Scarlatina and scarlatinal sore throat : a record of milk infection / Archibald K. Chalmers.

SCARLATINA AND SCARLATINAL SORE THROAT:

A RECORD OF MILK INFECTION.

BY

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REPORT

ON THE PRESENCE OF SCARLET FEVER IN THE NORTH-WESTERN DISTRICT OF THE CITY OF GLASGOW IN DECEMBER, 1893.

In December, 1893, several cases of scarlet fever occurred in the north-western district of the city, associated with the milk distribution from two dairy farms in the neighbourhood. This association was ultimately seen to be numerically of a very definite character, for, of a total of 30 cases of scarlet fever notified to us as occurring during the month of December in all the added area to the north-west of the city, which was not originally either Hillhead or Maryhill, 28 were consumers of the milk in question, although its purveyors shared the business of the district with other large dairies. We shall designate the two farms as A and B.

Attention was at first attracted to Dairy A, but it should be stated that three children in families using B milk exclusively sickened on October 24th, November 2nd, and November 7th respectively. These cases are mentioned because the suggestion of a common origin always arises in such circumstances. No evidence in support of this suggestion could be elicited, and for this reason they are excluded from further remark.

It will render the description which follows more easy of apprehension if we here introduce, in the form of a table, a record of the dates of sickening and notification of the cases under discussion, it being understood that the figures

refer to consumers who were not engaged in the milk traffic, unless this is specially mentioned :—

TABLE.

Date.	A Milk.		B Milk.	
	Sickened.	Notified.	Sickened.	Notified.
Dec. 5, . . .	1	—	—	—
,, 6, . . .	—	—	—	—
,, 7, . . .	1	1	—	—
,, 8, . . .	—	—	—	—
,, 9, . . .	—	1	—	—
,, 10, . . .	—	—	—	—
,, 11, . . .	2	—	—	—
,, 12, . . .	4	—	—	—
,, 13, . . .	4[1]	—	—	—
,, 14, . . .	—	2[2]	—	—
,, 15, . . .	2	4	—	—
,, 16, . . .	1	2[2]	—	—
,, 17, . . .	1	—	—	—
,, 18, . . .	—	5	2[7]	—
,, 19, . . .	2[3]	1	4[7]	1
,, 20, . . .	1[4]	—	—	1
,, 21, . . .	2[5]	1	1	1
,, 22, . . .	1[6]	3	—	1[7]
,, 23, . . .	—	—	—	1[7]
,, 24, . . .	—	—	—	—
,, 25, . . .	—	2	1[7]	2
,, 26, . . .	—	—	2	1[7]
,, 27, . . .	—	—	—	—
,, 28, . . .	—	—	—	2
	22[8]	22	10	10

[1] Two of these obtained milk A from a dairy in Byres Road, and some days elapsed before this was known. [2] One had milk from Byres Road dairy. [3] One of these was byreman at farm. [4] Household already infected. [5] One in household already infected. [6] Second milkboy. [7] One on each of these dates was a milker. [8] J. H. not included in this table.

It will here be seen that, towards the middle of December, and more especially on the 15th of the month, notification, and the usual enquiry which follows, made us aware that the A milk supply required investigation. On the same day we were favoured with a call from a gentleman resident in the centre of the outbreak, whose personal knowledge of the cases not yet notified was of much assistance to us.

A preliminary enquiry on the same evening at the farm led to an examination on the 16th and 18th of those engaged in the milking and despatch of the milk. The condition then ascertained to be present will be best described by extracts from notes made at the time of examination. The first four were examined on 16th December, the others, who were not present at this visit, being seen on the 18th.

Memorandum as to Sickness at Farm A, examined 16th December.

(1) J. H., milkboy, came from Rutherglen on 24th November, having been formerly in employment on a farm near Carmunnock, but with an interval of about four weeks between leaving it and going to Farm A. For a day or two at the end of the week ending 2nd December he had sore throat, and did not take his food well. On examination now, only some enlarged papillæ were found towards tip of tongue, and the fauces had a dull red appearance. He was sent to the Reception House for observation.

(2) P. B, milkman.—This man drives the cart from which H. and other two boys deliver milk to the A customers. He had a sore throat on Saturday and Sunday, 9th and 10th December, which he attributes to cold. There is at this date nothing suggesting scarlet fever on his person, and his own impression is that it was simply a cold, from which he frequently suffers.

(3) J., daughter of the farmer, and one of the milkers, had sore throat also on 9th and 10th December. She was slightly off food on latter date, but there was no sickness.

(4) J., another daughter. — On 10th December there was some pain on the right side of throat, probably in the sterno-mastoid glands. Neither she nor her sister now present any indication of scarlet fever.

(5) P. C., byreman, who also milks, examined on 18th December. Nothing suggesting scarlet fever is detected. Has had no symptoms.

(6) M., younger daughter, also milks. No evidence or suggestion of scarlet fever.

There was here, therefore, a history of illness of which the leading symptom was sore throat, and the association of the cases suggested that it was of an infectious character. Moreover, scarlet fever was recognisably attacking the consumers of the milk handled by the people who had the form of sore throat referred to, and it was the direct suggestion of these events that the infection of scarlet fever had been introduced among the farm hands in the person of the boy J. H., and had reached the consumers through the milk. On this assumption the boy was removed, in the first place, to the Reception House for observation, and, after some days, it was agreed that his symptoms warranted his removal to Hospital. Meanwhile such disinfection of the farm buildings as seemed necessary was carried out, and, there being no further evidence of active infection, the sale of milk was allowed to be continued. On the 19th, however, the byreman (P. C., above mentioned) sickened, and his illness proving to be scarlet fever of a malignant type, he was removed to Hospital on the 21st. On the day of his removal to Hospital the sale of milk was suspended, and the last person who sickened was a boy who assisted in the distribution of the milk. He resided with his parents at Claythorn, and sickened on 22nd December.

The milk sent out from this farm may be averaged at from 60 to 70 gallons daily, inclusive of skim milk and cream. By far the larger part of this was delivered from a cart sent to consumers residing in Kelvinside, in the neighbourhood of Great Western Road. This cart also supplied two dairies in

Byres Road, each with a variable quantity of sweet milk, skim milk, and cream, and it also supplied some customers in Maryhill. We have been supplied with a list of 57 families, exclusive of the customers of the Byres Road dairies, thus obtaining milk directly from the cart, and 50 of these are resident in the neighbourhood of Great Western Road. Very little skim milk was disposed of among this group, but it should be noted that one family in the Maryhill distribution, supplied only with skim milk, had one member sickening of scarlet fever. In addition to this, there was another area supplied with milk from the farm, namely, 23 families residing in Claythorn and Skaterig districts, off the Crow Road. These families all sent to the farm for their milk, and a large part of the skim was sold in this way; indeed, most of the skim milk was consumed by this branch of the distribution and by the Maryhill consumers.

This division of the supply is important. The cart delivery was under the charge of the milkman, P. B. (No. 2 in the list of servants before stated), and he was assisted in the distribution by three boys—one of them being J. H. (No. 1 of same list), and another, the boy already mentioned, who sickened on 22nd December. The milk sold at the farm, on the other hand, to messengers from the Claythorn and Skaterig houses, was not at any time in charge of those who managed the cart distribution.

In these two branches of the consumers we have a list of 80 families, exclusive of an unknown number who obtained their milk from the Byres Road dairies, and a few others who occasionally obtained it from the cart on its way to Maryhill. Of these 80 families, 11 (or 13·7 per cent.) contracted scarlet fever, yielding 18 cases, and 17 of these cases were in 10 households of the 50 previously mentioned as residing in the neighbourhood of the Great Western Road. These will be remembered as consumers to a large extent of sweet milk and cream. The Skaterig and Claythorn consumers entirely escaped infection, except the second milkboy, already mentioned, who was associated with J. H.

in the distribution of the milk from the cart. Two cases occurred in separate families, both obtaining A milk from one of the Byres Road dairies. Obviously the cases followed the cart traffic, and will be again referred to.

B Milk.

Here, again, we were indebted for the first note of warning to the intelligent interest taken in their food supplies by that section of the population which has chiefly suffered in connection with this outbreak.

On 20th December, a gentleman called at the Sanitary Chambers to inquire regarding this supply. His reason for anxiety was as follows:—On the 18th two of his household, and on the morning of his visit a third, fell ill of a throat condition of a patchy character.* His neighbour's household suffered in a similar manner in four of its members, and both had their milk supply from B Farm. On the same day it was reported from Belvidere that a girl admitted on the previous day under a certificate of diphtheria, from a household using B milk, proved to be suffering from scarlet fever.

A visit to the farm was made the same evening, when it was found that one of the milkers had, only an hour or two previously, been sent home, because she complained of sore throat, and had been unable to continue at work. This girl could not be traced till the following day, when she was examined in her home in the east end of the city, and her illness recognised to be scarlet fever. The farm was again visited the same evening, and another of the milkers, who slept with the one just referred to, was found complaining of sore throat. The first milker who sickened fell ill on the evening of the 18th, but with no marked symptoms beyond that her skin felt uncomfortably hot to her companion. Next day she had sore throat, but kept at work, without complaint, till the evening of the 20th, when she had to cease work, and was sent home. Her illness was by no

* One of these has since been certified as suffering from scarlet fever.

means well defined, and her companion's even less so. In this latter girl there was a definite complaint of slight sore throat, dating from the 19th, and she was removed on the evening of the 21st, first for observation, and finally to Hospital. Thereafter two more of the consumers sickened, and a third milker had sore throat on the 25th, but otherwise with symptoms still less defined than those of the milker removed on the 21st. These three girls all slept in one bed, and the presence of recognisable scarlet fever in the first to fall ill supplied the key by which to interpret the sore throat of the others.

None of the milk produced at B Farm was sold after 26th December.

In all, four households of consumers were affected, yielding 7 cases. The milk distributed from B Farm exceeds 300 gallons daily. About 70 gallons is produced by cows kept at the farm, the rest is imported from various farms in Lanarkshire, Ayrshire, and Dumbartonshire—all of which were, on enquiry, reported free from infectious disease. Further, all the milk cattle at A and B Farms were examined, and it fell to be noted that there was an entire absence of those teat eruptions and other symptoms which, in previous outbreaks both here and elsewhere, have been found to co-exist with scarlet fever among the consumers of their milk. In these byres the teats and udders were absolutely healthy.

We are now in a position to make some observations on the principle which guided the policy of the Department in dealing with these milk supplies. Two objects had to be kept in view—first, the protection of the consumers against the risk of infection; and, second, the protection of the trade interests of the farmer from unreasoning panic. To accomplish both objects meant a line of action which interfered with the farmer's business only to the extent of ensuring that the milk should reach the consumers by other hands than those which were either demonstrably or by implication associated with a present power of infection.

From the beginning of the enquiry, it has just been said, that no infectious character could be alleged against the milk as obtained from the cows on either farm; but infection clearly followed the use of the A milk in certain cases, and this power must have been acquired either during milking or delivery. We have already seen that from the cart distribution alone did cases follow, and that the cases were not in number such as might be expected if the whole amount thus distributed was affected. They suggested rather the occasional contamination of small quantities, such as might happen were the individual carrier of the milk, from the cart to the household, the source of infection. Our first information pointed to the boy J. H. as the actual carrier to those households, but later we learned that such was not invariably the case. The milk vessels used for measuring the milk and carrying it to the houses were used, however, indiscriminately in most cases, and a given dish might, in successive deliveries, pass from the driver to each milkboy in turn, or *vice versa*.

At our visit to A farm on 16th December, when it was decided to remove the boy J. H. for observation, there remained no recognisable source of infection on which to interdict the sale of milk, the possibility that any of the other farm-hands might then be incubating the disease being manifestly too intangible a basis on which to found legal interference. It was suggested, however, that the interests of this business pointed to removal of the milk cows to another byre, and to the distribution of the milk by an entirely different staff, but this, at the time, the farmer believed to be impracticable. After the byreman sickened, however, the suggestion was acted upon to the extent of transferring the cows yielding most milk to other premises, the milk of those remaining being churned.

Owing to the extent of the B business, the distribution of about 30 gallons only of the produce of the farm could be separated from the general distribution of imported milk, but the dairyman was quick to recognise the risk

to his business which the occurrence of sickness in three of the milkers implied, and the cattle themselves being, as before stated, healthy, he at once made an effort to have them removed to a byre in Maryhill. This, however, could not be arranged, and the milk of these cattle was withdrawn from circulation and churned.

The first illness on this farm began on the 18th December, and it is known that the families and dependents of both farms were on terms of familiar intercourse.

Two aspects of this outbreak will bear further remark. One is the responsibility of the milk purveyor for the health of his employés. This has been frequently pointed out in the past, but the farmer has not yet accepted the teaching.* It is a matter of common acceptance that infectious disease has often gained access to the source of a milk supply under the simple guise of a "common cold;" the rude awakening which follows may mean commercial disaster to the farmer. The relationship of infectious disease to a milk supply is of an extremely delicate character, and the plain duty of the farmer is to allow no one with symptoms of illness, however apparently trivial, to have anything to do with his milk trade while the symptoms continue, or until they are clearly not of such a character as, to a trained observer, would suggest the possibility of infection.

The second aspect of this outbreak to which we would direct attention is primarily of a medical character. It is a feature of all outbreaks of infectious disease that along

* The following occurs in a pamphlet, "On the Sanitary Requirements of a Dairy Farm," by Dr. Russell, which was drawn up at the request of the Local Authority of Glasgow, for the information of persons engaged in the milk trade in the District, and issued by them in 1889, to the number of 2,000, to farmers and dairymen, and to the Agricultural Society for distribution. It is from Section IV., which deals with "Disease in man in relation to milk":—

"The only safe rule for a farmer to follow is to let no one who is not in perfect health handle his milk. Infectious diseases taper off into slight forms, only recognisable when associated with well-marked cases. Scarlet fever, especially in adults, may produce merely a sore throat, or a blush on the skin which may never be observed. Enteric fever may lurk in what seems to be a simple diarrhœa or 'weed.' It is not ill health which has continued for some time, so much as the sudden indisposition which overtakes a previously robust and healthy person, which has to be suspected."

the stream of well defined and easily recognisable cases there extends a margin of less defined cases, diminishing in intensity and definition, until it is only by association that many are recognisably related to the main current. Cholera has its fringe in cases of diarrhœa of diminishing intensity, until finally it is lost in apparently simple diarrhœas. So also has enteric fever; and we have, in this city, just passed through a similar experience in regard to the eruption of small-pox. The margin of a scarlet fever epidemic consists of cases of associated sore throat, and reference has already been made to the unusually large proportion of these which occurred in the consumers of the milk under discussion.

How are these vanishing points of infection related to the cases which are easily recognisable? They are due to the same cause, and for at least the time of their duration must be held to be capable of a certain power of infection, but they do not come within even a liberal reading of any clinical description of cholera, or enteric fever, or scarlet fever, and consequently escape notification. In some instances in connection with the disease last named, later symptoms may indicate their true character, but such are always open to the suspicion that this might have been recognised by continuous observation at the beginning.

The byreman and second milkboy of the A staff had the disease in a well-marked form from the beginning, and the first of the B milkers to sicken had also symptoms which were recognisably those of scarlet fever, although they were by no means of a marked character. Indeed, the impression of the first Doctor who saw her was that she suffered only from a simple tonsillitis. It is impossible to say what impression one would have formed if an opportunity had occurred of examining the boy J. H. at the time he sickened, and the nature of the throat affection from which the others at A Farm suffered is an inference based entirely on their association with unmistakeable cases. We had the advantage of seeing the second and third milkers who

sickened at B Farm, and only after most careful examination could we decide that their removal to Hospital was warranted.

There must always remain a difficulty in recognising cases of this type, but it is one primarily of scientific interest. Meanwhile, farmer and milk consumer alike are exposed to risk, the one to his trade and the other to his health, and it would seem to be in the interests of both that the provisions for dealing with disease in connection with dairies should be amended so as to bring at once under observation the various guises under which infection may imperil our milk supplies.

Clause 9 of the Dairies, Cow-sheds, and Milk-shops Order of 1885 imposes a penalty on any cowkeeper who allows any person suffering from a "dangerous infectious disorder" to take part or assist in the conduct of his trade as a milk purveyor; but, for cases of the type just mentioned, this definition is too inflexible. The same objection might be urged, with equal force, against any definition of a disease the nature of which is rather a question of inference than of dogmatic assertion. Moreover, as the cowkeeper would justly refuse to accept the responsibility of distinguishing between the milder types of infectious disease and the simpler diseases which they simulate, it would appear that only by a system of periodic medical examination of all persons engaged in the milk trade are these milder forms of infection likely to be recognised in time to prevent milk contamination.

APPENDIX.

Dr. Marsh, Assistant Resident Physician, Belvidere Hospital, has supplied me with the following notes of the clinical appearances presented by J. H. and the B. milkers on admission to Hospital:—

(1) J. H., aged 16, milkboy No. 1 of Farm A.
Admitted December 21st, 1893, *at about 21st day of illness.*
Temperature, normal.

No desquamation of cuticle noted. Urine normal. The throat still presents the following conditions suggestive of scarlatina anginosa, viz.:—a state of congestion amounting to a dull bluish red, almost claret colour, of the parts at the back of the throat, but more especially of the pillars of the fauces, the uvula, and tonsils, and a large part of the soft palate. Tonsils slightly enlarged. The whole surface of the tongue is red and clean, and presents red and exaggerated papillæ. The lymphatic glands on the left side of the neck are moderately enlarged.

(2) A. C., first milker to sicken on Farm B., aged 17.
Admitted 23rd December, 1893.
Temperature on admission, 99°·4 F.

The condition of the throat is suggestive of scarlet fever. There is well-marked and uniform congestion of the fauces and soft palate. The tonsils are enlarged, and present several small irregularly distributed patches of exudation. Glands of the neck a little enlarged. Papillæ on dorsum of tongue also enlarged and congested. There is a faint scarlet blush on the chest, sides of the neck, abdomen, and extremities, which is affected by pressure. In this milker and her companions the exanthematous eruption

on the fore-arms and hands is intimately associated with an eczematous one, of a papular nature, due to exposure of the parts in washing, &c. The eczematous elements are unaffected by pressure.

(3) S. T., aged 18.
Admitted December 23rd, 1893.
Temperature on admission, 98°·8 F.

The angina condition in this case is also suggestive of scarlet fever. There is a distinct scarlatiniform rash on the soft palate and neighbouring parts. The redness is most intense on the uvula, the anterior palatine arches, and the tonsils; the latter are slightly enlarged. The dorsum of the tongue is covered with a white, cream-like fur, and presents enlarged and congested papillæ projecting through this fur; the edges and tip are of a bright red colour. There is a faint scarlet efflorescence on the skin of the trunk and extremities, which disappears on pressure. Cervical glands very slightly enlarged.

(4) K. M., aged 20.
Admitted December 26th, 1893.
Temperature on admission, 99°·6 F.

The skin over the legs, feet, and upper extremities presents a faint scarlet blush, which disappears on pressure. The tongue is slightly furred, and presents a few enlarged and red papillæ at the edges and tip. The parts at the back of the throat are congested and swollen. The tonsils are enlarged and are covered irregularly with small patches of whitish exudation. Cervical glands on left side are enlarged and a little painful.