Milk - Scarlatina:

The outbreak of Scarlatina in the Stapleton Urban Sanitary District, and its connection with the milk supply

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Milk-Scarlatina

We have in the above subject, I need hardly say one of the most interesting scientific problems of modern times. It has for a long time been suggested that milk, by some means or other, has been the vehicle of conveyance of Scarlatinal infection, and within the last few years it has been directly asserted, and, as I think, proved. I shall endeavour in this thesis to bring such facts forward as will convince, that some epidemics at least, have connection with the milk supply.

I am far from believing that all epidemics, or any case of Scarlatina, is connected with the milk distribution; indeed it is happened that in one year — the year 1889 — it was my lot to deal with two epidemics of Scarlatina; the one propagated by means of the milk, and the other not.

I will first briefly notice the second outbreak, that propagated by human agency, because it is commonly accepted as the most frequent and important factor in the distribution of Scarlatinal infection. It occurred in the same district as the March epidemic, and attacked 28 persons in 11 families. There was no common milk supply, and

Scarlatinal epidemic connected with the milk supply, but propagated by human agency

the schools were closed for the holidays.
One infant was first attacked. It had been taken by its mother to see an aunt in the city who was suffering from Scarlatina: two or three days after (July 4th) the child sickened with the fever and died on the 28th. It is interesting here to note that the mother who was exposed to the same infection as the child did not take ill until the 16th. - no doubt owing to the subsequent exposure to a more virulent form of the malady developed in the child.
The next case after the child appeared on July 6th, another on the 7th, two on the 8th, two on the 9th and one on the 10th. after these comes the mother of the child on the 16th.
This series of cases occurred in a row of 8 houses, 5 of which were affected. The infection then was brought by the child to this neighbourhood, and their acquaintances in the row, by constantly paying into each others houses did the rest. The method of its further spread I need hardly go into; the parties were chiefly on visiting terms and besides 3 of the affected children were frequently found playing in the streets while ailing. I found them twice myself, and they were cases for prosecution.
The second series of cases from July 20th to Sept 12 all lived within a few doors of each other in the same street.

Table of Cases

July	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	Sick	Possible source of infection
Bradham (Inf.)				/												A.	Aunts in City
Hen. Fudge						/										C	neighbours
Annie "							/									.	.
Eliz "								/								.	.
A. Williams								/								G.	.
Hy. Long									/							C	-
Fred. White									/							C	.
— "										/						C	.

July cont'd	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	31st		
Bradham	/																A	own child
Mary Mumph					/												D	Long's
Infr "						/											"	"
J. Sherry							/										C	Street
S. "								/									"	"
Jas. "									/								"	"
4 others "														4			"	brother
F. Thornell								/									B	Long's
Baby "												/					"	—
Jas. Maynard								/									Not known	Street
Thos. "									/								.	.
G. "										/							.	-
F Lander															/		.	Funeral
I. "				Augusta				15th									.	brother
A Wiltshire				"				28th									.	Maynard
I -				Sept				8th									-	brother
S. "				"				12th									.	"

During the above period Scarlatina was epidemic in the City, as well as all over the country: in London especially it for a long time will be remembered.

Medical Officers of Health must have experienced, and dealt with, many such epidemics where there was no possible milk agency in spreading. In some recent observations(1) Dr. Whitside Kime, the late Med. Off. of Health for Bradford, affirms that the Bradford epidemic of 1887 was not propagated by milk: On reading his report carefully, we has no difficulty in agreeing with him, at least, to the extent that milk was not the chief agent in its spread.

Dr. Kime on Epidemic of Scarlatina in Bradford

Our own observations

The subject of Milk-Scarlatina has brought into prominence many skilful and painstaking observers, who, if they have not succeeded in incriminating the cow, have at least brought before us many interesting results.

The difficulty does not seem to lie as much in convicting milk as a vehicle of conveyance as in finding out the primary source of the infection, either through a pathological condition in the cow, or after the milk has left the cow.

Milk-the occasional agent of Typhoid

Milk has over and over again been proved to be the infecting agent in outbreaks of Typhoid Fever: the method by which it receives its infecting qualities being generally clear — by washing milk cans &c. with water fouled by intestinal excreta

(1) In a recent report issued by the Privy Council on the Contagious Diseases of Scarlet Fever in Cows in relation to Scarlatina in Man, prepared by Prof. Brown.

~~x~~ by the addition of such water to the milk or according to D. Brown[1] (the Insp. Of. of Health of Carlisle) through Typhoid fever in Cows, a specific Enteritis.

Milk - the disseminating agent in Diphtheria

In an outbreak of Diphtheria at Jesmond Dene and Camboley in the Tantham Rural Sanitary District, Mr. W.H. Power[2] convicts the milk as the disseminating agent, although the method by which it received its infective properties was not known, but was supposed to have been contaminated before leaving the farm.

Milk - the disseminating agent in Scarlatina

The same able Observer, Mr. Power has on other occasions demonstrated the connection between Scarlatinal Epidemics and milk; the most noteworthy being the St. Giles and St. Pancras epidemics of 1872[3] and their relation to the milk supplied from a Surrey Farm, and the St. Marylebone epidemic[4] 1885 and its connection with milk supplied from a dairy farm at Hendon.

Dr. Buchanan the medical Officer to the Local Gov. Board in an introductory report giving the papers of Power, Klein & Bamford dated April 1886. says:- "Within the experience of the Board there have been 15 instances where one or other of these diseases (Enteric fever, Scarlatina or Diphtheria) has been shown upon sufficient evidence to have

(1) In a paper read before Brit. Med Assoc. at Glasgow. See B. M. Journal Aug 25th/88 page 413
(2) Reports to Local Government Board 1886-7.
(3) Page 63 in App. A No 9 in Reports to the Gov. Board on outbreak of Scarlatina in London by the [illegible]
(4) Reports to Local Gov. Board for 1885- by Power, Klein &c.

been distributed with the milk service of the families invaded, and further in the case of Scarlatinal outbreaks it was inevitable that infection of the milk by human agency should present itself as the readiest explanation of the facts, but as successive epidemics have occurred and have been found capable of more exact study, distrust of this explanation has arisen, and the means by which milk receives its infective properties has come to be regarded as unknown — as possibly being related to the milk, as a secretion of the cow."

The Hendon Cow disease

The much discussed Hendon Cow disease and its bearing on the infected milk has of late attracted much attention and many papers on the subject have been written. Mr Power in his report to the Local Government Board on this outbreak establishes the connection between the scarlatina in London, and the milk from the dairy at the farm. In considering the means by which the milk became infected he excludes external scarlatina — that is from a human source, and directly convicts the cows of complicity.

The symptoms of this cow disease, which causes scarlatina in man, are chiefly vesicles and ulcers on the teats and udder and loss of hair in patches, constitutional symptoms not being marked.(1)

(1) See Dr Cameron's account. proceedings of Epidemiological Soc 1875-6.

Mr Power was assisted in the pathological and bacteriological part of this investigation by Dr Klein, who remarked on the striking differences between these ulcers and Cow-pock and Sheep-pock under the microscope.(1) and also on the noteworthy fact that milch, while in the udder, did not contain the streptococci, but that the milch drawn from a teat extensively ulcerated contained it.(2) He says however "that we cannot draw any certain inference from this one observation."

The investigation however entered a new and unexplored region, and became additionally valuable and interesting thro' the participation of the Agricultural Department of the Privy Council in the investigation

Professor Cruickshank(3) who represented that department, made an exhaustive and careful research in the matter, and arrived at the conclusion that this Bovine Cow disease was not Scarlatina in the cow, but the true American Cow-pox — a disease not known or recognised in our time.

Principal Wallis(4) says "that in all his experience he had not met with any disease in the cow which was at all analogous to Scarlatina in man".

Arguments, many and varied, have

a Bovine cow disease in true American Cow-pox

(1) page 16 in No 2 paper to Local Gov. Board 1886
(2) " 19 " " " " " "
(3) Abstract of a report to the Agricultural Dep. of the Privy Council read before a Special meeting of the Pathological Soc. of London Dec 15 1887
(4) British Med. Journ. May 28, 88. the "Journal" Aug 25th/88 page 413.

been brought forward on both sides to prove the different theories.

It is an important fact that the same dealer who sold the (3, at first) affected cows to the Hendon farmer also sold cows to 2 other farmers, and the same disease of teats and udders spread among their stock, but Scarlatina did not result amongst their milk consumers.(1)

The question was at the end of 1888 so far from being settled has become more and more complex and intricate; and the bacteriological part of the investigation has not yielded results any more satisfactory, as two distinct and independent observers Klein(2) and Edington(3) have arrived at conclusions of a contradictory nature: But that I shall not enter into.

Nevertheless think, it more likely that the source of infection in the Hendon milk was human, as we read(4) of two of the milkers at the farm having lived in a neighbourhood where there were cases of Scarlatina, and although it is not clear that they conveyed the infection from there to the farm, it is quite conceivable that they may have done so.

matter settled

(1) Prof Crookshank's report to Privy Council see B. M. Journal Aug 20th/87 page 403.
(2) Extracts from Reports to Local Gov. Board. Appendix B. page 43.
(3) Observations on the nature of Scarlet Fever. B. M. J. June 11th/87 by A. Edington.
(4) Dr. Cameron's annual report to Hendon Local Board 1885.

Stapleton outbreak of Scarlatina

(1) In the beginning of April 1887 I, as Medical Officer of Health, was apprised of an outbreak of Scarlatina in my district — the Stapleton Urban Sanitary District. It was of sudden onset, and unfortunately virulent in character.

There can be no doubt as to the nature of the disease, as it was diagnosed by several practitioners, who were attending the different families, as well as by myself.

Fourteen cases came to my knowledge occurring in eight families; and these resulted in five deaths. It will thus be seen that altho the outbreak was not extensive, its effects were serious.

I have no doubt that 14 comprised all the cases, as I had a Surgery in the middle of the affected district, and was daily in each street, and thus was immediately informed of fresh cases either by neighbours or friends, as there was a very natural disposition and even eagerness amongst the people to have the disease stamped out.

The affected district — a suburb of Bristol — was of limited area, but populous. There had been a few sporadic cases in the City, but none any in this district for some years previous.

After a searching inquiry at the affected houses, the only common source of possible infection discovered was the milk supply.

Five of the families affected were supplied

(1) The main features of this outbreak were reported by me to the Stapleton Local Board in May 1887.

by a retail dairyman in the district and the remaining three families were supplied direct from a farm — the same farm from which the retailer got all his milk, about 12 g/s daily. No other dairyman was supplied from that farm. There was a list of milk-dealers from the city & elsewhere supplying the rest of the neighbourhood but no cases of Scarlatina were known. Save among those above indicated. This I am certain about, as, although notification of infectious diseases is not compulsory in this district, I had the assistance of neighbouring practitioners, besides having the opportunities already referred to of hearing of such cases.

Eleven of the cases might be called primary and the remaining three secondary that is to say the eleven appeared within 14 days of each other, from March 14th to April 4th, and three subsequently appeared in separate families, but in families previously attacked, between April 10th and 14th and were obviously infected from a human source.

Dr Orme says[1] "It is a notable lacuna in the evidence of these reports that usually only those cases of Scarlatina are known, which happened to harass the consumers of a particular dairy, while nothing is known or reported as to the existence of the disease

[1] Recent report issued by the Privy Council. "On the Eruptive Diseases of the Teat & Udders of Cows in relation to Scarlatina in man. An extract published in Provincial Med. Journal Jany 1st 1859 page 5.

probably prevalent in much more extensive form among those who were in no way connected with the condemned milk supply.

My conclusions might thus have been open to objection, but I did not go to the dairy-man or farmer, and get a list of their customers & find only those affected. I left my information among the people themselves.

Milk convicted as being disseminating agent

There could be no possible doubt then but that the milk was the disseminating agent; and being quite convinced of that fact my next business was to proceed to investigate the manner by which the milk became infected.

Enquiries at the dairy

Enquiries at the Retailers house elicited nothing, except of negative importance. There was no Scarlatina in any way connected with the house, and the premises were in a good Sanitary condition.

Enquiries at the farm

I next proceeded to the farm, and from the fact that the Retailer was supplied solely from them, I felt it necessary to make a very careful examination and detailed enquiries. Here also the farmer and family were free from Scarlatina, and otherwise well: This was also true of the Servants and workers about the farm, who lived in the neighbourhood. There was one exception however, a woman had been off work for a week (but was expected back next day) with a sore throat, presumably of Scarlatinal nature, he

having been infected in the same way as the others; but the first case appeared some days before his.

Examination of the premises showed them to be in a good sanitary condition. The dairy, which was in the same building as the house, was a model of cleanliness and order. The water supply and drainage were also good.

Stagnant pool near cow-sheds

I next proceeded to the cow-sheds, which were about two hundred yards distant from the house; and here a different state of things prevailed: a large stagnant pool was in close proximity thereto, and it received the drainage from several neighbouring fields, as well as the soakings from heaps of horse and cow manure which surrounded it. In rainy weather the pool was full and overflowing, but when dry, it was stagnant and foul.

The woman would not admit that the cows ever drank of this water, as they were said to have a good supply in a field near by, but after much pressing he admitted that it was possible that before he had finished replenishing the cows their first call might have been at the pool.

I was informed, however, by an intelligent and trustworthy Maid, who frequents the farm, that he has often seen the cows drink out of this pool.

The farmer and woman aver that the cows were all well and milking

and had not ailed at all for some time. I have every reason to think that he spoke the truth, as the above mentioned man, is always ready for if anything is known to be the matter — he being considerably delighted with cows — and he had not heard of anything.

Cows examined

I made a careful examination of the cows, especially as to the condition of the teats and udders, and their coats, and I was not able to detect anything specially abnormal in their condition.

Of course it is quite possible that some disorder may have existed, but was not detectable by an ordinary observer, owing to its mildness, and to the fact that the general health of the cows was not in any way affected.

Similar outbreak Wimbledon Merton

I may here draw attention to an article in the "Sanitary Record" first received (March 15/89) in which Mr Cooper (1) relates an epidemic of scarlatina at Wimbledon & Merton, traced by Dr Poddington, the medical Officer of Health of Wimbledon, and Mr C.H. Paine of the Local Gov. Board, to the milk supply. Mr Cooper says "neither at the dairy nor the farm, both situated at Merton, was any Sanitary defect discernable. At the farm 41 cows were kept housed in lofty and well ventilated sheds. In the casual observer these animals appeared in good health a fact that was verified by the

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(1) Scarlatina in its relation to Cows milk at Wimbledon & Merton read before the Epidemiological Soc. Dec. 12th 88.

Veterinary Inspector of the District, who examined all the cows, immediately after the epidemic broke out, and gave a certificate saying "the animals were in a healthy condition". Contemporaneously with the foetal outbreak, but not in any way preceding it, cases of Scarlatina occurred at the farmers house and dairy. The sudden stoppage of the epidemic was due to the stoppage of the milk distribution, on the morning of Dec 31st/86 Mr. Power arrived at the scene of the outbreak on Jany. 6th. 17 of the 41 cows were already removed, but amongst the 24 that remained some few appeared to be recovering from affection of the skin & udder, very similar to the malady reported on by Dr. Klein as having occurred amongst certain cows at Hendon" (1)

Amongst the deaths was a Lady nursing on Jany 9th/87. She was a Large built woman, & Dr. Klein on making a P.M. found the Streptococcus Scarlatinae."

This seems to show that the disease is not easily detected unless by those acquainted with the Hendon disease.

The cows, when I saw them, may already have passed over the earlier & more severe stage: or the bovine symptoms may not have been severe in the first instance, but the human symptoms would increase in severity & gravity on obtaining a more fitting nidus outside.

Dr. Klein (2) shows that the inoculation of cows (with the desquamating cuticle) & of dogs & kittens (with the throat discharges) from cases of Acute Scarlatina produced not definite results: and Dr. Geo. Klein

(1) Mr Powers report to Local Gov. Board June 14/87
(2) Annual report to Local Gov. Bd. Appendix A. No 9 pages 68 and 69

in a critical review of the Contagion of Scarlet Fever[1] says "it by no means follows, that animals, even if they are capable of becoming infected by Scarlet fever should necessarily have an exanthem or a desquamation similar in degree to that exhibited by the human subject".

It surely cannot then be concluded that when the ulcers and vesicles are absent from the teats and udders, and there is no loss of hair in patches, that, therefore there is no Scarlatina, even if the Kindom cow disease is Scarlatina.

The absence of general symptoms, such as are generally found in cases of Scarlatina, affecting the human being, such as loss of appetite, feverishness, scantiness of the milk &c are very quite as marked in the cows as the Kindom Cows[2] as in those at Hampton: although Dr. Cameron says[3] that in some cases there is fever, lasting 7 or 8 days, and in mild cases 3 to 4 days; but as he admits his observations are not all the result of personal research it must not be taken into much account.

There must be cases where the ulcers and vesicles on the teats and udders are not distinct: and the loss of hair

(1) A paper read in sect. of Pathology at Annual meeting of B. M. A. at Dublin Aug 1867
(2) Papers to Local Gov. Bd 1886. No 11 by Dr. Klein page 13
(3) Paper to Epidemiological Soc. 1885-6

is certainly a symptom of no consequence as cows are said to lose their hair from very trivial causes, and indeed at certain times physiologically.

Although these symptoms generally present in the Hendon cows — symptoms of doubtful significance, and often uncertain application, were absent from the Scarlatina cows we must not conclude that they did not give forth infected milk; indeed I feel satisfied that the milk was infected as a secretion of the cow.

The infection was clearly traced to the farm: there was no Scarlatina in, or in any way connected, with the farm; but there were conditions around the cowsheds, which were clearly insanitary and unwholesome:- the cows were living within a few feet of a large surface of decomposing animal and vegetable matter, which was bound to lower their vitality and render them liable to the influence of active forms of disease, either inhaled or taken internally.

There is no certain evidence that the germs of Scarlatina were present in the foul water. I much regret that I was not able to make a microscopic examination of the water, or the milk, with a view to the detection of the germs; my macroscopic examination of the milk however did not reveal, on standing 6 hours, the usual

thing, thick as a pudding" appearance hinted at by Cameron[1], in fact it seems quite normal and drinkable.

results Sanitary measures on epidemic

The adoption of sanitary measures — the removal of the manure to a distance, the emptying and disinfection of the pool (by means of lime) — together with the stoppage of the milk distribution, effected the entire cessation of the epidemic.

These results, I think, quite justify me in arriving at the conclusion I have, that this April epidemic was connected with the milk supply, and that the milk was infected as a function of the cow.

No doubt all the consumers of this infected milk did not take scarlatina, but that may be accounted for either by a previous attack giving protection, or by the absence of those constitutional conditions, which we know are necessary for the propagation of scarlatinal infection.

Conclusion

The Sanitarian has in this question of Milk Scarlatina a field of research full of promise of good results. The question is interesting to all. The Cowkeeper will come to learn, that, only by attention to ordinary Sanitary laws

(1) Paper to Epidemiological Soc.

with his household and shield him free from the ravages of disease; and he be preserved from annoyance and loss resulting from sudden collapse of his business. From the public point of view, its magnitude and importance need scarcely be hinted at. The solution of the problem will explain many of those hitherto unaccountable visitations which frequently appeared in cities, and towns, and cut off thousands of children annually, and spread the seeds of future sickness and trouble in others.

If my humble contribution to this controversy succeeds in advancing the question, even in a slight degree, or in stimulating any of the many able & skilful health officers to take up the subject and investigate the origin of all outbreaks, I shall feel that my efforts have not been without result, and that I have done some little towards advancing this all important question.