

Interim reports on an outbreak of milk-borne enteric fever in Clifton.

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INTERIM REPORTS

ON AN OUTBREAK OF

Milk-borne Enteric Fever

IN CLIFTON.

SEPTEMBER—NOVEMBER, 1897.



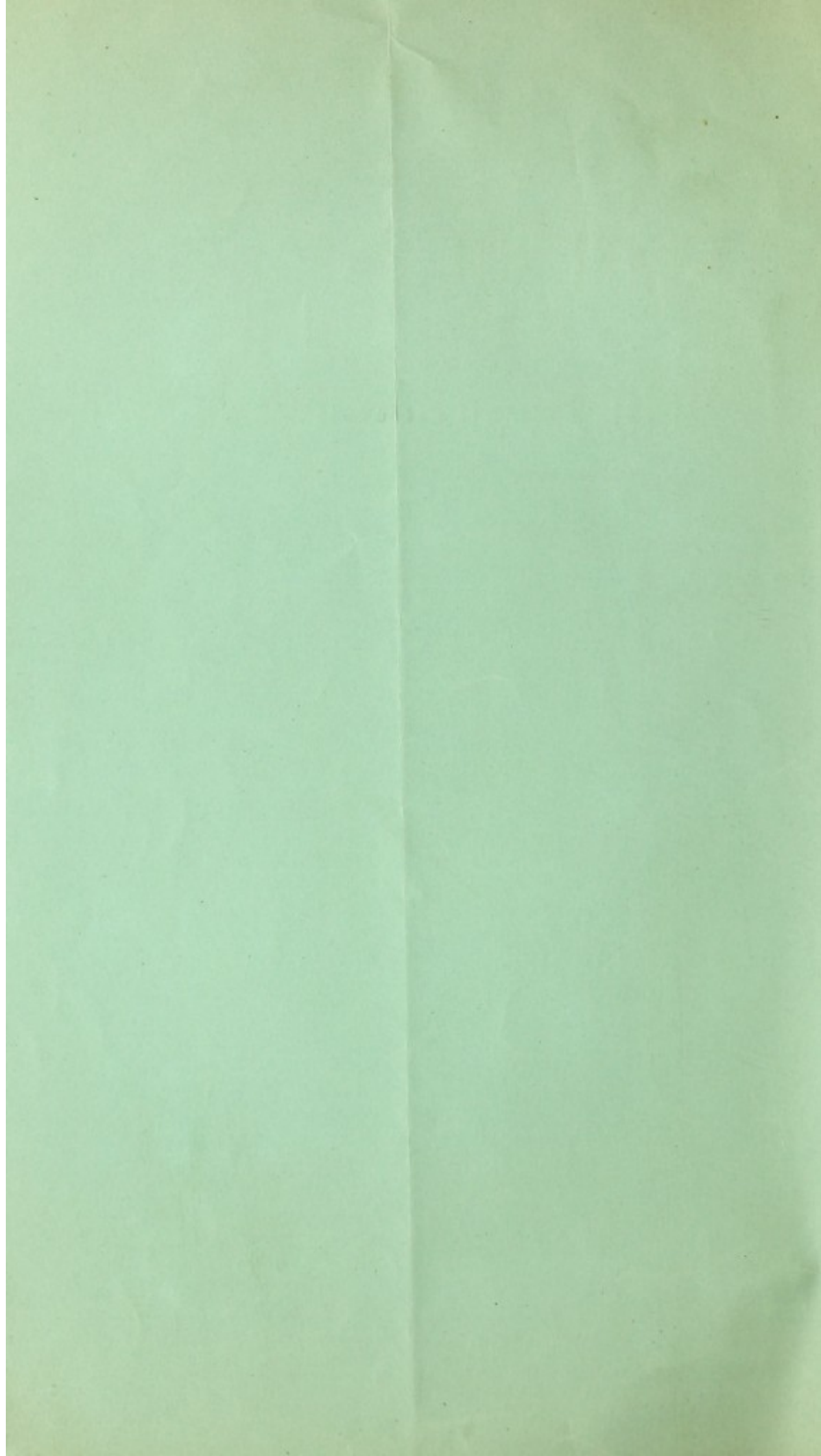
With a Chart showing the Methods of Diffusion.

Presented to the Sanitary Committee, and the Health Committee by

THE MEDICAL OFFICER OF HEALTH, D.S. Davies
and ordered to be printed.

"Over and over again it has been the same—the most natural explanation of
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NANSEN—*Farthest North.*



CITY OF BRISTOL

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BRISTOL :

BENNETT BROTHERS, LD., PRINTERS, COUNTERSLIP.

1897.

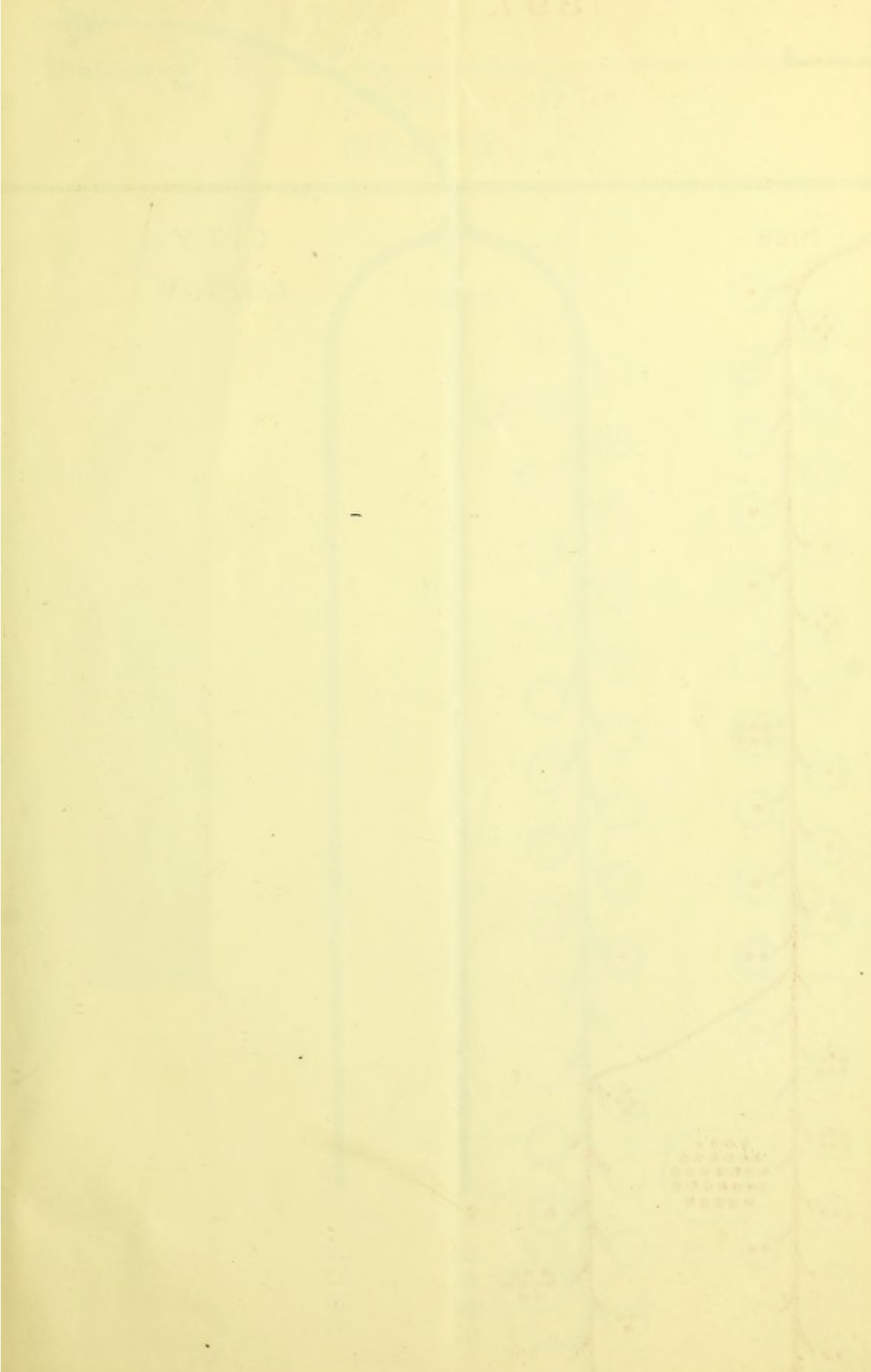


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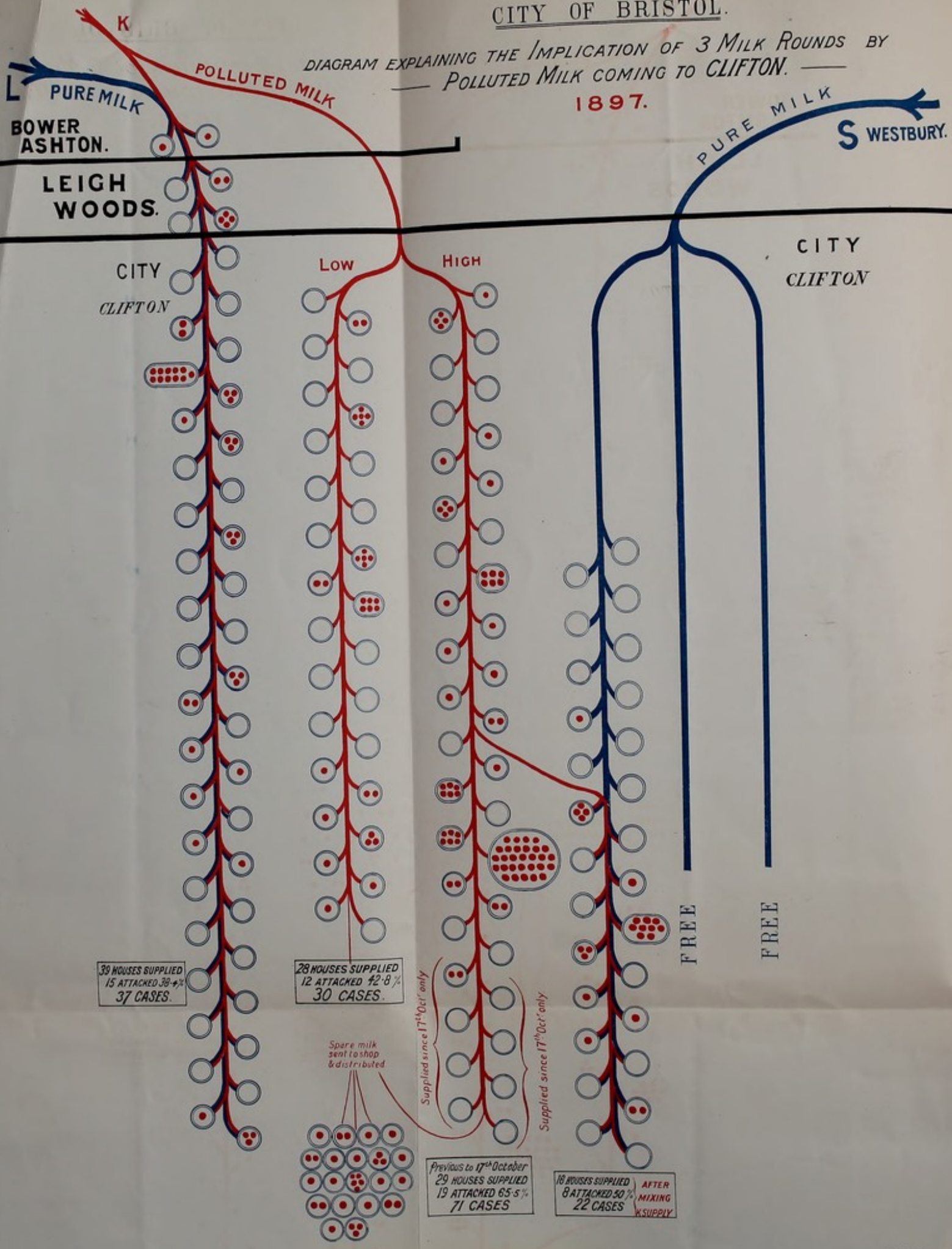
1897



CITY OF BRISTOL.

DIAGRAM EXPLAINING THE IMPLICATION OF 3 MILK ROUNDS BY POLLUTED MILK COMING TO CLIFTON.

1897.



INTERIM REPORTS

ON

An Outbreak of Enteric Fever in Clifton.

(The full Report on the Outbreak will contain the completion of the Bacteriological investigation, a full account of the sickness and mortality, and a resumé of the chief clinical features of the epidemic.)

TO THE CHAIRMAN AND MEMBERS OF THE HEALTH COMMITTEE,
GENTLEMEN,

On October 28th, 1897, I reported to the Sanitary Committee:—

ENTERIC FEVER.

The notifications of infectious diseases during the past three weeks have been 13, 22 and 46 respectively. The excess during the last week is referable to 18 cases of enteric fever notified, of which two were in St. Philip and 16 in Clifton. The number of enteric fever cases notified in the city during August, September, and October, up to Saturday, the 16th, had not exceeded the average for this period of the year, during which this disease always tends to become somewhat prevalent. The small group of cases in St. Philip, which I reported to your Committee on the 23rd September, and which caused some little anxiety, did not result in any extension under the prompt measures taken to deal with them; but on the 16th October two cases were reported in Clifton as probable enteric, subsequently confirmed by a bacteriological examination and by their clinical development. Early in the following week, on the 19th, a group of obscure cases of fever in one house was submitted to examination in the laboratory, and shown to be enteric fever; shortly after I learnt that a considerable number of obscure cases of fever were under observation in several other houses, so I at once sent a warning circular to the medical practitioners and made arrangements for extended laboratory observation, so as to definitely establish the diagnosis. The offer was willingly responded to, and the definite existence of typhoid fever in certain of these obscure cases was proved. Some of the more doubtful cases were submitted for control examination to Dr. Klein, who fully agreed with my results. I may add that the accuracy of the diagnosis has been amply confirmed by the post mortem examination in a case which unfortunately proved fatal. I was thus able to accurately define certain of the infected houses, and to prosecute inquiries as to causation. The evidence on this point was as follows:—Out of 30 infected houses which had come under notice up to the 26th inst., 27 received their milk supply from two distributors, A and B,* 18 receiving only milk from A and 12 of these receiving only milk which came from a particular farm K; the other 9 receiving milk from B, who, although he claimed to distribute milk only from a distinct farm, admitted, under pressure, that he was in the habit of supplementing his supply by milk also obtained from the farm K. Thus 21 out of 30, or more than two-thirds, of the infected houses definitely received their milk supply or some part of it from the farm K. Six more were also customers of A, and may occasionally have received milk from the same source, four of them being so situated that casual supplies might readily have been obtained

* A third distributor was subsequently found to be implicated, as detailed in my Second Report.

from this source. This makes a total of 27 out of 30 houses in which the evidence narrows down to point to one source of infection. The other three houses receiving milk from other distributors are a small proportion, which may be explained by the occasional use of milk at friends' houses, visiting, &c., in addition to the ordinary milk supply; add to this that the occurrence of multiple cases is particularly marked in those houses to which the supply from K has access, and the implication of the milk supply from this particular source seems to be definite. The outset in the majority of the present cases appears to date from the first or second week of October, so that, allowing for "the incubation stage" of the disease, the poison would seem to have been taken into the system during the latter part of September. As I have pointed out, the number of notifications of this disease received during the past week in this district was 16, two only occurring in other parts of the city. It must be remembered that the notifications during the present week will not, as is usual, indicate this week's crop of cases, but will include at least a fortnight's collection of obscure and doubtful cases, which we have now been able to clear up. The notifications in Clifton for the present week up to date number 25. There is no reason of any sort to suspect the public water supply of the city.

Immediately the diagnosis was established and the implication of milk supplies indicated, the distribution of the infected supply was ordered to be discontinued, and the distributors have met me readily in this respect. Two farms in the outside district—one of which now appears not to be in fault—have been carefully visited and inspected. Four samples of the drinking water and of the stream running through the farms have been taken, and two samples of the infected milk submitted to the city analyst for examination, and all the cows upon one farm have been carefully examined by a veterinary inspector. The water-shed of the farm is being visited daily for the prosecution of inquiries as to the existence of suspicious illness in the neighbourhood. All the animals seem perfectly healthy. No definite illness amongst persons has as yet come to light, but inquiries are still being made. The stream, however, which waters the meadow is, after the manner of most country streams, polluted at various points of its course by a considerable amount of sewage matter. I am not yet able to report to your committee the full result of the city analyst's examinations, as they are not yet completed, but so far as one can at present judge the results of the analyses may probably have an important bearing upon the case. The indication for the public safety is at present to adopt the very simple precaution of allowing no uncooked milk or cream to be consumed on the premises, a precaution which I myself, living in the affected district, have considered it sufficient to adopt. I have no evidence to show that butter has been in any way instrumental in carrying the infection.* The precaution seems almost too simple; but having regard to known methods of the transmission of typhoid infection and the circumstances of this particular case, it is one which should be rigidly and strictly observed. It is of course to be expected, now, that several cases of typhoid exist, that some few secondary cases not connected with this primary cause may arise in other ways, but I trust that no great extension is likely to take place. A special inspector has been detailed to assist the district inspector in Clifton work, and the chief inspector is attending to the system of charging the drains through the street gullies with sulphate of iron, in the manner which we generally adopt during the summer months.† Dr. Heaven has been most helpful in the large amount of work involved by the laboratory examinations, and in the many visits and inspections connected with the outbreak. In order to relieve any possible pressure on the Hospital and Infirmary wards, twelve beds are being prepared in your Authority's hospital for early use.

* It was afterwards found that no butter was made from the infected milk.

† Papers of instructions for the management of typhoid cases were also printed and circulated.

In reply to questions by members of the Committee, I stated that there had been some doubt amongst medical men as to whether the disease was typhoid. At the beginning the cases were very obscure; but subsequent developments proved that they were typhoid. I have made 67 bacteriological examinations, and have thus obtained earlier knowledge of the presence of the disease than I should otherwise have had. For the present I have no other advice to give to the public than that all milk or cream should be boiled.

On November 16th, I reported further to the Health Committee.

ENTERIC FEVER IN CLIFTON.

It is a matter for congratulation that, in my first Report to the new Health Committee, I am able to deal with a rapidly declining epidemic, the exciting cause of which has been ascertained and removed.

Thus, during the past three weeks, the Notification returns for Clifton have fallen from 100 to 60, and again to 19.* As the third week from the stoppage of the infected supply is now just completed, it is reasonable to forecast that the diminution will be fully maintained.

In my report to the Sanitary Committee on October 28th, I explained the nature of the epidemic, and showed how the facts already ascertained, hurriedly but with minute care, pointed to a source of contamination from one particular farm. Further investigation has proved our original conclusions to be absolutely correct, and I have nothing to withdraw from my Report of that date. But the accumulation of evidence has thrown much fresh light on some points which were then obscure, and I will endeavour to explain as shortly as possible the main channels of diffusion of the infected milk. (The red line in the chart shows infected milk, the blue line pure milk.) One farm only supplied infected milk, but it found its way on to 3 milkmen's rounds in the following manner:—

1st. The milk from the infected farm (K) was consigned for delivery to the distributor in Bristol (A.), by whose man (B.) it was met at the Suspension Bridge and distributed direct from the churn to the customers without going to any local dairy. Any milk not used on the round was returned, however, to the branch dairy and sold to casual customers. This supply served during the holiday month of August and up to the 26th of September, when the schools re-opened, two districts (*a*) the high level district, bounded on the east by College Road and on the south by Gloucester Row; and (*b*) the low level district extending from the Mall to Granville Place, Cumberland Basin on the south, and as far as Bellevue on the east.

On the re-assembling of the schools at the end of September, however, this supply was confined to the high level district.

This dual distribution is shown on the chart by the red lines K. Low and High.

Some of the earliest cases, developing at the beginning of October, showed themselves on the low level round, and many early cases also occurred on the high level round, but the incidence here was mainly in the second week of October.

On the high level round—

29 houses were supplied	...	...	}	Ratio of attacks to houses. 65·5 per cent.
19 were attacked	...	...		
71 cases resulted	...	...		

On the low level round—

28 houses were supplied	...	...	}	42·8 per cent.
12 were attacked	...	...		
30 cases resulted	...	...		

* During the week ending November 20th, the returns fell still further to 9.

Or taken together—

57 houses were supplied	...	...	}	54·8 per cent.
31 were attacked	...	...		
104 cases resulted, or about 2 cases per house				

2nd. A milkman (L.) started with a pure milk supply from Ashton, but at Bower Ashton he received a supplementary supply from the churn consigned to Clifton, after receiving which he supplied milk yielding two cases of typhoid at Bower Ashton: proceeded to Leigh Woods, where six more cases appeared in two houses supplied, and then entered Clifton. In the course of his Clifton round (see diagram, L) the following resulted:—

						Ratio of attacks to Houses.
39 houses were supplied	...	...	}			38·4 per cent.
15 attacked	...	...				
37 cases resulted, or not quite 1 case per house						

In this case a large quantity of good milk was polluted with a comparatively small quantity of infected milk, and it will be noted that the attack rate upon houses supplied was smaller, and the number of cases per house less. In one school, however, no less than 13 cases resulted, and 2 were fatal.

I may add that this purveyor had no right to purchase the (K) milk from the man (B) who was forbidden to sell it, and that this man omitted to account to his employers for the value of the milk sold. The purveyor also caused some difficulty by admitting the occasional purchase of supplementary supplies in Clifton, but denying any purchase outside. This obviously would not account for the Bower Ashton and Leigh Woods cases, and so we were put to the trouble of a house to house enquiry along his route. When he found out that we had ascertained his movements for the past two months he admitted the whole transaction.

3rd. The third and last implicated supply came originally from a farm at Westbury (S), to which no suspicion attaches, and this furnishes one of the most interesting features of the whole epidemic. The method of procedure adopted in working out the epidemic is this. As soon as suspicion attaches to a farm, this is inspected, lists of the customers on the various rounds are obtained, the milkmen on implicated rounds are called to give evidence, the routes of each round are mapped out, and the list and maps compared with the fever case books, compiled from the enquiries on notified cases. The milk from the Westbury farm is brought into Bristol on three rounds. Two of these rounds were found to be entirely innocent of cases, and the third round, as your Committee will see on the chart, was (with the exception of the single case of a servant in one house, situated near to the Branch where the returned infected milk went, and from which occasional supplies were possibly obtained) also quite innocent of cases, up to a certain point, but beyond this point cases began to occur with marked frequency. These facts went a long way towards exonerating the farm itself as a source of infection. On comparing the mapped out routes, it was observed that at the very corner where this change from freedom to infection occurred, S's round crossed that of the K supply, in charge of the man B.; and we were prepared to receive S's admission that at this point, on occasions when he found the demands of one large College house had shortened his supply, he was in the habit of buying a supplementary supply from B., who carried the infected K milk, and who, as before, neglected to account to his employers for the value of the transaction. After this, cases commenced at the very next house supplied, and recurred with considerable frequency throughout the rest of the route. The following are the results obtained:—

Before adding the infected milk	{ 11 houses were supplied 1 house attacked }	9 per cent.
1 case resulted		
After adding the infected milk	{ 16 houses were supplied 8 houses attacked }	50 per cent.
22 cases resulted		

The explanation of this implication, which for some time seemed obscure, settles the question of causation, and may silence some critics who, failing to trace from their imperfect knowledge any possible channel of infection, have traversed my statements, while they have uniformly neglected the courtesy of asking me if I have any explanation.* All the implicated persons have admitted before witnesses the accuracy of the facts I here adduce.

In the aggregate we find (up to Sunday, 14th November, 1897) —

	Houses.	Cases.
Houses attacked on regular rounds ...	55	163
Houses attacked obtaining casual supplies from branch to which infected milk was returned	20	32
Houses attacked obtaining milk from dairy- men not known to obtain infected supplies	13†	13†
(No multiple cases in any such house.)		
Totals	88	208

I am thus able to account satisfactorily for 195 out of a total of 208, or for 93·7 per cent. of the total cases, and when it is remembered that the infected milk was supplied to one retail shop, round which a cluster of cases has occurred, and to one refreshment room; and when the chances of infection by visiting are taken into account, the percentage of failure, which I hope further enquiry will reduce, is very small.† The number of multiple attacks in houses upon the infected supplies is very notable. The largest number in any one house (a school house) was 20, in others ‡13, 9, 7, 6, 6, 5, 5, 5, 4, 4, 4, 3, 3, 3, 3, 3, 3, 3 cases occurred, and several double cases in other houses. No multiple cases occurred in any house to which an infected supply cannot be traced.

INCIDENCE UPON THE COLLEGE HOUSES.

Clifton College has suffered somewhat severely, but its experience has been amply confirmatory of the accuracy of my previous conclusions. Out of the many College "Houses," containing large numbers of boys at susceptible ages, 5 only have been attacked, every one of which received, mixed or unmixed, the infected milk. In one house, receiving the unmixed infection (K) during September, 29 cases resulted; in a second (a master's house) receiving the same supply, 6 cases; in a third, which had apparently escaped up to the 24th October, it was found that it had not been put upon this supply until October 17th, and in due course 2 cases only followed on the 24th and 27th October respectively, (the lessened number of attacks furnishing an indication of diminution in the amount or intensity of the poison; only 1 out of 8 houses, or 12 per cent, was attacked of those supplied after this date, and only 2 cases resulted); in a fourth, with a diluted supply, only 4 cases resulted; and in a fifth, 2 cases followed, on 24th and 27th October respectively, a single delivery of the infected Milk (K) on

* A lady has favoured me with the criticism that if one farm supplied enough milk to serve so many houses and infect so many people, it must be an extraordinarily productive farm, and she would be willing to purchase it. This is fair criticism, but she has lost sight of the fact that the inherent tendency of all organic beings to multiply inordinately, is particularly marked in the class of organisms to which the *Bacillus* of Typhoid Fever belongs. The rapidity of multiplication by binary division varies greatly in different species, but under favourable conditions *Bacilli* have been observed to divide in 20 minutes, and it is a matter of common laboratory experience that colonies of considerable size and containing millions of *Bacilli* may be developed from a single cell in 24 to 48 hours. A simple calculation will show what an immense number of cells may be produced in this time, as a result of binary division occurring, for example, every hour, the progeny of a single cell would be at the end of 24 hours, 16,777,220, and at the end of 48 hours the number would be 281,500,000,000. (Sternberg). Milk is an excellent medium for the growth of the Typhoid organism, and it is the fact of the introduction of any Typhoid poison, however little, and not the quantity introduced, that determines the danger of transmission. A similar point has been raised by several persons at infected houses, who refused to believe that Milk could be the cause of the illness, because they had only bought a ha'porth of the infected supply very occasionally.

† Further enquiry shows that ‡ of these houses also obtained casual supplies from the infected milk, thus reducing the figures from 13 to 10. This will be corrected in my final Report.

‡ 13 corrected from 11.

one Sunday early in October. The other houses, although situated amongst those attacked, and differing from them in no particulars of construction or occupation, but receiving an uninfected Milk supply, were uniformly passed over. Each circumstance of the attacks was thus satisfactorily explained, and it became possible to advise with confidence that the work of the school should continue without interruption, and without fear of further infection. Two College Houses received the Westbury supply, one before, the other after the purchase of the Milk, no cases occurred in the first house, in the second 4 cases resulted.

INDIVIDUAL INSTANCES.

Although individual instances are of slight value in establishing a case, they may prove useful as confirmatory evidence. In one case (866) a lady attacked was the only one in the house who drank unboiled Milk. In another case a child of nine (II. 3.5) on a day's visit to Clifton, wished for Tea at a Restaurant, but being in a hurry to catch a train, drank some of the unboiled infected Milk, and developed Enteric Fever at the end of a week (the incubation period in Milk Typhoid may be as short as 5 days.) In another, a child (938) visited an Aunt, who was servant at a house supplied with infected Milk, where 5 other cases occurred, she drank Milk and sickened in 7 days. In another case a child aged eleven (1042) one of 4 children, all living under similar conditions and all using the same Milk, but the only one who refused to have boiled Milk with her bread and Milk, was also the only one in the house attacked. In yet another case (1090) the only inmate of a house attacked was also the only one who drank unboiled Milk. In a girls' school of 30 girls, 20 persons drank milk at supper, of these 5 drank only boiled milk and they have remained well. Of the 15 who drank unboiled milk 12 have had typhoid, and 3 only have escaped so far.

The remarkable immunity of the many schools in Clifton, none of which have been attacked, except those few which were supplied by one or another of the infected supplies, is very significant. In one large girls' school in Clifton, with over 230 pupils, 10 girls living in 5 houses, are absent with Typhoid, every one of them in houses supplied with Milk known to be infected. The pupils come from all parts of Clifton, and all the rest are perfectly free from the disease.

The last house supplied from the Westbury supply after infection was an Institution containing 63 persons, of whom not one has been attacked. Enquiry shows that a system of scalding the Milk in a steam jacketed cylinder is in use at this Institution, during the summer months, and the wisdom of this practice is justified by the result. It also supplies an answer to the oft repeated question whether it is necessary for safety to raise Milk to the boiling point. Apparently scalding is a practically safe protection. Many individual instances of the immunity of those who only drank Milk in Tea, and the heavy incidence of the disease upon raw Milk consumers points to the same conclusion.

Although there is now no infected Milk distributed in Bristol, I would advise the continuance of the rule to boil or scald the Milk, or Cream consumed, for the conditions at very many farms are no better than those disclosed, and with so many convalescents scattered over England from many infected towns, the danger of chance infection is ever present. The habit of drinking raw Milk appears to me also to be essentially unclean. The per centage of houses attacked on each infected service is very heavy. In the Melbourne Milk evidence of 1879, reported by Dr. Allen, 23 houses were attacked, out of 93 supplied, or only 24.7 per cent. and 40 cases resulted, with 3 deaths. (J. W. Moore, *Eruptive and Continued Fevers*.)

Public opinion in Bristol, acting upon vague rumour, has fallen very heavily upon one Company. Now this Company distributes the Milk of 20 farms, and all its supplies are perfectly free from suspicion with the exception

of this one farm (K), the Milk from which went direct upon the round, and never by any chance went near the Central Dépôt, upon which unfounded suspicion chiefly fell, while in reality its supplies were as safe as any in Bristol. One family, if not more, went so far, in obedience to vague gossip, as to remove their custom from a perfectly pure supply, and transfer it to one which had been the most highly polluted of the lot: but as the Milk had been withdrawn from circulation, the matter was allowed to pass. I have to express my obligations to the management of this Company, who have in the most public spirited manner given me every aid in the prosecution of my enquires, and have placed their books and their officers at my entire disposal.

Various correspondents have informed me that, after the Milk was prohibited from circulation, it has been seen coming into Bristol. I am well aware of it, and it is obviously wiser to have it brought into the district where it is under my control, than to prohibit and leave it in the country, where it is not.

THE CONDITIONS AT THE FARM.

I have already pointed out to the Sanitary Committee the conditions found to exist at the farm (K). I now lay before your Committee the City Analyst's Report, from which I quote:—

October 30th, 1897.

K FARM PUMP AND STREAM ABOVE K FARM.

"There is a remarkable closeness of agreement between these waters, which suggests that the pump is not supplied from a spring, but from the stream. Your inspection of the locality will have determined whether this is possible. The Analytical results prove these samples to be highly charged with patrescent organic matter, whilst a direct microscopic examination, without the assistance of culture processes, shows them to be swarming with micro-organisms in great variety. Here also it is not possible to state with certainty whether part of the organic filth contained in these waters is or is not of sewage origin. From a careful consideration of the data and from a knowledge of the water of the locality, I think there are distinct indications of sewage pollution, but the evidence, as is generally the case with stream waters, is not conclusive. However this may be, I have no hesitation in saying that these waters are not fit to be used for dairy work. I have also examined samples of Milk, one received from K Farm on the 26th inst. and one on the 28th inst. Though in some respects these samples differ from average Milk, there is nothing in the results to justify the assumption that water has been added to either."

As I pointed out, inspection of the district fully confirms the suggestion of sewage pollution of the stream, on which I report below. Mr. Stoddart is now engaged on a careful bacteriological investigation of the water, on which he will report fully when the experiments are complete. The Milk shows no evidence of added water, and this strengthens the inference that the rinsing of the Milk cans with the pump water is responsible for the introduction of infection. If this water can be shown to contain the Typhoid bacillus, the proof is complete, but as our investigation on this point is progressing and cannot be hurried, I forbear to speak definitely as yet.

There is no reason of any sort to doubt the integrity of the people at the farm, nor would they be likely to suspect the purity of their water supply, which they believed came from a spring, and which had caused no illness on the farm itself. It required indeed, trained observation to grasp the possible dangers of such a supply. The cows on the farm are perfectly healthy, the farm arrangements are satisfactory, the owner is now providing temporary water supplies in carts, and has undertaken to get Company's water laid on, if possible, by Saturday next (20th inst.), and I have no reason to advise your Committee to prohibit the supply for any longer period, and must ask for your decision on the matter.

THE DRAINAGE OF LONG ASHTON.

Long Ashton is a straggling village extending for a mile or more along the main road from Bristol to Weston. The road runs for a considerable distance parallel to and at a higher level than the Ashton Brook, at a mean distance of some 200 yards from it. The land rises abruptly from the brook toward the village and the natural drainage of the village is towards the brook, which passes in its course below the village, through another Dairy Farm and then through the K Farm, and close to the farm buildings.

An examination of the brook shows that it is utilised as the main sewer of the village. We have been able to discover that the sewage from 59 houses finds its way into the Ashton Brook, of these houses 37 are connected to a 6-inch sewer, (S on plan)^{*} which discharges into the brook about 125 yards below Yanley Lane, and the remaining 22 are connected to a cesspool (C on plan) in a field, the overflow from which passes directly down a ditch into the same brook about a third of a mile above the sewer outfall. Other houses dispose of their drainage over the fields above the brook, whence in times of heavy rain it might easily be washed down into the brook; and one cottage at least on the brook discharges its sewage directly into it, and thus, highly charged with excremental matters, it flows directly through K Farm.

The owners of property in the village, acting, I understand, under some pressure from the Rural District Council, appear to have been fairly active in connecting their houses with these drains, and in doing this, the result has been to concentrate the excremental pollution upon the brook, while the Rural District Council itself has been at no pains to provide a sewer into which these drains might properly discharge, and have thus connived at the persistent pollution of the streams running through important Dairy Farms.

The Cesspool to which we have alluded above is constructed of stone with defective joints, and the contents freely run away by a hedge-side ditch to the brook. We cannot learn that the cesspool is periodically or ever cleansed.

It appears to be the obvious duty of the Rural District Council to at once provide proper sewerage for this populous village, and to prevent the continuance of the pollution of the Ashton Brook, the dangerous nature of which has been amply shown.

THE POSITION OF THE COUNTY COUNCILS IN RELATION TO MILK SUPPLIES.

Large powers of control over the Rural District Councils are granted to County Councils, and they may appoint a County Medical Officer of Health to supervise and organise the work of the smaller areas. Neither the County Council of Somerset nor that of Gloucestershire, from which two counties we draw a great part of our milk supplies, has seen fit to do so: and it is impossible to absolve the County Council of Somerset from their share of the blame in neglecting to exercise a proper control over the health conditions of their county.

A large urban community is indeed in a defenceless position when it draws milk supplies from two or more counties neither of which is under unified control. Large powers of control over dairies within our district are indeed granted to us; but of what avail is this, as we have no power to step outside our district until suspicion of disease arises, and then the evil can only be checked, but not averted.

With so convincing a case as I have been able to lay before your Committee, it would seem hardly necessary to consider at length the various inflammatory and unsupported statements about the River Avon. There is no room in the annals of this epidemic for unexplained causes, and the wild talk that has been circulated on this subject is the worst form of panic-mongering. If proof be brought that microbes, disengaged at random from the river can show so much discrimination as to follow the trail of three milkmen only out of some 35 or 40, from house to house, and so much moral reserve as to attack the milk of one of these only *after* he had obtained surreptitious supplies, I will give in at once to the river theory of causation. But the evidence adduced must be well

^{*} The plan was laid before the Committee.

+ The County of Wiltshire has also neglected to appoint a County Medical Officer of Health.

substantiated. The only "evidence" advanced up to now is this :—Dr. J. Gage Parsons stated in the *Bristol Times and Mirror* of the 12th November, "I know of a family living in the infected district the members of which have nearly all been down with the fever, and who, I am assured, have no connection with the suspected milk, but were much in the habit (for recreation) of travelling up and down the river. I leave the inference in other hands."

I directly challenged Dr. Parsons' statement, as I knew it to be false, and demanded the name and address of his supposed family. His reply is worth quoting. (The italics are mine.)

"Upon making enquiry at the suspected dairy I was assured positively by the officials that they had not supplied milk either directly or indirectly to a family which was *generally reported* throughout Clifton to be suffering from typhoid fever. By the wording of the paragraph I intended to imply that *it was not from personal knowledge* I made this statement; if I failed to do this I much regret the ambiguity. Under these circumstances I trust you will excuse my mentioning the name—the *precise address I do not know*."

But I will not excuse Dr. Parsons, who had no accurate information as to any suspected dairy, who assumed as a fact what was "generally reported," and who does not even know "the precise address" of the family whose habits he details, from the consequences of this gross abuse of public confidence in foisting upon them as evidence what was the merest hearsay, and in urging this publicly in support of a preposterous theory; and I have requested him to publicly withdraw his inaccurate statement.

I have stated elsewhere that the diversion of the sewage from the river will be to the public convenience, and a proper scheme to this end is now being considered by the Council, it is unwise and unnecessary in the meantime to load the river, which we all know contains sewage, with responsibility for any part of an epidemic to which it demonstrably bears no relation. The immunity enjoyed by residents along the river bank during the present epidemic is indeed one of the most marked features.

The local smells from the surface-water street gratings, which occur intermittently during dry weather, are more readily dealt with by a letter to the office, which secures the service of a water cart, than by a letter to the paper, which does no good at all; nor will the removal of all sewage from the river affect these occasional local smells in any way.

I have to acknowledge with gratitude the valuable counsel and support during the height of the epidemic, afforded to me by Alderman Cope-Proctor and the excellent way in which the public, relying upon the Sanitary Committee's discretion, have disregarded the efforts of the panic mongers, and have faced the epidemic with courage and with common sense.

To Chief Inspector Kirley and Inspectors Wilkinson, Casely and Leat in outside work, and to my Chief Clerk (Mr. Harris), and Laboratory Assistant (Mr. Horler) I am much indebted for their indefatigable and always cheerful help.

I have the honour to be, gentlemen,

PUBLIC HEALTH OFFICES,

Your obedient servant,

40 PRINCE STREET, BRISTOL.

D. S. DAVIES, M.D.,

November 16th, 1897.

Medical Officer of Health.

CITY OF BRISTOL.

TYPHOID OR ENTERIC FEVER.

This is an infectious disease, which may affect persons of any age, and spreads from previous cases, usually by infected water or milk, from escape of sewer gases into houses, or otherwise. The infection lies chiefly or entirely in what passes from the patients, and the directions given below for dealing with such matters must be most carefully followed.

Precautions to be taken by Persons with Typhoid or Enteric Fever in their families.

1.—Patients with this disease should be nursed in one room, separate from the rest of the family. All carpets, curtains, and unnecessary furniture are to be removed from the room.

2.—Keep the patient in this room until the termination of the illness. Allow no visitors.

3.—At once put all bed and body linen, when taken from the sick person, into a large pan containing a mixture of half a pint of carbolic acid to two gallons of water, and soak it for an hour before taking it from the sick room; then boil it at home, but do not send it to a laundry. All cups, spoons, &c., used in the sick room should be washed in boiling water before removal from the room.

4.—Everything that passes from the patient, should be received into, mixed with, and covered with carbolic powder, or strong solution of carbolic or other efficient disinfectant, and at once thrown down the drain, which must be kept flushed with carbolic solution. All privies should be disinfected daily with carbolic powder, and all sinks and drains flushed with the carbolic solution.

5.—At once have any defects in drains, privies, or water closets remedied.

6.—If the drinking water is obtained from a well or cistern it must be boiled before use, and if upon analysis it is found to be impure, a pure supply must be at once obtained.

7.—Boil all milk or cream used in the house.

8.—The nurse must be careful to wash her hands with carbolic soap each time after attending to the patient, and all soiled linen must at once be put into the pan of disinfectant and kept wet.

9.—No sick person is to be taken from an infected house except to a proper hospital (see penalties.)

10.—At the end of the illness all bedding and clothes in use by the sick person must be properly disinfected, and the room and everything in it thoroughly washed and cleaned. (See instructions over page.)

11.—NOTIFICATION of the beginning of the illness is to be made by the Medical Attendant, and the Householder as soon as practicable, and notice of the end of the illness is also to be sent to the Medical Officer of Health, on the supplied postcard that the disinfection required by law may be carried out. The Notification Act includes the following Fevers:—Typhus, Typhoid or Enteric, Continued and Relapsing Fever.

12.—Patients and clothing or bedding used by them will be deemed still infectious and the subjoined penalties will continue to apply, until disinfection has been carried out to the satisfaction of the Medical Officer of Health.

D. S. DAVIES, M.D.

Medical Officer of Health.

PENALTIES.

Any head of family, nearest relative, person in charge of patient or occupier, who fails to notify to the Medical Officer of Health the existence of an Infectious Disease (viz.:—Small Pox, Cholera, Diphtheria, Membranous Croup, Erysipelas, Scarlatina or Scarlet Fever, and the Fevers Typhus, Typhoid, Enteric, Relapsing, Continued or Puerperal) in any building, is liable to a **Penalty of £2.** Failure to notify.

The Sanitary Authority may order the cleansing and disinfecting of any house or room and of any infected articles. Disinfection is in every case to be done to the satisfaction of the Medical Officer of Health. It may be done, if the Authority think fit, at the expense of the owner or occupier. Disinfection.

Any person who, when required by the Medical Officer of Health to deliver over infected clothing for disinfection, fails to comply with the requirement, is liable to a **Penalty of £10.**

Exposure of infected persons or things. Any person who exposes an infected person or any infected article in any public place or public conveyance, is liable to a **Penalty of £5.** This applies to selling or pawning infected articles, to sending children to school, to sending domestic servants home, and to sending back infected books to libraries.

Letting of infected houses or rooms. Persons letting, or showing for letting, infected houses or rooms without proper disinfection, are liable to a **Penalty of £20.**

Persons making false answers in connection with the letting of infected houses, are liable to a **Penalty of £20 or one month's imprisonment with hard labour.**

Ceasing to occupy infected rooms, &c. Persons ceasing to occupy infected houses or rooms without having them properly disinfected, or without first giving notice that they are infected, to the owner, are liable to a **Penalty of £10.**

And such persons making false answers when questioned as to the infected houses or rooms, are liable to a **Penalty of £10.**

Infectious rubbish. Persons casting infectious rubbish into ashpits or ashtubs, are liable to a **Penalty of £5.**

Retention of infectious body in living-room. The body of any person who has died of an infectious disease must not be retained in a room used as a dwelling place, sleeping place, or workroom, for more than 48 hours, without special permission, under a **Penalty of £5.**

The body of a person who has died of any infectious disease must not be carried in any public conveyance, except a hearse.

DISINFECTION.

The cleansing and disinfection required to be carried out after each case of Enteric or Typhoid Fever include the following processes detailed in Memorandum B, viz :—

- (a.) Removal of carpets, bedding, and clothing for disinfection by steam heat (3).
- (b.) The destruction of useless articles by fire.
- (d.) The scrubbing and cleansing of all floors and furniture (8).
- (c.) The cleansing or re-lime-washing of walls and ceilings, or any part of such processes as may be deemed necessary in each case, but the complete process may be required in any case.

PUBLIC HEALTH OFFICES, 40, PRINCE STREET,

October, 1897.

CITY OF BRISTOL.

DAIRIES, COW SHEDS. AND MILK SHOPS.

REGULATIONS

*Made under "The Dairies, Cow Sheds, and Milk Shops Order, 1885," and
"The Dairies, Cow Sheds, and Milk Shops Amending Order, 1886."*

Interpretation of Terms.

1.—In these Regulations the expression "Sanitary Authority" means the Mayor, Aldermen, and Burgesses of the City of Bristol, acting by the Council as the Urban Sanitary Authority.

For the Inspection of Cattle in Dairies.

2.—In every case where any Officer of the Sanitary Authority specially authorised by them in that behalf, has for the purpose of inspection obtained access to any Dairy in pursuance of the statutory provision in that behalf, no person shall wilfully obstruct such Officer in the inspection of the Cattle therein, and the occupier of such Dairy shall not without reasonable excuse neglect or refuse when required by such Officer to render him such assistance as may be reasonably necessary for the purpose of such inspection.

Regulations with respect to the Lighting, Ventilation, Cleansing, Drainage, and Water Supply.

3.—Every person following the trade of Cow-keeper or Dairyman, shall cause every Dairy or Cow Shed occupied by him to be sufficiently lighted by openings in the sides or roof, or by windows therein in such a manner as to secure the passage of light into every part of the interior of such Dairy or Cow Shed. Lighting.

4.—Every person following the trade of Cow-keeper or Dairyman shall cause every Dairy or Cow Shed occupied by him to be thoroughly ventilated by louvred ventilators in the roof thereof, or by louvred ventilators in the walls, or by other sufficient openings in the sides or roof so as to afford effectual means of ventilation by direct communication with the external air. Ventilation.

5.—A person following the trade of Cow-keeper or Dairyman shall not cause or suffer any greater number of cattle to be kept at any time within a building used by him as a Dairy or Cow Shed than will admit of the provision of a free air space of at least 800 cubic feet for every cow kept in such building. Air Space.

6.—Every person following the trade of Cow-keeper or Dairyman shall cause the floor of every Dairy or Cow Shed occupied by him to be cleansed thoroughly with water at least once a day, and the walls, partitions, doors and other parts of the Dairy or Cow Shed to be cleansed as often as may be necessary for keeping the same in a clean condition. Cleansing.

Every person following the trade of Cow-keeper or Dairyman shall cause all dung and offensive litter to be carefully swept up and removed from every Cow Shed occupied by him, at least once every day.

7.—Every person following the trade of Cow-keeper or Dairyman shall cause the roof and walls of every Dairy or Cow Shed occupied by him, except so much thereof as may be painted or covered with a material such as to render limewashing unnecessary or unsuitable, and as may be properly cleansed, to be limewashed at least twice in each year, viz. : in the months of May and October. Limewashing.

8.—Every person following the trade of Cow-keeper or Dairyman shall cause every building which subsequently to the coming into force of these Regulations may be newly occupied by him as a Dairy or Cow Shed to be so constructed that the floor thereof shall have a proper slope towards a channel which shall discharge over a properly trapped gulley, which in case of a Dairy shall be outside such Dairy, and in case of a Cow Shed, wherever practicable, outside the Shed. Drainage.

9.—Every person following the trade of Cow-keeper or Dairyman shall cause every Dairy or Cow Shed occupied by him to be effectually drained in such a manner as not to allow of direct communication by means of any drain between the interior of such Dairy or Cow Shed and any sewer or cesspool into which such drain may empty.

10.—Every person following the trade of Cow-keeper or Dairyman shall cause an adequate supply of pure water to be provided for every Dairy or Cow Shed occupied by him. Water Supply.

Regulations for securing the cleanliness of Milk Stores, Milk Shops, and Milk Vessels used for containing Milk for Sale.

11.—Every person following the trade of Cow-keeper, Dairyman, or Purveyor of Milk, or being the occupier of a Milk Store or Milk Shop, shall cause every Milk Store or Milk Shop in his occupation to be kept at all times in a cleanly and proper state.

12.—Every person following the trade of Cow-keeper, Dairyman, or Purveyor of Milk, or being the occupier of a Milk Store or Milk Shop shall cause the floor of every Milk Store or Milk Shop occupied by him to be washed and cleansed every day, and he shall cause the walls and ceilings thereof, except so much thereof as may be painted or covered with a material such as to render limewashing unnecessary or unsuitable, and as may be properly cleansed, to be limewashed twice in each year, that is to say in March and in October.

13.—A person following the trade of Cow-keeper, Dairyman, or Purveyor of Milk, or being the occupier of a Milk Store or Milk Shop shall not cause or suffer any solid animal or vegetable matter or thing, or any liquid other than Milk to be at any time deposited or kept in any Milk Vessel used or intended to be used for containing Milk for sale. He shall cause every such vessel to be from time to time thoroughly cleansed with hot water or steam so that the same may be at all times clean and fit for use.

Regulations for prescribing Precautions, to be taken by Purveyors of Milk and Persons Selling Milk by Retail, against Infection or Contamination.

14.—A Purveyor of Milk or a person selling Milk by retail shall not cause or suffer any Milk intended for sale to be stored or kept in any room or place in which there is an untrapped opening to a drain, or to be stored or kept in any room or place in which, or in any room or place that may directly communicate with a room or place in which, there is a person suffering from any infectious disease, or (either in the manner of storage or of distribution) do any act or thing likely to expose any such Milk to infection or contamination, or omit to do any act or thing necessary for the due protection of any such Milk from infection or contamination.

15.—A Purveyor of Milk or a person selling Milk by retail shall not use for the delivery of Milk for sale to any person, any can or other vessel that may have been in the possession of any person who he has been informed, or has reasonable grounds for believing, was at the time suffering from a dangerous infectious disorder: or any can or other vessel that may have been left at the residence of such person, until such can or vessel shall have been thoroughly disinfected and cleansed.

PENALTIES.

16.—Every person who shall offend against any of the foregoing Regulations shall be liable for every such offence to a **Penalty of £5**, and in the case of a continuing offence to a further **Penalty of Forty Shillings** for each day after written notice of the offence from the Sanitary Authority, provided nevertheless that the Justices or Court before whom any complaint may be made or any proceedings may be taken in respect of any such offence may if they think fit adjudge the payment as a penalty of any sum less than the full amount of the penalty imposed by this Regulation.

Commencement of Regulations.

17.—These Regulations shall come into force on the 1st day of February, 1891.

Revocation of Existing Regulations.

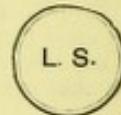
18.—From and after the date on which these Regulations shall come into force, all Regulations heretofore made under or having effect in pursuance of the Dairies, Cow Sheds, and Milk Shops Order, of 1885, shall so far as the same are now in force in the district be revoked.

IN WITNESS whereof the said Mayor, Aldermen, and Burgesses have caused their Common Seal to be hereunto affixed the 9th day of December, 1890.

The Common Seal of the Mayor, Aldermen, and Burgesses of the City of Bristol was hereunto affixed, in the presence of

D. TRAVERS BURGESS,

Town Clerk





Clifton
B.S.