

Dr. J.R. Hutchinson's report to the Local Government Board on an outbreak of enteric fever in the borough of Colne (Lancashire), 1913.

Contributors

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

(NEW SERIES No. 84.)

Dr. J. R. Hutchinson's Report to the Local
Government Board on an Outbreak of
Enteric Fever in the Borough of Colne
(Lancashire), 1913.

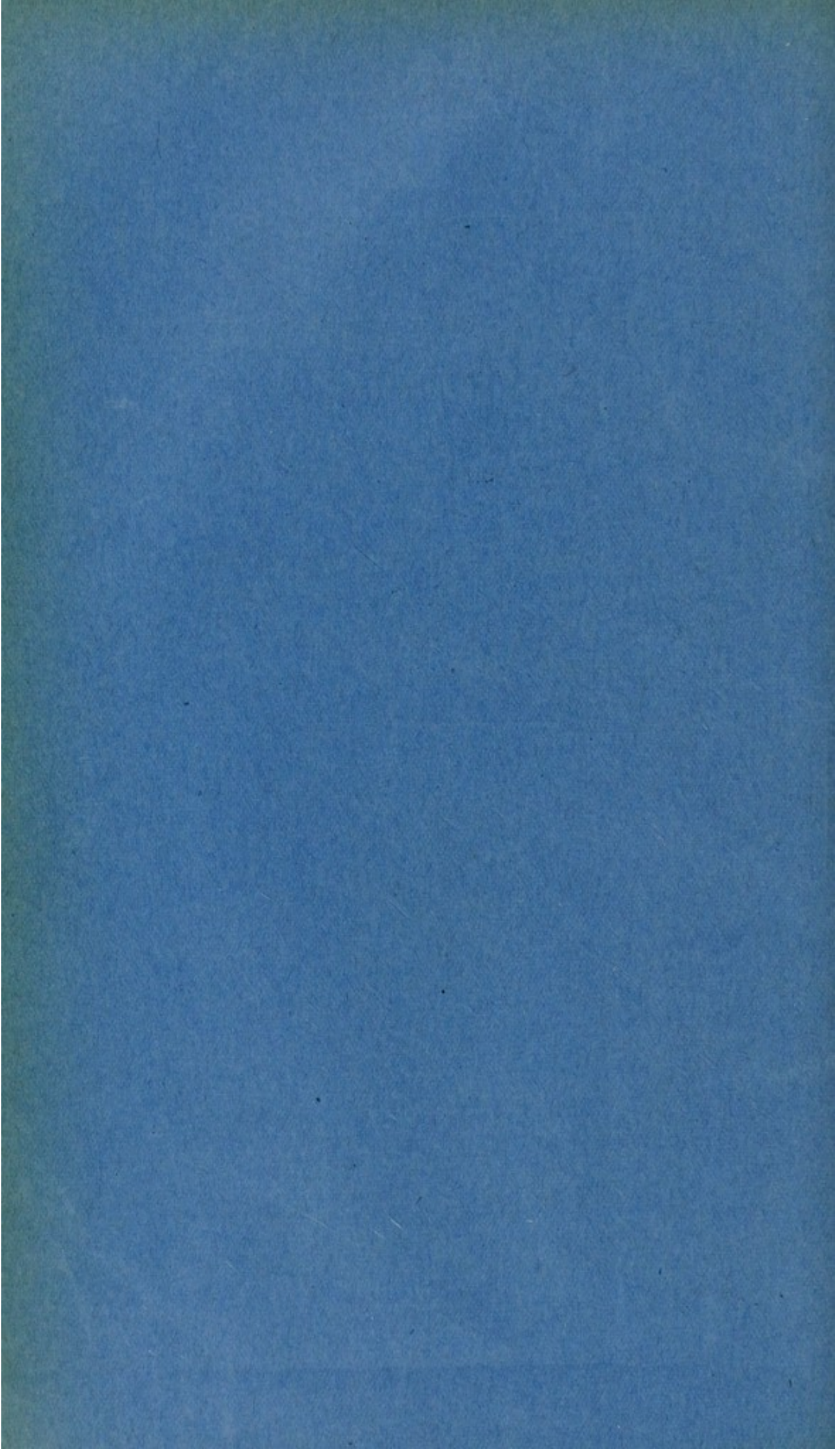


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Dr. J. R. Hutchinson's Report to the Local Government Board on an Outbreak of Enteric Fever in the Borough of Colne (Lancashire), 1913.

ARTHUR NEWSHOLME,
Medical Officer,
16th August, 1913.

On January 13th, 1913, a communication was received from the Medical Officer of the Borough of Colne (Dr. Doyle), acting in accordance with Article XIX., 15, of the Board's General Order of December, 1910, intimating that enteric fever had become prevalent in the town, and that up to the time of writing 22 cases had been notified. Dr. Doyle further stated that a milk supply was probably responsible for the outbreak, but it was not at all clear that all the cases were due to infected milk. The Board thought that further information was desirable, and I was instructed to visit Colne, which I did on January 17th, and subsequently.

Colne, with a population of 26,000, is the most easterly situated of a group of East Lancashire cotton manufacturing towns which stretches from Burnley to the Yorkshire border. The town itself occupies a ridge at an altitude of about 500 feet + O.D., and from this there are steep descents into valleys on either side. To the east extend the Yorkshire moorlands rising to a height of 800-1,000 feet + O.D. Traversing the town is the main road from Keighley and the manufacturing towns of the West Riding of Yorkshire to those of East Lancashire.

The history of the outbreak of enteric fever and the measures taken to combat it prior to my first visit were shortly as follows:— On January 3rd a case of enteric fever was notified, and this was followed on the 7th by the notification of four others at different addresses. On the 8th the two brothers of the first case were notified, as was an eighth case. Widal's reaction was positive in the three cases in which the test was made. Routine investigation showed that all the cases had a common milk supply from a dealer C. The medical officer of health immediately visited C. and ascertained that he obtained all his milk, except that produced by one cow which he kept himself, from two farms, A and B, and that he daily distributed in the town about 50 gallons of milk from these two sources. Dr. Doyle satisfied himself that there had been no suspicious illness on C.'s own premises, and then, in company with the medical officer of health of the district in which farm B is situate—farm A is in the borough

No. 84.

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—visited farms A and B. At B all possible assistance was given, and both medical men were satisfied that no illness at all comparable to enteric fever had occurred recently or remotely on this farm. At A, however, suspicion fell on the illness of a girl, M, aged 8, who, in the middle of December, 1912, had been under treatment by a medical man for "influenza and rheumatism in the neck." In addition to this girl two other members of the family, E. (aged 22) and El. (aged 17), complained of feeling unwell, whilst the baby Al., aged 4 months, was said to be suffering from "bronchitis." The whole of the milk produced at A was sent to the dealer C. These circumstances appeared to Dr. Doyle to be so suspicious that he undertook, on behalf of the town council, to buy and destroy all the milk produced at the farm as from that date, January 8th. It was then too late in the day to stop the evening's delivery; this was the last distribution made. Before leaving the farm Dr. Doyle obtained a specimen of M.'s blood for Widal's reaction, and this was returned as positive. On January 9th the blood reactions of E., El., and Al. were tested; all were positive.

A special meeting of the town council was summoned for the evening of January 8th, and C. was called before it to show cause why his milk supply should not be stopped in accordance with the provisions of Section 4 of the Infectious Disease (Prevention) Act, 1890. C. expressed his entire willingness to do whatever the medical officer of health thought necessary, and he at once supplied that official with a list of the addresses of his customers, amounting in all to nearly 200. On January 9th every milk-carrying vessel in C.'s possession was taken to the corporation depôt and sterilized with live steam, and every vessel from farm A was similarly treated. The supply of milk from farm A having been stopped in the way indicated above, C. was then in position to resume his round and obtain fresh supplies as best he might. Notifications continued to come in, and at the time of my first visit on January 17th, 36 had been received. A sub-committee of the health committee met daily at 10 a.m., and, acting on the advice of the medical officer of health, they decided, on January 13th, to open their smallpox hospital at the Jerusalem farm for the admission of enteric fever patients. Before opening the hospital the committee made arrangements with the adjacent Borough of Nelson by which the Nelson Town Council temporarily undertook to receive any smallpox cases which might occur in Colne into their smallpox hospital. Some time before January 17th a report appeared in the local press to the effect that the outbreak was due to infected milk, and I am informed that very little unboiled milk has been drunk in Colne since that time.

On the occasion of my first visit I found that in the year ending December 31, 1912, only five cases of enteric fever had been notified—one in each of the months of February, March, June, August and December. In only one, the February case, was Widal's reaction tested; this was positive. These cases occurred in different parts of the town, and only one of the streets infected in 1912 appeared in the list of addresses of recently noti-

fied cases supplied to me. From a house in this street a case (G. A., aged 5 years) was notified on November 16th. G. A. belonged to the vagrant class, and was only in the town with her mother for about six weeks, during which time they lodged at 27, W. Street. On December 11th this house was disinfected, and the patient and her mother disappeared immediately afterwards, and could not be traced. No information as to the history or causation of the illness could be obtained. It was said that they purchased milk from "any cart in the street," and C. declared that it was impossible for him to say whether or not he had ever supplied these people. After November 16th the next case to be notified was on January 3rd, 1913, and this constitutes the first known case in the outbreak now under consideration. The occupations of the notified cases of 1912 were in no wise connected with the production, distribution or sale of milk. In five instances during 1912, blood samples to be examined for Widal's reaction had been sent to the Public Health Department and proved negative. None of these cases, however, had been notified, and no attempts to trace them were possible owing to deficiencies in the records.

Extent and nature of the Outbreak.

The 36 cases which had been notified up to and including January 17th occurred in 25 houses; Widal's reaction had been tested in 19 cases, and positive results had been obtained in them all. An analysis of these notifications showed that all ages and both sexes were affected, the age distribution being:—

1-10 years.	11-20 years.	21-30 years.	31-40 years.	+ 40 years.
11	10	11	1	3

The cases which were subsequently notified up to February 19th made the total 74, occurring in 54 houses. If from this total be deducted the original case M. referred to above, and three cases in houses in the borough which may be classed as secondary*, there remain 70 cases, presumably with a common origin, the age distribution of which was as follows:—

1-10 years.	11-20 years.	21-30 years.	31-40 years.	+ 40 years.
20	16	22	4	8

The youngest case was a child of four months and the oldest a man of 71 years.

Of the 70 cases, 34 were males and 36 females. Six deaths occurred. Numerical classification of the 70 cases week by week,

* *I.e.* cases in invaded houses in which the illness did not begin for more than a fortnight after the first case.

according to the dates of onset of illness as given by the patients themselves, gives the following table:—

Week ending—

December 21st, 1912	2 cases
„ 28th, „	11 „
January 4th, 1913	25 „
„ 11th, „	17 „
„ 18th, „	7 „
„ 25th, „	6 „
February 1st, „	2 „
Total	70 cases

The approximate date of onset of the case M, at farm A, was December 5, 1912. One of the secondary cases was notified during the fourth week in January and the other two during the second week in February.

Reasons for attributing the Outbreak to milk supplied by dealer C.

At my first visit it did not appear that occupation was of any account; seven patients were employed in various capacities in cotton mills, but as the great majority of adults in the town are thus employed, this figure did not appear to be of much significance; six were school-children attending five different schools; other adults affected included two builders, a clerk, a window cleaner, a farmer, a van-driver, a shopkeeper, and a lady's companion. No one particular portion of the borough appeared to suffer more than any other; what was significant, however, was that with the single exception of one boy—who himself assisted in the distribution of the milk, and who certainly had many opportunities of drinking it—all the patients were in the habit of obtaining and drinking milk bought from the dealer C., who was only one of 68 milk vendors in the town. There seemed to be no doubt, therefore, that C.'s milk had been the vehicle of infection, and a brief visit to the hospital sufficed to show that there could be no question of the nature of the illness. I interviewed C., and from the information supplied by him the annexed map of his milk round has been drawn up. Each infected house is indicated by a black cross, and the relationship of the infected houses to the route taken by the milk vendor is clearly shown. C. called daily at about 200 houses, or approximately one-thirtieth of the total number of inhabited houses in the town.

Sources and method of distribution of C.'s milk.

C. and his brother are the proprietors of the milk round, and all the milk-distributing vessels are kept at C.'s house, where they are stored in the scullery. They have a contract with the tenant of farm A to supply 20 gallons of milk—practically all he produces—daily, and with the tenant of farm B for 30 gallons daily.

It was C.'s custom to meet his two farmers twice daily at the junction of three roads—shown on the map—where he received

from each of them one large "kit" of milk and handed over to each in return one large clean empty "kit." To this end he started out from his house with two large (usually one 12 and one 14 gallon) "kits," taking also one or two one-gallon cans, and a number of smaller ones; in addition, he carried a pint and a gill measure, which during the process of distribution were suspended inside the large "kits" by means of hooked handles. After having received the two full "kits" from the farmers, C. and his brother, accompanied by one or more boys, proceeded to distribute the milk, following the route indicated in red on the map. One of the two brothers remained in the milk cart, and he, by dipping the pint or gill measures into the contents of one of the "kits," measured out into the distributing cans whatever quantities were required by the customers. None of the boys ever did this work; commonly, however, a boy would be sent with a full one-gallon can, a quart can, and the gill measure to a number of houses, where he would measure out of the gallon can with the gill measure the varying quantities required by the customers. In this manner nearly the whole of the milk would be disposed of, and here it must be noted that, although the dealer always had two "kits" of milk to be disposed of by retail, and therefore measured out, he only carried one pint and one gill measure. Should it so happen that all the milk was not sold, but that some was left in the bottom of one of the "kits," it was, with the exception of a quart or so which was kept for C.'s family's use, emptied by one of the boys into a mug to be sold over the counter at a small shop kept by C.'s father, which represented the end of the round. When this had been done the small empty distributing cans were deposited, for convenience in carrying, inside the empty "kit" and taken to C.'s house, where they were scalded and washed by his wife. These operations were carried out in the scullery by pouring boiling water into the "kits" and cans. With this they were well rinsed and then dried with clean dish-cloths, after which they were inverted on a table, where they were kept until it was time for C. to go to meet his two suppliers again. No milk distributing utensils, therefore, were washed at the farms, and I ascertained that at farm A the "kits" were left in the farmer's cart until milking-time came round, so that in the case of a clean "kit" coming at night for the next morning's milk it was left in the cart all night. C. informed me that he kept no written list of his customers but relied entirely on his memory; asked if he ever supplied other dealers, he gave me the names of seven whom he "occasionally obliged when they were short." In cases of this kind the buyer has the milk put directly into his own distributing cans, and as it is paid for at once no record of the sale is made. At least three cases were traced to C.'s milk *viâ* an intermediate dealer. C. usually worked on each round with one 12 and one 14 gallon "kit," but he stated that one farmer did not necessarily get back empty in the evening the same "kit" which he had delivered up full in the morning. It sometimes happened that the farmers did not meet the dealer simultaneously, and the full "kit" first received by the dealer was placed nearer the front

of his cart than that last received, which was placed immediately behind the other, and therefore nearer the "tail" of the cart. It was C.'s invariable custom to begin serving his customers from the hindermost "kit," which may or may not on a particular day have contained milk from farm A. Moreover, the same measures were used to measure out the contents of the two "kits." C.'s round is roughly divisible into two halves—one to the east of Colne railway station, and one to the west. Generally he found that he had almost entirely disposed of the contents of the first "kit" by the time he reached the railway station, and beyond this point the customers were usually served out of the second one. Put shortly, it was impossible for the dealer to say whose milk a particular customer had on a particular day, and the customers on the whole of his round had to be regarded as having been exposed to infection. From the figures given by the dealer to the medical officer of health, it was estimated that the milk drinkers in a population of 900 persons had been thus exposed out of a population in the town of some 29,000.

Opportunities of infection of milk at Farm A.

The suspected farm A was visited, and from the information gained the history of illness here appears to be as follows. The family consists of:—

- Mr. D., aged 50, a farmer.
- Mrs. D., aged 46, his wife, six daughters.
 - E., aged 22, a weaver.
 - J., aged 17, an ex-weaver.
 - A., aged 15, a weaver.
 - M., aged 8, } schoolgirls.
 - D., aged 6, }
- Al., aged 4 months, and three sons.
- El., aged 17, a farmer.
- W., aged 12, schoolboy, who also assists on the farm.
- J. S., aged 3.

Mr. D., assisted by his sons, El. and W., does the farm work, which, as the land is practically all pasture, consists chiefly in feeding and milking 15 cows. Mrs. D. does the housework, assisted by J., who early in November ceased to work at her usual occupation of a weaver on account of "anæmia." Mrs. D. also always washed up the milking cans, but more will be said of this later. The girls, E. and A., worked at the mill, M. and D. attended school, as did W., whilst Al. and J. S. were under school age. On November 1st J. ceased to work at the mill, and as she felt unwell she consulted a herbalist, who told her she was suffering from "poorness of blood." From this time she remained at home and assisted her mother in the work of the house. In December she occasionally assisted to milk. Her illness, as described to the medical officer of health and myself, suggested erythema nodosum. At my request her blood reaction to the bacillus typhosus was tested on January 20th; it proved to be negative. The illness was not of a febrile nature and was in no way suggestive of enteric fever. There are on the ground floor of the farm house a living room, a sitting

room, a scullery, and a dairy; this latter is entirely disused, since the milk is never brought into the house, but strained from the milking cans into the "kits" either in the farm-yard or in the barn, a portion of which is set apart as a cowshed. All the milk produced is thus emptied into a "kit," which is graduated on the inside. If it is found that the "kit," when all the milk produced has been emptied into it, contains more than the farmer has contracted to supply, the surplus is taken out by dipping a jug into it, and this is used by the farmer's family. This, I was informed, is the invariable custom, so that whatever milk goes into the house is consumed there. When the quantity of milk in the "kit" has been adjusted it is put into the farmer's cart ready to drive to meet the dealer. There is no water laid on in the scullery, but hot and cold water from the town's supply is laid on to the slop sink in the living room which opens directly on to the yard. In this room meals are eaten and all the domestic operations of cooking, washing—both personal and of milk-cans and crockery—are carried out. After milking was finished the cans were brought to the house and washed by Mrs. D. with hot water from the taps after she had washed up the dirty crockery. The same water was not used, but the same dishcloths were used to dry both the crockery and the milk-cans. Mrs. D. continued to perform this work practically right up to her being removed to hospital, for reasons mentioned below, on January 14th. At week-ends she had the assistance of her daughters, E. and A., who were otherwise occupied during the week. After the milking cans were washed they were placed, mouth downwards, on a stone outside in fine weather, but in wet weather and at night they were placed in the scullery. On December 5th, by which time J. was quite well, her sister M. complained of headache and a tired feeling, and on the following day she ceased to attend school. M. usually slept with her sister A. and little brother J. S., but a few days after she became ill (?December 7th) she was so restless at night that she slept with her mother and her sister D. From December 8th to 17th she became progressively worse, but in the earlier portion of the time she sat by the fire in the living room; she was not confined to bed until towards the end of this period. Her symptoms were pain in the head and neck, thirst and diarrhœa; she had her bowels moved about "five times in twelve hours." She was nursed entirely by her mother, who still continued to do her share of the housework and the washing of the milk-cans. The urine and fœces passed during this time and afterwards were always dealt with by Mrs. D., who emptied the contents of the utensil down the midden privy which adjoins a middenstead. After emptying the vessel, she states that she took clean water outside, rinsed the vessel, and threw the water into the middenstead.

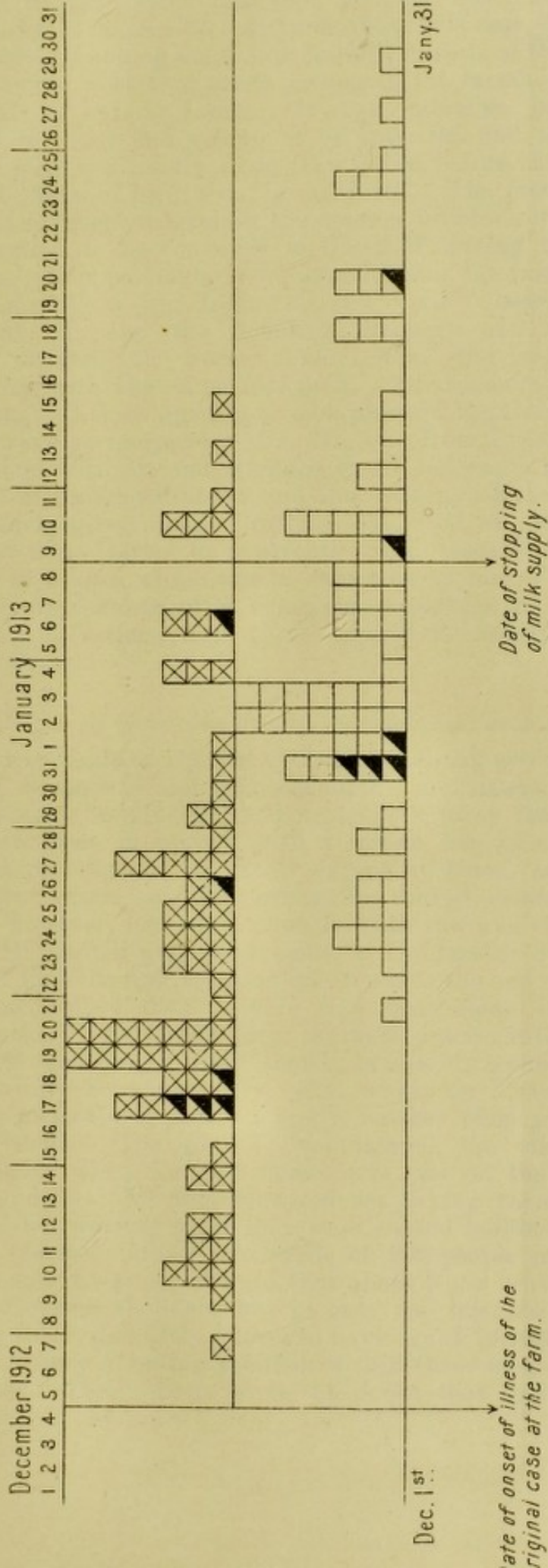
By December 17th M. was so ill that a medical man was sent for and he first attended the following day. At that time her temperature was 102.5° , and she complained of pains in her limbs and neck and of diarrhœa; a provisional diagnosis of "influenza and rheumatism in the neck" was made. She improved under treatment, and the medical man ceased to attend about December 25th. About this date she got up and lived with the rest of

the family in the living room; convalescence, however, was not rapid, as on admission to hospital on January 14th, although her temperature was subnormal, her pulse was intermittent and continued so until she had been in bed some days.

On December 31st El. commenced to be ill, as did his sister E. and the baby Al.; both El. and E., however, continued at work until January 5th. El. slept with W., and on January 7th he took to bed. On January 8th E. also took to bed, sleeping with J. and D., the latter of whom had slept with Mrs. D. and M. during the greater portion of M.'s illness. It was on this last date that Dr. Doyle visited and the last distribution of milk took place. M.'s blood—sample taken on the 8th—gave a positive Widal's reaction; on January 9th positive reactions were also obtained in the cases of E., El., and Al. About January 10th W. complained of being ill, and four days later M., E., El., Al., and Mrs. D. were removed to hospital. Mrs. D. at this time was not complaining, but she was removed in order that she might look after the baby Al., who was being breast fed. On arrival at the hospital, however, she was found to have an evening temperature of 103° , and her condition suggested an illness of about two weeks' duration. In company with the medical officer of health I visited the farm on January 17th and found the boy W. in bed with characteristic symptoms of enteric fever. He was removed to hospital next day. On January 20th D. began to complain, and she in turn was removed on February 1st.

Review of the Outbreak.

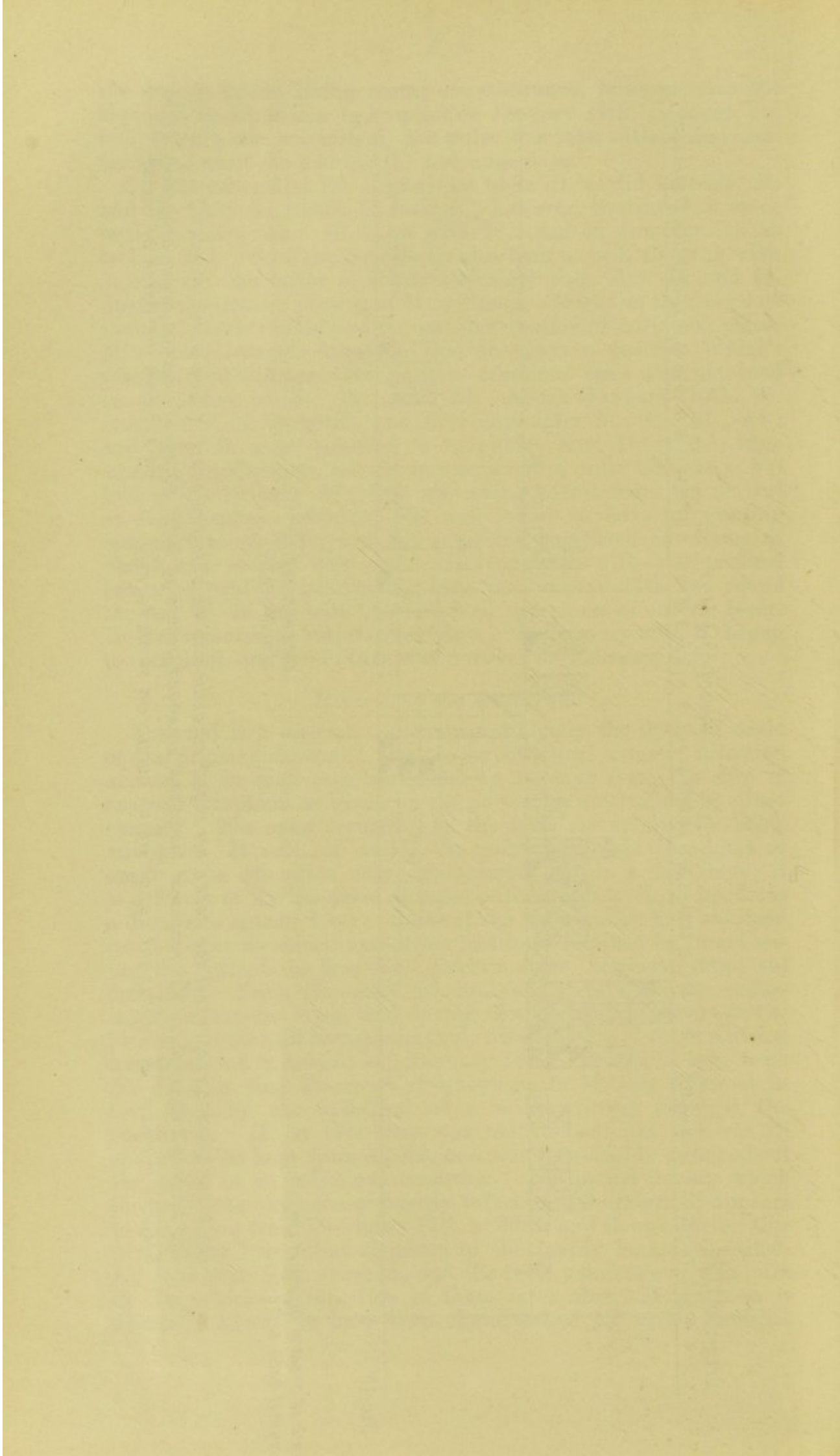
Annexed is a diagram showing graphically the dates of onset of the primary cases and also the hypothetical dates of infection arrived at in each case by deducting 14 days from the date of onset of symptoms as given by the patient or ascertained by other enquiry. The cases occurring on the farm are marked by black triangles. It will, of course, be understood that the dates of onset given are often only approximate within a few days; it is difficult to fix the dates of onset with certainty in so insidious a disease as enteric fever. Some of the information first obtained proved to be incorrect, and errors had to be rectified by interviewing the patients in hospital. Certain facts, however, stand out definitely. From December 5th to January 14th M. was suffering from enteric fever, and during this period five others of the farmer's household became similarly affected; five of these patients were removed to hospital on January 14th. It will be seen from the diagram that the onset of symptoms in M. was followed in two days by the infection of a milk drinker amongst the customers. M. at this time was not in bed, but she was ill enough to be kept from school, and was presumably going about the house in an infectious condition. The period during which the milk was most conspicuously infective (*see* diagram) appears to have been from December 17th to 20th, and it was during this period that four other members of the family became infected. All four were milk drinkers, and the facts point strongly to milk as the vehicle of infection in these cases also. M.'s illness is definitely known to have been characterised by severe enteritis



The blank squares represent the cases arranged according to the dates of onset. (See notes in text.)

The squares crossed thus \boxtimes represent the cases arranged according to the dates of infection, taken arbitrarily as 14 days before the dates of onset.

Squares marked \blacktriangle represent cases which occurred at the farm.



from December 17th onwards. On or about December 25th M. was so far better that her medical attendant ceased to visit, and it is noticeable that from about this date the number of new infections among the customers fell, in spite of the fact that in the following week four other persons in the farmhouse exhibited symptoms of enteric fever. It may, however, be added that none of the four had symptoms of enteritis, and that only two of them were sufficiently ill to take to bed before the visit of the medical officer of health on January 8th. The facts already set out seem sufficient to explain the manner in which it was possible for infection to be conveyed to the milk during the period in question. It is particularly noteworthy that the family milk was extracted with a jug from the full "kit" before the latter was sent off, and the domestic crockery and milking-cans, though washed in water direct from the tap, were all wiped dry with the same dishcloth. Furthermore, it has been shown that all these operations took place in the living room, and were always performed by Mrs. D., who from December 7th onwards slept with M. and attended to all her wants including the removal of diarrhœal stools and the washing of the utensil.

The facts given above illustrate the need of attention being given at dairy farms to apparently mild cases of illness which may be of a kind which can be conveyed by means of milk, and also the importance of a complete separation of all domestic cleansing operations from those applied to vessels used in the milk business.

Origin of infection of the original case at Farm A.

On the occasion of my first visit more than six weeks had elapsed since M. became ill, but from her mother and sisters I ascertained that for some months she had never been away from home; she had never been in contact with a known case of enteric fever; she had partaken of no meals except at home, and there she had never eaten any raw greens or cooked meats; the whole family, however, had eaten mussels, both raw and cooked, "once before M. was ill and twice since." On further questioning, I was told that the first occasion was towards the end of November, and that before then "there had been none in the house for months." As to the date, no more precise information was to be had than that it was "shortly before M. became ill." The mussels were bought by W., who, whilst on his way with the milk to meet the dealer C., met a hawker from whom he purchased them. The girl J. volunteered the statement that the mussels when brought home were put on the living room table, and that M. was reproved for taking them out of the bag and not waiting until they were cooked before eating them. At my request enquiry was made of 250 people in 55 infected houses, and it was ascertained that about 5 per cent. were in the habit of eating shellfish, but in only one instance—and that a child of three, definitely known to have drunk infected milk—was there a history of eating shellfish within three weeks of the onset of illness. There seems to be no doubt that had the milk at

farm A not become infected then M. would have been regarded as having suffered from an attack of influenza, and it may have been that other cases of so-called influenza were in reality mussel-borne enteric fever. The source of infection in the case of M. must remain obscure, as in the absence of more precise information it is not possible to say whether the time at which she ate mussels is or is not consistent with the theory that she was infected in this way. It can be definitely stated, however, that the shellfish were obtained from Morecambe Bay, in certain parts of which shellfish are well known to be liable to pollution.

On the Means taken by the Colne Town Council to Combat the Outbreak.

I have already referred (pp. 1-2) to the action taken to stop the supply of suspected milk on January 8th. From January 9th to February 19th it was conveyed in "kits" set apart for the purpose, to the sewage works and there destroyed. On January 9th all the farmer's milking utensils and the dealer's vessels were conveyed to the corporation depôt and sterilized with live steam. In addition to this the dealer's distributing cans were boiled at his own house. The action taken by the town council may not have been strictly in accordance with the procedure under Section 4 of the Infectious Disease (Prevention) Act, 1890, but the persons immediately concerned realised the gravity of the situation and did everything in their power to cooperate with the authority. The medical officer of health, who is a part-time officer, was, at his own suggestion, provided with an assistant in order that he himself might be able to devote more time to his public duties than would otherwise be possible. A sub-committee of the health committee met daily at 10 a.m., and on January 13th 26 cases having been notified, the smallpox hospital at the Jerusalem farm was opened for the reception of cases. It was on this date that the outbreak was reported to the Board. The hospital continued to be used throughout the outbreak, 26 cases being treated there with much success in spite of the very primitive accommodation. On January 23rd a circular was issued by the health committee to works managers, &c., advising the daily disinfection of closets. No public warning was issued as to the use of raw milk, but a paragraph appeared in a local paper to the effect that the disease was milk-borne, and this, I am told, had the effect of considerably diminishing the consumption of unboiled milk.

At my visit on January 17th, when it appeared that the milk drinkers in a population of approximately 900 had been exposed to infection, and this probably for several days, I urged upon the chairman of the health committee the desirability of obtaining further hospital accommodation, and suggested that it might be desirable to approach the Burnley Joint Hospital Board with a view to the early removal of new cases to the Board's hospital at Burnley. I further suggested that the inspector of

nuisances should visit daily all the houses of the dealer's customers and enquire as to any sickness therein, and that all such cases should be reported to the medical officer of health, who could then take whatever action he thought fit.

The latter suggestion was acted upon, but considerable delay occurred with regard to the provision of further hospital accommodation, and the matter was again brought up at a subsequent visit on January 28th, at which time 41 out of 57 cases were being treated at home. Before July, 1912, the Town Councils of Colne and Nelson—which places adjoin—had agreements with the Burnley Joint Hospital Board by which cases of infectious disease other than smallpox were received into the Board's isolation hospital at a weekly charge. For a considerable time there was much dissatisfaction amongst the constituent authorities of the Joint Hospital Board with the terms upon which cases from Colne and Nelson were treated, and this resulted in the termination of the agreements with both places in July, 1912. Since then both these towns, with a combined population of over 65,000, have been without hospital accommodation for infectious diseases other than smallpox. On January 28th the suggestion to approach the Burnley Joint Hospital Board with a view to at least some temporary arrangement by which primary cases should be received into the Board's hospital, was acted upon, but the terms of the agreement which the Hospital Board desired were regarded as unreasonably high. The only alternative appeared to be the erection of a temporary building in the grounds of the smallpox hospital at Jerusalem Farm, and on February 6th a tender was accepted for the erection of a ward to contain 12 beds. At my last visit to Colne on March 5th the building was approaching completion. It is unfortunate that it was not completed in time to be of assistance in the outbreak under consideration. Fortunately it was not required in consequence of the occurrence of a later series of secondary cases which there had been reason to fear and for which it was prudent to provide. But it will be of advantage as adding to the resources of the town in dealing with future outbreaks of infectious disease.

Throughout the outbreak special pails were provided at infected houses where the conservancy system of excrement disposal was in vogue; their contents were burned in the Corporation's refuse destructor.

I should like to express my thanks to the various persons, official and other, who assisted in my enquiries. In this connection I would specially refer to the aid given me by Dr. Doyle and by the milk dealers concerned.

J. R. HUTCHINSON.

