant overcrowding, or the disregard of precautions against contagion, it would probably be difficult to conceive conditions more favourable to the spread and

fatality of small-pox than those which obtained in London in the first three quarters of last century. In this respect, it is probable London was as bad, or even worse, than other large European towns. Small-pox and other infectious Fevers were allowed to run riot, and Bernouilli's calculation, derived from the experience of such places at such times, to the effect that 60 per cent. of those born took small-pox was probably not far wrong. The introduction of even partial and indiscriminate inoculation was not likely to, and in fact did not, increase to the extent which might otherwise have been expected the heavy toll that small-pox already exacted. Thus, the figures from the London Bills show that in the first quarter of the 18th century, when inoculation had scarcely begun to be practised in London, the deaths from small-pox were 44,306 out of 586,270 total deaths, or 7·6 per cent. In the following quarter, when a certain amount of inoculation was carried on, especially towards its close, small-pox was responsible for 49,941 deaths out of 660,800, or again 7·6 per cent. In the third quarter, when inoculation had become an established custom, 56,690 out of 549,891 deaths, or 10·3 per cent., were ascribed to small-pox. In the last quarter of the 18th century, although the total deaths had greatly fallen, under the influences to which we have already alluded, the deaths from small-pox still constituted 9·2 per cent. of the whole (45,428 out of 493,309). It cannot be denied that the proportion of small-pox deaths to deaths from all causes was greater last century in London after the introduction of inoculation than it was before, though it is also true that the death-rate in proportion to the estimated population from all causes and from small-pox showed signs of improvement during the last quarter of the 18th century, that any changes which would have the effect of reducing the chances of infection would diminish for the susceptible the prospects of attack and death by small-pox; while those who had acquired natural or artificial immunity would constitute to that extent a protected class. In so far as vaccination substituted a non-infectious procedure for the old inoculation, to that extent, and apart from any question of its affording any immunity, it should by checking

a fertile cause of the diffusion of small-pox bring about indirectly a reduction of mortality from that disease. Great as such influence must have been, and great as were the efforts which were now for the first time made to restrict the spread of small-pox—by efforts directed against contagion—there were, in addition, those other influences at work during the last quarter of the 18th century to which we have already alluded, influences which have been continued and intensified during the present century, and which, in our opinion, must be credited with a considerable share in the reduction of small-pox.

We agree with those witnesses who are of opinion that inoculation, as practised in this country and many parts of Europe last century, did tend to increase the prevalence and mortality from small-pox, that it introduced the disease into places that, in all probability, would have remained exempt from it, and in some large towns like London it tended to keep the contagion alive and make the disease endemic. It appears, however, from the Bills that its introduction did not at once or very materially increase the mortality from small-pox in London. This was, doubtless, owing to the fact that it was scarcely possible to make matters much worse then than they were before in regard to the number of small-pox deaths.

We are led to believe that but for the disease being kept alive by inoculation, the improvement of the public health which set in towards the end of the 18th century, in obedience to the causes to which we have alluded, would have brought about an earlier and greater decline of small-pox mortality. The mere substitution of a non-contagious process like vaccination for the old inoculation in a population of whom some 80 per cent. or more had acquired naturally or artifically such protection as previous small-pox affords would have a striking effect upon the small-pox death-rate by reducing the liability to infection of the remaining susceptible.

We think there can be no doubt that, speaking generally, in

London last century, whether from the indiscriminate practice of inoculation or from habitual indifference which permitted small-pox to run riot with little, if any, restriction, the great bulk of persons suffered from small-pox in childhood, and acquired such protection as an attack of small-pox affords. The deaths from small-pox each year were chiefly those of young children or new comers, who were exposed to the constant sources of infection always kept going, and to the effects of which they had not been rendered immune.

Thus the matter stood, when in January, 1799, cow-pox was discovered in a dairy in the Gray's Inn Lane, London, and attracted the attention of the leading medical men in town, and became the subject of experiments on a large scale by Drs. Woodville and Pearson at the small-pox Hospital.

Woodville published the results of his experiments in May, 1799, and Pearson in March of the same year distributed the hospital lymph to some 200 practitioners at home and abroad.

This was the starting point of the practice of "vaccination"; for Jenner had lost his strain of lymph. Woodville's cases merit careful attention, as from their number and detail, and from the fact that he had submitted nearly all of them to the variolous test within three months of their "vaccination," and found they resisted it, they produced a profound impression on the mind of the public and the profession. In July, 1800, thirty-three of the most eminent physicians and forty distinguished surgeons of the metropolis signed a declaration to the effect that "those persons who have had the cow-pox are perfectly secure from the future infection of the small-pox, and that the inoculated cow-pox is a much milder and safer disease than the inoculated small-pox." (*Morning Herald*, July 19th, 1800.)

Thus, Mr. Marson records 3,094 cases of post-vaccinal small-pox treated by him at the Highgate Hospital between 1836 and

1851, and a further series of 10,661 such cases between the years 1852 and 1867.

Dr. Gayton during the years 1870 to 1883 treated 8,234 cases of small-pox in vaccinated persons in the hospitals of the Metropolitan Asylums Board. At Sheffield, in 1887-8, 5,035 vaccinated persons were attacked by small-pox.

It is, however, superfluous to cite further evidence at this stage to prove what is no longer denied by anybody, that small-pox attacks the vaccinated.

No witness who has appeared before us has maintained the original contention of Jenner and the earlier vaccinators, and the protection now claimed by those who assert such protection is relative, not absolute; temporary, and not permanent.

It was at one time alleged that even if vaccination did not invariably prevent attack by small-pox, yet such attack was modified, and never severe or fatal. There can, however, be no doubt that fatal small-pox and cases of the disease in all its various types of severity occur in persons who have been successfully vaccinated.

Dr. Gayton's tables include fatal cases, not only in those stated to be vaccinated but without visible marks, nor only in those whose marks were considered to be imperfect, but also amongst those who exhibited at the time of their attack one, two, three, and four good marks of vaccination. We are not now concerned with the question of relative mortality in the various classes, to which we shall return, but these and numerous other examples suffice to prove what we believe is no longer disputed by anyone, that severe and fatal small-pox occurs in those who have been successfully vaccinated. As affecting the kind of attack, as well as liability to attack, the influence now claimed for vaccination is a relative one; that is to say, the contention is that, admitting to the full the occurrence of small-pox, and even

death from small-pox in the vaccinated, yet the vaccinated are relatively to the unvaccinated in a superior position both as regards the liability to be attacked and the chance of the disease assuming a severe or fatal form.

Restricting our attention, in the first instance, to the question of liability to attack, it is right to state that in the earlier part of the century, when cases of the failure of vaccination began to multiply, it was urged that, inasmuch as small-pox itself did not invariably prevent a second attack, it was unreasonable to expect that vaccination could accomplish more. The view appeared to receive support when experiments seemed to show that the cow-pox was merely the small-pox of the cow, and it was said the vaccinated are protected against small-pox because they have in fact had it. Indeed, the Select Committee of the House of Commons, which inquired into the operation of the Vaccination Act in 1871 reported that they had no doubt "that the almost universal opinion of medical science and authority is, in accordance with Dr. Gull, when he states that vaccination is as protective against small-pox as small-pox itself.

We have already shown that such protection is by no means absolute, but we cannot recall a single witness who has been examined by us on this question who has not admitted that whatever may be the amount of protection afforded by vaccination, it is at any rate less than that conferred by a previous attack of small-pox.

The Registrar-General, in his 43rd Annual Report, thus states the view of "the best authorities" on this point; he says, "it is pretty generally recognised, and this on good grounds, that the immunity derived from vaccination is both less perfect and less permanent than that conferred by small-pox itself; its efficacy diminishing with the lapse of time, while the protective influence of small-pox remains practically unaltered."

Dr. Ogle thinks there is no doubt that the protection by previous small-pox is greater than that of vaccination.

Dr. Gayton, after quoting a later opinion of Jenner's to the effect that the protection by vaccination was tantamount to that of an attack of small-pox, says, "Proofs are abundant already, and will continue to accumulate, to disprove these statements."

Mr. Marson, in the 16 years following 1836, and when he estimated the number of persons who had been inoculated or had Small-pox to be probably about equal to the number of those who had been vaccinated, found that only 47 persons were admitted to the hospital suffering from small-pox after the natural or inoculated disease, whereas there were 3,094 cases of small-pox after vaccination.

Mr. Sweeting is of opinion that vaccination is decidedly less protective than a previous attack of small-pox.

At Sheffield, in the 1887-88 epidemic, Dr. Barry found, as the result of his census, that 18,292 persons, or 6·6 of the enumerated population of the borough of Sheffield, had had small-pox prior to 1887. Of these, 23 were attacked again in 1887-88, and five died. This gives an attack-rate of 13 per 10,000 against an attack-rate of 155 per 10,000 in the vaccinated.

The evidence leads us to the conclusion recorded by Dr. Gregory, the Physician to the Small-Pox Hospital, in 1843, viz., "that any attempt to institute a parallel between cases of small-pox after vaccination, and cases of secondary or recurrent small-pox, must fail."

No hospital supplies so large an experience, extending over a long series of years, as the London Small-Pox Hospital. We learn from the figures recorded by Mr. Marson and Dr. Munk, and the reports of the hospital, that the percentage of cases of vaccinated small-pox patients to the total admissions has progressively increased with the increase of vaccination among the general population, if not in exact ratio, at any rate in a ratio approximating closely to it.

Years.	Post-vaccinal Small-Pox per Cent. of Total.
1826 - -	38
1835-45 -	44
1845-55 -	64
1855-65 -	78
1863 - -	83
1864 - -	84
1878-79 -	93
1885 - -	93
1888-91 -	(14 cases only) 100

We are not aware of any grounds for thinking that at any time more than 90 per cent. of Londoners have been vaccinated. Judging from the vaccination returns the proportion would seem to be less than this, and the evidence derived from local investigations supports the latter view.

The per centage of children not finally accounted for as regards vaccination in London is given as follows, by the Local Government Board, for the years since 1872 :—

1872 - -	8·8	1883 - -	6·5
1873 - -	8·7	1884 - -	6·8
1874 - -	8·8	1885 - -	7·0
1875 - -	9·3	1886 - -	7·8
1876 - -	6·5	1887 - -	9·0
1877 - -	7·1	1888 - -	10·3
1878 - -	7·1	1889 - -	11·6
1879 - -	7·8	1890 - -	13·9
1880 - -	7·0	1891 - -	16·4
1881 - -	5·7	1892 - -	18·4
1882 - -	6·6		

ANNUAL SMALL-POX DEATH RATES PER 100,000 AT DIFFERENT AGES IN LONDON.

——	0-5 Years.	5 years and upwards.
1851-60 - - -	130	13
1861-70 - - -	116	14
1871-80 - - -	113	34
1881-88 - - -	37	16

Thus we see that, except in the last period (which has been one of increasing default in regard to vaccination), and then only in the case of those under five years of age, there has been no substantial reduction of small-pox mortality, while at all ages over five the mortality from small-pox has been actually greater in the last three periods than in the first. Such saving of life as there has been in London in the period 1851-88 was most noticeable in the period 1881-88, and was confined to children under five years of age.

It has been urged that the observed changes in age incidence of small-pox mortality point to vaccination rather than sanitary reforms as the cause of the difference, since sanitary reforms should operate equally upon all ages, while vaccination might be expected to effect especially the young. There are, however, some considerations which prevent the acceptance of this explanation, at any rate for the whole of the facts. The increased death-rate from small-pox in persons above the age of childhood might, with equal reason, be ascribed to vaccination, or at least seems incompatible with the belief that the influence of vaccination against fatal small-pox is of an abiding character. Moreover, it has been pointed out by the Registrar-General in his report for the year 1879 that sanitation operates differently upon the general mortality of persons at different age periods. He calls attention to the fact that "while the mortality in early life has been very notably diminished, the mortality of persons in middle or advanced life has been steadily rising for a long period of years." He adds, "That the sanitary efforts made of late years should have more distinctly affected the mortality of the young is only what might be naturally anticipated; for it is against noxious influences to which the young are more especially sensitive that the weapons of sanitary reformers have been chiefly directed." He further suggests that the enhanced mortality at later ages may in part be due to the indirect influence of sanitation by preserving from early death a vast number of children of permanently unsound constitution who so diminish the healthiness and add to

the death-rates of later ages. At any rate there is evidence to disprove the assertion that sanitation in the wider sense must affect mortality at all ages equally.

Again, it has been fairly urged that, in order to ascertain whether the shifting of the age incidence of fatal small-pox can be fairly attributed to vaccination rather than to sanitary reforms, it is desirable to institute a comparison between small-pox deaths or death-rates at different ages and other comparable diseases rather than with the deaths or death-rates from *all* diseases.

Dr. Ogle thinks that the zymotic diseases would be the better ones to compare small-pox with, but he truly observes: "It is impossible to make similar comparisons in the case of Scarlet Fever or Measles, and diseases that only affect children. Fever is the only one of the zymotic headings that you can take, because it is the only one that affects all ages to any extent. Fever is, therefore, the only one which it is possible to subject to this kind of investigation."

Now, in regard to Typhus, which is not at the present time responsible for many deaths under five years of age, we learn that, comparing the earliest quinquennium which the Registrar-General's figures enable us to use with the quinquennium 1886-90, a fall of 46·9 per cent. in the children's share, *i.e.*, from 6·4 per cent. to 3·4 per cent. For the same period in the case of Typhoid Fever (even when the necessary correction for varying classification in regard to remittent fever has been made) there is a fall of 51·7 per cent. in the children's share, *i.e.*, from 17·4 per cent. to 8·4 per cent. For small-pox (even without any correction for chicken-pox) there is a fall during the same period of the children's share equal to 36·9 per cent., *i.e.*, from 31·1 per cent. to 19·6 per cent.

Not only then do we find that in certain other zymotic diseases comparable with Small-Pox a shifting of age incidence of the deaths so that the children's share is less and the adults' share

greater than was formerly the case, but the shifting would appear to be somewhat greater in the case of Typhus and Typhoid Fevers than in the case of small-pox.

The diminution of mortality of infants side by side with increase of mortality of older persons, which has been claimed to specially indicate the influence of vaccination upon small-pox mortality, seems to be also true in a remarkable manner of Influenza.

The Register-General, in his Fifty-fourth Report, institutes a comparison between the great Influenza epidemics of 1847-48 and 1890-91, and calls attention to the fact that "the epidemic of 1890-91 was distinguished from the equally fatal epidemic of 1847-48 by the greater comparative severity with which it attacked persons of middle age," and the table he gives shows that, while at ages under fifteen there was a lower rate in the last epidemic, at ages from fifteen to fifty-five there was an enhanced mortality, while above sixty-five there was again a reduction.

We find in these facts evidence that in diseases other than Small-Pox, and against which no artificial protective is invoked, there has been a change in the age-incidence of deaths and death-rates in the same direction as, and not very dissimilar in amount from, that which has been asserted to be distinctive of small-pox in consequence of the special influence of vaccination upon it. We are bound to conclude that a theory of causation, which takes no account of these phenomena, is unequal to an adequate explanation of the whole case.

If we are right in our conclusion that causes other than vaccination are operative upon the age-incidence of fatal small-pox, and if, as we hold, sanitary measures are influential upon small-pox mortality, and if it be true that "it is against noxious influences to which the young are especially sensitive that the weapons of sanitary reformers have been chiefly directed," we should naturally expect to find that in sanitary or healthy districts

as compared with less sanitary or unhealthy districts the reduction of small-pox mortality would be greater among the young than among the adult population.

That this is actually the case has been shown in section 198 of our colleagues' report. It is true that the admitted fact is there referred to the greater opportunity afforded to town dwellers of catching small-pox and catching it early. We are, however, quite unable to agree with our colleagues that overcrowding upon area or within dwellings ought not to be regarded as an insanitary circumstance, and the fact remains that sanitation or environment, or at any rate means other than vaccination, exert a profound influence, not only upon the amount of small-pox mortality, but also upon its age distribution.

That vaccination cannot be accepted as an adequate explanation of the shifting of age incidence of fatal small-pox, or at any rate as the sole explanation of the phenomenon, is proved by the fact that a very considerable shifting has been observed in the case of deaths from small-pox of those certified to have been unvaccinated. Now it is only since the year 1881 that the Registrar-General has classified the deaths from small-pox into three groups—the vaccinated, the unvaccinated, and the "not stated." Confining our attention to the unvaccinated, we learn that of 3,746 deaths in the years 1881-93, 1,483 were under five years of age, or 39·5 per cent. Now it has been repeatedly stated that the normal proportion of deaths from small-pox under five to the total Small-Pox deaths last century (and vaccination apart) may be taken as 80 per cent. What, then, is the explanation of the reduction of the proportion by one-half? It has indeed been alleged that vaccination may indirectly have produced the effect by reducing the amount of small-pox or controlling its virulence. If this explanation be regarded as satisfactory, it may equally be urged that any measures, such as isolation and more efficient precautions against contagion, may also exert a powerful influence, not only upon the amount of small-pox, but also upon its age distribution amongst the unvaccinated.

With a view to prove the truth of the theory that cow-pox is the small-pox of the cow—Variolæ Vacciniæ—and also to establish fresh lymph supplies, numerous attempts have been made by several observers in various ways to infect bovine animals with the virus of human small-pox. In the majority of the experiments the results have been negative. In a few, when the Small-Pox matter has been diligently rubbed into scarifications, or denuded surfaces, or punctures, certain results have been obtained which have been variously interpreted. The positive results have generally been redness, tumidity, or papules at the points of insertion. In some of the successful cases, appearances approaching what may be described as vesicular have been obtained, a few, indeed, have exhibited the physical appearances of vaccine inoculated on the calf; such vaccine results have sometimes appeared not at the points of insertion but at some distance from them. In none of the experiments have the usual signs of natural cow-pox been found to result.

Some of the cases in which vesicular results were obtained are certainly open to the objection that under the circumstances under which the experiments were made, there was the possibility, and even the probability, that vaccine virus (accidentally communicated) accounted for these results.

Matter obtained from the local products of such variolations of animals, when inoculated on human beings, in the hands of Chauveau and others, gave rise to small-pox, which proved to be infectious. In the hands of others, matter taken from the local results, even when these bore no resemblance to vaccine vesicles, after serial inoculations on animals and human beings, approximated so closely to the Vesicles of ordinary vaccination as to be indistinguishable from them; in such cases there does not appear to be any ground for believing that the communicated disease, whatever its nature, is any longer infectious.

In order to obtain local results on human beings similar to those of ordinary vaccination, by the application of matter derived

from human small-pox, it does not appear necessary to resort to the cow as an intermediary. One of the earliest experimenters who succeeded in variolating the cow, Dr. Thiele, of Kasan, described a method of storage and dilution of small-pox virus whereby he was enabled to cultivate lymph giving results indistinguishable from vaccine. Dr. Walker, who carried on a large vaccination practice in London, in the beginning of the century, appears to have entertained similar views, and practised the dilution with water of the small-pox virus.—(Memoirs of Lettsom, Vol. iii., p. 351.)

Adams, in 1805, had already succeeded in obtaining perfect vaccine results, without rash, with small-pox lymph taken from a mild variety of that disease. Guillou, in 1826, again records the fact that all the local appearances of vaccination could be obtained with lymph of undoubted variolous origin. Indeed, results approximating to these appear to have been arrived at by some inoculators in the previous century, who claimed to give small-pox without Fever or eruption, and with no other symptoms than those occurring on the inoculated arm; it was, however, pointed out that such modified variolation did not give the same immunity as that which usually occasioned an eruption.

While it is probable, then, that the insertion of small-pox matter into the skin of a calf can produce vesicles similar in some cases to those obtained by the inoculation of cow-pox matter, we are not aware of any evidence to show that the inoculation of the Pox of the cow on the human skin has ever produced small-pox. In this sense then cow-pox and small-pox are not convertible, and we think it is incorrect to speak of cow-pox as the small-pox of the cow.

It is impossible now to distinguish the various stocks of vaccine in use, it is, however, clear that much of that now current in this country and abroad is not derived from cow-pox at all, and probably still less is derived from that special variety of cow-pox which Jenner regarded as the true or protective

variety. It is scarcely probable, unless indeed it be held that all viruses that will give rise to the physical appearances of a vaccine vesicle when inoculated, are identical, that one and all should be endowed with precisely the same effects *quâ* immunity towards small-pox. If we had to express a preference for lymph derived from any of the sources described we should give it to that of variolous origin, provided always it has been rendered incapable of giving rise to infection.

Reference III.—The objections made to vaccination on the ground of injurious effects alleged to result therefrom.

It was at one time officially maintained that against "the vast gain" by vaccination there is no loss to count. Of the various alleged drawbacks to such great advantages the present state of medical knowledge recognises no single trace.

The Select Committee of 1871 reported "that if the operation be performed with due regard to the health of the person vaccinated, and with proper precautions in obtaining and using the vaccine lymph, there need be no apprehension that vaccination will injure health or communicate any disease." Even more recently this view has been re-affirmed in a pamphlet, entitled "Facts concerning vaccination for heads of families," "revised by the Local Government Board, and issued with their sanction"; which states that "as to the alleged injury from vaccination, all competent authorities are agreed that, with due care in the performance of the operation, *no risk of any injurious effects* from it need be feared."

We agree with our colleages that, notwithstanding repeated and emphatic assertions to the contrary, the admission must without hesitation be made that risk attaches to the operation of vaccination.

The statements contained in sections 399-421 of the Report appear to us to give ample reason at least for hesitation in

retaining compulsory vaccination in any form. We allude especially to the following statements, in which we generally concur:—

Section 399.—"It is not open to doubt that there have been cases in which injury and death have resulted from vaccination."

Section 409.—"It must not be forgotten that the introduction into the system of even a mild virus, however carefully performed, is necessarily attended by the production of local inflammation and of febrile illness."

Section 410.—"It is established that lymph contains organisms, and may contain those which, under certain circumstances, would be productive of erysipelas."

In section 413 we are told that vaccination may become exceptionally risky, through special circumstances over which, in our opinion, the parents can have little or no control, such as the prevalence of disease in the neighbourhood.

Section 417.—"It may, indeed, easily be the fact that vaccination, in common with chicken-pox, measles, small-pox, and other specific fevers, does occasionally serve as an exciting cause of a scrofulous outbreak.'

Section 418.—"It is freely to be admitted that vaccinia, like varicella, does occasionally cause an irritable condition of skin which may last long, but it is exceedingly improbable that it is responsible for any substantial increase in the number of chronic skin diseases in children." And again, "Amongst the inconveniences connected with vaccination is the production of contagious forms of eruption, such as have been classed under the names of porrigo and impetigo contagiosa. These eruptions are not attended with any risk to life, nor by any permanent injury to health, and they are usually curable by simple measures. References to these eruptions have been made by many witnesses.

Their occurrence has no doubt not unfrequently caused prejudice to the practice of vaccination." And in section 419 is recited the case of "a child previously in good health, and vaccinated with calf-lymph by means of a needle which had never been used before, who died about six weeks afterwards, with severely ulcerated arms and ulcers in several parts of the body and limbs. No precaution had been neglected, and the event could only, as in other similar cases, be attributed to what is known as idiosyncrasy on the part of the child, a peculiarity of health attended by exceptional susceptibility to the specific virus of vaccinia."

In sections 420 and 421 it is pointed out that "It was at one time doubted whether syphilis could result (from vaccination), and it was even confidently asserted that it could not," but that "Facts which were, not long after the issue of Mr. Simon's report, brought before the profession, and which were carefully investigated, made it certain that the negative conclusion which had been arrived at was a mistaken one, and from that time no doubt can have been entertained by any that it is possible to convey syphilis in the act of vaccination."

Putting together all these admitted elements of danger, though each may be slight in itself, we think that the sum of them constitutes a very serious objection even to the modified form of compulsion favoured by our colleagues.

It appears to us that the case for even this modified compulsion is practically surrendered in section 437, where our colleagues insist on the right of parental option as to the lymph to be used, on the ground that the risk of syphilis from arm-to-arm vaccination, however slight, is "naturally regarded by a parent with abhorrence." We cannot understand on what principle a parent is entitled to refuse arm-to-arm vaccination, because he regards its risks with abhorrence, but is not entitled also to refuse the not unreal risks of calf-lymph, though he also regards these with abhorrence.

Reference II.—Means other than Vaccination for diminishing the prevalence of Small-Pox.

We are quite unable to agree with those who have maintained that sanitary measures have little or no influence upon Small-Pox. We have already given our reasons for thinking that the teaching of the early sanitarians, like Howard and Haygarth towards the close of last century, initiated a new line of thought in the prevention of disease, and we believe the general improvement of the public health, which then set in, was due, in a large measure, to a greater sanitary activity, and that the falling off in the death rates of fevers and small-pox, as well as in the general death rate, is confirmatory of this view.

In speaking of sanitation we use the word in its widest sense; we are not speaking merely of drainage improvements, but we include the prevention of overcrowding on areas, or within houses and rooms, the proper constructions of dwellings, so as to permit thorough ventilation; the promotion of cleanliness by adequate water supply and the prompt removal of filth accumulations. Related to these measures, but in a somewhat different category, are means directed against contagion, the speedy separation (in suitable hospitals) of the infected from the healthy, the disinfection of persons and things, and the prevention of the propagation of the disease by inadvertent carelessness or by intentional inoculation.

If the view that attributes small-pox exclusively to contagion be well founded, it might indeed be possible to keep out the disease, even from insanitary places, by rigid isolation; but experience shows that some, even of the contagious diseases, are dependent for their extension and severity upon influences other than contagion. The Royal Commission on Infectious Hospitals in 1882, in their report, called attention to the fact that the opportunity for contagion which the presence of a small-pox hospital might afford to a particular neighbourhood, is insignificant as compared with other deleterious influences from which London suffers. The

returns and maps showed that a healthy neighbourhood in which a hospital has been planted, though to a certain extent injured, may yet be favourably compared as regards prevalence of small-pox with those localities in which, from over-population and neglect of sanitary precautions, the predisposing causes of disease are more deeply seated.

In 1885 the Metropolitan Asylums Board began to convey small-pox patients by steamer to the floating hospitals on the Thames at Long Reach. In 1889 notification became compulsory in London, and nearly all the reported cases of small-pox have been promptly isolated in such a manner as not to occasion infection from hospitals in crowded neighbourhoods. The comparative immunity that London has enjoyed of recent years is no doubt due to this policy which has been so vigilantly carried out by the managers of the Asylums Board.

There are 400 beds in constant readiness at the ships, and additional accommodation is available at short notice at Gore Farm. On receiving telephonic or other communication at headquarters an ambulance proceeds with a nurse to where the patient is, and on receiving the certificate that the case is one of small-pox, and without any compulsion, the patient is conveyed to the wharf where the ambulance steamboat is in readiness. Here the patient is seen by a medical officer of the Board, to confirm the diagnosis or otherwise. There are three ambulance steamers comfortably fitted up so as to carry 100 acute cases at a time.

It is a matter of experience that it is easier to secure notification and isolation in the case of small-pox than in the case of any other infectious disease. The promptness and ease with which an outbreak of small-pox in Marylebone was dealt with successfully by the Board, in 1894, afforded a striking illustration.

The Asylums Board has no jurisdiction in regard to disinfection or vaccination, nor is there in London any machinery for quarantining the inmates of infected households. Investigations

which have been made in London and elsewhere have emphasized the local and personal infectiveness of small-pox, and the pedigrees of localised outbreaks have been definitely traced to single importations.

Attention has been of late drawn to the part played by tramps in the spread of small-pox. Mr. Scovell, of the Metropolitan Asylums Board, pointed out the need for greater supervision of "shelters," and for the enforcement of greater cleanliness on the part of the vagrant population who use them. "small-pox," he says, "is usually found to be rife among the lower and more uncleanly portion of the population." Dr. Birdwood, who speaks from the experience of some 12,000 cases of small-pox, believes that attention to cleanliness and frequent ablutions prevent the spread of small-pox and dimish the amount of eruption; he cites the successful precautions taken against the infection of visitors to the small-pox ships, and the occurrence of discrete small-pox in babies, who are frequently washed, as evidence of the truth of his views.

In the last report of the Metropolitan Asylums Board we read, in reference to the recrudescence of cases of small-pox in June, 1895, that "the causes which produced this sudden spread of the disease were not far to seek. Of the 35 patients admitted during June, only six possessed a fixed home. Of the remaining 29, three were infected in a London infirmary where small-pox had been introduced by some undiscovered means in May, and seven were infected in another infirmary by the agency of a vagrant who developed small-pox shortly after his admission there. The remaining 19 were vagrants who possessed no lodging or no fixed lodging, or other persons of the lowest class of society, all of them sleeping, when they slept under a roof at all, in common lodging-houses, Salvation Army shelters, or the like."

Those who trust to vaccination say:—Vaccinate your child before it is three months old, and so render it less liable to have

small-pox badly if it should happen at some future date to come in the way of it. Those who trust to isolation say :—Small-pox is notified to be here, now. Let the healthy be separated from the sick, let the latter be isolated at home, or, if they cannot be properly attended to there, let them be removed to a suitably isolated hospital. There can be no doubt that the latter is the stronger position of the two ; and in practice it has been found to secure the intelligent co-operation of the public.

In accordance with the sub-head No. 2 of the reference to the Commission, we would suggest the following as the means other than vaccination which should be employed for protection of a community from small-pox :—

1. Prompt notification of any illness suspected to be small-pox. Improved instruction in the diagnosis of small-pox.

2. A hospital, suitably isolated, of adequate accommodation, in permanent readiness, and capable of extension if required. No other disaese to be treated at the same time in the same place.

3. A vigilant sanitary staff, ready to deal promptly with first cases, and, if necessary to make a house-to-house inspection. The medical officer of health to receive such remuneration as to render him independent of private practice.

4. Prompt removal to hospital by special ambulance of all cases which cannot be properly isolated at home. Telephonic communication between Health Office and Hospital.

5. Destruction of infected clothing and bedding, and thorough disinfection of room or house immediately after removal of the patient.

6. Daily observation (including, where possible, taking the temperature and inspection for rash) of all persons who have been in close contact with the patient during his

illness; such supervision to be carried out either in quarantine stations (away from the hospital) or at their own homes.

7. Closure of schools on the occasion of the occurrence of small-pox among the scholars or teachers.

8. Hospitals and quarantine stations to be comfortable and attractive, and so administered as to secure the confidence of the public. Hospital treatment to be free to all classes, and compensation to be paid to those detained or otherwise inconvenienced in the public interest, at the public expense.

9. Tramps entering casual wards to be medically inspected, their clothing disinfected, and bath provided. The measures for detection and isolation of small-pox in common lodging-houses suggested in a previous section of the report to be carried out.

10. International notification of the presence of small-pox, and special vigilance at sea-ports in communication with infected places, after the plan adopted in the case of cholera.

11. Attention to general sanitation—prevention of overcrowding, abundant water supply, and frequent removal of refuse.

Reference V.—Alterations in the provisions of the Vaccination Acts with respect to Prosecutions for non-compliance with the Law.

It must be obvious from what has been already said that we necessarily consider the legal enforcement of vaccination as inexpedient and unjust. We see no sufficient reason for withdrawing this particular medical prescription from the personal option which attaches to all other medical prescriptions or surgical operations; we do not think that medical authority or advice is

likely to gain in confidence or respect, by the adventitious aid of the police, and fine and imprisonment. But even if vaccination were a more effective and trustworthy prophylactic than we hold it to be, we should still think the continuance of compulsion at the present time to be an anachronism. The Final Report of the majority of our colleagues appears to show us this conclusively. The view there expressed of the value of vaccination differs very considerably from the opinion prevalent in and before 1853, the date of the first compulsory law. Whether such limited and conditional confidence in vaccination as is expressed in the report of the majority would have been held by the Parliament of 1853 to justify compulsion, is, of course, a matter of opinion; but when we recall the unqualified assurances then given that universal efficient vaccination would secure universal immunity from small-pox, we must say, in our opinion, it would not.

Our inquiry has shown that medical opinion as to the degree of immunity afforded by efficient primary vaccination has been modified since 1853, the date of the first compulsory Vaccination Act. At that time the Epedemiological Society used its influence to get the Act passed on the ground that the whole medical profession was agreed on the certain efficacy of vaccination as a preventative. The evidence we have received shows that this agreement no longer exists. Amongst the professional witnesses who have favoured us with their views there are marked differences of opinion as to the length of the period during which primary vaccination is effective. But not one of them has maintained Jenner's first claim that vaccination conferred a life-long protection.

It is apparent from the history of legislation on this subject that the assumption underlying every amendment of the law was a strong and general belief that, if only the absolute universality of efficient primary vaccination could be secured, epidemics would be prevented, and practical immunity would be secured for the whole population throughout life. On the other hand we have it

in evidence that the epidemic of 1871-73 was as severe and widespread as any experienced during this century, and that in the course of this epidemic "a very large proportion of the total small-pox deaths of adults was amongst people who had at some time or another been vaccinated."

It would seem, therefore, that there is a certain amount of discrepancy at the present day between the theory on which the compulsory law is based and the actual state both of fact and opinion.

Under these circumstances it has been suggested to us that the obvious remedy is to amend the law by making re-vaccination compulsory. But though such a course might receive a good deal of support from medical opinion, the evidence we have as to the condition of public feeling shows that it would be impracticable.

This condition of things can hardly be considered satisfac-factory. The law, as it stands, enforces, under penalty of fine or imprisonment, a practice once thought to be an effectual preventive of epidemics, and a practical safeguard for every individual vaccinated. But this prescription of the law is now generally recognised as insufficient, unless primary vaccination be supplemented by secondary or repeated vaccination. The question thus arises whether it is just or expedient to enforce at the cost of much local discontent a preventive which does not secure the end proposed, and which confessedly cannot now be supplemented by the only measures which, according to the medical opinions quoted, could make it effective.

In support of a continuance and reinforcement of the present law it is urged that if primary vaccination be not an infallible preventive, at least it always lessens the severity of the disease, if caught, and diminishes the mortality. It is, however, doubtful whether such results as these would have been held to justify compulsion when it was first proposed. And we cannot shut our eyes to the fact that this shifting of the ground of compulsion has

re-opened the whole question in the minds of many who accept this modified view of the Jennerian practice. As Commissioners commanded to consider and report on "provisions of the Vaccination Acts with respect to prosecutions for non-compliance with the law," we cannot avoid a reconsideration of this issue, which has very much to do with the unsettlement of public opinion on the Acts in question.

It cannot be denied that the law, as it stands, is of a very exceptional character. It is the only instance under our Constitution of the universal enforcement by fine and imprisonment of a surgical operation. In all other cases preventive sanitary law affects only outward circumstances, such as light and air, sewerage, overcrowding, public exposure of infected persons, and the like. In all such cases the social interests are so direct and predominant, and the individual claims affected are so slight, or so merely mercenary—as in the case of owners of insanitary premises—that the reasons for compulsion are simple and uncomplicated by any delicate question of personal rights. But compulsory vaccination goes beyond outward circumstances, and invades the integrity of the healthy body. It requires a wound, however slight, to be inflicted on every healthy infant born, and the contraction of a disease, however slight, of the successful cultivation of which the vaccinating surgeon must satisfy himself. The law gives the parent or guardian no option as to incurring the possible dangers of the operation. In all other cases he is allowed to decide on his own responsibility whether he will follow a particular medical prescription or not. But in this he must accept the operation with all its dangers, real or imaginary, at the dictation of the law. He may believe that he has lost previous children through the effects of vaccination. But nevertheless he must run the risk again, or be treated as a criminal. It may fairly be conceded that a compulsory law of this nature requires justification different both in kind and degree from that of laws affecting ordinary nuisances.

The case, as put before Parliament in 1853, seemed exceed-

ingly strong. But, unfortunately, it did not receive much discussion. It rested, as we have seen, on the practical unanimity of the medical profession in the opinion that universal primary vaccination would extinguish small-pox. It was argued that the plague of small-pox was such as to justify exceptional measures. It was believed that vaccination had already come into such general vogue that only carelessness accounted for occasional neglect. And, finally, it was assumed that there were no dangers to be feared such as might perplex the consciences of parents.

The law is also in abeyance by resolution of the guardians, in the following Metropolitan Unions, viz., Camberwell, Hackney, Islington, Lambeth, Mile End, St. Olave's, St. Saviour's, and Shoreditch. Making allowance for the fact that in about 46 of the 122 unions the suspension of the compulsory law is professedly only temporary until this Commission shall have reported, we cannot regard without anxiety and fear the painful conflict that would be inevitable if an attempt were made to revive and re-enforce the compulsory law in these localities against the prevalent opinion of the inhabitants.

Indeed, even to make the attempt would be impossible without a considerable change in the law. For at present the duty of enforcement lies with the guardians, and it is made a test question in their election. If we could suppose that the evidence laid before us would have the effect of changing local opinion, we might count on the future election of guardians willing to carry out the law. But a large part of that evidence has been published already, and there is hitherto no appearance whatever of any change in the local opinion of the unions above mentioned, except in the rare cases in which epidemic has occasioned panic. Each year of our labours has witnessed not an increase, but a decrease in the number of guardians elected in these unions by the supporters of compulsion.

It appears, therefore, that, if the present law is to be made really effective, this can only be secured by imposing the duty of

its enforcement on the police under the direction of inspectors of the Local Government Board. There is too much reason, however, to fear that even this would not be sufficient without a material increase in the severity of the law. The evidence received as to the prevalence and strength of conscientious objections on the part of parents convinces us that a considerable number could not be compelled by any penalties of fine or imprisonment to bring their children for vaccination or to allow the operation at their own homes. People who show this spirit are considered martyrs by their neighbours, and a few such cases soon create a local agitation against the law. The only way of enforcing the law without prosecution of parents would be to empower public vaccinators to seize children by the aid of the police and vaccinate them by force. But the attempt would probably create an agitation such as no Government could withstand.

The difficulty of compulsion is greatly enhanced by the undeniable fact that vaccination is attended by an appreciable amount of danger. The constitution of a child is always more or less disturbed by it; and though the number of cases in which this disturbance assumes a painful or fatal form bears small proportion to the number of infants vaccinated, yet a certain amount of risk remains undeniable: and the question whether this risk should be encountered or not is naturally regarded as a matter of parental responsibility. We are unable to report that this risk is infinitesimal or unimportant.

The degree of risk which parental feeling may justly be compelled to encounter is scarcely susceptible of statistical statement. If we were in a position to affirm that there is absolutely no danger, our task might be simplified. But when once the reality of appreciable danger is proved, as we hold it to be, it becomes a very delicate question how far the law is morally justified in interfering with the discretion of parents. It may be urged that a very great danger to the community might justify the enforcement of a proved and indispensable safeguard even at

some risk to individuals. But the danger from small-pox to any community using such precautions as we have recommended is not now great enough, nor is the safeguard of sufficient certainty to fulfil these conditions.

It is true that in a considerable number of the cases examined for us the injury or death is reported to have been only indirectly due to vaccination. Insanitary surroundings and parental ignorance or even parental neglect are assigned in some cases as the causes of complications. But even in such cases it is clear that, apart from the vaccination, the contributory causes alone would not have produced the results admitted. An operation which for its safety requires complete sanitation, with care and skill on the part of every mother, would seem to be scarcely a fit matter for universal compulsion.

On the whole, then, we are of opinion that a resolute and universal enforcement of vaccination is neither possible, nor expedient, nor just. It is not possible, because there exists a sufficient amount of conscientious opinion opposed to give it to recalcitrants the credit of martyrdom, and because in great centres, such as Leicestershire, it is questionable whether even the police could carry out compulsion without the aid of the army. It is inexpedient, because it concentrates attention on a safeguard proved to be insufficient in itself, and leads to the neglect of sanitation and isolation, which our evidence shows to be more effective. It is unjust, because to meet a danger often remote by a defence at best uncertain, it overrides parental responsibility and disregards parental feeling.

The proposal of our colleagues is, that while abandoning the attempt to enforce vaccination upon those who honestly object to it, we should continue to press it by force of law upon the indifferent and negligent. In the matter of re-vaccination, however, their proposal is different; they are impressed with the transient influence of vaccination, and recognise the need of re-vaccination as early as nine or ten years of age, and advise its

repetition at intervals, but they do not suggest that the repeated operation, which they regard as essential, should be pressed upon the indifferent and negligent as in the case of the primary operation.

Now, the whole principle of securing the protection of a community from small-pox by the artificial production of a mild disease (whether it be inoculation or vaccination) is based upon the thoroughness of the procedure in two directions:—1. In applying the inoculatory process to *every* individual; 2. In securing to each individual operated upon the maximum of protection the process is capable of securing.

The proposals of our colleagues appear to us to fail upon their own showing in both directions. They recognise the impossibility of securing the primary vaccination of every person, and open a means of escape for objectors. They are also not prepared to recommend that re-vaccination should be pressed in the same manner as the primary operation at a time when the vaccinated have lapsed into susceptibility to small-pox.

This serves to prove that any such system must at best be a broken reed on which to rely for the protection of a community from small-pox epidemics.

We believe the methods of isolation of the infected, disinfection, and the observation of strict cleanliness are both more successful and more legitimate methods for the State to encourage. They have the advantage of applying the preventive only where it is required: and they do not necessitate an operation upon the person of every healthy individual.

We, therefore, recommend that the law be amended by the repeal of the compulsory clauses of the Vaccination Acts. But in consideration of the prevalent belief in the value of vaccination as a prophylactic for an indefinite period, and we suggest that in other respects the law should be left as it is, subject, however, to

such modifications as are recommended for the diminution of attendant risks. The precedent established in the case of the abolition of compulsory church rates might be followed with advantage. In that case all machinery for laying and collecting the rate was left intact though the power of enforcement was taken away. The effect of our recommendation, if adopted, would be that vaccination would continue to be provided as at present for those who desire to avail themselves of it, but efforts to secure vaccination would be limited to moral influence—in a word, the whole country would be in the position of those unions in which the guardians have abandoned compulsion.

The grounds on which we object to the enforcement of vaccination by penalties necessarily lead us also to object to any method of indirect compulsion. We regard as both expedient and unjust exclusion from any branch of public service because of the refusal to submit to vaccination or re-vaccination. The injustice is perhaps most severely felt in the case of candidates for employment as pupil-teachers in public elementary schools. There are now districts in which, owing to the general opposition to vaccination, scarcely a girl or boy can be found who is legally eligible, and candidates have to be brought in at great inconvenience from surrounding districts. The existence of an exceptional case or cases in which such rejected candidates have, at some time afterwards, taken small-pox is, in our view, no justification for the continuation of this grievance. Statistics furnished to the Commission prove that large numbers of vaccinated or re-vaccinated persons have taken the disease; and we are not aware of any evidence to show that vaccinated pupil-teachers have any special immunity. If our recommendations were carried out the danger of contagion would be greatly diminished in schools, as elsewhere.

On the whole, then, while there is much in the report of our colleagues from which we dissent, and we have accordingly abstained with reluctance from adding our signatures to theirs,

we are at one with them in holding that it is unwise to attempt to enforce vaccination on those who regard it as useless and dangerous. We, however, go further, and agree with our colleagues, Mr. Whitebread and Mr. Bright, that it would be simpler and more logical to abolish compulsory vaccination altogether.

W. J. COLLINS.
J. ALLANSON PICTON.

The methods recommended by the dissentient commissioners, Dr. Collins and Mr. Picton, on page 211, have been carried out in London for some time past, long before the issue of the reports, with the exception that tramps entering a casual ward are not examined unless they complain of, or exhibit symptoms of illness. All the other points recommended are carefully carried out in this parish.

No personal opinion has been given in this resumé by myself except that on page 91, a paragraph on the inapplicability of the Scottish method of carrying out public vaccination to large English cities is inserted. There is the further consideration that all control of public vaccination by the Inspectors of the Locol Government Board, which now takes place at uncertain intervals with no previous notice to the Public Vaccinator, who is therefore liable to inspection at any moment, which would, by the adoption of the Scottish system of the Public Vaccinator going from house to house, become absolutely impossible.

A statement as to personal experiences as Public Vaccinator for some thirty years in Battersea may not be out of place here. During that period no case of syphilis contracted as the result of public vaccination was seen by me, no deaths directly attributable to the operation came to my notice and, further, during several epidemics of small-pox, as the result of enquiries in every case by the Sanitary Inspectors, no child vaccinated at the vaccination station by the Public Vaccinator was the subject of small-pox in this parish.

Summary of Sanitary Operations during 1895

The great amount of work done by the Sanitary staff is shewn in Table XVI. The work done was of a very thorough character and reflects great credit on the Chief and District Sanitary Inspectors.

The house to house inspections, the means by which most sanitary defects are detected, were up to the average number and would, if other duties did not make more urgent calls upon the staff, enable them to inspect every house in the parish during the year, a result which has been aimed at for some years. The great number of complaints received from the public, notifications of the existence of infectious disease, with removal to hospital in many cases and inspection and disinfection in all, together with the more systematic testing and re-organisation of defective drains and other urgent matters, render the inspectors unable to give more than a comparatively small portion of their time to this important work. Some premises require and obtain several inspections during the year from the constantly recurring defects found therein. It will be seen that the total number of houses inspected is greater than in former years, notwithstanding that such inspections formerly were in the majority of cases from house to house, when, of course, they can be more readily inspected than when from the prevalence of infectious disease or other causes each sanitary inspector has to traverse the whole area of his district daily. Inspections under the Factory and Workshops Act also add much to the duties of the staff.

It will be observed by reference to Table XVI., that sixty-nine thousand, four hundred and thirty two Sanitary operations were carried out during 1896, the largest number yet returned. The numbers for the years 1892, 1983, 1894 and 1895 are also given as a means of comparison, the Sanitary Staff having been augmented in the earlier of these years.

The number of house inspections during 1896 was the largest yet recorded, thirty-eight thousand seven hundred and

eighty-one. Although so great a number of houses have been inspected, many of them several times during the year, the great and most important work of all, house to house inspection, has not been universal in the parish; the ideal, towards which we should aim, being the inspection of every house each year. I have reason to anticipate that this matter will receive the earnest attention of all concerned and steps be taken to carry it out.

There were three thousand four hundred and sixty-one intimations served under Sec. 3, Public Health (London) Act, 1891. Nine hundred and nine of these cases required statutory notices under Sec. 4, &c., by order of the Health Committee and the Vestry, in addition to which one thousand nine hundred and fifty-two notices were served under Secs. 62 and 65, In nine hundred and fifty-nine cases proceedings were ordered, sixty-five summonses were issued, the other orders having been complied with and Magisterial orders were obtained and enforced in fifty-five instances.

Three thousand three hundred and two complaints were received during 1896 and attended to. One thousand six hundred and ninety-eight houses were disinfected for sanitary reasons, one thousand seven hundred and forty certificates of disinfection issued, and disinfectants were distributed free of charge in six thousand seven hundred and forty-eight instances. Overcrowding was abated in sixty instances, but this is an evil not at all so frequent in this parish as compared with those of central London. Two hundred and thirty-five premises were cleansed or repaired. Drains were tested by smoke in one thousand one hundred and eighty-eight cases, the majority of cases being found defective. Two thousand eight hundred and twenty-nine new or reconstructed drains were subjected to the hydraulic test and found sound. The large number of nine hundred and forty-one drains were cleansed and repaired. The water supply apparatus to w.c.'s were newly provided or repaired in nine hundred and eleven instances, six hundred and eighty-seven cisterns were cleansed or repaired. Two hundred and eighty-eight certificates of water supply to new houses were issued.

TABLE XVII.

Summary of Sanitary Operations during 1896.

	1892	1893	1894	1895	1896
Total Sanitary operations	38,779	54,577	53,791	55,806	69,432
Number of House Inspections ...	23,587	25,091	24,747	30,051	38,781
Bakehouses Inspections	215	296	313	460	532
Bakehouses Nuisances abated ...	...	18	19	49	57
Urinals—Inspections	251	260	318	483	468
Do. altered, repaired, or water laid on	...	120	119	31	40
Intimations Served, 54 & 55 Vic. cap. 76 (3)	3,691	4,420	4,289	4,256	3,461
Notices Served under Sec. 4 ...	921	1,211	1,076	1,198	909
Notices Served under Sec. 62 and 65...	1,588	2,572	1,605	1,709	1,952
Complaints Received and attended to...	...	4,089	3,253	3,877	3,302
Number of Houses Disinfected ...	1,227	2,069	1,449	1,454	1,698
Houses Supplied with Disinfectants ...	3,026	5,275	3,175	3,616	6,748
Overcrowding Abated	34	38	56	33	60
Premises Cleansed and Repaired ...	189	280	328	138	235
Drains Tested ... By Smoke...	700	1,491	1,272	1,331	1,188
,, Water ...	178	491	794	997	2,829
Drains Cleansed and Repaired ...	1,107	1,564	1,106	1,205	941
Drains Relaid	220	917	742	742	762
Soil Pipes ventilated	...	...	135	796	846
Sink and Rain Water Pipes disconnected	1,360	562	1,012	634	565
Water Closets Cleansed and Repaired	237	314	426	236	282
Cesspools Abolished	1	4	6	8	...
Mews and Stables Drained and Paved	86	30	11	8	17
Yards Drained and Paved... ...	161	253	938	555	735
Accumulations of Manure Removed or proper receptacles provided ...	41	70	56	61	56
Dust Receptacles Provided ...	738	772	1,221	688	587
Dust Complaints forwarded to the Surveyor	...	271	214	377	209
Leaky House-roofs and Gutters Repaired	185	84	240	134	180
Houses Supplied with Water ...	151	130	93	252	121
Water Closets Supplied with Water, or supply disconnected from drinking water cistern	860	731	1,113	1,054	911
Cisterns Covered, Cleansed and Repaired	409	469	624	816	687
Keeping of Animals in unfit state discontinued	5	16	11	16	25
Smoke Nuisances dealt with ...	10	26	21	11	12
Certificates of Disinfection Granted ...	1,044	1,659	1,551	1,538	1,740
Water Supply Certificate Granted (Sec. 48)	16	118	141	282	288
Proceedings Ordered by Vestry and Sanitary Committee	444	1,211	1,100	1,243	959
Summonses Issued	14	73	52	63	65
Magisterial Orders Obtained and Enforced	14	70	42	59	55
Sanitary Conveniences provided or improvements affected to Factories and Workshops, Sec. 38 ...	4	8	19	14	38
Underground sleeping rooms disused ...	...	...	...	12	19
Gipsy vans inspected	...	...	...	64	56
Drains laid to New Houses ...	...	...	...	...	266
Samples taken under the Sale of Food and Drugs Act	101	103	101	227	294*

*This is for the Sanitary year, 1896—the Analytical year ends March, 1897.

DETAILS OF POLICE COURT PROCEEDINGS.

	Summonses issued.	*Withdrawn or dismissed.*	*Magisterial Orders obtained.*
Under the Sale of Food and Drugs Act	45	9	36
Under Public Health (London) Act, 1891—			
Non-compliance with Notices or Contravention of Bye-laws	15	—	15
Exposure of Unwholesome Food	5	1	4
	65	10	55

Under the Sale of Food and Drugs Act, seven cases were withdrawn for the following reasons :—

1 Refusal to serve Inspector—article proved to have already been sold.
4 Analyst's certificates not being in accordance with the decision of Fortune *v.* Hanson.
1 A second defendant had already been convicted for the same offence.
1 Defendant dead.

Total... 7

And in two instances the summonses were dismissed, one on account of the article being duly labelled, and the other owing to conflicting evidence, the defendant being afforded the benefit of the doubt.

The case withdrawn under the Public Health Act was due to the fact that the defendant gave a wrong address, and could not be traced.

In the case of exposure of bacon in a condition unfit for human food, the defendant, in default of payment of a fine of £20, was committed to prison for two months.

Two hundred and ninety-three bodies were received in the Public Mortuary during the year 1896, seventeen of which were for sanitary reasons.

A prominent feature in the work of the Public Health Department is the largely increased number of special inspections made by the Chief Sanitary Inspector and the District Sanitary Inspectors the results of which are reported to the Health Committee at the next subsequent meeting. In order to facilitate reference to the minutes if necessary the dates upon which such reports have been made during the year 1896 are appended.

January 14th.—In consequence of a magistrate attached to the South-Western Police Court having been attacked by Typhoid Fever, the Chief Sanitary Inspector submitted a report at this Meeting relative to the sanitary condition of the Court in question, which was alleged to have probably been the cause of the illness. It stated that from a structural point of view the sanitary condition was good, that the various sanitary conveniences were properly trapped, ventilated, and supplied with water. The water supply was also examined, and found to be satisfactory, the cistern properly covered, and no defects in the sanitary arrangements of the premises could be discovered as likely to cause the illness.

He also submitted report relative to the sanitary conveniences provided at the Essex Paper Mills, Lavender Hill, to the effect that the water closet accommodation was not in a sanitary condition, and that no urinal accommodation was provided. The Committee gave directions for the conveniences to be re-constructed in a proper manner, and suitable urinal accommodation provided.

He also submitted report relative to the annual special inspection of urinals attached to licensed houses, stating that there were some 156 licensed houses where intoxicating liquors were consumed upon the premises, and 91 of these had urinals outside the premises, or were accessible to the general public, 62 had urinals accessible only from the house itself, whilst the following had either insufficient or no accommodation :—

"The Havelock"	...	...	Battersea Park Road.
"The Rose and Crown"		...	Culvert Road.
"Black Swan" ...	...	...	York Road.

These three houses the Vestry had several times brought under notice of the Justices, who had upon two occasions visited the same, but for substantial reasons decided to renew the l censes of the houses in question.

The urinals attached to the "Devonshire Arms," Ascalon Street, and "The Volunteers," Church Road, it was found had been closed, and the Committee directed that the Proprietors of these premises be called upon to open the same, and, in the event of their request not being complied with, representation be made to the Justices upon the matter. The latter course, however, was not found to be necessary, as the Proprietors complied with the Committee's requirements.

It was found necessary to serve 40 notices for various sanitary defects in connection with the urinals in the several Sanitary Districts as follows:—

No. 1 Sanitary District	8
,, 2 ,, ,, ...	1
,, 3 ,, ,, ...	10
,, 5 ,, ,, ...	21
Nos. 4 and 6 Districts	Nil.

February 4th.—The Chief Inspector submitted a report at this Meeting relative to the want of proper sanitary conveniences for the workmen employed at Stone Works, in the Stewarts Road, at which some 12 persons were employed, for whom no sanitary conveniences had been provided. The notice subsequently was complied with.

Laundry, No. 117 Battersea Park Road.—The Chief Inspector reported that, the Factory Inspector having drawn his attention to these premises, he visited the same, and found that the work-room was in a dirty condition, and some 10 persons were employed, for whom one water closet was provided, which was also used by the proprietor's family, that the washhouse was badly paved, and other defects of a minor nature were found to exist.

With reference to a laundry at 51 Battersea Park Road, it was found that 19 persons were employed, and that the work

rooms, &c., required cleansing and lime-whiting, that there was only one water closet for the house and the work people combined, and other sanitary defects of a minor character.

At a tailor's premises, situated No. 236 York Road, the workroom was found dirty and over-crowded, the room in question only containing 879 cubic feet of air space or a deficiency of 74 feet per person employed therein when not working overtime or using gas. It was found that one water closet only was provided for the work people and the proprietor's family.

The Committee gave directions for notices to be served in these three cases for abatement of the nuisances complained of, which were subsequently complied with.

February 18th.—The Chief Inspector reported that at No. 36 Lavender Road the water closet had been taken out, and refixed without giving the notice required by the Bye-laws of the London County Council, copies of which had been supplied upon two occasions.

The Committee therefore directed proceedings to be taken, the Magistrate ordering the costs to be paid by defendant.

March 3rd.—The Chief Inspector at this Meeting reported that the Factory and Workshops Act, which came into operation on the 1st January, 1896, enacted with respect to Bakehouses, "that a place underground shall not be used as a bakehouse unless it is so used at the commencement of this Act; and if any place is so used in contravention of this Act, it shall be deemed to be a workshop not kept in conformity with the principal act," and that in contravention of the section in question, the underground bakehouse at No. 72a Winstanley Road, although it had not been used since the beginning of November, 1895, and was not so used or occupied on 1st January, 1896, was on the 27th February found to be then occupied, and was proposed to be used again as a bakehouse. That he had cautioned the

occupier, against so using it, and had also conferred with the solicitor upon the matter, who was of opinion that the words "used at the commencement of the Act" did not permit of the premises in question being used in future as a bakehouse. The Committee directed that all necessary steps be taken for preventing the use of the bakehouse in future.

The usual notice was served, and the case was subsequently brought before a magistrate at the South Western Police Court on the 15th July, when, after giving careful consideration of the facts of the case, he decided that the using of the bakehouse was a contravention of the Factory and Workshops Act, and prohibited the continued use of the same, pending an appeal to a Higher Court. The case has not yet been disposed of.

At this Meeting it was also reported with reference to the condition of laundries at

131 Surrey Lane,
76 ,,
22 ,,
23 Orville Road,
103 High Street,

at which it was found there were contraventions of the Public Health (London) Act and Factories and Workshops Acts. The Committee gave the necessary directions for increased water-closet accommodation and cleansing to be carried out.

March 17th.—The Chief Inspector reported that acting upon information received on the 12th inst, he had visited the Licensed Slaughter House at No. 351 York Road, and found deposited in a shed at the rear of the premises, the carcases of two pigs, which were in his opinion unfit for human consumption, they having apparently suffered from pig typhoid. The carcases were dressed in the usual way as when prepared for human consumption, the skin covered with reddish purple patches, the kidneys soft, the flesh considerably inflamed, and in the muscular tissues

numerous abscesses of varying sizes. The carcases of the pigs were subsequently seen by the Medical Officer of Health and Veterinary Surgeon, who were of opinion that the pigs had suffered from that disease, and the Medical Officer of Health further expressed his opinion that the flesh was unfit for human consumption. They were later seen and ordered to be destroyed by the Magistrate at the South Western Police Court. The Licensee of the slaughter-house was subsequently summoned, and fined £5 and 5s. cost.

He further reported that in connection with this matter he had communicated with the Veterinary Inspector of the Agricultural Department, and had, on the following day, again visited the slaughter-house, when some pigs were found waiting to be slaughtered, and suggested to the proprietor of the business that they ought to be seen by the Veterinary Inspector before being sent to market; that having met the Veterinary Inspector on the same evening, a careful examination had been made of the viscera, &c., of each pig, and permission given for the carcases of the animals to be so sent.

Further that at midnight on the same day in company with the Veterinary Inspector, he visited a slaughter-house situate at No. 82 Usk Road, where an examination was made of the carcase and viscera of one pig, which your Inspector had caused to be placed upon one side, pending an examination by the Veterinary Inspector. The latter, however, considered that the carcase was free from any disease, and expressed his opinion that the action taken by your Chief Inspector in both these cases was necessary and perfectly justified, having regard to the seizure of the two pigs on the previous day, and the district from which these came.

At this Meeting he also submitted reports relative to the undermentioned workshops, to which the Factory Inspector had directed attention :—

31 Bridge Road West,	Laundries.
39 Do.	
76 Do.	
55 Mundella Road,	
27 Patmore Street,	
103 Mantua Street,	
148 Lavender Road,	
34 Winstanley Road,	
487 Battersea Park Road,	
38 Beaufoy Road,	
51 Rollo Street,	
11 Sheepcote Lane,	
142 High Street,	Boot Repairers.
116 Falcon Road,	Wheelwright's.

The principal matters the Factory Inspector called attention to at the above premises were the want of cleansing, and lime-whiting, and in one case overcrowding. The cases were considered by the Health Committee, the necessary Notices served, and the nuisances abated, in addition to which increased water closet accommodation, paving works, light and ventilation, &c., which your Chief Inspector found necessary, all upon inspection of the respective premises, were carried out.

April 14th.—At this Meeting he reported as to the condition of Factories and Workshops as follows :—

87 Falcon Road,
15 " "
201 Lavender Hill,
319 " "
Helmet Factory, Queens Road.

In the first case, it were found that the ventilation of the workshop was defective, and that the premises required properly cleansing and lime-whiting.

In the second case, similar matters was found to require attention, and, in addition, the workshop was over-crowded, there being a deficiency in cubic space of at least 532 cubic feet.

In the third case, the premises were found in good condition.

In the fourth instance, the workshop was badly ventilated, and required cleansing and lime-whiting. At the Helmet Factory, Queens Road, the sanitary conveniences were found in a dirty and more or less defective condition, necessitating entire re-construction.

The Committee considered the cases, and steps were subsequently taken, which resulted in the abatement of the nuisances complained of.

June 2nd.—The Chief Inspector reported at this meeting, that, in consequence of complaints which had been made, having reference to offensive smells giving off from the shafts in connection with the Dogs' Home during the cremation of the animals there, the premises were kept under close observation, and it was found that occasionally there was cause for complaint. That he had thereupon communicated with the Secretary of the Institution, and met the Architect at the premises in question, who admitted there had been some nuisance during the cremation of the dogs since the Muzzling Order of the London County Council had come into operation, and that this had arisen in consequence of the large number of dogs brought to the Home, which necessitated the furnace being re-charged before cooling down, but that the cause for complaint had now been overcome, inasmuch as an additional crematorium had been erected, which would enable the authorities in future to destroy as many as 1,000 dogs per week. That the furnaces were so arranged as to prevent any offensive effluvia being given out from the shaft if allowed to cool for recharging.

He also reported at this Meeting that the half-yearly inspection of Bakehouses had been made, and that with but some 19 exceptions the usual cleansing, &c., had been carried out, that some 108 of such premises were in use and registered, 44 of which were above ground, 54 underground, whilst 10 were semi-basements. That the heights of the Bakehouses considerably

varied, as, for instance, in No. 1 District the least height of any Bakehouse measured from floor to ceiling, was 7 ft. 6 ins. in

No. 2	District	...	...	6 ft. 6 ins.
,, 3	,,	...	...	6 ,, 3 ,,
,, 4	,,	...	...	7 ,, 0 ,,
,, 5	,,	...	...	6 ,, 0 ,,
,, 6	,,	...	...	6 ,, 6 ,,

The Bakehouse, measuring only 6 feet in height, is situated at No. 72A Winstanley Road, and is the one which the Vestry took steps to close, as reported upon at the Meeting of the Committee, on March 3rd. The whole of the Bakehouses were found to be lighted and fairly well ventilated, the supply of water in each case being separate and distinct from that supplying the water closet.

At this Meeting he also directed the Committee's attention to the undermentioned Workshops, &c., which had been inspected :—

51 Grant Road
53 Broughton Street
47 ,,
24 Ingrave Street

and also the Timber Yard, 137 Falcon Road, at which more or less insanitary conditions were found to exist, arising principally from want of cleansing, lighting, ventilation and proper sanitary accommodation. The Committee gave the necessary directions in the matters, and the notices served were subsequently complied with.

Further, that acting under the Committee's instructions he had made an inspection of Stanley Hall, Cairns Road, and that upon testing the drains and sanitary arrangements he had found the same in a satisfactory condition, except so far as the ventilation of the lavatory was concerned, which the Committee gave directions to be improved.

At this Meeting he reported that in consequence of an out-

break of Measles in the Infants' Department at Shillington Street Board School, the same had been disinfected, the air space so disinfected amounted to 143,600 cubic feet.

June 16th.—The Chief Inspector reported at this Meeting as to the defective manner in which a builder had constructed drainage works at Nos. 18, 20, and 22 Verona Street; that the drains, upon testing, were found to be in a defective condition, and that the inspection chambers were in many respects badly constructed, the gullies of the yards fixed at such levels as to be practically useless for draining the yard, that "T" junctions in place of "Y"s had been provided, and old pipes patched up with cement had been used in the work, that long hopper pans had been fixed, thereby contravening the bye-laws of the London County Council, and that the builder had, as a consequence of the manner in which he had executed this work, rendered himself liable to heavy penalities under the Public Health (London) Act. The builder, having attended before the Health Committee in respect of the matter, it was decided to appoint a sub-committee to examine the work, who accompanied by the Chief Inspector and the Inspector for the District, found that the report of the Chief Inspector upon the matter was in every way perfectly justified, and gave such directions as were necessary to the builder, in respect of the works, they were of opinion should be carried out to meet the Vestry's requirements. After considerable difficulty the works, as required by the Committee, were affected, and the drains found to be in sound condition.

He further reported that he had detected the Clapham Parish Authorities depositing road slop, &c., in an excavation in front of Grove Mansions, North Side, Clapham Common. There had been excavated some 887 cubic yards of sand and gravel, and it was this space that was being filled with the matter complained of. At the time of inspection, some 210 cubic yards of refuse had been deposited therein. He further

stated that he had cautioned the builder, and also the Clapham Authorities against continuing these deposits, as the same were a contravention of the London County Council's Bye-laws under Section 16 (2) of Public Health (London) Act, 1891. The practice was subsequently discontinued, and the Committee allowed the matter, which had been deposited in the excavations, to remain, subject to the same being evenly spread over the surface of the excavations, covered with four inches of lime in every part, and the upper portion being filled in with hard core or other suitable material. By this arrangement offensive refuse that had been deposited would be at least 14 feet below the surface, and 10 feet from any building.

June 30th.—The Chief Inspector reported that he had made an inspection of the sanitary conveniences, &c., in connection with the Gas Light and Coke Company's Works, Nine Elms Lane, in consequence of complaints which had been made in respect thereof and that he had previously inspected these works, and reported thereon to the Sanitary Committee on the 30th July, 1895, that he had found, upon inspection on the first date, that the conveniences were not in a satisfactory condition, and that representations were made by direction of the Committee to the Gas Light and Coke Company, which had been the means of affecting great improvement in the number and condition of the water closets, &c., attached to the works, and that, upon his second inspection, he had found that the conveniences were in good sanitary condition, being properly lighted, ventilated, supplied with water, and arranged in such positions as to be readily accessible from the portion of the works wherein the greater number of workmen were engaged, and that there was, therefore, no cause whatever for complaint.

At this Meeting he also reported as to the sanitary accommodation, &c., at St. Mary's Parish Schools, Green Lane, at which some 700 children attended, that he had found the water closets in very bad condition, not provided with suitable apparatus for

flushing, and the enclosure in which the conveniences were situated was attached to the School, and that it would, to effectually deal with the matter, be necessary to abolish the entire existing arrangements, and provide proper water closets, pans, and traps. This work was subsequently carried out, in addition to which the entire system of drainage, with the exception of a small portion of the surface water drain in the playground, was reconstructed.

At this Meeting also, the Health Committee had under consideration a report of the Chief Inspector relative to an offensive business which had been commenced at No. 61 Rosenau Road, and consisted in the cleansing and drying of hair of ox's tails imported from abroad, which, after cleansing, &c. was used in upholstering work; that the cleansing process was for the purpose of removing fœcal matter therefrom, and was such as to be at times of a most offensive character. By direction of the Committee the necessary notices were served and the business removed to other and more suitable premises.

He also reported as to the condition of the Workshops, sanitary conveniences, &c., at the following premises:—

Cigar Works, High Street,
28 St. John's Road,
1 Goulden Street,
109 High Street,
78 Lavender Hill,

where it was found necessary to affect great improvements either in the sanitary conveniences, cleansing, lighting, ventilation, &c.

In the first-mentioned premises entire new water closet and lavatory accommodation were provided.

In the second instance, in which the workroom was badly lighted and ventilated, new workrooms were in course of construction, and would be ready immediately for occupation.

In the third and fourth cases the Factory Inspector had stated the water closet accommodation was not sufficient. Upon inspection, however, it was found that in these cases there was proper and sufficient closet accommodation for the work-people employed therein.

In the fifth instance it was found that the workroom was somewhat overcrowded, and other defects of a minor character which required attention, were subsequently dealt with.

At this Meeting the Committee had under consideration a report with reference to the windows to water closets of houses erected by a builder in Broomwood Road, which were less than the size specified by the Bye-Laws of the London County Council under Section 39 (1) of the Public Health (London) Act, and also with reference to hollow partitions a builder had provided, dividing the rooms intended to be used for human habitation from the water closets of the houses he was erecting in North Side, Clapham Common, and stating that he had given both, ample opportunities for complying with the Bye-Laws in question, which they had failed to do. The Committee gave directions for the necessary proceedings to be taken should the windows and partitions not be immediately altered by the Builders. It was, however, found necessary only to proceed against the second builder upon whom an order was made by the Committee to provide solid partitions to the premises in question, and in respect of which the Magistrate inflicted a penalty of 20s. and 2s. costs.

July 14th.—At this Meeting, the Chief Inspector reported that Inspector Lawrence had, on the 10th inst., seized about half a cwt. of figs which were being sold at the rate of ½d. per lb. in Sheepcote Lane; that they were subsequently conveyed to the Magistrate, and ordered by him to be destroyed. The Committee gave directions for the necessary proceedings to be taken against the owner, who was subsequently convicted of the offence, and fined £5 and 5s. costs.

At this Meeting he also reported as to the manner in which the owner of No. 33 Landseer Street had executed certain drainage works, on which premises cases of Scarlet Fever and Typhoid Fever had occurred, that the owner had ignored the requirements of the Vestry in every way, and that he was of opinion that if the drains were opened up and tested they would be found to be in a very defective condition. The Committee gave instructions for the drains to be opened up and tested, and that, in the event of them being found in a defective condition, the necessary proceedings would be taken for the recovery of penalties to which the owner had rendered himself liable. The Chief Inspector reported that, upon opening up the drains and testing the same, he had found them to be in a seriously defective condition; and, further, that the same were without proper means of interception, inspection, and ventilation. The owner was subsequently convicted and fined.

The drains have since been entirely re-constructed in accordance with the Vestry's requirements.

September 1st.—At this Meeting he reported that complaints had been made relative to the condition of the sanitary conveniences at the Congregational Church and Schools, Bridge Road, that the drains, upon testing, were found to be in a defective condition, and the water closets required cleansing and repairing. The Committee gave directions for the necessary works to place the drains and sanitary conveniences into proper condition, which were subsequently carried out.

He further reported at this Meeting that he had discovered a man moving offensive animal matter during prohibited hours; and, further, that the matter was deposited in tubs with loose wood covers thereon, allowing offensive effluvia to escape therefrom. The Committee gave directions for the necessary proceedings to be taken in the matter, and the defendants, at the hearing of the

case, produced a large number of witnesses, who stated there was no nuisance from the van. The Magistrate, however, decided to accept the evidence of the Vestry's Chief Inspector, and fined the defendants.

He further submitted report relative to the deposits and sorting of animal and vegetable matter upon ground and in railway arches at the rear of Stainforth Road, that occasionally considerable nuisance was experienced from the offensive effluvia given off from the matter in question, for some great distance from the premises at which the sorting was carried on. The Committee gave directions that the necessary notice should be served with a view to the material being more frequently removed, since which some improvement has taken place.

He further reported at this Meeting that a shed adjoining the "Royal Oak" Public House, Patmore Street, was being used by a family for living and sleeping purposes, that such shed was without proper water supply or sanitary conveniences, and, as a consequence, unfit for human habitation. The Committee gave directions for the Notices to be served, and the necessary proceedings taken in the event of such Notices not being complied with. After considerable difficulty the owner, in conjunction with the Vestry's officers, succeeded in obtaining possession of the shed, and the nuisance was thereby abated.

At this Meeting he also reported that complaints had been made by residents in Stewarts Road, relative to offensive smell proceeding from the Projectile Co.'s works, New Road, and which was alleged to emanate from the pickling trough, that he had inspected the premises, and found no nuisance to arise either from the acid used in pickling troughs or from the oil used in tempering the projectiles made upon the works, that he had, however, discovered what appeared to be the cause of the nuisance complained of, viz, that it had been the practice

to deposit in a certain portion of the premises, clinkers, &c., drawn from the furnaces, over which water was thrown, which was being done at the time of inspection, and gave off very offensive effluvia. The manager promised to see that the practice was immediately discontinued, since which no nuisance has been discovered in connection with the works.

September 15th.—The Chief Inspector reported at this Meeting that, on the 5th inst., he had seized a quantity of bacon, about 96lbs., exposed for sale upon a barrow in the Falcon Road, which was, in his opinion, unfit for human consumption. The bacon was offered for sale at prices ranging from 2d. to 4½d. per lb., and during his examination of the meat he was subjected to most violent threats and abuse by the vendor and his assistants, and that the meat was subsequently seen by the Medical Officer of Health, who certified it as unfit for human food. The meat was taken before the Magistrate at the South-Western Police Court on the 7th inst., who gave the usual order for it to be destroyed. The owner (who had been previously convicted and fined £5, for meat seized in June, 1893), was subsequently convicted and fined £20 and 2s. costs, or in default two months' imprisonment.

At this Meeting, he also reported that certain alterations had been made to the sanitary conveniences in connection with the Wandsworth and Clapham Union Infirmary, without the necessary notice having been given to the Vestry by the Guardians of their intention to alter the apparatus in question, as required by the Bye-Laws of the London County Council, under Section 39 (1) of the Public Health (London) Act; and, further, that he was of opinion that, from a brief survey he had made of the sanitary conveniences for one or two of the Wards, there were many matters which required alteration, and asked for the instructions of the Committee as to making a full examination of the whole of the premises, and testing the drains. The Committee gave the necessary directions that this should be carried out.

October 6th.—At this Meeting, the Chief Inspector reported that an application had been made for certificates of water supply to certain residential flats in Albert Road, and that upon inspection he had found some of the flats were already occupied, and in his opinion, the residences in question were inadequately provided with means for storing water, and suggested that an additional 250 gallon cistern should be provided. The Committee gave directions for an additional cistern to be provided, as suggested, which requirement was subsequently complied with.

October 20th.—The Chief Inspector reported that the second special inspection of bakehouses for the year had taken place, and that the usual requirements of the Vestry with reference to cleansing, &c., had been carried out except in some 33 instances, in respect of which the Committee directed the necessary notices to be served, and, failing compliance, the usual proceedings be taken for enforcing the same.

November 3rd.—The Chief Inspector reported that he had attended the Annual Licensing Committee of the London County Council, for the purpose of Licensing of Slaughterhouses, Cowhouses, and Knackers Yards, and that the existing Slaughter Licenses were eleven, and Cowhouses nine. There were ten renewed applications for licenses for Slaughterhouses, and nine for Cowhouses. In two cases, objections were offered to the renewal of Slaughterhouse Licenses by the London County Council Officers, the objections referring to premises situated at No. 82 Usk Road and No. 351 York Road.

In the first of these cases, the objection was that the licensee had during the preceding twelve months slaughtered large cattle contrary to the conditions attached to the license in 1895, which was to the effect that the Licensee was to slaughter only his own pigs upon the premises. The Committee decided to renew the license in question, only upon the distinct understand-

ing that the licensee would adhere to the conditions attached thereto.

In the second case, opposition was offered, upon the ground that the licensee had been convicted in respect of carcases of diseased pigs which had been found upon her premises, and, further, that she was in the habit of slaughtering pigs other than her own upon the premises in question. The Committee also decided to renew this license subject to small animals only being slaughtered upon the premises.

One license which had been in existence for many years, and situated at No. 323 York Road, lapsed in consequence of no application having been made.

The number of licensed Slaughterhouses and Cowhouses in the parish at the present time, therefore, are ten of the former, and nine of the latter.

November 17th.—Acting under the instructions of the Health Committee, the Chief Inspector reported at this Meeting with reference to portions of the parish which were without a constant supply of water, to the effect that inquiries had been made, from which it appeared that the principal portions of the parish which were so affected, were the roads and streets on the South Side of Lavender Hill, and supplied by the Southwark and Vauxhall Water Company. The Health Committee decided to call the attention of the London County Council to the matter.

December 15th.—At this Meeting he submitted a report relative to the condition of Drains, &c., at the Latchmere Street School, a great deal of sickness having occurred to the children attending there, he had tested the drains and found that the greater portion serving the old school buildings were in defective condition, smoke escaping from defects in the system within the school buildings, and also at other points. The London School Board having, upon his request, opened

up the system of drainage at certain points, it was found upon testing with water that the drains were very defective, and in places laid with an inadequate fall. Further, that the urinals, &c., were not properly supplied with water, and other matters of a minor character also required attention. The Committee gave directions for a copy of the report to be fowarded to the London School Board requesting the matter should be attended to. The Board subsequently wrote, saying they were not disposed to interfere with the drains, and the Committee thereupon directed that the usual proceedings be taken with a view to enforcing the Vestry's requirements. Notice has been served upon the London School Board, and they have asked that the matter may stand in abeyance for a time.

At this Meeting he also reported that the Factory Inspector had called attention to the dirty condition of walls and ceilings of a workroom at No. 176 New Road, that upon the receipt of the notice he had visited the premises and found that the workroom walls and ceilings were in a cleanly condition, and that there was no cause for complaint; that the Factory Inspector had further drawn attention to the condition of yard and water closet attached to the workshop, No. 33 Northcote Road. In the latter case the Health Committee gave directions for the necessary proceedings to be taken, with a view to enforcing proper water closet accommodation for the workpeople, and generally to place the premises in proper sanitary condition, which works have now been carried out.

At this Meeting he reported that a carman had been detected by the Inspector for No. 1 District, removing fish offal during prohibited hours, that he had been previously cautioned with regard to similar offences. The Committee thereupon directed the necessary proceedings to be taken against Mr. Higgins in the matter. The summons was issued and the case came before the magistrate at the South Western Police Court on the 20th January, 1897, when he fined the

defendant 1/- and 2/- costs, at the same time characterising the bye-law as an "absurd one." The remark of the magistrate has not tended to assist the Vestry or its officers in the discharge of their duties and the enforcement of the bye-laws in question. Numerous complaints have been made with reference to the removal of offensive matter in the portion of the district where the offence in question was committed, and considerable difficulty had been occasioned in detecting the offence during prohibited hours. The offensive matter was being removed about an hour after the time allowed by the bye-laws, and the magistrate's remark must, therefore, be regarded as not calculated to assist the Vestry in carrying out the duty imposed upon it by the Public Health (London) Act, and the bye-laws made thereunder.

In consequence of the decisions of the High Court to the effect that defective combined systems of drainage, in respect of which no approval of the Sanitary Authority had been given, the the liability in respect thereto, falls upon the Vestry; it has been found necessary during the year under report for the Vestry to recognise its liability in this matter and put in proper repair certain of such combined systems. Bills have been before both Houses of Parliament with a view to an amendment of the law, the object aimed at being to impose the liability to repair, upon the owners of such properties. The matter is one of extreme importance to the Vestry, and it has given its support to the measures aforementioned, and it is hoped that there will be an early amendment of the law, in order that the difficulties now experienced in carrying out the provisions of the Public Health Act in this respect, may be removed.

During the year, in construction of drainage works, some eight cesspools in various parts of the parish were found to be in existence, which have been emptied and filled with clean brick rubbish or other suitable material. In some cases the cesspools were found to be in actual use, in others the drains had been laid through them.

The usual quarterly samples of water, taken from the Southwark and Vauxhall and Lambeth Water Company's supplies in various parts of the parish, have been submitted for analysis during the year.

During the latter part of the year 1895 the Vestry decided to transfer the supervision of the construction of drainage to new buildings from the Works to the Public Health Department. As this is the first completed year this work has been in operation, it may be desirable to lay before the Vestry a few facts in relation thereto. During the year no less than 8,834 inspections have been made by the Drain Inspector of new works in progress. These inspections do not include those made by the Chief Inspector. The number of drains tested was 1,560, and the number of premises at which the whole of the drains and sanitary arrangements have been completed in accordance with the Vestry's requirements is two hundred and sixty-six. The imposition of this extra duty upon the Health Department has considerably increased its responsibilities, at the same time it is very necessary that the work in question should be under the control of the Department, as the bye-laws of the London County Council have to be administered by the Officers of the Health Department, and Section 48 of the Public Health (London) Act provides for a certificate to be given in respect of the water supply for all new houses erected after the 1st January, 1892. Since the work has been transferred to the Department, every precaution has been taken that the Bye-Laws and the Act itself shall be fully complied with, and although at the first great difficulty was experienced owing to the fact that buildings in course of erection were in all stages of progress, after an inspection of the whole of the works then in progress had been made, the various difficulties were overcome, and all the drains of the buildings since erected have been executed in such a manner as to comply with the Bye-Laws, and a greater standard of efficiency of work done by the builders is gradually being obtained. It was formerly the practice in the testing of drains to give only a

sectional test, or in other words to test during the progress of the work only. Now, however, all drains are tested both sectionally and when the house is ready for occupation. The latter requirement was at first objected to by many builders, but as they now know what will be required before a house is allowed to be occupied, precautions are taken by them that the drains when completed shall be sound and water-tight throughout. Another matter which at first gave some trouble was the fact that builders seldom provided the frontage or portion of drains beneath the foot and roadway until they had either sold or let the house. Steps are now taken to guard against this, and as far as practicable all frontages are laid in prior to the drains within the curtilage of the buildings being constructed. In many details it is found that the present Regulations of the Vestry are insufficient, principally as to the composition of concrete, the strength and thickness of various pipes, and other matters of a minor nature. As these Regulations will, however, it is expected, be shortly superseded by the Bye-Laws of the London County Council, which that body are now making under Section 202 of the Metropolis Management Act, 1855, it is not suggested that the present Regulations should be amended, as the Bye-Laws now being prepared will be a uniform code and applicable to the whole of the Metropolis. This power which the London County Council has had since its formation, and also the Metropolitan Board of Works before it, has unfortunately remained a dead letter until the present time. The proposed Bye-Laws have been submitted to your Vestry for consideration, and the latter upon the recommendation of the Health Committee made such suggestions as in their opinion they deemed requisite. Should the proposed Bye-Laws with the Vestry's suggestions come into operation great assistance will be given your officers in the carrying out of the same, as they not only comprise the present requirements of the Vestry but also valuable additions in certain details.

Success has attended the efforts of the Department during the past year in the supervision of new drainage work, as will be

seen when it is stated that in only one case was it found necessary to take summary proceedings for enforcing compliance with the Bye-Laws of the London County Council, made under Section 39 (1) of the Public Health (London) Act, and it is hoped that by a steady perseverance in this branch of the work the result will be not only a more perfect knowledge on the part of the builders of the drainage requirements of the present day, but that there will gradually be a great improvement in the practical execution of the work.

In conclusion, I have to express my satisfaction with the manner in which the Staff of the Public Health Department—more especially the Chief and District Sanitary Inspectors—have carried out their duties during the year under report.

To my colleagues—more especially the Vestry Clerk, Mr. Wilkins and the Surveyor, Mr. Pilditch, I beg to tender my best thanks for the great assistance freely given to me at all times.

To the Members of the Health Committee and the Members of the Vestry generally, I have to express my sincere gratitude for the support which they have always extended to me, without which support I feel that the duties of Medical Officer of Health, which are increased year by year by fresh legislation, would become too onerous to be successfully carried out.

W. H. KEMPSTER, M.D.,

Medical Officer of Health.


BRITISH MUSEUM
30
61
JUL