of woman very much to the fore just now, and she would do more harm than good. Many years ago the repetition of visits was the cause of his town being cut up into small districts. He was quite sure that it was the wisest and best plan for one officer to do all the work of one particular district.

DR. PETGRAVE JOHNSON said that he had had reason to consider this question very carefully—of how far women were to be utilised in the public health service. He had had the chance of looking round and finding out how far it had answered in other towns. He thought that, in regard to Dr. Bostock Hill's remarks in regard to the isolation of diphtheria, Dr. Bostock Hill did not condemn hospital isolation entirely. He thought a great deal might be done by using nurses in the homes. At Stoke-on-Trent they used nurses in cases of ophthalmia, but he found they also needed an isolation hospital for really effective nursing and treatment. Dr. Snell, he said, referred to the fact that he had been going into certain figures which proved that hospital isolation was harmful, and he asked Dr. Snell if he had had in Coventry an outbreak of diphtheria (the answer was in the affirmative). Dr. Johnson proceeded to speak of his experience of an outbreak of diphtheria at Stoke-on-Trent, and strongly supported the practice of isolation, remarking, however, that the question was a very big one. He had found women school medical officers very useful for purposes such as the supervision of midwives and the Notification of Births Act, and their work in these directions was extremely valuable. One great difficulty was that of getting suitable women. It was, he said, extremely difficult to deal with unsuitable women. Dr. Bostock Hill had drawn attention to the necessity of combining many duties under the one officer; he (the speaker) was at present exercised with this difficulty. In his opinion it was possible to combine too many duties. It depended largely on the size of the staff of the medical officer of health. It seemed to him obviously necessary to have separate nurses in connection with phthisis. Speaking with regard to the qualifications of health visitors, Dr. Johnson said it was largely a matter of what the authorities paid; he, personally, had trained nurses, but there was a difficulty in getting them with all the other qualifications mentioned by Dr. Bostock Hill. He also said that at Stoke-on-Trent they had voluntary workers who did very valuable work.

At the conclusion of the discussion, DR. BOSTOCK HILL briefly replied.

NOTES ON AN OUTBREAK OF ENTERIC FEVER IN NEWCASTLE-UPON-TYNE, AUGUST-OCTOBER, 1913.*

By S. J. CLEGG, M.B., D.P.H.,
Assistant Medical Officer of Health, Newcastle-upon-Tyne.

THE outbreak about to be described, although of comparatively small dimensions, presents a few points which may be of interest and which, it is hoped, will lead to useful discussion.

Up to date there have been 31 cases, with no deaths, the type of disease having been mild on the whole. Thirteen households have been affected, with a varying incidence of 1 to 7 cases per household, in one instance the whole of one family, seven in number, being removed to hospital.

Date of Cases.—The accompanying diagram shows the distribution of the cases. The houses are of the flat type, of two stories, with two rooms and scullery downstairs, and three rooms and scullery upstairs, having a common yard and water-closet or privy, but separate water supply. They were found to be fairly clean, though some left much to be desired in that respect, and the number of cases per household bore a distinct inverse ratio to their cleanliness, the dirtier houses suffering more severely.

Water.—Each household has its own supply from the town water, direct from the mains.

Sanitary Conveniences.—Of the 13 households, 6 were on the privy and 7 on the water-closet system—22 cases occurring in the former and 9 in the latter, an average of 3·7 and 1·2 cases per household respectively. It is seen, therefore, that the cases were almost exactly three times more numerous in the privy households than in those on the water-closet system. The privies examined were very foul, in some cases being in such a condition as to render their use almost impossible, and were a source of much complaint, the inhabitants frequently making use of adjacent water-closets in preference. The water-closets are of the short hopper type, and were also found to be on the whole in an unsatisfactory state.

Flies.—Flies were very numerous in all the houses, and particularly in those having privies.

Coincident Diarrhoea.—The inspection revealed many cases of simple diarrhoea, which in some cases had preceded an attack of enteric fever.

Food and Milk.—There was no evidence that

*Read before a meeting of the Northern Branch of the Society of Medical Officers of Health, 24th October, 1913.

X—CASES OF ENTERIC FEVER.

	X				X		
	UPSTAIRS FLATS.	DOWNSTAIRS FLATS.			DOWNSTAIRS FLATS.	UPSTAIRS FLATS.	
86			84 W.C.	W.C. 85			83
82			80 W.C.	" 81			79
78			76 W.C.	" 77			75
74			72 W.C.	" 73			71
70			68 Privy.	" 69			67
66			64 "	" 65			63
62			60 "	" 61			59
58			56 "	" 57			55
54			52 "	" 53			51
50			48 "	" 49			47
46			44 "	" 45			43
42			40 "	" 41			39
38			36 "	" 37			35
34			32 "	" 33			31
30		X	28 "	" 29			27
26		X X	24 "	" 25	X X		23
22	X X X X X X X		20 "	" 21			19
18		X	16 "	" 17			15
14		X X X X X	12 "	" 13			11
10	X X X	X X X	8 "	" 9	X	X X	7
6			4 W.C.	" 5			3
			2 W.C.				1 W.C.
66		X	64 W.C.	62A	X	X	60A W.C.

Scotswood Road.

either food or milk was directly responsible for the outbreak.

Age Incidence.—42 per cent. of the cases were under 10 years of age, and 61 per cent. under 15 years. The actual numbers were as follows:—Under 5 years, 8; 5-10 years, 5; 10-15 years, 6; 15-25 years, 5; 25-35 years, 4; over 35 years, 3.

Schools.—Although 8 scholars of one school were affected, of which 4 were the first cases in the households, the strict localisation of the cases did not indicate that the school was a primary or even secondary focus of infection.

Rainfall and Temperature.—The four weeks previous to the probable first case had been dry and warm on the whole, the average weekly rainfall being 0.03 in., the temperature varying from a daily average mean of 55 degrees to 59 degrees.

Whatever effect such conditions may have had upon the life history of the bacillus typhosus, they were undoubtedly largely responsible for the prevalence of flies not only in the affected district, but elsewhere.

Vermin.—Although fleas were numerous, vermin were not observed nor complained of in any of the houses.

The preventive measures taken may be briefly referred to:—

Action Taken.—The four notifications from two households received between August 19th and 26th made the existence of a common focus of infection probable, which was confirmed by two subsequent ones on August 30th and by those following. A house-to-house enquiry, therefore, was made by the assistant medical officer of health and special inspector, during which every house on the affected sides of the two streets was visited, all contacts seen, and cases of illness of any kind investigated and blood tests made where necessary, this resulting in the detection of several further cases. It is of interest to note that in six instances, all in children under 10 years of age, there was not only no sign of illness at the time the examination was made, but no history of any illness in previous years which might have been enteric fever, yet they all showed a positive Widal reaction in their blood, indicating that, though they might not have suffered from an actual attack, they had become infected at some time with the specific organism, and under the circumstances had still to be regarded as possible sources of infection. All cases were removed to the City Hospital for Infectious Diseases, Walkergate.

The medical men practising in the neighbourhood were informed of the existence of the outbreak, and were able to render the department valuable aid in checking its spread. By arrangement with the City Engineer the privies, which were previously cleared out once a week, were now cleared twice weekly, and disinfectant powder used. The cells were also hot lime-washed, and the seats and floors thoroughly and frequently scrubbed out with disinfectant solution prepared under the supervision of the inspector.

The Health Department "Diarrhoea" leaflets were freely distributed, special emphasis being laid on the necessity for the boiling of milk, and of protecting food from flies.

The possibility of the outbreak having originated from an infected water or food supply was eliminated by bacteriological examination of various samples taken.

In view of the excessive incidence on children, special note was taken of ice cream, ginger beer and herb beer known to be freely consumed in the neighbourhood, the premises where these were made being inspected, and the persons employed in their manufacture examined. Bacteriological and blood examinations made proved to be negative.

Acting in conjunction with the principal School Medical Officer, all children from houses in the infected area were excluded from school for a period of three weeks, and the school chiefly affected was inspected and recommendations made for certain sanitary improvements.

The actual origin of the outbreak has not yet been traced. Of two possible first cases one dated her illness from July 23rd, the signs being of such an indefinite kind that it was at first considered to be a case of scarlet fever, and was notified as such five days later. The other, a girl of 7, suffered from a protracted illness, extending from the middle of July until the end of August, during which time the blood was tested for agglutination against the typhoid bacillus on three separate occasions, all proving to be negative. She was admitted to the Royal Victoria Infirmary with a provisional diagnosis of generalised tuberculosis; post-mortem examination showed lesions typical of enteric fever, including a perforation, but no typhoid bacilli could be isolated from the spleen, mesenteric glands, or the bowel contents; on the other hand, a bacillus was isolated from these situations which was thought to be the paratyphoid B bacillus, but

which is still under investigation. On or about August 6th the younger brother of this case began with identical symptoms, and a Widal done on September 1st gave a positive reaction with the typhoid bacillus, while a similar agglutination test carried out later against the paratyphoid bacilli A and B proved negative. Of the remaining cases, four gave partial reactions against B paratyphosus B, but the relation between these results and a possible coincident paratyphoid infection is not yet clear. The serum of each of the 31 cases agglutinated bacillus typhosus, whilst 8 agglutinated an organism of the paratyphoid group, isolated from water samples taken in the infected area, the identity of which has not yet been settled. The position from the bacteriological point of view is therefore seen to be somewhat intricate, and investigations are still being carried out in the hope of elucidating the problem.

From the character of the outbreak and from the results of the bacteriological examinations, it is considered unlikely that either infected food or water was the cause.

Several points with reference to the manner in which the disease was spread are of interest.

Distribution of the Cases.—The plan shows that the outbreak was localised to the lower halves of the adjacent sides of the two streets. One of the outstanding features of the social life of this district is the free and frequent intercommunication existing between various households, the conditions in this respect being practically those of one large family, and a history of contact with a previous case was obtained without exception, such contact having extended, as a rule, over a considerable period. The only case occurring outside the area was a cousin of one of the early cases, and had assisted in the nursing on several occasions.

Influence of Privies.—The fact previously noted, that the incidence on privy households was three times as great as on those on the water-carriage system, indicates the part these played in the spread of the disease, and is in accordance with the figures for the whole of 1912, when the same proportion was found. They were generally in a very foul and unsanitary condition, the seats and floors being soiled with faecal matter and urine, while in some cases the yards also showed evidence of similar contamination, which was doubtless carried into the houses on the boots and clothing of any person entering, whence its

transference to the food would be merely a matter of time.

The great number of flies in the affected area, and especially in those houses on the privy system, is in accord with the general experience of the influence of privies on fly prevalence, and it is very probable that the spread of the disease was in some measure due to food infection by them; the conditions for such spread were certainly present in the infective material near the houses, the large numbers of flies and the total absence of any precautions to prevent their access to food. The occurrence of the outbreak practically coincidently with the maximum prevalence of flies also points to the same conclusion.

Age Incidence.—61 per cent. of the cases were under 15 years of age, and 42 per cent. under 10 years, showing an excessive incidence on children according to the usually accepted statement that the maximal incidence of enteric fever is on the ages from 15-30.

TABLE I.

COMPARATIVE TABLE OF AGE INCIDENCE OF ENTERIC FEVER IN OUTBREAK IN BENWELL, AUGUST TO OCTOBER, 1913, AND FIVE YEARS, 1908-1912.

Percentage incidence at different age periods in:	AGE PERIODS.				
	0-5	5-15	15-25	25-45	45 upwards
Five years 1908-1912 ..	8 %	26.6 %	23 %	31.6 %	10.6 %
	34.4 %				
Benwell Outbreak, 1913	26 %	35.4 %	16.1 %	22.6 %	—
	61.4 %				

This is explained by the fact that the usual playground of the children is either the yard in close proximity to the privy or the pavement outside, both of which situations are liable to frequent contamination with infective material. In one instance as many as nine children were found seated on the ground in a picturesque group round the privy door.

The frequency of enteric in children is probably under-estimated, as the symptoms in them are often so mild as to lead to no suspicion of the true nature of the disease—the more general use of the Widal reaction as an aid to diagnosis should lead to their detection and tend to diminish the number of “missed” cases. This is fully borne out in the outbreak under consideration, only 4 of the 19 cases under 15 years showing definite clinical signs, whilst 6 had no symptoms at all.

Although the actual origin of the outbreak has not been discovered, the chief factors influencing its spread were undoubtedly the free intercommunication between the infected houses, the existence of privies, and the prevalence of flies. The type of house and the character of the tenant make the first almost inevitable, but the privy system is remediable, and cannot be too strongly condemned.

It will be noted that no reference has been made to the possibility of a "carrier" originating the outbreak, nor to the question of examining urine and stools before discharge from hospital.

With regard to the former, no investigation was made. As in every case contact could be proved with practically every person in the area, any adequate investigation would have necessitated the examination of the stools of at least thirty to forty persons, the expense of which would have been considerable. It was considered, therefore, that, as the infection was evidently not food-borne, and that all contacts and suspicious cases were being kept under close observation, this expenditure was not justified.

The examination of urine and stools for the presence of bacillus typhosus before discharge from hospital has not yet been instituted. At present each case is kept in until in good general condition, the average length of stay being about seven to eight weeks for the ordinary case. There is no evidence that any of these cases has been the cause of infecting others, though when one considers that about 3 per cent. of enteric fever patients continue to excrete typhoid bacilli in stools or urine for a variable period, possibly years, after recovery, one must conclude that any one of these discharged patients is a potential carrier and a source of danger to the community, and that measures ought to be taken to prevent this. That they are not being taken is entirely due to financial considerations, which it is hoped will ultimately be overcome.

The points I would like to bring forward for discussion are the following:—

A. *The Chronic Carrier*.—It is believed that about 3 per cent. of all persons suffering from an attack of enteric fever continue to harbour the bacillus typhosus, and to excrete it intermittently for varying periods, often for years, and many instances are on record where an outbreak of enteric fever has been definitely shown to be due to one of these cases. Probably the outbreak under discussion was of

this origin. Bearing in mind the difficulties associated with the detection of the typhoid bacillus in stools and the fact that they are only intermittently present, would the routine investigation of an infected district for carriers repay the trouble and expense involved?

Assuming that a chronic carrier has been discovered, what is to be done with him? Has he to be isolated, and, if so, for how long could this be carried out? Detention in an isolation hospital would be even more difficult to enforce than is the case in phthisis, the danger of which is so much before the public eye, and where, in addition, the infected and infective person is really ill; such detention might have to be prolonged indefinitely in the present state of knowledge, owing to the inefficiency of the methods directed to the elimination of the bacilli.

B. *Prophylactic Immunisation*.—The value of anti-typhoid inoculation is now well established, and as a prophylactic measure is coming into more or less general use in large communities. From the general course and circumstances of the present cases it is very probable that had it been possible to institute inoculation of all contacts as soon as it was recognised that one had to deal with an outbreak of some seriousness the total number of cases would have been lessened. An attempt in this direction was made, but unfortunately the word "vaccination" was used to convey the idea that similar protection against enteric fever would be afforded as against smallpox; but as soon as this was mentioned one met with an unconditional refusal to have anything at all to do with it, and no amount of explanation would convince the people that it would not affect their working powers.

It is intended, however, to make another attempt with the sporadic cases continually occurring on the following lines:—

1. The prompt isolation in hospital of the first case.

2. Searching out of all persons, members of the family especially, who have been in contact with the affected person, and keeping these under observation, both by impressing upon them the necessity for their own safety of immediately seeking medical advice on the appearance of any malaise, and by periodical visits from the Health Department inspectors.

3. The prophylactic inoculation of all contacts as soon as possible, and, in the remote event of such inoculation leading to any loss of work, recompense for such loss, if agreed

to by the Sanitary Committee, as is their practice under similar circumstances during outbreaks of smallpox.

4. The popularising generally of prophylactic inoculation, especially amongst the inhabitants of an infected district. The administrative difficulties would be many, but would not be insuperable, and it is hoped that action on the above lines will prove an effective measure towards the elimination of enteric fever from the city.

C. *The Influence of Privies on the Disease.*—The figures of this outbreak and of the city generally in past years show that the incidence of enteric fever is approximately three times as great on houses on the privy system as on those on the water-closet system, and it is the experience of many places that a reduction in the number of privies has coincided with a reduction in the enteric fever rate. It is to these three points, therefore, that one would suggest that discussion be directed, viz.:—

1. The importance of the chronic carrier.
2. The value of prophylactic inoculation.
3. The influence of the dry closet system.

I am indebted to Dr. H. Kerr, medical officer of health, Newcastle-upon-Tyne, for permission to publish the above details.

DISCUSSION.

THE PRESIDENT thanked Dr. Clegg for his interesting paper. He thought it might be well to ascertain if there were any drain openings in the back lane of the streets affected. He referred to a paper by the medical officer of health for Barnes which appeared some time ago in *PUBLIC HEALTH*, and which drew attention to the ill-effects produced by drain air. It was rather the fashion nowadays to decry these effects. With respect to privies, he considered the "box" type more objectionable than the "cell." A point worthy of investigation was that of age incidence. Was the number of cases in children a sign of a weak or of a flourishing epidemic? He had observed that the age periods of sufferers from enteric fever varied from time to time. Sometimes the disease occurred chiefly in adults and at others mostly among children. He would like to know if anyone had investigated this point. It occurred to him that some useful results might follow an enquiry where it was found that older people were not contracting enteric fever while children were.

DR. RENNEY referred to a small epidemic of 19 cases which occurred in Sunderland. In contradistinction to Dr. Clegg's cases, every house had a water-closet. Most of the cases were children. In his cases also the children played together in

the street, and there was a stable midden in close proximity. He was interested to hear that diarrhoea had preceded the enteric fever, because in Sunderland when they had much enteric fever they also had a good deal of diarrhoea. Probably many of the latter cases were really enteric fever. He also found it difficult to ascertain the actual origin of an outbreak of the disease.

In Sunderland they used to get about 100 cases per year. At that time the conveniences were nearly all privy middens. After they got certain districts cleared of privies, enteric fever ceased there.

He did not think their water supply was responsible for enteric fever. For some years the water has been bacteriologically examined regularly. The bacillus coli were nearly always found. It was suggested that the wells should be examined, and on this being done bacillus coli were found by each of two bacteriologists. He understood that it was quite possible for organisms from privy refuse deposited on the land to filter through fissures in the limestone to the wells.

DR. McDONALD said that there was a source of fallacy in the figures as to age incidence, in that the number of susceptible children in the area was not taken into account. He quoted a case of the disease in a patient aged 71. He referred to the effects of inoculation, and said that these were sometimes very considerable, and caused much constitutional disturbance.

DR. DICKINSON thought that the fact that the children had played together in the yards was the real factor in the age incidence. In the Maidstone epidemic, which was a water-borne epidemic, the age of the majority of the persons affected was from 15 to 25. In the outbreak under discussion, the six cases which had not been ill might possibly be carriers who had never had a true attack of enteric fever. It had been proved in India that persons attending cases of the disease had become carriers and remained so for a considerable time. With regard to inoculation as a prophylactic measure, he had been vaccinated twice. The first time there was considerable pain at the site of inoculation, with rise of temperature. On the second occasion he had only slight pain, and slight constitutional symptoms. He had seen thousands who had been vaccinated during the South African War, and thought that inoculation was of considerable value as a preventive measure, and should certainly be practised.

DR. JOHN TAYLOR said that in his district they had some such outbreak as this yearly. He would like to know how long the typhoid bacillus retained its vitality and power to infect. In his district the disease occurred year after year, scattered over one particular area of considerable

extent. The question which arose in his mind was—Were the privies and ashpits a source of infection? Was it possible for the bacillus to remain dormant in a privy (which was difficult to clean properly, some dust or refuse always remaining adhering to the sides) during the colder months, and to spring into renewed activity during the warmer seasons of the year? He was led to ask this because he usually found enteric fever disappear about December and reappear about September or October. Or was it a carrier who caused it? Was it likely that a carrier could be responsible for the disease over this particular area, extending over five or six miles? Why was the infection not carried to other parts of the district? The area in which the cases usually occurred was supplied by water from the limestone rock, which water was also supplied to Sunderland. The population of the area was about 10,000. The population of the rest of his district was about 57,000, and yet they had hardly any enteric fever amongst the latter, who were supplied with water from a different source. Both populations had pail closets and privies, but, generally speaking, the condition of the conveniences of the larger population was much worse than that of the smaller. In some cases the privy refuse was put on the land, and in others tipped. He had no cause to think there was any relation between the enteric fever and the tip.

DR. A. SMITH said that during the last ten years he had had little enteric fever in his district. He remembered several cases occurring some years ago in a certain court, and for several years afterwards they had a recurrence in the same locality, always about August. There was a large open ashpit in the centre of the court. After the ashpit was abolished, the disease disappeared entirely. Before the Widal test was introduced they had always some diffidence in diagnosing enteric fever in young children, unless they were really ill. Unquestionably at that time they met with a good number of doubtful cases of illness in children which the Widal reaction would have proved to be enteric fever. The disease was rarely found in very old people, but it did sometimes occur. He remembered a case in a person aged 70.

DR. HEMBROUGH hoped that later Dr. Clegg would be able to give them the origin of the outbreak. He would like to have some explanation of the incidence of the disease among children in this epidemic, and also what was meant by the statement that six of the children had no symptoms at all.

DR. MOSTYN pointed out, in reference to the remarks of Drs. Taylor and Renney as to the Sunderland and South Shields water supply, that the chemical analysis of that water, when he was at South Shields, varied considerably from time

to time. Owing to the peculiar pumping arrangements, which he illustrated by a diagram, it was possible for an infected water to be supplied to one part of the area only, and it was conceivable that this was the cause of enteric fever in Dr. Taylor's district.

PROFESSOR HUTCHENS said that in any case of possible enteric fever one of three organisms might be found—the bacillus typhosus, the paratyphoid bacillus A, and the paratyphoid bacillus B. The paratyphoid bacillus A was common in India, but was not found in Britain. The diagnosis of paratyphoid fever could only be made by isolation of the paratyphoid bacillus from blood or stools. In the examination of blood from a case in the same district as Dr. Clegg's cases he had carried the dilution to 1 in 5,000, and it reacted more strongly than in the 1 in 500 dilution. The French idea that house infection was the principal cause of enteric fever had been proved correct. After a patient recovers from the disease he remains infected for some time. If after three months from the time of recovery he still harbours the bacillus typhosus, he is then regarded as a chronic carrier. The majority of carriers are women, and apparently in the summer months they excrete bacilli and so infect the food, which is usually prepared by them. That seems to be the generally accepted fact with regard to localised outbreaks. With respect to the Sunderland water it was quite conceivable that refuse tipped near the reservoir might be responsible for infection through the water, but he knew of no evidence that water as pumped from the soil was infected with the bacillus typhosus. With reference to Dr. Taylor's question as to carriers, he thought that perhaps one or two carriers in the infected area might never move out of it.

A carrier might possibly infect a water-closet.

He thought that dust might be neglected as a source of infection.

The education of the general public in health matters was proceeding rapidly, and that might account in some measure for the diminution in the number of cases.

DR. CLEGG, replying to the discussion, said he had no information about drain openings in the back lane, but he did not think they were of much importance. It was difficult to form a conclusion as to whether the epidemic was a weak or a flourishing one from the age incidence. He thought that as cases in children were often mild and likely to be missed, they might be largely responsible for the spread of infection, in the same way as were mild and missed cases of scarlet fever. In the present outbreak diarrhoea was precedent to the enteric fever in only two of the cases. He considered that diarrhoea in enteric fever was in great measure a matter of diet, and was not a necessary symptom.

Not only may carriers show no symptoms, but they often gave a negative Widal reaction, which made diagnosis difficult. It was probable that the incidence of the disease in children in this area was over-estimated, as the place was swarming with them. In some of the instances in which "Widals" were done, the specimens were collected from several members of different families who were all congregated in one house.

He would like some expression of opinion as to the treatment and isolation of carriers, and as to the practicability of the establishment of a prophylactic Vaccine Therapy Dispensary.

DR. TAYLOR suggested that the discussion might be resumed at the meeting preceding the annual dinner, which would be held on December 17th, at 5.30 p.m. The result of the practical work might then be available.

ADJOURNED DISCUSSION.

DR. CLEGG, in re-opening the adjourned discussion, on 17th December, said that the actual cause of the outbreak had not been discovered, but it was probably a carrier who had become actively excretory, and the infection was most likely chiefly spread by personal contact. Since the date of the outbreak eighteen further cases had occurred in the locality. All these were relatives of, or acquainted with, the previous sufferers. Six of the more recent cases occurred in a place called Delaval Terrace, where two years ago there was an extensive outbreak. Of these six patients, three lived in houses in which there were persons who had enteric fever two years ago. Two cases occurred in houses also infected two years ago, although the original occupants had left. The houses in Delaval Terrace were previously on the privy system, but after the outbreak water-closets were substituted. One of the sufferers in Delaval Terrace two years ago removed to a new address, where a case had occurred during the last three weeks. A family from Aline Street (one of the streets concerned in the outbreak under discussion) removed to Boathouse Cottages, where several cases have recently occurred. He emphasised the probability of personal contact playing an important part in the spread of the disease in this district.

There were a few points he would suggest for discussion. Would investigations for carriers repay the trouble and expense involved, and when a chronic carrier had been found, what is to be done with him or her? There were also the questions of the length of time a carrier could be isolated, compensation for prolonged detention and treatment for elimination of bacilli. Enteric fever might be dealt with in the same way as smallpox, removing the first case to hospital immediately, searching out contacts, and keeping them under observation, inoculating them as a

preventive measure, and impressing on them the necessity for reporting the slightest symptom of illness. The value of prophylactic inoculation had been proved. Contacts might be treated in this way if they could be found early enough, and so help to prevent future cases. Public opinion might eventually be educated sufficiently to recognise the utility of such measures.

DR. JOHN TAYLOR thought that if a carrier was responsible for the enteric fever which regularly occurred each autumn in one particular area of his district, they would get more than they actually did in other parts of the district, especially considering the migratory habits of the inhabitants, who are chiefly miners. He could not reconcile himself to the idea that the chief factor in the regular recurrence of the disease was the chronic carrier, and he would like some explanation why carriers decreased with the decline of the privy system.

PROFESSOR HUTCHENS said that there could be no doubt as to the value of inoculation as a preventive measure. It was admitted that it had been of use in the South African War. Under later and improved methods it was still more valuable. In India, the incidence of enteric fever among the inoculated was much lower than in the uninoculated, and the disease was much less likely to prove fatal in the former. It was probable also that the incidence among the inoculated was less than the figures showed, for the reason that a certain number of those inoculated for true enteric fever with the bacillus typhosus contracted paratyphoid fever, which, however, would be returned as ordinary enteric in an inoculated person. In England it appeared that it would be the shorter and easier way in the end to get hold of the carriers. Enteric fever was chiefly prevalent among the wage-earning classes, and it was more difficult to persuade these people to be inoculated than well-educated persons. The cost of inoculation was quite small in comparison with the value obtained. Compared with what they were spending on tuberculosis, the cost of examining for enteric fever carriers was trivial. Some of the money now being poured out in the rather forlorn hope of eradicating tuberculosis might with more advantage and profit be diverted to similar ends in respect of enteric fever.

The typhoid bacillus was only excreted by a carrier at intervals. He considered that future administrative policy should be directed to the detection and supervision of the chronic carrier, and that protective inoculation, although its value was undoubted, should be secondary, and would prove to be more difficult of application. He thought it was clearly established that pathogenic organisms were strictly parasitic in man and the lower animals, and he did not attach importance to such organisms outside of the body.

DR. HISLOP said that in his hospital experience he had found little enteric fever among nurses who had been inoculated with typhoid serum. He had known enteric fever occur year after year in the same row of houses, generally in a relative of the person previously attacked. There was little doubt that a carrier was the originator of these outbreaks. There were numerous privies in the row. It is possible that infection sometimes may have been carried by flies, but the relationship of the persons attacked pointed rather to some communication between them. He referred to an outbreak affecting some 200 people in which the milk supply was suspected. Inquiry at the farm led to the discovery of a case of enteric fever there, but the date of onset excluded this case as the origin of the outbreak. No healthy person at the farm gave a Widal reaction, but further tests of stools and urine revealed the fact that one of the female milkers was a carrier. This woman had had enteric fever twenty years before. It was subsequently found that she was responsible for other outbreaks. Although she must have prepared food for her family, none of the latter had had enteric fever.

In North Shields they had hardly any enteric fever in the lower part of the town, where the conveniences were principally pails, etc.

PROFESSOR HUTCHENS said that the other members of the family of the milker may have been immune, or rendered so by repeated small doses of bacilli.

DR. EUSTACE HILL remarked on the difficulty of detecting carriers, and referred to the incidence of infection on the sexes. He said that the proportion of cases in males to females in Durham was 2 to 1. If the female was the person most likely to be the active agent, one would infer that the greater number of cases would be in the members of the household at home. He would like to discuss with Professor Hutchens the question of the vitality of certain organisms outside the body. This year, which was warm and dry, there was in Durham a fair amount of infantile diarrhoea, and yet they were practically as free from enteric fever as last year, which was cold and wet. He did not think that without carriers they would not have enteric fever. In the Eccles outbreak, eight or ten years ago, the typhoid bacillus had been found months after a convenience had ceased to be used. The incidence in Durham was small in water-closet towns and most marked in privy towns, which was in accordance with the well-known experience of Nottingham and Leicester.

It was agreed that the discussion be continued at the next meeting, which will be held at the College of Medicine, at 3.30 p.m., on the fourth Friday in February (27th). Dr. Hill promised to open the discussion.

THE INSPECTION OF FOOD.

WE would ask the attention of medical officers of health to the desirableness of sanitary inspectors taking the special certificate for inspectors of meat and other foods granted after examination, by the Sanitary Inspectors' Examination Board.

The syllabus of the subjects in which candidates are examined has been carefully drafted. It embraces all that an Inspector of Foods ought to know, and the great advantage of the examination is that it is of a thoroughly practical character. The subject is in itself not only an educational one, for the holder of this certificate should have no difficulty in obtaining an appointment when knowledge of this kind is required in the administration and practice of public health work.

We know of no qualification for the practical duties of a sanitary inspector which is more essential than this certificate, and we hope that those who are interested in this important branch of public health work, will not fail to make themselves familiar with this syllabus and the desirableness of sanitary inspectors obtaining this special qualification in addition to the one they may hold as sanitary inspector.

We may mention that at the last examination held in January, Col. Lane Notter, and Mr. T. Dunlop Young, M.R.C.V.S., acted as examiners, and specimens of diseased meat, collected from the city markets and slaughter-houses with the approval of Dr. Howarth, Medical Officer of Health of the City of London, were used to test the knowledge of the candidates. Some of the specimens consisted of chilled beef, frozen beef, British beef, meat and offal affected with tuberculosis, actinomycosis, foot and mouth disease, Australian parasitic disease, distomatosis, coccidiosis, pleurisy, peritonitis, hydræmia, bone taint, moulds, etc.

Other specimens consisted of fowls affected with tuberculosis, and different varieties of fish, fresh and unsound.

A special feature was made of the necessity of recognising the different butchers' joints into which meat is cut, normal and abnormal condition of the lymphatic glands and their situation. The ability of the student to incise them without in any way destroying the appearance of the meat was also tested.

The members of the Board include Sir Arthur Whitelegge (Chairman), Dr. E. C. Seaton and Sir Shirley Murphy, representing the Local Government Board; Dr. Reginald Dudfield, representing the Society of Medical Officers of Health; Dr. W. R. Smith, representing the Royal Institute of Public Health; and Dr. A. Wellesley Harris, with Mr. J. Osborne Smith, representing the Royal Sanitary Institute.