THE PREVENTION OF SMALL-POX.*

By LOUIS C. PARKES, M.D., D.P.H.,

Medical Officer of Health for Chelsea,
President of the Metropolitan Branch of the Society.

THE subject of small-pox is an interesting one to us at the present time, the Metropolis having recently passed through the most severe outbreak it has experienced since 1885, and there being at least a possibility of the renewal of epidemic activity in the course of the approaching winter.

The recent outbreak in London has, in certain respects, notably differed from its predecessors. It has had a short period; the maximum prevalence has been quickly attained, and the fall has been correspondingly rapid. In the first quarter of 1901 there was not a single death from small-pox in London, and there were only 7 cases; in the second quarter there were 7 cases and 2 deaths; in the third quarter 270 cases and 35 deaths. In the fourth quarter of 1901 the cases rose to 1,416 and the deaths to 192. In the first quarter of 1902 the cases were 4,470 and the deaths 734; the second quarter gave rise to 2,929 cases and 506 deaths; and the third quarter, just completed, to 356 cases and 73 deaths.

Contrasting this with previous London epidemics—such as those of 1859-60, 1862-63, 1866-67, 1870-72, 1877-78, 1881-82, and 1884-85—we find that these extended over longer periods than the epidemic just past, the average period of epidemicity being about two years. We also see that the maximum prevalence was more slowly attained, and that the decline was delayed and less rapid when it did occur. The epidemic of 1893-94 was comparatively small in extent, and was also of a somewhat anomalous character.

The chief feature of interest to be observed from Table A, however, is the almost absolute freedom of the Metropolis from small-pox from the year 1885 to 1901, with the exception of the epidemic years of 1893-94. There was no such immunity from small-pox in London in the inter-epidemic periods prior to 1885. This freedom of London from small-pox dates from the removal of the London small-pox hospitals outside the Metropolis to Long Reach on the river Thames. There seem to be strong grounds for the belief that this administrative reform has been the chief, if not the only, factor in the production of that comparative immunity from the disease

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Chart showing Week by Week the Number of Cases of Small-pox Notified by Medical Practitioners as having occurred in the County of London, 1901-1902.

which London enjoyed from 1885 to 1893, and from 1894 to 1901.

Why small-pox should have again become epidemic in 1901 in London, why the disease should have given early in 1902 every indication of rapid spread and intensity, why the maximum intensity should have been reached early in March instead of in May, as in most previous epidemics, and why the decline that set in from the second week in March should have been so rapid and persistent, are questions easier to propound than to answer.

The infection was probably originally imported from Paris. The central parts of London (St. Pancras, Holborn, and Marylebone) were first attacked. The disease then spread into Bermondsey and Southwark on the south, and to Stepney, Shoreditch, and Poplar on the east. The western boroughs, with the exception of the City of Westminster, which from its central position was specially prone to attack, have not been seriously affected. The greatest intensity of the epidemic was undoubtedly witnessed in Holborn and in Stepney, in both of which boroughs there is a large foreign element. This latter borough has a population of 300,000, of whom nearly a fifth are foreigners (mostly Jews), and it is reasonable to suppose that this fact has contributed largely to produce an outbreak of the dimensions observed in Stepney.

The total number of cases of small-pox notified in London during the year ending September 27th, 1902, has been 9,171, with 1,505 deaths, giving a case-rate of 20 per 10,000 of the population, a death-rate of 0.33 per 1,000, and a fatality of 16.4 per cent. of the notified cases.

The administrative measures of repression and prevention enforced in the various boroughs attacked, with which we are all familiar, may have in some measure controlled the rising epidemic in the last quarter of 1901 and the first quarter of 1902, but they certainly failed to stamp it out. It is impossible, besides, to say how far such measures were responsible for the shortening of the epidemic—for the early decline in March and subsequent attenuation of weekly cases dating from that period.

The chief preventive measures have been (1) the re-vaccinations performed on the general population and on the contacts with small-pox cases; (2) the removal of all notified cases to hospitals outside the Metropolitan boundaries.

The re-vaccinations, especially of contacts, have no doubt had some effect in controlling the epidemic. The re-vaccination of the general population must also have exercised some influence; but when we begin to inquire as to the extent to which the general

TABLE A.

London: Small-pox Deaths in each Quarter, 1856-1902.

Years.	First.	Second.	Third.	Fourth.	Total.
1856	194	146	108	74	522
1857	60	27	41	26	154
1858	41	34	54	118	247
1859	201	253	287	435	1,156
1860	464	240	99	74	877
1861	73	52	44	46	215
1862	37	39	77	192	345
1863	422	788	512	290	2,012
1864	161	116	140	120	537
1865	194	149	147	156	646
1866	245	396	390	357	1,388
1867	526	387	232	187	1,332
1868	280	187	70	69	606
1869	69	55	62	87	273
1870	99	118	157	584	958
1871	2,400	3,241	1,255	980	7,876
1872	831	582	237	131	1,781
1873	46	37	15	17	115
1874	24	10	10	12	56
1875	37	17	15	6	75
1876	7	26	110	592	735
1877	1,192	828	252	272	2,544
1878	556	618	133	109	1,416
1879	221	140	63	34	458
1880	122	144	49	160	475
1881	617	1,018	461	275	2,371
1882	212	128	53	38	431
1883	52	27	23	32	134
1884	60	293	196	364	913
1885	382	420	84	13	899
1886	9	12	2	1	26
1887	2	3	1	3	9
1888	4	1	2	2	9
1889	—	—	—	1	1
1890	1	2	1	—	4
1891	3	4	1	—	8
1892	7	24	6	4	41
1893	38	100	49	19	206
1894	7	34	43	5	89
1895	10	3	31	11	55
1896	5	3	1	—	9
1897	12	2	2	—	16
1898	—	—	—	1	1
1899	—	1	1	1	3
1900	1	2	—	1	4
1901	—	2	35	192	229
1902	734	506	73	—	—

TABLE B.
London: Small-Pox Cases in Boroughs, 1901-2.

		1901.		1902.			Total.	Case-rate per 10,000.
		Third Quarter.	Fourth Quarter.	First Quarter.	Second Quarter.	Third Quarter.		
Western	Paddington ...	4	16	62	46	6	134	9·2
	Kensington ...	4	10	43	47	10	114	6·4
	Hammersmith...	4	40	61	27	8	140	12·3
	Fulham ...	—	15	54	31	6	106	7·4
	Chelsea ...	2	3	20	17	1	43	5·8
	Westminster ...	9	92	175	56	2	334	18·5
		23	176	415	224	33	871	10·5
Northern	Marylebone ...	41	36	112	39	3	231	17·5
	Hampstead ...	3	3	10	10	—	26	3·11
	St. Pancras ...	101	153	226	119	17	616	26·1
	Islington ...	13	48	137	142	16	356	10·6
	Stoke Newington	7	12	38	11	2	70	13·5
	Hackney ...	14	22	196	220	3	455	20·5
		179	274	719	541	41	1,754	16·5
Central	Holborn ...	19	198	186	29	3	435	74·4
	Finsbury ...	14	79	134	31	48	306	30·5
	City ...	2	6	19	11	8	46	18·0
		35	283	339	71	59	787	42·6
Eastern	Shoreditch ...	2	16	314	118	7	457	38·8
	Bethnal Green...	3	30	277	200	39	549	42·2
	Stepney ...	4	155	928	421	38	1,546	51·5
	Poplar ...	2	68	333	282	15	700	41·4
		11	269	1,852	1,021	99	3,252	45·3
Southern	Southwark ...	7	82	252	260	7	608	29·4
	Bermondsey ...	—	107	101	107	15	330	25·3
	Lambeth ...	4	48	188	151	24	415	13·6
	Battersea ...	—	53	98	66	23	240	14·0
	Wandsworth ...	8	23	70	53	7	161	6·7
	Camberwell ...	—	54	146	191	17	408	15·5
	Deptford ...	—	4	71	62	10	147	13·1
	Greenwich ...	—	11	58	33	9	111	11·3
	Lewisham ...	2	10	50	33	5	100	7·6
	Woolwich ...	1	22	111	116	7	257	21·5
		22	414	1,145	1,072	124	2,777	15·6
	London ...	270	1,416	4,470	2,929	356	9,441	20·6

population has been re-vaccinated in the past year, it is evident at once that re-vaccination has been in no sense general, and that the working classes have, to a very large extent, declined to avail themselves of the proffered protection.

In Chelsea, which has a population of about 74,000, between October 1st, 1901, and June 30th, 1902—the period of by far the greatest vaccination activity—about 5,000 people have been re-vaccinated by the public vaccinators in the borough. I do not know the number of re-vaccinations performed by private practitioners in the borough for a like period, but placing it at a similar figure—which is probably an over-statement—10,000 persons over the age of ten years have been re-vaccinated in Chelsea during the past year out of a total population of 62,000 over ten years of age, or only 16 per cent. In Lambeth, according to Dr. Priestley's recent report, apparently about 19 per cent. of the population over ten years of age have been re-vaccinated during the past twelve months. In Chelsea and Lambeth, then, over 80 per cent. of the adult population have done nothing to protect themselves from attack, although it is possible that a certain small proportion of these people have been re-vaccinated at some time or another, and have not relied alone upon the infantile primary vaccination, which is now recognised as not necessarily conferring immunity from attack after the age of puberty.

The large majority of the people who decline to avail themselves of the protection afforded by re-vaccination are working class. Some of them are more or less conscientious objectors to vaccination, but the majority are merely indifferent, and will not take any trouble. Moreover, they dislike the prospect of a possibility of inflamed arms and enforced abstention from work for a short period.

My experience is that the only way to persuade this class to undergo re-vaccination is to offer them some monetary inducement. A small bonus at the time of performance of the operation, and the promise to compensate for loss of wages in the event of disablement, is an argument in favour of vaccination which these people can appreciate and which is not often rejected. Owing to the kindness of a lady in Chelsea, who placed £106 at my disposal for the purpose of promoting re-vaccination in the borough, it was found possible to get nearly all the inmates of common lodging-houses in the borough re-vaccinated. The chief sanitary inspector, accompanied by a public vaccinator, visited the houses at night, with the result that a very large proportion of the inmates became protected. Those who subsequently developed swollen arms received small sums in compensation.

Local authorities have no power to expend public funds in this manner ; but there can be no doubt that amongst the lower class of the population who are most frequently the victims of small-pox, and at the same time the least amenable to sanitary control, a comparatively small sum of money expended in this way would show a very large result in re-vaccinations. Money so spent at the very commencement of an epidemic, aided by a capable staff and proper organization, would be highly effective, and might stamp out altogether a threatened outburst. The expenditure early last autumn in the Metropolitan boroughs first attacked of a few thousand pounds in promoting re-vaccination amongst the class most liable to take and carry small-pox infection, might have saved the rates the half million spent on small-pox hospitals, not to mention the incalculable loss to trade and business, which has resulted from the widespread publicity given to the outbreak from its very commencement.

If a re-vaccinated population insures absence of small-pox, as we know it does, and money can effect the re-vaccination, even a very large expenditure might legitimately be incurred in this direction. It would undoubtedly be cheaper in the long-run than a small-pox epidemic. Let us hope that some day the Local Government Board will assent to the expenditure of public funds in promoting re-vaccination as a preventive measure of a more valuable kind than enormous outlays on temporary or permanent small-pox hospitals.

If re-vaccination of all children at thirteen or fourteen years of age were compulsory, as it ought to be, subject, of course, to the conscientious objection of the parents, as in the case of primary vaccination, extraordinary expenditure of this kind would after some years be very rarely necessary, as the danger of small-pox outbreaks would be most materially reduced. But until a community re-vaccinated at about the age of puberty springs up, small-pox recurrences may be confidently expected, and the protection of the community must be looked for in general re-vaccination at all ages, when an epidemic threatens. To popularize re-vaccination is largely a question of money with the class of people who do not intend to incur any loss, either for their own protection or for the good of the community.

The second great administrative measure—that of the removal of small-pox patients from London to large hospitals and encampments in Kent—is now a necessity for the Metropolis, but it is a necessary evil. London gets rid of its own nuisance by dumping it on its neighbour's land. The result is what we all know : whether

it be by aerial convection of the contagion or by lacunæ in the armour of administrative regulations, which appear to be well-nigh inherent in the routine of large establishments, and by which infection leaves the hospitals in mysterious and undetectable channels, small-pox hospitals are undoubtedly exceedingly liable to act as centres of infection to the surrounding neighbourhoods. The immorality of establishing nuisances of this class amongst an unoffending population is unquestionable, but will probably be practised by the wealthy and powerful community to the detriment of its weaker neighbours, until the introduction of compulsory re-vaccination in time renders such hospitals unnecessary.

We have witnessed during the past epidemic one danger in connection with small-pox hospitals which we may reasonably hope will be avoided in future. When the rising epidemic convinced the Metropolitan Asylums Board last autumn that the provision for small-pox cases at Darenth should be immediately supplemented, contracts were entered into with building firms for the erection of temporary hospitals in the immediate vicinity of the hospitals then actively in operation. I believe the workmen engaged were offered re-vaccination, but many of them declined. The result was that considerable numbers of them became infected; they carried the infection back with them to their homes all over London, and materially assisted in the propagation of the disease at a critical time, when the infectivity and striking power of the contagion were on the rise. Undoubtedly very much harm resulted, and a setback was given to the efforts in which we were then engaged to localize and limit the infection. In any future building operations in the contiguity of occupied small-pox hospitals, re-vaccination of all the workmen engaged should be rigidly insisted upon. No matter what the extra cost may be in the price of the tender, the extra expenditure will undoubtedly be fully warranted.

Small-pox hospitals should, then, be regarded in the light of necessary evils—necessary by reason of the failure to secure a general protection of the community from attack. We ought not to be satisfied because provision has been made in the Metropolis for dealing with so many thousands of cases, even if such provision represents the maximum requirements of any conceivable future epidemic.

What we ought to strive to impress upon the Government and public as our view of the situation is that recurring small-pox outbreaks are inevitable under the existing law as to vaccination; that it is only by universal re-vaccination that the country can be really protected against small-pox epidemics, and that to secure a

fully protected community it is necessary (1) to make re-vaccination compulsory between the ages of thirteen and fifteen; (2) to enable sanitary authorities to expend public funds in promoting re-vaccination in the manner above indicated whenever the district in charge of such authority is threatened with small-pox.

Finally, I would urge that we, as Metropolitan medical officers of health, who have had recent experience of the behaviour of small-pox, approach the Incorporated Society, with a view to arranging an influential deputation of our society, the British Medical Association, the Royal College of Physicians of London, the Imperial Vaccination League, and other bodies interested, to wait upon the President of the Local Government Board, to express our views upon the nature of the vaccination legislation, which it is incumbent upon the Government to introduce in the Parliamentary Session of 1903, in view of the expiry of the Vaccination Act of 1898, at the end of next year.

THE PROTECTION OF WATER-SUPPLIES.

MR. WALTER LONG, President of the Local Government Board, received recently a deputation from the County Councils' Association, the Sanitary Institute, the British Association of Waterworks Engineers, and the Underground Waters Reservation Association, who joined in advocating the appointment of a Royal Commission or other form of official inquiry as to the existing state of the law concerning water-supply. The speakers urged that it was essential that provision should be made for a controlling authority or authorities with powers to prevent water being taken without Parliamentary sanction for sale outside a given area to the detriment of local interests, to prevent waste, and to guard against the pollution of rivers and other sources of supply.

Mr. Long, in reply, said a Commission was already investigating the question of sewage disposal and the condition of surface waters. He would probably be informed of the views of that Commission upon that branch of the subject, and meantime he would not like to encroach in any way upon their work. He was in considerable sympathy with the views of the deputation on other aspects of the general question, and he especially agreed that it was undesirable that water should be obtained in abundance for a given area in such ways as to produce a dearth of supply in districts to which the water more properly belonged. He promised to make further inquiries, and to consider carefully the request for a Commission of inquiry covering the question of water rights.

PROHIBITION OF ARSENIC FOR PAINTS IN FRANCE.—The French Minister of the Navy has officially forbidden the use of arsenical green in powdered form for all painting in his department, and also prohibits the use of white lead, recommending zinc white in its place.