

Dr. S.W. Wheaton's report to the Local Government Board on enteric fever among hop pickers in Staffordshire and Worcestershire in 1909.

Contributors

Wheaton, S.W.
Great Britain. Local Government Board.
London School of Hygiene and Tropical Medicine

Publication/Creation

London : Printed for His Majesty's Stationery Office, by Darling & Son, Ltd., 1910.

Persistent URL

<https://wellcomecollection.org/works/b2rfnk33>

Provider

London School of Hygiene and Tropical Medicine

License and attribution

This material has been provided by This material has been provided by London School of Hygiene & Tropical Medicine Library & Archives Service. The original may be consulted at London School of Hygiene & Tropical Medicine Library & Archives Service. where the originals may be consulted. Conditions of use: it is possible this item is protected by copyright and/or related rights. You are free to use this item in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s).



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

REPORTS
TO THE
LOCAL GOVERNMENT BOARD
ON
PUBLIC HEALTH AND MEDICAL
SUBJECTS.

(NEW SERIES No. 30.)

Dr. S. W. Wheaton's Report to the Local
Government Board on Enteric Fever
among Hop Pickers in Staffordshire and
Worcestershire in 1909.

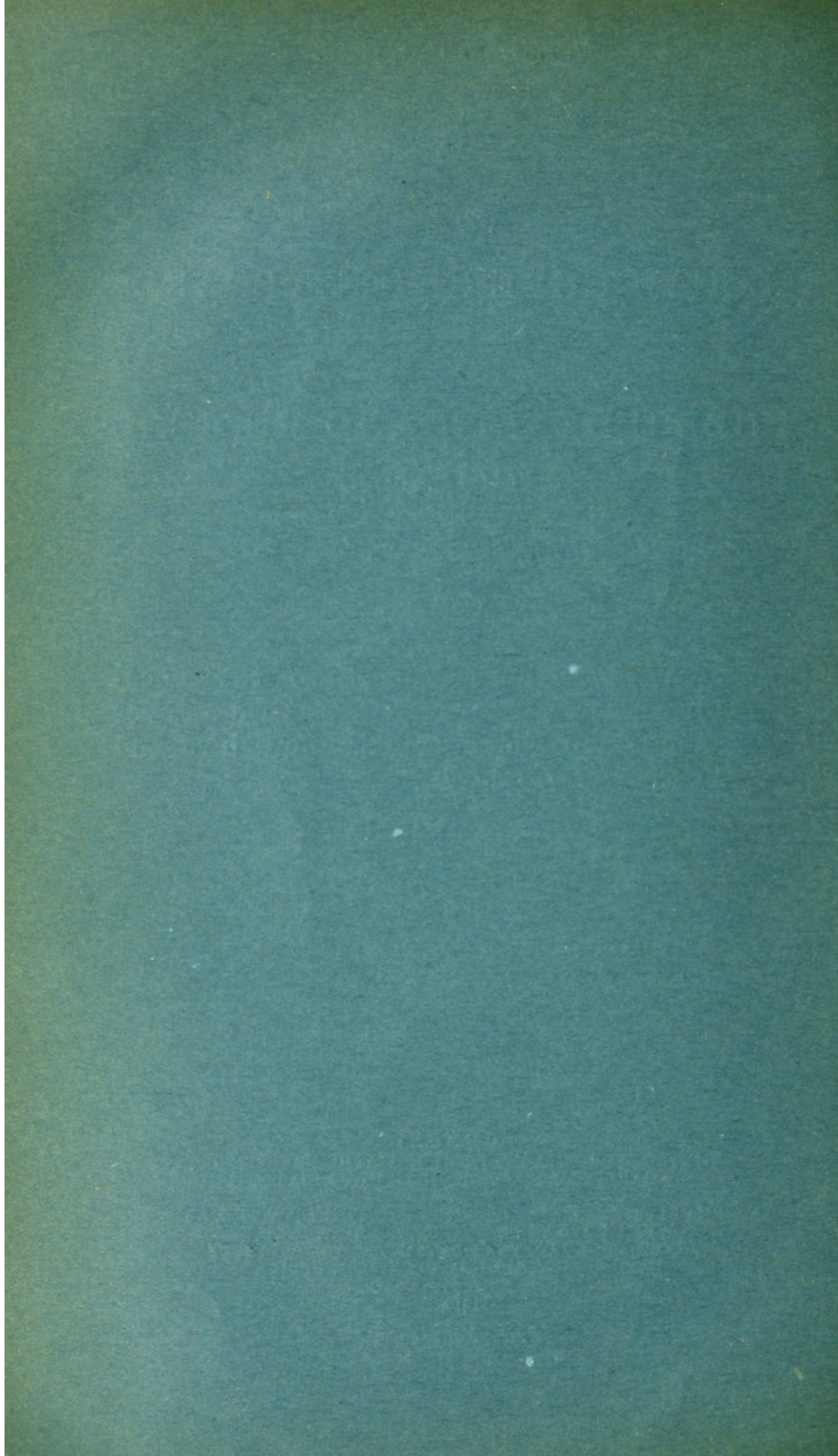


LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., FETTER LANE, E.C.; or
OLIVER AND BOYD, TWEEDDALE COURT, EDINBURGH; or
E. PONSONBY, 116, GRAFTON STREET, DUBLIN.

1910.

Price Fourpence.



219

Dr. S. W. Wheaton's Report to the Local Government Board on Enteric Fever among Hop Pickers in Staffordshire and Worcestershire in 1909.

ARTHUR NEWSHOLME,
Medical Officer,
1 May, 1910.

At the end of October, 1909, the Board's attention was drawn to accounts in the Worcestershire local press of outbreaks of enteric fever among persons returning from hop-picking. These outbreaks were reported to have occurred in the County Borough of Dudley and in the Rowley Regis Urban District, and it was stated that the sufferers had returned from hop-picking at two farms near Leigh Court Railway Station, four miles from Worcester. I was instructed to make enquiries into the origin and other circumstances of the outbreaks of this disease. On enquiry I found that cases of enteric fever among returning hop-pickers had occurred, not only in the County Borough of Dudley and the Urban District of Rowley Regis, but also in the Urban Districts of Stourbridge, Darlaston, and The Lye and Wollescote. One case only had occurred in each of the two last-named districts. These five districts form a considerable portion of what is known as "the Black Country." Rowley Regis and Darlaston are in Staffordshire, Stourbridge, and The Lye and Wollescote are in Worcestershire.

I found that in these districts nearly all the cases of enteric fever notified between October 1st and the date of my visit on November 16th had been in persons returning from hop-picking. A very large proportion of these hop-pickers were children; and, indeed, the school holidays in Dudley County Borough had been specially postponed to the month of September so as to allow children to proceed to the hop-picking. The schools were closed on September 3rd and re-opened on October 4th. All the sufferers, with one exception, had been to one or other of three farms; two of which belonged to the same proprietors, and were almost contiguous, the farmhouses being only half a mile distant from each other. These farms were the Pigeon House and

L O N D O N:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., FETTER LANE, E.C.; or
OLIVER & BOYD, TWEEDDALE COURT, EDINBURGH; or
E. PONSONBY, 116, GRAFTON STREET, DUBLIN.

1910.

Price Fourpence.

No. 30.

(15821—21.) Wt. 34296—403. 500. 5/10. D & S.

Great House farms belonging to Messrs. Leeke, at Leigh Court, and the Moor Farm, belonging to The Eardiston Farming Company, situate at Eardiston, near Newnham Bridge. All these farms are in the County of Worcester.

It will be convenient at this stage to give a short account of enteric fever prevalence in the sanitary districts specially involved from January 1st, 1909, up to the date of the completion of my inquiries at the end of November, 1909.

ENTERIC FEVER IN THE COUNTY BOROUGH OF DUDLEY, THE URBAN DISTRICTS OF ROWLEY REGIS, STOURBRIDGE, DARLASTON, AND THE LYE AND WOLLESCOTE.

The number of cases of enteric fever notified month by month in these various districts from January 1st to November 30th, 1909, was as follows:—

Month of Year, 1909.	County Borough of Dudley.	Urban District of Rowley Regis.	Urban District of Stourbridge.	Urban District of Darlaston.	Urban District of The Lye and Wollescote.
January ...	3	4	—	—	—
February ...	2	—	1	—	—
March ...	1	—	—	—	—
April ...	2	—	—	—	—
May ...	1	1	—	—	—
June ...	1	1	—	—	—
July ...	1	—	—	—	—
August ...	—	—	—	—	—
September ...	2	—	—	—	—
October ...	13	3	5	1	—
November ...	6	3	2	—	1
	32	12	8	1	1

Enteric Fever in Dudley County Borough in 1909.

There was an unusual prevalence of enteric fever in Dudley and the adjoining Urban District of Rowley Regis in the winter and spring of 1909. Three cases occurred in the Guest Hospital, which is a general hospital, at Dudley. The first of these was a girl who had been in hospital 26 weeks, but on December 26th, 1908, was notified as suffering from enteric fever. This girl came from the Rowley Regis Urban District, and it is suggested that, as enteric fever was at this time present in that district, some infected food was brought to her by visitors coming to the hospital. On January 11th, 1909, another girl was notified as suffering from the disease at the hospital; she was believed to have been infected by the previous case. On September 9th a third case of enteric fever was notified in the person of a man admitted to hospital from the Rowley Regis Urban District suffering from another disease. At the date of notification he had been in the Guest Hospital two weeks. No further cases have occurred in the hospital. In addition eleven other cases were notified in the borough, two in January, two in February,

one in March, two in April, one in May, June, and July respectively, and one on September 15th. Six of these were children. The case in September was a servant returning to the town, having fallen ill whilst in her situation near Birmingham, and no connection can be traced between her and previous or subsequent cases. The sanitary officials of Dudley could not find any explanation of the origin of these attacks of enteric fever, which were single cases in households scattered up and down the borough. All except two were admitted to hospital. No fresh notifications were received until October 18th, so that there was an interval of at least a month without any notification. After this, fresh notifications followed rapidly. Thirteen were notified in October and six in November, making nineteen in all. Fourteen of these were children, from nine to sixteen years of age, four were adult women, and one an adult man. Of these nineteen cases all but one had returned home from hop-picking on October 2nd, 4th, or 6th. The exception was a woman living at a public-house in Dudley, who was attacked on October 29th, and was not removed to hospital. Of the eighteen cases which had returned from hop-picking, eleven had been at Moor Farm, six at the Pigeon House Farm, and one at a farm in the vicinity of Moor Farm, known as Stonehouse. In 15 of these 18 cases the date of onset of the illness was ascertained with a fair amount of certainty, and proved to have occurred within fourteen days of their return home. In the other three cases the date of onset was more doubtful, but in two appeared to have been a little over three weeks after their return home, while in the case of the child coming from Stonehouse, it was probably still later. Of these three later cases one was the child of a woman who had been attacked three days after returning home, so that it is possible the child was secondarily infected from the mother. It was also possible that secondary infection explained the second of these cases, and the illness of the child which had been at Stonehouse might also be explained in the same way, since there was a clear history of diarrhoea and suspicious, but unnotified, illness in the mother and also in a sister at a much earlier date. There was, therefore, a very strong probability, amounting to certainty in the larger number of instances, that the infection had been contracted by these persons before their return home from the hop-yards. The source of the infection will be dealt with later. It is noteworthy that, with the three possible exceptions just noted, there was no clear indication of multiple attacks or of secondary cases in the infected households at Dudley, but there was suspicion that mild cases had occurred which had escaped notification. However this may be, the very slight extension of the disease in the invaded households is remarkable, inasmuch as the sufferers belonged almost entirely to the lowest class of the casual labouring population, and the conditions under which they were living as regards overcrowding and unwholesome surroundings were such as would facilitate the spread of the fever to a marked degree. This fortunate absence of spread is possibly to be attributed to the activity of the sanitary officials in promptly removing the sufferers to hospital, in disinfecting the dwellings, and

in keeping under observation the persons who had been in contact with the sufferers so as to detect the appearance of any suspicious illness among them. All the eighteen cases with one exception were removed to hospital.

Enteric Fever in Rowley Regis Urban District in 1909.

The early history of enteric fever prevalence in this district in 1909 is similar to that at Dudley. In December, 1908, nine attacks occurred in three families in Dudley Road; in January, three additional cases occurred in two families in this road, and one in Mott Street; in May one case was notified, and on June 28th one case, both in fresh families in Dudley Road.

As at Dudley, the sanitary officials could not find any definite explanation of the origin of the fever. All the patients were removed to hospital. From June 28th to October 15th no notifications of enteric fever were received. In this respect the history of the fever is also similar to that of Dudley. Between October 15th and November 8th, however, there were six notifications of enteric fever, and all were in persons who had returned from hop-picking. The dates of return were October 1st, 5th, and 6th. One patient was attacked six days before returning home; and two, three days; another 13 days; and two, 19 days after return. The two latter may have been secondary cases, since they were children whose sister was attacked three days after return, and they may have contracted the infection from her after leaving the farm. At any rate, it is evident that the original infection was contracted away from home. Of these six persons, three had been hop-picking at the Eardiston Farming Company's Moor Farm, where, however, they lived, not at the farm but in wooden huts "Dumbleton Barracks," about half-a-mile distant. They mixed with the pickers from the Moor Farm, and on occasion, as I am informed, visited it. Of the remaining three, one had been at Pigeon House Farm, the other two at Great House Farm. These are neighbouring farms before referred to, belonging to Messrs. Leeke. There was no extension of the disease in Rowley Regis apart from the two, possibly secondary cases, noted above. All the sufferers were removed to hospital promptly on receipt of the notifications.

Enteric Fever in Stourbridge Urban District in 1909.

Only one case of enteric fever occurred in this district previous to October 26th; this was notified on February 20th, and was of unexplained origin.

In October, however, five cases were notified, while a further case was notified on November 4th and another on November 8th. Very scanty information could be obtained of two of these cases. They were children who had been wandering about with their mother for a long time, and no definite information as to the onset of their illness or the date of their leaving or returning home could be obtained. It was known that they had been hop-picking at a farm near Hereford, but they do not appear to have stopped there long. The remaining five cases were all

persons returned from hop-picking. They all returned home on October 4th; three of them were taken ill on this day, the remaining two, ten days and a fortnight, respectively, after returning. There was, therefore, little doubt that infection was contracted away from home. All had been hop-picking at the Moor Farm, Eardiston. All were promptly removed to hospital, and no further extension of the disease occurred. Two of the patients died.

Darlaston, and The Lye and Wollescote Urban Districts.

These districts each afforded one case of enteric fever in returning hop-pickers. The districts had been otherwise free from enteric fever during 1909. At Darlaston a fatal case occurred in the person of a schoolgirl, who was attacked 13 days after returning from Moor Farm. At The Lye the sufferer was a schoolboy, who returned from the Pigeon House (Messrs. Leeke's farm) during the second week in October, and was taken ill, as nearly as could be ascertained, about November 9th. There was no extension of the disease from these cases, which were promptly removed to hospital.

CIRCUMSTANCES ASSOCIATED WITH THE OCCURRENCE OF ENTERIC FEVER AMONG HOP-PICKERS; AND ITS CAUSATION.

From the foregoing account it will be gathered that of all the cases of fever notified in these five districts between October 15th and November 23rd, 34 in number, 33 were in persons who had returned from hop-picking. Of these 33 sufferers from enteric fever, 17 had come from Moor Farm, three from the Dumbleton barracks, near this farm, 10 from Messrs. Leeke's farms, viz., eight from Pigeon House Farm, and two from the Great House Farm, one from Stonehouse, a farm situate between the Moor Farm and the railway station, and two from a farm near Hereford.

(a.) *Moor Farm.*—This is situate in the Tenbury Rural District, and belongs to the Eardiston Farming Company. This company employs about 1,000 pickers. In addition to the Moor Farm with the neighbouring Dumbleton barracks they have two smaller farms, at each of which over 150 pickers are engaged in the hop-picking season, and there are nearly 200 "home" or local pickers. No buildings, such as stables, pigstyes, and cowsheds, which under ordinary circumstances are occupied by domestic animals, are used by pickers employed by this company. The Manager, Mr. George Ballard, is Chairman of the Tenbury Rural District Council, and takes a great interest in hop-pickers. In 1906 the Moor Farm was visited by Dr. Farrar, who reported favourably upon the Dumbleton barracks, which are wooden buildings provided for pickers at some distance from the farm buildings.* At the Moor Farm the hop-pickers were chiefly from Dudley, Stourbridge, The Lye, and Cradley. Altogether,

* Dr. Reginald Farrar's Report to the Local Government Board on the Lodging and Accommodation of Hop-pickers and Pickers of Fruit and Vegetables, 1907. (No. 252).

there were over 400 people at the farm, excluding children under one year of age, of whom no record is kept although there would seem to have been a considerable number. At the Dumbleton barracks the people chiefly came from Cradley Heath, and were, exclusive of children under one year of age, about 240 in number. At the Moor Farm an old brick building was occupied by the pickers, who came from Dudley and Stourbridge; this building has a separate set of privies and a well pertaining to it. On questioning patients and their friends, and with the help of Mr. Ballard, I was able to ascertain that all the sufferers, with one exception, had occupied this building. There are, in addition, three sets of wooden barracks of recent construction, situate some distance, about 100 yards, from the brick buildings, provided with a separate well and with three sets of privies. These were occupied by people coming from The Lye, Cradley, and Cradley Heath, Bilston, and Darlaston. With one exception, none of the persons suffering from enteric fever had been accommodated in these barracks, although, probably, at least three-quarters of the total number of pickers were sleeping in them. This exception was the child from Darlaston; and I found that these Darlaston people occupied that barrack which was nearest to the brick building. There was, therefore, strong reason to regard residence in the old brick building as being concerned in some way with the incidence of enteric fever on the hop-pickers. This building is, under ordinary circumstances, used as a storehouse, and is divided up by partitions into stalls or cubicles. Externally, at one corner, are the privies, three in number; and situate 19 yards from the privies, and at the same level, is the well which furnished the water supply. All the surface water and sub-soil drainage from a large orchard tends to flow towards the privies and the well. The ground around the privies was boggy at the time when I examined them. At the time of my visit I noticed at the foot of some wooden steps, which give access from the yard to the loft forming the upper storey of the building, a heap of lime mixed with excrement and filth about 10 yards distant from the well. In this loft 85 people had been accommodated. I was told that the occupants of the cubicles in this loft were almost wholly women and children, that owing to the only access being by the wooden steps it was necessary to provide chamber utensils in the loft for use after dark, and the heap was partly composed of their contents, which it was impossible to prevent the people from bringing to the door of the loft and throwing over the rail to the ground below. It was obvious that there was here a possible source of pollution of the water of the well, particularly since, as some of the pickers stated, the yard was at times a quagmire. I heard also of complaints by the pickers as to the quality of the water from this well. In wet weather this filth would be washed over the yard, and might easily be washed down the side of the pump into the well. The privies also were a possible source of pollution of the well, since they were merely holes in the ground and were filled with excrement at the time of my visit. I accordingly suggested that the well should be examined. This was carried out by the medical

officer of health, Mr. A. E. White, of Wellington, Salop, and the inspector of nuisances, and the water was also subjected to chemical analysis.

On December 4th, 1909, Mr. White wrote to me to the effect that there was undoubted evidence of percolation from the surface along the sides of the barrel of the pump, that the sides of the well were of loose bricks only laid against the soil, but "there was no sign of leakage into the well from the soil above the water line." He also sent me a copy of the chemical analysis of the water, from which it was evident that it was much polluted. It contained of nitrates, 1.6 grains per gallon; of chlorides, 8.4 grains per gallon; and of total solids, 95 grains per gallon. It therefore seemed extremely probable that the limitation of the disease to persons occupying the old brick building was due to the pollution of the water of this well by the discharges from a case of the disease having been the cause of the outbreak. This pollution must have occurred not earlier than the latter part of September, otherwise cases of fever would have developed to such a stage at the farm that they could not well have escaped detection. For the same reason, it did not appear probable that the principal cause of the outbreak was infection by close personal contact, since this would have been more likely to have occurred early than late in September. It seemed much more probable that on one or more occasions the heavy rains, which fell towards the end of the hop-picking season, which is confined to the month of September, were the means of washing infective material from the surface into the well. I could not ascertain that any of the persons, who had been among the occupants of the building, were convalescents from enteric fever, but the difficulty of obtaining reliable information on this point was very great. When I came to make enquiries I found there had been a number of cases of sickness about the middle of September. References were also made to persons who had come down when ill simply to see their friends who were hop-picking, perhaps, from the Friday to the Monday only; but I could obtain no satisfactory particulars of any of these. Considering, however, the history given above of the prevalence of enteric fever in the early part of the year at Dudley, and the fact that the incidence of enteric fever contracted at the Moor Farm was chiefly upon people coming from Dudley Borough, it is probable that the earlier prevalence was the cause of the later outbreak, through the medium of some infectious convalescent from Dudley, whose discharges had been washed into the well and polluted the water. At the same time, it is possible that the spread might have occurred from personal contagion through the medium of some enteric fever convalescent, who did not become a source of active dissemination of the disease until towards the end of the hop-picking period.

In the "Black Country" the custom is for persons who have suffered from illness during the year to go away hop-picking in the autumn, with the idea that the change of air will set them up for the winter. Thus, undoubtedly, many cases of phthisis, and other forms of tuberculosis, and convalescents from many of the

infectious fevers are among the hop-pickers. In my report upon enteric fever in Quarry Bank Urban District, which is in the "Black Country," in 1895, I referred to the fact that, from my personal observations, I found that persons who were convalescent, or not completely convalescent, from enteric fever had gone from the district hop-picking.*

There had been no enteric fever in the Tenbury Rural District, so far as is known, during 1909, nor could I find on inquiry any history of illness, having any resemblance to enteric fever, in the district during that year.

With respect to the three cases occurring among children stopping at the Dumbleton barracks, it is quite possible that they may have drunk the water of the implicated well at the Moor Farm, since there was constant intercourse between the people stopping at Moor Farm and Dumbleton barracks, both at these places and in the hop yards. The case before referred to coming from a farm called Stonehouse, situate nearer the railway station, may possibly have had its origin in the same source, although it is more probable that this child was infected by antecedent cases in its own family.

(b.) *Messrs. Leeke's Farms.*—These, Great House and Pigeon House, are less than half-a-mile apart, and are in the Martley Rural District. Altogether, Messrs. Leeke employ about 1,000 pickers, of whom over 300 are from Birmingham. They are chiefly women and children. Men are discouraged from coming, and no portion of their railway fare is paid. The Great House is much the larger, and has been visited by Dr. Farrar, who has reported upon its unsatisfactory provision for the pickers. At both farms all the stables, cowsheds, pigstyes, and other buildings are cleared out, the animals turned into the fields, and their places taken by the hop-pickers. Since Dr. Farrar's visit, some improvements have been made. A cooking place has been provided at the Great House, but it is not yet roofed in. At the Pigeon House some barracks of wood and canvas have been erected in a field, a new well sunk to supply their occupants with water, and two privies provided in connection with them. The barracks were occupied almost entirely by the people from Birmingham; their water supply would appear to be at present free from pollution, and, so far as is known, no fever has occurred among these people. The buildings at Great House Farm are of the usual, old-fashioned type, situate round a central yard, where all the manure of the cattle and drainage from the buildings collect. Water supply at Great House is provided from a well situate in a cowshed, from which it is pumped and conveyed along the floor in a pipe to discharge into a small stone trough in the fold yard. The cowshed is occupied in the season by pickers, who may be said to be lying on the top of the well. The floor of the shed is made of cobble stones and bricks, so that it is very probable that liquid manure from the cows soaks into the ground directly over the well. There is another pump and well at the farmhouse, but the pickers are prevented from using it as much as possible, since the water is required for household and dairy purposes. This well is 15 yards from a pit privy,

* Dr. S. W. Wheaton's Report to the Local Government Board on an Outbreak of Enteric Fever in the Quarry Bank Urban District, 1895.

which was said to be disused, but at the time of my visit the door was unfastened and the pit filled with liquid filth. At a distance of 16 yards from the well was a large uncovered ashpit. The privy accommodation for the pickers consisted of two wooden structures placed over holes in the ground, and could not have been sufficient for the number of pickers at the farm.

The cowshed, which had been occupied by hop-pickers, was very dirty at the time of my visit. It had not been cleansed or limewashed since the pickers left it, and was now again occupied by the cows, who were milked in it. There are cows kept at both farms, 20 at one and 12 at the other, the milk of which is sent to Malvern. At the Pigeon House Farm there is little accommodation for pickers; apart from the barracks for Birmingham people, only a stable, cowhouse, and other out-buildings are available, and only about 150 people were accommodated in the farm buildings. The water supply is derived from two wells fitted with pumps. The one nearest to the buildings which were occupied by pickers is at the farmhouse, the other is situate at the bottom of an orchard, and about 50 yards from a large pond, formed by the accumulated land drainage of the farm. This pond was being enlarged at the time of my visit. The last-named well has been recently constructed and is 18 feet deep, lined with loose bricks, sunk in marl and shaly rock, resembling in these particulars other wells in the district. There were two privies situate at some distance from the farm buildings in a field, and in a situation such that it was very improbable that the water of the wells could have been contaminated by them. Since these two farms were dairy farms, supplying Malvern with milk, I suggested that the water of the four wells should be subjected to analysis.

Analyses were accordingly made by Mr. C. C. Duncan, the Worcester County Analyst. The water of the newly made well in the orchard at the Pigeon House was much the best, and its composition was typical of waters derived from the red marl on which the hop-yards of Worcestershire are situated. There were, calculated as grains per gallon, 37.1 grains of total solids, 3.1 grains of chlorine, calculated as common salt, no free ammonia, .001 grain of albuminoid ammonia, and a trace only of nitrates. The water of the farmhouse well which was nearest to the buildings occupied by pickers who suffered from the fever, however, gave a bad result on analysis. There were present in grains per gallon 67.2 total solids, 19.6 of chlorine, no free ammonia, .001 of albuminoid ammonia, 1.1 of nitrates, showing contamination by decomposed organic matter. The well in the cowshed at the Great House Farm gave per gallon 57.4 grains of total solids, 7.7 grains of chlorine, no free ammonia, .003 grain of albuminoid ammonia, .5 grain of nitrates, pointing to slight pollution by organic matter which was not completely decomposed. The farmhouse well here gave per gallon 49.7 grains of total solids, 7.3 grains of chlorine, .0004 grain of free ammonia, .001 grain of albuminoid ammonia, and no nitrates, pointing to a possible slight pollution by recent organic matter. These analyses show that the water of these wells with the exception of that in the orchard at the Pigeon House was not absolutely free from contamination. In view of this fact and of the un-

satisfactory surroundings of these wells it is possible that the fever may have been due to a temporary pollution of the water by the discharges of some specifically infected person. If this occurred it must have been towards the end of September, in order to explain the date of onset of illness of the affected persons, and, as has been suggested in the case of the Moor Farm, it would probably be brought about by the heavy rainfall which occurred at this time. In the case of the well in the cowshed, the water in the trough may have become polluted by persons dipping infected utensils in it, by washing clothes in it, and in many other possible ways. In the case of the farmhouse well at the Pigeon House, which was the most unsatisfactory of the wells, as shown by the results of chemical analysis, it is noteworthy that of the eight people attacked at this farm six came from Dudley Borough and slept in a brick building which was much nearer to the well in question than to the orchard well. There would appear to have been altogether between 30 and 40 people from Dudley sleeping in this building. The water of this well may have become specifically polluted by the rainfall washing excreta from the surface down the side of the barrel of the pump, or by persons washing infected clothing or utensils under the pump, so that infective matter might pass into the well. At the same time it seemed somewhat unlikely that if the water became polluted by infective material eight persons only, so far as is known, out of 30 or 40 in the nearest building, or a total of about 150 at the farm, should be attacked; but I was informed that the pickers were prohibited, as far as possible, from using the water from this well, so that only a limited number, and those mostly living nearest to it, may have partaken of the water. Inquiry showed that there had been cases of illness among the pickers at this farm, and in particular, that a woman sleeping in the building with the Dudley people was, on September 24th or thereabouts, attacked with illness, the chief symptom of which was diarrhoea. This woman was removed to Martley Workhouse on September 26th and remained there some weeks, but Dr. Dykes, the medical officer to the workhouse, informed me that the woman was suffering from inanition and debility from exposure and presented no signs of enteric fever. It is noteworthy that among the six cases in Dudley people was a girl who was notified as suffering from enteric fever at Dudley on February 8th, 1909, was admitted in the fever hospital there, and regarded as an ordinary case of enteric fever. This girl was again notified as suffering from enteric fever on October 24th, having returned home from the farm on September 7th and being attacked with illness on October 14th. Unfortunately no notes or even temperature records were kept at the Dudley Fever Hospital up to the date of my visit, so that I have no definite information as to the clinical features and cause of the illnesses from which this girl suffered. The blood of this girl was examined on December 10th, 1909, by Mr. J. C. G. Ledingham, of the Lister Institute of Preventive Medicine, and the Widal reaction was obtained. Examination of the faeces and urine failed to show the presence of the typhoid bacillus.

It is possible that she may have been still infectious after the first attack, if this was a genuine attack of enteric fever, and that she either may have been the means of infecting the water of the farmhouse well or may have spread the disease by personal contagion in the stable which she occupied together with other Dudley people.

I was able to trace only two cases of enteric fever among persons who had been at the neighbouring Great House Farm. These were in Rowley Regis Urban District, and the mode in which they contracted the infection is doubtful. Although as before described the water supply was very unsatisfactory, the presumption is that infection occurred from the same source as at the Pigeon House Farm, or from personal contact with the people at this farm or in the hop-yards. No enteric fever has been notified in the Martley Rural District during the year, and no illness resembling this fever is known to have occurred except among the pickers at these farms.

MEASURES TAKEN BY THE DUDLEY BOROUGH COUNCIL AND THE
URBAN DISTRICT COUNCILS OF ROWLEY REGIS AND STOUR-
BRIDGE FOR PREVENTING THE SPREAD OF ENTERIC FEVER.

All the patients were, with one exception in Dudley Borough, removed to hospital, in most cases promptly. Disinfection of the invaded premises, of the infected clothing and bedding, the removal of the contents of privies, and the flushing of drains, were carried out, together with supervision of contacts. The authorities concerned recognised the danger of the spread of infection among the crowded homes of the labouring classes in which the cases occurred, and to the prompt measures taken may well be attributed the almost complete absence of spread of the infection in the homes invaded, the circumstances of which were eminently conducive to the further propagation of the disease. Neither the Dudley Borough Council nor the Rowley Regis Urban District Council has provided hospital accommodation for persons suffering from infectious diseases other than small-pox. In both districts buildings erected for small-pox cases had to be used. These were built many years ago, had been paid for out of current rates, and the plans had not been approved by the Board.

The Dudley Hospital is a one-storey brick cottage with three rooms used as wards, a kitchen, a wash-house, bathroom, and water closet, all under the same roof. At the time of my visit the three rooms were occupied by fourteen patients suffering from enteric fever. The amount of air space and floor space per bed was only about one-quarter of that required by the Board for hospitals of this description. One trained nurse and her husband, who had been an hospital orderly, with two untrained assistants, were in charge of the patients. There is an ambulance and a Thresh's steam disinfecter.

At Rowley Regis the sufferers were treated in an old wooden building situate at Tividale. It has a very dilapidated appearance externally, but the inside is in a fair state of repair. There are three intercommunicating wards, a caretaker's room, a kitchen, and a small surgery, all under the same roof. One

ward contains six beds, which were all occupied by patients, another contains two beds, while the third has six beds; the last-mentioned ward was occupied by the nurse. The cubic air space, the floor space, and the means of ventilation are not sufficient to comply with the Board's requirements, but are not deficient to so great an extent as in the case of the Dudley Hospital. There is no water closet or bathroom. Fæcal matter is buried on the site, liquid refuse passes without purification to a ditch draining into a small watercourse, which is accessible to the public, and the water of which might be drunk by cattle pastured in the adjoining field.

The Stourbridge patients were treated in the hospital belonging to the Stourbridge and Halesowen Joint Hospital Committee. This is a modern hospital built by a loan sanctioned by the Board, and complies with their requirements.

MEASURES TAKEN BY THE TENBURY AND MARTLEY RURAL DISTRICT COUNCILS.

After the occurrence of enteric fever among persons coming from the Moor Farm was reported, the farm was visited by the medical officer of health and the inspector of nuisances of the Tenbury Rural District. All buildings which had been occupied by persons known to have been affected by the fever were cleansed and disinfected.

At the Great House and Pigeon House Farms, however, in the Martley Rural District, like measures of cleansing and disinfection were not carried out. In both districts the inspectors of nuisances had visited all buildings before they were occupied by pickers, and had seen that they were properly cleansed and limewashed and provided with bedding in accordance with the byelaws.

The account which has been given of the occurrences of enteric fever dealt with in this report, affords an illustration of the utility of early isolation of the sick from the healthy in the control of this disease, and of the disastrous results which may ensue in the absence of such isolation from the presence of a person capable of disseminating the infection of enteric fever in an aggregation of people under unwholesome conditions. There can be little doubt that the fever prior to the hop-picking season had been kept in check, or had been practically suppressed, in the Dudley and Rowley Regis districts, by the application of measures of isolation and disinfection, acting in concert with a safe source of public water supply and with use of water closets. When these checks were removed, and the people were brought into closer contact with each other, were using water supplies liable to pollution and provided with defective methods of excrement disposal, the fever broke out again. It is fortunate that the outbreak occurred towards the end of the picking season, otherwise the results would no doubt have been much more serious. As it was the disease was conveyed to other districts, especially Stourbridge Urban District; but when it again came under sanitary control there was practically no further spread.

The Councils of the Rural Districts of Martley and Tenbury have byelaws for securing the Decent Lodging and Accommoda-

tion of Persons engaged in Hop-picking or in the Picking of Fruit and Vegetables; but byelaws of this sort, however desirable in the interests of the hop-pickers, would not prevent such occurrences; although by securing the provision of increased cubic space per person, efficient ventilation, and general improvement in the accommodation of the pickers, they might be expected to limit, in some degree, the extension of infectious disease. Further safeguard against such outbreaks would be attained if pickers had to obtain a card from the sanitary authorities of the district in which they live certifying that the picker had not recently suffered from any infectious illness, and that the household was free from infectious disease. At the same time, there would be great advantage in prohibiting the employment of tramps and gipsies.

With reference to the employment of children, and the special facilities given by the education authorities for this purpose in postponing the school vacation so as to allow the children to go to the hop yards; it may be advantageous to the proprietors of the hop yards that they should be able to obtain child labour, which is stated to be very efficient for the purpose, but, in existing circumstances, the children suffer from the unwholesome conditions in which they have to live. The nurses at the hospitals informed me that all the patients returning from hop-pickings were extremely dirty, verminous, and covered with bites of fleas and other insects.

The actual number of cases arising from the outbreaks will never be known. Messrs. Leeke, I am told, employ a large number of tramps and gipsies, and no doubt many patients incubating fever would travel considerable distances from the foci of infection and find their way into workhouses and common lodging-houses. The risk of spread of enteric fever to the travelling public is also considerable, owing to the sufferers returning home by public conveyances when taken ill. Special railway carriages are set apart for hop-pickers during the season, and are subjected to disinfection before being returned to the general passenger traffic; but I ascertained that several of the sufferers returned home, before the expiration of the picking season, by the ordinary passenger trains, and used trams and other public vehicles before they reached home. The risks to the public in connection with the simultaneous or subsequent use of the same premises for accommodating hop-pickers and for dairy farming can hardly be exaggerated. It is very desirable that systematic visits of inspection should be made to the buildings or tents occupied by hop-pickers, with a view to securing wholesome conditions whilst they are in occupation, and that some method of medical visitation, for the purpose of detecting cases of infectious disease at their onset, should be adopted.

For assistance in pursuing my inquiries I am indebted to the county medical officers of Worcestershire and Staffordshire, to a very large number of medical officers of health of sanitary authorities in those two counties, especially those of Dudley, Rowley Regis, and Stourbridge, and to the inspectors of nuisances of Dudley Borough and of the Martley and Tenbury Rural Districts.

S. W. WHEATON.

