

**Report by the Medical Officer on outbreak of enteric fever in Royal and Western Infirmaries, and Fever Hospital, Belvidere, Glasgow, in August, 1884.**

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REPORT BY THE MEDICAL OFFICER

ON

OUTBREAK OF ENTERIC FEVER

IN

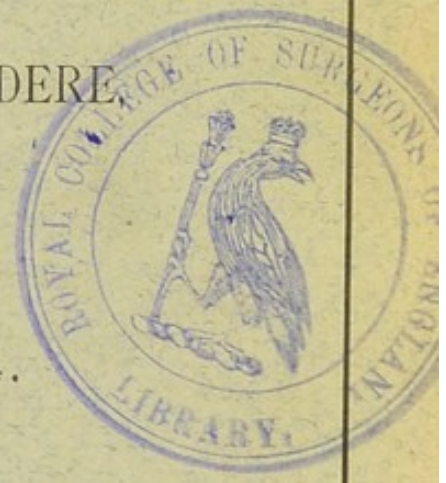
ROYAL AND WESTERN INFIRMARIES,

AND

FEVER HOSPITAL, BELVIDERE

GLASGOW,

IN AUGUST, 1884.

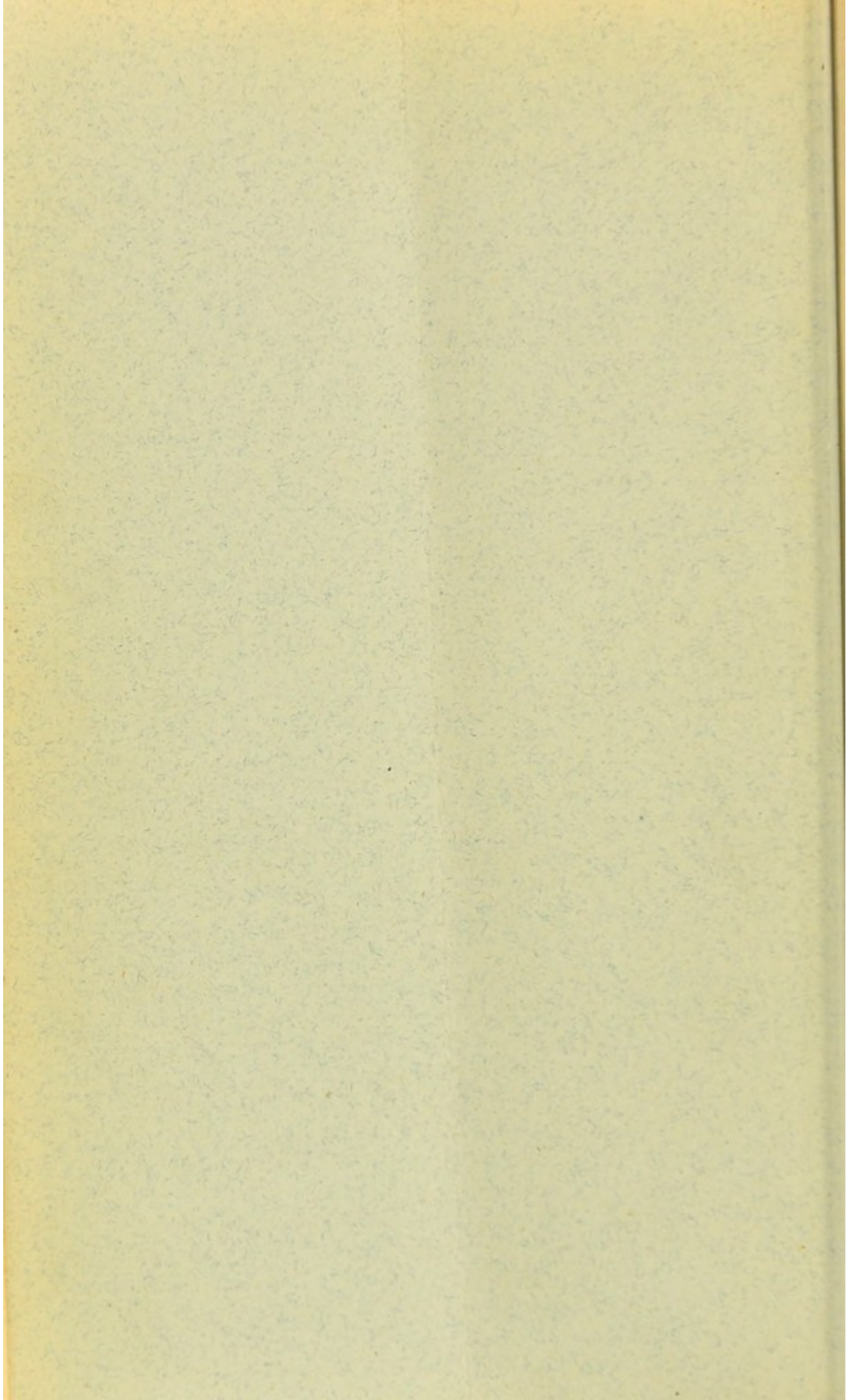


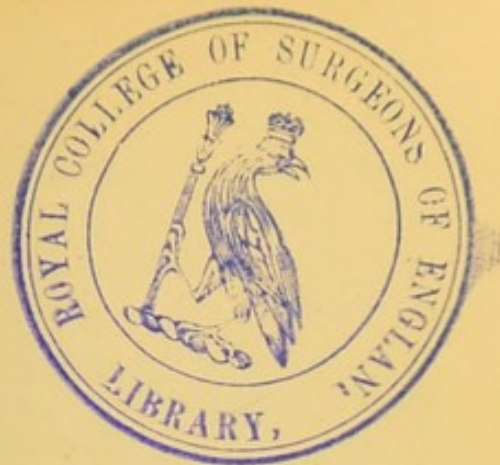
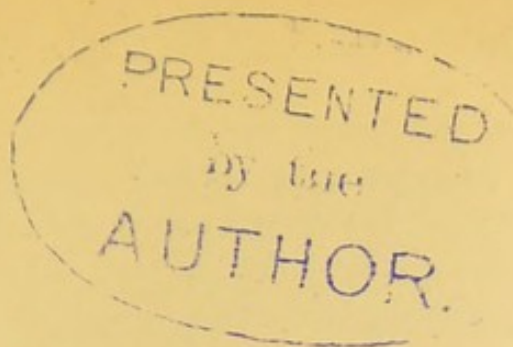
18th September, 1884.

GLASGOW:

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REPORT BY THE MEDICAL OFFICER ON OUTBREAK  
OF ENTERIC FEVER IN GLASGOW ROYAL AND  
WESTERN INFIRMARIES AND FEVER HOSPITAL  
IN AUGUST, 1884.

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IN the last days of August, 1884, the Superintendent of the Western Infirmary observed among his staff several cases of febrile sickness, and received reports from the resident assistants of unaccountable elevation of temperature among the patients under treatment in the wards. By 1st September some of these cases had developed into undoubted enteric fever, and he put himself into communication with me. In such circumstances the first thing to be done is, from a rapid survey of the facts, to determine a course of preventive action. On tabulating the cases of sickness, decided as well as suspicious, but all more or less febrile, they were found to exist both among patients and the female staff, not confined to any ward or department of the house, and yet from the dates of seizure to clearly indicate the operation of some medium of infection becoming suddenly active, and having access to the inmates generally. There were no cases of enteric fever under treatment in the wards. In the history of the Hospital only one case of enteric fever had ever originated in the house, and that was some years ago, in the person of a nurse who was in attendance upon an isolated case which had been admitted as a patient. Of the known media for the spread of the fever, there was only one which brought all the cases within the range of its influence, and that was the milk supply. Water in Glasgow may always be set to one side as an epidemic agent. It was scarcely conceivable that in a newly-erected hospital, the drainage

of which had been carefully planned and tested, any derangement of such extent and gravity as to impregnate the whole building with specific effluvia, and yet have escaped the observation of the senses, could exist. Still, to set that doubt at rest, as well as to make sure that the specific poison, however introduced, should not spread secondarily by any defects in drains or soil-pipes, the whole system was carefully examined with the smoke test by the officers of the department. Only a few insignificant defects were discovered. As regards the question at issue it was clear that the medium of infection did not exist in that direction. The Superintendent gave orders that all milk should be boiled before use. Application was made to the milk-contractor for a list of the farmers from whom he obtained his supply. A long experience in such inquiries has taught me that in the distribution of the milk consigned to a milk-dealer, while he may correctly state from what sources individual customers are *usually* supplied, there is no certainty that these sources are always the same. On Sundays, from the stoppage of trained milk, there must be a deviation from the system which prevails during the week, and in general from a variety of causes, there is so much chance of variation and intermixture that portions of any one farmer's milk may, especially in the afternoon delivery, find their way to any customer at one time or another. The practical result of this system of business is that in any investigation for a contaminated source, while it is well to follow up first such indications as the agent can give, nothing short of an examination of every farm on his list is satisfactory. In the present case there were 40 farms in the list supplied, scattered over the counties of Stirling, Dumbarton, Lanark, Renfrew, Ayr, and Wigtown. A circular letter was at once issued to each one enquiring as to the health of the farmer's household, his employés and their families, and the cattle, since the 1st of June, and at the date of reply. At the same time an inspection by the milk inspectors was begun, and I went in person to the three farms designated as the chief source of the hospital supply. In this way seven farms were visited in Renfrewshire and Ayrshire without result.

Meanwhile I knew that the milk supply of the Royal Infirmary and Belvidere Hospital was from the same agent. I heard from Belvidere that a nurse who had been sent from the Royal Infirmary as a case of scarlet fever was found to be suffering from enteric fever, and that she had sickened at the same time as the Western

Infirmary cases. On visiting the Royal Infirmery I found that the Superintendent and visiting staff were also becoming aware of a febrile outbreak in their wards and among the female employées; and, in fact, had decided that some of the cases were examples of enteric fever. By the end of the week (6th September) Dr. Allan had also made out a similar outbreak among his scarlet fever patients. The case against the milk had now become a certainty. We had three coincident outbreaks of enteric fever among the patients and officials of three institutions, situated one at the extreme west, another at the extreme east, and the third intermediate, in the extreme north of the city, isolated as to locality, as to sewers, and related only in the use of a common water supply and a common milk supply. The city generally showed no signs of a similar epidemic influence. There had been evidence of the commencement of the usual sporadic autumnal increase of enteric fever, but there is the same difference between the scattered, irregular appearance of such cases and the condensed, contemporaneous local outburst of epidemics, as there is between the weeds by the wayside and the field of grain. The former suggest nothing but a series of disconnected accidents, the latter carries conviction to the mind of the observer that there has been one act of sowing.

Before stating the discovery to which the investigation, which was dictated by these facts and this line of reasoning, led up to, I shall, in accurate detail, give an account of the main features of the three outbreaks of enteric fever up to yesterday, the 17th September. Just as the diagnosis of an individual case of fever is strengthened by the progress of the case, so my argument as to the nature and origin of these local epidemics derives, or ought to derive, increased conclusiveness from a survey of their characteristics now, when they have run the main part of their course. The basement fact in reference to the causation of a case of fever is to determine the date when the patient sickened. The basement fact in reference to the causation of a series of cases is the coincidence of the dates of sickening of the individual cases in the series.

I have obtained from the Superintendent of each Institution a return of the cases originating in the institution from 1st August. These are arranged according to the date of sickening in the following table which shows the number who fell sick each day from that date to the 17th September.

DATES OF SICKENING IN THE THREE INSTITUTIONS.

		AUGUST.															SEPTEMBER.															TOTAL													
		Sat.	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	Sat.	7	8	9	10	11	12	13	14	15	16		17	18	19	20									
WESTERN INFIRMARY.																																													
Daily, ...			1	...	1	4	1	4	1	4	2	1	1	5	1	5	1	1	4	2	3	1	2	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...			
Weekly,		1	...	...	1	...	...	...	13	...	...	...	...	...	...	...	...	18	...	...	...	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	44					
BELVIDERE.																																													
Daily, ...			...	...	...	1	...	4	1	3	1	...	4	3	1	3	...	...	2	6	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...			
Weekly,		...	...	...	...	...	10	...	...	10	...	...	...	...	...	13	...	...	...	...	...	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	31			
ROYAL INFIRMARY.																																													
Daily, ...			...	...	...	2	1	1	3	1	2	3	4	...	1	1	1	...	2	1	5	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Weekly,		...	...	...	...	...	10	...	...	10	...	...	...	...	...	11	...	...	...	...	...	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	29		
TOTAL.																																													
Daily, ...		1	...	1	1	3	9	3	10	4	3	8	12	2	9	2	1	8	9	10	1	3	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Weekly,		1	...	...	...	...	33	...	...	...	...	...	...	...	...	42	...	...	...	...	28	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	104	

Milk stopped on 6th September.

When you look at this table it will compel your reason to the conclusion that by some common agency the specific seeds of enteric fever were sown in these institutions at the same time. The mere looking at it and comprehension of it is all that is necessary but I shall shortly write out what this table tells. In the first 22 days of August no fever originated in those institutions, although in the case of the Royal Infirmary several cases admitted from without were under treatment, and in the case of Belvidere, it is a fever hospital, and has enteric wards. On the 23rd the first case sickened in the Western Infirmary—a servant employed in the kitchen; on the 24th the first case sickened in Belvidere—a mother nursing her child in a measles ward; on the 25th the first cases sickened in the Royal Infirmary—a patient in surgical ward 23, and another in medical ward 4. The 23rd August was a Saturday, and, taking the natural weeks thereafter, the subsequent development in these Institutions was:—In the week ending 30th August—13 cases in the Western Infirmary, 10 in Belvidere, and 10 in the Royal; in the week ending 6th September—18 in the Western Infirmary, 13 in Belvidere, and 11 in the Royal; in the week ending 13th September—12 in the Western Infirmary, 8 in Belvidere, and 8 in the Royal. The last cases appeared on the 12th September in the Western Infirmary; on the 8th September at Belvidere; and on the 11th September in the Royal. So much for the coincidence in time. The following facts show how general within each institution has been the distribution of the specific poison. In the Western Infirmary 26 patients have been infected, 7 nurses, 7 cleaners, 1 kitchen porter, 1 boy employed in the laboratory, 1 servant, and 1 house physician—44 in all. The patients are scattered over 15 wards, medical and surgical; the officials are also in their employment distributed over the house. At Belvidere, 24 patients were infected, 3 nurses, 2 nursing mothers, 1 cleaner, and 1 lady who made a short visit to the matron—31 in all. Of the patients, 20 were under treatment for scarlet fever, 3 for measles, and 1 for typhus. One of the nursing mothers was in a scarlet fever, another in a measles ward. Of the nurses, 2 were in scarlet fever wards, and 1 in a measles ward. The cleaner was in a measles ward. In the Royal Infirmary 26 patients were infected, 2 nurses, and 1 cleaner—29 in all. The patients were scattered about the house, but chiefly surgical, there being generally fully a half more surgical than medical inmates. The nurses were employed, 1



in the erysipelas, the other in a surgical ward. All these persons had milk. The Western Infirmary nurses get sweet milk only. The convalescent patients get skim milk with porridge. The resident physician drank cold sweet milk largely to lunch and supper, and never took porridge. The first person who was seized in the Western drank cold milk "in large quantity." The kitchen porter lives and boards outside, but admits having drunk milk in the kitchen. So did the laboratory boy. One of the worst cases is a nurse who was on milk diet for indigestion. These examples of the incidence of the fever on special milk-consumers could be multiplied from the other Institutions. I ought to add that only undoubted cases are included in this statement; but in each Institution there has been a fringe of cases of a febrile nature, which aborted, but were no doubt also specific in their origin. The total number of cases so far is 104. The average number of patients and officials in August was—in the Western Infirmary, 450; at Belvidere, 475; in the Royal, 624. The proportion of cases so far has therefore been twice as great in the Western as in the Royal. An outbreak in the entire community proportionate to that among this hospital population of 1,549 would imply between 30,000 and 40,000 cases! But it will never be accurately known how much mischief this outbreak has worked. A constant stream of patients was passing into and out of these institutions, while the infection was being distributed within them. Several discharged patients have already been discovered ill. In such subjects, weakened by previous disease, the results must be severe. The majority of the cases are of a bad type. Already there have died of the Western Infirmary group, 1 nurse and 3 patients; of the Belvidere group, 1 patient; of the Royal Infirmary group, 1 nurse and 3 patients.

Now, let us turn to the result of our investigation of the 40 sources of milk supply. All returned a clean bill of health save one. The following is the letter received from Mr. Kirkhope, South Fergushill, near Kilwinning:—

"South Fergushill, Kilwinning,  
"6th September, 1884.

"Dear Sir,—In reply to your favour which I have just received this morning, I beg to make the following answers:—

"1st. One of my servant girls felt rather unwell on Tuesday morning last. Dr. Milroy saw her and gave her some medicine.

She felt no better on Wednesday, and we advised her to go home with her mother, who lives quite near. Dr. Milroy reports to us this morning that he is afraid of typhoid fever.

“Gastric and typhoid fever have been prevalent for some time in the villages of Fergushill and Bensley.

“2nd. There has been no sickness in my house (with that exception) since 1st June, but a great deal within 500 yards of my farm. The villages of Fergushill and Bensley are quite near, and belong to Messrs. A. Finnie & Son. More or less fever has been there for some months, and many adults have died.

“3rd. My cows have never suffered from any epidemic, but during the last seventeen years I have lost no fewer than thirty-nine dairy cows besides young cattle. Their illness and death I have attributed to the bad water supply on my farm. The sewage of Fergushill and Bensley run into the burns from which my cattle drink. For some years I could not understand what was the cause of so many deaths, for my father rented this same farm for between twenty and thirty years, and he never lost more than three cows during that time, although his stock was beginning to get sickly, and became worse on my hands; that, no doubt, was owing to the increase of the population of these villages.

“I have done everything I possibly could do within the last three years. I have called the attention of Mr. Glen, manager to the Messrs. Finnie. He merely laughed, and said it was a fancy I had got into my head about bad water, although the burns were then visibly in a state of stench.

“Since then I informed the Honourable G. R. Vernon, commissioner to my landlord, the Earl of Eglinton, and Mr. Stewart, Lord Eglinton’s factor. Since I spoke to them a filter has been erected at each village through which the sewage flows; but I am told on good authority that the poison from the sewage runs from the filters with the liquid into the burns from which my cattle drink. Since the filters were erected I asked both the Sanitary Inspector and officer for the district to look at the state of the burns. They told me that I should not complain to them, seeing that I had told Mr. Vernon and Mr. Stewart about it. I also directed the attention of Mr. M’Gill, veterinary surgeon, Stewarton, who attended to two of my cows lately. His opinion was that they both suffered from the effects of drinking bad water.

“I have also had the water of one of the burns analysed, and have just had the report to-day, which is very bad. During the

winter and early spring I had my cows watered from the well that supplies us for domestic purposes. They drank freely so long as we could give it to them, but the spring which supplies our well is injured by the workings of the Messrs. Finnie, the result being that we had to withdraw it from the cattle.

"I will be very glad if Dr. Russell, medical officer of health for Glasgow, will cause an inspection to be made, and I will discontinue sending milk until he is satisfied.—I am, yours very truly,

"JOHN KIRKHOPE."

The last milk was sent from this source on the morning of 6th September. On the 8th I inspected the locality. I found that a dairymaid, aged 16, whose parents live in the adjacent village of Fergushill, had a shivering on 23rd August; on the 31st she told her mother that she had a bad headache; on the 1st September her mistress noticed she looked ill; on the 2nd she was seen by Dr. Milroy, Kilwinning, who suspected fever; on the 3rd she ceased to work, and went home; on the 8th I saw her very ill with typical enteric fever. Her father had been ill with a slight attack of the same disease a fortnight before her. I verified all the statements of Mr. Kirkhope as to the water supply and general condition of the villages which drain into the burns which pass through his farm. The population of Fergushill is 537, of Bensley 318. There have been during the last two years over 100 cases of enteric fever in these villages. It is the usual fate of every new-comer to have this "fever of the place." From a return furnished by the local Registrar, I find that since 1st January, 1883, there have been 5 deaths from "gastric" or "enteric" fever. Of these 4 were in 1883, which gives a death-rate of 4.67 per 1,000, that of Glasgow for the same year being 0.3. As to the unhealthiness of the cattle, and its relation to impure water, I have the following letter from Mr. M'Gill, V.S., Stewarton:—

"Stewarton,

"September 11th, 1884.

"Dear Sir,

"I hereby certify that I visited and examined two Cattle at the farm of South Fergushill (Mr. Kirkhope's), on 26th June last. I found one cow suffering from diarrhœa and very much fevered. There was a very offensive smell from her breath, and the fœcal evacuations were perfectly black and very offensive. The other

cow was also fevered and suffering from severe irritation of the kidneys, the urine being scanty and offensive in smell. After examining the Cattle, and finding no probable cause for these diseases, I suspected that it must arise from some defect in the water supply, and went to the fields to examine it. The water was running in a scanty stream, and was very black and filthy looking, and in stagnant pools it was coated over with a black fluid of sewage. The sewage from the two rows of colliers' houses was entering directly into the stream at the corner of the field, and above these houses and the other farm the stream of water was quite clear. The two Cattle I attended recovered, so that I had no opportunity of making a post-mortem examination. I am firmly of opinion that the polluted water supply was the source of the disease, and that the water was perfectly unfit to be consumed by Cattle with safety.

“ Yours truly,

(Signed) “ WM. G. M'GILL, V.S.

“ Dr. Russell,

“ Sanitary Department,

‘ 1 Montrose St., Glasgow.’”

In a letter dated 11th Sept., Mr. Kirkhope says—“ I am sorry to say that four of our cows have been suffering severely since you were here, and we were obliged to send for our local Vet., Mr. Merry, Irvine, who distinctly says that the disease they are suffering from is caused by the impure water they are drinking.” I saw the sewage oozing into the burn at Fergushill. There had been heavy rain on the night preceding my visit, and when the samples were taken from the two burns on the 9th, they were in flood after another heavy fall of rain. Dr. Clarke's analyses, therefore, give no idea of the state of things during dry weather, as to which there is a concurrence of local testimony. The aspect of the Fergushill well—a hole in the middle of the hollow square formed by the miners' cottages—was quite as repulsive as the analysis of the sample taken. The well which supplies the farm is sunk in the middle of the yard, and the analysis shows that it also is contaminated. As to the farm steading it is in bad repair, but in general very clean, and the farmer evidently does his best in the adverse circumstances imposed upon him. The following are the analyses referred to:—

## ANALYSES.

Analysis of a sample of water from a spring pump well at South Fergushill Farm, Kilwinning, Ayrshire, marked No. 132, received on the 10th inst.

	Grains Per Gallon.
Carbonate of Lime, - - - - -	3·64
Carbonate of Magnesia, - - - - -	1·16
Sulphate of Lime, - - - - -	5·68
Chloride of Calcium, - - - - -	1·00
Chloride of Magnesium, - - - - -	2·50
Chloride of Sodium, - - - - -	4·41
Nitrate of Soda, - - - - -	4·80
Phosphates, &c., - - - - -	·28
Silica, - - - - -	·14
Organic and Volatile Matter, - - - - -	6·77
	<hr/> 30·38
Free Ammonia, - - - - -	·0016
Albuminoid Ammonia, - - - - -	·0028
Nitric Acid, - - - - -	2·57
Oxygen required for readily oxidisable Org. Matter,	·057

The results of my Analysis show that this Water is grossly contaminated with the products of sewage, and although these seem to be in an oxidised condition at present, such a large proportion of Nitric Acid indicates that the soil in the neighbourhood of the well is saturated with sewage matters, and the use of such a Water is, in my opinion, attended with great danger.

JOHN CLARK, PH.D.,  
*City Analyst.*

Analysis of a sample of water from public dip well in Fergushill Village, Kilwinning, Ayrshire, marked No. 133, received on the 10th inst.

	Grains Per Gallon.
Carbonate of Lime, - - - - -	2·80
Carbonate of Magnesia, - - - - -	1·28
Sulphate of Lime, - - - - -	8·57
Sulphate of Magnesia, - - - - -	·83
Chloride of Magnesium, - - - - -	1·49
<i>Carry forward,</i> - - - - -	<hr/> 14·97

	Grains Per Gallon.
<i>Brought forward,</i>	14·97
Chloride of Sodium, - - - - -	5·13
Nitrate of Soda, - - - - -	4·32
Phosphates, &c., - - - - -	·84
Silica, - - - - -	·56
Organic and Volatile Matter, - - - - -	4·32
	<hr/>
	30·14
Free Ammonia, - - - - -	·0098
Albuminoid Ammonia, - - - - -	·0042
Nitric Acid, - - - - -	2·310
Oxygen required for readily oxidisable org. matter,	·185

This Water is grossly contaminated with the products of sewage matter, and its composition is similar to what would be obtained by filtering a mixture of 1 part of Glasgow sewage and 4 parts of pure Water through a porous soil. In my opinion the use of this Water for dietetic purposes is attended with great danger.

JOHN CLARK, PH.D.,  
*City Analyst.*

Analysis of a sample of water from Fergushill Burn in Ward's Field, near the fallen tree, Kilwinning, Ayrshire, marked No. 134, received on the 10th inst.

	Grains Per Gallon.
Carbonate of Lime, - - - - -	6·06
Carbonate of Magnesia, - - - - -	Trace.
Sulphate of Lime, - - - - -	1·52
Chloride of Magnesium, - - - - -	·90
Chloride of Sodium, - - - - -	1·33
Nitrate of Soda, - - - - -	Trace.
Phosphates, &c., - - - - -	·28
Silica, - - - - -	·42
Organic and Volatile Matter, - - - - -	3·87
	<hr/>
	14·38
Free Ammonia, - - - - -	·010
Albuminoid Ammonia, - - - - -	·014
Nitric Acid, - - - - -	Trace.
Oxygen required for readily oxidisable org. matter,	·385

This water contains more organic impurity than is found in good drinking water, but there is not sufficient evidence that the impurity is derived from sewage matter; and, although I could not recommend the use of this water for household purposes, I am not prepared to say that it is unfit for cattle.

JOHN CLARK, PH.D.,  
*City Analyst.*

Analysis of a sample of water from Bensley Burn at a point after passing under the railway, near a large Saugh Tree, marked No. 135, received on the 10th inst.

	Grains Per Gallon.
Carbonate of Lime, - - - - -	5.29
Carbonate of Magnesia, - - - - -	.31
Sulphate of Lime, - - - - -	.70
Sulphate of Magnesia, - - - - -	1.66
Chloride of Magnesium, - - - - -	.20
Chloride of Sodium, - - - - -	2.18
Phosphates, &c, - - - - -	.35
Silica, - - - - -	.63
Organic and Volatile Matter, - - - - -	4.28
	15.60
Free Ammonia, - - - - -	.006
Albuminoid Ammonia, - - - - -	.015
Nitric Acid, - - - - -	None.
Oxygen required for readily oxidisable org. matter,	.857

This Water is too impure in my opinion to be used for dietetic purposes, but, as the impurity seems to be of vegetable origin, I am not prepared to say that it is unfit for cattle.

JOHN CLARK, PH.D.,  
*City Analyst.*

There are 20 milk cows at South Fergushill Farm. The following is a statement of the milk sent into Glasgow during the month of August, and the amount supplied by the agent to the three institutions:—

	Despatched from Fergushill.	Western Infirmary.	Belvidere.	Royal Infirmary.
Sweet milk (gallons),	908	1,607	2,292	1,551
Skim do. do., ...	—	1,011	416	761
Cream (gills), ...	—	186	62	480

Though the milk sent from Fergushill is accounted for and charged as sweet, it was all despatched as skim and cream. It

left Montgreenan Station every morning at 7.51, reaching St. Enoch's at 9 a.m. The morning milking was, therefore, kept 24 hours on the premises, the evening 12 hours. The Saturday morning milking was despatched on Saturday evening. Therefore the Monday morning's despatch comprised milk which was 36, 24, and 12 hours old. These facts are of importance, as I believe milk skimmed by the farmer is the most dangerous, if there is danger. It is longest exposed to local influences, and the specific germ multiplies, and so intensifies the specific energy before it reaches the consumer. Milk is delivered at all the hospitals morning and evening in about equal quantities of each sort on each occasion. The average afternoon supply would therefore be :—

	Western Infirmary.	Belvidere.	Royal Infirmary.
Sweet (gallons), ... ..	26	38	26
Skim, do., ... ..	17	7	13

It is obvious, therefore, that while the proportionate amount of the Fergushill supply was small, it was amply sufficient on any one day to yield the whole or the larger part of this delivery at each institution, in the chances of the daily distribution, being 25 to 30 gallons on the daily average, and on Mondays 40 to 45 gallons. But after milk has been traced from any source into the agent's hands, it is useless to speculate as to the mode of its distribution, and the chances of its turning up here or there in the various channels by which it leaves him. Of course it is not probable that the hospitals absorbed this particular milk invariably. Indeed, though I am not yet in a position to give details, I have evidence that it has produced disease among other consumers of milk from the same agency. The agent admits that it may have reached these Institutions at times.

I find from personal enquiry that the condition of this district of the rural parish of Kilwinning is a matter of public notoriety. The villagers, the doctors, the farmers, everybody is alive to it. I was shown letters in the *Irvine Herald* about it. The Local Authority and the landlord alone are indifferent to it. There could be no more glaring proof of the hollow farce of rural sanitary administration in Scotland than we obtain by looking from this state of things in the parish of Kilwinning back upon the circulars issued by the Board of Supervision specifically upon the sanitary inspection of dairy farms, beginning with 25th Nov., 1875, and ending no further gone than 27th August, 1884. That circular



was addressed to the Clerk of the Local Authority of Kilwinning, as of every authority in Scotland, and informed him as follows:—  
 “ The provisions of article V. of the Directions and Regulations  
 “ issued on the 28th July, 1884, shall extend to and include water  
 “ used in Cow-houses, Dairies, and Milkshops, either by Milch Cows  
 “ or for the purpose of washing and cleansing vessels intended to  
 “ contain milk, or for any other purpose connected therewith.”  
 Said Article V. enjoins with all the authority of an Order in Council in anticipation of Cholera, and for the second time in two years—

“ V. In any case in which there is any doubt as to the whole-  
 “ someness of Water used by the inhabitants as a beverage, or for  
 “ dietetic purposes, the Local Authority shall take immediate  
 “ steps to ascertain the quality of such Water, and if it shall be  
 “ certified after analysis by a competent Analytical Chemist or  
 “ by a qualified Medical Practitioner that the Water of any  
 “ Well or other source used as a beverage or for dietetic purposes  
 “ within the jurisdiction of the Local Authority is so tainted  
 “ with impurities, or otherwise unwholesome, as to be injurious  
 “ to the health of the persons so using it, or calculated to promote  
 “ or aggravate choleraic or other epidemic, endemic, or contagious  
 “ disease, the Local Authority are hereby required to take prompt  
 “ measures for procuring wholesome Water to be supplied in its  
 “ stead, so far as the case requires, to the inmates of the houses  
 “ situated within the limits of their jurisdiction, and to prevent  
 “ the use as a beverage or for dietetic purposes of the unwhole-  
 “ some Water, by shutting up any Well or Wells from which it  
 “ is drawn, or otherwise as the circumstances may require. If  
 “ the Medical Officer shall have reason to believe that any Water  
 “ used as above stated is unwholesome, the Local Authority shall  
 “ at once prevent its use until it has been analysed.”

The Local Authority put the Circular in their waste basket, and it has been left for you, in self-defence, to obtain these analyses. It now remains for you to forward the results to the Board of Supervision in the hope that some means may by it be found to compel the Local Authority to do their duty. It is by such by-paths that Cholera will find its way into our large cities.

JAS. B. RUSSELL.

SANITARY DEPARTMENT,  
 1 MONTROSE STREET,  
 18th Sept., 1884.