

FINAL REPORT ON TYPHOID

FERGUSON REPORT ON EPIDEMIC
AS MADE TO THE CITY COUN-
CIL ON MAY EIGHTH.

PRELIMINARY AND FINAL REPORT ON THE

Prevalence of Typhoid Fever at Pana,
During April and May, 1916.

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Engineer.

The State Water Survey having been notified that an epidemic of Typhoid Fever existed in Pana and that the public water supply was under suspicion, I was instructed to visit Pana and make a thorough investigation to determine if possible the cause of the typhoid outbreaks and to make such recommendations as were deemed necessary to prevent the further spread of the disease.

The following report is of an informal nature and it is given in order that the City may have the facts before them at once and thus be able to take the necessary steps to suppress the epidemic. A complete and formal report will later be prepared and sent out from the office of the State Water Survey as a matter of record for the City.

Valuable assistance has been given during the investigation by the city officials, physicians, milk dealers and many interested citizens and I take this opportunity to thank them.

Typhoid Previous to Present Outbreak.

Information obtained during the present investigation and also during an investigation made by the writer on October 6, 1914 shows that up to October 1915 there has not been a large number of cases of typhoid at any one time but that the city has been far from free from the disease.

Cases of typhoid were not reported by the physicians to the local board of health until within the last few months and it is probable that if we had a record of all cases in past years the number might be greater than we realize.

The records of Mr. G. F. Morgan, Secretary of the local Board of Health, show that since October 1, 1915, and up to the present outbreak the following

number of cases of typhoid have been reported:

During Oct., 1915	3 Cases
During Nov., 1915	8 Cases
During Dec., 1915	0 Cases
During Jan., 1916	1 Case
During Feb., 1916	6 Cases
During Mar., 1916	9 Cases

Total for 6 months ----- 27 Cases

To some the figure of 27 may seem small but when we stop to consider that if the city of Chicago had a proportionable number of cases it would mean in round numbers 9,000 cases, we may realize the serious typhoid situation here at Pana. Moreover we must not forget that typhoid is a preventable disease since we know the germ that causes it and know how these germs are carried from one individual to another. The continued prevalence of typhoid in a community means the failure to make use of our knowledge of sanitary science.

Present Typhoid Epidemic

Description of outbreak: Since April 16, to date there have occurred 36 cases of typhoid. One of these cases came to Pana sick from another city and thus received his infection elsewhere. This leaves 35 cases comprising the present outbreak and these are distributed as regards age and sex as follows:

0-4	1	0	1
5-9	1	4	5
10-14	1	5	6
15-19	8	2	10
20-39	5	5	10
40 and over	3	0	3
Total	19	16	35

From this tabulation we see that the cases are about evenly distributed among both sexes and that the cases have not been confined mostly to school children as seems to be the impression of many persons. The following table showing the distribution of cases as to schools attended or occupation shows this more clearly:

No. of cases among High school Students	6
No. of cases among North school students	1
No. of cases among South school Students	2
No. of cases among East school Students	6
No. of cases among Catholic school Students	2
Total School Cases	12
No. of cases among those that were at home such as housewives and babies	6

No. of cases, employed away from home, but in Pana ----- 12
Total No. school cases ----- 18
Thus from the foregoing tabulations we see that the agent of infection must be or have been a general one to which persons of all ages and sex and have been about equally exposed.

With the exception of 10 cases the cases at the time of their infection resided in the Southeastern part of the city or in that portion South of the B. & O., and East of the I. C. railroads. The 10 cases outside of this area are located near it and no cases have occurred among the residents of the far Western and Northwestern portions of the city.

From a study of the dates of occurrence of all the cases and allowing for the period of incubation or the prodromal period we find that the agent of infection was active sometime during the first 10 days in April, or at least began to be active during that period for the occurrence of more cases from now on will show that the source of infection prevailed after the first 10 days in April or that the later cases are secondary cases, resulting from contact with other cases.

Method followed to ascertain cause of outbreak: The large number of cases occurring within a short period of time making what we may call an explosive outbreak indicated that there was some common source of infection and that it could not be private wells which only individual families used. A visit has been made to all houses containing cases, and detailed information obtained regarding the food, milk and water supply of each case. An effort has been made to have this information as complete and accurate as possible and definite statements rather than guesses have been sought.

The data thus obtained has been carefully tabulated and studied. In addition, information regarding the dairies, milk depots has been obtained. The water works has been visited and all former reports of the State Water Survey regarding the public water supply have been reviewed. Private wells which are used by many people have been visited and examined.

No analysis of either samples of milk or water have as yet been made as samples collected at this time would not necessarily show their condition at the time the infection took place, namely during the early part of April. The source of food, water and milk supply is of more importance to determine the cause than any delayed

analysis, although samples have been collected today of the city water and of water from a much used private well in order to determine their present condition.

Milk the Agents of Infection: The data obtained during the investigation and which has been carefully studied shows that the present outbreak has been due to the infection of the milk supply of one of the local dealers. The time will not be taken to give in detail the facts and reasons upon which this conclusion is based but it may be stated in brief that all of the cases had used milk from this dairy, either at home or at restaurants, or soda fountains during the period when we know the infection of the patients took place.

The greatest number of cases that occurred among the customers of any other milk dealer were 6 and all of these were also customers of the dealer whose milk became infected. In all milk supplies from 8 different dealers have been used by the patients and there have been several instances of the overlapping of customers of the different dealers. If the infection had been caused by other than a milk supply for instance a water supply the cases would no doubt, have been more scattered among the customers of the milk dealers. *different*

The location of the cases with reference to the milk depot is also a point of evidence that the infection spread from the use of milk from this depot, although too much stress can not be laid on this point as some persons from other parts of the city had also secured milk there.

It may be that the milk supply has been infected only during a short period possibly even only one day or one or two bottles of milk. Just how this milk became infected with typhoid organisms can not be stated at present and may never be known. Owing to the prevalence of typhoid fever in and around Pana during the last Fall and Winter we may say that the disease is more or less seeded in the community and that some of the recovered cases are still carriers of the germs of disease. It is readily conceived therefore, considering the manner of distributing the milk and the handling of milk pails or buckets how a contaminated milk utensil from one household might have served to contaminate an entire days' supply at the milk depot.

On the other hand the milk might have been contaminated on one of the

farms or by some "typhoid carrier," although thus far we have been unable to learn of any cases of typhoid occurring on any of the farms supplying the dealer in question.

In order to prevent the further spread of the disease by milk the local Board of Health have been advised as to methods to follow. All milk utensils should be sterilized at once and sterilized again ~~and~~ every time they are used. The transference of milk utensils from houses having cases to any milk dealer should absolutely be prohibited.

The local Board of Health is handicapped in handling the milk situation here at Pana in as much as the city has no milk ordinance. I cannot too strongly urge upon the city council, the adoption of a milk ordinance licensing all milk dealers and giving proper officials control and regulation over the production and sale of milk in the city of Pana. I believe that no milk should be sold in Pana unless pasturized or obtained from tuberculin tested cows. No doubt the State Board of Health will be glad to assist the city in preparing such an ordinance.

Private Wells: In as much as there has been some question locally as regards the quality of water from private wells and their relation to the present outbreak of typhoid fever a few words regarding them may not be amiss at this time.

The waters from the majority of private wells are undoubtedly generally inferior in sanitary quality to the public water supply. I have examined only a few private wells during this visit, but from those that I have examined and a knowledge of conditions found to exist in other cities, I feel safe in stating that only a small percentage of private wells are not subject to contamination. That they do not become dangerously contaminated is simply a matter of good luck. Knowledge that a well is subject to contamination should be sufficient to prevent its use or bring about its reconstruction without the need of going through the form of making an analysis of the water. As examples of such I wish to call attention to the well known as the jail house well and to another well known, I believe as the Big Four well.

The Jail House Well is located at the edge of the alley near the city hall and not over 20 feet from a sewer. This sewer may leak at any time and seep into the well. Such occurrences have elsewhere been known to happen

and similar contamination from leaking sewers or privy vaults may explain that supposedly ~~fine~~ flavor to some well waters which lead the owners to state that they have the best wells in the city.

The Big Four well is located on the West side of South Locust Street, just South of the Big Four tracks. Inspection of this well shows that it is not tight at the top and that filth may enter it; especially filth can be washed in during rains or by waste pumpage during the use of the well. Thus in this well the water is contaminated by washings from the side walk.

Many people locally seem to hold the idea that if their well is considered unsafe the thing to do is to pump it out or throw in a chunk of lime and this will make everything alright again. This, I believe is a wrong idea and a wrong method to follow. If a well is ^{subject to} contaminated by seep water come contaminated by seep water why be content to pump it out and allow the new run of water to be subject to the same contamination? If a man has a horse stolen from his barn he is not content to simply get a new horse and place it in the barn under the same conditions as before. He would first secure a lock and lock his barn door. The same should apply to a well. If one inflow of water has become contaminated, the water can be boiled or treated with chloride of lime until the well can be so constructed as to prevent future contamination. Any well should be cemented and made watertight for at least 8 degrees to 10 ^{feet} below the surface of the ground.

I have had people say they have a good well, it is 40 or more feet deep. What good does it do from a sanitary standpoint to have the well deep if it is not watertight in its upper portion? Chloride of lime is far superior to ordinary lime for sterilization of water and it requires very much less of it.

Public Water Supply: The data and evidence obtained during the present investigation shows that the city water has not been infected and has not been the cause of any of the cases of typhoid. Certain improvements in the city supply however are desirable, and I wish to take this opportunity to present this matter to the city council.

The State Water Survey recognizes that this city's water supply similar to other surface water supplies is subject to intermittent contamination and has in several reports submitted to the city, recommended that the puri-

fication plant be completed so that a good clear water safe at all times may be furnished the consumers. The plant is in much better condition than I found it about a year ago and probably the best results with the present equipment that can be secured are now being obtained.

An entirely satisfactory water which will be safe at all times can not be secured, however, until a coagulation and sedimentation basin is built and equipment installed for sterilizing the water after it passes through the filters. Plans for such improvements were prepared a year or more ago and approved by Mr. Paul Hansen, then chief engineer for the State Water Survey and now chief engineer of the State Board of Health. Construction was postponed, I understand for financial reasons. We hope that the city council will now take up again the matter of improvement at the water works and feel that the results will be appreciated by the thoughtful people of the city.

I have taken considerable of your time this evening at which I understand is to be a very busy council meeting but I feel justified in taking this time to urge the council to consider the proposition of improving the milk and water supplies of Pana. There are no two things which can compare in importance to the city at the present and at all times than a good water supply. Such improvements mean a more healthy community and thus greater wealth and material propriety.

In closing I wish to say that the State Water Survey wishes to be a constructive and a critical bureau and will gladly assist Pana in any way it can to better its water supply.

Respectfully submitted

HARRY F. FERGUSON