

Special report on small-pox in Bermondsey from October 12th, 1901, to September 6th, 1902.

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SPECIAL REPORT

ON

SMALL-POX . 2

IN

& BERMONDSEY,

From October 12th, 1901, to September 6th, 1902.

BY

R. K. BROWN,

B.A., M.B., B.Ch., B.A.O. (R.U.I.), D.P.H. (Lond.)

(Fellow of the Royal Institute of Public Health.)

(Fellow of the Incorporated Society of Medical Officers of Health.)

Medical Officer of Health for the Metropolitan Borough of Bermondsey.

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To the Mayor, Aldermen and Councillors of the Metropolitan Borough of Bermondsey.

GENTLEMEN,

I beg to present herewith a special report on the recent small-pox epidemic and the measures which have been adopted to prevent its spread. For convenience, I have treated it under the following heads:—

Origin and course of the Epidemic,
Statistical,
Aerial Diffusion of Small-pox;

and under the head of Prevention will be found:—

Vaccination,
Isolation,
Disinfection,
Notification of Chicken-pox,
Issuing of Handbills and Posters,
Examination of Contacts and House to-House Inspection,
Closure of Schools,
Quarantine.

The information concerning the number of vaccinations has been kindly supplied by the Public Vaccinators, and that concerning the workmen employed in building the new shelters, as well as the number of small-pox patients who passed through the Wharf, by the Metropolitan Asylums Board.

I desire here to express my appreciation of the very able way my efforts to check the disease have been seconded by the whole Sanitary staff, from the Chief Inspector to the disinfectors.

Your obedient servant,

R. K. BROWN.

Origin and course of Epidemic.

As stated in my annual report, the epidemic which started in London during August made its appearance in Bermondsey on October the 12th, 1901, when two cases were notified from Farthing Alley. This was followed in the second week by one case; in the third and fourth weeks by 20 and 30 cases respectively. As will be seen by the accompanying chart, from the fourth week of November till the third week in June we had an average of five to ten cases per week, the latter number being only exceeded three times, viz.: on the first week of April, when there were thirteen cases, and on the second and fourth weeks of May, when the cases numbered 11 and 12 respectively. The notifications declined steadily after the first week in June, till the first week in July. From this date onwards the cases averaged about one per week. This report deals with 297 complete cases which occurred up to the week ending September 6th. There is no accounting for the origin of the first case. It was supposed to have been imported in the form of an unrecognised case from the hopping gardens, but the evidence in support of this is very flimsy. As regards locality the cases continued to crop up in this region till the middle of November. By this time some forty cases had occurred in and about where the first cases occurred, viz.: Wolseley Buildings, London Street, Farthing Alley, Eckett Street, Jacob Street, the rest of the Borough being comparatively free. From the middle of November, 1901, onwards, no part of the Borough could be said to be specially attacked, and the cases continued to occur sporadically according as the infection was imported from one place to another. The incidence in the region of the South Wharf will be discussed later.

Statistical.

There were 333 notifications of small-pox. Mostly on removal to the wharf, but in a few cases after being seen by myself, 36 were found not to be suffering from small-pox, thus making a total of 297 actual cases.

The distribution in the three registration sub-districts of the Borough will be seen in the following Table.

TABLE I.

Bermondsey.			Rotherhithe.			St. Olave's.			Whole Borough.		
No.	Deaths.	Rate %	No.	Deaths.	Rate %	No.	Deaths.	Rate %	No.	Deaths.	Rate %
195	27	13.81	77	13	16.9	25	4	16.0	297	44	14.8

Bermondsey had the largest actual number. The highest attack rate per thousand living was in St. Olave's, viz., 2.66, as compared with 2.38 for Bermondsey, and 2.03 for Rotherhithe.

In Table II. will be found particulars of the cases as regards age distribution, vaccination and mortality. The statistics concerning vaccination have all been carefully revised; where in doubt letters have been written to friends concerning the vaccination of the children, parents interviewed, and in many cases the patients have been revisited after recovery and the statements carefully verified. This has all entailed a considerable amount of work, but I present the result in the present table with every confidence in the correctness of the figures. The table has been made on the model of the Metropolitan Asylums Board one, which for the sake of comparison is appended herewith. Those cases have been placed among the vaccinated where there was the slightest evidence of vaccination or where the parents made a positive statement that the operation had been done, though it had only "taken" very slightly or not at all.

The death rates on the whole are lower than those of the Metropolitan Asylums Board, because to quote the words of their circular "in arriving at this figure many cases of recent admissions have been included because they have been completed by death; whereas the contemporary cases which will nearly all ultimately recover, cannot be included until completed by discharge—the result being that the rate of mortality above given is undoubtedly higher than it will be when all the cases have been completed and the final rate ascertained."

Still, making due allowance for this the death rate in Bermondsey may be considered low, especially of the vaccinated cases.

TABLE II.—BOROUGH OF BERMONDSEY.

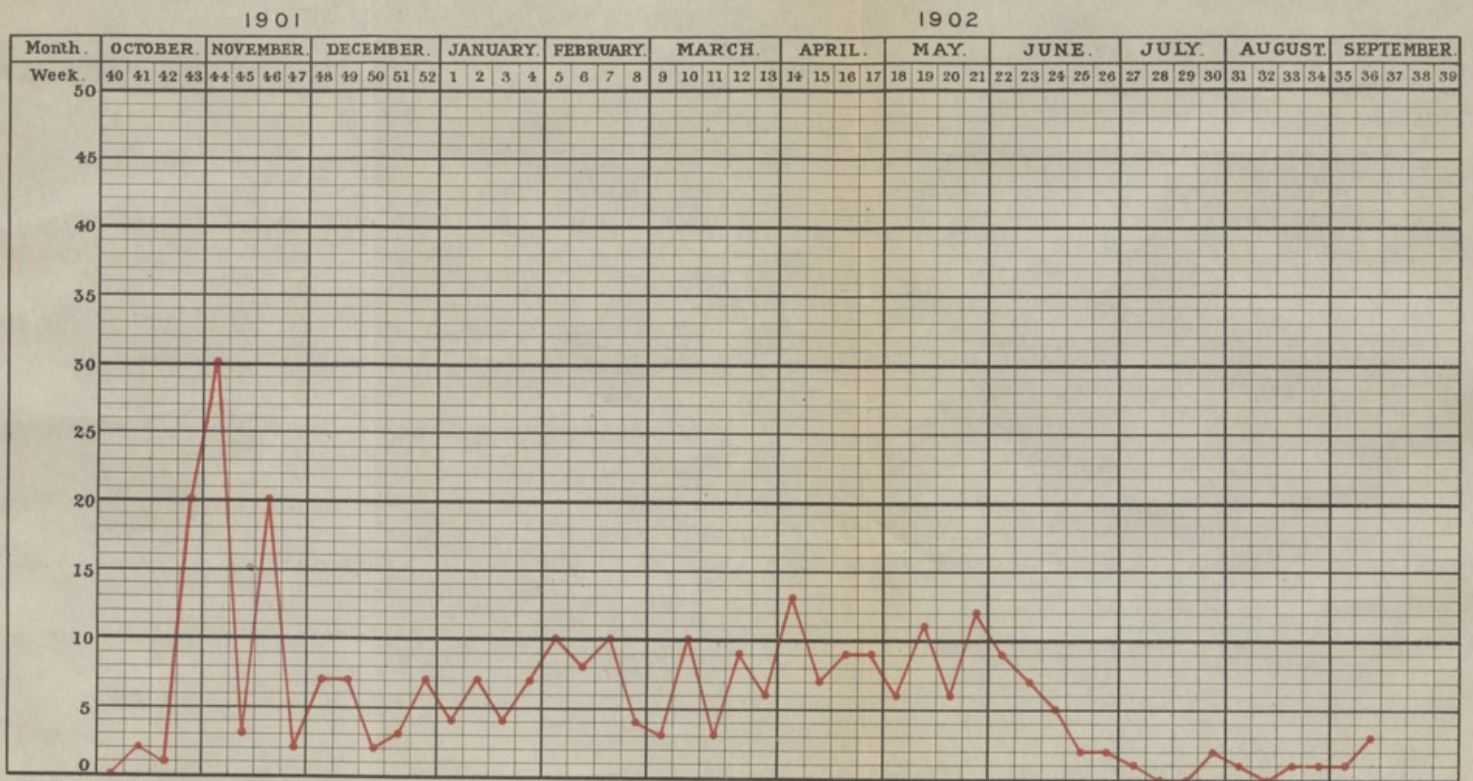
Ages.	Vaccinated.			Doubtful.			Unvaccinated.			Total Cases and Deaths.			Ages.
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	
Under 1 ...	3	1	33.33	—	—	—	1	—	—	4	1	25.00	Under 1
1 to 5 ...	6	—	—	—	—	—	9	8	88.89	15	8	53.33	1 to 5
5 „ 10 ...	18	2	11.11	1	1	100.0	6	—	—	25	3	12.00	5 „ 10
10 „ 15 ...	14	—	—	—	—	—	10	6	60.0	24	6	25.00	10 „ 15
15 „ 20 ...	37	2	5.40	—	—	—	5	1	20.0	42	3	7.14	15 „ 20
Total under 20	78	5	6.41	1	1	100.0	31	15	48.39	110	21	19.09	
20 to 25 ...	53	3	5.66	1	1	100.0	2	—	—	56	4	7.14	20 to 25
25 „ 30 ...	41	4	9.75	—	—	—	2	2	100.0	43	6	13.95	25 „ 30
30 „ 35 ...	39	5	12.82	—	—	—	—	—	—	39	5	12.82	30 „ 35
35 „ 40 ...	14	3	21.43	—	—	—	1	1	100.0	15	4	26.67	35 „ 40
40 „ 50 ...	16	3	18.75	—	—	—	—	—	—	16	3	18.75	40 „ 50
50 „ 60 ...	9	—	—	1	1	100.0	1	—	—	11	1	9.09	50 „ 60
60 „ 70 ...	5	—	—	—	—	—	—	—	—	5	—	—	60 „ 70
70 „ 80 ...	2	—	—	—	—	—	—	—	—	2	—	—	70 „ 80
Total between 20 and 80	179	18	10.05	2	2	100.0	6	3	50.00	187	23	12.30	
Grand Total	257	23	8.95	3	3	100.0	37	18	48.65	297	44	14.81	

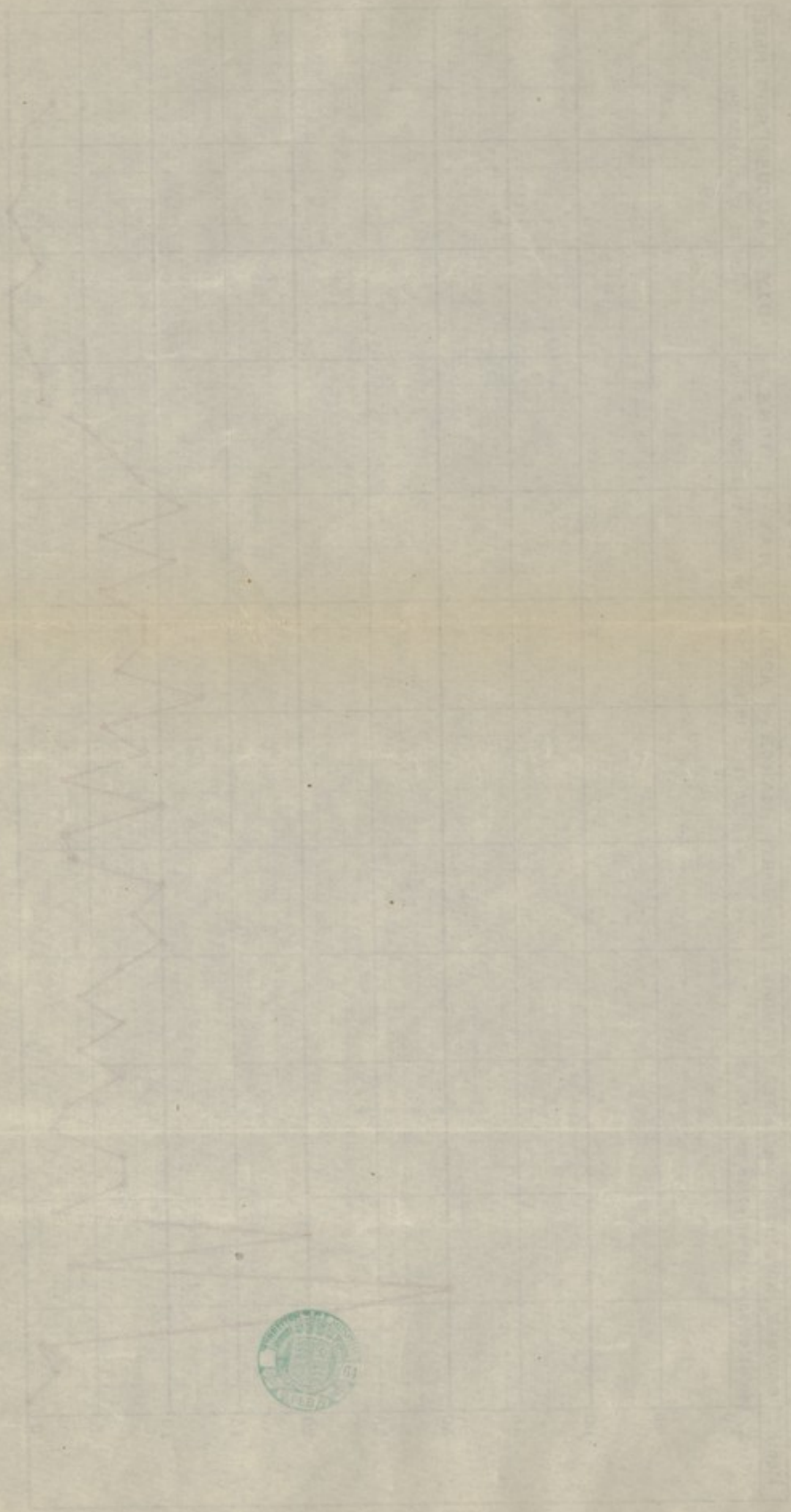
TABLE III.

Table giving particulars of 1,017 cases of small-pox treated in the Metropolitan Asylums Board's Hospitals to recovery or death during the year 1901, their condition in relation to vaccination and the mortality per cent. :—

Ages.	Vaccinated.			Doubtful.			Unvaccinated.			Total Cases and Deaths.			Ages.
	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	Cases.	Deaths.	Mortality per cent.	
Under 1 ..	—	—	—	—	—	—	17	15	88.24	17	15	88.24	Under 1
1 to 5 ...	1	—	—	2	2	100.00	44	24	54.55	47	26	55.32	1 to 5
5 „ 10 ...	11	—	—	4	4	100.00	34	13	38.24	49	17	34.69	5 „ 10
10 „ 15 ...	42	1	2.38	3	1	33.33	41	14	34.15	86	16	18.60	10 „ 15
15 „ 20 ...	107	2	1.87	3	—	—	25	13	52.00	135	15	11.11	15 „ 20
Total under 20	161	3	1.86	12	7	58.33	161	79	49.07	334	89	26.65	
20 to 25 ...	132	13	9.85	8	3	37.50	9	4	44.44	149	20	13.42	20 to 25
25 „ 30 ...	141	15	10.64	5	4	80.00	10	5	50.07	156	24	15.38	25 „ 30
30 „ 35 ...	96	17	17.71	8	4	50.00	3	3	100.00	107	24	22.43	30 „ 35
35 „ 40 ...	76	22	28.95	5	3	60.00	3	2	66.67	84	27	32.14	35 „ 40
40 „ 50 ...	102	27	26.47	14	12	85.71	6	5	83.33	122	44	36.07	40 „ 50
50 „ 60 ...	42	8	19.05	5	3	60.00	1	—	—	48	11	22.92	50 „ 60
60 „ 70 ...	10	3	30.00	3	2	66.67	1	—	—	14	5	35.71	60 „ 70
70 „ 80 ...	—	—	—	3	3	100.00	—	—	—	3	3	100.00	70 „ 80
Total between 20 and 80	599	105	17.53	51	34	66.67	33	19	57.58	683	158	23.13	
Grand Total	760	108	14.21	63	41	65.08	194	98	50.52	1017	247	24.29	

SMALL POX.





In a certain number of cases the source of infection could be more or less distinctly traced, and in a larger number it could only be vaguely conjectured or not traced at all. Of the first-class there were 114, and these can further be divided into primary and secondary cases. By primary cases are meant first cases in a house or family, and of these there were 23. These in their turn gave rise to 91 secondary cases. In Table IV. will be found particulars of the primary cases. This list does not include a few cases which occurred near the wharf, of which the origin was probable, but still doubtful, and which are alluded to later, under the subject of aerial diffusion.

TABLE IV.

No.	Date.	Initials.	Sex.	Address.	Source of Infection.
1901					
1	Oct. 24	W.N.	M	Ernest Street ...	Disinfected infected house, October 12th, 1901.
2	" 23	G.W.	F	Wolsley B'd'gs.	Brother works at South Wharf, and visited here.
3	" 24	W.P.	M	Ernest Street ...	Disinfected infected house, October 12th, 1901.
4	" 26	E.K.	F	Fair Street ...	Visited infected house, Limehouse, October 13th, 1901.
5	" 27	C.E.M.	F	Mellicks Place...	Mother lives in infected house, Farthing Alley.
6	" 28	T.M.	F	Dockley Road...	Grandmother to first cases in Bermondsey and visited Farthing Alley
7	" 28	M.H.	F	Wolsley B'd'gs.	Worked with Mrs. D., Eckett Street, who had previously developed small-pox.
8	" 29	M.N.	F	Monarch B'd'gs.	Patient washes for Mrs. J., who lives in infected house; patient's mother is also visited by Mrs. J.
9	" 29	W.L.	M	Webb St. B'd'gs.	Two previous cases in workplace, Crayford. [area.
10	Nov. 2	H.L.	M	Fort Road ...	Pawnbroker's assistant—received articles from infected
11	" 12	M.S.	F	Parish St. W.H.	Notified from Camberwell as small-pox, October 30th, 1901; returned from South Wharf as chicken-pox, and subsequently developed small-pox. Vaccination performed at Wharf, October 12th, did not take properly. Evidently became infected during stay of day or two at Wharf.
12	" 16	A.H.	M	Guinness B'd'gs, Pages Walk	Relations removed with small-pox from New Church Street 14 days previously. Patient employed in infected area.
13	Dec. 2	J.H.N.	M	Rouel Road ...	Several previous cases at workplace, Holborn.
1902					
14	Jan. 20	K.C.	F	Abbey Street ...	Visited house in Larnaca Street where two cases had occurred.
15	Feb. 3	A.S.	F	Weston Street ...	Came from lodging-house in Borough where several cases had occurred previously.
16	" 24	F.L.	F	Long Lane ...	Previous case in workroom, Shoreditch.
17	Mar. 4	H.D.	F	Gareth Place ...	Visited 14 days, before infected house in same Place.
18	" 12	L.D.	F	Larnaca Street...	Infected in Camberwell before coming here.
19	Apr. 4	G.H.	F	St. Helena Road	Husband worked in Purfleet, and 14 days before had unrecognised attack of small-pox.
20	May 12	B.H.	F	Larnaca Street...	Took in basket making from infected house in same street.
21	" 12	J.R.	M	Clarence Street	Friends of infected family in same street.
22	Apr. 19	E.F.	F	Bermondsey Wall	Infection from unrecognised attacks in several members of family. These were treated as influenza with a slight rash.
23	June 11	H.R.	F	Adams Gardens	Infected by fellow worker who attended workplace while suffering from supposed chicken-pox, but was really small-pox.

Subtracting these primary and secondary cases from the total of 297, there are left 183 cases of uncertain origin. This only illustrates the extreme difficulty of tracing the source of infection in the majority of small-pox cases. From the experience gained in endeavouring to do this, I do not think enough stress has been laid upon unrecognised attacks. How is it possible, in considering the number of people with whom a patient may have come in contact to exclude unrecognised cases among the latter? There is scarcely any infectious disease where the range of virulence from the mildest to a fatal attack is so great, and I do not doubt that many people, mistaking a mild attack, with perhaps one or two spots, for a "chill," or "influenza," or some other everyday complaint, have continued during the attack to go about in trams, buses, and other public conveyances infecting others.

The reason why such cases do not play much more havoc is that the majority of people with whom they come in contact are more or less immune, either naturally or through vaccination, or, if not fully immune, require, I do not doubt, a certain maximum dose of the poison before becoming infected.

This brings me to another very important subject, viz., the aerial diffusion of small-pox.

Aërial Diffusion of Small-Pox.

In discussing this part of the subject, the influence of the South Wharf on the region immediately surrounding it, the attack rate of which was greater than any other part of the Borough, necessarily comes under review.

I think it is now admitted by all medical men, that the infection of small-pox can give rise to the complaint without actual contact, since the poison is mostly inhaled, and more rarely

occurs through inoculation. The distance, however, through which it can travel, and still infect, has been for a long time the subject of much controversy. Judging by analogy with other infectious diseases, and seeing that in all infectious diseases one must inhale a certain amount of the poison before the disease, as it were, "takes root," one would not expect the infection of small-pox to be potent at more than a short distance. In this disease, for instance, I should expect people in the same room, or house, if not too large, or those visiting hospital wards or going close to a large amount of infective material, or coming in contact with people whose clothes are infected, to be attacked with small-pox if not immune already.

This is not, however, what is meant by aerial diffusion. It is the conveyance of the poison of small-pox in a sufficiently concentrated form to infect susceptible subjects at long distances, say from one or two hundred yards up to three or four miles. To explain this fully I here reproduce the diagram made by Dr. Power, of the Local Government Board, in his report to the Board on the prevalence of small-pox in Fulham in 1885.

The report relates to the period between May 25th, 1884, and September 26th, 1885.

Taking the small-pox hospital as a centre, he divided the neighbourhood into special areas by concentric circles, distant $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1 mile respectively from the hospital.

These circles were again divided into quadrants, and the figures in the diagram represent the percentage of houses attacked. The greater prevalence in the $\frac{1}{4}$ -mile circle, under this view, would be due to the greater concentration of the poison. It is suggested that the greater incidence in the south-east quadrant was due to the fact that the north-west wind was most prevalent at that period.

Dr. Power's report shows that this influence was exerted when the acute cases were restricted to twenty, and on one occasion was marked when there were only nine cases, of which five were acute. Other writers have followed in the same strain, the latest contribution to the subject being the report to the County Council of Essex, by their Medical Officer, Dr. Thresh. To put his views briefly, he attributes the greater part of the prevalence of small-pox in the Orsett Union in Essex, to the presence of a large number of acute cases of small-pox in the ships of the Metropolitan Asylums Board, anchored about half-a-mile from the nearest houses in Essex. He considers this view strengthened by the fact that during the eight months ending April, 1902, under consideration, the most prevalent winds blew from the south-west, and west south-west, from the ships over the south portion of Parfleet hamlet, and that these winds presumably carried the infection over this long stretch of water.

In view of the fact, which I have previously shown, that it is difficult to trace the source of infection in a large number of the cases of small-pox; that it is almost impossible to exclude communication between a hospital and the surrounding neighbourhood; from the analogy with other infectious diseases, and the additional fact that the infection of small-pox is most commonly acquired at short distances, we should hesitate to accept the theory of aerial diffusion from small-pox hospitals through such long distances, without the most uncontroversial proof of the impossibility of the acquisition of infection through shorter distances.

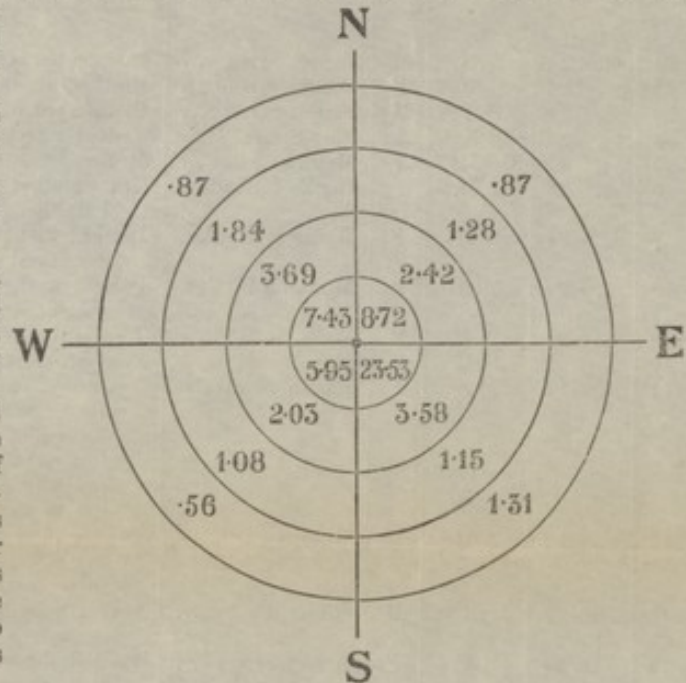
Without criticising these views in detail, I propose giving a short account of my experience of the South Wharf, which is situated in this Borough, mentioning the conclusions which may be drawn. I shall be mainly concerned with stating the facts as far as I could ascertain them, so that the reader can draw his own conclusions from them.

The Borough of Bermondsey is roughly $2\frac{1}{2}$ miles long by 1 mile broad. The long axis runs due east and west, the short one being at right angles, viz.: north and south. It is bounded on the north side by the river Thames, which runs approximately east and west. At the north-east corner of the Borough, the river takes a curve due south, and bounds the east end of the Borough for about $\frac{3}{4}$ mile.

About the centre of this end is situated the South Wharf of the Metropolitan Asylums Board. The Wharf itself, therefore, faces east. It is surrounded closely by houses to the west and north, those on the south being separated by a large timber yard.

There are, of course, no houses on the east, but here ships and barges are constantly passing, many of the latter being commonly anchored quite close to the wharf.

Taking this as a centre, there are within the area, having a quarter of a mile radius, some 320 houses. By extending the radius to half-a-mile there are only 56 more added. This group of houses is for all practical purposes separated from the rest of the Borough by the Surrey Commercial Docks, which occupy 360 acres. The population, at a computation of 8 persons to a house, is 2560 (the percentage for the Borough being 8.2). The methods of communication are



three, all of which have to pass through a portion of the docks, viz.: by Rotherhithe Street on the north, Commercial Dock Road on the west, and Plough road on the south.

At each of these roads there are bridges which are occasionally opened to allow ships to enter the Docks, and where ambulances and other vehicles are liable to be detained, occasionally as long as twenty minutes.

In Rotherhithe Street the houses are continuous, except at the entrance to the Docks known as Lavender Bridge, with the rest of the Borough, since Rotherhithe Street is part of a long straggling thoroughfare, running from one end of the Borough to the other, along the river.

From this peculiarity of position this area is locally known as "Down Town." The South Wharf itself was originally intended to act only as a place of embarkation for small-pox patients, which were being removed to the ships at Long Reach. The accommodation was increased during last winter, and there are now shelters for isolation of doubtful cases. Owing to the number of patients in the recent epidemic, and the constant influx of patients at all times during the day and night, the wharf could hardly ever be said to be entirely free from cases temporarily detained there en route for the hospital ships.

Steam boats proceed down the river with patients three times in the twenty-four hours. Owing, however, to the fog on the river, these boats are occasionally detained at the wharf for a considerable period.

This happened three times during last winter, when the boats, and all available beds in the shelter, became crowded, thus affording all the conditions favourable to the spread of small-pox in the neighbourhood by aerial diffusion of infection, if such exists. In the following Table will be found the result:—

TABLE. V.—DETENTION OF SMALL-POX PATIENTS AT SOUTH WHARF THROUGH FOG.

Date.	Rough approximation of number of patients detained.	Direction of Wind.		Date and address of first case after detention.	No. of days between detention and case.	Direction of house as regards South Wharf.
		Morning.	Afternoon.			
Nov. 4, 1901	20	E.N.E. and calm	N.N.W. and N.E.	Dec. 3, Odessa Street	29	S.
" 5, "	30	Calm, N.N.E. ...	N.W., variable and calm ...	Do.	28	S.
" 6, "	40	S.S.W. ...	S.W. ...	Do.	27	S.
" 7, "	60	S.W. ...	S.S.W. ...	Do.	26	S.
" 15, "	20	N.W. and S.S.W.	S.S.W. and S.S.E.	Do.	18	S.
" 16, "	40	Variable and calm	Variable & S.S.W.	Do.	17	S.
Mar. 4, 1902	40	S.W. and S.E. ...	S.E., E., E.N.E.	Apr. 26, Faustin Place	53	N.
" 5, "	120	E. ...	E. ...	Do.	52	N.
" 6, "	40	Calm and variable	N.N.W., N.E., S.W.	Do.	51	N.

A single glance at this Table shows that no harm resulted to the inhabitants of the neighbourhood from this detention, and that what cases did occur could not be put down to this, with one possible exception, since they occurred after the incubation period of twelve to fourteen days, which elapses from the receiving of infection to the development of symptoms.

This exception would be cases Nos. 2, 3 and 4 of Table VI. Although notified at the same time, No. 3 was at a more advanced stage when removed than either 2 or 4. No. 3 made a statement when he returned from the hospital to the effect that when he went down there he met two men who had been working on the same ship on which he worked at Millwall. These men would therefore have contracted the disease prior to No. 3. I have not been able to confirm this story, because the cases did not occur primarily on the ship, or else they would have been known to the Port authorities. It is quite possible, however, that they may have belonged to some other district in London, and have been working on this ship, when they might easily have escaped the knowledge of the Medical Officer of Health of the Port. As the patient has gone out of the district, I have been unable to get the name of the ship.

If this is true, and I have no reason to doubt the man's statement, it would afford some clue to these cases. Even if it is not true, it will be seen from Table V. that the wind was blowing from the house towards the wharf on November 16th, when infection might be supposed to take place; further, it is highly improbable, even had the infection travelled all that distance from the wharf, that it would have picked out a house at the end of the street farthest from the wharf, when it would probably meet with many susceptible subjects, not only in the large timber yard it would have to pass through, but also in the street, before it reached the house in question.

It might be objected to this, that when there was fog on the river there could be no wind. This, however, is not the case, as even during the presence of a fog there is always a slight and variable breeze on the river, and the fog does not always remain at the same density, inasmuch as it frequently partially lifts, but not sufficiently to allow the ambulance boats to start, and then becomes dense again.

But even were there no breeze at these times, it would only mean that a greater accumulation of infection would take place at the wharf, which would show its effect as soon as the fog lifted. In addition there is an Elementary Church School right opposite the wharf gates, the distance between the latter and the school door being some sixteen yards. During the play hours the children are constantly running about looking at the ambulances, and have been seen occasionally trying to look into them from the step. Out of the 130 children attending here, not a single one has

contracted small-pox during this epidemic. It is true they were all vaccinated early in October, but they had opportunities of acquiring infection even before this date, since there were a considerable number of cases from other parts of London passing through the wharf. This immunity, however, speaks as much for the efficiency of vaccination and re-vaccination as for the improbability of aerial diffusion.

During 1901 there passed through the wharf 1,630 small-pox patients, and during the present year up to July 26th, 6,886. At the height of the epidemic the ambulances frequently came very close one after another, as many as four or five arriving at the wharf at the same time. Still, there does not appear to have been any more cases in this area at the time the epidemic was at its worst in London.

The attack rate per house in this area was 5.03 per cent., as compared with 1.27 per cent. for the whole Borough, and 2.03 in an area of the same size as that taken round the wharf, with Wolseley Buildings as centre, but with the number of houses 1,724, and the population 13,792. The attack rate, including all cases, per thousand of population in the wharf area, was 10.55, as compared with 2.30 for the whole Borough, and 5.35 for the Wolseley Buildings area.

In Table VI. will be seen particulars of all cases which occurred in the area between October, 1901, and September 6th, 1902. It will be seen that of the 27 cases, the number of primary cases is 17, and these gave rise to 10 secondary cases. As to the origin of the primary cases, six had more or less definite connection with the wharf, and these in their turn gave rise to six secondary cases, thus making a total of twelve. Of the eleven remaining primary cases, there is a possible origin in five, and there is no trace of the source of infection in six.

Some of the cases in Rotherhithe may be explained in this way. Most of the ambulances go to the wharf by the New Dock Road. There is a bridge on this road over the canal joining two of the largest docks, and it is very often opened to let ships pass, just as ambulances and other vehicles are coming up. I have frequently seen two or three ambulances stopped in this way, standing in the midst of other vehicles. One doctor informed me he has seen people from a 'bus which was drawn up close opposite an ambulance, putting their heads out to try and see into the interior of the ambulance. I have no doubt that infection in some of the cases has been acquired in this way.

I have dealt so far with the ordinary inhabitants in this area. I now come to what I might call the day inhabitants, namely those employed in this quarter-mile area, in various yards and places. Of course a good many employees are inhabitants in this area, but a considerable proportion, probably at least a half, come from other parts of the Borough outside this, or from Deptford, Poplar, and elsewhere. I have caused enquiry to be made in these yards, of which there are 16, employing 703 men. Among these there only occurred three cases of small-pox, one of which is case I. of Table VI. The other two were in a wharf north of South Wharf. One of the patients lived in Poplar, where he may have become infected, and the other lived in the borough, outside the quarter-mile area, and was probably infected by the Poplar man with whom he worked.

The Master of the Surrey Commercial Dock Pier, which is next pier to the Metropolitan Asylums Board's Wharf, became infected on February 3rd, 1902. He lived in Balham, so that obviously he may not have been infected here at all, or if he was, it was by coming in contact with some of the men from the ambulance ships, who, I am told, were in the habit of frequently landing at this pier.

Lastly, the Metropolitan Asylums Board were engaged from September last year to May of the present extending their buildings at the South Wharf. The average day gang was 100 and the night gang 35, but on one occasion the day gang was 140 and the night gang 50. Among these temporary employees, who were not subject to compulsory re-vaccination, and all of whom, it will be admitted, worked very close to the source of infection, only two contracted small-pox. The first one, H. H., of Hackney, was removed to hospital, February 27th, 1902. The second, C. H. J., of Edmonton, was removed on June 1st, 1902.

The latter of these men worked two months at the wharf before becoming infected.

It will be noticed that neither of these dates, nor that of the Pier Master, corresponds with a probable infection from the accumulation of cases during the fogs.

Be it noted that in dealing with this part of the subject I have dealt with facts, and have given an account of every individual case as far as I could ascertain the circumstances. I have not formed any theory first and seen if the facts bore it out.

It is not safe to draw dogmatic conclusions from so few facts, but a due consideration of those set out here would seem to warrant the opinion that the wharf is accountable for a considerable number of cases in the quarter-of-a-mile area under consideration.

I do not think the connection between these cases and the wharf can be explained by aerial diffusion. If it were possible to trace all the movements of the patients in regard to the wharf employees and small-pox ambulances from the tenth to fifteenth day before they took ill, and also to trace the movements of all persons connected with the wharf and the ambulance steamers, I think it is possible that the origin of infection in the cases unaccounted for could be found. I would not feel justified in making the wharf account for all the cases in this region, but I cannot help feeling that a considerable share of the prevalence is due to its presence.

The corollary to this is that any accumulation of small-pox patients in a thickly populated neighbourhood may be a source of danger to the inhabitants unless the hospital and ambulance arrangements are managed on very strict lines, so as to prevent all inter-communication between persons employed in that hospital and the surrounding inhabitants. The facts set out here show, I certainly think, that the danger is to be looked for in this direction, and not through aerial diffusion of the infection.

In the case of the South Wharf the men from the ambulance steamers should not be allowed to land when and where they please.

TABLE VI.

No.	Date.	Initials of Patient.	Age.	Sex.	Address.	Position as regards Wharf.	Probable or Possible Source of Infection.
1	1901 Oct. 27	F. B.	17	M	Elgar Street ...	S	Used to converse with men employed at South Wharf.
2	Dec. 3	F. G.	4	M	Odessa Street ...	S	Indefinite.
3	" 3	G. G.	42	M	Do. ...	S	Indefinite; sailor; worked about river; possibly came in contact with the ambulance boats.
4	" 3	R. G.	46	M	Do. ...	S	Indefinite.
5	1902 Jan. 10	R. C.	16	F	Rotherhithe Street	W	Indefinite; used to stand and watch passing ambulances.
6	" 13	T. T.	18	M	Odessa Street ...	S	From Nos. 2, 3 and 4, same house.
7	" 13	J. D.	49	M	Rotherhithe Street	N	Indefinite.
8	" 21	M. B.	35	F	Derrick Street ...	S	Shop; men from ambulance steamers frequently purchased food here.
9	" 29	H. B.	63	M	Do. ...	S	No. 8; contact from same house.
10	" 29	W. M.	6	M	Do. ...	S	Ran about streets; may have been in infected shop, which is close (No. 8); he frequently looked through the ambulance windows while they were waiting admission through the gates at South Wharf.
11	Feb. 10	J. S.	17	M	Sedgers Buildings	S	Employed as ostler at Acorn Stables, Rotherhithe Street. Miss C., who lived next door to the stables, was removed with small-pox, and her brother was in and out the stables with this patient continually.
12	" 18	E. C.	29	F	Elgar Street ...	S	Patient bought her groceries at address of case No. 9, and was in the shop a few hours before No. 8 was removed. No information as to whether she was in shop at time of removal of No. 9.
13	April 26	M. A. G.	19	F	Faustin Place ...	N	Worked in Deptford, and visited a young man in that Borough who had returned from the hospital ships.
14	May 11	T. J. P.	15	M	Derrick Street ...	S	Worked at a coke factory in the Minories. On the week previous to his removal he was working with two boys whose brother and sister had been removed with small-pox a week before. These boys did not stop away from work at all.
15	June 2	W. P.	12	F	Rotherhithe Street	N	Builder's foreman of extension buildings, South Wharf, lodged here.
16	" 5	E. E. N.	28	F	Do. ...	N	Indefinite; watched friend being removed to Wharf from Silver Street.
17	" 9	A. B.	3	F	Do. ...	N	Close to No. 15. Mother, a school teacher in Lewisham, left the child during her absence by day in the charge of some neighbours.
18	" 13	A. J. P.	10	M	Do. ...	N	Contact from No. 15, same house.
19	" 14	A. P.	20	F	Do. ...	N	Do.
20	" 18	A. P.	16	F	Do. ...	N	Do.
21	July 28	E. W.	65	F	Castles Buildings...	S	Indefinite. About a fortnight previous to removal she came in contact, in a bus which starts from the "Acorn," Rotherhithe Street, near the Wharf, with a boy just returning from the hospital ships.
22	Aug. 12	C. W.	58	M	Do. ...	S	Contact from No. 21, same house.
23	" 20	J. M.	44	F	Faustin Place ...	N	Indefinite.
24	" 27	A. T.	32	F	Castles Buildings...	S	Attended to case No. 22 after removal of case No. 21.
25	Sept. 4	E. P.	42	F	Faustin Place ...	N	Sister to case No. 23; visitors.
26	" 6	T. M.	77	M	Do. ...	N	Contact from case No. 23, same house.
27	" 6	T. M.	23	M	Do. ...	N	Do.

Means Adopted to Prevent Spread of Epidemic.

These consisted of vaccination, isolation, disinfection, the compulsory notification of chicken-pox, and appointment of experts in small-pox by the London County Council, issuing of posters and handbills, examination of contacts, house to house inspection, closure of schools, and quarantine.

Vaccination.

The subject of immunity in general against infectious disease has been one of the most difficult problems in medicine since the latter became a science. It has been known from very ancient times that, when a person recovered from an attack of most of the infectious diseases, he was rendered immune, with very few exceptions, to a second attack of the same disease. When I say with few exceptions, I mean that the rule is not absolute, because some people have been known to have second, and even third attacks of measles, scarlet fever, small-pox, etc.; but still this does not invalidate the general principle. It was found in pre-vaccination times that if a person was artificially inoculated with small-pox virus he contracted, as a general rule, a mild form of the disease, which rendered him immune against the severer form. There is considerable risk, however, in this method of producing immunity, but so great were the ravages of small-pox in the eighteenth century that numbers of people were found willing to take this risk when inoculation was introduced by Lady Mary Montague. Jenner, in the end of the eighteenth century discovered that a similar result could be produced by inoculation with cow-pox, and this has been followed by a steady and continuous decline both of the attack and death-rates in small-pox, which has been just in proportion to the efficiency with which vaccination has been carried out in the community.

It is only within the last year or two that cow-pox has been proved to be small-pox, modified in such a way by passage through the cow that it renders the subject of inoculation immune from small-pox without producing the latter disease in its contagious form.

The amount of immunity produced by vaccination varies according to the efficiency of the vaccination, *i.e.*, the number of marks up to a certain point, and four or five marks have been found to produce a sufficiently lasting immunity. One mark may produce a certain amount of immunity, but it only lasts a very short time. A common view, and one which is mistakenly or wilfully propagated by anti-vaccinators is, that vaccination is claimed by vaccinators to render one absolutely immune for all time. This is very erroneous, for the immunity produced by vaccination as well as by natural acquisition of small-pox or any other infectious disease, tends to fade and become less as time goes on. Therefore, to keep one absolutely immune to small-pox, the subject would require to be vaccinated at intervals. These intervals differ within very wide limits for different individuals. A good primary vaccination renders a few people immune for the rest of their lives, so that they cannot be got "to take" a second time, and immunity in a few others may only last a year or two. Between these limits there is every gradation.

The theory is, that when a person recovers from an attack of a certain disease, the cells of the body manufacture an antitoxin which neutralises the virus of the same disease, and leads to recovery from the particular attack, or immunity from this disease if re-introduced at a later period into the system. A great many people are naturally immune to some infectious diseases, small-pox among the number, otherwise this disease would have depopulated the globe long ago.

Now, looking at Tables II. and III., it will be seen that the death-rate on the whole is favourable to the vaccinated, and as only about "four" patients out of the whole number have been re-vaccinated, it shows that the primary vaccination has left some trace of immunity. The same remark applies if one looks at the age periods, the only apparent exceptions being that between 5 and 10 and 20 to 25 of Table II. This only shows that some persons are naturally immune; but that it would be most unsafe to draw conclusions unfavourable to vaccination from these age periods alone, will be shown by looking at the same age periods in Table III., which deals with larger numbers, and is therefore a safer guide.

On the occurrence of a case of small-pox, the vaccination officer was at once communicated with, and he made arrangements with the public vaccinators to at once visit the infected house and endeavour to get all the healthy inmates vaccinated or re-vaccinated, as the case might be. In the majority of cases he was successful, and if they were done within 24 or 48 hours of becoming infected, they did not develop small-pox. Such quick vaccination did not always take place, because the cases were often late in the disease, say three to five days after the rash made its first appearance, before they were reported, or because the people took a day or two before they could make up their minds to be done. As a consequence, it was not an uncommon thing to find the vaccination and a very mild attack of small-pox developing simultaneously. This was not at all satisfactory from a public health point of view, because one had great difficulty convincing the patient that he had small-pox, and that it was not a vaccination rash from which he was suffering. He frequently, therefore, walked about with a mild attack of small-pox. There seems to be a popular impression that the milder the attack of small-pox, the less dangerous it is to others. There is nothing more erroneous, and it cannot be impressed on people too strongly, that though they have a mild, and as far as they are concerned, trivial, attack of small-pox, they may give it in a severe and fatal form to some person who is more susceptible than they are.

As mentioned before, only four out of the 297 who were attacked with small-pox had been re-vaccinated, and among these the most recent re-vaccination was eighteen years before, the longest being 40 years previously. This shows the advantage of re-vaccination. Among the officials of the Public Health Department, including the clerks (for some patients with small-pox walked down to the Town Hall, Lower Road) none contracted small-pox who had been re-vaccinated, the only ones who took the disease being two disinfectors, neither of which had been vaccinated

since infancy previous to becoming infected. They were, however, re-vaccinated after receiving the infection, and both developed mild attacks of the disease from which they recovered. From the beginning of the epidemic in October, 1901, till the end of July, 1902, there was a total of 20,890 vaccinations, which included 6,032 primary, and 14,858 re-vaccinations, performed by the public vaccinators in Bermondsey. There was also a great number of vaccinations performed privately, but there is no way of arriving at the exact figure on this point. I do not doubt that this measure has taken a great part in the prevention of the spread of the disease in Bermondsey.

When small-pox invaded Bermondsey it was generally considered to be a badly vaccinated borough, and this probably with some truth. For some years the Vaccination Act had not been properly enforced. In Bermondsey it had been the custom of many practitioners to vaccinate with one mark. Their defence is, that if they did not give in to the wishes of the parents they would get no vaccination at all to do. There is a great deal of truth in this, since I have very commonly heard from parents that their sole reason for not going to the Public Vaccinator was that he vaccinated in four or five places. Though the present system of vaccination has probably got some communities better vaccinated than the old one of vaccination stations, it is far from ideal. The great objection from the practitioner's point of view is, that it gives a practitioner in a neighbourhood power to visit the patients of other doctors, and although as a whole the Public Vaccinators have acted in a most honourable spirit, and have, so far as I know, never wilfully abused their position, still they cannot always prevent a certain number of patients from returning to them for treatment in complaints other than those due to vaccination. The present vaccination system, which is only temporary, will come to an end next year, and I would suggest that every general practitioner be made a public vaccinator, and get a moderate fee for each vaccination, provided it was up to the Local Government Board's standard. To keep them up to this there would require to be appointed a vaccination superintendent who would examine all arms, and grant the certificate. The advantages of this system would be:—(1) less complaint on the part of parents, as each practitioner would look after his own families and make sure they were vaccinated; (2) Doing away with the one mark vaccination; and (3) Removing any grounds of complaint on the side of the general practitioner. Complaints have been made in a few cases, both lay and medical, of the large fees which the public vaccinators have got during the present epidemic, but, as I have said in reply, it is not the fault of these gentlemen; they did not make, but are only carrying out, the present law.

In conferring immunity against attack, the advantages of re-vaccination are so very great that I think legislation should be introduced, making re-vaccination at a certain age compulsory. A very good age for re-vaccination is between 10 and 15. Such legislation exists in Germany where small-pox is practically extinct. That it has been of great advantage in Bermondsey is shown by the few patients attacked who had been re-vaccinated previous to becoming infected, and also by the fact, alluded to already, that not a single child in the infant and girls' departments of the Trinity Schools, Rotherhithe, though daily exposed to infection, contracted small-pox during the epidemic.

The question of a change of the vaccination authority has come before the Public Health Committee many times, but they mostly declined to express an opinion except once, when it was that vaccination should be transferred to the Borough Councils in London. I would prefer to see it under some central authority such as the Local Government Board, but failing this under the Borough Councils, since being sanitary authorities, it is more natural that such an important sanitary measure as vaccination should be administered by them.

Isolation.

On the receipt of a notification of small-pox, a copy of the certificate was made out and brought by an inspector to the house and the case telephoned away. By this means all the cases were removed mostly within a couple of hours of the receipt of the notifications to one of the Metropolitan Asylums Board hospitals. If the case occurred out of routine office hours, there was an arrangement by which the hall-keeper at the Town Hall, Rotherhithe, got the case away either per telephone, or if too late for that, by going straight to the Ambulance Station at Old Kent Road. The disinfectors were also immediately communicated with; so that whether the case was removed day or night, disinfection was performed immediately. There was no difficulty getting any of the cases away, as almost all of the patients and their friends showed a great willingness to help the authorities in their endeavour to check the spread of the disease.

Disinfection.

This was invariably done immediately after the removal of the patient. The disinfectant used for fumigating the rooms was a 2 per cent. solution of SO_2 , made by carefully sealing up all crevices in the room and burning 2lbs. of sulphur to every 1,000 cubic feet. The clothes and all articles in the house, including the infected clothing of the remaining inmates, were removed generally after sulphuring the room, but sometimes before, and put into a steam disinfectant heated up to 120 Centigrade. The steam is under high pressure similar to an ordinary engine boiler so that it penetrates all parts of the fabric. It has been found sufficient to thoroughly destroy the most resisting micro-organisms as well as their spores. It however destroys some articles, notably leather. Where there was a fabric which could not be done in this way, it was placed in the disinfectant along with a burning formalin lamp. A very strong solution of this gas was generated which was almost, if not quite as effectual as the steam, and left no ill effects on the fabrics. This gas is extremely diffusible and will penetrate almost anything, so that in a strong solution very few microbes have a chance of escaping. After disinfection was performed a notice was served on the landlord to strip and cleanse the walls, and in default this was done by the

Council. 227 notices were served to strip rooms after small-pox, 250 rooms were stripped by landlords, the remainder being done by the Council. The notices served do not correspond to the number of cases of small-pox, because rooms were done in many cases without notice, and notices were not served when cases occurred in the workhouse or infirmaries, or in the shelters of the Council. Repapering of the walls was not recommended to be done until 14 days had elapsed from the removal of a case.

Notification of Chicken-pox.

The question of the advisability of making chicken-pox notifiable came up early this year, since it is so frequently mistaken for small-pox. I did not advise this course because: (1) It was likely to make some practitioners, upon whom the statutory obligation of diagnosis rests, not quite so careful in endeavouring to differentiate between the two diseases. (2) To get the full benefit all cases ought to be visited and examined by the Medical Officer of Health, and the diagnoses confirmed or altered as the case may be. The practical objections to this are obvious. And (3), it greatly increases the work of the already overburdened Public Health department.

The London County Council, however, found that there was a great lack of uniformity of action among the Borough Councils, some requiring the disease to be notified, others not, and determined to have uniformity. They therefore made chicken-pox notifiable in February for three months, and at the end of that time made a further extension of six months. I think I can show that the result, as far at least as Bermondsey is concerned, justifies the opinion expressed by the Public Health Committee on my advice.

During this period, up to September 6th, there were in all 679 notifications of chicken-pox, viz.: 427 for Bermondsey, 203 for Rotherhithe, and 49 for St. Olave's. In three cases only was the diagnosis altered—one in Gareth Place, one in St. Helena Road, and one in Centre Block, Vine Street Buildings.

In the first two cases the practitioner wrote asking me to see the cases, and merely notified the cases as chicken-pox because it was notifiable. Had it not been so, they would have simply written to ask it to be seen before notifying small-pox, or else have notified the latter with a similar request, in the first place. The same remarks apply to the case in Vine Street Buildings, with this addition, that there had been a case of genuine small-pox twelve days before in the same tenement, of another member of the family. The expense of these notifications £74 6s. The houses in which the cases occurred had all to be visited by an inspector, and in many cases by myself. School certificates were sent off for every case.

This trouble and expense would be very slight if the amount of benefit derived in the check of small-pox compensated for it, but I do not think it does. To visit all cases would be impossible with the present staff, and would require the appointment of additional experts. I certainly think that if a practitioner is in doubt as to whether a case is small-pox, and is really anxious to act on the safe side, he can generally get a second opinion to at least share, if not assume, the responsibility. Further, in Bermondsey, and, I presume, in other parts of London, chicken-pox was not by any means the only disease mistaken for small-pox. In the early stages, at least, small-pox was more commonly mistaken for influenza than any other disease, and many cases were seen in surgeries of private practitioners, treated as influenza, and sent home to develop small-pox a day or two later. The initial symptoms of the two diseases are exactly similar, but it shows that when a case with symptoms of influenza comes for treatment it should in times of small-pox prevalence be looked upon with suspicion and isolated for a day or two. Other diseases which are commonly mistaken for small-pox are measles, scarlet fever, typhoid, purpura, various forms of eczema, lichen, herpes, and other diseases too numerous to mention. The diagnosis has, with few exceptions, been corrected at the wharf, and I doubt very much if the appointment of experts by the London County Council has sensibly diminished these errors. These will only be lessened by the increasing experience gained by the general practitioner and by the exercise of the greatest possible care in acting for safety in doubtful cases.

I should like to have seen a few experts appointed who have had experience of small-pox under the Asylums Board, or some similar institution, and whose services would be available in many of the cases which presented difficulties even to those who have had a considerable amount of experience of the disease already.

In the large majority of boroughs in London the Medical Officers of Health have acted as small-pox experts, and although the statutory obligation to diagnose rests entirely with the general practitioners, still, for the sake of the public health, the Medical Officers have given their services freely when asked to do so.

On the first outbreak of small-pox in the Borough, I addressed a circular letter to all the practitioners offering my services in assisting in the diagnosis of doubtful cases. When chicken-pox was made notifiable by the London County Council, in addition to the notice circulated by them, the Public Health Committee had a notice printed, drawing attention to the fact that chicken-pox was notifiable. At the end of this notice, a similar offer of assistance in diagnosis was made, and if the practitioner desired me to see any case of chicken-pox he was asked to write his request on the notification form.

Practitioners availed themselves freely of my services during the whole period of the epidemic.

In this connection I am unable to state accurately the number of cases seen by myself in consultation as I was called upon at all hours, both on week days and Sundays. In this way I have seen nearly a third of the actual cases, and a considerably larger number of suspected cases which did not turn out to be small-pox. The number of doubtful cases seen in Bermondsey by the experts of the London County Council during the period of which this report deals was ten.

Issuing of Handbills and Posters.

Early in October instructions were given by the Council that their Medical Officer should prepare and issue a handbill and posters; the latter to be posted in conspicuous places over the Borough and the former to be distributed, one to every family in the Borough. The following is a copy of these bills. They were both the same and differed only in size.

METROPOLITAN BOROUGH OF BERMONDSEY.

PREVENTION OF SMALL-POX.

Owing to the prevalence of Small-pox in the Borough, the Council of the Metropolitan Borough of Bermondsey think it advisable that every one should be acquainted with the early symptoms of the disease, and the best way to prevent its spread.

The time which elapses from receiving the infection into the system to the appearance of the first symptoms is nearly always 12 days. During this time the patient feels well, after that period the symptoms are:—

- I.—Chills and shivering in adults, or convulsions in children.
- II.—Intense frontal headache.
- III.—Severe pains in the small of the back and limbs.
- IV.—Vomiting.
- V.—On the third day pimples appear on the forehead and face, and later, gradually appear on other parts of the body.

Should any person suffer from these symptoms they should be immediately isolated and have medical advice.

Vaccination is the best way to prevent the disease. Those who have not been vaccinated since childhood, or had small-pox, should be re-vaccinated. Parents who have not had their children vaccinated should get it done at once, as unvaccinated children are less likely to recover from an attack. Those who have been in contact with a case of small-pox and have not recently been vaccinated, should have it done, because even if they have already contracted the disease, it will run a much milder course.

Vaccination or re-vaccination will be performed free of charge by any of the Public Vaccinators. The patient, by applying to the Vaccination Officer, Mr. Bedding, at the Guardians' offices, Tooley Street, S.E., can have the operation done at his own home or at the surgery of the Public Vaccinator.

In cases of urgency, application may be made direct to one of the Public Vaccinators. It is performed with pure glycerinated calf lymph issued by the Local Government Board, thus avoiding all risk of conveying any disease.

The following are the names and addresses of the Public Vaccinators:—

- Dr. D. Smart, 108, Grange Road,
 Dr. V. A. Jaynes, 157, Jamaica Road,
 Dr. W. B. Johnston, 157, Jamaica Road.

RICHARD K. BROWN, *Medical Officer of Health.*

Town Hall, Lower Road, S.E.

It was feared that by issuing these bills a panic would be produced, but the result has not justified these fears, since the people took the sensible view and learnt from them the early symptoms and got vaccinated.

Examination of Contacts and House to House Inspection.

Early in the epidemic a very useful system was inaugurated among the Medical Officers of Health in London, by which they kept one another posted in the contacts which occurred in each of their districts. When an inspector visited an infected house, he took the names and addresses of all persons who had been in contact with the patient. The names and addresses of those living in the Borough concerned were handed to one of the district inspectors to be visited periodically, and of those living outside the Borough to the Medical Officers of the district to which they belonged, so that they might be kept under observation. The Metropolitan Asylums Board also sent a daily list of those who had visited friends at the Small-pox Hospitals, as well as daily lists of admissions to, and discharges from, or deaths occurring in the hospitals.

The London County Council also gave a great deal of assistance by distributing among the Medical Officers of Health in London daily lists containing particulars of all cases occurring in the Metropolis, so that if any contacts were missed otherwise or any source of infection doubtful, it could be traced by looking at these. By these various sources of information we had constantly a very large number of contacts under observation. The house in which the contact lived was visited at first every second day, and towards the end of the incubation period, every day, by an inspector, and on the slightest suspicion of illness occurring, immediately by myself. The number of cases of small-pox occurring among these contacts was small compared with the total number under observation.

In Wolsley Buildings and the Courts and Alleys adjoining, in Gareth and Porlock Places, or wherever a case occurred in cul-de-sac or street where it was likely to spread, a house to house inspection was instituted. By this method a good many cases were discovered during the early part of the outbreak in Wolsley Buildings. In two cases the patients refused to see a doctor, but their scruples were easily overcome by the exercise of a little patience.

No difficulty was experienced in Bermondsey obtaining the names and addresses of contacts, nor have I reason to think that any cases of small-pox were wilfully concealed with the possible exception of the two mentioned above.

As a rule when the name of a workplace outside the Borough was given by a contact, the firm was not directly communicated with. This was generally done through the Sanitary Authority of the Borough in which the workplace was situated.

Closure of Schools.

During the end of 1901, it was found necessary to close two schools, viz., East Lane Board School, and the Catholic Schools, Dockhead. This action, the reasons of which are given more in detail in my Annual Report, was because so many of the early cases were children connected with these schools, the prevalence of the disease in the immediate neighbourhood, and the necessity of cleansing and disinfecting the schools.

In reference to this action I have heard the opinions expressed, that it was more likely to spread than check the disease, because the only healthy time these children had during the day was the five or six hours spent at school. As regards the first of these views, the result amply justifies the action, for the violence of the epidemic, especially as regards children, ceased immediately after the closing. It is well known to medical men, school teachers and others, who know much about schools, that very close intercourse takes place between little children. They are boxed up together in one room and are constantly licking each other's slates, sucking slate pencils belonging to each other, exchanging sweets, kissing, etc. These things tend to spread infectious disease very rapidly, especially diphtheria, scarlet fever and small-pox. Further, there is no doubt that children are much less liable to give or take infectious disease when playing about in the open air. They are not, while there, engaged with slates, pencils, and many other objects which make suitable media of infection. In other words the intercourse is not nearly so close. No matter how well a school room is ventilated, it cannot be so well ventilated as the open air, or be such a suitable place for the rapid dilution, and thus rendering innocuous of the virus of an infectious disease.

Quarantine and Shelters.

At the beginning of the epidemic and up to about the end of 1901, when we thought that the epidemic might be checked, an endeavour was made to quarantine families, and in the following list will be found the number received into the Shelter and the length of their stay:—

TABLE VII.—SMALL-POX.

Time in Shelter.	Number of Families.	Time in Shelter.	Number of Families.
28 days	1 family.	8 days	1 family.
16 "	4 families.	7 "	1 " "
15 "	4 " "	6 "	4 families.
14 "	10 " "	5 "	1 family.
13 "	4 " "	3 "	6 families.
12 "	1 family.	2 "	4 " "
11 "	3 families	1 "	4 " "
10 "	1 family.		
9 "	1 " "	482 days.	50 families.

Average per family 9·64 days.

The stay of some appears much longer than 14 days, and this is because fresh cases cropped up in the families while resident there. We, however, had to stop quarantine as a general measure since we found ourselves liable to be surcharged, and this measure was afterwards only adopted as a special one in certain cases. Concurrently with quarantine in 1901, compensation was given for loss of work. This, for the same reason, was given up, except in special cases recommended by the Medical Officer of Health. I think quarantine is useful for contacts if they handle textile fabrics of any sort, or food stuffs which are not sterilised by cooking after the last handling by cooking before being used. It is best to judge each case on its own merit, as cases are sure to turn up to which no general rule will apply. From October, 1901, to July 31st, 1902, the following are the expenses in connection with compensation for loss of work and in the Shelter:—

	Compensation (loss of work).	Expenses of Shelter.
1901	£73 1 8	£36 18 11
1902	16 6 0	20 7 10½
Total	£89 7 8	£57 6 9½

Judging from the previous visitations of small-pox in London there is likely to be some recrudescence of the disease in the winter and spring, in which, no doubt, Bermondsey will share; but I do not anticipate that the disease will get the upper hand. By a steady adoption of the measures which have already proved successful there need be no alarm.

