

# Typhoid case at Woodlands School

Saturday 27<sup>th</sup> November 1909.

## **EXECUTORS OF MARL FARMER SUED.**

### **ACTION BY A DEGANWY SCHOOL MASTER.**

At the Liverpool Autumn Assizes on Monday, before Mr Justice Bray and a special jury, the hearing was opened of an action in which Mr George Field, a schoolmaster, of Deganwy, sued **Margaret Thomas and John William Hughes**, executors of **Emmanuel Jones**, of Marl Farm, for damages for alleged breach of warranty in regard to a milk supply. The defendants deny that Emmanuel Jones gave a warranty or committed any breach of it. Mr Horridge, K.C., M.P., and Mr Rigsby Swift (instructed by Messrs. Field, Sons, and Harrison) are counsel for the plaintiff; and Mr Taylor, K.C., and Mr Cuthbert Smith (instructed by Messrs. Gradwell, Abercromby, and Co., agents for Mr J. Hughes, Conwav) were counsel for the defendants.

Mr Horridge, in opening the plaintiff's case, said that the circumstances in many aspects were extremely sad. Mr Field, who kept the Woodlands School at Deganwy, was claiming for damages in respect not only of the death of his wife but also of the serious illness of himself and his only child, and injury done to his school – all the result, as he alleged, of their having drunk milk which was infected by typhoid germs. Substantially the question for the jury would be whether the milk supplied was contaminated and was responsible for the spread of the disease. But under the Sale of Foods Act, the plaintiff would be required to show that he relied on receiving a pure milk supply, as any purchaser would. It was no answer for the defence to say that they had not been able with reasonable care to discover any typhoid germs in the milk, because in law the vendor always sold the article at his own risk. Eminent experts would be called before the jury, to tell them what was known by science with regard to typhoid fever. The old idea, about drains being the cause of typhoid fever was now practically abandoned. Of course if the specific typhoid bacillus got into a drain the disease would be spread, in that way, but ordinary sewer gas did not cause the disease. Water and milk were now recognised to be the most fertile causes.

### **THREE CERTIFICATES.**

The plaintiff, counsel went on, was an Oxford man. and, after spending some years abroad, he had settled down at Deganwy as a schoolmaster. For a short time prior to 1905 he had run the Woodlands School in partnership with a Mr Pugh. The school had previously been used as a convalescent home for patients from Birmingham, and the drainage system of the house was excellent. In 1905, when the plaintiff bought out his partner, and became the sole proprietor of the school, he was at the pains to secure three certificates of the sanitary condition of the institution; one as to the drains being in good order: another as to the water supply being good; and a third, given by a local sanitary inspector named Little, as to Marl Farm, from which the milk came, being properly kept. Besides all this, he obtained from Emmanuel Jones, who had himself succumbed to typhoid during the outbreak, a personal assurance that proper precautions were taken to secure the purity of the milk supplied. It was arranged that the school milk should be delivered in two special tins, which were daily cleansed and scalded at the Woodlands. The first case of typhoid to occur was that of Mrs Thomas, the housekeeper of Emmanuel Jones. She contracted the disease in February, 1909. and was taken to the Llandudno Fever Hospital. She was displeased, for some reason, with the treatment she received there, and was, on March 16th. removed. That date, counsel suggested, too early for her removal from the hospital.

### **DISEASE IN THE SCHOOL.**

On April 3rd the first symptoms of the disease were noticed in the school, when a boy named Geoffrey Wood showed signs of illness, and was ordered to his bed. There were three scholars who were specially liable to receive any contamination there might be in the milk, the boy Wood, already mentioned, and two others named Barlow, and Tuxford, who used to drink fresh milk. When infected milk was taken with tea, counsel remarked in passing, it was comparatively harmless, because the germs ceased to fertilise at a certain degree of heat which was very much less boiling point. The boy Barlow left the school on March 20th, and Tuxford was inoculated on his father's order as soon as he heard about, the outbreak. Both Barlow and Tuxford thus escaped, the disease. On April 7th two boys named Barron were leaving the school for the Easter holidays, and were each given a glass of fresh milk on their departure, and ten days alter they began to be unwell. Mr Field himself, who used to drink fresh milk after his breakfast, and his two-year-old daughter both became ill about this time. and a few days later Mrs Field, whose case was probably a communicated one, also took to her bed. A boy named Tommy Mammatt, the son of some friends who had been visiting the Fields, was another sufferer. On the 9th Dr. Woodhouse, who had been attending the boy Wood called in Dr. Suckling, a typhoid specialist, from Birmingham, and as they came to the conclusion that, the boy was without doubt suffering. from typhoid, he was removed to the hospital. On Easter Sunday, April 10th, Dr Travis, the medical officer, and the sanitary inspector named Little, examined the drains at the house, in connection with which there was an interception trap, which prevented anything from the sewer getting into the house drains.

### **THE DEATH ROLL.**

Dr. Woodhouse at this stage warned Field about the milk supply, and an effort was made to obtain milk elsewhere but this could not be done, probably because people who had heard that there was disease at the school did not care to be mixed up with it in any way. From that day, however, the milk was regularly boiled at the school, and so the spread of infection was prevented. A further examination of the drains revealed the fact that, when the dining-room was added to the old building, the architect's plans had been disregarded in one particular.

A drain, which ought to have been disconnected and diverted was left under the dining-room: but as it was beneath 8in. of macadam, 6in. of concrete, and 1in. of cement, it could not have caused any harm, even if it had burst. Mrs Field had to take to her bed on April 17th. Her case was diagnosed as typhoid, and she succumbed about, a month later. At the time his wife contracted the disease the plaintiff was lying seriously ill and as her death occurred before his recovery he never saw her again. There were about twenty-five houses in the neighbourhood, Mr Horridge continued, which were supplied with milk from the Marl Farm, and in eight of the houses typhoid had occurred at this time. One of the houses was a, hydro and one an hotel, and it was calculated that there were about 250 persons in the neighbourhood, who had their milk from this farm. Out of this number twenty-four persons, or 10 per cent., had suffered from typhoid.

Counsel proceeded to enumerate the various cases which had occurred among the customers. Two of them proved fatal, the victims being Councillor Richard Conway and a boy who was employed at the farm. Emmanuel Jones himself was taken ill early in May and died on the 15th. When a typhoid epidemic, said Mr Horridge, originated in the milk supply it was always noticeable that a percentage of children was larger than when it arose from water supply, for the obvious reason that milk was more largely consumed by children than by adults.

#### **HEAVY LOSSES.**

In dealing with the question of damages counsel explained to the jury that Mrs Thomas was not only one of the executors under the will of the late Mr Emmanuel Jones, but had been bequeathed the whole of his personal property, and had a life interest in his real estate. Plaintiff's losses in connection with the school had been heavy, for he had lost the whole of the summer term and although for the winter term all the old scholars had returned, there were no new pupils. Added to this loss were the medical and nursing expenses and the expenses of Mrs Field's funeral, making a total of £664. Plaintiff was not entitled to any compensation for the loss of his wife, except on a pecuniary basis, but he was entitled to recover an amount equal to the actual loss he had suffered by being deprived of her considerable and important services in connection with the management of the school; and there was a further claim in respect of the pain and suffering he had himself endured.

#### **LIKE A HOSPITAL.**

Plaintiff was then called. He bore out counsel's statement generally as to the outbreak of typhoid at the school. There were four nurses in attendance at the school, and the place was more like a hospital than anything else. In connection with the milk supply, plaintiff had done all he could to satisfy himself that proper hygienic precautions were taken at Marl Farm, and Mr Jones had assured him that he supervised everything himself. Regarding Mrs Thomas's removal from the hospital, plaintiff said that her husband had told him that both he and Mrs Thomas were disgusted with the treatment she had received at the hospital, and complained that they thought the charges were very high, and that they did not like the nurses. That was the reason why they decided that Mrs Thomas should go back home. Incidentally plaintiff mentioned that he had been feeling ill for some time before he took to his bed.

Mr Taylor (.cross-examining): Have you ever complained about Victoria drive, which leads up to your school, being unhealthy? - I have complained three times about the road, chiefly because it is such a bad road that it is impossible at certain times to walk along it without getting stuck.

But have you not complained of its being insanitary, and have you not been for some time afraid of some epidemic like this happening?—No. I have complained of a certain smell I have noticed in Victoria drive from time to time.

Haven't you complained of it as being likely to produce some outbreak of this kind?—I think not. What I said was that in case of an outbreak of this sort people might, rightly or wrongly attribute it to the condition of the drive. I said that in a letter I wrote to the paper.

May I take it then that you apprehended such an outbreak?

- No, I didn't apprehend it.

#### **PUTTING IT STRONGLY.**

Mr Taylor quoted a letter plaintiff had written to the medical officer, in which he described the nuisance in Victoria drive as being a menace to the public health. "What epidemic," he asked, "did you think was likely to arise?"

Witness replied that he did not think fevers were caused by bad smells, but he had feared that the nuisance might lead to sore throats or something like that. He was trying to put the thing as strongly as he could, because he wanted to stir the council into action.

#### **MEDICAL OFFICER AND THE DRAINS,**

Dr Travis, the medical officer. did not take the view that these illnesses were caused by the milk?—Not at first.

He had all along taken the view that this farm was properly managed, and that the milk was all right up to a certain day, if you like?—I think so.

The water supply that goes to the farm is precisely the same as goes to the school?—Some of it, some of it isn't.

After Dr. Travis made an examination of the drains on Easter Monday, witness was told that he, had tried to make out that they were in a bad condition and that one pipe across the yard was blocked. On the same occasion he made a complaint about the drain beneath the dining-room.

Counsel quoted a letter written by Dr. Travis to Mr Field, the plaintiff's brother, who was acting as plaintiff's solicitor. In it he stated that, if the drain which passed under the new wing was leaking it would pollute the soil under the house. The grease trap was choked and in a foul state and open to the outside atmosphere. All precautions known to sanitary science were taken at Marl Farm, Dr. Travis wrote to prevent the spread of infectious disease. A sample of the milk taken on April 13th was examined bacteriologically in London without revealing the presence of any bacilli.

#### **AN ALTERED VIEW.**

Mr Taylor also read a letter written by Mr Sydney Field, the solicitor, to Dr. Travis on March 4th, in which occurred this passage "You are wilfully shutting your eyes to the obvious origin of the disease viz., the milk supplied from Marl Farm." The letter also spoke of the matter as being of the highest importance to the plaintiff, and also being of public interest to the district in which Dr. Travis acted as medical officer. "The whole case," the letter added, "will be laid before the proper authorities as soon as my brother is strong enough to transact business." On the 8th June Dr. Travis wrote to the plaintiff condoling with him in his irreparable loss. "Public health work," he said, "carries with it very grave responsibilities. At first we were unable to trace the infection which occurred, but subsequent events showed clearly that the contagion was carried to your school in the milk."

What were the "subsequent events," as far as you know, that had come to this gentleman's knowledge after March 15th?

-He had completed his inquiries and formed his conclusions, I suppose.

Do you know of any events which could have altered his judgment?—Nothing but, his own judgment.

Excepting the letter which suggested that he would be brought before the public authorities, do you know of any fact or event which could have added to the material on which he formed his judgment?

-No, excepting that his own opinion changed.

Mr Taylor remarked that the change of views was rather extraordinary.

### **DEFENCE'S THEORY!**

His Lordship asked what was the cause of the outbreak according, to the defence.

Mr Taylor: Existing typhoid cases at Llandudno Junction, infection being conveyed through the drains and also the fact that these sewers discharge into the Conway, quite close to Llandudno Junction.

Mr Horridge: Then you suggest that you can catch it in the air?

The cook at the Woodlands denied that the milk cans were ever left near the drain in the yard, and the gardener deposed to having made periodical inspections of the drains and gullies.

Thomas Tecmore Thomas, the assistant surveyor of Conway, said that, when a water pressure test was applied there were signs of a leakage in the drain beneath the dining-room, but suggested that it, might have been due to the hammering of the pipe.

Freeman A. Delamore, the borough surveyor of Conway, in cross-examination, was asked if he had ever suggested as a possible explanation of the cause of the outbreak that rats had travelled up the sewer from Llandudno to the Woodlands. He replied, that he had never advanced that theory, but said there were rats in most sewers, and no doubt they could have travelled in the way suggested.

The Court at this point adjourned until Tuesday.

### **TUESDAY'S HEARING.**

#### **EVIDENCE OF SIR JAMES BARR.**

#### **SAYS IDEA OF TYPHOID FROM DRAINS HAS BEEN EXPLODED.**

At the hearing on Tuesday evidence for I the plaintiff was continued. Mr Segar Owen, architect, of Warrington, deposed that the drain beneath the dining-room at the school ought to have been disconnected when the extension was made, but through an oversight, it had been left there. There was no leakage in the pipe, but even if there had been any contamination of the soil, the macadam, concrete, and cement beneath which the pipe was buried would have prevented any injurious effects from arising.

Miss Williams, matron of the Llandudno Isolation Hospital, stated that Mrs Thomas (who was housekeeper at Marl Farm) was admitted to the institution suffering from typhoid fever. Mr Emmanuel Jones came, to see her every day, but he used to stand about, a yard from the bed. Mrs Thomas was discharged from hospital by her own doctor.

Mr Horridge: In your judgment, was she quite well when she left?

Witness: No, I don't think she was sufficiently recovered to be removed.

Answering his Lordship, she said that she thought Mrs Thomas was suffering from phlebitis, and her heart was weak when she was taken away.

His Lordship: Otherwise she was fit to be discharged? --As far as I know.

Would there be any danger of infection from her? --I didn't think so at the time.

Do you mean that you have altered your opinion since? --There might be a possibility.

By Mr Taylor: Milk was brought from Marl Farm every clay specially for Mrs Thomas.

Sarah Emily Lewis, a nurse at the isolation hospital, said that two days before Mrs Thomas was removed from the hospital she heard a conversation between her and her doctor. The doctor was persuading her to stay longer in the institution, but she persisted in saying she wanted to go home, and she was discharged.

Miss Sharp, matron of Birmingham Convalescent, Home, near Marl Farm, stated that she frequently saw Emmanuel Jones delivering milk. On one occasion he spoke to her. He was looking very worried, and he said, "This trouble over here (pointing to the school) is killing me." He said how very sorry he was for the Fields, and said he could not sleep at night for thinking of their great trouble. He said he had got a certificate, and what could he do? She told him he could do nothing, and he was not to trouble. He then told her that he was going to sell all his cows at an early date and give up dairy work. She did not see him again, as he died a few days afterwards.

James Percival Barron, one of the boys who attended the Woodlands School, stated that he and his brother left school on the 7th April for their home in Middlewich. Before leaving he and his brother were given a glass of milk and a piece of cake. About a fortnight later he became unwell, and later suffered from typhoid fever.

Dr. S. L. Melville, Middlewich, deposed that he saw the two Barrens boys on the 1st May, and they were then at the end of the first or the beginning of the second week of the fever.

Other witnesses gave evidence as to the dates on which persons who, it. was alleged, had consumed milk from Marl Farm, became ill from typhoid fever.

Dr. Edward R. Woodhouse, of Llandudno. who attended the boy Wood and the members of the Field family at Woodlands, stated that on the day the drains were examined he had his attention drawn to the manhole outside the verandah, but he could not, as had been suggested, detect any offensive smell, nor was the manhole foul. He thought it, was pointed out to him because the cement work was rough.

#### **DRAINS AND TYPHOID.**

Sir James Barr, who' said he had had a wide experience of typhoid cases, deposed to his visits to members of the Field family, and also to Emmanuel Jones. With regard to Jones, there was no doubt that, he was suffering from typhoid fever and the effects of alcohol.

Sir James, replying to a further question of Mr Horridge, said the idea about typhoid fever coming from drains had been exploded long ago. From the first there had been no direct evidence that it was caused by drains; it was pure assumption from beginning to end. Professor Haldane had made experiments which showed that there were fewer typhoid organisms in sewer gas than in ordinary atmosphere. Those experiments were confirmed by Dr. Andrews, the celebrated bacteriologist, of London, who had lately been engaged in a series of experiments which had shown that he had only been able to get pathogenic organisms out of sewer air when he had put them in. The typhoid germ he had ascertained did not live more than two days in a sewer, and that no

sort of organism from a main sewer could get into a house drain if there was an interceptor; therefore the only way in which a house drain could be infected was from the house itself.

Mr Horridge: Is typhoid as infectious in the earlier periods as later on? - No.

Is the difference considerable? Very considerable. Proceeding, Sir James said that the period of incubation varied very much. If a person got a very intense dose the period, might, be cut down to ten days, but in a comparatively mild case it might run up to three weeks. Referring to an epidemic in Liverpool in 1897, due to ice cream sold by an Italian at a Knotty Ash fair, and from which 27 cases arose, Sir James, said that in the, first case, a, little girl went home from Liverpool to Denbigh, and in her case the period was about three weeks. Dr. Hope (medical officer of health) ferreted out the whole thing. Witness did not think that Victoria-drive, leading up to plaintiff's school, had anything to do with the Woodlands cases at all.

Mr Horridge: I understand it is suggested that these germs came from the sewer which joins the Woodlands sewer, 200 yards from its outlet?

Witness: It is utterly impossible.

And then travelled up three quarters of a mile, and came through the interceptor, into the house?

The suggestion is ridiculous. He did not see how rats could get past the interceptor into the house drains. When he saw the Woodlands it was in a perfectly sanitary condition, and he never saw a cleaner house than the school.

Asked as to his view regarding the drain under the dining-room floor of the school, Sir James said such a thing was quite common. There was one under his house, but if the drain was well laid and if properly covered there was not, the slightest risk of a smell coming through. None of the Fled cases were contact cases. He pointed out that in hospitals they treated typhoid persons in the ordinary ward, and the only person who ran any risk of infection was the nurse, and he always told the nurses that if they got the disease or gave it to anybody else he should blame them, because if they washed their hands thoroughly and took proper precautions there was practically no risk. The chief carriers of typhoid were milk, walcis, and flies, and in milk the bacilli would thrive. A person who had suffered from typhoid might carry the germs in the system for months, or a year sometimes, and a person who had attended on a patient might carry the germs on the finger nails for days.

Cross-examined by Mr Taylor: Have you ever known of a case where milk has been infected in the way you suggest, that is by a person in personal attendance on a typhoid patient dealing with milk direct?

Sir James Barr replied that in the ice cream case he had mentioned the infection must have been conveyed in that way. The Italian had his wife ill from typhoid fever, but he had not typhoid himself. He would be brought into close contact with his wife. The germs did not. fly about in the atmosphere, the disease must be conveyed.

At this point, the court adjourned until Wednesday morning.

## **WEDNESDAY'S HEARING.**

### **EXPERT'S TESTIMONY.**

On Wednesday Mr Taylor resumed his cross-examination of Sir James Barr, who had attended the Fields and Emmanuel Jones, and who gave evidence on Tuesday supporting the theory that the infection was introduced in these cases by the milk supply. In answer to Mr Taylor, Sir James said that he had taken two samples of Emmanuel Jones's blood when he saw him. In one sample tested at a laboratory no bacilli were detected ; the other sample he tested himself and found evidence of slight infection. The germs might have been transmitted from a typhoid patient, to the milk through the medium of a dozen persons. Under one finger-nail a person might carry a hundred million germs, but the germs, Sir James added, were never air-borne, But if the bacilli are clinging to dust particles they may be blown about?— Well, they may be, but there are no cases on record. Dr. Meredith Young, the medical officer of health for Cheshire county, said he had examined the drainage system at the schools, and found it to be well planned and well executed. At, Marl Farm the drainage went where it could. He had seen the open ditch in Victoria drive, near the school, but would have to be very hard pressed for a, theory to account, for the epidemic before he would suspect the ditch. The suggestion that the bacilli had travelled along the sewer from Llandudno Junction and entered the school drains was even more improbable. Even if bushels of bacilli were put into the sewer at Llandudno Junction it would be practically impossible for them to travel along the sewer against the flow. In the rat theory there was nothing whatever. Rats were not found under the modern sewerage system. Many people were, naturally, immune, from typhoid, he stated. Milk was a good medium for the cultivation of bacilli. A bacillus had been known to live as long as twenty-eight or thirty days in milk. It was impossible to say when a typhoid patient was absolutely free from the germs of the disease. There was a case on record of a doctor after having an attack of typhoid carrying the bacillus for twentv-nine years.—(Laughter.) But in ordinary medical experience it was safe for a typhoid patient to go about, among the public, three or four weeks after convalescence.

In the course of some questions as to the possibility of bacilli travelling along the sewer to the school drain, Mr Taylor asked, "Can they go uphill?"

"Oh, yes," replied the doctor. "They have got tails at both ends and can go in any direction."

Mr Taylor: Like the aviators.—. (Laughter.)

Mr Horridge: Or like the ferryboats.

### **THE CASE FOR THE DEFENCE:.**

Mr Taylor, addressing the jury for the defence, laid emphasis on the fact, that no evidence had been called to prove that Emmanuel, Jones ever attended on his housekeeper, Mrs Thomas, after she came back from the hospital, and there was no evidence that the persons who did attend on Mrs Thomas ever handled the milk. There were causes other than the milk supply which might be held accountable for the outbreak. The neighbourhood was rich in infective powers in relation to typhoid. As late as October, 1908. there had been an outbreak at Llandudno Junction, and ,there were cases there. which continued to be infective. until April last. The typhoid bacilli discharged from the main sewer at Llandudno Junction might account for anything. When the, bacilli dried on the mudbanks of the estuary they could be borne about by the wind, clinging to dust particles. 'Counsel also commented strongly on the fact that of the 150 guests staying at the hydro supplied with milk from Marl Farm only one had had typhoid, whereas of the servants—much less likely to drink milk than the hydro guests -no fewer than six had been attacked by

the disease. This, 'he said, was a strong argument in favour of the theory that the drains or some other medium had brought the contamination.

Mrs Margaret Thomas, one of the defendants, was then called. She said she was the housekeeper of the late Mr Emmanuel Jones, at the Marl Farm, and had been in his service altogether for twenty-eight, years. While she was at the hospital Emmanuel Jones, although he visited her, never came near to her bed. When she returned to Marl Farm she was attended to by her' daughter and a nurse and Jones did not, give any assistance.

William Little, sanitary inspector, Llandudno, said he had found the drains at Woodlands School in a defective state. This witness had not completed his evidence when the court rose.

#### **THURSDAY'S HEARING.**

On Thursday evidence for the defence was continued.

Dr. John David Jones, of Llandudno Junction, was examined by Mr Taylor.

Is there any truth in the suggestion that you are an old friend of Margaret Thomas's family, ---Not at all.

Is there any foundation for the suggestion that you have been either engaged to or are courting or paying, addresses to Maggie Thomas or any of the daughters? ---Not at all. It is deliberate lie.

Witness proceeded to state that he attended Margaret Thomas at Marl, Farm, and she was removed to hospital on February 9th last.

While she was in hospital you know that Emmanuel Jones visited her, do you think there was any risk in it?---Not at all.

She left the hospital on the 16th March by witness's permission, as in his judgment he thought, she was in a fit and proper condition to be discharged. Indeed, so far as the typhoid was concerned, she could have left the hospital about nine or ten days before she did but there was hesitation in discharging her because of heart and bodily weakness. Witness, told the daughter who was attending on Mrs Thomas that she was not to do anything in the dairy.

Witness officially notified the public health authorities that, Emmanuel Jones was suffering from typhoid fever for the sole reason that Sir James Barr took a sample of Jones's blood, etc., which suggested that Sir James was of opinion that Jones was suffering from typhoid. He considered such a notification did no harm even if the case, did not. turn out to be typhoid.

Mr Taylor: Was your own personal opinion that it was typhoid?

Witness: No. When he received Sir James Barr's letter giving the result of his analysis with regard to Jones witness thought he had made a mistake in sending a notification that it was typhoid. In his death certificate he said that death was due to valvular disease of the heart, typhoid fever, and congestion of the lungs.

His Lordship You still say typhoid fever in your certificate.

Witness I had notified typhoid, and I thought. I would stick to it---(laughter) to overcome, some difficulties,

Mr Taylor: What were the difficulties ?

Witness: As Dr. Travis has to make his report to the Registrar-General about his cases. Well, he has got my report that it is typhoid, and then he sees the death certificate with no typhoid in it.

His Lordship And he would ask for an explanation? ---Witness: Certainly.'

And then you could give your explanation that you came to the conclusion that it was not typhoid. There would be no difficulty about. that?---No.

Mr Horridge Are you in the habit of putting things in your certificates that are not true for the purpose of helping the medical officer of health? ---Witness: No.

When you certified that Emmanuel Jones had died from typhoid you honestly believed it, to be true?---I took the assumption of Dr. Barr.

His Lordship: Did you believe it to be true'? ---Witness: I did.

#### **EXPERT AND CONWAY FORESHORE.**

Dr. A. J. Fullerton, who has had a large experience in connection with typhoid fever, deposed that he had visited Marl Farm, the Woodlands, and Llandudno Junction.

Mr Taylor: Taking; the cases at the Woodlands, with their dates, and the series of cases at the Hydro, in your judgment do those cases present the appearance of typhoid arising from milk

Witness, Except for the fact that milk was consumed at certain of the houses neither the outbreak at the school, hydro, nor as a whole present, the characteristics of a milk outbreak. On the contrary, if you take the characteristics one by one, I think in almost every case that it is against a milk outbreak.

Asked to give his reasons for arriving at that, conclusion, he said that the usual characteristics of a milk outbreak were that the onset was sudden, the course comparatively short, and the termination abrupt. In ordinary outbreaks males, going about, in a greater degree and being more exposed to chance, infection, were more likely to be attacked by the disease, but in milk outbreaks, the infection being in the home, the proportion of females attacked was relatively higher. In milk outbreaks, moreover, the cases were generally less severe and there was. a smaller proportion of contact or secondary cases. If the milk supplied to the Woodlands School was contaminated a large number of cases would have occurred, as all the inmates drank the same milk.

Witness connected the outbreak at the school with the epidemic at Llandudno Junction, which commenced with a case notified on November 6th, 1908, and concluded with a case notified on June 20th of this year. He linked them all together as one outbreak. The cause, he believed, was the condition of the foreshore of the river in the neighbourhood of the Junction. He had had a good deal of experience in the matter of inspection of tidal estuaries contaminated by typhoid, and only six years ago he had reported on a typhoid fever outbreak at a place where the conditions were entirely similar to those in the present case. In a tidal estuary, where the foreshore was exposed twice daily, a fine sludge, which might contain a greater or lesser degree of typhoid bacilli, brought down by the outfalls, was deposited on the foreshore, and when the sludge dried the particles with the bacilli clinging to them, were blown about. In such towns as Newhaven, Southend-on-Thames. and Chichester, where from his own experience these conditions were constant, typhoid was endemic. Further, witness stated that there were mussel beds near the outfall in Conway town. Children who went down to collect mussels and dabbled their fingers in the mud might get the infection.

The incidence of typhoid at the hydro, where only one of 150 guests was affected, while six of the servants were attacked, was another proof that milk was not the cause of the outbreak.

Cross-examined by Mr Horridge: Is there any reasonable possibility of typhoid being connected through house drains? Witness: Under certain conditions; and I might say that the idea is not exploded—I am not giving my own opinion.

In your judgment, is it reasonably- possible in certain cases? In certain cases it is distinctly and reasonably possible that typhoid fever can be connected with defective drainage.

His Lordship Assuming there was no case of typhoid in the school. typhoid could only have been given to a, person in the house through the drains by means of a defective interceptor?—Witness That is so.

Mr Horridge: Therefore unless there were germs introduced into the school from the main sewer the fact that the drain under the school was stopped, or anything of that kind, would not have produced typhoid ?

Witness No. If the drain was under the house it would stop the bacilli from coming up.

Counsel pointed out the importance of that case to the future of the Conway, and asked witness if he had visited the mussel beds or had he any knowledge as to the force of the current, of the Conway, to which witness replied in the negative. Counsel also pointed out that the mussel beds could not be reached except by boats, and therefore no children could take them; that all the sewer outlets only discharged on the ebb tide, and that there was a current of six miles to carry the sewage out to sea.

Mr Horridge: Having all these facts before you, have you examined the shore to see whether there is any deposit?

Witness: No, I accept the report of an official.

Before you damn a place like this have you taken the trouble to see whether there is any deposit there?

I have taken the Government officials report and an ordnance map.

You looked at it from the train?—Yes.

From February until June all the cases were connected in some way with this milk supply?—I think I agree with you. Yes.

Therefore the bacilli carefully selected people who took the milk from Marl Farm? -Yes.

These floating bacilli? They have selected two groups of people who took milk from Marl Farm. Don't you think it is a far-fetched idea that the bacilli should wander up a sewer and into the house? -I don't attribute the outbreak at the school to -that.

#### **EVIDENCE OF DR. GLYNN.**

Dr. Glynn, Liverpool, deposed that he had 40 years' experience of typhoid cases, and his view was that the Woodlands outbreak was not due to the milk supply. His substantial and main reason for stating that was that so many boys took the milk and did not catch the typhoid. He should be inclined to consider that the drainage or shore was the possible cause of the outbreak He was familiar with the Conway, and he had seen the mussels dragged up and left on the shore, which was important.

Mr Taylor: Do you think that a possible cause? - Witness: Yes.

How do you think a cause like that operates in affecting a boy up at the school, a mile away from the shore? The boy might find his way towards a bacillus, and a bacillus might go towards the boy.

Mr Horridge: They went to meet each other. (Laughter )

Witness Yes. Boys are in the habit of wandering about, and so are some bacilli.—(Laughter.)

His Lordship: And the boy might come across a bacillus.—{Laughter.)

Mr Taylor: They have tails at both ends? ---Witness They have.

And are very active?—Very active. They are carried about by flies and cockroaches. Proceeding, he said an estuary like that of the Conway was a recognised source of danger. The outbreak of fever at the school might have been due to the drainage system being imperfect. He did not think that Margaret Thomas was in an infected condition when she left the hospital.

Dr. Nathan Raw, Liverpool, generally supported the view of the previous witness as to the outbreak at Woodlands not being due to milk.

Mr Taylor: Does anybody know how typhoid bacilli move or are transported?

I don't think it is known how they move or how long they live. He added that it was well-known that many estuaries were infective, especially in the autumn

His Lordship: Would you go so far as to say that it is dangerous to go to stay in Llandudno in the autumn?—

Witness: No.

Mr Taylor There are cases in Liverpool at the present time? ---Witness: Scores.

This concluded the evidence, and today (Friday) counsel will address the jury.