TYPHUS FEVER IN BERMONDSEY.*

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BERMONDSEY, and what were originally the neighbouring Vestries and Districts, have always been liable to outbreaks of typhus fever.

The latest occurred in 1899, in connection with houses in Minto and Western Streets, and amounted to ten cases, nine of which belonged to Bermondsey. Special reference to this and other outbreaks in London since then will be found in the Annual Reports of the Medical Officer of the London County Council for this and subsequent years.

Only one case occurred in Bermondsey since 1899, viz., in Rothsay Street, at the south-west end of the Borough, till the outbreak of which this paper is a record commenced in January, 1903. For convenience I have tabulated all the cases which occurred, with short notes of the source of infection, etc., in the last column. I shall refer to the cases by their numbers in column 1. I also append a temperature chart to illustrate my remarks on the course of the disease. For the notes on which these are based I am indebted to the Medical Superintendents of the South Eastern and Brook Hospitals, where the cases were treated.

CASE 1 occurred on January 20th, 1903, in Jamaica Road, at a fish shop, close to the neighbourhood where the majority of the cases occurred, but I was unable to discover any connection between this and the subsequent cases, since a cross-examination of the patients and their friends failed to elicit that there had been any dealings between them and the occupiers of the shop where the first case occurred. The patient was a fish porter, and may have contracted the disease at Billingsgate.

CASE 2 occurred fourteen days later, on February 4th, in Stevens Street, about a mile and a quarter from the first one. There was no traceable connection between the two. I wrote to the Medical Officer of Health for the City of London, where the lad worked, but he could suggest no source of infection. In both these cases the families were clean, in good circumstances, and not over-crowded.

CASE 3 occurred on February 22nd, after an interval of eighteen days from the last case, in Warford Place, quite close to Case 1, though the connection, if any, could not be traced. This patient before removal was seen by several doctors, one of whom was an old resident in one of the M. A. B. Hospitals. This gentleman informed me that

* Read at the meeting of the Metropolitan Branch.

the rash was scarlatiniform, and so like scarlet fever, that he made up his mind to discard the history of the late appearance of the rash, and notify it as scarlet fever. She was removed to hospital on February 28th, and died on March 8th. The diagnosis of scarlet fever was not confirmed, but typhus was suspected, though the evidence of its existence (*viz.*, "so very faint a rash that a positive diagnosis was out of the question"), as stated by the medical superintendent was very slight, and the *post-mortem* showed only pneumonia.

Cases 1 and 2 seem to have been sporadic and accidental, since beyond the fact that Case 1 occurred in the neighbourhood of Case 3, there seems no other ground for suggestion of a connection between them and the subsequent cases.

CASE 4 was a little girl of nine years; she fell ill on March 3rd, nine days after the last. Her residence was about three quarters of a mile from Cases 1 and 3, and the only thing in common between her and the last was that they attended the same school, which was situated about midway between their homes. Case 3 was at school during the early stage of her attack, for the teacher described her as "sitting shivering by the fire, and vomiting once or twice." They were not in the same class, but had opportunities of meeting out of class hours in the play-ground and class-rooms.

CASE 5 is not so clear; she fell ill five days after the last, *viz.* on March 8th. She was married, and lived in a small street just round the corner—certainly not more than fifty yards—from case 4. This latter occurred in an annexe to a beer-house, with which it communicated directly, where Case 5 frequently went for beer. Her children went to a different school from the last two cases, and situated in a different direction, but do not seem to have been personally acquainted with Case 4, though owing to the proximity of their respective houses I do not see how they could have failed to play with one another occasionally in the street, without necessarily knowing one another's names. The onset of the illness in this case was so close, in point of time, to that of Case 4, that unless a very short incubation period is assumed, it seems difficult to establish a direct connection.

CASES 6 and 7 were sisters, and CASE 8 a brother of Case 3, and arose from her by direct contagion, twenty days after her removal to hospital, proving that Case 3 was typhus.

CASE 9 was brother to the last three, and was infected directly by them after an incubation period of about a fortnight.

CASE 10 was a very well-marked typical one, but presents great difficulties as to its origin; she fell ill on March 29th, nine days after Cases 6, 7 and 8, and twenty days after Case 5. It occurred in one of the best residential houses in the Borough. Her friends were

well-to-do. The patient assisted her mother in house work, had not been visiting anywhere the previous month, and had only occasionally gone into the street, and then not in the immediate neighbourhood of the previous cases. The house is in the main road, and about a quarter of a mile from Warford Place, where Cases 3, 6, 7, and 8 occurred. Her father and brothers, however, have a wood-yard at the back of, but not communicating directly with Warford Place, and her sister, who had had influenza a couple of weeks before *she* developed typhus, and was attended by the medical man who notified the latter, did office work in this yard. I was informed that none of the inhabitants of 14, Warford Place had worked in this wood-yard during the last ten years, and that the sister who worked in the office did not come in contact with the hands except when paying them once a week through a small window.

CASE 11 occurred on March 31st. In this case children from the same house and family attended the Paradise Street school, in connection with which were cases 3, 5, 6 and 7. An illness in a young brother of this patient, which occurred between March 16th and 21st, may possibly have been the connecting link between this and the other cases which attended the school.

CASE 12 occurred on April 1st in a street in the same neighbourhood, but the only traceable connection with previous ones was that a sister and young brother attended the Paradise Street School, there being in addition a history of the young brother having been ill on or about March 6th with diarrhœa.

The remaining cases require no special comment, since they were all infected directly by the cases mentioned above. In all the seventeen cases, with the exception of 1, 2, 5, and 10, the only meeting-place common to all where they might have acquired infection was the St. Joseph's Schools, Paradise Street. Of the thirteen cases which had this school in common, eleven were scholars, and the remaining cases, 11 and 12 in the table, though they did not attend the school, had brothers or sisters who did, and in both cases there was a history of some indefinite illness among these scholars previous to the case of typhus. It is hard to ascertain the nature of the illnesses in the members of the families of 10, 11, and 12, which preceded the typhus; but in one case at least, that of S. R., æt. eight years, brother to Case 11, the illness was described as febricula, and was of sufficient duration to be compatible with an anomalous attack of typhus. He was sent to the Infirmary, and the Medical Superintendent, who had seen a good deal of typhus in Ireland, stated that he had no symptoms suggesting this complaint. It is just possible that as our knowledge of infectious disease becomes fuller, these indefinite illnesses in families

which precede the case of typhus may be classed as "latent" or "masked" typhus, in which the virus after "passage" through one or more human beings becomes more virulent, or getting into more favourable soil culminates in a typical attack of typhus fever.

That similar mild cases occur in other infectious diseases has been shown in the case of diphtheria by the late Sir Thorne Thorne in the Milroy Lectures for 1891; by Koch in his description of the suppression of endemic typhoid in a group of German villages in the district of Trier; and more recently in the case of scarlet fever by Caziot, who describes an outbreak of nineteen cases in a school which originated in the so-called "latent" or "masked" cases. The mildness of typhus in children, coupled with the not infrequent absence of or poor development of the rash, has long been known, and from one or two of the cases I saw, I can quite understand the disease being overlooked when not associated with more typical cases.

In no other way does it seem possible to account for cases appearing suddenly where there were no previous ones, unless an extraordinary vitality of the virus in houses and clothes is assumed. As regards the general surroundings of the patients, in the cases 1, 2, and 10, the people were clean, in comfortable circumstances, and not overcrowded, and in the absence of an outbreak one would not have thought of looking for typhus.

In the remaining cases, though the people were poor, they were by no means destitute. One or two families were dirty, but taken on the average they were by no means the worst in the Borough; and employing as a standard of cubic space the figures of the bye-laws for houses let in lodgings, viz., 400 c. f. for living and sleeping, and 300 for sleeping only, and half these figures for children, they were not overcrowded.

Coming to the question of diagnosis, the cases with the exception of the first three and last were examined by me prior to removal to the M. A. B. hospitals. Here the diagnosis was confirmed with the one exception mentioned (Case 3). Among the diagnostic points common to the large majority of the cases, I may mention: (1) The sudden onset; (2) The late appearance and character of the rash; (3) The sudden rise of temperature to the maximum in those cases where it could be observed; and (4) The dulling of the faculties.

1. *Sudden onset*.—Almost every patient was quite decided as to the day of onset of the disease, and some went even so far as to state the hour of the day on which it occurred; one stating that she left work for dinner and was attacked during this interval; and another that she took ill just as she was putting on her hat to go out. Murchison draws attention to this characteristic.

No.	Date of Onset of illness.	Date of Rash.	Initials of Patient.	Sex.	Age.	Address.
1	Jan. 20th 1903	Jan. 25th ...	C. D.	M.	25	211, Jamaica Road ...
2	Feb. 4th	Feb. 7th ...	S. E.	M.	16	11, Stevens Street ...
3	Feb. 22nd	Feb. 27th ...	E. M.	F.	9	14, Warford Place ...
4	March 3rd	March 8th ...	N. C.	F.	9	29, Neptune Street ...
5	March 8th	March 12th	S. L.	F.	29	7, Aylton Street ...
6	March 20th	About March 25th or 26th	M. M.	F.	2	14, Warford Place ...
7	March 20th	Do.	E. M.	F.	7	14, Warford Place ...
8	March 21st	Do.	I. M.	M.	11	14, Warford Place ...
9	April 3rd (said to be)	April 3rd ...	E. M.	F.	35	New Cottage Row Shelter
10	March 29th	April 2nd ...	E. E.	F.	33	127, Jamaica Road ...
11	March 31st	April 4th ...	W. R.	M.	23	5, Donne Place ...
12	April 1st	April 6th to 7th	R. D.	M.	18	8, Salisbury Street ...
13	April 6th	April 10th ...	J. D.	F.	15	New Cottage Row Shelter
14	April 8th	April 10th ...	M. A. D.	F.	44	New Cottage Row Shelter
15	April 10th	April 14th ...	E. M. R.	F.	5	New Cottage Row Shelter
16	April 14th	April 19th ...	W. M.	M.	6	New Cottage Row Shelter
17	April 20th (about)	April 25th ...	S. R.	M.	15	5, Donne Place ...

Removed.	Remarks.
Jan. 31st	Ill first with blood poisoning. Removed as enteric fever. Worked all day at Billingsgate Market, and had his meals at Thames Steps.
Feb. 12th	Notified as enteric. Worked at tailor's in Cheapside as messenger and porter.
Feb. 28th	Notified as scarlet fever. Died March 8th with diagnosis of pneumonia. Attended St. Joseph's Schools, Paradise Street, 3rd standard. Was last there on February 23rd. This is not far from No. 1, but there seems to have been no dealings between the families at any time.
March 12th	Attended St. Joseph's Schools, Paradise Street. 1st standard. Last there March 2nd. Took ill 8 days after February 23rd. Not in same class as No. 3.
March 14th	Lives near No. 4. Children attend Albion Street Board School and Clarence Street Church School. Unknown to No. 3. Patient a trousers finisher for a Jew, East End, but had no work for fortnight previous to illness. Died March 19th.
March 30th	Attended St. Joseph's Infants. Last there February 26th. Source of infection, No. 3.
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March 30th	Attended Dockhead School. Absent March 2nd to March 13th, and from March 20th onward. Source of infection, No. 3.
April 3rd	Source of infection, Nos. 6, 7 and 8.
April 5th	Sister, aged 29, had an illness, said to be influenza, lasting from March 15th to March 22nd. Works in father's office in James Place. No one from No. 14, Warford Place works in this business place. The patient assists her mother in house work, and has not been near any known source of infection.
April 7th	Casual labourer at the Docks, and not acquainted with the families in which any of the previous cases occurred. Two children in family and two downstairs attend St. Joseph's School. Died April 10th. S.R., brother, 8 years, attended St. Joseph's School—ill between March 16th and 21st.
April 7th	Van guard for Pink's, Staple Street. Was at work on April 1st. Sister attends St. Joseph's School. 4th standard, and T.H., on same landing, also attends that school. Visited within the fortnight previous to his taking ill, many country districts in the immediate neighbourhood of London. Brother, J.D., 8 years, attended St. Joseph's School—ill about March 6th with diarrhoea.
April 10th	Source of infection, No. 12—is sister of this patient.
April 10th	Mother of No. 12. Same source of infection.
April 10th	Sister of No. 11, by whom she was infected.
April 19th	Source of infection, Case 9.
April 29th	Source of infection, Case 11.

2. *Late appearance and character of rash.*—This generally made its appearance from the fifth to the seventh day of disease, and usually appeared as small roseolous spots on the trunk and extensor aspects of the limbs. They were not elevated at first, but occasionally became so later, and though fading at first on pressure, very soon became permanent and often petechial.

As this roseolous rash became marked, it was nearly always accompanied by subcuticular mottling, giving a brownish sun-burnt appearance to the skin. In addition to the petechiæ which appeared as the result of the gradual change in the roseolous spots, there were frequently other petechiæ present, which appeared early and independently of the roseolous rash, and were very often indistinguishable from flea-bites. These latter are said to be easily recognized by the puncture in the centre and the light-red areola around, but this criterion applies only to the early stage, since when old they lose these characters and resemble closely the petechiæ of small-pox or typhus. The latter can, however, generally be distinguished by their want of uniformity in size if a sufficient number are closely examined, when a certain percentage will often be found larger and somewhat deeper seated than flea-bites. Other considerations which go to show that in many cases we had not to do with flea-bites but petechiæ, are that they were seen on many of the patients whose habits and surroundings were perfectly clean, and also that in one family where three children were lying ill together in one bed, the two elder were covered with petechiæ, whereas the baby had less than half-a-dozen altogether. Had flea-bites been so numerous as the appearance of the elder members suggested, I think it highly improbable that a baby with a tender skin should be immune.

I have gone into this symptom somewhat fully, since the medical practitioners and myself found it a very practical difficulty, and a feature of diagnosis on which opinion differed very much.

The amount and visibility of the rash differed greatly in different cases. In one case, No. 6, the child above mentioned, the rash seemed to be absent except for those half-dozen petechiæ. She was in the same bed as her elder brother and sister, who had typical attacks of typhus, and was in the same stage as they were. The child looked ill, had a temperature of 102°, furred tongue, etc., and but for the surrounding circumstances I don't doubt that the case would have been undiagnosed, and put down to some complaint of childhood. I never realised before how easy it is for this disease to be kept going among young children, in the same manner as happened in the outbreak in Nazareth House recorded in the Public Health Text-books.

3. *The sudden rise of temperature to the maximum.*—In those cases

where they were under observation from the first, such as contacts, the temperature rose very rapidly within forty-eight hours to 102° , 104° , or higher. In this respect they differed markedly from enteric.

4. *The dulling of the faculties.*—This is always looked upon as a very important symptom, but in one case at least it appeared to be absent throughout the disease; she was mother of patients 3, 6, 7 and 8, and was otherwise typical. In a majority of the cases it was very marked, and was accompanied by deafness. Suffusion of the conjunctivæ was common, but some did not show this.

Having seen several cases of typhus in Belfast and Dublin, I had no hesitation in arriving at a diagnosis in the majority of the cases, though as a whole they did not seem so severe or typical as the cases one sees in Ireland. This is however probably to be explained by the

be inferred that it was gradual and prolonged, like that of enteric. It was usually short as stated above, and began about the 14th and 15th day. The chart on previous page shows the temperature in such a case. In the cases in which it was prolonged beyond this, it was due to complications. That the cases were infectious admits of no doubt, but the disease was exceedingly capricious in the victims it selected for attack. Several cases occurred within two or three weeks from the removal of a previous case in the family; but the danger of infection does not appear to have been very great to casual visitors, or even to many of those whose contact with the patient was very close. It was rare for the nurse in attendance upon the patient previous to removal to be attacked. Of the two families which suffered most, in one the father and in the other the mother escaped, though both were in very close attendance. No doubt had the disease gained a firmer footing at first, and occurred at the beginning of winter instead of towards the end, the virulence of the poison would have become exalted, especially if the usual predisposing conditions of over-crowding and poverty existed in the neighbourhood attacked.

PREVENTION.

The usual methods were adopted to stamp out the outbreak, viz., isolation in hospital, disinfection, and keeping contacts under observation. This latter was done in the case of three families several members of which were attacked, by keeping them in quarantine during the period of incubation in the Council's shelters. The advantage of this is shown by a reference to the table, which shows that four cases occurred in these dwellings. Under ordinary circumstances the last case would have occurred here also, but the existence of this contact was unknown until he became a victim of typhus.

Another preventive method which I took was the closing of St. Joseph's Schools, Paradise Street. This was done on April 20th, for a period of fourteen days, which brought it up to the Easter Holidays. The reasons given to the Council for this action were as follow:—

“1. With the exception of the first two cases in the Borough, the earliest discoverable case, viz., No. 3, occurred among children attending that school and was unrecognized, and a number of other cases are apparently connected with this.”

“2. Several of the families where adults have been attacked have had children attending this school, and in two cases at least there has been a previous history in the family of some indefinite form of illness, which may have been an unrecognized attack of typhus.”

“3. Judging from the mild form which the disease takes among children, I am inclined to think that some unrecognized case or cases

have been infecting the school, and it is therefore advisable to have it closed for a period to prevent the spread of the disease."

That this action was justified, appears from the fact that no fresh cases occurred among the children in the neighbourhood, and the outbreak very speedily came to an end. This outbreak was instructive, inasmuch as it showed how typhus may be kept up by mild, unrecognized cases among children, analogous to "masked" or latent scarlet fever; and also that the origin of the first case was as obscure and difficult to trace as when Murchison propounded his theory that it arose *de novo*.

Failing the "masked" or "latent typhus" theory, the only other feasible suggestion is that the poison is harboured for long periods in old second-hand clothes which find their way from certain endemic centres to London, and—given favourable soil—start the disease.

ARE PRIVY MIDDENS A NUISANCE.—This question was discussed recently before a bench of magistrates at Macclesfield. The defendant was a well-to-do person, but had an "honest conviction" that privy middens were better than water closets, and that no nuisance was caused by them. The magistrates upheld the contention of the Health Department of the Corporation, and made the necessary order.

IMMUNITY OF ANIMALS DURING PREGNANCY AND THE PUERPERIUM IN RESPECT TO INFECTION AND INTOXICATION.—All agree that various factors like cold, loss of blood, etc., increase the susceptibility to infection. In order to determine whether pregnancy is also such a factor, Bossi, of Genoa (*Archiv. f. Gynäkologie* 68.1) has experimented on seventy-nine rabbits and guinea-pigs, some pregnant and some non-pregnant, injecting under the skin or into the veins cultures of the bacilli coli, diphtheriæ, tuberculosis, etc., as well as streptococci and staphylococci. His conclusions from these observations, which he regards as only preliminary, are as follows:—

1. After infection with mixed cultures of streptococci and staphylococci, or streptococci and diphtheria bacilli, the number of acute infections was much greater with pregnant than with non-pregnant animals. Also the number of deaths was much greater with pregnant animals when equal amounts of the germs were injected under similar conditions.
2. The further advanced the pregnancy, the greater were the effects of the injection.
3. The temperature was higher after experimental infection in pregnant animals than in the control animals.
4. Abortion was common after experimental infection. Opposite results were obtained after experimental infection with *Bacilli diphtheriæ*: the pregnant animals possessed the greater immunity.
5. Frequently pathogenic bacteria were found in the placenta and less often in the fetal blood.
6. Diphtheria toxin had less effect on pregnant animals.
7. Puerperal animals showed no great susceptibility to experimental infection.
8. Injected micro organisms were found in the milk secretion.

The important clinical conclusion is drawn that artificial interruption of pregnancy is indicated in cases of infectious disease like tuberculosis: