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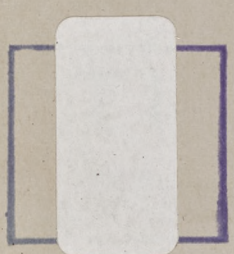

CATALOGUED

Errors & Appeals
Briefs
Vol. 1898

BETWEEN

The Mayor and Aldermen of Jersey City.
Complainants.

—and—

Patrick H. Flynn and the Jersey City Water Supply Co.
Defendants.

Depositions taken on part of the defendant, Jersey City Water Supply Company on notice to complainants, before Walter J. Knight, Master & Examiner in Chancery, on Tuesday, October 30, 1906, at 11 o'clock in the forenoon, at No. 243 Washington street, Jersey City, N. J., in the presence of Mr. James B. Vredenburg appearing for the complainants, and of Mr. William D. Edwards and Mr. William H. Corbin, appearing for the defendants.

LEMUAL KAYHART a witness produced on the part of the defendant, being duly sworn testifies as follows:

Direct Examination by Mr. Corbin.

Q. Where do you reside?
A. In Boonton.
Q. What is your age?
A. Sixty-one years old.

New Jersey State Library

Q. Have you always lived in Morris County?

A. Yes.

Q. Did you formerly reside near the so-called Parsippany dyke at Parsippany?

A. Yes, sir.

Q. During what years did you live there?

A. I lived there between 1866 and 1888.

Q. In what houses did you live?

A. I lived in William J. Righter's houses, both of his houses, one south of the Turnpike, for a few years, and then I moved across the Turnpike on the north side, in the larger house.

Q. How long did you continue to live in the one south of the Turnpike?

A. I think I lived there about four years.

Q. And the rest of the time in the one north of the Turnpike?

A. I lived from that time until 1882-1885, I lived from 1873 to 1885 and then I moved away from there up the Turnpike a little ways, right in the same neighborhood, right close by.

Q. Then you lived in the first house you have mentioned from 1866 to 1873, is that it?

A. I didn't live there—no, when I went in 1866 I lived in the big house with another man that I worked for, for two years.

Q. What do you mean by the big house?

A. On the north side, the house with a cellar under it.

Q. How long did you live with him?

A. Two years.

Q. Then you went to the one on the other side of the road, did you?

A. Then I lived across the road for about three or four years.

Q. Was that in Righter's house, too?

A. Yes, sir.

Q. Then where?

A. Then I moved back across on the north side in the big house.

Q. To where you had formerly lived?
A. Yes, sir.
Q. Did you remain there until you left in 1888?
A. In 1885 I left that house.
Q. Then where?
A. Then I went up to right opposite the dyke, middle of the dyke about, in that road that turns in there.
Q. Whose house was that?
A. That was in the house that went to the Childrens' Home property, right by the bridge.
Q. Now in this big house where you first lived with another man, and to which you afterwards came back, was there a cellar under that house?
A. Yes, sir.
Q. What was the condition of that cellar as to wetness during the time you lived in it?
A. Well, while I lived there with him I only recollect one distinct time that he called my attention to when he opened the outside doors, he told me to look at what kind of a cellar he had there, what they were living over, and it was nearly half full of water. The outside doors, you know, that slam up against the house, but I had no occasion to go down the cellar while I lived with him.
Q. When was that?
A. I think that was in 1867.
Q. And in this little house across the road where you lived, was there a cellar or any excavation under that?
A. There was a little outside cellar there, about a foot deep or so, that was dug in the ground about a foot, and then the wall was laid up I think about two feet on two sides of the ground, but the front was only about a foot deep.
Q. What was the condition of that as to wetness?
A. That was cemented, but when there was high water it would run right in and fill up; there was only a little to fill up, but it would, and we used

to lay boards across there to get in what we wanted.

Q. The third house you have mentioned, opposite the dyke, what was the condition there?

A. Up by the dyke, we couldn't use that cellar at all.

Q. What was the trouble?

A. It was wet and muddy and water in there all the time, we never used that at all, couldn't use it.

Q. What was the condition of the public highway along opposite where the dyke now is, in wet times?

A. Well, when I first went down there, up to 1875 it was in a very bad condition when it rained; in the spring of the year when the frost went out it was just like a mire.

Q. Did you ever see the water standing over the road?

A. I seen it running across the road.

Q. How deep?

A. Well, six inches I should think.

Q. Where did people walk who went up and down the road?

A. Well, they walked some times, when they could get through, they would walk along the sidewalk that was above the road, along the stone fence there, and I have seen them pull off stones to step on, and I have seen boys get on top of the stone fence and walk across.

Q. How about wagons, could they go there?

A. Well, they went there, but I have seen them get stuck in the mud there, and seen them stay there over night with loads on.

Q. Was there a culvert with a stream or rivulet running across the road there?

A. Yes.

Q. In the same place that it is now?

A. That is up, I suppose, a little more than half way to what they call the Condict property, there was a stream that ran across there pretty much all

the time in wet seasons, and when there was a freshet—

Q. Now, on the side of the road, the north side of the road which is towards the reservoir, did you observe the character of the ground and the grass there?

A. Well, that lot there opposite the—this belonged to the Cobb estate, next to Will Righter's.

Q. Well, was it wet or dry?

A. I seen it so wet that they couldn't gather hay in the summer time.

Q. When they did gather hay how did they mow it?

A. They generally mowed it with a machine, but it wasn't what you would call swampy ground, it was wet, the water would stand on it some times for days.

Q. Near this drain, did they mow that by the machine or—

A. Across Righter's property?

Q. Yes.

A. Well, they always used to mow it with a scythe that strip of grass there where the stream ran across.

Q. How wide a strip was that?

A. Well, I should suppose about in the neighborhood of 75 feet across there any way, from fifty to a hundered feet, I cannot remember exactly.

Q. Now you know where Troy brook is?

A. Yes, sir.

Q. Was there formerly a mill pond on Troy brook?

A. Yes, sir.

Q. Where was the dam?

A. The dam was about, I suppose, a hundred and twenty-five yards from the house down the stream.

Q. From the little house you lived in?

A. Yes, the water backed up near the fence at

the garden that was in back of the house, when the dam was full.

Q. That place where the dam was was near Righter's east line, wasn't it?

A. Well, he owned land over the other side of there.

Q. When did that dam go down?

A. It went down, I think, in 1876.

Q. Did they ever build it up again?

A. Never—oh, you asked me if the dam was near the east line of his property?

Q. Yes.

A. Yes, it was right close to the east line, near what they call Ford's property.

Q. What was this dam used for?

A. There was a saw mill down there.

Q. An ice pond?

A. Well, they used to gather ice there.

Q. The outlines of the pond are visible there still?

A. What is that?

Q. The outlines of the pond are still visible, are they not?

A. I think they are, without any doubt, they were the last time I noticed it, a long time after it was drained.

Q. This drain across the road that you have mentioned, did that flow down towards Troy brook or into Troy brook?

A. Right across to the saw mill property, yes, right across the brook.

Q. Where did this water come from that filled that brook?

A. Why it came from all of the flat land, from along side of where the dyke is now, and all through the slope off back toward the back road down through the swail there; there is a basin there or slope there that runs both ways and concentrated down at that point.

Q. That is all.

Cross Examination. By Mr. Vredenburg.

Q. When you lived there you were living in the house which now forms part of the Childrens Home?

A. Well, I lived in that house one year and then they wanted to do something with the property, or build it up for some of the hands to live in, and then I moved from that house—I only lived there one year—and then I moved over to what they call the Jacobus house, in front of Kingslands, right in the bed of the reservoir now, and I lived there two years and then moved to Montville.

Q. And you left the house that is in the bed of the reservoir in 1885 you say?

A. In 1888, in the bed of the reservoir, I lived there two years, but I worked all the time down by this same house where I lived, by the brook, I had a shop there right from 1885 to 1888, I worked in the shop by this little house by the brook, right in front of the reservoir now, about the center of it, I suppose.

Q. And what was your business there?

A. Wagon making.

Q. And this dam that you speak of, was a dam across Troy brook?

A. Yes, sir.

Q. It dammed the Troy brook?

A. Yes, sir.

Q. How far was that from your shop?

A. Well, when I lived in Righter's place it was about a hundred and twenty-five yards, something like that, I suppose.

Q. From the house?

A. From the house.

Q. The dam was?

A. Yes.

Q. And the water that was dammed was used for the purpose of running a saw mill?

A. Yes, sir.

Q. Do you know what head the dam had?

A. No, sir, I do not, it didn't have very much fall, I suppose when the dam was full there might have been five feet of water down at the lower end, might have been five feet of water down by the dam.

Q. Was the dam east or west of Mr. Righter's, of this big house that you speak of as Mr. Righter's house?

A. Well, it was south, south or south-east, and they call it the south side of the Turnpike; the shops were on the south side of the Turnpike.—south-east I suppose, a little east of south, the way the direction of the road was laid.

Q. You say that dam went out about 1876?

A. I think it went out in 1876.

Q. How do you fix the date?

A. Well, it was shortly after Righter died—Will Righter's father.

Q. In the same year?

A. I think likely it was that same fall.

Q. He having died in the spring?

A. He died in summer some time, the fore part of the summer, I think, as near as I can recollect, of course I never made a note of the time, I am only just going back to what my memory tells me, according to the circumstances.

Q. Can you tell, with any accuracy, what year it was that you saw any persons whose wagons were stuck in the mud?

A. Well, between 1869 and 1873 and 1874 or 1875, along there, I have seen them stuck there most every year, most every year somebody would get stuck fast there, and would have to get somebody to pull them out, in the spring of the year.

Q. In the spring of the year when the frost heaved up the road?

A. It seemed to be hard some times when it got dried off, but when you would drive over it it would

bend that way; I drove over it when I seen it bend under the horse's feet.

Q. Now, when was the last time that you have a distinct recollection of walking over the land between the dyke and the Turnpike, at the point which you have been speaking of?

A. Well, I walked over that land I suppose every year, I was down there more or less.

Q. When you lived in the house that is in the reservoir, I understood you occupied the shop still, on the south of the Turnpike road?

A. On the south of the Turnpike road and opposite about the center of the dyke where the road turns to go to Morristown, in there.

Q. Well, which side of the property which is now the Children's Home?

A. The road went through it, it was about, I think, a hundred feet, I think the line of that property went about a hundred feet from below the road, and the house was on that part of it, and the shop was on the other side of the road, just past the corner of the property.

Q. On the south side of the Turnpike, and was it east or west of the Home?

A. The shop?

Q. Yes.

A. It was south-west of the house, the shop was then. South-west across on the other side of the brook, the house was on one side of the brook towards the reservoir, and the shop was on the other side of the brook and the other side of the road, both, on the west side of that road, what we call the Morristown road.

Q. How near to the Turnpike did the pond extend when it was full?

A. Well, I don't know as I could tell, the nearest point was right opposite the house that I lived in, the nearest point of that I suppose would be—I suppose that lot may be was a hundred feet away, or a little more maybe to the back garden fence, and

the pond used to come up within fifty feet of the fence, some times right up to the fence, when it was high water.

Q. That was the rear garden fence?

A. Yes, sir.

Q. And that rear garden fence was how near to the Turnpike?

A. Well, a hundred feet or a little over I suppose, maybe.

Q. And that was the garden fence of which house?

A. Of the small house on the south side of the Turnpike.

Q. Belonging to Mr. Righter?

A. Yes, sir.

Q. And do you think that point was about the nearest point?

A. That is the nearest point to the Turnpike of the pond.

Q. After the pond was let out did they use the land that was covered by the pond for grass or any other agricultural purposes?

A. They mowed it.

Q. After the water was out?

A. After the water was out.

Q. And how did they cut that, with a mowing machine?

A. Well, I think they mowed it with a scythe the most of it, and some parts of it they mowed with a machine.

Q. What was the last time that you recollect seeing them mowing it with a machine?

A. The ground was pretty low there and I guess it took quite a number of years before it got high enough to go all over it with a mowing machine, I don't know as they ever did, I don't know as I ever saw them mow it with a mowing machine. There was, away up above the pond, not where the pond was I never seen them mowing there with a mowing machine, but there was a piece up above the

brook which was a high piece of ground there that never was over-flowed at any time that I ever seen.

Redirect Examination.

Q. When you were living in the little house how high was the ground around your house, from the surface of the pond, when the pond was full?

A. Well, I don't know.

Q. As near as you can estimate it?

A. It might have been two feet and a half and it might have been three feet.

Q. The flow of water in that—

A. Do you mean from the high water mark?

Q. I mean when the pond was naturally full, not a flood I don't mean?

A. Well, about, I should think,—of course I never surveyed it.

Q. I only want your recollection?

A. I might make a mistake of a foot.

Q. In which direction was the natural flow of the water there on your place?

A. East.

Q. Well, that is toward the pond or what way?

A. East, south-east right across down the stream.

Q. Towards the Troy brook?

A. Towards Troy brook.

Q. When you were living in the little house it flowed towards the rear of your lot and towards the pond?

A. The water always went down towards the pond from the road.

Re-cross Examination.

Q. Did it run along the road and then to the pond, or how did the water from the road get to the pond?

A. There was a ditch along the road from—

there was a ditch on the north side of the Turnpike all the way from the Post Office, what they called the Post Office, that was right where the road turns in, where I lived.

Q. Yes.

A. The long building there; from below that a ways there was a ditch all the way down to this culvert, on the side of the road.

Q. Well, when it got to the culvert what then?

A. Ran to the culvert and then the culvert would take it, in natural kinds of water, when there was no flood it ran to that culvert and then across.

Q. Then was there a brook from there to the pond?

A. There was a ditch from above the road to that, they used to run water through there in wet seasons and across through the same culvert.

Q. After it went across to the culvert how did it get to the pond?

A. Well, there was a ditch right down to Righter's lot.

Q. From the culvert to the water of the pond, when the pond was full, was how far?

A. Well, I should think it was—I don't know, I never took particular notice, but I should judge it was maybe a hundred yards across there, or a little more, I don't know exactly how near, they ran a swail in there where that culvert came in, there was a kind of a slank, marshy place on the lower side of this lot where that ditch ran across in the upper end of the pond there, and the water ran in through there and so to the pond; the water would back up to there in high water.

Q. That is all.

Sworn to before me, (the signature being waived) this 30th day of October, 1906, at Jersey City, N. J.

GEORGE E. JENKINS a witness produced on the part of the defendant is recalled.

Further Direct Examination by Mr. Corbin.

Q. You are a surveyor?
A. Yes, sir.
Q. And reside where?
A. Dover, New Jersey.
Q. In 1898 and 1899 were you connected with the Morris County government?
A. Yes, sir, the Board of Free-holders.
Q. In what capacity?
A. Assistant engineer in charge of construction of road improvements in the county macadam roads.
Q. Did the county at that time have charge of this road running along parallel to the Parsippany dyke?
A. Yes, sir.
Q. Through Righter's property?
A. Yes, sir.
Q. Did you go there and look at it?
A. Yes, sir.
Q. When first?
A. The first visit I made was in the spring of 1898, the Board of Free Holders were then contemplating the improvement and macadamizing of that piece of road, they already had macadamized a short strip of the road on the extreme eastern end, and this was to be an extension of the work from that easterly end to the junction of the Morristown road at Denville, so as to make a complete strip of macadam all the way through.
Q. State the condition you found the road to be in and adjacent property, at that time?
A. At that time I went over the road for the purpose of looking at it with reference to drains and with reference to any part of the road that it thought might be necessary to put a Tulford bottom

in, and at the section of the road along the flat just east of Cobbs corner, we gave it pretty careful consideration, and at that time the evidence showed itself that it was a marshy piece of road without a substantial bottom.

Q. Was there water there at that time?

A. There was water there at that time.

Q. Was there a culvert there at that time?

A. And a culvert.

Q. What was the appearance of the adjacent land on the side towards the dyke?

A. Well, now, I don't think that I gave particular attention to the condition of the land on the side of the road.

Q. State what you did look at?

A. We devoted our attention particularly to the road and the road-bed. I remember we took up the question of putting in additional drains, and I think that that was done, I am not exactly positive about that, but I think we put in some additional wrought iron pipe in a section of the road.

Q. Well, did you find it necessary to raise the road?

A. We raised the road somewhat over a foot, I was given instructions particularly—I am a little bit ahead of the story. In 1898 the work wasn't taken up, it was postponed for one year, and in 1899 the work was again taken up; we began it in April. I went over the road the latter part of March, I think, because I began the work of cross sectioning, etc., in April, and it was then very apparent that the condition of that road was such that it would need to have some harsher treatment.

Q. What was the matter with it?

A. It was cut and rutted giving evidence of the fact that teams had been mired there in the early spring.

Q. How as to dryness or wetness?

A. Very wet, and the ruts in the road were full of water.

Q. Any ditches along the side?

A. Yes, sir.

Q. Water in them?

A. Water in those, yes, sir, and the Freeholder from that district decided to call the County Engineer to look over the work, and he came down and he was of the same opinion that it would be necessary to Tulford that piece of road, and then the Road Committee visited the site, they looked the matter over, and we gave them an estimate of about what it would cost to put in the Tulford bottom, and they came to the conclusion that they didn't have money enough to do that, and they would have to take their chances on the bottom of that road standing, and so my instructions were that I should plan the grade line so as not to cut the old road-bed, endeavor to keep that intact, and then bring the fill upon that and then put the stone road on top of the fill, and that is what we did.

Q. How much did you put on?

A. I think the average fill across there was about one foot of dirt and then the six inches of macadam, so that raised the road a foot and a half.

Q. Did you do anything about drains and culverts?

A. Cleaned out the drains in the immediate neighborhood of the road.

Q. And followed them down into the fields?

A. No, sir, did not; the contractor refused to do that without extra pay and they didn't have the extra money to do it.

Q. What was the result of this work, did you see it afterwards?

A. Yes, sir, I went over the road afterwards.

Q. When?

A. I think 1899,—I think it was 1901 or 1902, I think it was, and I noticed that the road did not stand the traffic, but that the macadam was rutted and had already cut through under the travel, showing that the bottom was not solid.

Q. How was its condition as to wetness then, in 1902?

A. It was about the same, I think, although the season of the year that I was there, at that time it was a dryer season of the year, it was in the early fall, and it wasn't as wet as when we first looked over the road in the early spring.

Q. But the filling and the six inches of stone that you put on were not sufficient to keep it up out of the mud?

A. No, sir, it was not.

Q. Have you seen it since?

A. Yes, sir.

Q. Has it been repaired or rebuilt since?

A. I don't think it has, I think it is very much in need of repair.

Q. That is all.

Cross Examination by Mr. Vredenburg.

Q. When you were there in March, 1899, was there more than one culvert or drain or ditch by which the water from the north side of the Turnpike could get to the south side of the Turnpike?

A. I think there was, my impression is that there were two culverts.

Q. And where were those culverts?

A. Well, one of them was taking care of the water that flowed down to Troy brook, I think they called it the Troy brook, and the other culvert, as near as I can recollect, was east of that.

Q. Well, were they both west of Righter's house —do you know where Righter's house is?

A. No, I don't think I can testify with reference to the relationship of the culverts to Righter's house.

Q. How far were the culverts apart?

A. Well, I think they must have been fully five hundred feet apart, that is my impression.

Q. Did the water from both of them go down to Troy brook?

A. I think so, I think that is correct, yes, sir.

Q. Now when you were there in March was there any water flowing through these culverts?

A. Yes, there was.

Q. How much?

A. Well, considerable.

Q. What do you mean by considerable?

A. Well, the culverts stood about full.

Q. Both of them you think?

A. Yes, sir.

Q. And was the water running or standing?

A. The water was running, but at a very slow rate.

Q. In both culverts?

A. In both culverts.

Q. And I think you said it was a pretty wet time?

A. It was a wet time, and the ruts in the road were full of water at the time.

Q. Now when you went there in the fall was there water in both culverts?

A. Yes, sir, there was—no, I think one culvert there wasn't any water in, I think that was the one furthest east.

Q. Now the one that was furthest west, there was some water in that?

A. Yes, sir.

Q. Was it flowing?

A. Yes, sir.

Q. About how much was in?

A. Well, there was a fair stream running through the culvert, I don't know as I could give—

Q. Any estimate of the number of gallons, for instance?

A. No, sir, I could not estimate that.

Q. What was the size of the culvert?

A. Well, I think that probably the—did you ask me do I know the size?

Q. Yes.

A. I think that the culvert was probably about —well, I estimate it to be about two feet, that is my recollection.

Q. Two feet square?

A. Yes, sir, it may have been a little higher than that, but I think two feet from side wall to side wall would cover the width in each. I don't think there was a foot of water in it.

Q. Now you spoke about the bottom of this being unsubstantial?

A. Yes, sir.

Q. I understand you to mean by that that when you put a weight on it it sank?

A. Yes, sir.

Q. Someone had put on, before you got there, a macadam of some sort of earth and stone for the road and that had sunk down when you were there?

A. Well, I guess I gave the wrong impression, if that is the case. What I said was,—the natural surface of the road when I went there the first time, and also when I went there the second time was just as the Township Committee had left the road, which is, under ordinary country conditions, road repairs, they used to plough up the gutters and throw the dirt in the middle of the road and let the travel sort of wear it down; that was the condition in both cases when I went there. Then when we came to improve it we raised on that surface by putting additional earth on and then putting our macadam on top of that earth.

Q. And that, with the use, you say, sank down?

A. Yes, sir, cut through, they cut through the macadam.

Q. Cut through?

A. Yes, sir.

Q. Now it is necessary to put more on?

A. Yes, sir, or else take it up and put what they ought to have done in the first place, put in a Tulford bottom.

Q. The object of the Tulford bottom is to prevent the top from sinking down?

A. Yes, sir, and cutting through.

Q. Did you examine at all the character of the natural soil in the road?

A. Nothing more than what we observed from what the wagons had cut in going through and brought up with them on the wheels.

Q. Well, was that gravel, or what was it?

A. No, I think not, I think that that was more of a loamy nature, than gravel.

Q. Did you notice how deep the ditches were on each side of the road?

A. I believe we did, yes, sir.

Q. How deep were they near the culvert, for instance?

A. Fully two feet.

Q. Did you notice what the bottom of that was?

A. Yes, sir.

Q. What was that?

A. That was the same character of material.

Q. You don't say it was reparied since 1899?

A. I don't think there were any reparis made to it since it was built in 1899.

Q. That is all.

Sworn to before, (the signature being waived) this 30th day of October, 1906, at Jersey City, N. J.

Mr. Corbin: Referring to Mr. Ferris's testimony on page 532, etc., with regard to deeds which he could not find, I offer in evidence the following deeds and documents.

I offer in evidence deed from Horace N. Van Duyne and wife to Jersey City Water Supply Company, dated January 9, 1905, recorded in book W 40

17, Morris County, page 328, February 20, 1905, and covers 14 plus 20 to 25 plus 01.

Marked Exhibit D 6.

Mr. Corbin: I offer in evidence deed from Abby J. Hennion, et al and Steuart Hennion and others, to Jersey City Water Supply Company, dated August 1, 1900, recorded September 15, 1905, book B 39 page 102, covers 196 plus 88 to 197 plus 85.8 and 181 plus 06.50, to 193 plus 18.

Marked Exhibit D 7.

Mr. Corbin: I offer in evidence a deed dated September 7, 1905, recorded September 15, 1905 in book D 39, page 105, from Edgar J. Jacobus to Jersey City Water Supply Company, covering the same premises as Exhibit D 7.

Marked Exhibit D 8.

Mr. Corbin: I offer in evidence a deed from Sarah M. Van Ness and Alvah Van Ness to Jersey City Water Supply Company, dated August 30, 1900, recorded September 28, 1900, book T 33, page 180; that covers 227 plus 65.35 to 228 plus 80.70.

Marked Exhibit D 9.

Mr. Corbin: I offer in evidence a deed from Frank Stanley and others to the Jersey City Water Supply Company, dated March 31, 1903, recorded April 3, 1903 book K 36, page 35. That covers 422 plus 64.11 to 430 plus 51.28. Also covers 422 plus 91.01 to 430 plus 78.27.

Marked Exhibit D 10.

Mr. Corbin: I offer in evidence a deed from

Ralph Shaw, guardian of Eva Stanley, et al, to the Jersey City Water Supply Company, dated March 31, 1903, recorded April 3, 1903, book K 36, page 30, covering interest in same property as exhibit D 10.

Marked Exhibit D 11.

Mr. Corbin: I offer in evidence a petition in condemnation and award of commissioners appointed by Justice Dixon, in the matter of the application of the Mayor and Aldermen of Jersey City for the condemnation of lands of the North Jersey Land Company, the award being dated March 5, 1901; that covers 595 plus 51.25 to 595 plus 81.51.

Marked Exhibit D 12.

Mr. Corbin: I offer in evidence a deed from Georgiana C. Moore and husband and another, to the Jersey City Water Supply Company, dated August 24, 1900, recorded February 11, 1901, book R 14, page 605, that covers 595 plus 81.51 to 608 plus 13.79.

Marked Exhibit D 13.

Mr. Corbin: I offer in evidence a deed from same parties to same grantee, dated July 31, 1905, recorded August 1, 1905, book B 17, page 546. That is for two extra pieces occupied by the refuse, and conveys two parcels of land, one containing 2,980 square feet, and the other containing 2,447 square feet in the Township of Acquackonock, Passaic County. This is the extra width described in Mr. Ferris' testimony on page 533, line 20.

Marked Exhibit D 14.

Mr. Corbin: I offer in evidence a deed from

Meers Artificial Leather Company to the Jersey City Water Supply Company, dated September 27, 1905, recorded October 13, 1905, book G 17, page 246, covering the mill race piece referred to by Mr. Ferris, page 533. 790 plus 66.10 to 790 plus 77.30.

Marked Exhibit D 15.

Mr. Corbin: I offer in evidence a deed from Albert P. Fisher and wife to the Jersey City Water Supply Company, dated July 7, 1902, recorded October 17, 1902, Liber S 15, 293. Covers 804 plus 03.34 to 805 plus 77.58.

Marked Exhibit D 16.

Mr. Corbin: I offer in evidence a Grant by the State of New Jersey, through the Riparian Commission, to the Jersey City Water Supply Company, for crossing of the Passaic river, dated July 21, 1902, sealed with the great seal of the State, not recorded in County Clerk's office. 829 plus 74.48 to 834 plus 24.48.

Marked Exhibit D 17.

Mr. Corbin: I offer in evidence a deed from the Morris & Essex Railroad Company and the D. L. & W. Railroad Company, lessee, to the Jersey City Water Supply Company, dated November 10, 1902, recorded March 22, 1906, book 623 of deeds, Bergen County, page 613. It is three parcels in the Township of Union, first, Marion avenue, second, Kingsland Creek, third, at Travers property in the center of the Van Winkle ditch.

Marked Exhibit D 18.

Mr. Corbin: I offer in evidence agreement and deed from the Morris & Essex Railroad and the D.

L. & W. Railroad Company, lessee, to the Jersey City Water Supply Company, dated November 10, 1902, recorded in Bergen County, book 623, page 617, on the 22nd of March, 1906, and conveys the right of way across the Kingsland yard.

Marked Exhibit D 19.

Mr. Corbin: I offer in evidence agreement and deed for substituted right of way of Morris & Essex Railroad Company and the D. L. & W. Railroad Company to the Jersey City Water Supply Company, dated September 12, 1905, recorded March 22, 1906, book 623, page 621.

Marked Exhibit D 20.

Mr. Corbin: I offer in evidence a deed from the Morris & Essex Railroad Company and D. L. & W. Railroad Company to the Jersey City Water Supply Company, dated July 10, 1902, recorded March 22, 1906, book 623, page 610, being grant of right of way on west bank of the Hackensack river.

These deeds from the Morris & Essex give all of the Morris & Essex lands up to the westerly side of the Hackensack river, I am talking now, on the pipe line.

Marked Exhibit D 21.

Mr. Corbin: I offer in evidence a deed from the Morris & Essex Railroad Company and D. L. & W. Railroad Company, to the Jersey City Water Supply Company, dated July 10, 1902, recorded in the Hudson County Register's office, March 24, 1906, book 935, page 301, county block 2373.

Marked Exhibit D 22.

Mr. Corbin: I offer in evidence a deed from the

Morris & Essex Railroad and the D. L. & W. Railroad Company, to the Jersey City Water Supply Company, dated September 12, 1905, recorded March 22, 1906, in book G 18, page 163, Morris County for lands in reservoir.

Marked Exhibit D 23.

Mr. Corbin: I offer in evidence a deed from Abel I. Smith and others to the Jersey City Water Supply Company, dated September 1, 1904, recorded Jan. 5, 1906, book 928, Hudson County deeds, page 127.1067 plus 10.41 to 1070 plus 79.39.

Marked Exhibit D 24.

Mr. Corbin: I offer in evidence a deed from the New York, Susquehanna & Western Railroad Company, to the Jersey City Water Supply Company, dated November 21, 1902, recorded Hudson County, January 8, 1903, book 828, page 148, covering the crossing of Railroad at County road.

Marked Exhibit D 25.

Mr. Corbin: I offer in evidence a deed from the Erie Railroad Company to the Jersey City Water Supply Company, dated February 4, 1903, recorded March 30, 1903, book 827, page 545, Hudson County, for a crossing of the Erie Main Line of the Paterson and Hudson River Railroad, in the Borough of Secaucus.

Marked Exhibit D 26.

Mr. Corbin: I also offer in evidence a deed from the Erie Railroad Company and the Northern Railroad Company of New Jersey to the Jersey City Water Supply Company, dated November 21, 1902,

recorded January 8, 1903, book 828, page 142, being a county road crossing of the Northern Railroad.

Marked Exhibit D 27.

JOHN H COOK a witness produced on behalf of the defendants, being duly sworn, testifies as follows:

Direct Examination by Mr. Corbin.

Q. Where do you reside?
A. Passaic, N. J.
Q. What is your profession?
A. Hydraulic engineer.
Q. How long have you been in that occupation?
A. Since 1880.
Q. State what your employment has been as hydraulic engineer?
A. I was with the Holyoke Water Power Company until 1893, when I was engaged in the business of measuring water that was used for power and in the testing of turbine wheels, and during that time I generally kept, or had charge of making out of the bills and so on, and the daily measurement of water that was used for power at that place, at Holyoke, and after that time I went to Ansonia, Connecticut, where I was with the Ansonia Land & Water Power Company and measured water that was used for power at that place, and I have also measured water that has been used for power at various places in the country, in Connecticut and in New Jersey and Pennsylvania, and I came to Paterson in 1897, and since that time I have been in the employ of the Society for Establishing Useful Manufacturers, the East Jersey Water Company, and the Jersey City Water Supply Company.
Q. In what capacity?
A. In the Society and in the Dundee Water

Power & Land Company I have established a system of measurement of water from day to day, water that is used by the mill for power, and with the East Jersey Water Company I have had charge of the deliveries of water since 1902.

Q. How with the Jersey City Water Company?

A. With that I have had charge of the delivery of water to Jersey City and the making out of the bills, etc., since about 1902.

Q. Well, when the Jersey City Water Supply Company began its deliveries to the Municipality of Jersey City did you have charge at that time?

A. I had charge of the deliveries of water at that time.

Q. And you have had it ever since?

A. Yes, sir.

Q. What is your position with the Jersey City Water Supply Company?

A. I am called the hydraulic engineer.

Q. Are you daily at their office, in this employ?

A. Yes, sir.

Q. And, as I understand you, before the Jersey City Water Supply Company began to make deliveries you held somewhat similar position with the East Jersey Water Company ?

A. Yes, sir.

Q. When did the East Jersey Water Company cease making its deliveries of water to Jersey City?

A. The 23rd of May, 1904, at 5:20 P. M.

Q. Did the Jersey City Water Supply Company begin at the time they stopped?

A. Yes, sir, it was done at the same time.

Q. Now, up to that hour the East Jersey Water Company was giving what has been commonly spoken of as the temporary water supply, was it not?

A. Yes, sir.

Q. And where did that supply come from?

A. It came from the pipes of the East Jersey Water Company, and it was delivered up, or, at

least just for about a year prior to May 23rd, 1904, was delivered at a place called Upper Montclair, where the pipe line of the Jersey City Water Supply Company and the pipe line of the East Jersey Water Company crossed each other.

Q. And that water was taken from what streams and where?

A. It was taken principally from the works of the East Jersey Water Company at Little Falls, the pumping station.

Q. That is in the Passaic river?

A. Yes, sir.

Q. You say principally, where was the rest taken from?

A. Well, we had an arrangement with Newark whereby we got some water from the Newark pipe.

Q. That came from the Pequannock river?

A. Yes, sir.

Q. I show you a map—blue print entitled "Jersey Water Supply Company, Jersey City, N. J." Map showing drainage area, reservoir and pipe line, was this map made under your direction?

A. Yes, sir.

Q. Does this correctly show the drainage area of the Rockaway river?

A. I believe it does.

Q. And does it show the two pipe lines you have mentioned, that of the East Jersey Water Company, and that of the Jersey City Water Supply Company?

A. Yes, sir.

Q. Does it also show the Newark pipe line?

A. It does.

Mr. Corbin: I offer this map in evidence.

Marked Exhibit D 28.

By Mr. Vredenburg:

Q. Is this the State Map?

A. It is, copied from the State Map.

Further Direct Examination.

Q. Prior to May 23, 1904, the water which the East Jersey Water Company was supplying from Little Falls was delivered where?

A. Well, it was delivered at Upper Montclair.

Q. That is where these two pipe lines cross, as shown on the map?

A. Yes, sir.

Q. And that you say was so for about a year?

A. Yes, sir.

Q. Previous to that year where had the East Jersey been delivering its water to Jersey City?

A. At Kearny avenue and Belleville Turnpike road in Arlington, on top of the hill.

Q. Was that change in the point where delivery was made, the change contemplated in contract Y annexed to the Bill, which is printed on page 83 etc., paragraph 2?

A. This delivery at Upper Montclair was to conform to this requirement in this second paragraph here to contract Y.

Q. Do you remeber the day when that change in point of delivery began?

A. We started to deliver the water by way of Upper Montclair on the 9th day of June, 1903, and we delivered about twenty million gallons a day in that direction, and continued to deliver about ten million gallons a day by way of Kearny avenue, until the ninth day of July, in the month following, 1903, and then we delivered all the water to Jersey City by way of Upper Montclair after the ninth day of July, 1903.

Q. Then the Jersey City Water Supply Company's pipe from Upper Montclair to Jersey City had been completed by that time, had it?

A. It had, as far as my knowledge goes.

Q. Well, you had been delivering water through it?

A. Yes, sir, and we have continued to deliver water through it.

Q. Ever since?

A. Yes, sir.

Q. When did you begin to deliver water from the Rockaway river, or the Boonton reservoir, through the entire length of the Jersey City Water Supply Company's line?

A. 5:20 P. M., May 23, 1904.

Q. Has that delivery continued to the present time?

A. Ever since.

Q. And the temporary supply has ceased since that time?

A. The supply from the East Jersey Water Company ceased at the same instant.

Q. Has Jersey City received its entire supply from the Boonton reservoir since the date you have last mentioned?

A. I believe so.

Q. Has the City received anything from the East Jersey Water Company since that time?

A. Nothing from the East Jersey Water Company.

Q. Have you had charge of keeping the records of the daily deliveries?

A. Yes, sir.

Q. Who has made out the quarterly bills?

A. I have.

Q. Have you rendered the bills quarterly to Jersey City as required by the contract?

A. Yes, sir.

Q. And what are the ends of your quarters as fixed?

A. We make the quarter end the 23rd of August, the 23rd of November, the 23rd day of February and the 23rd day of May each year; we take the meter out at 5:20 P. M. on each of those days.

Q. When you make out the bills do you swear to them?

A. Yes, sir.

Q. And how many copies of the bill do you render to the City?

A. I don't remember how many, three I believe there are, but we usually make several in order to have an absolute copy of the record in the office.

Q. Did the City pay, according to your bills rendered, at first?

A. I don't think they ever did.

Q. You mean didn't pay promptly?

A. Didn't pay promptly.

Q. But I mean did they pay some of the first bills rendered in full?

A. I think they paid the first bill in full.

Q. Did you keep duplicates of the bills which you rendered to the City?

A. Yes, sir.

Q. I show you nine quarterly bills, the first dated August 24, 1904, the last dated August 24, 1906, and ask you whether those are duplicates of the bills rendered to the City?

A. Yes, sir, they are.

Mr. Corbin: I offer those nine quarterly bills in evidence to be marked as one exhibit.

Marked Exhibit D 29.

Q. Have you kept the daily readings of the deliveries of water to the City?

A. Yes, sir.

Q. How often are your meters read?

A. They are read—the meter at Jersey City is read four times a day, as six o'clock in the morning, and at six o'clock in the evening and at noon and midnight.

Q. And the reading recorded?

A. The reading is recorded in a book which is kept for that purpose.

Q. How are the dials of these meters arranged, do they read on continuously?

A. Yes, sir, so that if there is an error made in any daily reading why it would be eliminated in the next day's reading.

Q. I show you three blue print sheets, entitled "Daily account of water delivered to Jersey City, one for the year 1904, one for 1905 and one for 1906, the one for 1904 beginning on May 23rd, 1904, and the one for 1906 ending September 30, 1906, are these accounts of the daily readings of your meters?

A. Yes, sir, these are blue print copies of our sheet which we keep.

Q. Do you render those to the City?

A. Yes, sir.

Q. With your quarterly bills?

A. Yes, sir, and in fact each month we send a blue print to some City official.

Q. The blue print shows the reading all the way up to date when you sent it?

A. Shows the quantity that has been drawn from day to day up to the time that we sent them the blue print.

Q. Has this been done every month since the delivery has commenced?

A. Yes, sir.

Mr. Corbin: I offer those three blue prints in evidence and ask that they be marked.

The schedule for 1904 marked Exhibit D 30.

The schedule for 1905 marked Exhibit D 31.

The schedule for 1906 marked Exhibit D 32.

Q. Do these schedules also show the total monthly deliveries?

A. Yes, sir.

Q. Do they show correctly, monthly, the average daily deliveries?

A. Yes, sir.

Q. The deliveries of water have been increasing, haven't they?

A. Yes, sir.

Q. I observe by these schedules that at first the delivery was from thirty-two to thirty-three millions a day, and this present year they have arisen as high as thirty-eight and six-tenths, in some months?

A. Yes, sir.

Q. Have you made any estimates to see what the percentage of annual increase of the water consumption is?

A. No, sir.

Q. Have you schedules of this sort which would show the deliveries to Jersey City made before the Jersey City Water Supply Company commenced?

A. Yes, sir.

Q. You haven't got them here, I suppose?

A. No, sir; those are deliveries by the East Jersey Water Company, you mean?

Q. Yes.

A. No, sir, I haven't those here.

Q. Have you kept an account of the moneys which Jersey City has paid on these bills?

A. Yes, sir.

Q. And you have reckoned up the amount due, under the terms of the contract, for water delivered?

A. Yes, sir.

Q. And credited the amount of payments?

A. Yes, sir.

Q. I show you a paper entitled: "Statement of amount due the Jersey City Water Supply Company from the Mayor and Aldermen of Jersey City to November 1, 1906." Was this made up by you?

A. Yes, sir.

Q. Is this a correct compilation of the bills rendered and of the amounts paid?

A. Yes, sir.

Q. And of the balance due, as per contract?

A. Yes, sir.

Mr. Corbin: I offer this paper in evidence and ask that it be marked.

Marked Exhibit D 33.

Mr. Vredenberg: I object to it as immaterial and incompetent.

Q. Has the City ever made any payment within the time limited by the contract?

A. I believe not.

Q. Has it ever, since the Vice Chancellor's order in this case requiring them, pending the suit, to make certain payments at the rate mentioned in his order—have any of those payments ever been made within the time limited by the order?

Mr. Vredenberg: Objected to as incompetent and immaterial.

A. No, sir.

Q. Does this paper show when they have been made, so far as they have been made?

A. Yes, sir.

Q. In this paper I observe certain credits by amounts received from the Hudson County Freeholders, amounting in all to $4,226. How came this to be credited on this bill against Jersey City?

A. There was an arrangement whereby the Jersey City Water Supply Company supplies water to the Hudson County Freeholders at Secaucus, and that arrangement provides that the money which is received from the Hudson County Freeholders is paid, or at least the money which they should pay

is paid, to the Jersey City Water Supply Company, and the Supply Company credits to Jersey City the amount of money which is received in excess of the amount of money which Jersey City would pay for this particular water, if it was paid directly to Jersey City. You see, we collect the money and credit the money to the City which is in excess of the price which Jersey City should have paid for it if it had been delivered to Jersey City.

Q. It is not delivered to Jersey City in fact?

A. It is not, in fact, but they in their agreement say that it shall be held to be delievered to Jersey City, or it should be held to be a delivery.

Q. Is that water which is delivered to the county, out near Snake Hill, is that water included in the totals, in your blue pencil sheets?

A. No, sir.

Q. That is because it does not go through the meter in Jersey City?

A. Yes, sir.

Q. But it is in fact a delivery of that much additional water by your company?

A. Yes, sir.

Q. And you say, by agreement with the City, you keep a separate record of that, and credit the amount of—

A. Credit the amount above—for instance, suppose that the Hudson County Freeholders paid at the rate of $140 a million gallons for that water, and we collected that amount of money for it, then we take out of that, at the rate per million gallons which we should take, considering the total quantity which Jersey City drew, and the remainder is credited to Jersey City on their water bill.

Q. That is under a special contract you have with the City?

A. Yes, sir.

Q. Have you got that contract here?

A. I have not.

RECESS.

JOHN H. COOK resumed the stand.

Further Direct Examination. By Mr. Corbin.

Q. Mr. Cook, where is the meter located through which the water is measured to Jersey City?

A. In Kearny avenue near the Jersey City reservoir.

Q. What kind of a meter is that?

A. A seventy-four inch Venturi meter.

Q. How far is that from the point where the water is taken into the conduit at the Boonton dam?

A. Some twenty odd miles, I don't know how far it is myself.

Q. And at the place where you take it in at the Boonton dam, have you different levels from which you can draw?

A. Yes, sir.

Q. How are the different levels, from the top down?

A. Well, I cannot give the elevation of those different points, I could look it up, but I cannot give it off hand.

Q. Have you a record of the elevations of the water in the Boonton dam during the year 1906?

A. Yes, sir, up to the 26th day of October, I think, from the first of November, in 1905.

Q. Substantially one year?

A. Yes, sir, except the last two or three days.

Q. I show you a book here with tabular figures, from November 1, 1905, to October 28, 1906, is this the record of those elevations?

A. Yes, sir.

Q. What hour of the day were they taken?

A. Six o'clock in the morning, I think it states it at the head of the column.

Q. What do the black figures indicate?

A. The black figures indicate the depth of the

water on the over-flow, when there was water washing over the over-flow.

Q. What do the red figures indicate?

A. They indicate that the water was below the level of the over-flow.

Q. How is this expressed?

A. In decimals of a foot.

Q. Then on how many days do you find that the water did not flow over the dam, and what were the dates?

A. There were nineteen days in the year when the water did not flow over the dam.

Q. What days were they?

A. September 17 to 26th, both inclusive, September 28 and 29th, and October 12th to 18th, both inclusive.

Q. During that first period in September what was the lowest that the water fell below the crest of the dam?

A. Fourteen-hundredths of a foot below.

Q. About two inches?

A. About an inch and seven-tenths.

Q. And in the latter part of September how low did it fall then?

A. Four-hundrdeths, which is half an inch.

Q. During the period in October what was the lowest point to which it fell?

A. Sixteen-hundredths below.

Q. Then for the last year the water has never been, according to these gaugings, more than two inches below the crest of the dam, has it?

A. No, sir.

Mr. Corbin: I offer this book in evidence containing the stages of water from November 1, 1905, to October 28, 1906, in the Boonton dam, and ask that it be marked.

Marked Exhibit D 34.

Mr. Vredenberg: I object to it as not properly proven and as incompetent.

Q. Under whose direction is this kept?

A. Under my direction.

Q. Who actually takes the readings of a morning?

A. The gateman, whose name is Frank McIntosh; I have here the note books with the record in, and I myself worked up that table there with McIntosh, and checked it with him myself, so as far as that goes the table is all right.

Q. Checked it up from the daily readings?

A. Yes, sir.

Q. Have you the books here with the daily readings in?

A. Yes, sir, here are the original note books which are kept by the man at the dam, he keeps them in ink.

Q. You say they are read both morning and night?

A. Yes, sir.

Q. But your statement is made up from the morning reading?

A. From the morning reading.

Q. Mr. Cook, where is your gauge located from which these readings are taken?

A. Those readings are taken by myself on a hook gauge which is located in one of the stock plank grooves in the upper gate house, the water is perfectly still and quiet there, and enables a man to measure it.

Q. Well, the level ascertained there to which this hook gauge is attached, is that level with the water at the Spillway?

A. The point at which the hook gauge was set was brought over from the Spillway but not by me, I think it was done under the direction of Mr. Merriman, who was there, I believe, at the time the work was done.

Q. Describe what a hook gauge is, and why you use a hook gauge?

A. Well, a hook gauge is a gauge, and at the bottom it has a hook that is about, we will say, about an inch and a half across from the point to the shaft, and this hook gauge is used so that the exact surface of the water may be determined at the time the measurement is taken.

Q. What do you hook it to?

A. Not to anything, it is just a gauge with a hook at the bottom, and it is set, so that from a certain zero, which in this case is the level of the over-flow, you can lower the hook down or raise it up as the case may be, and when the point of the hook coincides with the surface of the water there is a little bright sparkling point that appears there, you can just see it, the surface of the water is raised a trifle,—a little bit of a pimple like.

Q. But you must have something that is fixed?

A. For instance when that gauge shaft—there is a scale on the shaft of that gauge, and when the point on that shaft is marked zero and the vernier is at zero the point of the hook is at that time level with the over-flow from the reservoir.

Q. You have a fixed gauge on the side of the wall?

A. No, we have a fixed point from which at any time we can reproduce this zero of this gauge.

Q. But if the gauge is movable—

A. Well, the vernier is set at zero.

Q. The vernier is fixed?

A. Yes, sir.

Q. The other hand is set on the wall and stays there permanently?

A. Yes, sir, bolted to the floor and the wall.

Q. Is that an accurate way of ascertaining it?

A. Yes, sir, as accurate as I know and as convenient as I know of for making accurate measurements.

Q. The vernier that is there remains fixed on the wall, does it?

A. Yes, sir, it does.

Mr. Corbin: Mr. Vredenberg, in view of the fact that I produce here the original books kept, which Mr. Cook swears are the original books kept by the man at the dam, do you desire me to bring him here to prove his actual readings from day to day?

Mr. Vredenberg: I do not.

(At this point the witness was withdrawn to permit of the examination of another witness.)

THADDEUS MERRIMAN, a witness produced on behalf of the defendants, is recalled.

Further Direct Examination. By Mr. Corbin.

Q. You are an engineer?

A. Yes, sir.

Q. Were you connected with the work of the building of the Boonton dam and the finishing of it?

A. Yes, sir.

Q. What do you know about the vernier that was set for the purpose of ascertaining the levels of the water?

A. It was set in what is known as the upper gate house, at the point where the water is taken from the dam for passage or delivery into the conduit. The vernier was set on the wall, or rather on a small stone or iron which is firmly bolted to the floor, the elevation of the vernier was placed so that when its reading was zero the point of the hook of the gauge should be at the elevation of the crest of the Spillway, the elevation of the crest of the Spillway being determined by taking the aver-

age of one hundred and fifty readings, space two feet apart on the crest of the Spillway.

Q. Was this done under your direction?

A. Yes, sir.

Q. Did you test it after it was done?

A. Yes, sir.

Q. Is it accurate?

A. I think it is, sir.

Cross Examination. By Mr. Vredenberg.

Q. How did you test it?

A. By observing the elevation of the water.

Q. Of the water?

A. By observing the behavior of the water in the reservoir on passing over the crest of the Spillway.

Q. Who observed that?

A. I did.

Q. How did you observe it?

A. At the time the water just began to pass over the dam.

Q. What did you see?

A. Could see the water just lipping the crest.

Q. How did you test your vernier by that?

A. By knowing that the vernier read zero at that time.

Q. How far is the vernier from the crest of the dam?

A. Well, from the crest of the Spillway?

Q. Yes.

A. That must be fifteen hundred feet or thereabouts.

Q. You cannot stand at the vernier and see the water pass over the crest of the Spillway?

A. No, sir, cannot do it at the same time, but the water was raising so slowly in the reservoir I doubt whether it was a ten-thousandths part of a foot.

Q. At one time you saw the water passing over the crest of the Spillway?

A. Yes, sir.

Q. And you walked down to the building in which the vernier was?

A. Yes, sir.

Q. Then you looked at the vernier and the vernier marked zero, is that so?

A. Yes, sir.

Q. That was your test of its accuracy?

A. Yes, sir.

Q. Now is the Spillway at the same elevation for the whole three hundred feet or is there a crest in it?

A. No, sir, the elevation of the Spillway for its entire length is not the same, that is, there are small irregularites in it, and those irregularites were eliminated, as I stated a moment ago, by taking a number of elevations on the crest of the Spillway, a hundred and fifty of them.

Q. Is not the water as it passes over the Spillway at its center, deeper than any other part?

A. I don't think that is the principle, no, sir.

Redirect Examination.

Q. Those irregularities on the Spillway that you speak of, were they designed irregularities or mere irregularities of the cutting of the stone?

A. Of the cutting of the stone.

Q. Because it was not cut absolutely?

A. It was not cut absolutely, no, sir, that is, it wasn't polished,—finished.

Re-cross Examination.

Q. Do you know to what extent it differs in different parts?

A. I should say that the maximum variation might be perhaps three-sixteenths of an inch.

Q. That is all.

Sworn to before me, (the signature being waived) this 30th day of October, 1906, at Jersey City, N. J.

JOHN H. COOK recalled.

Further Direct Examination. By Mr. Corbin.

Q. Now, Mr. Cook, have you recently observed the river below the Boonton dam?

A. Yes, sir.

Q. When did you go there?

A. I went there October 16th.

Q. And who was with you?

A. Mr. Kutterback and I.

Q. Was there any water going over the dam at that time?

A. There was not and had not been for five days previous.

Q. Did you walk down the river?

A. We walked down the river from the Boonton dam to the bridge—Highway bridge, about, I should think, a mile below, and continued from there along the road and on the bank of the river, at intervals, until we reached Zabriskie's dam and continued down along the river from there in a carriage.

Q. Tell us what you found, in the way of water, in the river?

A. When we walked down the brook there was some water in the brook at the very beginning or in the old bed of the river from the foot of the dam, there was a small amount of water coming out through from that pool which is below the outlet from the over-flow of the lower gate house, and when we reached a point, I should say, two thousand feet below the dam, my idea is that there was about, we

will say, half a million gallons a day, or perhaps somewhat more than that flowing in the stream, and at places the stream was ten feet wide, and then there were places where it was narrower, and when we reached the bridge below there was at that place, I should imagine, on an estimate, that there might be perhaps something more than a million gallons a day flowing, for about a mile.

Q. That is the Kingsland bridge?

A. It is the first highway bridge below the river, above the dam.

Q. Go on.

A. We found at that point, according to my estimate, that there was about, well, somewhat more than a million gallons a day flowing at that point.

Q. Did you walk further on down below that mile?

A. We did not walk close to the river further than that, we got into a carriage and drove along, and were on the bank of the river some few places and could look over and see the water, there was quite a quantity of water in the river below which was backed somewhat by the old dam at Zabriskie's, and below Zabriskie's the water was more spread out on the river bed, which came through leaks in the old dam.

Q. How much water would you guess there was below Zabriskie's dam?

A. Perhaps a couple of million gallons a day.

Q. How near to the dam did you observe a flow of the stream?

A. Why, the flow is not more than forty or fifty feet from that cut stone wall which is at the outlet of the west gates from the lower reservoir.

Q. So that there was practically some sort of a brook all the way down?

A. Practically water from the foot of the embankment down the river, some water all the way.

Q. Water enough for cattle all the way down?

A. It would depend on how many cattle, but I

would say there was water enough for any reasonable number of cattle anywhere below the dam.

Q. Mr. Cook, have you made any estimate of the flow over that dam when one inch of water is flowing over it, or any other particular depth?

A. No, sir, I just sort of estimated what the quantity would be with a foot of water or with an overflow, and it would be in the neighborhood of one thousand cubic feet per second.

Q. With a single inch what would that be?

A. It would not be—well, it would be of course a definite part of that, but I don't know what proportion of that it would be.

Q. Could you have that reckoned up?

A. The reason we have never determined that is this,—that Mr. Merriman and I talked about it, and we have always concluded that we would go together some day and we would compute the quantity of water which was flowing over the crest of that Spillway at different depths, but as a matter of fact we have never done so.

Q. What is the length of the Spillway?

A. Three hundred feet.

Q. And substantially level?

A. Yes, sir.

Q. An approximation of the amount can easily be reckoned as to any of those depths?

A. Yes, sir.

Q. I wish you would level it on depths of half an inch and an inch?

A. And so on up to a foot?

Q. Yes, and each inch up to twelve.

A. Yes, sir.

Q. In a million gallons per day?

A. Very well.

Cross Examination. By Mr. Vredenberg.

Q. Mr. Cook, since the 23rd day of May, 1904,

have you been in the employment of anyone else except the Jersey City Water Supply Company?

A. Yes, sir.

Q. In whose employ have you been?

A. In the New Jersey General Security Company, Society for Establishing Useful Manufacturers, and some other parties that I am not employed by regularly.

Q. The first one you mentioned was Security Company?

A. New Jersey General Security Company.

Q. What is your employment there?

A. They own several mills in Paterson and Passaic, and I assist in the management of those mills, I have charge of the power plants and generally looking after the operation, and let them to tenants.

Q. Then I understand you have been in the regular employment of these persons or corporations that you have mentioned, and in addition to that you have been employed by others temporarily?

A. Yes, sir.

Q. I understood you to say that the water of the East Jersey Water Company was not delivered to Jersey City after 5 P. M. on May 23, 1904?

A. Yes, sir.

Q. And at that instant the water from the Boonton reservoir was delivered to Jersey City?

A. Yes, sir. I didn't say at that instant, if you will excuse me for interrupting you, but I said that the change was made as quickly as such a change could be made, one was shut off and the other put on, a very brief interval.

Q. How was that accomplished?

A. The water from the East Jersey Water Company's pipe is put, or was put into the Jersey City Water Company's pipe at Upper Montclair by means of a connection, it was laid along between so that those pipes—

Q. So that what pipes?

A. Between the East Jersey Water Company's

pipes and the Jersey City Water Supply Company's pipe. I have a little plan here that will show that if you like to look at it, just how it was done, and there were short connections, sixteen inch connections between the ends of that pipe, which was used for a connecting pipe, and at the time we made that change the water was in the Jersey City Water Supply Company's conduit, down as far as Hamilton, and the stock planks were in the end of the conduit there, and when we made the change we removed the stock plank, or at least Mr. Kutterback removed the stock plank from the end of the conduit and closed down the delivery from the East Jersey Water Company's pipe at the same time, it was all effected within a period of, I should think, twenty minutes or half an hour. It closed one down and let the other on, so that it would do the thing without making any disturbances in the conduit in the flow.

Q. Did it make any disturbances?

A. As far as I know it didn't, I was up at the closing off, in another place, at that time.

Q. Then you didn't see it?

A. I didn't see the operation performed there, although I was in communication by telephone, and was at the Great Notch reservoir where I was doing something else which was connected with such a shutting off.

Q. Then you have been telling us with respect to that entirely hearsay?

A. Well, not entirely hearsay, no, I was on the pipe line and as Kutterback shut off below I arranged about the pressure above, I had a gang of men there so that they would hold the pressure at the East Jersey line at the proper point when we were shutting off the water from the Jersey City Water Supply Company's line, he couldn't do anything there without affecting me at the point above on the line.

Q. On what line?

A. East Jersey Water Company's line.

Q. At the time this occurred you were somewhere on the East Jersey line?

A. Yes, sir.

Q. How far from this point?

A. I should think perhaps a mile and a half or two, something like that.

Q. What was the evidence there that the East Jersey water had been cut off?

A. As he closed down his valve why the pressure arose where I was, and I took off water then from the reservoir line, so that the pressure in the East Jersey Water Company's line should not be raised, that it should be held at the same point that it was before he began to cut it off.

Q. What evidence was there that the water from the Boonton reservoir had been turned on?

A. No evidence except that the other had been cut off.

Q. When had you been at the point where the East Jersey Water Company's pipe and the pipe from the Boonton reservoir united, before that time?

A. Oh, I suppose I had been there off and on every day or two for some weeks or months, I was there very often.

Q. Doing what?

A. Looking at the meter and looking at the pressure record and various things, I was up and down the line and always made it a point to go in there.

Q. Was there a meter at that point?

A. Yes, sir, that is where the deliveries were made to Jersey City prior to the time that the Jersey City Water Supply Company supplied water on the 23rd of May.

Q. Then the meter that measured the water that was delivered to Jersey City before May 23, 1904, was at Montclair?

A. Measured at Upper Montclair, yes, sir, as provided for in the contract.

Q. When you were there last was the water in the pipe from the Boonton reservoir?

A. Well, you mean above that point?

Q. No, at that point.

A. Why of course it was, because that is a part of the seventy-two inch line and the water was in that pipe of necessity, because it was being delivered through it, but do you mean was it water that was coming from Boonton?

Q. Was the water in the pipe which might be called the Jersey City pipe, as distinguished from the East Jersey, above Montclair, at the point of crossing the junction—was the water in that pipe at the time you were last at that junction before the water was turned on?

A. The water was certainly in it, yes, sir.

Q. So that, as you understood it, all that was necessary for the purpose of having that Boonton water delivered to Jersey City was to take up some planks?

A. That is it.

Q. Now where were those planks?

A. They were a short distance above the meter house and the point where this water was delivered, about, I should think, four or five hundred feet.

Q. And as soon as those planks were taken out from the pipe the water would flow down to Jersey City?

A. Yes, sir.

Q. Where was the meter that measured that water from Boonton?

A. The meter was in that connecting piece and is there still. If you will let me show you that blue print I could show you plainly how it is, and I think you would understand it in a moment.

Q. I think I understand it. When was the meter put at Kearny avenue?

A. Well, some time previous to June 9, 1903, but I don't know how long before.

Q. And from which meter do you take the fig-

ures you give us, as measuring the water delivery at Jersey City?

A. Previous to the 23rd day of May, 1904, the water was delivered and measured through the meter at Upper Montclair, because the contract provided that is should be; after that time the meter at Uper Mountclair was not in service any more, it wasn't in the line of delivery, and the water was measured through a sevnty-two inch meter at Jersey City.

Q. And since then it has always been measured through that meter?

A. Yes, sir.

Q. Is there any other meter between that and the Boonton reservoir?

A. No other meter in the strict sense of the term, but we have an arrangement whereby we get an approximate measurement of the quantity through certain gates at Boonton before it is delivered into the conduit.

Q. Did you buy this Venturi meter?

A. The Jersey City Water Supply Company did, so far as I know.

Q. You say it was purchased before June 9, 1903?

A. I know it must have been because we put water through it at that date, I don't know how long before.

Q. You don't know how long before it was purchased?

A. No, sir.

Q. Do you know from whom it was purchased?

A. Builders Iron Foundry, I don't know that because I purchased it, but I know they are the people that built it, and we have bought meters of them at different times,—the Builders Iron Foundry of Providence, Rhode Island.

Q. Have you ever tested it in any way?

A. By comparison with the meter at Upper Montclair, and not very closely with the gates at

Boonton, and I have tested the registering apparatus, so-called, several times.

Q. Now the first test by the East Jersey meter, —how did you test it by that?

A. Those meters were set and supposed to be set right—independently of each other, and then when the water was passed through one it was measured through the other and so found to check.

Q. Did you check it?

A. Yes, sir.

Q. Personally?

A. Yes, sir.

Q. When?

A. At the time—well, at the time they were set up; when the meters were set up I went there with Mr. Waldo Smith, who was in charge of the thing generally, who was the Company's engineer, and the machines were set up, and we tested at the registering apparatus and recording apparatus, and after that we compared the flow of one meter with the other—with the flow through the other.

Q. How do you test the flow of one with the other?

A. Why if one meter said that thirty-two million gallons went through it, and the other said the same, why we said there was a check. In fact if it didn't absolutely check, if there were a tenth of a million gallons difference we said there was a check, because the difference was sometimes in one direction and sometimes in the other.

Q. Well, the Venturi meter of the East Jersey was up at Montclair?

A. Yes, sir.

Q. And the other one at Jersey City ?

A. Yes, sir.

Q. Which one of you were at Jersey City and which at Montclair?

A. Don't have to be at either place, all you have to do is to get the readings of the meter and com-

pare them, the man could telephone them over the 'phone.

Q. Did anybody telephone you?

A. Yes, sir, repeatedly.

Q. Who?

A. The gateman at both places. The usual custom in our office is to have the meter readings of all our Hershel meters, so called, telephoned to the office every morning, and that reading is entered in a book and that book is checked with the book in which the gateman himself keeps his reading from time to time.

Q. You didn't do the reading, the gateman did the reading?

A. Sometimes I made a reading when I was there; generally when I was there I checked up the reading with the man to see that everything was all straight about it.

Q. This Venturi meter is the invention of a man by the name of Venturi, is it?

A. The application of this particular principle for the measurement of water is the invention of a man named Clements Hershel.

Q. When?

A. Why about, as I remember, 1888 or 1890, somewhere along there, I was present and helped make the original experiments which were made upon this meter.

Q. He was in the employ of the East Jersey Water Company?

A. Not at that time, I think he was at that time with the Holyoke Water Power Company, and I was an employee in his department, and he started his investigation about this water meter, and I made some of the measurements, I ran a hook gauge to measure the difference of level in a nine foot pipe, I believe.

Q. What is the Holyoke Water Power Company?

A. It is, or was at that time, the largest Water

Power Company, I think, in America, but since that time it has fallen back in that respect.

Q. What do you mean by Water Power Company?

A. A company which supplies water that is used for power by corporations that lease land and water rights from the Water Power Company.

Q. And Mr. Hershel was inventing a machine by which his employer could charge for the water delivered by him or her?

A. Yes, sir, that was what he was after.

Q. This test that you make by the gates, what is that?

A. The computation was made of the flow of water through those gates from certain experiments that had been made upon gates of that kind by Mr. J. Waldo Smith, who was at that time connected with the East Jersey Water Company.

Q. And it is that conclusion that you now appeal to as a test for this Venturi machine?

A. I say that it is a check on the flow of the Venturi meter; it would be taken by an engineer for what it was worth.

Q. Now you said that you tested several times the recorder?

A. Yes, sir.

Q. What do you mean by that, as testing that separate from the machine?

A. The principle of this Venturi meter is that when the loss of head between the up-stream end of the meter and the throat is known the quantity of water passing through that throat can be computed. Now this recording apparatus is a little machine whereby the difference of head between the up-stream end of the Venturi and the throat is converted by this little machine into gallons per fifteen minute interval or ten minute interval, as the case may be.

Q. A very delicate machine?

A. No. Perhaps I don't make it quite clear to

you, but this little machine will convert this difference of head into a rate of flow and from that rate of flow into a quantity delivered in a certain definite length of time.

Q. How does it convert it?

A. Well, now, something like this,—in the top of that machine there is a drum, and on that drum there is a raised surface, against that drum there is a little wheel, and that little wheel is on the top of the stick or bar that is attached to a float, that floats in a vessel that is filled with mercury; now that vessel in which it is floats in another vessel of mercury; now this thing is so arranged that when these pressures—the up-stream pressure is brought into one vessel of mercury, and the down-stream pressure in the other vesel of mercury, that this float shall be maintained at a higher or lower elevation. Now when the time comes for this machine to record, certain clock work was arranged that at a certain time it shall release a certain maximum that shall revolve this drum,—close whenever the drum revolves; the position of that little wheel on that drum determines how long the wheel shall remain in a certain position so that a gear, which is on the bottom of that drum shall become engaged in another gear that will drive the recording maximum so that it shall show how many gallons has passed through that thing in fifteen minutes.

Q. This recording apparatus is what you have been testing from time to time, I understood you to say?

A. Yes, sir.

Q. You tested that frequently?

A. Well, I have tested it, and have been there perhaps personally four or half a dozen times, but I have a man who looks after all our meters, who is a very skilful fellow and understands them very well, and he goes through all our meters occasionally, and what we do when we test it is this,—we put on an artificial head on this recording appa-

ratus and see if the recording apparatus registers the proper amount for the head which we put upon it.

Q. If more water is running through than the recording instrument records that will tell you?

A. What we test is to show us if the recording apparatus records the proper amount for that loss of head or for that difference of head.

Q. You, then, have made no other test of this Venturi meter that is being used to meter water from Jersey City than the test you have mentioned?

A. No, that is all; I have made those tests at different times as I say, and once in the presence of Mr. Ferris.

Q. Is there no way, Mr. Cook, of testing absolutely whether that Venturi meter records water which passes through it, accurately?

A. I don't know of any practical way, I haven't thought of any practical way at present whereby we could test that Venturi meter beyond the test we have made.

Q. Couldn't you use a weir?

A. I don't think of any place where we could use a weir.

Q. That would test it accurately, if you could use it?

A. I don't know whether it would or not. In my opinion, the quantity of water which flows over a properly constructed weir cannot be determined with much, if any greater accuracy than the quantity of water flowing through a properly constructed Venturi meter with proper observation of the loss of head.

Q. This table which you produced, marked Exhibit D 33, was made up by you?

A. Yes, sir.

Q. It seems that you did not speak accurately when you said that Jersey City had never paid in full for any water?

A. Within the time.

Q. Has she ever paid in full for any water?

A. I think, if you compute the interest, that from the time the bills should have been paid, until the time it was paid, I think there never was a time when she paid in full, when Jersey City paid in full.

Q. Well, it shows here on the face of it when she made her first payment there was $1,200 more due than she paid.

A. I don't understand it so, I don't understand what you mean.

Q. (Paper shown to witness.)

A. Yes, sir, therefore I say I don't think Jersey City ever paid in full.

Q. You do understand that the first time she paid there was $1,200 she did not pay?

A. Yes, sir, that is right.

Q. Now I understand you to charge interest at the rate of twelve per cent., is it?

A. Six per cent.

Q. Only six?

A. Six per cent.; that is the legal rate, I believe.

Q. Then I see you compound it every three months?

A. No, sir, I made this computation in the way that partial payment computations, as I believe, are usually made.

Q. You compound interest every three months, don't you?

A. I make the interest up to the time the interest payment was made, whenever that payment was made, some times three months interval and some times it was nine months.

Q. You compound it every time payment was made?

A. I don't compound it at all, I think.

Q. Don't you?

A. In the ordinary partial payment way.

Q. You add that $1,200 in at the next payment, don't you?

A. Yes, sir, that is what I do.

Q. And you charge the interest on the balance after that, don't you?

A. Yes, sir.

Q. And you keep on doing that?

A. Yes, sir, that is right.

Q. About every three months?

A. Well, there was a place down here where it was nine months between, something like that I think.

Q. Then you didn't charge compound interest for nine months at that time?

A. Two hundred and thirty-five days I think was the longest interval.

Q. Now since the order of the Court made in the injunction suit has not Jersey City paid in accordance with the order?

A. No, sir.

Q. In what respect hasn't it?

A. According to the order of the Court, as I understand it, Jersey City is to pay within a reasonable time.

Q. Pay what within a reasonable time?

A. Pay the amount of this $88,450.

Q. When did she pay the first $88,450?

A. Well, they paid a lump sum on September 15, 1905, which may have and probably did include several of those $88,450, and the total cash was $230,214.

Q. When did she pay the next $88,000?

A. She paid the next $88,000 January 17, 1906.

Q. When did she pay the next $88,000?

A. March 23, 1906.

Q. When did she pay the next $88,000??

A. June 29, 1906.

Q. Wasn't that in accordance with the order of the Court?

A. Not as I understand it, no, sir.

Q. In what respect was it not?

A. I have read the contract, but I don't remember. Let me see, I think I read the order too, as I

understand it the order did not say any definite day, but we have done this,—we have allowed Jersey City fifteen days in which to pay the bill, for which we have not charged interest.

Q. Now in addition to that you have collected for the water belonging to Jersey City delivered to the County Board of Freeholders, have you?

A. Yes, sir, and have credited Jersey City with the amount.

Q. And that was in addition to the order of the Court?

A. Your agreement specifies that this amount shall be in addition.

Q. Well, that is in addition to the order of the Court, isn't it?

A. Yes, sir.

Q. So that they not only have paid you what the Court ordered them to pay you, but paid you this additional amount which you collect from the Board of Freeholders?

A. Which you specifically agreed to pay.

Q. Yes, and we did do it too?

A. Yes, sir, that is true.

Q. Now this Map, Exhibit D 28, I would like to cross-examine about that. Mr. Cook, this Map, you say, was made under your supervision, I think are the words used?

A. Yes, sir.

Q. What do you mean by that?

A. A man in our office made it, a Mr. Bryan, and he made all the tracings from the State Map, and after he made the tracings he made the blue print, and I told him what I wanted put on it and Mr. Bryan put it on it.

Q. Didn't you examine it to see whether it was accurate or not?

A. Yes, I looked it over to see whether he did what I wanted him to.

Q. You are satisfied this Map is accurate?

A. I am satisfied it is as accurate as a State Map is accurate.

Q. Have you ever been over the water shed?

A. No, I won't say—never been up in the Boonton water shed much above Boonton itself, except somewhere up in the Longwood valley, I was through there once, years ago. Here (indicating on map) is the Boonton reservoir, and this big white line represents the outside line of the water shed.

Q. Which is the pond from which the Boonton water works is—

A. I cannot even tell you that, I don't know which it is. That little pond right there (indicating on map) is where they take their domestic supply from.

Q. How do you know, Mr. Cook, that this white line accurately represents the water shed?

A. I don't know it, or, at least, I know it to this extent,—I saw when Bryan did the thing that he had a line marked off between the head waters of the various little streams around here, which he pointed out to me. You see right there (indicating on Map) a place like that, you know it must go over there, and there is the water going down in this direction and in the other direction, and the drainage area must be about half way between those two. This is not absolute. I suppose if a man went around and drove stakes with a level he might make that slightly different, but it is not material.

Q. You don't mean to present it then as an accurate map, but as substantially accurate?

A. Substantially accurate for the purpose for which I am using it.

Q. For instance you show the line as running through the Parsippany dyke?

A. Why I suppose it does too, I suppose the drainage area comes right over along the top of that dyke.

Q. As I understand it, this mark which you have made on there to show the reservoir from which Boonton is supplied with water, that is within this drainage area, Mr. Cook?

A. It would appear to be so.

Q. Does it include Dover also, this drainage area?

A. Yes, sir.

Q. That is within the drainage area then?

A. Yes, sir.

Q. And Hibernia?

A. Yes, sir.

Q. That is all.

Sworn to me before (the signature being waived) this 30th day of October, 1906, at Jersey City, N. J.

THADDEUS MERRIMAN recalled.

Further Direct Examination. By Mr. Corbin.

Q. Mr. Merriman, when the tests of conduit No. 4 were being made, did you take a part in that work?

A. Yes, sir.

Q. When was that and what part did you take in it?

A. The first test was made on the 22nd of October, 1904, and also on the following day, the 23rd. Another test was made on the 29th of October of the same year, and then later further tests were made in May and June of 1905.

Q. What was your part, did you have charge of it or what did you do?

A. During the experiments in 1904 I had charge of the observations on sections 1 and 2, including Hook Mountain Tunnel. On the experiments of

May and June, 1905, I had charge of all the field work and made all the computations of those experiments, as also all the computations that were made on the first experiment.

Q. Did you work out the result of these experiments?

A. Yes, sir.

Q. And ascertain the carrying capacity of conduit No. 4?

A. Yes, sir.

Q. What did you find it to be?

A. Well, the capacity of—I should not have said that, perhaps. The co-efficient of factor n in Kutter's Formula, which I deduced for section 4 for the conduit in the experiment of May 3, 1905, was .0138; fort he experiment of May 3, 1905, was .0140. The indication of those results is that the capacity of the conduits near full, and within a foot of full, seventy million gallons per day, slightly more than that.

Q. Have you given this data from which you found this co-efficient and computed this result, to the City Engineer?

A. No, sir.

Q. You have written out the data, have you?

A. Yes, sir.

Q. The details from which you made up your computations?

A. Yes, sir.

Q. What did you give to the City engineers?

A. I personally never gave anything to them.

Q. You have your data there before you, have you?

A. Yes, sir.

Q. From which you made this up?

A. Yes, sir.

Q. In the shape of blue print sheets?

A. Yes, sir; I have the originals here in my bag.

Q. This is a blue print of the original?

A. Yes, sir.

Mr. Corbin: I offer in evidence those blue print sheets of the data and computations of the witness, and ask that the same be marked.

Marked Exhibit D 35.

Mr. Vredenberg: I object to it as incompetent and as not properly proven.

Q. Are those made up by yourself?

A. Yes, sir.

Q. Those are the correct measurements of your observations and experiments?

A. These are the correct results of the observations that were made by me on sections 1 and 2 of the tunnel; on sections 1 and 2 of the conduit, and on section 4, in May and June. The observation of the height of water along the rest of the line, during the experiments of October, 1904, were made by others; the results of their observations were handed to me and I compiled them.

Q. I am speaking now of conduit 4, you have your own observations there?

A. Yes, sir.

Q. All I want is No. 4, have you got No. 4 there?

A. Yes, sir, I can take it off.

Q. Please do so. And this is the one that is the result of your own observations?

A. It is the result of my own observations, in so far as I made the observations at one end of the tunnel, and my assistant made the observations at the other end.

Q. Was he working under your directions?

A. Yes, sir, and in communication with me by telephone. I made all the computations.

Q. Who was he?

A. Mr. Bryan.

Q. You made the computations from the result of both of these?

A. Yes, sir.

Q. These are your own computations?

A. Yes, sir.

Mr. Vredenberg: Objected to for the same reason.

Q. What were the observations made?

A. The observations which were made consisted in reading by means of a pointed gauge the elevations of the water surface at the upper end of section 4 of the conduit, and also at its lower end; from these observations the slope of the surface of the water in section 4 was determined, and by means of a knowledge of the slope of the surface, and a knowledge of the properties of the tunnel, and by properties I mean area and distance around its circumference, the size of the tunnel, the co-efficient was determined, and from the co-efficient, by means of Kutter's Formula, as required by the specifications the flow of the factor was reduced.

Q. Just describe more in detail the process of your calculations?

A. Well, in determining the flow of the factor n for any tunnel or conduit or river it is necessary to know the length of the section.

Q. Well, that you have?

A. That was had, yes, sir.

Q. What size did you take for the size for the tunnel?

A. The size for the tunnel was taken as the theoretic size.

Q. Was it larger or smaller than the theoretic size?

A. I took the theoretic size; it was necessary to know the slope, to know the size and to know the quantity of the water.

Q. And the slope was ascertained by the differences between the readings at the two ends?

A. Yes, sir. The quantity was determined from the meter readings at Jersey City, during the time that the observations for the height of the water were taken.

Q. When you say slope you made the slope of the surface of the water?

A. Yes, sir.

Q. That slope is somewhat greater than the slope at the bottom of the tunnel?

A. We would depend on the quantity of water flowing, also on the conditions of the sides of the conduit.

Q. Go on?

A. Having the quantities, then the length. The slope of the surface and the quantity of water passing, together with the knowledge of the area and primeter, that is the circumference, so to speak, of the tunnel or conduit, it becomes possible to compute a factor which will represent or be indicative of the degree of smoothness of the sides and bottom of the cross section.

Q. In computing that did you use the Kutter Formula, as prescribed in the contract?

Mr. Vredenberg: For determining the smoothness of it?

Mr. Corbin: I understand that is what Kutter's Formula is for.

Witness: For the smoothness or roughness, whichever it may be.

A. Kutter's Formula is an expression which determinates the flow for a certain co-efficient which is called c. That co-efficient c. is dependent on the surface slope, on the area of the tunnel, on its primeter and on a factor n. If all the other conditions are known it becomes possible to compute the flow of this factor n. which is the factor that was called for and likely to be of a certain given size, by the specifications.

Q. What did the specifications call for, for the factor n?

A. The specifications called for factor n, .014 for concrete or brick work or Ashlar lining, I think, and they call for .018 for Rubble lining, but there was no Rubble used anywhere on the work.

Q. What do you find the co-efficient to be?

A. Found the average of the two experiments to give .0139.

Q. And in making these computations you assumed the size of the tunnel to be the theoretic size in the contract, whereas in fact it is the greater size?

A. Yes, sir.

Q. Would the greater size carry more water or less?

A. Well, the actual co-efficient for the sides and bottom of that tunnel, for its primeter is probably greater than the flow determined by these experiments. If in these computations the actual size of the tunnel had been used, the flow for the factor would have come out greater than the 0.139 which the experiment determined, the capacity, however, would have been the same. It comes in in this way, —the average velocity in the theoretic section is greater than the average velocity in the actual section.

Q. Because of the friction of the size?

A. Because of the similar friction due to the influence of an inch of water all around, an inch or thereabouts.

Q. So practically you balanced off the additional size of the conduit against any aditional friction there might be by reason of roughness of the bottom?

A. Yes, sir.

Q. Is there any doubt in your mind that conduit No. 4 would carrys eventy million gallons a day?

Mr. Vredenberg: I object to the question as incompetent.

A. In my judgment the tunnel would have the capacity of more than seventy million gallons. Its capacity when flowing within a foot of full, as required by the specifications, was determined when experiments were made slightly in excess of seventy million gallons a day.

Q. Could it be operated at a higher level or not?

A. There seemed to be no objections in operating it full.

Q. Then it would carry more water?

A. In that case it would carry more than seventy million.

Q. And if it were operated under a slight head it would carry substantially more, considerably more?

A. I should think it might be increased, speaking very roughly now, ten per cent., I cannot say, that might mean a head of four or five feet though, it is hard to answer such questions off hand.

Mr. Corbin: In accordance with your Honor's suggestion we have taken some testimony on the part of the defendants, to expedite matters, and when we stopped the other day Mr. Merriman, the engineer, was on the stand.

Further Direct Examination. By Mr. Corbin.

Q. Mr. Merriman, I omitted to ask you, and I will ask you now, what has been your experience on works involving hydraulic computations?

A. For the City of New Britain, Connecticut, on the question of an additional water supply I made for them the measurements of flow of water, in connection with certain diversion suits which were threatened against the city for the taking of the water of the stream called Roaring Brook. With the United States Nicaragua Canal Commission I had charge of and made all the hydraulic computations on the Lake and River Division of the Nic-

aragua Canal, and for the Board of Water Supply of the City of New York I made all of the hydraulic computations upon which the preliminary estimate of cost of that work was based. I have also at various times made investigations on the flow of the streams of water in pipes for others.

Q. What is your present employment?

A. Division Engineer of the Board of Water Supply of the City of New York.

Q. That is on the new water works at the Catskills?

A. Yes, sir.

Q. In your judgment are the results which you obtained from the experiments which you have described of a sufficient degree of accuracy to determine, within the limits of Kutter's Formula, the co-efficient prescribed by the specifications?

A. Yes, sir, they are.

Q. In your judgment has the conduit the capacity to carry seventy million gallons per day within the terms of the specifications?

A. Yes, sir, it has.

Q. In actual service, you mean, under service conditions?

A. Under service conditions and complying with the requirements of the specifications.

Q. Are there any other experiments known to you that you could have made, other than you did make, to determine with any greater accuracy the capacity of this section 4 of the conduit?

A. Any further experiments which might have been made would have been merely duplications of those which have been made.

Q. You spoke the other day of frequent readings of the meter at Jersey City, to determine the flow, while you were conducting your experiments. I think you mentioned an interval of fifteen minutes; have you looked to see what the interval was?

A. Speaking at that time from memory I stated that the meter readings were made every fifteen

minutes. As a matter of fact, and desiring to correct my testimony of the other day, those readings were made every half hour.

Q. Was this sufficiently frequent for your purpose?

A. Yes, sir, it was.

Q. As a matter of fact did you obtain a constant flow through the conduit at the time of the experiments as shown by the readings?

A. As shown by the readings the flow through the conduit was constant during the time of the experiment.

Q. You were asked whether there might not be some fluctuations in the surface of the water at the ends of the conduit due to increased or diminished rate of draft by Jersey City during the time of your experiments; what do you say to that?

A. Yes, sir, I answered that question by saying that there might be such fluctuations. The rate of draft by the City from the conduit, however, is practically constant, that is, water is drawn from the conduit through a steel pipe and delivered into the reservoirs at Jersey City; if the water delivered to the conduit from the reservoirs at Boonton were in excess of the quantity of water drawn by the city from these conduits then the excess would flow into one of the delivery reservoirs at Jersey City; the quantity of water passing through the conduit at all times being the quantity of water passed into the conduit from the reservoir at Boonton.

Q. Then whether Jersey City drew little more or a little less would not cut any figure in the constancy of the flow?

A. There would be no difference on the flow.

Q. It would simply stay in the reservoir at Jersey City, instead of taking it into the pipes?

A. The variations in draft by the city make themselves felt by raising or lowering the surface of the water in the reservoir at Jersey City.

Q. But not in the conduit?

A. But not in the conduit.

Q. In finding out the capacity of a conduit, I suppose the portion of it that is smallest determines the capacity of the whole doesn't it, that is the smallest in the sense of carrying capacity?

A. Yes, sir, it is like a chain, the strength of a chain is the strength of its weakest portion.

Q. Now taking this section No. 4, as I understand it, there are seven thousand feet of tunnel and four thousand feet of masonry conduit, the two together forming section 4, is that right?

A. Yes, sir, the total length.

Q. And in your observations you took the whole eleven thousand feet as one?

A. Yes, sir.

Q. Then your observations would give us the data for finding out the carrying capacity of the section 4 as a whole?

A. Yes, sir.

Q. And not as to the tunnel alone or the conduit portion alone?

A. No, sir.

Q. You made no such separate observation?

A. No, sir.

Q. I find in the specification this clause: "The conduits shall be capable of delivering the full supply called for when discharging with a free upper surface, the water surface not to be higher than one foot below the top of the arch." Do you find any limitations further than those in the specifications which imposes any other hydraulic condition on the delivery?

A. No, sir.

Q. How does this factor n. in Kutter's formula vary with the velocity of the water, how is it affected by the velocity?

A. As the velocity of the water increases the factor n. decreases.

Q. How is the velocity of this conduit No. 4, is it higher or lower velocity?

A. Comparatively speaking it is low.

Q. About how much an hour?

A. During the time of the experiments it was about one foot per second, speaking roughly.

Q. Two or three miles an hour?

A. It would be about a mile and a half an hour.

Q. Now I suppose the conduit was running not further than half its capacity?

A. It was running at less than half its capacity.

Q. Suppose it had been running the full capacity of seventy millions, would its velocity have been greater or less?

A. Nearly twice as great.

Q. Then the factor n. would have dropped?

A. Yes, sir, the factor n. would have dropped.

Q. I believe you are the engineer who put in the gates at the foot of the Boonton Plain to prevent the water flowing from the pool at the bottom of the Plain, going over into the river, are you?

A. Yes, sir.

Q. Will you describe them and state what their purpose is, and how they are designed to act?

A. The purpose was to prevent the flow from the lower level or navigation level of the Morris Canal back into a head race of a number of water powers which discharged from the head race directly into the Rockaway river, and so into the reservoir at Boonton. These gates were erected on the top of the submerged dam built across the point of the Junction, and between the navigation level of the canal and the canal of the head race; they were designed to operate so as to freely admit of the passage of water from the navigation level—so as to freely admit of the passage of water from the head race canal into the navigation level canal, and yet to prevent and back flow or flow in the oppisite direction.

Q. How is that accomplished?

A. That is accomplished by pivoting these gates above their centers, so that they are free to swing

with the current in either direction, but in one direction to swing fully open and in the other to swing to a full stop position.

Q. Is the method used there an improved one in engineering, is it usual for that purpose, of allowing water to go one way and not the other?

A. Yes, sir.

Q. Have you observed them since they were constructed?

A. Yes, sir.

Q. Were they successful?

A. They were working.

Q. How does the water generally flow there, in which direction?

A. The water flows from the head race level of the canal into the navigation level.

Q. What time is it likely to flow in the opposite direction?

A. Well, the conditions there were such that at all times of heavy rainfall, the flow was from the navigation level directly into the river, that is, before the gates were put in, but since that time that condition has been overcome by making arrangements to carry the flood waters through the lock of the canal, a distance of about 2000 feet from this place, and discharging them into the Rockaway river, a long distance below the main dam.

Q. The overflow has been carried further down the canal?

A. Yes, sir.

Q. Did you observe whether the canal has a current from this point where the gates are?

A. Yes, sir, there is a current, and the supply from the canal, with the exception of certain waters, comes in from small streams which run directly into the canal, passes through the level of the power canal into the navigation canal, and so on down to as far as Mountain View.

Q. That is where the Greenwood Lake waters come in?

A. Yes, sir. The quantity passing through the power canal and into the navigation canal is proportionately an average of 25 cubic feet per second to supply the usage of the canal for leakage and lockage.

Q. Is there not water also drawn from the canal down at Montville?

A. I am not very familiar with that. I know that a certain quantity of water is taken out of the canal a short distance below Boonton and again returned to the canal at Montville, but whether there is any direct draught from there or not I don't know.

Q. Suppose your gates did not shut absolutely tight when they are used automatically and a little water leaks around into the head race, would any of that water get back into the river?

A. I think any water passing those gates—the quantity that does pass is very small, but any water passing those gates would not get into the Rockaway river unless the entire level of the power canal was drawn out.

Q. Where would the water go that leaks through there?

A. Why, it would simply move two or three feet towards the river, and then when the current again reversed would be driven back into the navigation canal.

Q. Is it your judgment as a matter of fact, that as the gates are now arranged the water that goes through the gates towards the power canal does not in fact get into the river?

A. I never made any direct observation of that point; I have not seen the situation there for about a year, but as long as I was familiar with it, and I might say I was familiar with it for a year and a half intimately, I never saw any water pass through those gates down into the Rockaway river.

Q. That is all. You may cross-examine, Mr. Vredenburgh.

Mr. Vredenburgh stated to the Court that since the adjournment, some facts came to his knowledge which he thought ought to be put into this case at this time.

Defendant's counsel objects to the re-opening of the Complainant's case for the purpose of putting in any cumulative testimony.

The Court: I will allow counsel (inasmuch as he says that he has only discovered that since the last hearing) to show the character of the soil there. And as to this other matter, I am clear that I ought to admit it. Of course, it may be as counsel for the company contends that there is no connection between the outbreak of typhoid fever in Dover and the outbreak in Jersey City, but whether there is or not will depend upon the evidence. Now, I suppose of course you would prefer to have that evidence put in at the earliest possible time. Of course, counsel must put in the evidence at once.

Mr. Vredenburgh: Yes sir. I am not ready to-day.

The Court: Well, you ought to do it to-morrow.

By the Court. I think I ought to permit Complainant's counsel to show that the sewage of the Mansion House at Dover is discharged into the Rockaway river at night secretly. That is newly discovered evidence—Mr. Vredenburgh says it is, but I think it is proper that he should be permitted to show that.

Cross-Examination.

Q. I understood you to say that what you have testified to is the carrying capacity of this conduit and tunnel known as conduit No. 4?

A. Yes, sir.

Q. I understood you to say that in October, 1904, you made certain observations for the purpose of determining that capacity; is that so?

A. I did not on section 4 personally, no, sir, but I made observations on Sections 1 and 2 at that time.

Q. Were there observations made at that time on conduit No. 4?

A. Yes, sir.

Q. Did you attempt to calculate from those observations the carrying capacity of it?

A. Yes, sir.

Q. But you found that there had been some errors made in the data, and that the data amounted to of no value?

A. Yes, sir.

Q. The specification annexed to contract provides as follows, that the carrying capacity of all masonry conduits or tunnels will be determined by Kutter's formula having co-efficient "N" to equal .014 for brick work, conduit or ashlar lining, and .018 for rubble lining. Did you take either one of those figures as the co-efficient "N" in the Kutter's formula?

A. Did I take either of them and use it?

Q. Yes.

A. No, sir.

Q. You then sought to ascertain some other efficient "N" than that provided for by the contract by the contract?

A. I sought to ascertain the value of the contract section as it stands.

Q. Then you sought some other value for co-value for co-efficient "N" than that provided for or by the specification?

A. Yes, sir, I did because—

Q. (Interrupting) Yes, that is all; that is the only question I am asking you now. You say you

did; now the value that you found out, was that greater or less than .014?

A. It was slightly less.

Q. It was slightly less than .014?

A. Yes, sir.

Q. Was it greater or less than .018 the other value for "N"?

By Mr. Corbin. Rubble lining?

By Mr. Vredenburgh. Now don't interrupt me. How far have you got with my question?

(The Stenographer read the question)—mentioned in the specification?

A. I said it was less than .014 therefore of necessity it must have been less than .018.

Q. How much less than .014 was it?

A. On the first experiment, that is the experiment of May 3, 1905, it was less by .002; in the experiment of June 1, it was exactly .014. The average of the two therefore would be less than .014 by .0001.

Q. What was it in figures?

A. In figures?

Q. Yes.

A. .0001.

Q. What was the co-efficient "N" that you found?

A. The value that I found as the average of the two experiments was .0139.

Q. .0139?

A. Yes, sir.

Q. If you had taken as the co-efficient "N" the figures .018, the carrying capacity of this conduit No. 4 would have been less than 70 million gallons of water a day, would it not?

A. Why of necessity, yes, sir.

Q. I understood you to say that there was some

data made from which you made a calculation in October, 1904, and that there was subsequent data obtained by you in the following year in May, 1905, and in June, 1905—that the first investigation for data was made by you on May 3, 1905, and the second investigation was made by you on June 1, 1905; am I correct in that?

A. Yes, sir.

Q. Now your examination made in October, 1904, or in the data that was taken in October, 1904, was taken at the two ends of the tunnel, was it?

A. Yes, sir.

Q. The examination that you made in May and in June, 1905, was taken at the two ends of the section?

A. Yes, sir.

Q. And the section consists of a tunnel of 7,100 feet and of masonry conduit of 4,000 odd feet?

A. Yes, sir.

Q. In this examination that you made on May 3, 1905, you stood at one end of the conduit or of the section, and Mr. Bryan stood at the other end of the section, and you measured the elevation of the water in your end, and he measured the elevation of the water in his end; am I correct about that?

A. Yes, sir.

Q. Your end was the east end?

A. Well, I don't think I could say as to that without looking at my notes.

Q. Don't you remember whether you stood at the east end or west end?

A. Well, there were two experiments made, and during one of the experiments I was at the lower end, and during the other I was at the upper end, but I don't remember which end it was.

Q. Which end was the masonry conduit at?

A. The masonry conduit was at the lower end.

Q. At the east end?

A. At the easterly end of section 4.

Q. And when you stood at the easterly end did you stand at the very mouth of the tunnel or some distance west of that?

A. There is a section there of about 200 feet of concrete.

Q. Yes, you stood where?

A. I stood at the end of that concrete section.

Q. At the easterly end of the conduit, what is there there?

A. At the easterly end?

Q. Yes.

A. Why, there is a connection chamber between the conduit and the steel pipe.

Q. The conduit there makes a connection with the steel pipe of a carrying capacity said to be 50 million gallons per day?

A. Yes, sir.

Q. Now how did you ascertain the elevation of the water at that point?

A. By measuring from a point at a known elevation, from a point on the gauge of the surface of the water.

Q. How did you get at that, was there a manhole there?

A. There is a gate-house there and a number of manholes.

Q. A number of manholes?

A. Yes, sir.

Q. More than one?

A. Yes, sir, we had them all open so as to get plenty of light.

Q. You had a number of manholes open and you stood on the outside of the conduit, and put your measuring rod or what not down from the top of the conduit to the surface of the water?

A. Yes, sir, it was done practically in that way.

Q. Sir?

A. It was done practically in that way; the distance was measured at a point from a known elevation to the surface of the water.

Q. Known elevation on what?

A. A bench mark, so called, at a point of known elevation.

Q. In the conduit?

A. No, sir, on one of the floor beams of the connection chamber.

Q. Wasn't the water at that time backed up into the conduit by means of boards?

A. Yes, sir, stop planks were in place.

Q. Stop planks were in place?

A. Yes, sir.

Q. Now the value of the co-efficient "N" which you used was computed by you on the assumption that a certain theoretical uniform size and condition of surface existed in the entire length of section 4 of the conduit including both the tunnel and masonry, wasn't it?

A. The assumption made by me was that there did exist a contract section straight and smooth, and true, lying within the actual section of the tunnel as constructed. The factor which I determined was for that section, and not the actual section as it stands.

Q. Now, won't you listen to that question once more?

A. I listened to it, sir. A simple yes or no would not have answered the question properly.

Q. Why can't you answer yes or no to that question?

A. I could not answer yes to that, sir, because the inference then would be that the value of the co-efficient I determined would be for the actual tunnel as its stands, whereas for that I made no figures.

Q. Wasn't it on a theoretical condition of surface?

Objected to.

By the Court:

Q. Do you understand the meaning of the phrase "condition of the surface?"

A. It was the condition of the surface we were looking for, we made no assumption as to that.

Q. Do you understand the meaning of those words?

A. Yes, sir.

By the Court. I don't see any objection to that question.

A. If the words "condition of the surface" are left in the question I must answer the question no, because the condition of surface is what we were looking for, and to make an assumption as to the condition of surface when we were trying to find out what that condition was, would be like making an assumption as to the weight of a book or any other object before we actually weighed it.

Further Cross.

Q. Well, was it of uniform size, leaving the words condition of surface out?

A. No, I made no assumption as to a uniform size.

Q. Did you make a computation of "N" according to the actual dimension of the tunnel?

A. No, sir.

Q. Then it was theoretical, was it?

A. It was what might be called the contract section—theoretical might cover it.

Q. Wasn't that contract section uniform?

A. Contract section uniform?

Q. Yes.

A. Yes, sir, as uniform as it could be constructed in practice, yes, sir.

Q. The theoretical section which you used was uniform, wasn't it?

A. No, sir, it was not for the reason that the

water stood during the time of the experiment at a greater depth at the lower end of the section than it did at the upper end.

Q. Didn't you take the average of the two and compute them?

A. I computed the average section, yes, sir.

Q. You made this computation on a basis that was uniform?

A. Yes, sir, secondarily only though Mr. Vredenburgh I took the average.

Q. Wasn't the rate in inflow or delivery into section 4 of the Boonton reservoir uniform during the whole period of your tests?

A. Yes, sir.

Q. And wasn't the recorded rate of overflow from Section No. 4 according to the Ventura meter in Jersey City, uniform during the period of those tests?

A. Yes, sir.

Q. Your notes show that the elevation of the water surface at that end of section 4, during the first portion of the period of your observation on May 3rd—the surface fell about 3/8 of an inch and afterwards rose to the same amount in the second part of the period?

A. There was an elevation of approximately 3/8 of an inch yes, sir; that was the maximum variation; the variation from mean would be very much less than 3/8ths.

Q. What was the area of the water surface of section 4?

A. Why I would say, speaking roughly, it would be about fifty-six thousand square feet.

Q. Now did not the rise and fall, Mr. Merriman, of this water surface, in the conduit, indicate a dissimilar rate of out-flow from the section No. 4?

A. No, sir.

Q. Why not?

A. The rise and flow of the surface of the water in section 4 in that case would no more indicate a

greater inflow or out-flow from the conduit than would a wave in a perfectly tight vessel indicate leakage into or out of that vessel.

Q. How do you account for that wave?

A. Water is never at rest under any conditions, it is always oscillating, due to the influences and changes in pressure and to the waters natural tendency, or tendency of any body, when once put in motion to remain in motion.

Q. I notice by your data that the rise and fall of that water was the same, and occurred at the same time, and was the same in amount at both ends of this section—how do you account for that?

A. I should anticipate that the wave length was half the length of the section.

Q. That is, the wave length with those eleven thousand feet, you think?

A. Say about five thousand feet, I think, fifty-five hundred feet.

Q. Wasn't it for the whole section?

A. I should anticipate that the wave length, Mr. Vredenberg, was less than the full length of the section. I cannot conceive of a wave in any vessel having a length exactly equal to the length of the section.

Q. Mr. Merriman, you took an examination every half hour for four hours, did you not?

A. The meter at Jersey City was read every half hour for four hours, I think that is it, yes, sir.

Q. And how often were the elevations?

A. My impression is that they were taken every fifteen minutes, I could find out in a minute.

Q. The elevation data as you gave them to us would seem to indicate that this wave motion or this increase of elevation occurred gradually about two hours after you started, and gradually decreased down to the time that you had your last elevation, is that so?

A. Well, I don't know as to that, sir, without looking at the notes, I cannot say.

Q. It may be so. Now have you any other way of accounting for that increased elevation when the water at the gate at Boonton was uniform, and the reading of the meter was uniform, other than that you have given?

A. That is the true explanation.

Q. If the meter at Jersey City was not accurate enough to indicate that wave—did you make any tests of the Venturi meter at Jersey City?

A. No, sir.

Q. Your ascertainment or determination of coefficient n. depended upon the accuracy of that meter, did it not?

A. Oh yes, yes, sir, of course.

Q. You had to have that accurately in order to tell the velocity?

A. Yes, sir.

Q. I understood you to say that you hadn't been up at that dam for one year, at the dam at Boonton?

A. Well, it has probably been as long as that, I cannot say.

Q. Did you ever see a loaded canal boat come down that slide and strike the water at the foot?

A. Yes, sir, yes, sir.

Q. Why did you build the gates?

A. Why were the gates built?

Q. Yes.

A. To prevent the flow or passage of water from the navigation level of the canal, which is polluted, back into the race-way level of the canal, which empties directly into the Rockaway river above the dam at Boonton.

Q. I understood you to testify that no such water did?

A. It did prior to the building of these gates, and these gates were put there in order to prevent such flow.

Q. It did prior?

A. Yes, sir.

Q. But you think the gate has prevented it?
A. Yes, sir.
Q. That is all.

Re-Direct Examination.

Q. This theoretic section of the conduit No. 4, was that a smaller section or a larger section when the tunnel was actually built?
A. It was a smaller section.
Q. So that you made your reckonings as if the section only had the theoretic size?
A. Yes, sir.
Q. In fact it is larger than you estimated it to be?
A. Yes, sir.
Q. Then is its carrying capacity likely to be greater or less than the amount you have figured?
A. It should be exactly the amount I have figured.
Q. Because you have taken the whole section together?
A. Yes, sir.
Q. And if you took the tunnel alone it would be more, would it not?
A. Why I don't think that could be done.
Q. Well never mind that. The concrete section of four thousand feet is of the theoretic size?
A. Yes, sir.
Q. And the remaining seven thousand feet of tunnel is some inches larger?
A. Yes, sir.

The Court: I understand that the theory of the City is that the size of the actual tunnel has been diminished by the amount of gravel and other matter at the bottom.

Mr. Corbin: The fact is that the tunnel is six inches bigger than it was estimated to be.

By the Court:

Q. The theoretic section is the section which is entirely free from gravel or any other solid matter at the bottom?

A. Yes, sir, it lies entirely inside of the actual section constructed.

Mr. Vredenberg: Our contention is that the roughness of the bottom has never been properly computed; not that we want to say that we can prove that it did not carry seventy millions, we only want to know that it has carried seventy millions and our experts have never yet been convinced that it will carry seventy millions, according to the Kutter Formula will not, if they use the co-efficient n. as provided for by the contract. They do it in some other way, and the question comes, does it carry that now; they think it does, they made measurements to show that they think it does, and I don't know that we can disprove that it don't. It is for the Court to say, after the evidence is in, whether it will carry that seventy millions, or whether there ought to be some other more definite measure of that.

The Court: What I would like to know is whether this theoretic section, upon which this computation has been based is smaller than the actual section, taking into account the fact of the inequalities of that section and of the gravel and other matter which has collected or might collect at the bottom of that section.

Mr. Vredenberg: The difficulty, may it please your Honor is that they determine the size by the velocity of the stream, by the amount of water that goes through.

The Court: Well, I know the velocity of the

water has a great deal to do with the amount actually delivered, but I suppose that the assumption is that the pitch of the theoretic section is the same as the pitch of the actual section.

By Mr. Corbin.

Q. Will you not state to the Vice-Chancellor now what it was that you were ascertaining by your experiments, and what the method is of ascertaining the co-efficient n. and what the purpose of it is?

A. The flow of water in a conduit such as the one under discussion is dependent first on its size, second on the character of its sides and bottom from a point of view of smoothness, and third on its size.

By the Court:

Q. Well, you said size.

A. Oh, third, on the slope of the water. In order to determine the capacity then of a conduit which has been constructed and built, it is possible by measurements to obtain the slope of the water surface by direct measurements. It is also possible to obtain the area of that section, and it is possible to measure the quantity of water passing through it, so that the only unknown quantity remaining is a factor for the smoothness or roughness which is the factor n. spoken of in Kutter's Formula. This is what we did. In this particular case, however, the tunnel was built of an area somewhat larger, approximately four per cent., three and a half to four per cent. larger than the area required by the contract. The sides and bottom of the tunnel as constructed—the bottom of the tunnel as constructed is somewhat rougher than the bottom of the tunnel would have been had it been smoothed up with concrete, but the increased area, that three and a half per cent. excess, is sufficient to overcome the increased smoothness of the bottom, and bring the

value for the factor n. down to and slightly lower than the requirements for the specifications. The value for the factor n. as stated in the specifications was given only for the purpose of determining the size to which the aqueducts and tunnel should be built. When the specifications were written there was nothing known about the slope; therefore, it was impossible to say that the conduit should be eight feet and a half or whether it should be ten feet, because the size is dependent on the slope. By specifying, however, the values for the factor n. it was possible to write a specification which would cover all cases. The size to which the section 4 should have been built, under the specifications and on the slope as laid, was approximately eight and a half feet, it was actually built eight and sixty-three or sixty-five or sixty-seven hundredths, somewhere along in there; it was built larger; the area was about two square feet greater than was required; that increased area is sufficient to overcome the roughness of the bottom of the gravel.

Q. The bottom of this tunnel is all rock, isn't it?

The Court: It isn't necessary for my information to go over this. Because I shall have to read the evidence.

Q. Now, one of the things you had to ascertain was the slope of the surface of the water through the whole section, wasn't it?

A. Yes, sir.

Q. The tunnel portion as well as the concrete portion?

A. Yes, sir.

Q. And that slope was affected, was it not, by the actual roughness which existed in the tunnel? That is, the retardation by roughness?

A. Yes, sir.

Q. So that what you got at was the actual slope, wasn't it?

New Jersey State Library

A. Yes, sir.

Q. And you assumed that the tunnel was no bigger than the conduit? Or, in other words, the theoretical section, didn't you?

A. I took the section as required by the contract.

Q. And that was, throughout the tunnel, less than the actual construction?

A. Yes, sir.

Mr. Vredenburgh: I don't know that I ought to object to the witness's construction of the specifications. I construe them differently. I don't 'construe them as the witness does.

The Court: That is a matter of argument.

Q. This Kutter's formula is often used the other way, to ascertain how much a pipe is actually delivering or will deliver, isn't it? Used conversely?

A. Yes, sir; by assuming a value.

Q. You were working in the opposite direction, to find out what the actual co-efficient was?

A. Yes.

Q. You were reversing the process which is often used, weren't you?

A. I employed the process by which the formula is derived, I think.

By Mr. Vredenburgh:

Q. You were improving on the Kutter's formula?

A. No, sir. I couldn't stop that.

CYRUS F. SPROUL sworn for the defendants.

Direct Examination by Mr. Corbin.

Q. What is your residence and your profession?

A. My residence at present is Keyport, New Jersey. My profession is civil engineer.

Q. How long have you been a civil engineer?

A. I graduated in 1884.

Q. Did you have to do with water-works?

A. Yes, sir.

Q. Prior to the making of Flynn's contract with Jersey City, in February, 1899, did you have to do with the designing of the proposed works and the making of estimates for the purpose of bidding?

A. I did. Yes, sir. I did all the work for the Flynn proposition.

Q. Did you have anything to do with the previous propositions he had put in to Jersey City?

A. One of them. The one that was the advertisement of February 23d. I got that scheme up and prepared the bid.

Q. And did you plan these works that were finally accepted?

A. I did, yes sir. That is, as to maps that were presented to the city; the proposition and the maps and the plans that went with the bid I prepared; got them up.

Q. Who made the figures on which to bid?

A. I made the figures.

Q. In placing this large storage reservoir at the very lowest point of the utilized watershed, was that a feature found in the former biddings or a new feature?

A. It was a new feature; entirely new.

Q. Is it usual or rather unusual to be able to find a place where you can get your storage at the lower end of the water-shed?

A. Well, it is unusual.

Q. Considered a favorable thing, when you can get it, is it, or otherwise?

A. Yes.

Q. In designing these works, and in figuring for the bid, was there any design made or any figures

made for the construction of any sewers or disposal works?

Mr. Vredenburgh: I object to that.

Mr. Corbin: The whole scheme was designed by this man and those working with him, and involved no such thing as is now assumed by the city. My suggestion is to show that nothing of the kind was designed or reckoned for or bid for.

By the Court. Do you want this witness to state that neither in the plans or the maps or the contracts or figures or writings furnished the city there was any reference with respect to sewage?

By Mr. Corbin. Not exactly. I want to go further than that and show that in the design of the works, the pollution was not to be taken care of in any such way, but first and chiefly by digging a very large and deep sedimentation reservoir, and this witness was there when some of these things occurred. I want to call his attention to that.

By the Court. I will allow you to put in any evidence in rebuttal to what the other side has put in. You have a right to show just what papers were presented to the city, and if the papers presented to the city include maps, writings, statements and figures, and a written proposal for a contract, you have a right to show that, but if you are merely going to ask this witness what was in his mind, that is a very different thing. Put your question again.

Q. Did you make any estimates or calculations from which Patrick H. Flynn's bid which was offered to the city?

A. I did, yes, sir.

Q. In those estimates and calculations, were any

estimates or calculations for sewerage, sewers or a disposal system (Interrupted)

Objected to.

By the Court. Well, the papers of course will speak for themselves.

By Mr. Corbin. That is just the trouble, sir, they don't.

(After further discussion.)

The Court. You may show if you can that this witness took part in the consultations which were had between the city officials and the representatives of the water company; in so far as such consultations have been put in evidence by the other side you have the right to give your version of them. I will permit you to say what took place between the city officials and the representatives of the water company.

Q. My question is whether you estimated upon sewers or the construction of them in the making of this bid?

Objected to and overruled.

Q. How did you plan to take care of such pollution as might come down the Rockaway river?

Ojected to and over-ruled.

After some discussion, the Stenographer was directed to read the question, and read as follows: How did you plan to take care of such pollution—

By the Court. I will exclude any effort to show what was in the witness's mind that was not communicated to the city authorities.

Q. Did you assist in the preparation of Flynn's proposal of August, 1898?

A. I wrote the draft of it.

Q. You wrote the draft?

A. Yes, sir.

Q. Under plan No. 1, which is the accepted plan, I find you wrote this statement: A plan has been prepared to prevent all contamination thereof from any sewers. Now, in accordance with that specification, were you present at any discussion of this bid of Flynn's with the city officials afterwards or at any of the discussions?

A. No, I don't think I was with any of the city officials, no, sir. The first proposition of February 23rd I attended a session, but on this one I wasn't. I heard it discussed by Mr. Flynn and all his lieutenants.

Q. Were you up to the water shed with the city officials when they came up and visited it?

A. Yes, sir.

Q. Were you one of the party?

A. Yes, sir.

Q. Did you hear any discussions then?

A. I heard frequent discussions, yes, sir.

Q. Now what was in general the plan by which you proposed to prevent any contamination of the water?

Objected to and overruled.

Q. Did you hear any discussion upon the subject with the city officials upon those occasions?

A. I heard discussions about the rag mill, and I think they asked what are you going to do with that.

By Mr. Vredenburgh:

Q. You say they, who do you mean by they?

A. I remember distinctly riding at one time in the wagon with the Mayor; I was riding alongside

of him. The thing was generally planned so that some representative of Mr. Flynn was in each one of the wagons so that if any questions were asked they could answer them, and I know that question was asked about the rag mill—there is a bad place there.

Further Direct.

Q. How many wagon loads were there?
A. I think there were 3 to 4.
Q. And you were in one of the wagons?
A. Yes, sir, and when we would get up to Split Rock pond or Denmark Lake, they would get out of the wagons and look around and there would be general talk amongst themselves.
Q. Did you show them the reservoir or the proposed reservoir site?
A. Yes, sir.
Q. Did you show them the proposed dam site?
A. Well, do you mean the present one?
Q. The one that was contemplated?
A. The one that was contemplated, yes, sir.
Q. That was a little further down the stream, wasn't it?
A. Yes, sir.
Q. Was their attention called to how deep the water would be in the reservoir?
A. I think all those points were talked of, Mr. Corbin.
Q. What is the effect of a deep reservoir like the Boonton reservoir, 100 feet deep or more, upon—(Interrupted)

Objected to.

By Mr. Corbin. He is an engineer.

By Mr. Vredenburgh: I object to any evidence

from this witness unless he is shown to be qualified to speak.

Q. Have you had any experience in water works?

A. Do you mean in the construction of them?

Q. Yes, any study of the subject of hydraulics?

A. I have had something to do with water works in the city of Orange, the Orange reservoir in the year 1885 or 1886, I think; I never was in the construction of any big water works except the Boonton works.

Q. How long have you made a study of the subject, a study of hydraulics and the study of the construction of reservoirs. How long have you had to do with water works in any capacity, and what study have you made upon the subject of the purity of water supplies?

A. Well, I was on geological work in this state, and I spent about six months, I think, going all around the state and gauging up the flow of the streams, but so far as making any analysis of the water to tell whether it was pure or not, I had nothing to do with that.

Q. Well, can you say from your learning upon the subject, your experience, what effect upon the water there would be by storing it in a large deep reservoir?

Objected to.

A. I know what the effect of a big reservoir would be on the water, and I know why that reservoir was built there.

Q. Why was it done?

A. Shall I answer the question?

Objected to and overruled.

Q. How deep is this reservoir at Boonton?

A. I think it is about 105 feet deep at the dam, at the deepest place.

Q. Well, those works won't allow you to draw the water in Jersey City mains for 105 feet of depth, will they?

A. No, sir.

Q. How much of the depth of the water in that reservoir can you draw down?

A. The flow line is 305.25 but you can only draw the water down to 1.57 I think.

Q. Then you can draw it down a little less than 50 feet?

A. Yes, sir.

Q. And there is 60 feet of depth you can't draw it?

A. We cannot use that at all for the water supply.

Q. What is that for?

A. To allow sedimentation to take place.

Q. Have you made a study of the sedimentation of water?

A. Well, I heard something of it, I have not devoted years of study to it, no, sir, but I know what sedimentation is, and I know what that reservoir was intended for.

Q. Have you read—

A. Well, I know my idea of its was—

Q. Do you know the effect of sedimentation?

A. I certainly do.

Q. What is the effect of sedimentation in a standing deep reservoir?

Objected to.

By the Court. If Mr. Corbin persists in this line of examination by this witness, I shall allow Mr. Vredenburgh to cross-examine him as to his knowledge as an expert upon the subject.

By Mr. Corbin:

Q. I will ask this question, if the Court please. Was the leaving of the depth, the great depth of water below the draught line in the Boonton reservoir, an accidental situation, or was it designed?

Objected to.

By the Court. The design itself shows that it was the purpose to have a deep reservoir, and to have a reservoir so deep that there would be water in it 60 feet below the lower point of discharge.

Q. Did you have charge of the preparation of the bottom of the reservoir site?

A. Yes, sir.

Q. Under whose directions?

A. Doctor Leal.

Q. There were farm houses there?

A. Yes, sir, farms and farm houses and out houses.

Q. Did you treat the soil at the places?

A. Yes, sir.

Q. What was done with the buildings?

A. Torn down and some of them moved away and some of them torn to pieces and moved away, and some of them moved bodily; all the rubbish was thoroughly burned up.

Q. Did you have charge of the construction of the Parsippany dyke or back dyke?

A. I did, yes, sir.

Q. Were you there throughout its construction?

A. I was.

Q. Did you have charge of the construction of the cut off walls that were put down to shut off the water?

A. Yes, sir.

Q. How deep did you put them, I mean with a view to what you found?

A. Well, the average depth beneath the strip surface was about seven feet, I think, and it ran

from five feet, the shallowest, to thirty feet, the deepest.

Q. Did you get them to what appeared to you to be impervious soil?

A. I certainly did.

Q. What was the result—have you observed results since?

A. I have, yes, sir.

Q. Is there any flow-out from that reservoir, in your judgment?

A. Not in my judgment there isn't.

Q. Do you think you have a tight wall?

A. Yes, sir.

Q. How does the soil, take the Righter farm, for instance, compare with the wetness that existed before?

A. There is nothing the matter with the Righter farm, some of the Water Company's property is wet.

Q. Well, the Righter farm?

A. Probably an acre of the Righter farm might be a little wetter than it was before.

Q. How do you account for that?

A. Well, do you want me to give my idea of it?

Q. Yes.

A. Well, I never have considered that the water comes underneath the core wall. My explanation is that that country, the hills on the east and west of the reservoir, have always gathered an immense amount of storage of water that has fallen on them, and what is now the inside of the reservoir was always a wet swampy place. There was a hundred and fifty acres of wet marshy ground inside of the reservoir.

Q. Which part?

A. The northern part, up towards the Parsippany end, and there was a stream that fed a mill down there, where the present dam is located, that rose up at the Parsippany end, and there was no other source to feed that stream at all, except these

streams and marshy ground that was inside of the reservoir, that is, the water shed was not sufficient to keep that stream running the year around, and it was a constant stream, a stream at least eight or ten feet wide, and my explanation is that the water that was stored on the hills, on the east and west came out to the surface down in the bed of the reservoir, that was the easiest place for it to get out, it was the lowest ground in that neighborhood. Now, when we filled the reservoir up with water we put a pressure on the outlet of that storage, that water that was stored in the hills, and it was easier to get out somewhere else than it was to go there against the head of water, and the water is going to go to the low ground, if it possibly can, and instead of coming out on the side of the hill and down into the reservoir it worked out into the end of the hill, and that is just where the water that is making the ground wet around there now comes from, right out of the end of the hill.

Q. When the weather is dry does it go up and down, with the dry and wet weather?

A. It does, yes, sir; there is some water running there all the time.

Q. Well, the reservoir has remained substantially full for thirty months, hasn't it?

A. There was a short time, I think, for two months, we drew the reservoir down two or three feet, but outside of that it has been running over the spillway I think, right along.

Q. If it came from the reservoir wouldn't you expect the flow to be steady?

A. I would, yes, sir, in the course of time, in the course of years, if it came from the reservoir I should think it would get less, but nothing that you could observe from day to day, it wouldn't vary from day to day.

Q. Does it now, with dry and wet weather?

A. Yes, sir.

Q. Since the ditch has been put in across the

road how has the wetness been on the Righter farm that you have mentioned?

A. Mr. Righter's farm. Can I tell how that was wet?

Q. Go ahead.

A. There was only one part of Mr. Righter's farm—if I had the map here I could show you, that adjoins Troy brook on the south and north, and is from three to four feet lower than the general elevation of the ground in that country; that particular portion on the north side of the brook and south of the turnpike there were three or four, possibly five acres of ground that, previous to the time we put in the culvert across there and carried it direct to Troy brook, was wet, and it was wet for this reason,—that the water that came from the Water Company's property and ran through the culvert under the turnpike, instead of going direct to Troy brook after it left the culvert ran about a hundred and fifty feet until it struck this low swampy ground, and next to the brook the ground is about a foot higher than the general elevation of that marshy part, and the water collected in there and couldn't get out until it got away down in front of Mr. Righter's house, that is, it went about a thousand feet, where it ought to have only gone about a hundred and fifty feet to get to the brook, and it had to collect to an elevation of a foot and spread over that territory before it could find an outlet, even on the other end, but as soon as we put— opened a ditch direct to the brook why the water disappeared immediately, and there has never been any since, unless an over-flow from Troy brook.

Q. Where is the acre of the Righter farm that you say is wet?

A. The acre of Mr. Righter's farm is on the north side of the Turnpike about a little north-west of his house, but I think that is somewhat different from the wet ground that is on the Water Company's property.

The Court: I don't know what Mr. Vredenburgh's view of the matter is. I don't know whether you think it worth while to go into much more evidence about it.

Mr. Vredenburgh: I don't, sir.

The Court: When I was there, we went all over that field, and it was perfectly dry. Now, there was water in the reservoir, and it is manifest therefore that if the field was wet the witness did not come from the reservoir, but from something else. It seems to me that is a very small matter indeed. And there are so many important matters connected with this controversy that it is not worth while to waste evidence at that time. Of course, there is evidence on the other side, but you can't get rid of that fact that we saw it dry when the reservoir was full.

Cross-Examination by Mr. Vredenburgh.

Q. Mr. Sproul, what is your business?

A. What I am doing now?

Q. Yes.

A. I am superintendent of a railroad, now.

Q. How long have you been superintendent of a railroad?

A. Sinec the last day of June, I think, of this year.

Q. What railroad?

A. The Raritan River Railroad. Runs from South Amboy to New Brunswick.

Q. And what business were you doing before that?

A. I have been constantly in the employ of this waterworks scheme since 1898 up till last June.

Q. You did not work outside of that?

A. Oh, might do a little job once in a while; but nothing to amount to anything.

Q. Job in surveying?

A. Yes, sir.

Q. Between the time that you spent the six months in the geological work and 1898, what were you doing?

A. Oh, I worked between six and seven years on the geological work. I was only six months on that one particular thing. I worked pretty generally all around the different parts of New Jersey.

Q. Was that your chief work during those years?

A. During those six or seven years, yes, sir.

Q. Under Mr. Vermeule, were you?

A. Yes, sir.

Q. Mr. Sproul, you said that the water was 105 feet deep adjoining the dam. You have levels showing just what the depths of that is, haven't you, somewhere?

A. Yes, sir.

Q. Accurate levels?

A. Yes.

Q. You have seen this map that Mr. Ferris produced here with these levels on?

A. The contour map of the reservoir?

Q. Yes.

A. Yes, sir; I saw that.

Q. That is substantially accurate, isn't it?

A. I think it is very close, yes, sir.

Q. That shows substantially accurately the depth?

A. I don't think it would show the depth of the water at the dam, no. I don't think there was any survey made below 260 feet.

Q. How do you know the depth there, then?

A. Because I run levels for the profile of the dam.

Q. And between the lowest level, lowest profile, shown on Mr. Ferris's map, and this dam, you think there is no indication on the map what the contour of that land is?

A. That is my recollection of it. I could tell better if I looked at the map.

Q. And you think that is all 105 feet in depth below the spill-way?

A. My recollection is that the original elevation of the ground where the dam goes across was about 200 feet above sea-level, and the spill-way is 305. That is the reason I say 105 feet deep.

Q. And as to how much of it is that depth you haven't anything that will tell you with any accuracy now, have you?

A. No; it was—

Q. (Interrupting) Now, Mr. Sproul, that wasn't the original reservoir, as I understand you. What was the depth of the original reservoir, if you know, at the dam?

A. Well, I think the flow line, instead of being 305, was 292, down at what they call the Kingsland site; and I think the elevation of the original surface down there would probably be about 190.

Q. Is that from actual measurement or is that your judgment?

A. That is my recollection. I have made actual measurements.

Q. You haven't those memoranda here now?

A. I haven't got them here, no sir.

Q. And how low was the lowest outflow gate in that dam?

A. Well, it didn't differ, probably, two or three feet from the elevation it has now.

Q. It didn't differ?

A. No, sir.

CHARLES W. BANCE sworn for the defendants.

Direct Examination by Mr. Corbin.

Q. State your residence and your profession.

A. My residence is Jersey City. And my profession is that of a civil engineer.

Q. How long have you been a civil engineer?

A. Neighborhood of ten or twelve years.

Q. And with what firm have you been associated?

A. I have been associated with the firm of Earl & Harrison, and also in the employ of the Jersey City Water Supply Company.

Q. Did you work under Mr. Harrison, Chief Engineer of the Jersey City Water Supply Company?

A. Yes.

Q. Did you have charge of the Watchung Tunnel?

A. I did.

Q. Who gave the measurements and the levels and the surveys as the work progressed?

A. I gave them all.

Q. How long did the work continue?

A. The work commenced in 1900 and continued until 1904. 1904 was the time the water was turned on.

Q. How big was the finished tunnel required to be by the theoretic size of the specifications?

A. Eight feet and 6 inches diameter.

Q. How big did you build it, finished size?

A. We built it with a horizontal diameter of 8 feet and 8 inches, and a vertical diameter of at least 8 feet and 8 inches, and at some places larger. In places the roof was higher than called for by the plan, which resulted in a larger vertical diameter.

Q. Of what do the sides and arch consist?

A. The sides and roof consist of brickwork with concrete in back of the brick work, filling up the space between the brick sides and arch and the rock.

Q. How long is the tunnel?

A. Seven thousand four hundred feet.

Q. What material did you encounter in building this tunnel?

A. Rock.

Q. All rock?

A. With the exception of a few feet at the west portal, it is all rock. Part of it was taken out in open cut. That is, about 200 feet at the west end; that was earth.

Q. There is a conduit?

A. It is a brick conduit.

Q. How did you finish the bottom of the tunnel?

A. The bottom was finished by excavating all the loose material that had been blasted down to a depth which would be at least one inch below the theoretical water run or bottom of the tunnel. And in places where the blasting had resulted in breaking out more rock than was required, leaving holes, gravel was distributed and the entire bottom leveled up to a smooth line which is at least one inch below the lower theoretical grade in the center, and from 8 to 10 inches at the sides, that is, where the bottom of the tunnel and the brick sides meet.

Q. Is the bottom finished level, that is, across?

A. Not exactly level. There is a rising of about 4 inches from the center to the sides.

Q. And if it had been finished with concrete, it would have had a still greater dish?

A. Yes, it would have had a rise of about 1 foot and 2 inches.

Q. What gravel was this that you put in?

A. This was a screened gravel which was obtained at Hewitt on the line of the Greenwood Lake Railroad.

Q. And of what size screen?

A. It was screened from half an inch to an inch and a half.

Q. Was it selected for the purpose?

A. Yes. The gravel in the gravel pit, of course, was in all sizes, with sand mixed in. But the sand was screened out, and the larger stones above an inch and a half was screened.

Q. The bottom, as left by the blast, I suppose, was rough and jagged?

A. Yes, sir.

Q. And what did you do with any projections?

A. Any projections that came above that grade of one inch below the theoretical grade we reblasted if they were too hard to be taken out by picks; in most cases the rock was splintered from the effect of the blasting, but in some cases there would be small humps or projections.

Q. Do you remember how much gravel you had to put in to fill up these roughnesses in the bottom from one end of the tunnel to the other?

A. Between 500 and 550 yards.

Q. Was that levelled down to the surface?

A. Yes, sir, it was spread and gradually levelled, and then smoothed off.

Q. Did you go through the tunnel after it was completed?

A. Yes, sir, I went through it several times.

Q. Were you actually there on the work while it was going on?

A. I was there every day.

Q. Did you make measurements of the size of this section or have Mr. Merriman to use at the time he was making his calculations?

A. Yes, sir.

Q. At how frequent intervals did you make them?

A. At intervals of 25 feet.

Q. Did you report them truly to Mr. Merriman?

A. I did, yes, sir.

Q. Did you find all those sections to be greater than the theoretical sections of the specifications?

A. Of the sections, yes, sir, except at the ends where the tunnel section meets the concrete sections; there, of course, the bottom was made to conform to the concrete conduit section.

Q. That is just the theoretical section?

A. Yes, sir.

Q. Why was it the bottom of the tunnel was filled up with gravel, as you have mentioned, in-

stead of being finished off with concrete or other substance?

A. Well, there was a large amount of water flowing into the tunnel from the sandstone rock, which occurred about half the length of the tunnel, and there was so much water flowing in there that it wasn't practical to fill up the bottom with Rosendale cement concrete.

Q. If the specification reads that one of the modes of finishing or the making of the invert there is with Rosendale cement, would that have been practical?

A. No, sir, it was not because the cement would have been washed out before it was set, leaving only the stone and sand that would be mixed with it to make the concrete.

Q. If I understand you then the tunnel is about two inches wider than called for?

A. That is right.

Q. And the bottom of it at the middle is an inch more than called for?

A. About an inch more than called for.

Q. And at the sides several inches lower?

A. Eight inches lower.

Q. And at the top of the tunnel how does that compare with what is called for?

A. That top varies from the grade called for by the profile to a grade which would be in some cases 4 inches higher.

Q. Why was that made higher?

A. Well, that was done by the bricklayers in order to be on the safe side and keep it high.

Q. At the top it is considerably bigger in space?

A. Yes, sir.

Q. Have you figured up what it cost to finish the bottom in the way it was finished?

Objected to.

Objection overruled.

A. I have.

Q. What did you find it to be?

A. I found the cost for placing gravel in the excavation, after the excavation had all been finished and all the small projections taken out, to be about $3.00 a lineal foot; $3.03, to be accurate.

Q. Did you make any estimate of what it would cost to remove the loose rock to a depth of one inch below the specified depth?

A. Yes, sir, I did.

Q. What was that?

A. That cost was, in addition to the $3.03 for placing the gravel there, $2.60.

Q. Are there any other items of expense in constructing the bottom the way it was?

A. Well, there is another item which it would be difficult to determine; there was preliminary work done in taking out that bottom at the same time as the other was done.

Q. What do you estimate the price or cost per lineal foot of making the bottom as it is?

A. Well, as I say, I estimated the total to be $5.63 a foot; I cannot say what the additional cost should be added to that for the preliminary work done on it.

Q. Have you made an estimate of what it would cost to make an invert of Rosendale cement in a soil where it could be easily done?

A. Well, an invert of Rosendale cement with Portland cement finish, I should say could be put in for about 30 cents a square foot.

Q. That would be what per lineal foot?

A. That would be about $2.25 per lineal foot.

Q. In that have you reckoned anything for taking care of the water, assuming that it was in a place where you could do that sort of thing?

A. I am assuming that it was to be done in a place where the water could be taken care of.

Cross-Examination by Mr. Vredenburgh.

Q. This rock was drilled, I suppose, out by blasting?

A. It was done by power drills operated by compressed air.

Q. Of course, in that sort of thing you sometimes blast out more rock than you want more frequently than you would blast out exactly to the line?

A. You cannot blast it out exactly to the line unless it happens by chance; the holes are always drilled on the line, and as a usual thing the rock breaks off outside of the line and leaves projections and depressions.

Q. You say you had to fill in behind the brick work and between that and the rock,—how much do you estimate there was of space there to be filled in?

A. Why, the space there was large enough to require a yard of concrete per lineal foot, that is a yard of concrete and loose rock. At the top of the arch we were only required to put in loose rock.

Q. How much space do you think there is between the inside of the brick line and the rock as actually blasted out in the arch?

A. Do you mean what is the space between the sides?

Q. I understand that the arch was also filled in between the top of the arch and the rock above?

A. Yes, sir, and that was filled there from 3 or 4 inches to as high in places as several feet.

Q. Several feet?

A. Several feet in a few instances; it would probably average right through the tunnel about 18 inches I should say.

Q. And that 18 inches was filled up over the arch with pounded stone?

A. Fragments of stone as it came out.

Q. Then it was a brick arch, and between the pounded stone and the brick arch, was there anything put in, any cement put in there?

A. No, sir, the stone was used to fill on top of the brick arch.

Q. Then was the brick filled right up against this stone?

A. The brick arch was built up first and stone filled in afterwards.

Q. Now, this was brick lined in this way on each side, but there was no brick lining at the bottom, was there? Was there any brick lining at the bottom?

A. No, sir, not on the bottom.

Q. Nowhere?

A. No, sir.

Q. Not even through the earth—now you say there is about 200 feet through the westerly end that was earth?

A. That was concrete.

Q. Was it brick lined on the sides?

A. Yes, sir.

Q. And concrete on the bottom? ?

A. Concrete on the bottom.

Q. And the tunnel for 7,400 feet was actually brick lined and arched?

A. Yes, sir.

Q. But at the bottom there was no cement put or anything of that sort?

A. No, sir, not on the floor.

Q. How much above the floor, how far above the floor did the brick lining commence?

A. The brick lining was put in at a point right above the elevation of the floor, on the sides, that is the theoretical elevation, and that would be about 1 foot 3 inches above the present bottom of the tunnel.

Q. Then the brick lining was commenced at an elevation which was the theoretical bottom of the tunnel?

A. Except in cases where the bottom was lower.

Q. But those were the exceptions?

A. Yes, sir, it was built on solid rock to at least that depth.

Q. Now the bottom of the tunnel was also jagged as the sides and the tops were, I suppose, as you blasted holes here and a prominence there, etc., when your blasting got through with?

A. Well, not to such an extent on the bottom.

Q. Not quite so much?

A. No, sir.

Q. Now what you did, as I understand it, was to level off the projecting points and fill up the cavities with gravel; now how much gravel did you use?

A. I used 550 cubic yards of gravel.

Q. What was that worth a yard, did you figure in your estimate?

A. I didn't get it that way, it cost us $2.50 a yard on the cars, and then in the—

Q. Well, now, I want to get at that. The gravel cost you $2.50 a yard?

A. On the cars.

Q. How did you figure that up?

A. That is what we paid for it, $2.50, we bought it at that price.

Q. You paid somebody $2.50 a yard for the gravel, and you used five hundred and fifty yards?

A. Five hundred and fifty yards, about five hundred and fifty.

By the Court:

Q. Then as I understand, the floor was not completely covored with the gravel, but only in places?

A. Well, in places, where the rock was perfectly flat and smooth and conforming to the grade of the bottom of the tunnel, why no gravel was put over it, but if there was an adjoining piece where there was a cavity why the gravel was filled in there to conform to the parts.

Q. What proportion was gravel and what proportion solid rock?

A. Well, I never measured that.

Q. Well, approximately?

A. Approximately about three-quarters of it was gravel and the balance solid rock.

By Mr. Vredenberg:

Q. The three-quarters of it that was gravel was not one continuous gravel, but was some places rocks and other places gravel, I suppose?

A. That is it.

Q. What was the depth of the hole—

A. Well, in some cases.

Q. One moment. What was the greatest depth of the hole that you thought it was not necessary to fill with gravel; do you understand my question?

A. What was the depth below our grade there of the rock that was not covered?

Q. No, there were some holes that you didn't fill up with gravel?

A. There were no holes; we filled up all the holes, all the holes were filled up.

Q. But that is an indefinite term to some extent; there were depressions that you didn't fill up, I suppose?

A. Well, I wouldn't call them depressions, they were sections—parts of the bottom which conformed practically to the grade of the bottom of the tunnel, that is within an inch of the theoretic grade, an inch below.

Q. An inch below?

A. Yes, sir.

Q. Then a depression that was not greater than an inch you didn't bother to fill up?

A. No.

Q. Now you said part of this was red sand stone and part was, I suppose, trap?

A. Part trap.

Q. The water came in where?

A. Came in through the sand stone.

Q. Did it come through all the sand stone uniformly or did it come through more some places than at others?

A. Well, of course some of the streams were heavier than others, depending upon the location, and for the full extent of the sand stone there was water coming in at intervals; of course some of the streams were larger than others.

Q. Well, now which; the largest stream you encountered where?

A. The largest stream was under the railroad, under the Greenwood Lake railroad near the center of the tunnel.

Q. How far was it below that railroad?

A. My recollection is about a hundred and twenty feet.

Q. And that railroad runs through a cut there, doesn't it?

A. At that point there is a slight cut, a cut of about ten or twelve feet.

Q. In the rock?

A. In the earth.

Q. Don't reach the rock?

A. The cut is not in the rock, no, it runs a valley, and there are rocks on the slopes of the valley, but the earth is at the bottom where the railroad line runs.

Q. That stream that ran in at that point was about what size?

A. It was about three or four inches, filled a three or four-inch pipe.

Q. Was it continuous?

A. Running all the time.

Q. Did you ever trace where it came from?

A. Never did.

Q. Did that come in the side or the bottom?

A. It came in the side.

Q. What is your estimate for cutting off the irregularites in this figure that you have given us?

A. Well, I found that separate—there was no separate track of that kept.

Q. How did you get at it then?

A. I knew what our total expenses were for that part of the work.

Q. Where did you get your total expenses from, Mr. Harrison's books?

A. No, from the Water Company's accounts.

Q. You took the total expenses of what, now?

A. Why, the total expenses spent on that work in the tunnel.

RECESS.

Q. There are what may be called wastes in that conduit, are there not?

A. Wastes?

Q. Wastes, yes, which prevent the water from rising nearer to the arch than 12 inches—at the Three rivers, is there not?

A. Oh, do you mean that drain there?

Q. Yes.

A. Well, there is a drain under the conduit.

Q. What is it for?

A. Why, that is a drain that was put in there while the conduit was being built, to take care of the water in the trench; there was a lot of water there, it was a seamy rock, that is, between the end of the tunnel and the Third river.

Q. Perhaps I should call it an overflow instead of a waste, is there an overflow which prevents that section No. 4 from having more water in it than would fill it to within 12 inches of the arch?

A. Well, that waste prevents the water getting higher than within one foot of the theoretical top of the arch; that waste is 7½ feet above the theoretical water line.

Q. But I understood you to say you encountered no water until you struck the sandstone, now how far was this sandstone from the easterly end of the tunnel?

A. We encountered it in the trap rock but not to such an extent as in the sandstone; there was in the neighborhood of from half a million of gallons a day coming out of the trap and a million and a half out of the sandstone.

Q. Whereabouts in the trap rock was that?

A. It was not all at one place, but at intervals all the way along. I struck it as soon as we got in within 100 feet.

Q. The trap rock was on the west side?

A. Yes, sir, the sandstone was on the east side.

Q. What prevented you from cementing that portion of the bottom as required by you in the specifications?

By Mr. Corbin: As required by your construction of the specifications.

Q. As required by my construction of the specification in the trap rock?

A. The water—as I say, there was some water in the trap, but in addition to that there was water from the sandstone which had to be taken care of which ran right through the tunnel—well, the biggest part of it came through the sandstone section, and it ran out of both ends, so that any concrete placed in the dryer portion that didn't have so much water in it would be subject to washing out from water running out of the tunnel; it ran out at both ends, and it rose high enough to run to both ends. We had pumps in there all the time that we were working and were constantly pumping to keep the water low enough to put the gravel in.

Q. Then, as I understand it, it could not have been brick lined or cement lined because there was too much water in all of that rock, is that it?

A. It could not have been—the invert could not have been put in of Rosendale cement or concrete because it would not have set.

Q. Could it have been brick lined?

A. No, that would be open to the same objection, that is, if the bricks were laid in mortar you could only put dry bricks in there but you could not have put any brick masonry in that part of it.

Q. No part of the tunnel?

A. Oh, it might have been done in sections, perhaps.

Q. What do you mean?

A. Oh, we could have found places in some instances in the interior of the tunnel that would dry and completely dammed that portion, so that the water would have run each way from it, but if that had been done for 100 feet, it would have been opened to some objection. There would have been no advantage in putting in the short section of brick work and having the raise gravel.

Q. Why not?

A. Because if any part is gravel, it would be just as well to have the entire length gravel. If there is any objection to gravel at all, the same objection would hold good for the short section or a section that was half the length of the tunnel as for a section the whole length of the tunnel.

Q. If you had put in brick lining or a lining of cement, you would have had a smooth bottom, would not you?

A. Yes.

Q. Well, your figures of $3.06 include both the gravel and the leveling of the floor off?

A. No, that $3.06 was just for placing the gravel in, and the other amount I stated of $2.60, I think it was, was for smoothing it off.

Q. Do I understand you that the gravel which only cost you about $1,500 when you purchase it, that that would cost you $40,000 in the tunnel?

A. Well, that $40,000 includes the smoothing off.

Q. Well, that is what I say?

A. Yes, sir.

Q. Three dollars and six cents would be $21,000, would it not?

A. About that.

Q. Well, that $21,000 was more than the gravel cost—that only cost $1,500?

A. Well, there was the work of putting it in there.

Q. Well, did it cost you $18,000 to put the gravel in the tunnel?

A. Yes, sir.

Q. How do you make that up, how do you account for expending such a large sum as that in putting the gravel in?

A. Well, after the gravel arrived at the tunnel or near the west end of the tunnel, it had to be unloaded and loaded into smaller cars and hauled into the tunnel, and on the east side it had to be hauled by teams from the Montclair Heights depot about a mile away, I should judge, and then unload it and load it in small cars and hauled in to the east side by mules, and there being but one track there the rate of progress of hauling it in was necessarily slow.

Q. Now, wait a minute, the hauling it from the cars to the tunnel by team cost how much a yard?

A. Cost about 50 cents a yard.

Q. Fifty cents a yard?

A. Yes, sir.

Q. Fifty cents a yard, that would make three dollars then a yard when you got it, at the mouth of the tunnel?

A. Of the tunnel, yes.

Q. Now that was only as to part of it, the biggest part of it wasn't—

A. That was only about half of it, twenty-five cents for all—that is half.

Q. Now the getting in to the tunnel cost you how much a yard, you only had to lay it on cars and run that car in and then unload it, that is all there was to do?

A. That is all.

Q. And that couldn't cost you over fifty cents a yard at the outside, could it?

A. Hardly, the thing cost just about fifty cents a yard.

Q. That would only be $3.25 for five hundred yards.

A. Well, there were other items.

Q. What other items?

A. The labor of spreading it, the labor of—

Q. Wait. Now how much would it cost you a yard to spread it, the labor of spreading it, a yard, it would not cost ten cents a yard, would it?

A. A good deal more than that.

Q. How much would it cost?

A. Forty cents, under those conditions.

Q. What other charges,—what other item of expense?

A. Then there was the cost of running the lighting plant.

Q. Running what?

A. The lighting plant in the tunnel.

Q. What had that to do with putting the gravel in?

A. If you didn't have light you couldn't put it in.

Q. Well, you had the light there anyway for other purposes?

A. Yes, but we would not have kept on operating it if we had been through; that is a charge against that gravel.

Q. Eh?

A. The charge for that lighting plant while the gravel was being put in is part of the cost of doing that work.

Q. Well, how much is that? You were doing other work in there at the same time?

A. Not when we were putting the gravel in, everything else had been done.

Q. Well, how much did the light cost, how long were you putting the gravel in?

A. Six weeks.

Q. All the time?

A. All the time.

Q. Was the light lighted there the whole time?

A. Yes, night and day.

Q. How much did it cost, six weeks lighting, how many lights did you have?

A. We had a light every fifty feet, that would be about a hundred and fifty lights.

Q. How much would a hundred and fifty lights cost for six weeks?

A. About $1,500.

Q. Fifteen hundred dollars, well, you have got up to $3,000; now where is the rest?

A. There were pumps and other supplies, feed for the mules.

Q. One moment. If you had put cement in that bottom you would have needed those same lights, wouldn't you?

A. The same lights, yes.

Q. Go on, what is the next item?

A. There was feed for the horses and mules, and other supplies.

Q. That was included in the cost of carting, wasn't it?

A. No.

Q. Why not?

A. Because the cost that I gave you for carting there was just for the labor of loading and unloading in the tunnel.

Q. Fifty cents, carting it from the depot?

A. Fifty cents.

Q. How much did the feed for the horses cost you?

A. I couldn't give that in detail.

By the Court:

Q. Do you know what anybody who was doing

this carting would charge for taking the gravel from one point to another?

A. Well, a contractor probably would—our prices in this are lower than it would have cost us by contract, in fact we would naturally have a profit added; a contractor would not be able to put a plant there to do that small piece of work, comparatively.

By Mr. Vredenberg:

Q. What other item is there?

A. Then there were supplies for track in the tunnel, track cars.

Q. Well, you had the track there.

A. Yes, the track was there, but part of the cost of that track is chargeable to that tunnel work, just the same with gravel.

Q. Well, you put that in once in the cost of getting it in from the tunnel mouth to the interior of the tunnel, you charged forty cents for that; you don't want to put it in again?

A. Well, there was always expense of keeping it up all the time, there was a gang of six men working on it continuously.

Q. Well, now, you perhaps have gotten up to $3,500, where is the difference between $3,500 and $21,000?

A. Well, the $21,000 is from the books of the company. I haven't got the details of every item of that expense, I have given you the total there, as it shows on the books of the company, and the vouchers.

Q. Well, what possible item can there be that would make the difference between $3,500 and $21,000.

A. There was cement—I can give you some of these things.

Q. Cement?

A. Yes.

Q. What cement was used in putting gravel on the bottom?

A. It wasn't used in the gravel, but it was used where the rock was excavated down below the side walls, it was filled under with cement and plastered up, smoothed.

Q. What had that to do with putting in the gravel?

By the Court:

Q. As I understand it, that made a support for the brick foundations?

A. It made a support for the brick foundations, and smoothed the rock below the brick foundations, there were cavities in that the same as there would be in the bottom of the tunnel, that had to be filled in; we wouldn't fill them with gravel on the sides, so they were filled in with concrete cement.

By Mr. Vredenberg:

Q. How much did that cost?

A. I have the total of the cement shoes, and the total payroll includes the masons engaged in that work, as well as the other laborers; there was no distribution made of each man engaged in that work, so it is impossible to give exactly just the labor cost.

Q. I show you an exhibit in this case, C 52, did you make that?

A. No, I didn't make that.

Q. I call your attention to the first diagram on the upper left hand side, what does that represent, a brick-lined tunnel?

A. That represents a brick-lined tunnel, and earth and loose rock.

Q. It is loose rock, no earth about it.

A. It says under it, earth and loose rock.

Q. Is that the way the brick was laid in this tunnel?

A. No, the brick was laid similar to that, eight inch.

Q. The one just below?

A. Yes, eight inches, except in places. In places where the roof was higher, wher the rock was a little loose—had been blasted out, was made thicker, about four courses instead of two.

Q. When you gave Mr. Merriman the data for the arch of the tunnel, you said, I understood, that you gave the data every twenty-five feet?

A. Yes, we had measurements every twenty-five feet.

Q. Now between those twenty-five feet you averaged—

A. Well, it would run straight from one section to the other, practically straight.

Q. Well, you averaged the size of the tunnel between those twenty-five feet?

A. Well, I have not made—the section between those twenty-five feet would be an average of any two sections, I didn't have anything to do with that.

Re-Direct Examination.

Q. Referring to this exhibit C 52, which counsel has just shown you, and with that cross section entitled sound rock, the tunnel, as constructed, has a flatter floor than as shown there?

A. Yes, it has a flatter floor, instead of having a rise of a foot and two inches it has a rise of about four inches from the center to the sides.

Q. Then in taking out the bottom you took out enough of it to make the floor comparatively flat?

A Yes, took it out flat. That was the way the rock broke.

Q. And that was what required the masonry construction at the foot of the brick walls?

A. Yes.

The Court: The brick wall must have had something to rest on.

Q. How is that?

A. It was put on solid rock, and then taking out the bottom broke the rock under the walls in places. They didn't take out large sections of it, but enough to loosen the rock for several inches together in some cases. In some cases, only an inch. But where it was loose at all we plastered it with cement. Where it was out altogether we put in cement and stone.

Q. What kind of cement?

A. Atlas Portland.

Q. Did you use any Rosendale cement on the whole job on this tunnel?

A. There was some Rosendale cement used in back at the beginning of the work, at the ends. After the shut-down, and the reorganization, when work was resumed in 1902, Atlas Portland was used.

Q. Then, at the foot of these walls where you put that cement concrete into these broken places, did you make that a smooth continuous surface continuing the wall down?

A. Yes. It came out a little. That is, it wasn't exactly vertical. It probably was a little battered.

Q. A little battered?

A. An inch or two.

MORRIS R. SHERRERD sworn for the defendants.

Direct Examination by Mr. Corbin.

Q. Mr. Sherrerd, please state your residence and your profession.

A. I reside in Newark, New Jersey. And I am a civil engineer.

Q. What experience have you had as a civil engineer, particularly in the line of hydraulic engineering?

A. Most of my work during the last fifteen years has been the hydraulic branch of the profession. I have done work on a number of different water-plants and have had consulting practice in connection with water matters in a number of cities and with a number of concerns. And for the last eleven years I have been chief engineer for the water department of the Board of Street and Water Commissioners.

The Court: In Newark?

Witness: In Newark.

(Witness, continuing): And during the last year I have been Chief Engineer for all the departments of the Board, a position that practically corresponds to that of City Engineer. Prior to that I was City Engineer at Troy, and during the last fifteen years that I mention I was at one time consulting engineer for the Pennsylvania Steel Company in regard to their water supply matters, which included the installation of a plant of a capacity of 30,000,000 gallons a day at the Steelton works, which works are about 3½ miles long along the Susquehanna River at Steelton. And I have also been consulted about water matters in East Orange, and Bordentown, and Davenport, Iowa, and Passaic, New Jersey, and also for the town of Steelton water works, and for a number of other concerns at Steelton, and in many other places that I cannot remember off-hand.

Q. Have you done construction of water works?

A. I have had charge of both construction and

operation. I had entire charge of the construction of the new reservoir, tunnel and pipe line for the city of Newark, costing $1,800,000, which was completed in 1905.

Q. Did you examine the Watchung tunnel and its invert?

A. I did.

Q. When?

A. On several occasions.

Q. Did you walk through the tunnel?

A. Walked through one time, and went through in a boat on another occasion. The first time the water was lower in the tunnel. They had taken out some of the dams that were used during construction. The second time the dams were in use and the water was deeper and we went through in a boat.

Q. When was it?

A. The first examination was in April, 1904, and the second on May 7, 1904.

Q. What did you find the general condition of it to be from an engineering point of view?

A. I found it to be a good piece of work from an engineering point of view, and suitable for the purposes for which it was constructed.

Q. Did you observe the bottom, the way that had been finished?

A. I did.

Q. How did you find it?

The Court: Was the gravel in the bottom at that time?

Witness: The gravel was in on the second day.

A. I found it in good condition as regards uniformity. The gravel had been spread in the chinks in the rock, and was uniform.

Q. Under the conditions encountered there,

would it have been a practical thing to do to have made that invert of Rosendale cement concrete?

A. It would not, on account of the amount of water that was coming through the rock.

Q. Would that have been a desirable finish under the circumstances?

A. It would not have held with Rosendale cement, in my opinion.

Q. What is your opinion of the character of the invert as finished, as to whether it is proper and whether properly done?

A. I think it is a good piece of work, and that is a satisfactory way of handling the situation encountered in the tunnel.

By the Court:

Q. I should like to ask a question, and that is this: If the bottom had been covered with Rosendale cement, and if the bottom could have been dry at that time, would the cement have stood the pressure after the—

A. (Interrupting) I don't think it would all the time; I mean, for the whole surface of the bottom. Portions of the bottom would have remained intact. You mean, if it was dry at the time it was laid?

Q. Suppose it was dry at the time it was laid, and then the pressure had reached it afterward?

A. It would not have remained intact throughout its entire length. There would be portions of it.

Q. Suppose Portland cement had been put there?

A. It would have been rather difficult to even have laid the bottom with Portland cement in portions of the work. It would have been necessary to go to great expense to keep the water off the bottom while even Portland cement was being laid.

Q. But Portland cement would have stood?

A. It would have stood the pressure if properly put in, and the flow of water kept off while it was setting.

Mr. Corbin: It may be proper for me to say that our construction of the contract is that the suggestion of Rosendale cement was only alternative, and that the thing we have done is within a fair scope of the construction of the contract.

The Court: I understand the proposition.

Mr. Vredenburgh: I have a very different view of that.

The Court: I understand that counsel differ.

Q. Then, as I understand you, in your opinion, if it had been practicable to have laid the Rosendale cement under the most favorable conditions, the bottom would not have remained intact with the pressure of water that is now pressing against it?

A. That would be my judgment, particularly with Rosendale. And in tunnel work it is almost impossible to use Rosendale cement for any of the work of that kind.

By Mr. Corbin:

Q. You have seen the Boonton Reservoir?

A. I have.

Q. And are familiar with the line from there down?

A. Yes; I have been over a good deal of it.

Q. With those works constructed as they are, in your judgment would there be any sediment or other matter to be carried to this tunnel and deposited there?

A. I don't think there would be any carried, at

least to that distance, on account of the distance from the reservoir. There would be very little anywhere else.

Q. Now, as to growths which develop in conduits. Do they develop on the sides or bottom?

A. They show on the sides; very seldom on the bottom.

Q. In your opinion is there any objection to the finish as it is, because of expected growths or sedimentation?

A. I don't think there is.

By the Court:

Q. I would like to have him answer this question, whether there would be more growth on the bottom with this gravel than there would be with cement?

Mr. Corbin: He has just answered that the growths come on the side and not the bottom.

The Court: I would like him to answer this question.

A. I don't think there would be. It would be like the bottom of a brook. There might be some small slime there on the stones, but no growth that would amount to anything.

By Mr. Corbin:

Q. Is there any objection, in your judgment, to that form of finish of the invert other than the suggestion that it might, by reason of its roughness, cause some additional retardation of flow? Is there any other objection?

A. I don't think there is, in that location. There might be objections if it were placed in a tunnel that needed to be cleaned out continually.

But in the location of this tunnel, my judgment would be that it will not be necessary to clean it any more than perhaps clean up some growths on the side walls. And then the experience on water works has been that these masonry aqueducts have not been cleaned out—at least at very rare intervals, if at all.

Q. You have examined the stone dam at Boonton?

A. I have, yes, sir.

Q. I show you Exhibit C 58. You will observe here sketch called "Kingsland Dams," with a dotted line showing a method of enlarging the dam by thickening it and also adding to its height. Is it feasible to raise that dam in that manner?

A. Such a method could be employed successfully for that work. I haven't followed these dimensions, of course.

Q. I am not asking you to verify the scale of it at all, but whether that method would be proper.

A. That method could be employed. It would be perhaps necessary in putting the slice on the dam to drain the space between the new and the old work so that the water would not collect in there and make a pressure that would tend to slide the slice off. There would have to be weep-holes.

Q. You wouldn't trust to that slice for additional tightness but only for weight?

A. Only for weight, to prevent overturning.

Q. If there should be a space where water could collect between the new and old work, I suppose there would be danger of freezing and such things, as well as pressure?

A. There might be danger of freezing; and it would create a pressure if there was even a thin layer of water, if it got height enough it would tend to bulge out the slice put on.

Q. Did you examine the little dam and the gates at the foot of the Boonton plane?

A. I did, yes, sir.

Q. What have you to say as to that structure?

A. Those gates were working very well, and it was a good method of controlling the back-flow. A very small amount of water could flow back, and it would be only conditions that might be easily remedied by watching; that is, if some stick or leaf should get under the gates.

Q. If a little water should flow through, did you observe what would become of it?

A. There is enough pondage above that if it was only for a short interval the water that would flow back into the gates would not be drawn down into the river. There is too much water in the pool. So that before that could happen, as I have watched the operation on several occasions, the water in the raceway would come in with sufficient volume to again feed the canal.

Q. In your judgment, is that a proper device to serve the purpose it is intended for?

A. Yes.

By the Court:

Q. That would require a man?

A. It would need attention occasionally—from day to day. It can't be neglected for months at a time.

Q. What is to prevent a stick or something of that sort from getting in there while the water was flowing from the canal into the race-way and keeping those gates open?

A. I think that it wouldn't happen. Once in a while a leaf or stick might be caught as the gate closed. That would be only a little leakage through that particular gate. The next rise of water in the race-way would again open those gates and release that stick. I saw it operating that way on one occasion, where these little leaves and sticks are washed through the gate. So that would only be a temporary interference with the opera-

tions, and a very small amount of water might go back into this pool, but not sufficient to be washed down into the river.

The Court inquired of Mr. Corbin whether it was his idea that if Jersey City took from the water plant they would be obliged to station a man at these gates in order to keep them in proper working order.

Mr. Corbin said he would like to look at the contract further before answering the question definitely, but that it was his impression that the burden would be upon the Water Company to take care of that matter.

Q. Have you been over the watershed of the Rockaway?

A. I have been over a good deal of it.

Q. What do you say, speaking generally without referring to any special points as to it?

A. I should say it was a good collecting ground.

Q. What have you to say as to the effect of the water standing in the Boonton reservoir, and if you can speak in regard to your own experience do so, and tell us what in your judgment is the effect of water upon the waters of the Rockaway river?

A. It is a good deal like a filtration system; it acts as a filtration system would. Our experience here in Newark with our new reservoir near the city is that long-time storage tends to improve the quality of the water, and it is getting to be a conceded fact in the water works management that that is one of the most effective ways to improve the quality of the water, not only from the point of view of bacteria, but also from the point of view of color.

Q. How does it act?

A. It acts as a sediment basin, and it seems as if the bacteria die off, die a natural death if there is no food for them to live on.

Q. How is the color affected?

A. It is bleached, the water is bleached.

Q. By sunlight?

A. By sunlight and air.

Q. Does the air have any effect upon the water?

A. Yes, sir, the air and the wave effect does its part, too. The Cedar Grove reservoir has about a month's supply, and it has resulted in cutting the bacteria account in about two.

Q. What is that?

A. It has reduced the bacteria account by one-half.

Q. How long have you had it in use?

A. About a year and a half.

Q. How big is it compared with the Jersey City and Boonton water supply?

A. It is about one-eighth or so in area; it has a capacity of 700 million gallons.

Q. What reservoir is that?

A. The Cedar Grove reservoir of the Newark water plant, which is located back of Upper Montclair, near Cedar Grove centre.

Q. It is about 1/10th the size of the Boonton reservoir?

A. Yes, sir, I said about 1/8th in area I thought.

Q. How much water do you draw from it each day?

A. About 30 to 35 million gallons.

Q. If your reservoir was bigger would you expect worse or better results?

A. Better results.

Q. How deep is your reservoir?

A. Fifty feet.

Q. Do you draw the water clear down to the bottom?

A. No, sir, we have not had occasion to draw it more than one-half way down.

Q. What is the elevation?

A. Four hundred and five feet.

Q. Is it fenced?

A. It is partly fenced; there is a rail along the road for a portion of the way.

Q. You have 4 other reservoirs up in the mountain, haven't you?

A. There are 4, counting Echo Lake.

Q. That is one of your reservoirs now, isn't it?

A. Yes, sir.

Q. Are any of them fenced?

A. They are only fenced just to the dam; there is a little guard rail around the dam.

Q. Do you know any reservoirs in New Jersey that are fenced?

A. I have seen some small ones but not storage reservoirs.

Q. How about the Hackensack reservoir?

A. I haven't seen their storage reservoir.

Q. You are familiar with the situation around the Boonton reservoir, are you not?

A. Yes, sir.

Q. In your judgment is it necessary to fence there?

A. I don't think the entire property should be fenced at all, but there are some points along the road that might have protection if they were fenced at those points.

Q. Such as what point, for instance?

A. I say referring to where it would be easy for cattle to stray off the road onto the property.

Q. Did you visit Mt. Tabor in the Boonton watershed?

A. Yes, sir.

Q. When?

A. Last spring sometime.

Q. Did you look at their sanitary arrangements there?

A. I looked at the place where they had deposited some excrement.

Q. What have you to say about that?

A. I would say it was safe in the way I saw it, the condition in which I saw it.

Q. Is there any menace there to the Jersey City Water Supply?

A. I don't think so.

Q. What was the system of disposal as you saw it last year?

By Mr. Vredenburgh: When did he see it?

By the Witness: This spring, 1906, May 18 or 19th, or I should say May 19th or 20th of this year.

Q. Up there at Mt. Tabor, I ask you what their system was?

A. The method I understood was that they collected from some of these houses the excrement that had been deposited in boxes and dumped into this pool near the barn and the wash from this pile was protected by a ditch that had been dug, so that it would not drain into or run into the brook, and what struck me as making it perfectly safe was that the soil between this point of deposit and the brook, which was down probably 200 feet below it, was of a sandy nature, so that the water would percolate through that sandy soil and would be filtered, any wash from this pile would be filtered; it was a dry deposit that I saw there, and there was nothing offensive about it at the time I saw it.

By the Court:

Q. At that time it was deserted?

A. There were some people living there in the camp at the time, we saw several of the houses that looked as if they were occupied.

Q. It is a summer resort?

A. Yes, it is a summer resort.

Q. Well, the condition of things was quite different, I suppose, from what it was when you saw them?

A. Well, I understood there was to be some other arrangement made about it.

Re-Direct Examination.

Q. Who showed you about the place?

A. I went with Doctor Leal and some of the Newark officers, and the superintendent, or one of the men that seemed to be in charge there told us about it and went with us.

Q. Has Doctor McLoughlin, the bacteriologist, kept you posted or given you the result of analysis made of the Jersey City water?

A. I have looked over the tabulation of those analyses.

Q. For what periods did you examine those bacteriologist examinations?

A. I think it was for the last two years, about that period, I have forgotten the dates.

Q. And up to how recent a date?

A. Well, quite recent, I didn't look at the dates on the tabulations.

Q. Well, within a few weeks or months.

A. Yes, within a month.

Q. What did they indicate as to the purity of the water as delivered to Jersey City?

A. They indicated a low bacteria count and marked uniformity, that is, as compared with the amount of water that is coming down the river; for instance, the bacteria counts do not seem to go up and down with the floats in the river, they remain practically uniform, and are under, as a rule, one hundred bacteria per cubic centimeter, which, depending of course on their kind, would be considered very good water.

By the Court:

Q. To what do you attribute that uniformity?

A. To the effect that the reservoir has, and also the pipe line to the city.

Further Direct Examination.

Q. What effect does that pipe line have on the supply?

A. That has a marked effect on our supply, in reducing the number of bacteria, the absence of light seems to kill them off quite as effectually as some of the other means of destroying them.

Q. How does the length of your pipe line compare with that of Jersey City?

A. I think about the same, twenty-one miles is the Newark main line.

Q. And Jersey City I think is twenty-two. How is the purity of this Jersey City supply indicated by Doctor McLoughlin's reports, as compared with water supplies generally?

A. It is very good.

Q. Do you use the Venturi meter in your system?

A. We use a number of them.

Q. On the main line?

A. On the main lines and other points.

Q. Have you made tests of them to know their accuracy?

A. I made some very careful tests of them, particularly of the large ones that are used up at the intake, the forty-eight-inch meters.

Q. How did you do it?

A. We checked those by constructing the weir above the intake reservoir—forty-foot weir; the City went to considerable expense in this connection in settling up the Newark contract; there was some controversy over the question as to whether the meters were reliable or not, and after constructing this forty-foot weir, and also arranging an automatic float to give the readings of the water level above the weir continuously, we were able to get twenty-eight days' reading on the weir at a time when no water went over the intake dam, and as all the water that was going through the Ven-

turi meters during that entire period was also going over the forty-foot weir we got exceptionally satisfactory tests of the readings of the meter or the reliability of the meters, this weir being placed on the stream and all the water going into the intake going over it and the water level in the intake reservoir being the same at the beginning and end of the period, and the result of that test showed that the Venturi meters were accurate to within one-half of one per cent., or as near as you could count on the readings of the meter being accurate,—

Q. Have you also—

A. —and if anything a little more water passed than the readings indicated; the half of one per-cent.

Q. Have you had an opportunity to test your Venturi meter by having one at each end of your line and joining one with the other?

A. We have had an opportunity to watch that for long intervals where they were in series and by subtracting the different ones and found that they will run within one per cent.

Q. Is there any more recent or better method of measuring water, or more accurate method known to science than the Venturi meter?

A. There is not.

Q. Is there any other method in fact that would be relied on for measuring flowing water in a pipe, under pressure, except the Venturi meter?

A. There are other makes of revolving meters that have been made up to quite a large size, but I would say that for these sizes, forty-eight inches and above, the Venturi is practically the only satisfactory method of measuring.

Q. Has your experience shown it to be reli-able?

A. It has.

Q. How many years experience with it have you had?

A. Eleven.

Cross-Examination. By Mr. Vredenburgh.

Q. Mr. Sherrerd, have you ever seen a canal boat going up that lock at Boonton?

A. Yes, I have.

Q. Did you notice that it carried up with it the water and sewage from the lower level, the water as sewered in at the lower level, up to the higher level?

A. There is some drip off of the boat, generally runs off before it is thrown over the top of the Plain.

Q. The Cedar Grove water plant that you speak of?

A. Reservoir.

Q. Reservoir—the brook enters it how far from the dam?

A. It is fed by a pipe line from the Pequannock watershed, it doesn't catch the flow from the brook.

Q. How far does the pipe line empty from the dam?

A. Empty into the reservoir?

Q. Yes.

A. There are two arrangements, one is an inlet gate house that is about twenty-five hundred feet from the outlet gate house in the dam, and the other is about four thousand feet from the outlet, the other inlet is about four thousand feet.

Q. Is it at the opposite end of the reservoir?

A. Well, one of these inlets, the inlet gate house is across the reservoir, nearly opposite the outlet, and the other inlet is the standpipe that comes out in the end of the reservoir, which is about four thousand feet, as I said, from the outlet, perhaps less than that, but the outlet gate house is not at the other end, it is on one side, so that I cannot answer your question directly.

By the Court:

Q. Well, is this Cedar Grove reservoir supplied entirely by gravity?

A. It is, yes. Well, the outlet gate house is in the dam, Mr. Vredenburgh.

Further Cross-Examination.

Q. Does the water enter the reservoir at the opposite end of the reservoir from the dam?

A. There are three dams. I cannot answer your question in that shape. The water does enter the reservoir at one end and also enters at the side, depending on the operation of the reservoir, and the main dam is on the side opposite the inlet gate house, and in regard to the other two dams one is at each end.

Q. When you went through the Watchung tunnel, Mr. Sherrerd, did you notice the evenness or unevenness of the bottom?

A. I did, yes.

Q. How?

A. With my feet. I had hip boots on and I could feel.

Q. Did you have rubber boots on?

A. Yes, sir.

Q. Could you detect unevenness with your feet?

A. I could tell it was smooth for the spreading of gravel laid carefully, and was smooth.

Q. Could you tell where the gravel was laid, with your feet?

A. Yes—as distinct from the rock, you mean?

Q. Yes.

A. Well, you could get a long stretch of flat surface that would seem to be rock and where you would strike the gravel you would feel the little lumps of gravel, stone.

Q. How could you tell whether the gravel was even with the rock or not?

A. You could tell pretty well yith your feet. I have found that that was a very good way to judge

paving surfaces; for instance, you can tell the unevenness very easily by walking over streets, if you have been in the habit of doing that, as I have been, in connection with paving work.

Q. Would there be any trouble about brick lining that tunnel?

A. Was there?

Q. Would there have been any trouble?

A. The bottom?

Q. Yes.

A. There would have been some trouble, yes; it would have been practically impossible to have kept cement from washing out of the joints in the brick work.

Q. While it was wet?

A. If you tried to lay a brick bottom in the tunnel it would be practically impossible to keep the water from forcing out the joints and washing the cement out.

Q. You mean after it set or before?

A. I mean while you were laying it.

Q. Would the same trouble arise after it was set?

A. After it was set; if it was laid with Portland cement it should hold the water pressure, if it were arched in, if it was made a reversed arch in the bottom.

Q. Was there any difficulty about draining the water from the tunnel?

A. There was, yes.

Q. What?

A. Because it came in in such large quantities and so many places, it came through the rock seams.

Q. What difficulty did that present, only a question of expense as to draining it, wasn't it?

A. Practically, yes, a question of expense, but it would be very expensive to so drain the tunnel that a Rosendale bottom could be put in; I doubt very much whether it could have been drained so as to put in a Rosendale cement.

Q. You could put in a brick bottom with Portland cement?

A. Certainly you could.

By the Court:

Q. Well, now, suppose that you had put in an under drain, what would be the diameter of a drain or pipe necessary to carry off the water in that tunnel?

A. You mean as a sort of a guess, I presume, as I have never made any measurements of the water.

Q. Yes, a guess, of course.

A. The tunnel is comparatively flat, and unless it was laid with considerable depth under the bottom at the outlet it would take a large sized drain, something like an eighteen-inch pipe, something of that kind, I presume.

Q. Then you would lose the water that would otherwise have come into the tunnel?

A. Yes, you would lose that.

Q. Now would the loss of that water have been an advantage or disadvantage, looking at the matter purely from the standpoint of good water supply for Jersey City?

A. Well, I don't think it would be material either way, from that point of view.

Further Cross-Examination.

Q. I understood you to answer the Court that you would lose the water; there would be no trouble putting the water in the tunnel after the tunnel was completed?

A. You would have to let it come through your lining somewhere.

Q. There would be no trouble about that, the pipe would do it?

A. You could bring it back in, yes.

Q. Most of the water came from the top?

A. No, I think it came through the sides and bottom as well as the top; the most that you would notice in going through casually would be that that came from the top, on account of the drip, of course, but I saw it coming in the sides, and also saw the clear water running into the riley water in the bottom, showing that it was running in from the sides and bottom, making a clear part through the riley water.

Q. Didn't it come from behind the brick walls?

A. Some of it was lead through the brick walls.

By the Court:

Q. By artificial openings?

A. By an opening made there.

Further Cross-Examination.

Q. Did I understand you to say that you saw some of it coming up from the bottom?

A. I saw the clear water appearing in the riley water one time when I went in, they had been taking the dams out that they used to hold the water comparatively still, and they had made—almost all the water in the tunnel at that time was very riley, and as we went through we could see in a number of places along the side and through the botttom clear water coming up into this riley water, showing that there was evidently water coming in from the sides and bottom.

Q. Well, that would come in from—from the fact that the tunnel was brick lined, would it not, brick lined, with the sides and arched, most of the water would have to come down through the bottom?

A. I couldn't tell that.

Q. Now, did you see any point, when you went through, where it came in with any violence, from the bottom?

A. Well, it was impossible to tell that, Mr. Vredenburgh, because the amount of water that stood in the tunnel, that would check any head of water squirting in, but it seemed to be coming in in quite some volume.

Q. Do you know what spongilla is?

A. Yes, sir.

Q. What is it?

A. That is a growth that is found in water conduits.

Q. Is it true that if they are allowed to accumulate after a year or two they become very hard with a long finger-like growth extending from them which are a serious obstruction to the flow of the water?

A. Well, I haven't seen any with very long finger-like growth; I have seen them in our Newark conduit; they do grow in water in time, I have no doubt.

Q. Have you any knowledge of the Sudbury aqueduct?

A. Yes, sir, in a general way but not in regard to that kind of growth.

Q. The Sudbury aqueduct is a masonry aqueduct?

A. Yes, sir.

Q. About how long?

A. I don't know the length of it, I presume 25 miles or so.

Q. Twenty-five miles?

A. Something like that.

Q. Does the water flow by gravity?

A. It does through a portion of the conduits.

Q. Well, haven't they thought it necessary, Mr. Sherrerd, to clean those subways twice a year?

A. I don't know as they have.

Objected to as not cross-examination.

Q. Well, if that is true that they have found it

necessary to clean them twice a year, do you see any reason why it will not be necessary to clean this conduit?

A. Yes, sir, I see reasons.

Q. What are they?

A. Well, we haven't found any such conditions to exist in the Newark plant, and it derives its water supply from practically the same watershed, or the adjoining watershed having the same character of water.

Q. Well, the water does not differ here from the water that runs through the Sudbury aqueduct, does it?

A. I think it would be very likely to differ materially, and does differ materially.

Q. In respect to this growth do you think it does?

A. Yes, sir, in all kinds of the chemical parts of the water.

Q. Well, is spongilla a chemical growth?

A. No, but it may depend for its food on certain chemicals in the water, certain ingredients or minerals it might be proper to say or better to say.

Q. Well, where was it they grew in the Newark aqueduct?

A. They grew near the intake on the sides of the pipe to some extent, but we have not been bothered very much with spongilla.

Q. You left them there?

A. Yes, sir.

Q. Are there any other growths of a similar character there?

A. There are some other growths, yes, sir.

Q. What?

A. Well there is a kind of algea or slime that is found there.

Q. Is there any animal growth?

A. Well, the line between the two is so hard to define, but I imagine that there are, yes.

Q. Do you know Mr. Fitzgerald?

A. I do, yes; you mean Fitzgerald in the Boston Metropolitan district?

Q. Yes; have you read his reports?

A. No, sir.

Q. Would you think this statement to be accurate, Mr. Sherrerd, after the aqueduct had not been cleaned out for about a year, an accurate gauge with a Ferris meter showed the capacity to be 92.58 of its total capacity—per cent. of its total capacity?

A. I did not quite catch your question.

Q. After the aqueduct had not been cleaned out for about a year, an accurate gauge with current meters showed the capacity to be 92.58% of its total capacity?

A. Of its what?

Q. Of its tabulated capacity?

A. Well, that is very much greater—a great deal higher per cent. of reduction in flow than I have found to be true of the Newark plant; one per cent. a year in our large pipe seems to be about as high as it runs.

Q. Well, he says in his report that after the cleaning of the same aqueduct by Mr. Fitzgerald with the gauge it showed 103.95% of the tabulated capacity, thus making a total of nearly 11%; do you think that statement is devoid of accuracy?

A. That seems to me to be high from my experience, and I think the conditions there were perhaps—that the original cleaning referred to as being in the year previous had not been as thorough or complete as the latter one was.

Q. So that his percentage was for more than one year?

A. Well, the gauge, as I understand it, was made on April 4, and on May 29, and there was that difference between those two dates; in the meanwhile the aqueduct had been cleaned.

Q. And that was with the measurements made before and after?

A. Yes, sir, before and after the cleaning. I understood from your previous question that that represented the cleaning of one year.

Q. Yes, I did say that, I am reading from the yearly report. This is the statement after the aqueduct had not been cleaned for about a year, an accurate gauge with a current meter showed that on April 4 a capacity of 92.58 of the tabulated capacity, and on May 29, after cleaning, another gauge showing 103.95 of the tabulated capacity.

A. I will still say that my suggestive way of interpreting that will be correct, and your interpretation of that thing is that it meant more than a year's cleaning.

Q. Of course you cannot form any definite idea of how much more than a year?

A. No, sir. You cannot take a portion of that report, not knowing what the context is, and form a very accurate conclusion.

Q. Do you know Mr. F. B. Stearns, the chief engineer?

A. Yes, sir.

Q. Do you think that this statement might possibly come from him: If the following information regarding the retardation of flow by lack of cleanliness in the aqueduct was first sought in March '98, and its flow was measured both by meter and gauge, and one year later, in March 1899, that water had precisely the same depth and flow and measured in the same manner it averaged about 10% less than when it was cleaned—

A. Which portion of the conduit was this, was it in the entire length of the aqueduct? I have found in my own experience that the retarding effect is very apparent for the first two years' use of a pipe line in the upper end of a pipe line nearest to the intake, from my examination of the Newark pipe line that condition does not maintain to a point as far down as the Watchung tunnel; the

pipes are remarkably clean from a point half way down from the Newark intake—

Objected to as not cross-examination.

Complainant's counsel state that the object of the cross-examination was to show that growths of this nature would occur in conduits, and it would be therefore necessary to cleanse the conduits from time to time, and that it cannot be cleansed, except at great expense, on account of gravel having been substituted in the bottom of the conduit for a smooth surface.

Q. Does this spongilla occur above the water line in a conduit?

A. It generally occurs below the water line.

Q. Do they require air for their nourishment?

A. No, sir, it does not seem to from my experience with the Newark aqueduct; they do not seem to grow on the bottom, they grow on the sides of the aqueduct; of course they may branch off.

Q. What makes you think this is a growth on the sides rather than a growth on the bottom, have you any theory upon that subject?

A. No, I haven't any special theory; it may be like lichen on trees; some grow on a vertical surface, some grow on rocks, some grow on the north side and some on the south side of a tree, whichever it may be of the nature of the plant to grow on. Most of this spongilla that I have noticed grows about on the curves of the wall.

Q. And all below the water line?

A. Yes, sir, all below the water line.

By the Court:

Q. Would they not be likely to grow where there is more inequalities in the side or bottom of the aqueduct?

A. Well, these plants that grow in water seems to take their food from the water rather than from the material to which they are attached.

Q. Would it not seem to be a logical conclusion that they would start at the bottom rather than on a smooth side?

A. All I can say to that is they don't seem to grow to the same extent at all on the bottom that they do on the sides; there may be some reason for that that I cannot account for.

Further cross.

Q. You know Mr. John R. Freeman, of the Croton Aqueduct, who makes reports yearly and oftener with regard to the Croton aqueduct. Now in his report, as I understand it, he says this, that the deposits in the Croton Aqueduct average fully a quarter of an inch thick and possibly fully half an inch thick on the side walls below the water line and more on the bottom, and in spots of considerable size it is fully two inches thick.

By Mr. Corbin: Deposit?

By Mr. Vredenburgh: No, the growth, well, it means growth, Mr. Corbin; I will read on further. This deposit of slime occurred mainly in the upper 2 miles?

A. I have said that, Mr. Vredenburgh. I have said that the slime growth laid upon the bottom of this aqueduct, but I have been referring to spongilla growth in my previous answers.

Q. Well, the slime was there two inches thick on the sides and deeper on the bottom?

A. What portion of the conduit was it, near the intake?

Q. The upper two miles?

A. Well, that may be true because the growths

are more apparent, and more luxurious, if I may use that word, at the upper end, and then the growths taper off until in our pipes, when we get half way down, we find very few.

By the Court:

Q. How can you get rid of that slime in a tunnel like this?

A. By a movement over the gravel, over the stones, if they were raked over of course—it could be cleaned as readily, I think, perhaps, from the gravel as from the side walls.

Q. What do you mean, take a rake and stir it up?

A. Either by a rake or some scraper with projections from it.

Further cross.

Q. Where would you get your force from?

A. Under the same condition of force as you would have to clean it otherwise, you would use the same measure in one case as in the other.

At this point Mr. Corbin read some testimony heretofore given in regard to slime.

By the Witness: I admit it is growing in your tunnel at the upper end near the intake.

Q. You do admit that?

A. Yes, sir, at the upper end, but the growth that would retard the flow of water would be entirely at the upper end of the conduit, and there would be no necessity of cleaning this tunnel for years, if at all.

Q. Suppose you were told some gentleman had gone through this tunnel only six or nine months

ago and had found this slime growing there, you would not then say it would not grow there?

A. I don't think I have said it would not grow there.

Q. But you say it occurs worse near the intake?

A. Yes, up near the intake.

Q. Mr. Sherrerd, you spoke about fencing; where did you see any fence around that reservoir near the line on the property?

A. I don't know where the property lies that Mr. Vredenburgh spoke of, and I don't know that I said there were fences there; I said along the road.

Q. You saw some fence near the road?

A. Yes, sir, but I don't know whether it was on the property line or the reservoir or not.

Q. Did you go up the Parsippany dyke?

A. Yes, sir.

Q. Did you see any fences between that road and the Parsippany dyke?

A. I didn't see any there, I didn't think it would be necessary to have any there.

Q. Wouldn't cattle wander there upon the side of the dyke?

A. Not likely to go up such a steep bank of the dyke.

Q. The bank is not so steep but what they could go up and browse there?

A. Could, of course, but they are not likely to climb as steep a bank as that.

Q. Don't you think it would be proper to have a fence so that they couldn't get up there? What objection is there to having a fence?

A. No objection.

Q. The proper thing to have had?

A. Might be the proper thing to have, but not necessary thing to have.

Q. Now you went up with Dr. Leal to Mt. Tabor; why did you go up there?

A. I went there to look over the conditions at this place.

Q. At his request?

A. Yes, sir, at his request.

Q. And in his employment?

A. I don't know that I would say in his employment; as a witness in this case.

Q. You were employed to go up there and look at Mt. Tabor?

A. Not especially employed for that.

Q. How did you happen to choose a day when the people were not there?

A. It wasn't chosen with that in view, it was when this case was about to be tried before, and they wanted me to testify in connection with it, and only had a short time to make the examination.

Q. I understood you to say last May?

A. Yes, sir.

Q. May of this year?

A. Yes, I think some of the testimony was being taken here then. I was in court here on the 18th, and went up there on the 19th of May.

Q. Well, did you go to other parts of the Rockaway valley at the same time?

A. I went over quite a good deal of the Rockaway valley at that time and at other times; I am more or less familiar with the whole region.

Q. Did you go to Hibernia that day?

A. No, sir.

Q. Well, did you go up to Dover that day??

A. Yes, sir, I was at Dover, that is, I went up from here to Dover.

Q. Did you go to Wharton that day?

A. No, sir, I went up through the Longwood valley.

Q. Did you go to Boonton that day?

A. That day or the next.

By the Court:

Q. Have you ever noticed any difference be-

tween the growth, such as we have been speaking of, in steel pipes and in a tunnel such as this?

A. Have I noticed any difference?

Q. Yes.

A. Of any kind?

Q. Well, either any kind or any quantity?

A. There is not any material difference, I think if anything there is apt to be on certain kinds of masonry work more growths because there would be the joints and the seams that might be open, that would give that, but in the steel pipes it depends a good deal on the care with which the coating is applied as to whether these growths get an attachment to it or not, but even with all the care that is used they are very numerous in the upper ends of the conduits, so that there is more or less similarity about it, in the same kinds.

Further Cross-Examination.

Q. Mr. Sherrerd, did you have anything to do with the purchase of the Benson-Snyder farm?

A. I had to do with the negotiations for that.

Q. How near was his manure heap to the stream?

Mr. Corbin: I don't see how this is cross--examination, I don't know what counsel is driving at, and I don't know even where that Benson-Snyder farm is. I object to it as not competent now.

Mr. Vredenburgh: The object, may it please your Honor, is to show that the City of Newark has gone to considerable expense in removing outhouses much further away from the stream than any here in its watershed—gone to considerable expense, under the advice of this gentleman, and very properly so, I have no complaint against his doing so, but the cross-examination is upon his statement that this is a good collecting ground, this City of Dover is a good collecting ground, when he

as engineer of the city of Newark very properly goes to a very large expense to remove one closet from the watershed.

Mr. Corbin: I object to it as not proper cross-examination, it is not competent; that raises an issue as to the wisdom of the Board in control of it in Newark; we cannot try those issues, the conditions have all got to be known and inquired into to make it of any value.

The Court: Perhaps the question would become proper after a while, but I don't think it is proper now.

Mr. Vredenburgh: Of course Mr. Sherrerd won't be here again.

The Court: I suppose he will be here as long as is necessary.

Mr. Vredenburgh: Yes. I didn't mean to cross-examine him any longer, but I thought if it came up in any other shape that Mr. Sherrerd would be the man to know.

The Court: I am not sure that this would not be proper at a later stage of the cross-examination. For instance, if Mr. Sherrerd should testify that it was unnecessary to stop the use of cesspools within twenty-five feet, I will say, of the Rockaway river, if he should say that it was unnecessary to do that, and that it was a useless expense, why, then perhaps you might ask him further whether he did not advise the doing of that or a similar thing in connection with this Newark supply, but now I do not think that the question is proper. You can undoubtedly cross-examine him with regard to his statement that this is a good collecting ground, I think that opens the door to any

inquiry with respect to the location of this stream in reference to Dover. I do not say that you cannot cross-examine on that.

Mr. Vredenburgh: Well, the expression, a good gathering ground, is so indefinite, may it please your Honor, that I would doubt whether I would be justified in going into very much of a cross-examination; when the witness said a good gathering ground he may have meant a hundred things. Whether I ought to make that more definite or not, I am not clear about in my own mind.

Re-Direct Examination.

Q. Did you examine the Lyondale Print Works, with Dr. Leal?

A. Yes, I examined the conditions below the mill there.

Q. Did you follow it down to see how far down the coloring matter was in anywise observable in the stream?

A. Yes.

Q. To how low a point did you find it?

A. I went across the bend in the stream and to a point that I should say was about fifteen hundred feet below, saw no indication of the coloring matter there.

Q. You think it had disappeared there at that time?

A. Yes.

By the Court:

Q. Is that coloring matter poisonous?

A. I don't know what its nature is, I didn't go into that phase of the question.

Q. You don't know whether it is held in solution chemically or whether it is dissolved in the water?

A. I don't.

Adjourned until Thursday, November 8th, 1906, at the same place.

Taking of depositions, etc., in the above stated matter, before the subscriber, one of the Masters in Chancery of New Jersey, at the hour of eleven o'clock in the forenoon of Friday, the 23d day of November, A. D. 1906, at the office of Messrs. Vredenburgh & Wall, No. 1 Exchange Place, Jersey City, N. J., in the presence of Messrs. Vredenburgh and Record, counsel for the complainants, and of Messrs. Corbin and Edwards, counsel for the defendants.

By agreement and consent of counsel said depositions are taken in shorthand, question and answer in full, and when written out are to be deemed and taken as the original depositions in this case, and the signatures of the witnesses waived.

GORDON K. DICKINSON sworn.

Direct Examination. By Mr. Vredenburgh.

Q. Doctor, you live where?
A. Jersey City.
Q. How long have you lived in Jersey City?
A. I was born here.
Q. What is your profession?
A. Physician.
Q. How long have you practiced?
A. Thirty years.
Q. Where have you practiced?
A. In this town.
Q. Where is your office at present??
A. Two hundred and seventy-eight Montgomery street.
Q. Are you connected with any of the hospitals in Jersey City?
A. I am.
Q. What hospital?
A. City Hospital and Christ Hospital.

Q. How long have you been connected with Christ Hospital?

A. Since 1891.

Q. What position do you occupy there?

A. Surgeon—attending surgeon.

Q. How long have you occupied that position?

A. Since 1891.

Q. And in the City Hospital what position do you hold?

A. Attending surgeon.

Q. For how long?

A. I think I was appointed about 1887 or 1888, and then while I was on the Board of Health I resigned and was reappointed later.

Q. In connection with sanitary science are you connected with any body?

A. I am connected with the State Sanitary Association.

Q. What is your connection with them?

A. I am a member, and have been on the Executive Board for several years, and I have been told, unofficially, at the last meeting that I was elected president.

Q. Have you given any attention to sanitary science with reference to communities, doctor?

A. I have at times, as most physicians do.

Q. What were your duties as a member of the Executive Committee of this Sanitary State body?

A. Largely to suggest topics for the programmes of the coming meetings; we meet in July and arrange the programme for the meeting, which generally takes place in December.

Q. You meet once a year?

A. Yes, and that generally means write a paper, or get somebody to write it for you.

Q. You said a State organization; is it recognized in any way by the State?

A. Well, I don't know whether we are incorporated, I don't think we are.

Q. How does a person become a member—elected?

A. By paying $2 and becoming elected.

Q. Elected by what?

A. By the executive body at their annual session.

Q. As a physician, what study do you make of sanitary science?

A. I made it a hobby for the last five years, something to take my mind from my regular practice and relieve me of the tension that comes through it.

Q. What societies are you a member of?

A. I am a member of the Practitioners' Club of Jersey City, which is an incorporated body; of the County Medical Society, and New York Academy of Medicine, and I am a member of an organization over in Brooklyn, I have forgotten the name, I believe it is Queens & Nassau Medical Society.

Q. Do you hold any official position in the city?

A. In the city?

Q. Yes.

A. Not at present.

Q. Did you any time in November,—in this month?

A. Hold any official position?

Q. Yes.

A. No, sir.

Q. During this month, doctor, have you had occasion to examine the water tributaries to the Rockaway river above what is known as the Boonton reservoir, from which Jersey City is obtaining its water?

A. You don't mean examine the water, but you mean the tributaries?

Q. Yes.

A. Yes.

Q. Will you please state when you did it and why you did it?

A. Well, the date I don't recall; probably you have it there.

Q. Perhaps if you look at your report it will refresh your mind.

A. This is my report. On the morning of the 3rd instant I received a communication from the Board of Public Works signed by their president and by the president of the Committee on Water Supply, I think some such term, requesting me to go with a body of gentlemen to the water shed and make such examination as we could make, and make the report in our own way; that was brought to me by Clerk Bouten, and he brought with him a number of blanks and asked me to suggest names of other physicians to go on that committee of inspection; I gave him a list of a number of physicians in different parts of the Town who I felt would be independent, who were not tied down by politics or by any connection with any company or with the City, and out of that number they selected nine, rang them up on the telephone and got their acquiescence, and then later filled out these blanks and delivered them. We went up there on the morning of the fifth.

Q. That is November, 1906?

A. Yes, sir.

Mr. Corbin. Counsel for the defendant objects to expert testimony on the part of this witness, as a sanitarian as he has not duly qualified in that regard. As a physician and surgeon I will admit anything with regard to Doctor Dickinson, but as a sanitarian my objection is that he has not qualified himself by either practice or study.

Mr. Vredenburgh. I ask counsel to cross examine the witness if he desires now, as to his knowledge of sanitary science.

By Mr. Corbin:

Q. What experience, if any, have you had in the

matter of examining water sheds and sanitation of water sheds?

A. Practical experience?

Q. Yes.

A. Why, I think that is the only time I went over it carefully, except once a year or so ago, with Doctor Leal.

Q. What practical work, if any, have you done in a sanitary line?

A. I don't know that I have done any practical work, except in my connection with the Board of Health; that might be considered, to a certain extent, practical.

Q. What was your connection with the Board of Health?

A. I was one of the members, and president, while I was there.

Q. During that time did you do any practical work in the way of personal inspection of premises and privies and so on?

A. Yes, sir.

Q. To what extent?

A. Well, off and on I would go around to visit premises and places that were complained of, in order to see what the complaints amounted to, and to see if the inspectors were carrying out their work properly.

Q. Did you ever make any tests of vaults during any of your experience?

A. No, sir.

Q. Did you ever do any laboratory work or chemical work or bacteriological work in connection with sanitation?

A. Never.

Mr. Corbin. I renew my objection that the witness is not qualified as a sanitarian.

By Mr. Vredenburgh:

Q. Where did you go, doctor?

A. We took the morning train to Dover and started in there.

Q. What place did you first visit?

A. I cannot tell you the names, those things pass from me, but we crowded into an automobile and climbed Dover hill and inspected the privy on the premises. A man living on the summit of the hill, it was stated, was suffering from typhoid fever at that time.

Mr. Corbin. I object unless the place is identified, and also as to the indefiniteness of the testimony.

Q. Would you recognize it as the property of J. H. Barton?

A. That seems to be the name.

Q. Now will you please describe the privy as you saw it there?

Mr. Corbin. I object to this as not newly discovered evidence, or such evidence as is within the purview of the order of the Court opening complainant's case.

A. Well, we found one of those big country privies, more like a sentry box, built over a media that was apparently not cemented, if it had been there was no cement in evidence, it hadn't been cleaned out, the privy was full to repletion with solid excrement, and the fluids that went on the surface of the same would quickly run off through the apertures in the stone of the media to the ground outside. If I recollect correctly, a few feet from this privy on the ground was some fluid excrement, and this was back of the house a distance of thirty or forty feet, on the slope of the hill, it was some distance down to a brook which we visited; that brook was the nearest, about a thousand feet; the brook was several feet wide and several inches deep flow-

ing rapidly, and I am told that the distance from the brook to its entrance to the stream was about two miles; we didn't follow the brook. I did not consider that this place was one of any importance other than that it was open to suspicion on account of some previous investigation and complaint.

Q. Did you notice the dip of the land from the house to the brook?

A. Yes, we took a mental test of that, and I think in a thousand feet there was a dip of about nearly one hundred feet, if I recollect, I don't recall positively.

Q. Now passing on, doctor, to the Eugent Cooper house?

A. I don't recollect the names, I would have to refer to this paper.

Q. Well, referring to this report can you state what you found there?

A. I remember that, yes.

Q. It consisted of how many houses?

A. Well, there were half a dozen houses on a fairly level plateau, and a little distance back of the houses were the same type of privies that you see in the country and close to them was a small brooklet.

Mr. Corbin. I object to this evidence as not newly discovered or such as is within the purview of the Court's order in opening the complainant's case.

A. The brooklet had running water in it, and part of the time it was exposed and part of the time it ran subterraneanly from these houses down to Ford's pond, it was in a trench which was narrow in the top and somewhat over-grown with weeds; we followed it down to Ford's pond, passing through privies in the way.

Q. Did you notice whether the privies of these six houses were over-flowing or not?

A. Yes, they were full of excrement, so that the

fungous of the excrement was higher than the surrounding wall.

Q. Now the house which I would call the George Park house on Second street, the stable and privy in the rear of the house, do you recollect seeing that?

A. My recollection is that that house is somewhat elevated, and back of the house they have filled up with stones a wall about eight feet, and the privy is close to the wall line, this privy is about, I don't know how deep.

Mr. Corbin. The same objection with respect to this property.

Q. Was that cemented or not?

A. To my recollection we didn't find any cemented privies, I cannot remember specifically as to this one, but I don't remember noting any cemented privies, that is, where they were properly constructed so as to be impervious.

Q. Do you recall which way the natural drainage of this property was, with reference to Ford's pond?

A. Well, it drained into this same brooklet, and this brooklet ran to Ford's pond.

Q. Did you make any test of the sink in that house?

A. I don't recall whether it was that house or some other, I know one of the houses along that little brooklet we poured some water into the sink, I believe, and also into the privy; of course the privy was not connected with the house, and in both instances we got a positive test.

Q. The Lawrence house on Second street, privy in the rear about six feet deep; do you recollect that? You may, if you desire, refer to your report.

A. That is the last house on that line. Yes.

Q. What can you say as to the condition there?

Mr. Corbin. I object to any evidence with respect to this house, for the same reason, that the evidence is not newly discovered, nor within the purview of the order of the Court opening the case.

A. Conditions somewhat similar to the others.
Q. Did you notice Ford's pond?
A. Yes.

Mr. Corbin. Same objection with reference to evidence respecting Ford's pond.

Q. Did you notice to what extent, if any, the land, the natural drainage from which was into Ford's pond, was built up?
A. Well, there were numerous houses, there was an amphitheatre with a pond in the center, houses on the property all around, the surface drainage and the natural drainage apparently is towards the pond.
Q. Stables there too?
A. Stables, yes.
Q. Now did you go to Wharton?
A. Yes.
Q. Were you taken to Mr. Rowe's house there at Wharton?
A. I don't remember the name; we were taken to a house at Wharton, and they told me away back in July there was a case of typhoid fever, and the privy was near the river, if I recollect.
Q. River or canal?
A. Near the canal, and we made a test there, I believe,—

Mr. Corbin. Same objection with respect to this.

A. —with a positive result.
Q. What was the test, doctor?
A. The test consisted in throwing some urinite

into the privy and then pouring the water, and this solution appearing in the canal.

Q. Did you see that yourself?

A. Yes, if we made it there, my notes will tell you whether it was at that place, I think it was.

Q. And by your notes you refer to this report?

A. Yes, I drew this up, this is all my own doings, I drew it all up. We took, on this investigation, Mr. Eagen who is the head of the Eagans school in Hoboken, and he made stenographic notes from comments made by myself; he wrote out his notes, sent them to me and from that I made my report. I made the report entirely and then got the gentlemen together and read it to them, and they endorsed it.

Q. Now, doctor, the next one in this report seems to be Richardson Boynton & Company's works at Dover?

A. Yes, sir.

Q. Did you notice in what way the excrement from the toilets was removed?

Mr. Corbin. Same objection.

A. They had a building somewhat apart from their general plant that was not quite the size of this room, and in it were accommodations for about a dozen men; underneath this building, which was open underneath, a cart was backed in and the excrement was expected to drop into the cart, and they told me that when the cart became full to overflowing or became noxious through orders it was removed, by contract; and the man who contracted to remove it—

Mr. Corbin. I object to what was told him.

A. —he removed it they did not know where to. Under the cart, or, rather in order to accommodate the cart, the ground had been dug away and the sur-

face water of that part of the property comes up to within a short distance of the surface of the ground, and it accumulated there, and in this surface water was not only the cart but the accumulation of foul paper, debris.

Q. Do you recollect, doctor, going back to the upper bridge in Dover where the Morris canal, which above that was on the south side of the river, passes through a lock and joins the river and after a short space leaves it again on the north branch?

A. Yes, I remember that.

Q. Now at that point did you notice what the appearance of the water was?

Mr. Corbin. The same objection to evidence respecting this.

A. Well, the water was discolored apparently,—not discolored, but was murky, and coming up through the water continuously was a discharge of marshy gas.

Q. How did you detect that?

A. By seeing the bubbles, that is, I presume it is marshy gas because I have always been told so.

Q. For a distance of a mile from that point down the Rockaway river did you notice in what way the river was lined, on both sides, with reference to buildings?

Mr. Corbin. Same objection, this is not newly discovered evidence and not within the purview of the order opening the case.

A. On the south side it was closely lined with numerous buildings which would rise above the bank of the river, by a wall about six feet or so high; protruding through this wall were a number of drain pipes and at the bridge, the upper bridge, I have forgotten the name of the street, was apparently a sewer vent of 2 x 3, we will say; the inside of

this, as far up as you could see, was an accumulation of moist mud, from which was dripping a certain amount of water, not in volume, but some was coming down; from others there was no water seen escaping.

Q. What was the character of the water you saw escaping from there?

A. From that stream?

Q. Yes.

A. It was limp, but all of this accumulation in this sewer was moist.

Q. Now what as to the north side?

A. On the north side there are no houses lining the stream; between the stream and the houses that are built there, which are some twenty feet or more back from the stream, is a running pond, ditch, that ditch begins about at the line of the poor house which is close to the bridge.

Q. Electric?

A. Electric Power House and runs down parallel with the river, approximately a thousand feet and then enters the river.

Q. Now along the line of that drain which you have last referred to, from the Power House, did you notice the houses known as the Seven Sisters?

A. Yes, sir.

Q. On Bergen street?

A. Yes, sir.

Q. Did you make any test there?

Mr. Corbin. The same objection; the evidence is not newly discovered nor within the purview of the order opening complainant's case.

A. We were permitted to enter one house and the urinite was thrown and appeared in the stream; we also were permitted to go into the Power House and throw the urinite in their toilet, and in ten or fifteen minutes that entered the stream, and then this colored water I followed down to where the

New Jersey State Library

stream entered the river, and saw that it did enter the river.

Q. You, I suppose, refer to the Electric Power, when you said Power House?

A. Yes, Electric Power House.

Q. Did you notice anything being thrown in the river when you were there?

A. We saw one woman come to the side of the stream, south side and throw something from a bucket in.

Q. Now in the lower margin of Dover did you visit the houses of people of the poorer class?

A. We did.

Q. I refer you now to Patrick Varley, 270 East Blackwell street?

Mr. Corbin. I object to this evidence with regard to the lower margin of Dover and Patrick Varley's house as not newly discovered, nor within the purview of the order opening complainant's case.

Q. Did you notice the privy in the rear of that house?

A. Yes, I remember that distinctly.

Q. How far was that from the river bank?

A. My impression is about ten feet,—no, twenty-four feet. We poured the urinite water into this privy, which was the usual one, full of manure, and we waited, I guess, ten minutes and then it came out into the river.

Q. Do you remember whether at that point there was any protest by anybody about your making a test?

A. Why, Mr. Varley was a good natured Irishman, and he said he was sure there was nothing the matter with his place, he had made an effort to protect himself against any such attacks that might come from pollution in the river, and placed his privy back in a position where it would be considered safe; there was no special protest.

Q. Now the two houses in Samus avenue near Canal, owned by Edward Neighbour or for whom Edward Neighbour was the agent, Mr. Heath was a tenant of one house and Mrs. Cornelia of the other; did you notice whether the sinks in those houses emptied into a brook or not?

Mr. Corbin. Same objection.

A. Yes, I remember that; there is a little once time brook now more like an open sewer running from this place down past the gas plant, through it and over to the river. We did not need to make any tests because their privies were so old and dilapidated that the rocks had fallen away, and you could see the manure inside the privies as you stood on the outside, and they were full. Any fluid excrement or water would be bound to flow right over towards this open drain; I followed the drain down past the gas plant and beyond that I didn't go, but it could not go anywheres else than the river, without going back and over the hill.

Q. Now the last house on the north side of Lee avenue, Mrs. Atkins, did you notice a privy there?

Mr. Corbin. Same objection.

A. Yes, I remember that.

Q. What was the condition?

A. Same condition.

Q. Now did you notice any Italian tenants there?

A. Several; I didn't get their names.

Q. Messrs. Guild & Clark were agents, what was the character of their privies?

Mr. Corbin. Same objection.

A. Same condition.

Q. Over-flowing?

A. Yes, sir.

Q. And 52 Samus avenue, Andrew Baker owner, did you notice where the sink outlet was, with reference to the drainage brook?

Mr. Corbin. Same objection.

A. Same condition.

Q. It emptied into that brook, did it?

A. Yes, sir.

Q. Mr. Patterson, 44 and 46 Samus avenue, Mr. Patterson was the owner; did you notice where the contents of the sink there ran?

Mr. Corbin. Same objection.

A. My recollection is, same condition.

Q. The privies were over-flowing there, also?

A. Yes, sir, double houses, two families: this brook runs through the gas house property, enters the river about five hundred feet distant from the Patterson house.

Q. Now there is one other house in Dover, the Jenkins house, 373 East Blackwell street, did you notice the privy there, of that house?

Mr. Corbin. Same objection.

A. I remember that, yes; I saw the privy, we made no test.

Q. Did you notice how near the privy was to the river?

A. I don't recollect.

Q. Did you notice whether there was any urinite discoloration on the mud on the bank of the river, near the privy?

A. Yes there was, just inside the water.

Q. Did you go to the Lyondale Bleach, Dye & Print Works at Rockaway?

A. Yes, I remember that.

Q. And the Rag Works at Powerville, did you visit that also?

A. Yes, sir.

Q. Did you attempt to inspect the work—what was going on in the Rag Works?

A. I attempted it.

Q. What was the result of the attempt?

A. Ran up against a man.

Q. What did he say?

A. He told me that I must go back.

Q. Were you allowed to inspect it?

A. The man in charge of the Rag Works—I happened to have had some professional relations with him years back, and he was very glad to see me, and he told me I couldn't go through because there would be a man stop me—

Mr. Corbin. Objected to for the same reasons before stated.

A. I attempted it and failed.

Q. Did you notice where the rags were that were used?

Mr. Corbin. Same objection to all the evidence respecting the rag mill.

A. We looked around and saw the rags lying between the buildings and the bank of the river, along its margin, in places.

Q. You also went to Boonton?

A. Yes, sir.

Q. And examined to some extent the water there?

Mr. Corbin. Objected to on the same grounds as before stated.

A. We did.

Q. What you saw there you put down in this report?

A. Yes, sir.

Q. Did you notice the hanging gates that are there to prevent the water from the lower canal going into the Rockaway river?

A. I did.

Q. What is your judgment of the efficiency of those gates that you saw there?

Mr. Corbin. Objected to for the same reasons before stated, and also not competent, and lack of expert knowledge on the part of the witness.

A. May I state what I saw?

Q. Yes.

A. There was very little difference in the pressure in the raceway and in the canal; at times the water would flow from the raceway to the canal and that would throw the gates out, and at other times there would be an influx of water from the canal towards the raceway, and before these gates could thoroughly shut a certain amount of water would pass in from the canal to the raceway.

Q. You saw that?

A. Yes, sir.

Q. Did you notice the Boonton Silk Works, below the Cooper-Lord estate?

A. Yes, sir.

Q. In the Rockaway river?

A. Yes, sir; I did not visit them.

Q. Did you notice any sewage coming down the cement drain, in the Incline Plane at Boonton?

Mr. Corbin. Same objection with respect to the Incline Plane?

A. I did.

Q. Now, doctor, to go back to the Rockaway

river itself, did you notice in the water, at any place, human excrement?

Mr. Corbin. Same objection.

A. No, I didn't see any.

Q. Did you go down to where the Rockaway river enters the reservoir?

A. No, we didn't go on the river below the place where the railroad crosses it; from there we proceeded to the reservoir by road.

Q. Then you were not at the point where the river enters the reservoir?

A. No, sir.

Q. The nearest point where you saw the river to where it enters the reservoir was how far above the reservoir, about?

A. Why they told me a half a mile.

Mr. Corbin. Objected to for the same reasons as before stated, and also lack of qualification.

A. Judging from what I saw on the river banks above, I should not consider it potable water.

Q. Doctor, in this report you say,—"In a few instances we proved the contamination of the Rockaway river with human excrement." What do you mean by that sentence?

A. Human excrement means urine and fecal matter in solution.

Q. Well, when I asked you whether you saw it in the river you said no?

A. You cannot see urine in the river, but urine running over fecal material is certainly noxious, ground water percolating through and around fecal material is noxious.

Q. Well, how did you prove the contamination of the Rockaway river with human excrement?

A. Simply by our test showing that water in privies will pass into the stream.

Q. What was your judgment, doctor, after visiting this watershed, as to whether the river as it enters the reservoir is contaminated or not?

Mr. Corbin. Objected to as not newly discovered evidence, or evidence within the purview of the Court's order; also because of lack of qualifications to speak as an expert.

A. I am forced to believe from our finding that it is contaminated.

Q. After you returned did you make any report to the Board?

A. I did.

Q. And is this the report?

A. This is the report, yes, sir.

Q. It is signed, I see, by yourself as chairman?

A. Yes, sir.

Q. Is that your signature?

A. Yes, sir.

Q. The next signature is Henry Spence?

A. Yes, sir.

Q. Do you know whether he signed that?

A. Yes, sir.

Q. Who is he?

A. A physician in Jersey City.

Q. Of what age?

A. He is, I guess, about thirty-seven or thirty-eight years old.

Q. A man of large practice in the City here?

A. Fairly large practice.

Q. You have known him?

A. I have.

Q. Hugh Allen I see is the next signature; do you know him?

A. Yes, sir, very well.

Q. Did he sign it?

A. He signed it.

Q. Where does he reside?

A. In the upper part of the city.

Q. And he has practiced how long?
A. Longer than I have.
Q. A large practice?
A. I think so.

Mr. Corbin. I object to this as incompetent.

Q. The next signature on this report, I see, is W. L. Faison, what is he?
A. He is one of the leading surgeons of St. Francis Hospital, and a man of good judgment.
Q. A practicing physician in this Town?
A. A practicing physician.
Q. And have practiced here how long?
A. About fifteen years, I guess.
Q. O. M. Weigand?
A. He is on Summit avenue, almost the West Hoboken line.
Q. Did he sign this?
A. He signed it.
Q. A man of large practice?
A. A man of large practice in this community.

Mr. Corbin. Objected to as not competent or pertinent in regard to this report.

Q. The next I see is Mr. Parsons?
A. John C. Parsons.
Q. Is he a physician?
A. Yes, sir.
Q. Practicing where?
A. In York street near Jersey avenue.
Q. Is he one of the leading physicians?
A. Stands very high.
Q. The next person signing seems to be James A. Exton, do you know him?
A. Very well.
Q. He practices where?
A. He is in Arlington.
Q. In this county?

A. Yes, sir.

Q. And is he a man of prominence in his profession?

A. Yes, he is secretary to the State Sanitary Association, and has been for a number of years.

Q. Was he on the Pollution Commission of Passaic, do you know?

A. I don't know.

Q. He is a physician?

A. Yes, sir.

Q. Of large practice?

A. Is said to have.

Q. The next signature here is Charles H. Purdy, do you know whether he signed this?

A. Yes, sir.

Q. What is his business?

A. His business is physician and Radiographer and Dermatologist.

Q. And the next signature I see here is George W. C. Phillips?

A. He is a druggist and water analysist.

Q. In Jersey City?

A. Yes, sir.

Q. Have been here for many years?

A. Been here about thirty years.

Q. And the last signature is J. E. West?

A. Doctor West lives on Ocean avenue, in the lower part of the city.

Q. And he is a physician?

A. He is.

Q. In large practice?

A. I presume he has had in his time; he is fairly well on in years now.

Q. Now, doctor, are these the persons to whom you refer as having been selected by you to go with you on the watershed?

A. Yes, sir.

Q. Are these all of them?

A. Why, I gave others on the list, but these are the ones that were selected. Dr. William Pyles is

another party who was invited and on account of previous engagements was unable to go.

Q. Are these the signatures of all that did go?

A. Yes, sir, with the exception of the guide, Mr. Griffin, and what I call the clerk, Mr. Eagen, who had no official connection.

Q. Now, after this report was signed, you filed it with the Board of Works, I see.

Mr. Corbin. Objected to as incompetent, I don't think whether he filed it or did not file it is competent.

A. Yes, sir.

Mr. Vredenburgh: I offer this report in evidence.

Marked Exhibit No. 1 of this date.

Mr. Corbin: Objected to as not lawful evidence, not competent, and also, if it has any evidential value, is not within the purview of the order of the Court opening complainant's case. I would like to ask a question or two on this paper, with your permission.

Mr. Vredenburgh: Certainly.

By Mr. Corbin:

Q. You drew this up, doctor, as I understand it, from the stenographer's notes, and first signed it, and these other doctors signed it, is that it?

A. Why, a committee of three was appointed to draw up the paper.

Q. Who did draw it up?

A. And that was left to me and I drew it up from the notes, our committee met, read it over and discussed it and had agreed to accept it.

Q. Were these who signed it all with you in the party on your investigation?

A. Yes, sir.

Q. And they all made the same journey as you did?

A. Yes, sir.

Q. You went together in an automobile?

A. Yes, sir.

Q. Were all in one automobile?

A. Had two automobiles. If you will notice that when we finished with Dover Dr. Allen was obliged to leave us, and it is so noted in the report.

Mr. Corbin: I object to it for the reasons above stated.

By Mr. Vredenburgh:

Q. Doctor, did you observe anything else of importance with reference to the potability of this water other than what I have asked you, or what appears in this report?

Mr. Corbin: Same objection as before.

A. So far as I was capable to observe I think I have stated everything that is objective, or nearly so.

Q. Did you go to Hibernia?

A. No, sir.

Q. Did you go or stop at any of the places except those that I have mentioned in my examination?

A. Only here.

Q. Did you notice, doctor, whether the sewage on the Incline Plane, to which you have referred, had any odor or not?

Mr. Corbin. Same objection.

A. I didn't notice any.
Q. That is all.

Cross-Examination. By Mr. Corbin.

Q. You stated that you were informed at Wharton, at the house you visited, that there had been a case of typhoid fever there last July; wasn't the information that there had been a case of typhoid fever there last February instead of July?
A. It may have been.
Q. Now you say that a test with urinite was made there, in fact it was made at the house next to the house where the typhoid fever patient had been and not at that house, wasn't it?
A. Why, my recollection is that we were told it was that house.
Q. You think it was the house where the case had been?
A. That is my recollection.
Q. Now the house you mentioned at the beginning of your testimony, Barton's, up on the hill, South Dover, about a thousand feet, you say, from a stream; you went there because it had been reported that Mr. Barton had had typhoid fever in September, did you not?
A. Correct.
Q. Who actually put in the urinite in making the tests on your trip?
A. The son of Mr. Griffin, accompanied by one of our members.
Q. What color was used?
A. It came out—
Q. No, what color, white, black, green, blue or what?
A. Why, it was a reddish color when dry, and it came out a greenish blue in the stream.
Q. You spoke of Mr. Griffin being your guide, you mean Mr. Griffin, Jr.?
A. Mr. Griffin, Sr., was the guide, and Mr. Grif-

fin, Jr., did the throwing of the urinite, or assisted.

Q. They were both with you?

A. Yes, and in some cases the members of our staff would throw the urinite.

Q. Which ones?

A. Why, different ones, Doctor Weigand particularly; he carried it in several instances.

Q. I hav'n't read your report, but I understand there is a statement in it that the current in the reservoir is from the river directly toward the intake of the Jersey City Water Works; have you any personal knowledge on that subject?

A. Simply as I saw it, and when I was there previously with Doctor Leal I think that was under discussion then, and—

Q. This time you did not go to the place where the river empties into the reservoir?

A. No, we didn't at that time when Doctor Leal took us over.

Q. The distance from that point to the point of the intake of the Jersey City pipes is about a mile?

A. Yes, sir.

Q. You didn't go out on the lake on either occasion?

A. No, sir.

Q. You don't pretend to have any personal knowledge on the subject of the currents in the lake?

A. No, but I didn't state myself positively, either.

Re-Direct Examination.

Q. You spoke of Doctor Leal; who do you mean by Doctor Leal?

A. Our good friend over here.

Q. The gentleman present here?

A. The gentleman present.

Q. The Doctor Leal you refer to is the gentleman

present who is connected with the Jersey City Water Supply Company?

A. Yes, sir.

Q. That is all.

Sworn to before me (the signature being waived) this 23rd day of November, A. D. 1906, at Jersey City, N. J.

GEORGE T. BOWDEN recalled.

Direct Examination. By Mr. Vredenburgh.

Q. I show you this report referred to by Doctor Dickinson, in his examination; where does that report come from?

A. From the files of the Board of Street and Water Commissioners.

Q. It has the stamp there, signed by you?

A. Yes, sir.

Q. When was it filed?

Mr. Corbin: Objected to as incompetent.

A. November 12, 1906.

Sworn to before me (the signature being waived) this 23rd day of November, A. D. 1906, at Jersey City, N. J.

DR. CHARLES H. PURDY sworn.

Direct Examination. By Mr. Vredenburgh.

Q. Doctor Purdy, you live where?

A. Three hundred and twelve Montgomery street.

Q. What is your business?

A. Physician.

Q. How long have you been a practicing physician in Jersey City?

A. Eleven years.

Q. Have you any specialty or do you practice—

A. General medicine, with dermatology, diseases of the skin.

Q. Were you one of the gentlemen who went with Doctor Dickinson?

A. I was.

Q. To the watershed, as testified to by him?

A. Yes, sir.

Q. And you signed this report, doctor?

A. Yes, sir.

Q. You heard the testimony of Doctor Dickinson?

A. Part of it.

Q. You accompanied the doctor on this visit which he has testified to, to the watershed, about the third of this month?

A. Yes, sir.

Q. Did you go to the house known as the Barton house, where it was said there was a case of typhoid fever?

A. I did.

Q. Did you see the water closet?

A. I did.

Mr. Corbin: Objected to as not newly discovered evidence, and not evidence within the purview of the Court's order opening complainant's case.

Q. Do you recall what part of the testimony of Doctor Dickinson you heard?

A. I came in as he was testifying at the latter part of this, I should judge of the Barton case, he was speaking then of the condition of the privy and

the distance from the stream; that part of it I heard.

Q. Does his testimony as to that correspond with your recollection?

Mr. Corbin: Same objection.

A. It does.

Mr. Vredenburgh: I ask this witness in this way in order not to repeat the testimony; if counsel objects, I will be forced to ask all the questions over again.

Mr. Corbin: I don't think I will make such objection, but I will decide as I go along; I don't think my objection will be to that form of it.

Q. His testimony with reference to the Eugene Cooper six houses, with one family each, on First street?

A. That was on First street, yes.

Q. That corresponds with your recollection?

Mr. Corbin: Same objection.

A. Yes.

Q. And with reference to the George Park house, on Second street?

Mr. Corbin: Same objection.

Q. Stable and privy in rear of the house?

A. Yes, sir.

Q. Does his testimony in that respect correspond with your recollection?

A. Yes, sir.

Q. And the Lawrence house on Second street, privy in rear, about six feet deep, on the edge of the bank?

A. I don't know as I recall the Doctor's testimony in that particular case, but I particularly remember going to the house.

Mr. Corbin: Same objection with respect to those premises.

Q. Do you remember how near to the edge of the bank the privy was, how near to the brook?

A. Possibly ten or fifteen feet.

Mr. Corbin: Is not that the one the Doctor said was twenty-four feet?

Mr. Vredenburgh: No, this is another one.

Witness: That is the third group of houses that we visited, the Lawrence house; that is the one, about eight feet.

Q. You also went to the Rowe house at Wharton?

A. I did.

Q. And you saw the privy there?

Mr. Corbin: Same objection with respect to that property.

A. I do.

Q. Do you recollect Doctor Dickinson's testimony at to that?

A. That there was said to have been a case of typhoid fever there?

Q. Yes.

A. Yes.

Q. Does his testimony correspond with your recollection?

A. We heard there was a case of typhoid fever in that house.

Q. Well, his recollection as to the solution filter-

ing through the ground in the rear, do you recollect that?

A. Yes.

Q. And running into the canal?

A. That I saw myself.

Q. Did you notice whether the urinite thrown in the sink of that house went into the canal?

Mr. Corbin: I object to that, there is no evidence that any urinite was thrown into the sink.

Q. Wasn't there urinite thrown into the sink?

Mr. Corbin: I object to your showing the witness a paper to testify to something.

A. What I saw was coming apparently from the privy.

Q. Now, do you recollect the Richardson Boynton Company's works at Dover?

A. I did.

Q. Do you recall Doctor Dickinson's testimony as to that?

A. No, I don't.

Q. Don't recollect his testimony?

A. No, sir.

Q. Do you recall how the sewage was disposed of there?

Mr. Corbin: Same objection as before.

A. The sewage from the general buildings seemed to be conveyed through a series of cemented pipes; where that emptied I don't know, but from the closet or privy entered directly into a cart or wagon, in a depression six or seven feet in the ground.

Q. Do you recollect whether the excrement from those closets were taken away in a wagon?

A. That was the statement that we received, that it was removed at irregular intervals.

Q. Did you notice whether there was any of that on the ground from having fallen off the wagon?

A. It was on the ground, there was evidence of it, paper, and possibly four or five inches of foul-looking water, and the wagon stood there.

Q. Now, after you went back to the bridge at Dover, do you recollect Doctor Dickinson's testimony as to the south bank of the river, about a mile down from that point?

Mr. Corbin: I object to the evidence with regard to the south bank of the river at Dover as not being newly discovered evidence and not being otherwise within the purview of the order of the Court opening the complainant's case.

A. My recollection was that Doctor Dickinson said something about a railroad bridge; now the directions there, I don't know which is the south or which is the north bank of the river.

Q. Do you recollect the point where the canal passes into the river from one side and then passes out of the river on the other side?

A. Yes.

Mr. Corbin: Same objection with respect to this point.

Q. And the bridge near there?

A. Yes, sir.

Q. Will you please state what you saw as to the south bank of that river for about a distance of a mile from that bridge down the river on either bank of the river?

A. You say down the river, do you mean from the Cooper-Lord plant to the reservoir?

Q. No, I mean from that bridge in Dover, near

where the Morris canal goes from the right side to the left side, in the town of Dover?

A. Oh, the town of Dover; I got that mixed up with Boonton.

Q. Yes, Dover.

A. Across the bridge at the point where the river and canal come together, we walked down a few feet, possibly a hundred feet, to a second bridge; we then came back to the south side, do you call that—

Q. Yes.

A. And at that point we found a sewer with foul water running into the river, and further down we stopped at the Electric Light plant, at which point we made a test; I made, with Mr. Griffin, a test of the deposit there, with the urinite solution; I saw Mr. Griffin put that solution in the closet and then I went outside, leaving Mr. Griffin and Dr. Weigand in the building, to observe, if possible, if that solution made its appearance in a small brook or runway running parallel with the river. The solution made its appearance in ten or fifteen minutes. I followed this possibly three or four hundred feet and left there.

Q. Followed what?

A. This stream. I was satisfied that it did enter into the river; I saw that at the previous trip; I didn't take the trouble to go down this time, two or three members of the party did so. There was one other house in that vicinity, I don't recollect the name of the street; there was a test solution put in the closet there; I didn't see that put in the sink or privy, but saw the evidence of it coming out.

Q. Can you recollect 270 East Blackwell street a man by the name of Patrick Varley, a privy in the rear of house?

Mr. Corbin: Same objection with reference to these premises.

A. Privy, twenty-four feet from the river?

Q. Yes.

A. Yes, I was at that place.

Q. Do you remember testing that?

A. Yes.

Q. What did you do, what test did you make?

A. Urinite solution was thrown in the privy and within a short time, ten or fifteen minutes, its appearance was noted in the stream or river.

Q. You saw that, did you?

A. I saw that.

Q. Now, do you recollect Doctor Dickinson's testimony as to the houses of Edward Neighbour, agent, on Samus avenue, near the canal, Mrs. Heath is a tenant of one house?

A. Yes, a group of three or four houses.

Q. Did you notice the privies were over-flowing?

A. Yes, over-flowing.

Q. Where did they flow into or over-flow, where did it go into?

A. It was a dry runway at the time we were there, and that was traced out to a stream further down; there was no water in that stream at the time we were there.

Mr. Corbin: I make the same objection as to this evidence.

Q. Are there Italian houses there?

Mr. Corbin: Same objection.

A. I don't know who occupied the houses; I recollect the houses, they were said to be Italian tenants, I believe.

Q. Were the privies over-flowing there?

A. Yes.

Q. Do you remember the doctor's testimony as to the house at 52 Samus avenue, owned by Andrew Baker?

A. Yes.

Q. Is your recollection the same as Doctor Dickinson's as to them?

A. Yes, sir.

Q. Also as to Mr. Peterson, 44 and 46 Samus avenue?

A. Yes.

Mr. Corbin: Same objection with respect to all these properties.

Q. Do you remember the Jenkins house, 373 East Blackwell street, privy on bank of river back of the house?

A. I don't remember the number of it, I recollect the house.

Q. Do you recall seeing the urinite discoloration in the mud?

A. Yes, sir.

Q. Did you visit the Lyondale Bleach & Dye Works?

A. Went through the yard and through the property.

Q. Did you visit the Rag Works at Powerville?

A. Yes, sir.

Q. Were you allowed to inspect them?

A. I wasn't.

Q. Did you try?

A. We did.

Q. At Boonton did you notice the cemented drain, half cemented drain somewhere between the upper and lower level of the canal?

A. I did.

Mr. Corbin: Same objection.

Q. Did you notice whether that was carrying sewage or not?

A. It was carrying sewage, yes.

Q. How did you know it was sewage?

A. By its appearance.

Q. Did you hear Doctor Dickinson's testimony as to that?

A. Yes.

Q. Does your recollection coincide with his testimony as to that?

A. It does.

Q. Now, doctor, from your examination of that watershed, can you say whether there was contamination of the Rockaway river with human excrement when you were there?

Mr. Corbin: Same objection.

A. I believed the water to be contaminated.

Q. Was there anything else, doctor, that you noticed there with reference to the river?

A. Why, at that Rag Works I noticed one thing that does not appear in this report, and that was the method of beating the rags, and the dust flying through the air. On this trip the machines were in operation and there was a great cloud of dust arising, and on the bank of the stream, a very few feet, two or three feet, from the stream was a pile of material, dusty and dirty, which was said to have been taken from this beater.

Mr. Corbin: Objected to as incompetent and for the reasons before given for objecting to the other evidence.

Witness: Another point I don't think that appears in the report is that basin in the sewer at Boonton—

Mr. Corbin: Same objection.

Witness: —About half way up the intake the cemented basin seemed to me to be liable to overflow very readily and flow directly into the river.

Q. Now as to this beating of rags, I don't quite understand that; won't you explain that a little more fully?

Mr. Corbin: Same objection.

Q. You say you saw a machine there that was in operation, that was doing something with rags; now just what was that as you saw it?

A. It was a machine that was evidently beating rags; we were informed—at the previous trip I made over there I was informed by the proprietor, I presume he was, that the rags were beaten in this machine.

Q. What did you see?

A. I merely saw the dust rising and heard the sound as though some machine was in operation.

Q. That is, sound of something being beaten?

A. Yes, sir.

Q. And from that machine the dust was rising?

A. Clouds of dust rising.

Q. Where did the dust go, was it in a building?

A. It seemed to be a small shack outside of the main building of this Rag Works.

Q. Did the dust come out?

A. Yes, great clouds of it.

Q. And went in the air?

A. Through the air.

Q. Thrown by the winds in any direction?

A. Yes, sir.

Q. How near was that shack to the river?

A. Seemed to be directly over it, on a platform, I took it to be an intake directly to the river.

Q. Now you say you saw some of the dust which was beaten out of these rags and had settled in the house or near the machinery placed somewhere—where was that, now?

A. Placed on the right hand side of the stream looking down towards the reservoir.

Q. How near the stream?
A. Possibly two or three feet.
Q. How large a pile was it?
A. A pile possibly five or six feet in diameter and possibly rising two or three feet.
Q. That is all.

Cross-Examination. By Mr. Corbin.

Q. You are a practicing physician in domestic practice in Jersey City?
A. Yes, sir.
Q. Ever had any experience examining watersheds?
A. No, sir.
Q. Ever had any experience as a sanitarian?
A. No, sir.
Q. Or bacteriologist?
A. Never.
Q. Analysist?
A. None.
Q. Chemist?
A. None.
Q. Nor as inspector of water or watersheds?
A. No, sir.
Q. That is all.

Sworn to before me (the signature being waived) this 23rd day of November, A. D. 1906, at Jersey City, N. J.

RECESS.

GEORGE C. WHIPPLE recalled.

Direct examination. By Br. Vredenburgh.

Q. Mr. Whipple, you have heretofore been sworn in this case?

A. Yes, sir.

Q. Were you called upon by the city authorities of Jersey City to make an analysis of the water at Jersey City coming from the reservoir at Boonton, on or about the 23rd day of October of this year?

A. Yes, sir, I was.

Q. By what city authority were you requested to make that examination?

A. By the Mayor.

Q. Did you see the Board of Health or any members of it at that time?

A. I saw Doctor Sauer and the Mayor together, on October 22nd.

Q. Now, in pursuance to their request did you take a sample of the water and analyze it?

A. Yes, sir.

Q. Will you please state what day and what time of day you took the water?

A. It was on Tuesday, October 23rd, in the afternoon, about 3 o'clock. I went to the high service reservoir in Jersey City and took a sample of water at the point where water discharged from the aqueduct from Boonton into the reservoir.

Q. What did you do there?

A. I simply collected the sample of water, making the collection in two portions; one in a small sterilized bottle for bacteriological examination, and the other in a two-quart bottle for chemical and physical analysis.

Q. Please state how you collected it?

A. I collected the bacteria sample by leaning over the edge of the stonework under which the water discharges into the reservoir, holding the bottle in flowing water, meantime holding the glass

stopper in the other hand to protect it from dirt, and replacing the stopper in the bottle after I had collected the sample. After I collected the sample I put a piece of tin-foil around the neck of the bottle to further protect it and put this bottle in a pasteboard case with a screwed cap and put this in my bag for transportation.

Q. Now, how did you collect the other sample?

A. In the same way, excepting that a paper was tied over the top of the bottle, the stopper of the bottle, instead of the tin-foil that I mentioned before.

Q. Just where were both samples taken from?

A. From the point where the water discharged over the edge of the masonry, over the edge of the weir, I may say, into the reservoir.

Q. Was the water you got the water from the pipe before it got into the reservoir, or after it got into the reservoir?

A. As it was going into the reservoir.

Q. Before it got in?

A. Yes, sir.

Q. What did you do with thae sample—with both samples?

A. I took the two samples to my laboratory in Brooklyn and began the analysis of the water, both bacteriological and chemical, as soon as I had reached the laboratory, which was somewhere about in the vicinity of 5 o'clock the same afternoon.

Q. How did you make the analysis of this water for ascertaining bacteria?

A. I made a test of the sample to determine the total number of bacteria present, in the usual way, by means of the Gellatin Plate Culture; this method has already been described in previous testimony.

Q. By you?

A. I think by myself.

Q. Or by your assistant?

A. I think by both myself and my assistant. I further began a test of the sample to determine the

presence of the colon bacilus—presence or absence of the colon bacilus. I did that first according to the method of the presumptive test, which has been testified to in previous hearings. I examined on the following day the gas tube into which this sample was placed to determine whether or not any gas had formed in it, and, having found that gas had formed, I removed a portion of the liquid in the tube to what is known as a tube of lactose litmus agar, and perhaps I ought to say that I tested the sample in three portions; in one case I used ten cubic centimeters of the water, adding this amount to the fermentation tube of the presumptive test; in the second case I used one cubic centimeter of the sample, and in the third case I used one-tenth of a cubic centimeter. The test referred to with the lactose litmus agar was made with that part of the sample in which I used one-tenth of one cubic centimeter. To describe the second portion of the test more minutely I may say that I took a small portion of the liquid from the fermentation tube in which I found the gas and put this into a tube—sterilized tube containing sterile distilled water. I then plated some of this water in the usual way on the lactose litmus agar medium that I mentioned. This plate was then put in the thirty-seven degree incubator and allowed to remain twenty-four hours, at the end of that time I saw on the medium red colonies. I transferred a portion of the matter of these red colonies to a second fermentation tube, and put the tube in the thirty-seven degree incubator and observed the changes that took place, in the same manner as in the case of the presumptive test. By transferring from one particular colony on the lactose litmus agar plate I secured a pure culture of whatever of the organism happened to be that I transferred, therefore the result of the second fermentation was a more reliable one than would have been the case or then was the case in the first fermentation tube. This second test with the

fermentation tube gave positive indications of the presence of the colon bacilus. Furthermore, I continued the presumptive test in the usual way and obtained indications of a positive test in that also. I removed a portion of the colony tested by means of the fermentation tube and examined it under the microscope; it had the appearance of being colon bacilus. I further found by sub-culture that it was an organism which did not liquify gellatin, thereby giving an additional indication that the colony observed was the colon bacilus. I concluded, as a result of my test, that the sample of water examined contained the colon bacilus in one-tenth of a cubic centimeter. Those portions of the sample wherein I used one cubic centimeter and ten cubic centimeters for the test also gave positive indications of the presence of the colon bacilus according to the method of the presumptive test. The test which I made to determine the number of bacteria in the sample by the method of gellatine plate culture showed, after the usual period of incubation, twelve hundred bacteria per cubic centimeter.

Q. You say that when you examined under the microscope the colony, as you have described, derived from this sample, you saw what appeared to be b. coli; won't you please describe just what you did see?

A. I saw what was apparently a pure culture of bacteria under the microscope; they were short rods, were motil, and were something over one micron in length; in appearance they resembled the colon bacilus as it is well known.

Q. I don't understand the word "appearance"?

A. In form and in size but not motility.

Q. What?

A. They resembled the colon bacilus.

Q. Were they not colon bacilus?

A. It is impossible to say from the microscopical examination alone that they were, but so far as ap-

pearance goes I should say that they were, although that test alone is not conclusive.

Q. Were they a bacteria of some kind?

A. Yes.

Q. Did they have motion?

A. Yes, sir.

Q. They were alive, then?

A. Yes, sir.

Q. And could you, by any means known to you, distinguish them from b. coli?

A. No, sir, I considered them to be such.

Q. You believed them to be b. coli, did you?

A. Yes, sir, so far as I could judge from those tests.

Q. What other tests were there to convince you whether they were b. coli?

A. I think you mentioned as to whether I would judge that from the microscopical examination alone. When I consider all the other tests that I made I have no hesitation in saying that they were b. coli.

Q. Now, did the presumptive test show the presence of b. coli?

A. Yes, sir.

Q. And in what amount of water, what kind of sample?

A. The smallest amount in which it showed that was one-tenth of one cubic centimeter.

Q. Well, did you examine any smaller amount of water than the one-tenth of one cubic centimeter?

A. No, sir.

Q. Was the water in which these samples were taken from the result of your analysis contaminated or not?

Mr. Corbin: Objected to as incompetent.

A. In my judgment the analyses was that of a contaminated water.

Q. Did you accompany the Board of Health in its visit to the watershed?

A. I went over a part of the watershed with some of the members of the Board of Health.

Q. When first, after you had taken this sample?

A. On the day following the collection of this sample, which was Wednesday, October 24th.

Q. Had your analyses of that sample been completed at that time?

A. No, sir, they had not.

Q. Where did you meet the members of the Board of Health on the occasion in which you visited with them the watershed, and where did you go and what did you do?

A. We went together on the train from Hoboken to Dover.

Q. On what day?

A. On October 24th, Wednesday.

Q. Yes.

A. We went together in an automobile and drove to Wharton, and then back to Dover, visiting various places.

Q. Did you visit any place before you went to Wharton?

A. Well, we stopped, on our way to Wharton, at the Singleton mills.

Q. What did you see there?

A. We noted the position of the cesspools with reference to the stream.

Mr. Corbin: Objected to as not newly discovered evidence or within the purview of the Court's order opening complainant's case.

Q. What was that position, you say you noticed the position?

A. That was about that cesspool, that was within, I should say, about twenty feet from the stream; I am speaking from memory; we were told that that cesspool had not been used for some little time, that they were at present using a new one which was

further from this stream, perhaps twice as far, and was located nearer the mill.

Q. Did you examine that?

A. We looked at that through an opening and saw that it was quite full and was covered with a scum on top.

Q. Did you notice whether this new cesspool was cemented or not?

A. We couldn't see from—or, I didn't notice whether it was or not; there were no indications that it was.

Q. Did you notice any drain from the cesspool towards the river, either one of the cesspools?

A. Everything was covered with earth, and we could not see any drains from the cesspools; we did notice several pipes and drains of various kinds protruding through the wall into the stream.

Q. Was anything coming from any of those?

A. There were liquids coming from one or two of them; I have forgotten just the details.

Q. Then did you notice any other thing on your way to Wharton that you now remember?

A. I think we observed some of the buildings between Dover and Wharton that were near the canal, but we didn't make any special examination of them.

Q. Then you went to Wharton; where did you go there?

A. We looked at several places, the locations I cannot remember at the present time, but in particular a brook which was on the left of the road as we went out, where we saw some new buildings being put up or which had recently been put up, and some new privies located—

Mr. Corbin: Objected to for the same reasons before stated.

A. —We also observed the brook.

Q. Some new privies—finish that.

A. —Which had been located since my previous inspection of two years ago.

Q. How near the brook?

A. I cannot say exactly, but I should think that some of them, several of them, were less than fifty feet, and probably one or two of them were considerably nearer; I didn't make a memorandum as to those things at that time.

Q. When you got to Wharton what place did you visit?

A. Well, these places I speak of were in Wharton.

Q. Well, what other places in Wharton?

A. We followed along the course of this brook and noting its general filthy character, and noting the fact that it ran into the main stream of the canal.

Q. What do you mean by noting its filthy character?

Mr. Corbin: Objected to for the same reasons before stated.

A. I mean its filthy appearance, stagnant water, general litter and general uncleanliness.

Q. What other place did you visit at Wharton?

A. We stopped and talked with a number of individuals.

Q. Well, pass on to what you saw, unless Mr. Corbin desires what they said to you?

Mr. Corbin: No, I don't.

Q. Pass on to what you saw?

A. After that we merely walked along the canal to see the general location of the canal.

Q. Didn't you go to the house in which it was said there had been a person with typhoid fever?

A. No, sir, I didn't.

Q. Now, after Wharton where did you go?

A. From Wharton we went back to Dover.

Q. Did you go anywhere on your way back?

A. No, sir.

Q. What did you do at Dover?

A. On our way back to Dover or when we arrived in Dover I called, together with Doctor Lambert, on one or two of the physicians in the city, among them Doctor Hahn.

Q. Did you go to the Health Board first?

A. My recollection is that we went to the Health Board after lunch, but before lunch we went and called on Doctor Hahn, from whom we learned that he had had a case which he thought might have been typhoid fever, and he also informed us that his neighbor, Doctor Cook, also had a case which he thought was typhoid fever. Then we went to lunch. After that we saw Doctor Hunter, of the Health Board, and were informed by him that he had no knowledge of typhoid fever in Dover; we then went to one of the cases, or to the case that Doctor Hahn had mentioned as being a possible case of typhoid fever. This man lived near the gas works. We learned from him that there was another case of typhoid fever, or that there was a case of typhoid fever in the city, and he gave the name as Joseph Barton, which was the case that Doctor Cook, we afterwards learned, had in charge. We then drove to Mr. Barton's house and went there and saw the patient and talked with the lady who, I understood, was his wife, in regard to the case.

Q. Did you see the closet there?

A. On my way out I looked into the back yard and saw the location of the privy and its relation to the surrounding country; the privy I found to be over-flowing, and there was excrement liquid matter extending over a square yard or more outside of the vault; this was in such a situation that with a sharp rain it could be washed down hill.

Q. What do you mean by down hill?

A. The privy is in the back yard, about twenty-

three feet from the fence; just outside of the fence there was a sharp bank, and this bank reached down towards the road, entered on the road, which is a continuation of Morris street, and that road runs down hill and crosses a brook, the distance from the garden or from the back yard to the brook being about seven hundred and fifty feet. In elevation the back yard is about eighty-four feet above the water in the brook.

Q. What is the character of the brook?

A. It is a small brook.

Q. Running stream?

A. Running water five to eight inches deep, I should say, and several feet wide, and I see from the map that it runs into the Rockaway river, passing through the car shops on its way.

Q. What car shops? In Dover, you mean?

A. Yes, south of Dover; not south, but down stream.

Q. What as to the current of this brook, was it rapid?

A. Well, there was a good, brisk current in the river; I could not say as to its velocity, but you would call it a well-running brook.

Q. Do you think it possible, Mr. Whipple, that typhoid germs from that patient, if deposited in the privy, could find their way to the main tap in Jersey City?

Mr. Corbin: Objected to as not proper or competent.

A. Yes, sir, I think it is possible.

Q. Now, after leaving that place where did you go, in the way of examining the watershed?

A. By that time—after examining that place we took the train home, but before doing that, perhaps I should say before we went to the Barton place, we stopped to examine one of the privies, I forget the

name of that main street there—South Blackwell street, and I witnessed there one of the tests.

Mr. Corbin: Objected to for the same reasons.

A. (Continuing) I there witnessed one of the tests of a privy which was adjacent to the stream.

Q. Will you please state what that test was, accurately; what did you see done?

A. I saw Mr. Griffin, young Mr. Griffin, go into the privy and deposit some urinite in the vault, through the seat, and then pour in several pails of water; and then, together with others, I stood on the wall near the stream and finally saw the green coloring matter come out and run away into the stream.

Q. Was the blood taken from the patient at the same visit?

A. Yes, sir, I saw Doctor Sauer—I presume you mean Mr. Barton?

Q. Yes.

A. I saw Doctor Sauer take a sample of Mr. Barton's blood.

Q. Mr. Whipple, I didn't ask you about the chemical tests which I understood you made. Have you here a statement of what the results of the test of the sample of water which you took on the twenty-third of October, as you have already told us, both as to the chemical results as well as the bacteriological results?

A. I have a memorandum which I copied from my original notes. Shall I read the results?

Q. Yes.

A. The following were the results of the physical analysis, of the chemical analysis and the bacteriological examination of the sample of water which I collected at the inlet to the high service reservoir in Jersey City on October 23, 1906, at 3 P. M.:

WATER ANALYSIS

Hazen & Whipple,

Consulting Engineers, New York.

Standard Methods of the American Public Health Association	City or Town, Jersey City State, N. J. Date, Nov. 7, 1906. Reported to

DESCRIPTION OF SAMPLE.

Laboratory number
Source of sample No. 2364, Inlet to High Service Reservoir in Jersey City.
Date of collection, 1906, Oct. 23 (Tuesday).
Hour of collection, 3 P. M.
Date of analysis, Oct. 23.

PHYSICAL ANALYSIS.

Temperature
Turbidity, 8.
Color, 35.
Odor (see abbreviations below) 1 2.

CHEMICAL ANALYSIS.

(Parts per Million)

Nitrogen as Albuminoid Ammonia	in solution in suspension total	.162
Nitrogen as Free Ammonia		.020
Nitrogen as Nitrites		.001
Nitrogen as Nitrates		.000
Total Organic Nitrogen		
Oxygen consumed		
Total residne		120.0
Loss on ignition		18.0
Fixed residue		102.0
Suspended solids		

Iron	0.4
Total hardness	47.0
Albalinity	47.0
Incrustants	0.0
Chlorine	4.8
Free carbonic acid	
Dissolved oxygen	

BACTERIOLOGICAL ANALYSIS.

Number of bacteria per c. c. 10

Test for B. coli in 0.1 C. C. 1200

0 = Negative test 1.0 "

+ = Positive test 10.0 "
(presumptive)

= Positive test
(complete)

1.0 C.C.	#
	+
	+

20

MICROSCOPICAL ANALYSIS.

Microscopic organisms per c.c.

Amorphous matter.

Abbreviations used to describe odors of water:

0 None
1 Very faint
2 Faint
3 Distinct
4 Decided
5 Strong 30
v Vegetable
m Moldy
a Aromatic
f Fishy
g Grassy
e Earthy
d Disagreeable
Etc.

For other references see

(Signature) G. C. WHIPPLE. 40

Q. You have read the analysis from a paper, I notice?

A. Yes, sir.

Mr. Vredenburgh: I offer that paper in evidence.

Marked Exhibit 2 of this date.

Cross-Examination. By Mr. Corbin.

Q. What house was that in East Blackwell street where you saw tests made?

A. That was No. 296.

Q. South Blackwell street it was, wasn't it?

A. Well, I have it in my notes East Blackwell street.

Q. Is it the main street?

A. Yes, sir, it was down near the gas works.

Q. East Blackwell street that would be, yes.

A. East Blackwell is what I have.

Q. In speaking of Barton's house in South Dover, you found this outdoor privy in the garden to be twenty-three feet from the rear fence, did you not?

A. From the fence near the street, there was perhaps what you would call a rear fence I think a little nearer than that to the building.

Q. Then from the fence down to the street, you say, there was a very steep decline?

A. I should call it a pretty steep hill, climbing with a horse, yes, sir.

Q. But between the fence and the privy, that is, for the twenty-three feet, it is not very steep there, is it?

A. In the back yard it is not very steep.

Q. Which way is the grade from the privy, which way does it decline to the fence, is it up or down towards the fence?

A. I should say, from my original inspection, that the material would flow towards the fence.

Q. As a matter of fact, is not the decline of the property from the fence towards the privy?

A. No, sir, I should say not.

Q. Well, it is pretty flat, is it not?

A. It is rather flat, but the liquids, when they left the vault, started in the direction of the fence.

Q. Did you take any levels or are you telling us this from your observation, by looking at it?

A. I am telling you from some levels and the measurements which I took.

Q. What levels did you take which induces you to say the fence is on the ground lower than the privy?

A. I didn't take levels in the yard.

Q. You took levels beyond the fence?

A. From the fence to the brook.

Q. From the fence to the brook you found a decline of eighty-four feet in the whole distance?

A. Yes, sir.

Q. But on those twenty-three feet from the privy to the fence you took no levels?

A. Took no levels there, no, sir.

Q. With what did you take your levels?

A. With a lock nut level.

Q. Now this privy vault you found full, and you saw evidence of liquid overflowing to an extent of a square yard near the privy?

A. That is a very rough estimate, I should say at least that, probably more.

Q. And from seeing that, and under the conditions in that garden you think it possible that typhoid germs could go from that privy to the taps in Jersey City?

A. Under certain conditions, yes, sir.

Q. You would consider it highly improbable?

A. Depended on the condition.

Q. The condition would have to be what—flood, to immediately carry germs into the stream?

A. What I say is that a hard rain would wash them down into the brook.

Q. Do you know how many miles that is, that privy, as the water flows to the taps in Jersey City?

A. Well, I should say that the privy might be perhaps fifteen miles, to the reservoir, and I have forgotten just the length of the conduit line, but that would be added to that.

Q. Suppose the conduit line was twenty-two miles it would be about thirty-seven miles, would it?

A. It would be something like that.

Q. The reservoir intercepting the flow, on the way?

A. Well, the water would necessarily flow through the reservoir.

Q. Did you talk with Mr. Barton?

A. Personally I didn't, no, sir, I listened to some of the conversation.

Q. You said that some one told you there had been a case of typhoid fever; Doctor Hahn mentioned that there had been a case of typhoid fever near the Gas Works, did you trace that up at all to see whether that was so?

A. Yes, sir.

Q. Did you find any such case?

A. We saw a man sick, and—

Q. Who was he and where was he?

A. The patient's name was Oscar Ford.

Q. Where was he?

A. He lived in a house near the Gas Works, and I understood, or we were told, worked in the Gas Works.

Q. Do you know the street and number?

A. I should say he was on East Blackwell street, on the left hand side going from Dover. I cannot tell you the number.

Q. That proved to be not a case of typhoid fever?

A. That proved to be not a case of typhoid fever, as nearly as I have been informed.

Q. The only cases of typhoid that you found

really to have existed were the cases of the young man at Wharton who was sick last February, and of Joseph Barton on South Dover Hill, whom you visited?

A. I have heard of other cases.

Q. You have heard of other cases, you didn't know of any others or trace up any others, did you?

A. I learned from the New Jersey State Board of Health that there had been a case of typhoid fever on the Rockaway valley in July, that a sample of blood was seen.

Q. What Town was that?

A. I suppose Boonton, but I am not sure about the Town line.

Q. Do you know who it was?

A. I have the name as given to me by the State Board of Health, but I don't think I have a memorandum of that with me.

Q. Did you follow it up at all?

A. Not personally, but I understand that others have.

Q. You learned, didn't you, then, that he lived a long way from the stream?

A. I haven't positive information of that.

Q. Did you sterilize that bottle yourself in which you took the sample?

A. No, sir, I took that from our stock of sterilized bottles which are in our Laboratory and which are in constant use.

Q. Now at the place where you took this sample, are you not aware that there is a growth on that stone work over which the water flows which might affect the quality of the water that you took the sample from?

A. There was no growth there at the time I was there that would affect the analysis as I have given it to you,—the bacteriological examination as I have given it to you.

Q. Don't you know that that growth is scraped from this stone every few days?

A. I don't know that.

Q. Don't you think that that place where you took it, going over that growth on that stone work is a very nnfair place to take a sample of water?

A. I think it is a very fair place to take it.

Q. Did you do all the laboratory work yourself on this sample in the sterilized bottle?

A. All of it, yes, sir.

Q. What was the temperature of the water October 23, when you took the sample?

A. I didn't taste it, but it was cold to the touch.

Q. What was the temperature of the air?

A. I could not say, but it was cold, so cold that I had my overcoat on and my collar turned up.

Q. Which was cooler, the air or the water?

A. I cannot say.

Q. Who made the physical analysis of the large sample?

A. I made all the analyses.

Q. On both of them?

A. Everything in connection with it.

Q. Did you use the Indo test?

A. No, sir.

Q. Why not?

A. I didn't happen to have any of the Indo solution made up in the Laboratory, and I didn't consider it necessary to use it; if I had I should have made up a solution and used it.

Q. Did you use the coagulation of milk test?

A. No, sir.

Q. Why not?

A. Same reason.

Q. You didn't have the solution ready in your Laboratory to use?

A. Didn't happen to be ready, no, sir.

Q. Did you grow any of the organism on a boat?

A. No, sir.

Q. Why didn't you use that test?

A. Because it is not reliable and should not have used it in any test.

Q. Did you not use it at times?
A. Very, very seldom; once in a year.
Q. Did you use the nitrate test?
A. No, sir.
Q. Why not?
A. Didn't consider that was necessary; recent investigations of these various tests have shown that the tests that I speak of are practically sufficient to determine the presence of the colon bacilus.
Q. Who has determined that, that they are not necessary?
A. I should say perhaps scientific men generally.
Q. Scientific men generally have been using these tests for years?
A. Have been, but are dropping them off one by one.
Q. They use several tests so as to get side lights on the subject?
A. Yes, sir, I have often done the same.
Q. But you didn't use any others than what you have told us about?
A. None other than I mentioned, no, sir.
Q. Are they not generally considered necessary, these tests I have mentioned, or the most of them, to detect the presence of B. coli in water?
A. Often considered necessary; I don't think people rely upon them so much now as they did formerly.
Q. And yet these methods are recommended, are they not, by the Committee on Laboratories, section of the American Public Health Association as standard methods of water analysis?
A. They are there, yes.
Q. You are a member of that Committee which recommend them?
A. Yes, sir.
Q. Did you approve their report in that respect?
A. Yes, sir.
Q. When was that?

A. That was a year and a half or two years ago, I have forgotten just when.

Redirect Examination.

Q. You said, Mr. Whipple, in your cross examination that some of these tests which were referred to by Mr. Corbin have been dropped, what do you mean by that?

A. I mean to say that it has been found, as a result of some elaborate experiments in Washington, that whenever we got the tests which I speak of the others followed in almost every case, as a matter of necessity.

Q. What do you mean, got the results that I speak of, what do you mean by that?

A. Whenever we got a positive test in a fermentation tube, after working with a pure culture obtained from a presumptive test, in almost every case the test for the coagulation of milk and the test for indo and nitrate followed as a matter of course, therefore it is not considered necessary to go through all this extra work.

Q. You said that by reason of some experiments at Washington—when were those experiments?

A. They have been made during the past year.

Q. By whom?

A. By the chemists in charge of the filter plant there.

Re-Cross Examination.

Q. Of the water works?

A. Yes, sir.

Q. Yet the last authorized statement put out on this subject is the report of the committee to which I have referred, signed by you and others, two and a half years ago?

A. Well, I cannot say that that was the last authorized statement.

Q. What later one is there which has any general acceptation?

A. That certainly has quite a general acceptation; the results I speak of have not been published, but I have looked them over and I believe them to be correct.

Q. Who is the man in Washington that has been examining the Washington water, that you have mentioned?

A. Francis F. Longley.

Q. On the strength of what he has been doing for the last year you have presumed to omit the tests which were prescribed by the Committee two and a half years ago?

A. That in part, but also on the strength of the work which I have done myself in past years.

Q. You made your report of this analysis to the City authorities?

A. I made it verbally to the Health Department, to the president of the Health Department; but I furnished them no official report, no written report.

Q. What does this mean, Mr. Whipple, in this report that you have produced here; you say report to November 7th, 1906, what is the meaning of that?

A. Well, that was the date when I made this copy of the memoranda. You see the "Reported to" is left blank, I simply put it down "Jersey City" and then date. That was the date when I copied it.

Q. Date when you copied it from your record?

A. Yes, sir.

Q. This particular water?

A. It was the date when this particular memorandum was copied from my original record.

Q. That is marked Exhibit No. 2 of this date?

A. Yes, sir.

Q. And it is the analysis of the report of October 24th?

A. Yes, sir.

Q. That is all.

Sworn to before me (the signature being waived) this 23rd day of November, A. D., 1906, at Jersey City, N. J.

WILLIAM F. FAISON sworn.

Direct Examination. My Mr. Vredenburgh.

Q. Doctor, you reside where?
A. One hundred and forty Mercer street.
Q. Your business is what?
A. Physician and surgeon.
Q. What part of the practice of medicine do you practice?
A. Well, surgery now; I do some general practice too.
Q. And you have practiced surgery in Jersey City how long, sir?
A. I came in 1889, I think it was.
Q. And are you connected with any hospitals?
A. St. Francis Hospital.
Q. What position do you occupy there?
A. I am what is called the Gyneaological abdominal surgeon.
Q. Did you sign this report produced here from the City files and referred to by Doctor Dickinson in his testimony?
A. Yes, that is my signature.
Q. You were not present when Doctor Dickinson was testifying here this morning?
A. Yes, sir.

Mr. Corbin. Objected to for the reasons before stated, not newly discovered evidence and not within the purview of the order of the Court opening complainant's case.

Q. Do you recollect when you visited the Rockaway watershed with Doctor Dickinson and the

other physicians for the purpose of examining the watershed?

A. Do I remember when?

Q. Yes.

A. It was Monday week, I think it was last Monday a week ago I think.

Q. Do you remember who went with you?

A. Yes, sir.

Q. Who?

A. Doctor Dickinson and Doctor Spence and Doctor Purdy and Doctor West. Do you want them all?

Q. These gentlemen who signed this report were all along with you that date?

A. Yes, sir.

Q. Did you visit in Dover the property of Mr. J. H. Barton on Morris street where there was said to be a case of typhoid fever?

A. I don't remember the name; we went there and got the names of those places; we visited a place where there was said to be typhoid fever, I don't remember the name.

Q. Did you visit personally the Eugene Cooper house—I will show you the report, you may look at it?

A. I don't know whether I would remember those names, I know we were together all the time, but the names I don't know as I would remember them, we saw so many places; that was given to the stenographer and he took them down, the name was given to him, such and such a place.

Q. And those names were incorporated in your report?

A. Yes, sir.

Q. You have heard the report read?

A. Yes, I read the report over and I got a copy of it.

Q. Was that report accurate?

A. Yes, sir.

Mr. Corbin. I object.

Q. And what you state in that report as having been seen, was seen by you?

Mr. Corbin. Objected to for the reasons before stated and as not proper evidence.

A. Yes.

Q. I notice in this report that at that time this Committee visited places in the Town of Dover, can you say from your recollection that the report in those respects is accurate, that you did visit them?

A. We did visit them.

Mr. Corbin. Same objection.

Q. Now I notice in the report, doctor, that you say that you made certain tests of urinite in certain places, for instance one at Patrick Varley's 270 East Blackwell street, placed in the privy, the privy being about twenty-four feet from the river bank and full of manure, do you recollect that case?

A. We made quite a few, at least a dozen or more, I think, but the name I don't remember, there are so many names.

Q. How did you make the tests that you made?

A. Mr. Griffin made the test. They put that urinite as it is called, in the closets, and we went down below in the stream and watched to see if it turned out green.

Q. What was the result?

A. Yes, it came out.

Q. I notice that you state in your report, doctor, this sentence: "In a few instances we proved the contamination of the Rockaway river with human excrement." What do you mean by that?

A. I don't know, unless it was this solution we put in there going through the water closet and came down into the stream; that was my idea.

Q. Now you also say that the river, meaning the Rockaway river, as it enters the reservoir, is contaminated; what do you mean by that?

A. That meant that the closets or drain would go into the river.

Q. What do you mean by contaminated?

A. Well, we consider that the matter contaminates it,—I do.

Q. That is all.

Cross Examination. By Mr. Corbin.

Q. At Dover you say Mr. Griffin put urinite in certain privies and then poured a number of pails of water in after it, didn't you?

A. Yes, sir, I saw him, in one case, do that.

Q. Well, he poured water in every case?

A. I never went with him.

Q. Then you, after that, saw green color coming out into the river near by?

A. Yes.

Q. And on that fact you base your statement in the report that you proved that the Rockaway river was contaminated with human excrement, that is the basis of it?

A. Yes.

Q. And on that same fact you base your statement in that report that the waters of the Boonton reservoir, fifteen miles below, were contaminated?

A. I don't think we said that the water down below was contaminated,—contaminated the place where we were.

Mr. Vredenburgh. What I read from the report was that "we are of the opinion fully held out by conditions seen by us that the river as it enters the reservoir is contaminated."

Q. It was on that circumstance that you base that?

A. Yes, I don't know how far it was from there down to the river.

Q. Assuming it is fifteen miles as the river flowed?

A. Yes, sir.

Q. Have you ever taken part in the examination of a watershed before?

A. No, sir, I know absolutely nothing about it.

Q. You are not a bacteriologist?

A. No, sir.

Q. Or sanitarian?

A. No, sir.

Q. Your business is Abdominal Surgery?

A. I have to do something else, but that is what I try to do.

Q. And this is your first experience as a Sanitarian or Inspector of watersheds?

A. Yes, sir.

Re-Direct Examination.

Q. Are you connected in any way with the City Government here?

A. No, sir, not at all.

Q. Have you ever been?

A. Never have been; in the City Hospital years ago, that is all.

Q. I think you said you were connected with St. Francis Hospital?

A. Yes.

Q. What have you to say as to the number of typhoid fever patients in St. Francis Hospital during the month of October?

A. I don't treat medical cases at all; I go through the wards occasionally and saw one ward full, that is all.

Q. That is all.

Sworn to before me (the signature being waived), this 23rd day of November, A. D., 1906, at Jersey City, N. J.

OTTO A. WEIGAND sworn.

Direct Examination. By Mr. Vredenburgh.

Q. You reside in Jersey City?
A. Yes, sir.
Q. Where is your office?
A. 1151 Summit avenue.
Q. How long have you been a practicing physician?
A. A little over sixteen years.
Q. What branch of medicine do you practice?
A. General practitioner.
Q. Were you one of the Committee of physicians who went with Doctor Dickinson to visit this watershed at the request of the Board of Public Works?
A. Yes, sir.
Q. I show you the report and ask you whether that is your signature?
A. Yes, sir.
Q. Do you recollect visiting the house known as the Barton house, where the man had been sick with typhoid fever?
A. I don't know the names exactly; we saw some house and I believe that was the name, it was up on top of the hill in Dover where we were told there was a case of typhoid fever; of course we didn't know.
Q. Who visited that house?
A. We were in the yard.
Q. Did you look at the closet?
A. Yes, sir.
Q. Did you go to the six houses of Eugene Cooper's?
A. Yes, sir.
Q. On First street?
A. Yes, sir.
Q. Did you read the report you made with reference to that?
A. Yes, sir.

Q. Is that accurate?
A. Yes, sir.

Mr. Corbin. The same objection to this evidence as in the other case of the previous witnesses.

Q. And the same with reference to the George Park's case?
A. Yes, sir; that is the house and stable, I believe.
Q. And the report is accurate as to what you saw there, is it?
A. Yes, sir.
Q. And the same as to the Lawrence house on Second street, privy in the rear about six feet deep?
A. Yes, sir.
Q. And also as to Mr. Rowe's house on Canal street, in Wharton—do you remember going up to Wharton?
A. Yes, sir, I remember that case particularly, because I made a urinite test there.
Q. And the Richardson & Boynton Stove Works at Dover?
A. Yes, sir.
Q. And the statement in the report of what you saw there is accurate?
A. Yes, sir.
Q. And did you notice the river, the Rockaway river below where the canal, known as the Morris canal, passes from the one side of the river to the other?
A. You mean at Dover?
Q. At Dover?
A. Yes, sir, they commingle.
Q. Is the statement of the north and south bank of that river, as mentioned in the report here, in accordance with what you saw?
A. Yes, sir, exactly.
Q. And the drains, etc.?
A. Yes, sir.

Q. Now I notice here a statement as to the jail and the electric power house, do you remember, with respect to that, making any tests in the water of the electric power house?

A. Yes, sir, we made tests of the water of the power house and also some other houses right in that neighborhood.

Q. Do you remember about the Seven Sisters?

A. I believe that is what I was told the name of the place was.

Q. Now the statement in the report as to what you saw there, and what you did there is according to the truth?

A. Is accurate, yes, sir.

Q. I notice, too, by the report, that you visited the homes of people that are called the poorer class, for instance Patrick Varley, 207 East Blackwell street, where there was a privy in the rear of the house, twenty-four feet from the river bank, do you recall that?

A. I recollect that very well, yes, sir.

Q. Also the house of Edward Neighbour, agent —two houses on Samus avenue, Mrs. Heath occupies one of them on Samus avenue and Mrs. Atkins the other, on the north side of Lee avenue, do you remember that place?

A. I remember a whole lot of houses that were there, I don't remember the names; of course they were given to the stenographer we had with us; I know we saw a whole lot of places there in that region; I remember the region in general.

Q. And what is stated in the report as to that is accurate?

A. Yes, sir, it is accurate.

Q. And also Tony Rose, an Italian, Andrew Baker, owner, 52 Samus avenue?

A. I think I remember what the guide called Samus avenue.

Q. Mr. Peterson, owner, 44 and 46 Samus ave-

nue, sinks run into the brook, privies over-flowed, double houses, two families?

A. Yes, sir.

Q. This brook runs through the gas house property, do you recollect that?

A. I remember the whole neighborhood, yes, sir.

Q. And the Jenkins house, 373 East Blackwell street, privy on bank of river, back of house?

A. Yes, sir; we made no test there, but I think that is the place where Mr. Griffin claimed he put some urinite in the privy some time before that, and we stood up on the mud and ashes there in the bottom of the river and we could see it.

Q. Did you also visit the Lyondale Bleach & Dye Print Works?

A. Yes, sir.

Q. And the Rag Works at Powerville?

A. Yes, sir.

Q. At Boonton what is said about those two works in the report is accurate, is it?

A. Of course at Boonton we didn't see very much there, just a part of it, it was going very little.

Q. Do you recollect at the Rag Works at Powerville?

A. Yes, sir.

Q. Did you go into that?

A. No, sir, we were not allowed.

Q. Did you see the rags?

A. Yes, sir, any number of them, large quantities.

Q. Did you notice the cleaning?

A. No, sir; in fact we were told by the proprietor that they don't clean or disinfect the rags at all, just seemed to be dumped in a sort of an out building.

Q. When it rains on those rags that you saw, where will the water necessarily go?

A. The natural supposition is that water will find its own level, and the river probably would be

the lowest point there, that is only an inference, but is a perfectly natural one.

Q. Now did you notice the open cemented drain on the Incline?

A. Yes, sir, at Boonton.

Q. At Boonton, between the upper and lower level of the canal?

A. Yes, sir.

Q. What was in that at the time you were there?

A. Just sewage was running down.

Q. How could you tell that?

A. Tell by the color and looks of it, general sliminess.

Q. Did you notice any odor?

A. Well, I didn't have very much of a chance, I had a kind of a cold in by head.

Q. In this report I see you use this language: "In a few instances we proved the contamination of the Rockaway river with human excrement?"

A. Yes, sir.

Q. What do you mean by that?

A. We got the direct evidence that these privies we tested drained directly into the river, that is, Mr. Varley's privy at Dover, right on the banks of the river, the Electric Light Company's privies on, I forget the name of the street, in Dover, draining into this open brook that we proved conclusively runs into the river, and then we tester—Mr. Griffin put some solution, I believe, in the sink of a house—of the Seven Sisters houses and we got the test there, and then we got it at Wharton in the house of,—I forget the man's name, Ross, I think that was the name, where the privy was directly on the banks of the canal and drained directly into the canal, and the canal, below that, empties into the river. We only got the positive test in a few cases, but there is no doubt at all in my mind that the general condition is such that more or less, you might say, of the sewage ultimately finds its way into the river from all these towns; we haven't proven that, but

the natural inference is very strong that way, from what we have seen.

Q. Now you say tests were made; did you make any tests personally?

A. No, I just put some urinite in the privy of the toilet of some silk mill I believe in Wharton, but it didn't come out there.

Q. You didn't put it in the Electric Power house?

A. No, sir, I didn't.

Q. You don't now remember putting it in any other place except up at Wharton?

A. I am sure I didn't.

Cross Examination. By Mr. Corbin.

Q. The urinite was put in by your party in twenty or more houses, wasn't it, in the course of the day?

A. No, sir, I don't believe it was quite as many as that.

Q. Well, a dozen or fifteen?

A. The urinite was put in probably about five, I guess, was all.

Q. Only five in all? I understood you to say there were quite a number of tests made, but there were only a few in which you got positive results?

A. No, we just saw the places and saw the conditions, we didn't make tests in every place.

Q. And didn't get positive results in every place you tried, either, did you?

A. I believe the only place we tried that we did not get a positive test, to the best of my recollection, was the silk mill in Wharton.

Q. You spoke of a place where you put color in yourself and did not get any positive result?

A. That is the silk mill I am speaking of.

Q. You think there were only five places tried in all?

A. Can I look over that report?

Q. I wanted your recollection—it is not very important, but I thought you said you tried quite a lot of places?

A. I can remember, according to this, six places where we used the urinite, and got the test in every one but one.

Q. Is this the first experience you have had in inspecting a watershed?

A. Yes, sir.

Q. You are not a sanitarian or anything in that line?

A. No, sir.

Q. Or analysist or bacteriologist?

A. No, sir.

Q. That is all.

Sworn to before me (the signature being waived), this 23rd day of November A. D. 1906 at Jersey City N. J.

(Following testimony taken November 8, 1906, was omitted by mistake from proper place in book.)

BEFORE His Honor Vice Chancellor Stevens.

Mr. Vredenburgh and Mr. Record appearing for the complainant.

Mr. Corbin and Mr. Edwards appearing for the defendants.

Transcript of shorthand report of the evidence given upon the trial of the above stated cause, on Thursday, November 8, 1906, at the Chancery Chambers, Newark, N. J.

WELDON D. GRIFFIN recalled.

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Mr. Griffin, you have already been sworn in this case?

A. Yes, sir.

Q. Will you tell us what examinations you have made of the Mansion House closets since the last hearing?

A. Well I made tests at the Mansion House, I should judge, a half a dozen times since the last hearing.

Q. Now, What Mansion House are you referring to?

A. The Dover Mansion House.

Q. The house—

A. On the corner of Blackwell and Sussex street.

Q. In the city of Dover?

A. In the city of Dover.

Q. What is it—

The Court: Well, we have had all that.

Mr. VREDENBURGH: Yes; it is the hotel there.

Q. Did you make any test of it on the 29th of last month, of October?

A. Yes sir; I did.

Q. Please tell what you did?

A. At five minutes after seven I placed—

Q. Five minutes after seven what—day or night?

A. Night.

Q. Five minutes after seven. Go on.

A. I placed a small quantity of urinite in the closet in the first floor of the Mansion House; I went to the outlet of the Morris street sewers and stayed there until a quarter past eleven; a quarter past eleven the

outlet or the pipes was filled up and my green came gushing out.

Q. What do you mean by your green?

A. The powder which I put in the Mansion House when dissolved in water becomes green.

By the COURT:—

Q. You mean the pipe was filled up?

A. Well, when I first went there there was a very small amount of water coming out of the pipe, or small amount of discharge, but at this time, a quarter past ten—

By Mr. VREDENBURGH:—

Q. Quarter past what?

A. Quarter past eleven, the pipe filled half way up, I should think, and came gushing out in large amounts, and it flowed that way possibly for—well, I stayed for two hours and it was still flowing that way and then I left.

Q. This gushing out that you speak of, do I understand you to say it continued for two hours?

A. Yes, sir, it did; I don't know how much longer.

CROSS EXAMINATION by Mr. Corbin:—

Q. What is this urinite?

Q. Why it is one of the coal tar dye, so I understand, and when placed in water it is very easily seen, it becomes green.

Q. If you picked up with the point of a needle what will adhere to the needle, that would color a gallon?

A. I understand it covers one part in a million.

Q. In other words, one gallon would color a million gallons of water?

A. Yes, sir, and I made tests in places with a very small amount of it, and found it wasn't satisfactory.

Q. What you could put on the point of a pocket knife blade would color a stream instantly?

A. No, sir.

Q. In a very few seconds?

A. No, sir.

Q. How much did you put in at the Mansion House this time?

A. I should think about three tablespoonfuls.

Q. That would be enough to color three million tablespoonfuls of water?

A. I am not sure about that; I am only speaking from hearsay.

Q. This was at the water closet on the first floor?

A. Yes, sir.

Q. And you waited four hours and ten minutes before you saw any green come in the river?

A. Waited until a quarter past eleven.

Q. And you put it in at five minutes past seven?

A. Yes, sir.

Q. You stayed there two hours, that would be until after one o'clock?

A. Yes, sir.

Q. And it was still running a large stream of water?

A. Yes, sir.

Q. Was it running green all that time?

A. Yes, sir.

Q. For two hours?

A. A very strong green.

Q. Well, the amount of green you put in that water closet at five minutes past seven would not account for a two hours flow, would it?

A. Yes, sir; I think it would.

Q. How much did you put in?

A. Why I don't just exactly recall; I never measured it; I have it in a tin can and spill out of the tin can as much as I think is necessary.

Q. A tablespoonful?

A. No, sir; in all my tests I use a good more than a tablespoonful.

Q. You say in this case about three?

A. Three or more; I am not certain about the amount.

Q. Did the pipe continue to run half full for those two hours?

A. I don't know as it was exactly half full the whole time, but it ran more than usual for the two hours.

Q. It first gushed out half full?

A. Yes, sir.

Q. How big a pipe is it?

A. Twelve inch.

Q. Then some hundreds of gallons of water came out during those hours?

A. I never measured it.

Q. But it must be so?

A. I don't know as it would be no, it usually runs from over quarter full.

Q. That quantity of water couldn't come from any water closet, could it?

A. Not from one water closet, no, sir, couldn't.

Q. Did you make any effort to see where it came from?

A. It would be impossible to trace where it came from.

Q. You don't mean to tell us that the spoonful of color that you put in this one water closet would account for a flow of two hours of that water coming out there—account for the greenness of it?

A. Yes, sir, it would.

Q. Did you go back to see whether the water closet was running or not?

A. No, the water closet wasn't running.

Q. And you dumped it into the bowl of the water closet?

A. Yes, sir, I did.

Q. At the time you made that test the laundry tubs in the laundry of the Mansion House were connected with this pipe emptying into the Rockaway river, weren't they?

A. I don't know anything about that; I never tested that.

Q. Did you never test them?

A. Never tested the tubs.

Q. You made a number of tests in this Mansion House?

A. Yes, sir, always in the same closet.

Q. Didn't you know that the laundry tubs emptied into this twelve inch pipe?

A. No, sir.

Q. Didn't you know they have been recently cut off?

A. No, sir.

Q. You weren't aware of that?

A. No, sir, I am not aware of that.

Q. Did you test anything else but this one water closet?

A. That night?

Q. Yes.

A. No, sir.

Q. Did you at any other time?

A. I have.

Q. What did you test?

A. Made lots of tests.

Q. What did you test?

A. At different times throughout the town.

Q. No, in the Mansion House?

A. That is the only closet I ever tested, the only place in the Mansion House. I tested that because it is close to the entrance.

Q. Who was with you?

A. I was alone.

Q. You were alone when you put it in?

A. Yes, sir.

Q. And you were alone when you watched the water coming out into the river.

A. No, I wasn't alone when I watched it come out, I was in an automobile and I had my chauffauer with me at the time I made the test.

Q. What is your age?

A. 23—24.

Q. What is your occupation?

A. Now inspecting the water shed for Jersey City.

Q. Who employs you?

A. I don't know; I know I get my cash.

Q. The city pays you?

A. Yes, sir; the city pays me.

Q. How long have you been in that employ?

A. Why I have been there possibly five or six months; I am not sure; haven't worked steadily.

Q. What education did you have?

A. I went two years to the High School, and a year and a half to Pratts Institute in Brooklyn.

Q. High School where?

A. Kearny.

Q. You lived in Kearney?

A. Yes, sir.

Q. Did you ever make any study of sanitary matters at all?

A. Never at all.

Q. No technical education at all?

Q. Yes, I have had a technical education.

Q. What education in Pratts Institute did you have?

A. Education in—

Q. In what line?

A. In the engineering branches, all of them.

Q. Engineering branches?

A. Yes, sir.

Q. But the matter of sanitary inspection or regulation you haven't studied?

A. No, sir.

Q. Did you ever have anything to do with it before you began to make these tests for Jersey City?

A. Not in sanitary matters, no, sir.

Q. Who told you to use urinite in finding out this —to find out things?

A. Why, I think Mr. Whipple suggested urinite; I used to use blue dyes and different kind of dyes and found they were not very satisfactory.

Q. How, at eleven o'clock at night could you detect that there was green in this water?

A. I had a little electric lamp with me.

Q. And you held that down to the pipe?

A. You could see it in the dark with the ordinary moonlight.

Q. You could see it without any light at all, in the dark?

A. Yes, sir; very easily see it.

By the COURT:—

Q. Did you see any solid matter coming out of that pipe?

A. No, sir; couldn't distinguish any solid matter.

Q. Well, if you turned on the electric light could you see right through the flow?

A. No, sir; I couldn't.

Q. Why?

A. Why, the green, you couldn't see through the green, it is a very heavy green, and I couldn't see through the water at all; if it had been clear water possibly I could have seen through it.

Q. Do you mean to say you could not have seen any solids floating on the top of that current?

A. You could have seen it if it had been floating on the top.

Q. You didn't see any solids whatever?

A. Nothing that I noticed, no, sir; I noticed paper, considerable paper, mostly tissue paper.

FURTHER CROSS:—

Q. You saw what?

A. Tissue paper, no solid matter.

Q. When did you see that, the whole two hours?

A. No, sir; I saw it at intervals.

Q. You say there was a green stream gushing out of there for two hours?

A. Yes, sir, there was.

Q. And for a time this twelve inch pipe was running half full?

A. Practically half full, I don't know exactly.

Q. In your inspection did you do anything else?

A. Nothing else at all,—well, I looked over the shed and found closets that were over-flowing, etc.

Q. You didn't trace up and find where water closets lead to, whether they are cesspools or anything of that kind?

A. Well, I know there is a cesspool in the rear of this Mansion House, and that I have went back there after having made a test, while they were making some changes here a short while ago, and I saw my green in the cesspool.

Q. In the same water closet?

A. Exactly.

Q. You put green in the water closet and found it in the cesspool?

A. Yes, sir.

Q. You never before found it in the river?

A. No, sir.

Q. Where was your father this night?

A. I don't know.

Q. Was he in Dover?

A. No, sir; he isn't there very often.

Q. Were there any other inspectors there that night for Jersey City, except you?

A. I was the only inspector there.

By the COURT:—

Q. Did you notice the construction of this cesspool?

A. No, sir, I just saw the center of it; it is quite a large cesspool.

Q. You don't know whether it has any outlet?

A. No, sir; I don't.

Q. How far is it from the river, from the edge of the water?

A. Why, it is only a block and where I saw the green come out it is two blocks.

FURTHER CROSS EXAMINATION:—

Q. Were any gentlemen there from Jersey City that night with you?

A. No, sir; none at all.

Q. The leaders from the roofs of the Mansion House empty in to that same pipe, do they not?

A. I don't know anything about that.

Q. Do you not?

A. No, sir.

Q. Never inquired to see where they go?

A. Never asked.

Q. And the leaders from other buildings go into that same twelve inch pipe?

A. I don't know anything about that.

Q. Haven't inspected about that?

A. Never examined a leader, no, sir.

Q. Heretofore when you put green into that water closet as often as you looked in the cesspool in the rear yard you found the green in the cesspool?

A. I have only looked in the cesspool once and found it there then, yes, sir.

Q. How big was that cesspool which you saw?

A. I did not see the size of it; I never evamined it as to its size.

Q. How did you see into it at all?

A. There was a hole in the center of it.

Q. A manhole?

A. Yes, sir.

Q. Was there a cover to it?

A. Yes, sir.

Q. Did you see how deep it was?

A. No, sir.

Q. Did you see how deep it was to the surface?

A. Do you mean how deep it was down to the top of the water?

Q. Yes.

A. My recollection is that it was about 4 feet; I am not certain about that.

Q. When was it you saw that cesspool?

A. That was several months ago.

Q. How far is that cesspool from the banks of the river?

A. A block and a half, I should think.

Q. Several hundred feet?

A. Yes, sir, a good deal more than that; about 800 feet.

Q. This 12-inch pipe which shows at the river, is it an iron pipe?

A. Yes, sir, cast iron pipe.

Q. Did you ever trace up that pipe to ascertain where it runs under the street or buildings?

A. That would be impossible; you can't see it.

Q. You have spoken of this cesspool and the water as it came out of the pipe; now did it have the appearance, in your judgment, of having come from an opening of a cesspool?

By the COURT: You may ask him whether he saw anything else beyond what he has described.

Q. Did you have any theory as to why this water gushed out at the time you saw it?

Objected to and overruled.

By the COURT:—

Q. You were there when it began to gush out?

A. Yes, sir.

Q. Describe what you saw just before that time, and what happened just in that time?

A. I first saw a small amount of water, and then the pipe apparently filled up to a certain extent and the flow increased very strongly, and it staid at that height for the whole time I was there, about two hours.

Q. Did you go back again in the morning?

A. No, sir—yes, I did go back again the next morning; I am mistaken about that.

Q. What did you see then?

A. I saw the pipe was clean—there was no green matter the next morning.

Q. How about the quantity of water that was coming out in the morning?

A. I think it was about a quarter full.

Q. That is all.

RE-CROSS:—

Q. During the two hours you were there, or rather the four hours you were waiting there at the mouth of the pipe, before the flow of water increased, was there a flow of water all the while?

A. Yes, sir there was all the time.

By the COURT:—

Q. Was that clear?

A. I would not call it clear, no, sir; it was of a milk color, perhaps not very strongly so, but it was not clear.

Q. How did you find it the next morning?

A. The same milk color.

J. G. A. BICKLEY, sworn for Complainant:—

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. You live where, sir, at the present time?

A. I am living on the corner of Union street and Richards avenue.

Q. Whereabouts?

A. Dover.

Q. In the city of Dover New Jersey?

A. Yes, sir.

Q. How long have you lived in the city of Dover?

A. About 25 years.

Q. What has been your business?

A. I have been an iron worker there until the last year or so.

Q. Have you also been a contractor there?

A. I have done considerable building there.

Q. You own lots there?

A. Yes, sir.

Q. And you own land there still?

A. Yes, sir.

Q. Do you own the house you live in?

A. Yes, sir.

Q. And other houses?

A. Yes, sir.

Q. Now I show you a map, Mr. Bickley, and ask you whether that is your map?

A. Well, that is a survey which was made by my

son, who is an engineer; it was made a good many years ago; I suppose some 18 years ago.

Q. Made for you?

A. Well, we made it for reference.

Q. Your son is where?

A. My son is a mechanical engineer and chief draughtsman of the Reading Iron Company in Reading, Pa.

Q. What portion of the property shown on this map did you ever own?

A. Well, I owned—lots there—this is Richards avenue; I owned that property there.

Q. What did you own formerly?

A. This part here.

By the COURT: That does not mean anything on the stenographer's notes. You will have to describe it.

FURTHER DIRECT:—

Q. You owned the block on this map which is bounded by Richards avenue and Union street?

A. Yes, sir, and I owned another property on Myrtle avenue.

Q. I will get to that in a minute. Did you ever own this whole block?

A. I owned this half block here.

Q. Which has your name written on it?

A. Yes, sir, and over here I owned the entire block; I bought it from Tom Johnson.

Q. On Myrtle avenue and Passaic street?

A. Yes, sir.

Q. And your name is written on that, too?

A. Yes, sir.

Q. Did you ever own any more of this property or only that?

A. Only that.

Q. Now when you came to Dover 25 years ago, describe if you will the surface of this land shown on this map?

A. Well, this property here on the corner of Richards avenue and Union street was the old bed of the river.

Q. How much of that property shown on the map in addition to that which you now refer to, was the old bed of the river?

A. This was all the old bed of the river, and when I filled in these 2 lots, I put in $1,500 or $2,000 of dirt.

Q. Was that the general character of all the land shown on this map?

A. Yes, sir; this has all been filled in. Of course this survey was made before this land was filled in.

Q. Now just one question about that; when you say the surface of the ground was the bed of the river won't you please describe what was on the surface of the ground in the way of stones?

A. Gravel and small cobble stones.

Q. Was that the description of the surface of all the land you have spoken of?

A. Yes, sir.

Q. And the cobble stones were of what size?

A. From the size of a walnut to the size of a goose egg, something like that, sometimes larger and sometimes smaller.

By the COURT:—

Q. You say it was the bed of the river; did you ever see the river flow there?

A. No, sir, I haven't seen the river flowing there from the fact that the Central Railroad Company built a division over that land down there and filled it in, and that has shut the river in and confined it to the channel.

Q. Then you mean the river spread out over there in times of high water?

A. Oh, high water flows over it now; it flows over it at the present time in high water.

FURTHER DIRECT:—

Q. Now this filling in you speak of, what was the character of that; where was it made from; where was the dirt obtained from?

A. From excavations made up on the mountain and filled in here, consisting of rock, shale, etc.

Q. You did some of it, you say?

A. Yes, sir.

Q. To what depth did you fill in this land on this bottom?

A. Six feet in some places, because when I dug the foundation for my present dwelling, or, in fact, I did not dig any foundation, but I had to dig down to get a basis for a foot wall, and I had to go down to solid ground, and I was about 6 feet below the present grade.

Q. You say that you built on that property; are there other houses on the same property besides yours?

A. Oh, yes, sir; a great number.

Q. Is it mostly built up?

A. All built up.

Q. And the names of the owners are on this map?

A. Yes, sir.

Q. Now when you built your houses will you please describe in what way you connected them with the sewers or with the drains or cesspools?

A. These sewers were built at that time; they were built before the ground was filled in when that was all open work.

Q. Please tell us how the sewers or drains are shown on this map. There is a dotted line running

from the house of J. Rostow?

A. Yes, sir; it runs diagonally across and intersects that land.

Q. That is at Bergen street and also from W. Salas?

A. Yes, sir; right along there, and runs along where is shown this dotted line, and then this line down Hudson street, and then turns down and goes through the property of Mr. Carpenter, Mr. Rotta and then strikes in there; this sewer comes up from Mt. Hope out of the canal (indicating).

Q. There it strikes in Passaic street and it strikes another sewer which crosses under the Morris Canal coming down from Mount Hope?

A. Yes, Mount Hope avenue.

Q. Then those combined sewers run down Passaic Street?

A. Into Richards Avenue.

Q. And thence down Richards Avenue to Mercer Street—

A. Where it intersects another sewer on River Street.

Q. And thence it is continued—

A. A little ways down—

Q. Opposite Mr. Carpenter's place, and thence across into the river?

A. Yes, sir.

Q. Is that an open drain or sewer at the present time?

A. Open on the surface.

Q. No, open so anything can flow through it?

A. Yes, sir.

Q. Now, there is another sewer which runs from the sewer I have just mentioned up what is called River Street?

A. River Street; yes.

Q. And how is that built?

A. Just the same; open work.

By the COURT:

Q. Who built these sewers

A. The individual owners. On Passaic Street, me and Ed. Roddy. Billy Brannon built what comes opposite here (indicating) and me and Ed. Roddy built across Myrtle Avenue until it runs 100 feet opposite the rear end of our property. That is all open now.

Q. Beyond?

A. Beyond that; it is open yet.

By Mr. VREDENBURGH:

Q. This Mount Hope; is that a little village?

A. No; it is quite a village.

Q. Now, the other dotted lines shown here also represent other sewers?

A. Yes.

Q. There are several of them on the map?

A. Yes; scattered around.

Q. Now, are there any cesspools to those houses?

A. I have been to the expense of several hundred dollars this last summer putting in cesspools; but it is open cesspools and might just as well not from the very fact that the formation of that ground is a strata—

Objected to.

The COURT: The witness is now giving his opinion rather than a statement of fact. He can state any fact.

WITNESS: I will tell you. I just buit a a house over there on the J. H. Pitney property on the corner of Passaic Street and Myrtle Avenue. I dug down holes to put in posts; and I could see the ebb and flow of the river in that hole.

Q. Now, these cesspools that you built? What is the bottom of them?

A. The old bed of the river.

Q. And what does it consist of as to stone?

A. Gravel and small cobble-stones and pebbles and so on. It is just the kind of a sewer a farmer would build in order to drain a meadow.

Q. Do you ever clean them?

A. They clean themselves.

Q. How do they clean themselves?

A. By percolating through the ground.

Q. Have you seen other cesspools built in the neighborhood besides the one you built?

A. I have not seen them, but I know of them.

Q. Do you know how they are built, as to their bottom?

A. Just the same as we built the whole of them. Oh, the bottom of them I never looked at, but they go down to the bottom of the river bed now.

Q. The sides are laid up how?

A. Open work.

Q. Anything to prevent the water getting through the stones?

A. Nothing at all, sir.

Q. Well, in your judgment do those cesspools prevent in any way the sewage that is put in those cesspools going right out into the river?

Objected to as incompetent.

The COURT: The witness is giving us the facts. I sustain the objection.

(Mr. Vredenburgh offers the map in evidence, and the same is marked "Exhibit C 105 Nov. 8, 1906").

Q. This canal basin; that is connected with the Morris Canal I suppose.

A. Yes, way above that.

Q. And the part of it marked Rockaway River represents the river?

A. Yes, sir.

Q. The scale as shown here is 75 feet per inch; is that accurate?

A. I told you, I am not the author of that map; my son made it. And I should judge it would—being an egineer—I judge it would be accurate.

Q. So far as you have made any measurements here you found it accurate?

A. Yes, sir.

Q. I notice that there are water mains on here They are represented—

A. By the two parallel full lines.

Q. There is one pipe running down Essex Street?

A. Yes, I think there is.

Q. And also through Bergen Street?

A. Yes, sir.

Q. And also through a portion of Hudson Street?

A. Yes.

Q. And also a portion of Myrtle Avenue?

A. It runs I guess, all the way down Richards Avenue.

Q. Runs partly down Myrtle Avenue?

A. Yes.

Q. Does it run any further down Myrtle Avenue than shown on this map?

A. It must be, because I just tapped a main there (indicating) and that is down very near to Union Street. It runs down to Union Street, anyway.

Q. And runs the whole length of Richards Avenue as shown on this map?

A. Yes.

Q. Is that water main connected with many of the houses?

A. All those houses, of course, take the water from those different mains as they are located.

Q. And that water comes from what supply?

A. From the supply station.

Q. Public supply of Dover?

A. Yes.

Q. And do you know whether there are bath rooms in these houses?

A. I presume there is, in some of them. But of course I don't know; I wouldn't swear to that.

Q. As to closets. Do you know about there being water-closets connected with the water?

A. I presume there is. I wouldn't swear to that.

Q. You don't know about it?

A. I don't know about it.

Q. Not so in your house?

A. No; I've got cesspools. I've got closets but I've got cesspools.

Q. How does the closet connect with the cesspool?

A. Direct.

Q. Over the cesspools?

A. No, the closets in the house are connected by a 4-inch soil pipe.

Q. You get the water into your closet?

A. Yes.

Q. And from the closet it goes through the soil-pipe into the cesspool?

A. Yes.

Q. The pipe to your house is a 4-inch soil pipe?

A. Yes.

Q. Is that the usual size?

A. Yes, the usual size.

Q. Do these cesspools go down below what was formerly the surface of the land?

A. No. Generally try to get down onto the river bed. And it percolates through that soil just as readily as it would go through a sieve.

CROSS EXAMINATION by Mr. Corbin:

Q. Your plans appear to be situated between the canal on one side and the Rockaway River on the other?

A. Yes.

Q. You speak of that as being the old bed of the Rockaway River. That is merely your idea of it, isn't it, without any knowledge?

A. Well, where my present house stands, there was —when we were digging for putting in the foot-walls we dug up old iron that was made at the old forge above there, &c.

Q. And you judge from these facts that they are brought down by water?

A. No I don't know as they are brought down by water. It was probably a dumpage.

Q. During the twenty-five years you have known Dover, the Rockaway River has been right where it is shown on the map, hasn't it?

A. I knew Dover 60 years ago.

Q. Wasn't the Rockaway River just where it is now?

A. I presume it was; but they have confined it to its channel.

Q. The Central Railroad Company has a line of railroad along the bank of the river between your property and the river?

A. Yes, sir.

Q. An earth bank several feet high, isn't it?

A. I presume it is an earth bank. The face of it on the Rockaway River side is large boulders.

Q. It is rickrack work, isn't it?

A. You might call it rick-rack work.

Q. To protect it from the waves?

A. Yes.

Q. And that bank is several feet higher than the surface of your land before you filled it?

A. Yes, sir.

Q. And the bank on the other side is several feet higher than the original surface of your land?

A. Yes.

Q. And your land as now filled is some six feet above its original surface?

A. About that.

Q. And that new grade of your land is about as high as the railroad?

A. Yes.

Q. And as high as the bank of the canal?

A. No. The bank of the canal is higher.

Q. Now, when this map was made, the water pipes were already in as shown on the map, were they?

A. No water pipes, no sir.

Q. What do the lines on the map mean?

A. That is copied from the original. After the sewers was made before the ground was filled in then the lines of the water pipes was filled in on this map.

Q. There were no water pipes there when this map was made about eighteen years ago?

A. No, sir.

Q. When were they put in?

A. I can't tell that, for I didn't keep any account.

Q. When the Dover works were constructed, I suppose.

A. When the Dover works were constructed.

Q. Ten years ago?

A. Possibly. More or less; more, I guess.

Q. These drains indicated by the dotted lines. Were they already built when this map was made eighteen years ago?

A. Yes, those were all open. The streets were not made.

Q. They were open stone drains?

A. Open stone drains.

Q. When the ground was filled, they were made covered stone drains?

A. Yes, sir.

Q. Not pipe drains?

A. Not pipe drains.

Q. Now, this drain that comes down from Mount Hope, this was obviously built when the canal was built, wasn't it?

A. I don't know. There is an arched culvert under the canal.

Q. That is a finished construction?

A. A finished construction.

Q. And the water that comes down under the Morris Canal from that drain is thence carried by this open stone drain down to the river?

A. Open stone drain down to the river.

Q. Now the land is filled, that open stone drain has become for much of its course a covered stone drain?

A. It is covered up from the top and filled in with earth, stone and rock.

Q. And the surface of the ground is some six feet higher than it used to be?

A. About that.

Q. Now, on your property and on the property of your neighbors, you have backhouses in your yard, don't you?

A. Yes.

Q. Old-fashioned stone vaults? And the material drops off into the stone and gravel?

A. Yes, sir.

Q. You said in the new place you built, which appears to be some 700 feet from the Rockaway River, that you had seen the ebb and flow of the river in the bottom of that vault?

A. No, not in the vault. In holes that I dug down.

Q. By which you mean that you saw the water rise and fall therein?

A. Yes.

Q. And when the water is in flood or freshet, you would sometimes see the water over the top of the ground even, isn't that a fact?

A. Yes, sir. I have seen it several times during my residence there.

Q. Have you any knowledge as to the relative level of the bottom of your privy vault and the bottom of the Rockaway opposite?

A. Well, in digging all these foundations we generally dig down to get to the old bed of the river.

Q. Till you get gravel and boulders?

A. Yes.

Q. That whole country is underlaid with gravel and boulders, and sand, isn't it?

A. Yes, sir; I have driven down wells sixty and seventy feet.

Q. What do you find sixty or seventy feet down?

A. Sand, sand, sand.

Q. And gravel?

A. No gravel down there.

Q. How far down do you find gravel?

A. Well, now, in the driving of wells the first thing we encounter is the earth we have made.

Q. That is, the top soil?

A. Top soil. The next thing we run into is gravel and boulders, pebbles and cobbles.

Q. How big cobbles and boulders?

A. They run different sizers. Sometimes in driving down we strike a big cobble, and we shift over six inches or so and miss it.

Q. But the most of it is rather small gravel; isn't it?

A. Well, the size of an egg, walnut, and so on; graduated.

Q. And sand intermingled?

A. And gravel; not much sand there.

Q. How soon below the old natural surface do you find sand?

A. After we get through that strata we generally strike the hardpan.

By the COURT:

Q. How thick is the first stratum?

A. The small cobbles?

A. Yes.

Q. Oh, it varies in thickness. Sometimes four feet thick, sometimes not so much, sometimes not more than three feet thick.

By Mr. CORBIN:

Q. Then hardpan?

A. Then hardpan.

Q. How much?

A. Not a great deal. Probably two feet three feet. And then we run across another strata of gravel. And then we stop. That is about sixteen feet below the surface.

Q. Sand below that?

A. Sand for fifty feet. You can't get water after we get below this second strata of gravel.

Q. You have never gone to the bottom of the sand stratum I suppose?

A. No, we might go down to the other side in order to get it.

Q. Now, you said that these privies, these vaults, cleaned themselves.

A. To a very great extent.

Q. By which you mean that the stuff that goes into them disappears in the bottom?

A. Well, as I say, the water percolates through and goes out.

Q. The moisture that goes into it disappears in the bottom?

A. Yes.

Q. This sand and gravel bottom?

A. Yes.

Q. Do you know how deep they are made?

A. Well, some goes six feet; some more some less

Q. They go a little more than has been filled in?

A. A little more than has been filled in.

Q. And the bottom of them is a gravel bottom?

A. Yes.

Q. Wasn't one of your houses last year connected with one of these drains, and didn't the inspectors of the water company warn you to build a cesspool to dispose of it?

A. Yes, sir. And I went to an expense of a good many dollars to do it.

Q. And didn't the city inspectors at the same time tell you not to do it?

A. No, sir.

Q. Didn't Mr. Griffin tell you practically that?

A. Well, he said "go slow."

Q. About building the new cesspool?

A. I had built one then. He said "go slow." That is all he said.

Q. You were building a new one then?

A. Yes sir—oh, I had built it when he said that. Talking casually with him one day, he says: "You can go slow."

Q. But you did build it and disconnect your premises, like a good citizen?

A. Yes. Well, I don't want to be a menace to anybody's health if I can help it. But it cost a good deal of money to do it.

Q. Well, your neighbors have done the same thing, haven't they?

A. A number of them have, to my knowledge. But "many" I couldn't say.

Q. Do you know of any one of them whose house sewage connects with these drains in the street?

A. That I do not.

RE-DIRECT EXAMINATION by Mr. Vredenburgh:

Q. You don't know whether they do or not?

A. No.

Q. Now, when you first saw the river, I understand it was more than twenty-five years ago.

A. Oh yes. I was born right in the neighborhood, and I can remember the neighborhood when I was a child.

Q. At that time was this land that we have spoken of the bed of the river or not?

A. Well, that map wasn't in existence then. I only know this as a boy, that the river was just one vast sheet of water that flowed all over there. There was no restriction to it.

Q. Now, I understand you to say that the bottom of these cesspools not only your own but the others —was rock and coarse gravel.

A. Cobbles and pebbles and gravel.

Q. Now, that gravel and coarse pebbles you have mentioned extend from the bottom of the cesspool about four feet to the hardpan?

A. About that, yes.

Q. That hardpan is impervious to water is it, or not?

Objected to as leading.

By the COURT:

Q. Well, what is the character of the hardpan?

A. Well, it is so hard you can hardly drive a pick in it when you come to dig it. It takes a man four times as long to dig a cubic yard of that as it would of the other stuff above it, the gravel and cobbles, and so on.

By Mr. Vredenburgh:

Q. And the thickness of that is about how much? Two feet I think you said.

A. Well, yes, thereabout. I never dug through, but I have driven pipes through it.

RE-CROSS EXAMINATION by Mr. Corbin:

Q. Counsel, in questioning you, used the word "rock" or "rocks," as being the bottom. There are no ledges of rock in that valley, are there?

A. No, it is all loose rocks that have been quarried, or came from the mines.

Q. You mean something that has been brought there?

A. Yes.

Q. Foundations of old buildings, or what?

A. No, I think it is rock that has been dug out of the iron mines and carted there by the Central Railroad or the Hibernia Railroad and dumped there.

Q. Dumped down along the river?

A. Down on the bank of the river, yes.

Q. That is, where the rickrack has been placed?

A. Yes.

Q. You don't mean any of the strata underneath you consist of rock, do you?

A. No, sir.

RE-DIRECT EXAMINATION by Mr. Vredenburgh:

Q. What do you mean by rock?

A. Well, you go into a quarry and quarry out stone. I call that rock; because they are all shapes and sizes.

Q. What kind of stone is on the bottom of this cesspool. You spoke of it as cobble stone.

A. Cobblestone, they are the round boulders.

Q. And I understood that you built one of your houses partly from the stone that you. got there Won't you please tell us about it.

A. When I started to build this present house I am just finishing now, I started out to contract to put up four feet of rock wall, those quarried stones. After I dug the foundation I found I got more stone than I knew what to do with.

Q. From where?

A. Dug it right out of this earth that had been filled in. It had been filled in from the mountain side with stone promiscuously, rock, I suppose, and so on. Then I withdrew my contract with the mason and put in a concrete foundation, built it in between two forms and used this rock and cobbles and gravel, that is, large pebbles, and built it in concrete I had enough to complete the foundation.

Q. And you excavated for your house did you?

A. Yes, sir.

By Mr. VREDENBURGH: I now desire to proceed with the evidence of the Board of Health and their record of typhoid fever at Dover, but I want first to ask the other side —I am informed there were two cases of typhoid fever early in October, I think, and those typhoid cases were taken on the cars to the Paterson Hospital under the direction and at the request of the other side, now I desire to have them admit if they will what I have said so I will not be put to the expense of bringing the physician here to prove it. Of course if it is not so and I have been misinformed in regard to it, they can tell me so.

By Mr. CORBIN: I never heard of it before.

By Mr. VREDENBURGH: Then of course I must prove it.

Testimony of Dr. Frederick E. Lambert.

Dr. FREDERICK E. LAMBERT, sworn for Complainant.

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. You are a practising physician, are you Doctor?
A. Yes, sir.
Q. Where?
A. Jersey City.
Q. How long have you practised medicine there?
A. 11 years.
Q. Do you reside in that city?
A. Yes, sir.
Q. Are you connected with the Board of Health of that city?
A. Yes, sir.
Q. In what capacity?
A. I am president of the Board.
Q. How long have you been president of the Board?
A. About 6 or 7 months.
Q. How long were you a member of the Board before that?
A. A year and a half.
Q. Did you last month investigate any cases of typhoid fever in the city of Dover?
A. Yes, sir.
Q. Please state what led up to that investigation?

Objected to.

Q. Did you investigate it as President of the Board of Health of Jersey City?
A. Yes, sir.
Q. Now please tell us what led up to that investigation?

By Mr. CORBIN: I object to that. He can tell us what he did, not what was in his mind.

Testimony of Dr. Frederick E. Lambert.

By the COURT: He may state that as a result of certain information from certain suorces what he did.

Q. Well, please go on and state, Doctor?

A. I was informed by the Superintendent of the Bureau of Contagious Diseases of our Board of Health—

Q. What is the name of the Superintendent?

A. Dr. Sauer .

Q. Well?

A. That we had an increased number of typhoid fever cases in the city(Interrupted)

Objected to.

By the COURT: That is not evidence.

A. (Continuing)—and we arranged for an inspection of the water shed, and on our tour of the country we looked up the cases of typhoid. First we went to the Board of Health of Dover and made inquries and they would not give us any information—

Objected to.

Q. Well?

A. They refuse absolutely, they refused to give us any record, they said they were in the safe, they would not give us the records of the Board of Health then we called upon the Doctors there.

By Mr. Corbin: Who refused? I think we ought to have something we can trace up. Who did you call upon?

A. We called upon Dr. Hann.

Q. Dr. Lambert, when Mr. Corbin interrupted you, I was trying to find out from you what member

of the Board of Health you called upon, that is my question now; what member of the Board of Health you asked to give you the records of typhoid fever in Dover?

A. Dr. Hunter, a dentist.

Q. Dr. Hunter?

A. Yes, sir; he is a dentist.

Q. He is the one that refused to show you the record?

A. Yes, sir.

Q. Now you went from there to where; you said you investigated the matter by asking some questions?

A. Yes, sir, I went to Dr. Hann and he said he had a case but he wasn't sure whether it was typhoid, that he never had a blood test taken of the case; then I went to another Doctor, and we found there was a case in East Dover upon the hill, of typhoid, and went to the house of the patient and asked questions of the persons in the house in the presence of Mr. Whipple, the expert of the Water Board; Dr. Sauer, President of the Bureau of Contagious Diseases of the Board of Health of Jersey City, and Mr. Griffin and myself. We questioned the patient —(Interrupted).

Q. One moment; you first questioned Dr. Cook, didn't you?

A. No, sir, I questioned him after we had been to the house.

Q. Who told you where the house was?

A. We were told there was a case of typhoid on the hill, by Dr. Hann.

Q. Dr. Hann?

A. Yes, sir.

Q. Then you went on to investigate?

A. Yes, sir, we went on to investigate the case.

Q. Did you see Dr. Cook before you went to the house of this person?

A. No, sir, we saw him after we had been to the patient's house.

Q. How did you know where to go to the house?

A. We were directed by Dr. Hann. We questioned the patient as to how long he had been sick.

Q. Who was the patient?

A. Joseph H. Barton—we questioned the patient (Interrupted).

Q. You saw the patient?

A. Yes, sir.

Q. In this house?

A. Yes, sir.

Q. Was he in bed?

A. He was sitting up in an arm chair with Blankets over him, alongside of the bed.

Q. Did you examine him?

A. I did.

Q. What was his appearance?

A. He was very much emaciated and pale, and had the appearance of a patient recovering from typhoid. He admitted he had severe hemorrhages of the bowels the third week of the disease and had been a very sick man. His wife said they had been throwing the stools into the privy outside of the house for two weeks, until Dr. Cook told them it was a case of typhoid, and they had better take care of the stools by sterilizing them and not throw any more in the privy vault. All this was given voluntarily by the wife of the patient without questioning. We inspected the vault and found it was on the slope of a hill, the descent was quite steep, I should judge it was more than 45 degree angle which led into a drain in the side of the road, and then into a brook.

Q. Mill Brook?

A. Mill brook. The privy vault was very poorly constructed of loose stones overflowing and forming a small cesspool behind the privy. We also examin-

ed or inspected the drain along the road. That is all about that particular case.

Q. Now did you take the blood of the patient?

A. We also took a test of the blood of the patient, at least we had a specimen of the blood taken and sent to the State Laboratory, and the report came back that it was a case of typhoid.

Objected to.

By Mr. VREDENBURGH: Oh, we will prove it all.

By the COURT: That last statement of the Doctor is not evidence. The person who made the examination must be called.

By Mr. VREDENBURGH: We have sent for him but he has not arrived yet; it is Mr. Randolph of the State Board of Health. Why he has not come I don't know, nevertheless we will prove it other ways. Your Honor does not mean to strike out that he took a specimen of the blood of the patient and sent it to the State Board of Health.

By the COURT: Do you object to that, Mr. Corbin?

By Mr. CORBIN: Not if the Doctor himself took it.

By the WITNESS: We took it. Dr. Sauer, in my presence, pricked the ear of the patient and took some blood from the patient, and it was sent to the State Laboratory, and I saw the report; the report was mailed by our Dr. Sauer—he mailed it himself at Jersey City; I have seen the report.

Testimony of Dr. Frederick E. Lambert.

Q. (Handing witness a paper) Is that the report?
A. That is the report.

By Mr. CORBIN: So far as the fact of their being a case of typhoid fever in East Dover, we don't deny it. Our information is to the same effect; that Mr. Barton was ill with typhoid fever on East Dover hill, and they need not go any further to prove that. We will admit there was a case of typhoid fever in there.

By the COURT: I understood Mr. Corbin objected to the last question and answer. The answer was that Dr. Sauer took a specimen of blood from the ear of the patient and sent it to the expert of the State Board, now I do not understand Mr. Corbin objects to that statement although he objects to the report.

By Mr. VREDENBURGH: You say you admit there was a case of typhoid fever in East Dover?

By Mr. CORBIN: Yes, in East Dover hill, Mr. Barton. My objection was to the introduction of hearsay evidence. We admit the main fact that there was this case of typhoid.

Q. You have in your hand a certificate, Doctor Lambert, that was received by your Board; what do you know about that certificate?

A. You mean from the State Board?

Q. Yes, what do you know about that, of your own knowledge?

A. I know that it was mailed by our superintendent—

Q. No, that particular certificate that you have there?

Testimony of Dr. Frederick E. Lambert.

The COURT: Is it worth while to discuss the certificate when the admission fully covers all the facts contained in the certificate.

Mr. VREDENBURGH: If it does, then of course—

The COURT: Let Mr. Corbin see the certificate.

(Same handed to Mr. Corbin).

Mr. CORBIN: I have no objection to it.

Mr. VREDENBURGH: I will read it to your Honor so that you may see what it is.

"Board of Health of the State of New Jersey. Report of examination of specimen of blood for typhoid fever, received 26, 10, '06; examined 26, 10, '06, taken by Ferdinand N. Sauer, address 314 Varick street, Jersey City, name of patient, Joseph Barton; result of examination of blood giving typhoid fever reaction."

Q. Now, doctor, the cesspool to which you refer, at the time you saw it, was it full or in what condition was it?

A. It was full, full to the brim.

Q. Had it over-flowed at all?

A. Yes, sir.

Q. What evidence was there that it had overflowed?

A. There was a small pool of the contents behind the privy.

Q. And how near was that privy to this drain that you speak of, or ditch?

A. A few feet.

Q. Two feet?

A. A few feet, I should judge, probably.

Q. How was it as to elevation, was it above that drain or below it?

A. The privy was above the drain.

Q. About how much?

A. Oh, I should judge about nine feet probably.

Q. And in what way was the land at that—surface of the land, the dip of the land at that point, did it dip toward this drain or from it?

A. Toward the drain it was quite a descent there, quite a steep incline.

Q. Now what is your judgment, doctor, as to the over-flow of this privy reaching the brook in case of showers or wet weather?

Objected to.

The COURT: Well, the doctor can describe the physical contour of the land. As I understand it, the doctor says that the ditch or drain was nine feet below the privy, and that the slope of the land was from the privy, toward the drain, is that so?

The WITNESS Yes, sir.

The COURT: Now, you can go on and describe the drain, if you like. Was it a covered or an open drain?

The WITNESS: In case of a short shower I believe from physical conditions of the sloping—

Mr. CORBIN: I object to that as not responsive to the question of the Court.

WITNESS: Oh! the hill that the water or shower could carry these germs into this drain and into the brook.

Mr. CORBIN: I move to strike out the answer as not within the Court's ruling and not responsive.

The COURT: Well, in form perhaps it is objectionable, but is it in fact.

Mr. CORBIN: It seems to me so, sir.

The COURT: It is equivalent to the doctor saying that the contour of the land was such that the rain washing down that hill would carry the contents of the privy into the drain, that is about what the doctor stated; I don't see how you can describe it in any other way.

By the COURT:

Q. What was the length of this drain?

Mr. VREDENBURGH: I was going on with that.

FURTHER DIRECT:

Q. Now this drain that you spoke of, the Court asked you whether it was an enclosed drain or open?

A. Open drain.

Q. How was it with reference to street,—was there a street there?

A. Yes, sir.

Q. Was it along the side of the street or across the street or how?

A. Along the side of the street.

Q. Was there any running water in that ditch at the time you saw it?

A. No, sir.

Q. And that lead down to some ditch?

A. Brook.

Testimony of Dr. Frederick E. Lambert.

Objected to.

Q. Now, doctor, do you recollect what day that was?

A. That was October 21st.

Q. Now up to the time that—was it the 21st or 24th, doctor?

A. 21st, our notes state here, and Doctor Sauer—

Q. Do you remember what day of the week it was?

A. It was Wednesday, the 24th.

Q. Now, had you any information of this patient until you ascertained it from this Doctor of Dover?

A. No, sir.

Q. And on that day, as you have mentioned,—you obtained the information on that day that you went up there, as you have mentioned, and didn't know of it before?

A. No, sir.

Q. Now, had there been to your knowledge at that time an examination of the water of Jersey City as delivered from this Boonton reservoir in Jersey City?

A. On my way up to the water shed on the train I asked Mr. Whipple the results of analyses of the water, both at the intake and below the reservoir, and at the taps in Jersey City.

Q. And he gave you information?

A. Yes, sir.

Objected to.

Mr. VREDENBURGH: Now that is one of the facts upon which this witness subsequently acted. Now, of course, Mr. Whipple is here to verify it, but whether I should not ask this witness what that was—it seems to me it don't prove what it was, but it is one of the facts upon which this witness subsequently acted.

Mr. CORBIN: He was on his way up there when he asked Mr. Whipple the analysis. Doctor Whipple is in the room now.

The COURT: What do you refer to, when you say subsequently acted?

Mr. VREDENBURGH: Subsequently notified the people of Jersey City that, as members of the Board of Health, that the water ought to be boiled.

The COURT: He can say that in consequence of information received from Mr. Whipple and in consequence of other things, if those other things entered into his action.

Q. Doctor, you need not tell us just what Mr. Whipple told you, but he did tell you something that day, don't tell us what, but I only ask you whether he did tell you something that day with regard to his analysis of the water of Jersey City, just previous?

A. Yes, sir.

Q. Now, you said that Dr. Sauer had told you something about an increase of typhoid fever cases in Jersey City, had you observed that increase yourself?

A. I did not, until my attention was called to it through our Health Department.

Q. When was your attention called to it, as far as you can recollect now?

A. I believe a few days, probably a week, before we made the inspection of the water shed.

Q. Now, after your attention was called to it, did you make any investigation to see whether there had been an increase?

A. No, sir.

Q. You did not?

A. No, sir.

Testimony of Dr. Frederick E. Lambert.

Q. Now, doctor, after that examination, did you make a subsequent visit to Dover?

A. I did.

Q. Please tell us what you did on that visit?

The COURT: First give us the date.

A. Monday, the 29th of October.

BY THE COURT:

Q. Alone or in company with others?

A. In company with others, members of our Board of Health; do you want me to mention their names?

BY MR. VREDENBURGH:

Q. Yes, so far as you can recollect them.

A. Dr. Finnerty and Dr. Sauer.

Q. Was Dr. Culver along at the second visit?

A. Not on the second visit; it was on the third visit Dr. Culver was along.

Q. Dr. Purdy, was he along?

A. No, sir; that was an independent party.

Q. So far as you now recollect you remember Sauer and Finnerty?

A. That is of our Board.

Q. Was there any other member of your Board?

A. Dr. Rowe.

Q. Now, then, will you please state what inspection you made then?

A. We walked along the Rockaway river and saw and witnessed tests of cesspools and privies; I took part in those tests. I went into one house, 99½ East Blackwell street and threw some dye into the bowl of the water closet and flushed the bowl probably twenty times or more; we went out on the opposite side of the bank of the river and saw the coloring matter come in in stained streams in the Rockaway river,

within eight or ten minutes probably; we had made other tests the same day.

Q. Yes?

A. We tested the Swedish Church; I am not sure whether that was our second trip or our first trip, but within less than ten minutes we had a return flow of this stained urinite dye showing the water running directly into the stream from the Swedish Church. Further than that you could see with your eye that the contents of the privy was filled up, almost to the floor, up to the sill of the out-house.

Q. Did you notice fecal matter in the stream at that time?

A. Not in the stream at that point, but we did in other places.

Q. You did in other parts?

A. We took it upon a stick and had a physical demonstration of it.

Q. Where?

A. That was where the canal runs into the stream intermingled with our water shed water.

Q. There you did discover fecal matter in the water of this stream?

A. On the stones of this culvert as it was coming out from the opening.

Q. Did you notice water from the printing concern?

A. Yes, sir.

Q. What concern is that?

A. The Lyondale Print Works; I saw what they call Doctor Leal's purification works there; it was two dams of stone, about, I should judge eighteen inches at the base or probably two feet and built up to one stone on the top of the stream, and I measured one of the stones, the largest one; I think it was about 9 x 7 inches; the smaller stone was about 5 x 4; there were two dams there, and this brook that

ran directly into the Rockaway river; the scum or dye stuff just above it flowed over the first dam was so contaminated, so filthy, that you couldn't see through the water; after it passed through the first dam there was a little improvement; after the second dam there was a little more improvement, but the dye stuff and all the impurities were running right into our stream, in the water shed of the Rockaway.

Q. Now, do you remember a ditch from which steam came?

A. Yes, that was a ditch up about a block or two below where the canal runs into the river; there are quite a number of houses that drain directly into this brook, which empties into the Rockaway river.

By Mr. CORBIN:

Q. Well, cannot you locate that, doctor, so that we will know where it is?

A. It is about two blocks from Morris street, is it, where the two sewer pipes run right into our Rockaway river.

Q. Has it any name or anything that you can tell us?

Mr. VREDENBURGH: You know where the two blocks are; you can cross-examine him.

Q. Doctor, did you notice the sink in the house in which this typhoid patient was?

A. I did; of the case of typhoid that Doctor Keis had, but not all.

Q. I am not speaking of that; I will come to that in a few minutes; now, I am speaking of the house in which Mr. Burton was?

A. No, sir.

Mr. CORBIN: That is Barton?

A. You mean the house sink; it is Barton; have you reference to the house sink?

Q. Yes.

A. No, I didn't inspect that at all.

Q. You told us about the cesspool?

A. Yes, sir.

Q. Or privy vault?

A. Yes, sir.

Q. Did you make a subsequent visit; a third visit?

A. Yes, sir; November 1st, Thursday.

Q. Now, in consequence of what you saw, and in consequence of the report of the Health Officer as to the increase of typhoid fever, and in consequence of the report that Mr. Whipple gave you as to the character of the water delivered in Jersey City, what did you do, doctor?

Mr. CORBIN: Objected to as not competent.

The COURT: Well, cannot the doctor state what he did?

Mr. CORBIN: I suppose what he desires to bring out is proclamations he might make.

The COURT: Whether the proclamations will have any effect in this case,—the proclamation is not evidence before this Court of the truth of the facts contained in it, but I think that as to the fact that a proclamation was made might be shown.

A. On my return to Jersey City it occurred to me that I was directly responsible, being President of the Board of Health of Jersey City, to take some action, after witnessing an outrageous, collosal—

Mr. CORBIN: I object to that as not responsive and not evidence.

Testimony of Dr. Frederick E. Lambert.

A. —To warn the people of Jersey City of the impure water we are drinking.

The COURT: The doctor can say what he did.

By the WITNESS: I called upon the Jersey City Journal and the Hoboken Observer and stated plainly the conditions that I had found up there—

Objected to.

By the WITNESS: I asked them if they would in a plain, quiet way come out in their papers advising the people of Jersey City to boil their water under the present conditions of the water shed; the Jersey City Journal did not publish it, but quite the contrary; they published a most scurrilous attack upon me for attempting to safeguard the rights of our city.

CROSS-EXAMINATION by Mr. Corbin:

Q. And the Observer published in its quiet way your notice in 4-inch type, didn't it?

A. It did that against all my wishes.

Q. Why, Doctor, neither paper did what you wanted them to do, then?

A. Why, I have said that the Jersey City Journal did not publish the statement.

Q. Then neither paper did what you asked them to do, did they?

A. Well, not practically; the Observer made too much of it, and tried to make it appear too flaring and too glaring about the typhoid conditions of our city.

Q. The Observer published it with big headlines all over the top of the first page, didn't they?

A. No, sir.

Q. Well, half-way across the page?

A. No, sir.

Q. Well, how many inches of space did they devote to it?

A. I did not measure it.

Q. Well, they kept it up for several days, didn't they day after day?

A. Well, I think about three days.

Q. Didn't you get out some kind of a circular about that time and give to the school children of Jersey City?

A. No, sir.

Q. Who did that?

A. No one did that; we got a circular out, but it was not sent to the school children.

Q. Wasn't it taken over to the public schools and given to the school children?

A. No, sir.

Q. That was stopped, wasn't it?

A. Not to my knowledge; I know I went in to the Board of Health and called up our health officer and the stenographer and asked him to get out a plain statement in regard to the polluting of the water, but they got up great head lines, a pamphlet about typhoid, and that pamphlet was printed, and I found it on my desk on the meeting night of the Board of Health; we held our meeting the same night the pamphlet was printed, and I forbid—I told the health officer that they were not pamphlets fit for circulation, and I asked him why he had published the pamphlet or had it printed.

Q. Then the health officer did not have your sanction in doing what he did?

A. Not with those glaring headlines of typhoid; no, sir.

Q. What was the thing he published?

A. It was a pamphlet in 2-inch type.

Q. The matter in it was what?

A. I called his attention to it, and he said: Well, we want some attention called to it by the public.

Q. Well, the substance of the paper you agreed to, didn't you?

A. No, sir.

Q. Why not?

A. I wanted the typhoid eliminated at that time.

Q. Dr. Lambert, are you a licensed physician?

A. Yes, sir.

By Mr. VREDENBURGH: I would like to interrupt you to ask the witness a question that I over looked.

By Mr. CORBIN: Very well.

RE-DIRECT:

Q. Eliminating the question of typhoid fever, what would you say as to the necessity of Jersey City boiling its water?

A. I certainly would advise the boiling of Jersey City's water from the physical conditions that we have to combat with; there was a great deal of contamination about it; we had bacillus or bacteria, which are dangerous, and you cannot eliminate those present conditions in the way the East Jersey Water Company is supplying Jersey City with water; we cannot eliminate all that bacteria from the water without boiling it.

Q. Bacteria of what disease?

A. The coli bacillus is a common bacteria found in drinking water, which comes from human excrement.

Q. I refer now to what other diseases besides typhoid fever?

A. Well, we have this coli bacillus, which may produce a dangerous condition of cholitis—inflammation of the intestines, diarrohea and high fever.

Q. That is all.

FURTHER CROSS:

Q. Where were you licensed, Doctor?

A. Long Island College Hospital.

Q. You had 11 years practice, where?

A. In Jersey City.

Q. Did you make a special study of sanitary matters?

A. I made no special study of sanitary matters.

Q. You were appointed on the Board of Health a year and a half ago?

A. Yes, sir.

Q. And this is the first investigation of typhoid or similar disease you have ever made, is it not?

A. I beg pardon.

Q. I say this is the first investigation of typhoid or such diseases you ever made?

A. It is not; in the city, do you mean?

Q. I mean anywhere?

A. No, sir.

Q. You never made any investigation of the water shed before?

A. No, sir.

Q. You never made any tests such as these dye tests anywhere else before that time, did you?

A. No, sir.

Q. You never made any study of the question of water sheds and their proper purity, &c.?

A. I have since taken this question up.

Q. Yes, within the last few weeks?

A. Yes, sir.

Q. Previous to this visit you made to the water

New Jersey State Library

shed, you had had no experience in that line whatever?

A. No, sir.

Q. It was practically confined to your ordinary practice?

A. Yes, sir.

Q. Now, what good does it do to boil water?

A. It breaks up the bacteria and kills the germs.

Q. Is there any water drank anywhere that has no bacteria in it?

A. Well, I know this, that all large cities are being protected by cooking plants.

Q. Won't you confine yourself to the question, is there any water drank anywhere that has not got bacteria in it?

A. Not in a dangerous condition that we have and that we are at present combating in Jersey City.

Q. How do you know that it exists to a dangerous condition?

A. I know it from the water experts.

Q. You have been told so, you don't pretend to know it from your own knowledge?

A. I haven't analyzed it; I am giving you such facts as I have seen myself.

Q. This bacillus cannot be seen in the water, can it?

A. I cannot see any bacillus in the water.

Q. And this bacillus coil lives in the human intestines, doesn't it?

A. It does in the excrement.

Q. Well, it doesn't come from anywhere except from the human intestines, does it?

A. Yes, sir; it does.

Q. Where eles does it come from?

A. From animals.

Q. Do you say that typhoid bacillus or germs comes from animals?

A. Don't get off now, you were speaking of bacillus coli.

Q. That comes from the intestines of warm blooded animals only?

A. Yes, sir.

Q. And typhoid germs from the intestines of human beings only?

A. Yes, sir.

Q. Now, you went to see Mr. Barton in East Dover Hill, what is the street he lives on?

A. Morris street, I think it is, but I am not positive.

Q. Well, you don't know, do you?

A. Yes, I do; I think it is North or South Morris, but I have been there in the house.

Q. Does he live on one street or two?

A. He lives on the corner.

Q. Do you know what corner he lives on?

A. Northwest—northeast corner of Morris street and the intersecting street; I don't know what the name of the other street is.

Q. Corner of Mill Brook road and South Morris street, is it not?

A. Yes, sir; I think it is.

Q. Up on the hill side of East Dover?

A. Yes, sir.

Q. How far is his house from any other house?

A. Oh, there are several houses there; there is one across the way on the opposite corner.

Q. What?

A. There is one right across the way on the opposite corner.

Q. How far away?

A. Well, you know how far one corner would be away from another corner.

Q. The hill side where he lives is not built up to much extent, is it?

A. No sir.

Q. And his is about the last house out on the margin of the city, isn't it?

A. Yes, sir.

Q. He lives about on the city line?

A. I should judge so.

Q. Did you make any examination to find out where he got typhoid fever from?

A. Yes, sir.

Q. He works at Kingsland, doesn't he, in the shops of the Lackawanna Railroad?

A. Yes, sir.

Q. And comes home each night by train?

A. Well, I know he comes home Saturday night, probably not every night; he probably got the typhoid at Kingsland, if that is what you are leading up to.

Q. You did not make any measurement to see how far it was from the brook you have spoken of, to his privy, did you?

A. No, sir.

Q. Well, in a straight line, without following the trend of the land, but straight across it is 600 or 700 feet, is it not?

A. I should judge it to be between five and six hundred feet.

Q. And the way water must flow it would be about a quarter of a mile, would it not?

A. To the stream, do you mean?

Q. I mean to get to Millbrook from his privy, and to allow the water to flow naturally over the ground it would be at least a quarter of a mile, would it not?

A. I could not answer that question.

Q. You also say that near this privy you saw a ditch; you mean the ditch alongside of the highway, don't you?

A. I did not say I saw a ditch, I saw a drain.

Q. Do you mean an earthen drain?

A. No, sir; an ordinary street drain.

Q. A drain alongside of the street?

A. Yes, sir; a country road drain.

Q. How far was the street out from that vault?

A. I should judge about 10 feet; 9 or 10 feet.

Q. This ditch or drain you say is a drain alongside of the highway?

A. Yes, sir.

Q. To carry the water off the road?

A. Yes, sir.

Q. It is merely a depression to keep the road dry, it is not a regular water course?

A. No, it is not a water course.

Q. And any water that flowed down that road through that depression would have to follow the road for a distance and then follow a depression which ran ultimately into the brook?

A. No, sir; the drain is deep enough to confine a stream of water coming from rain or a sharp shower in its bed; it would not overflow the road.

Q. The road is well ditched each side, is it not?

A. The side where this privy drained into it is well ditched.

Q. Now, you say the privy drained into it; now there is no drain from the privy to the road, is there?

A. There is no drain, but on account of the sloping condition of the ground it runs there.

Q. You mean that where the privy is, is higher than where the road is?

A. Yes, sir; there is quite a slope to it, and water coming down the hill from a shower of rain would carry this artificial cesspool which is formed outside of the privy from the overflow of the vault into the road.

Q. Now, you are speaking of artificial cesspool, the ground must be lower then back of the privy?

A. Back of the privy there is probably 3 or 4 feet flat and level ground.

Q. That is what you call an artificial cesspool?

A. Yes, sir.

Q. What did you see there, Doctor, which makes you use such a term as artificial cesspool?

A. I saw the pool of the effluvia.

Q. Wet or dry?

A. Wet.

Q. And what did you see there, wet?

A. Dark looking material which looked like human excrement.

Q. On the top of this bank?

A. Yes, sir; just outside of the privy vault.

Q. And so you went off and published your circular in Jersey City?

A. Well, we had another case down below there at Wharton of direct contamination within a few feet.

Q. Very well; now, you say there was another case at Wharton?

A. Yes, sir.

Q. Now, that occurred last February, didn't it?

A. Well, there was one case there in February.

Q. That was a case where a man was brought home sick from Burlington?

A. I believe the case was brought from outside somewhere.

Q. And the doctor took charge of it from the day it came there, didn't he?

A. That I don't know.

Q. That was in February, 1906?

A. It was in February.

Q. And because of that case brought from Burlington and this one that came from Kingsland to East Dover Hill, one of them 8 or 9 months ago, and the other more recently, you began the publishing of these circulars in Jersey City?

A. I did not begin the publishing of the circulars

in Jersey City until after my inspection of the water shed, and I found the pollution there and the contamination of typhoid, and then I thought I would advise the boiling of the water, and I had a perfect right to do that.

Q. I am not questioning your right, Doctor, I am asking you for the facts; I assume you tried to do your duty. This was your first inspection of it?

A. The third inspection.

Q. Those three you have described were all you made?

A. Yes, sir.

Q. Now, this woman up there in East Dover that told you for one or two weeks and until the Doctor told her it was a case of typhoid, she had emptied the chambers into the privy vault?

A. Yes, sir.

Q. And after that she did as she told you?

A. Yes, sir.

Q. Disinfected them and buried them?

A. Yes, sir.

Q. Didn't she tell you that she disinfected the privy, too?

A. No, sir.

Q. Did you see the Doctor who was attending the case?

A. Yes, sir.

Q. Is he here?

A. Oh, yes—I don't know—yes, Dr. Cook is here.

Q. He is a reputable physician, is he not?

A. Yes, sir.

Q. And understands his profession?

A. I believe so, so far as I know.

Q. Well, this course that the woman said she pursued after she got word from the Doctor to disinfect the excrement and bury it in the ground was proper treatment, wasn't it?

A. That would depend altogether upon the physical condition of the ground and how deep in the ground she would bury them.

Q. Suppose she should bury it the proper depth, is there any other method known to science at this moment than that of first disinfecting and then burying the excrement?

A. I could not answer that question.

Q. How deep ought it to be buried?

A. I think they ought to be buried two or three feet underground, but that would depend altogether upon the soil and condition of the land.

Q. Do you know the theory of burying them into the earth?

A. I don't.

Q. What?

A. I don't.

Q. Don't you know it is so that the germs would be destroyed by other bacteria that is in the earth?

A. Yes, sir.

Q. And this other bacteria that destroys the bacteria germs are found near the surface of the earth?

A. Yes, sir; I know that, if that is what you are referring to.

Q. Right near the surface of the earth, are they not?

A. Yes, sir.

Q. Than that is the place to bury this stuff, is it not?

A. Yes, sir.

Q. Then if she put them 2 or 3 feet below the surface of the earth, they would be below that influence, wouldn't they?

A. Probably.

Q. Then you were wrong in saying that they ought to be buried 2 or 3 feet, were you not?

A. Probably I am.

Q. That would depend upon the nature of the soil, wouldn't it?

A. Yes, sir, it would depend upon how deep the bacteria were that were to act upon the excrement.

Q. Do you mean to infer to the Court here by what you said that there was any possibility of contamination having come to Jersey City by reason of the Wharton case?

A. I said there was a possibility.

Q. And you think so now?

A. Yes, sir, it might be washed in by sharp showers.

Q. Is that your opinion that this Burlington case or this Wharton case has caused typhoid fever in Jersey City?

A. Well, I would not say that absolutely.

Q. You have just spoken on your cross examination of the case at Wharton?

A. Yes, sir.

Q. The case that was brought from Burlington last February?

A. Somewhere outside of Wharton.

Q. Do you believe that it is a fact that that has anything to do with the present typhoid in Jersey City.

A. Well, we have had typhoid cases right along in Jersey City.

Q. Ever since you were born, haven't you?

A. Probably.

Q. Is there any city in this country of over 30,000 inhabitants that hasn't got cases all the time?

A. Well, outside cases come in sometime.

Q. Well, you know Jersey City's record in that regard is exceptionally good, don't you?

A. No, sir. I don't, I know we have more cases in Jersey City at the present time than we have had in a good many years.

Q. Is it not true that now for the first time typhoid cases are reported?

A. No, sir.

Q. When did you begin to have them reported?

A. Well, our Board has got no power at the present time to compel physicians to report.

Q. Why not?

A. Because we have been trying to get a law passed to take it away from the County Board of Health, and (Interrupted).

Q. Hasn't your Board recently passed a resolution or taken some formal action asking the physicians to report all typhoid cases to you?

A. Yes, sir.

Q. And they have responded and reported them to you?

A. Yes, sir.

Q. When did you send out that circular that you speak of?

A. I think it was in the first of the week or the latter part of last week.

Q. At whose suggestion was it sent out?

A. At the suggestion of the superintendent for contagious diseases.

Q. Previous to that Jersey City never exacted the terms or asked reports from physicians in all its history, did they?

A. I believe that all contagious diseases have been requested to be reported, and typhoid is one of the contagious diseases.

Q. Has your Board taken any steps to have typhoid cases reported except death from typhoid heretofore?

A. Do you mean our Board?

Q. Either the Board of Health of Jersey City or the County Board?

Testimony of Dr. Frederick E. Lambert.

By Mr. VREDENBURGH: Well, ask him one question at a time.

Q. Has the city taken any steps to get reports of cases of typhoid fever until now by the sending out of this circular except reports of death cases?

A. I cannot answer that question.

Q. Well, your physicians responded, didn't they?

A. I belive some did.

Q. And it showed here in October about 52 cases of typhoid fever either ascertained or suspected, didn't it?

Objected to.

(The Stenographer read the question).

A. Yes, sir.

Q. Some of which are in the hospital at Jersey City?

A. I am not sure whether that includes the records of the hospitals or not. I am not keeping the records; we have another doctor that does that.

Q. Did you follow up any of those cases to see where the typhoid fever came from?

A. Yes, sir; I made inquiries of doctors, and one of the hospital doctors told me that he tried to trace one of the cases—there were three cases came to the hospital, one July 21, another July 22, and another July 25, and they were from different parts of the city; one from Monticello avenue, one from Greenwood section and one on the Heights, and there wasn't one of those cases he could trace to anything but our city drinking water; that was his opinion.

Q. Didn't he find other cases where people had been away for vacations in the summer or been elsewhere and came back to Jersey City with typhoid?

A. I found very few such cases, and I asked the physicians to find out if they could.

Q. Mrs. Rowland and her daughter were cases of that sort?

A. I don't know any such case.

Q. How many out of the 52 cases have you any information as to where the cases crame from?

A. I don't know exactly the number, but it is small.

Q. How many deaths from typhoid were there in the month of October?

A. Last month.

Q. Yes.

A. I think 6 or 7 deaths.

Q. You had as many as that frequently before?

A. Not as many as that frequently.

Q. Don't you know that the record of typhoid deaths were only 17 per 100,000 of population?

A. I believe that is all.

Q. Isn't that an exceptionally good record?

A. It is a fairly good record.

Q. Now is there any city in the country that has a better record?

A. Yes, sir; there are several.

Q. Name one of the cities?

A. Well, I am not an expert on such data.

Q. Harrison has a filtration plant, has it not?

A. Yes, sir; Harrison has a filtration plant.

Q. Newark has not?

A. I understand Newark has but Newark protects its water shed and sees to it that a number of houses and such things are removed. There is no town's sewerage running into Newark's water shed.

Q. There is not?

A. I understand so.

Q. Yet the Newark record is not as good as Jersey City's record in the matter of typhoid fever, is it?

A. It is a larger city and there are a great many more people there.

Q. But I mean per 1000 of population; are you not aware that the Newark record is not as good as Jersey City's record?

A. Yes, sir; it is worse than Jersey City.

Q. There are about 250,000 people in Jersey City at the present time, are there not?

A. Yes, sir.

Q. And if there were 52 cases that is about one case actual or suspected for every 5000 people, is it not?

A. Yes, sir.

Q. At this season of the year is not that an admirable record?

A. I do not think even one case is an admirable record if it is necesary to boil your water to protect your citizens from typhoid.

Q. Have you the least evidence to show the Court that so much as one case of typhoid is attributable to the water?

A. I sincerely believe that there are such cases but we cannot always trace the chain of evidence to the water, but I believe our water experts can explain how difficult it is to prove that there is typhoid bacillus in water.

Q. It is bred in milk, is it not?

A. Yes, sir.

Q. And by celery?

A. Yes, sir.

Q. And by lettuce?

A. Yes, sir.

Q. And by oysters?

A. Yes, sir.

Q. And in all kinds of fresh vegetables?

A. Yes, sir.

Q. And it may be bred by water that is impure.

A. Yes, sir.

Q. Have you ever investigated this subject with-

out the influence of water at all, to know about how many we have a right to expect in cities from other causes of deaths per hundred thousand?

A. No I could not say about that.

Q. Don't you know that 16 or 18 up to 20 per hundred thousand is the number without reference to water?

A. Probably it is.

Q. You are not an expert on this particular matter are you?

A. No, sir.

Q. Does the city have bacteriological examinations made of the water once in awhile?

A. Yes, sir.

Q. What bacteriologist does it for you?

A. Mr. Whipple of New York.

Q. Did you ever get Dr. MacLaughlin of Jersey City to do it for you?

A. I think he is employed by the East Jersey Water Co.

Q. Doesn't Jersey City sometimes employ him?

A. Yes, sir.

Q. Who do you employ personally by the city?

A. Mr. Whipple is employed; I don't employ anyone personally.

Q. Who do you employ yourself in your own private practice?

A. I simply warn them to boil the water.

Q. That isn't what I mean. Have you had occasion to have bacteriological examinations made in your medical practice, and if so, whom do you get?

Objected to as not cross examination.

Q. When you went to Dover to make and made tests of the houses who else was with you helping you make the test?

A. Mr. Griffin.

Q. Which one, junior or senior?

A. Mr. Walter Griffin.

Q. Is he the senior?

A. That is the son.

Q. Was Griffin Sr. along too?

A. He was along with our party, yes, sir.

Q. You say you went to 99 1-2 East Blackwell street?

A. Yes, sir.

Q. You yourself went there?

A. Yes, sir.

Q. And personally threw some colored matter into a water closet?

A. No, I did not say that. I say I saw it put in by Mr. Griffin.

Q. That is the first time you ever saw such a thing done, wasn't it?

A. Well, we made some tests previous to that, but that was my first trip to this water shed.

Q. That day you saw it done for the first time there?

A. Yes, sir.

Q. Did you ascertain that there was a cesspool in the back yard of these premises?

A. No, sir; that was the second time I saw it done.

Q. Well, did you ascertain that there was a cesspool in the backyard of that house?

A. Did I ascertain that?

Q. Yes.

A. I believe Mr. Griffin did, yes, sir.

Q. Did you inquire in the house where their drain went, did you get their version of it?

A. They didn't know.

Q. Did you ascertain that the leaders of that house went directly into the river through the pipe?

A. Did I ascertain that?

Q. Yes.

A. I should judge all the leaders of the town led into the river.

Q. I want to know what you ascertained,, I want to see how thorough your investigation was, what did you ascertain about that?

A. I should judge so that the leaders would go there.

Q. Didn't you then ascertain that the leaders from this house went into the river, and pipes from the water closet went into the cesspool in the back yard, and that was the arrangement of this house?

A. Yes, that was the arrangement.

Q. And when you saw put into this water closet some blueing or coloring matter you afterward saw that coloring coming out of the pipe into the river?

A. No, not out of the pipe, it came trickling through the wall of the river bank.

Q. Therefore you inferred it was the same coloring matter that you had seen put in the water closet?

A. I certaily did.

Q. That is all the evidence you have upon that subject?

A. Yes, sir; that was enough.

Q. That was enough for you?

A. Yes, sir; that water closet was contaminating our system.

Q. You assumed that it was the same coloring matter that you had seen put in the water closet?

A. It changes its color. Urine is kind of a reddish powder before and when it comes in contract with water it turns green.

Q. Well it was the same kind of material that you saw put in?

A. The same kind of material, what do you mean?

Q. If somebody else had put some of that green powder into some of the leaders of that house, you would have got the same results, wouldn't you?

A. Well, it was a two story house; I don't think there was anybody up on the roof pouring in that kind of stuff into the leader.

Q. But if they had poured some in at some other house in that neighborhood the same results would have occurred?

A. No, sir; I don't think so because we went directly out after flushing the water through this privy.

Q. You know that very little of this coloring matter diffuses itself through a large quantity of water, don't you?

A. Yes, sir.

Q. That is a fact?

A. Yes, sir.

Q. How much did you put in there?

A. We had a small bottle containing about 4 oz. of the coloring matter.

Q. Did you put it all in?

A. No, sir.

Q. About a teaspoonful?

A. More than that, considerably more than that.

Q. And the water which you saw 10 minutes later trickling through the wall towards the river was of a similar green color?

A. Yes, sir.

Q. Now take the Swedish church that stands on the green flat on the banks of the river?

A. Yes, sir.

Q. The privy that you saw stands a few feet from the banks of the river on the same grass plot?

A. Yes, sir.

Q. You saw some coloring matter put in there I understand?

A. Yes, sir.

Q. And saw some of the green matter afterwards trickling through the wall?

A. Yes, sir; after we had thrown some water on

the heap of effluvia or fecal matter, we did.

Q. Where did you throw that water?

A. On the coloring matter in the closet.

Q. Who threw in the water, who actually did it?

A. Mr. Ransom threw some, Mr. Griffin threw some.

Q. Threw pails of water?

A. Yes, sir.

Q. And then you saw it trickling through the stone wall, saw this color coming out of there?

A. Yes, sir, plenty of it.

Q. Now, doctor, if you were told by a health officer of the city of Newark that he had done that repeatedly and had thrown 20 pails of water in there and could not get such results, don't you think you might be mistaken about it?

A. I would think that man was trying to deceive somebody because I had the President of the Board of Health of Dover with us that day, and if you would like to hear the conversation that took place between us, I will give it to you.

Q. No, you need not give it. What was his name?

A. Lavine.

Q. If you had put your green matter in the loose stones in the bank and a little water had been spilled on that, wouldn't you get the same results?

A. No, sir, that is, we couldn't have got such enormous results.

Q. Well, did you get an enormous quantity?

A. We got it out of several places, not out of one place, but several places, it came through there very plainly.

Q. How much water came through there?

A. We did not measure it, we saw it.

Q. How many pails of water did you put in there?

A. We put in probably 10 or 12.

Q. Until it flooded over the top?

A. Top of what?

Q. The vault?

A. No, sir.

Q. But you said that the vault was filled up to the floor of the vault?

A. That was this heap.

Q. Heap of solid matter?

A. Solid matter.

Q. Was there any liquid in the bottom of it?

A. I could not see any liquid in the bottom there, sir.

Q. How deep was the vault?

A. I did not take its measure.

Q. How deep judging from what you could see?

A. I could not judge from what I saw, I did not take the measure of it at all, that is to say the depth of it.

Q. The water that was thrown in was drawn from the river, I suppose?

A. Yes, sir; above the point where the stream flows.

Q. On the river?

A. Yes, sir.

Q. Now you spoke of one place where you saw fecal matter in the river at the mouth of the drain?

A. Culvert.

Q. How do you know that was fecal matter?

A. Why simply I saw it.

Q. How close were you to examine it?

A. One of us went down to the river and took a stick and poked it under one another's noses.

Q. Was it from sense of smell you got that?

A. Yes, sir.

Q. That was where?

A. This place where the canal flows into the river ——about two blocks from where the canal flows into the river.

Q. Two blocks above or below it?

A. Two blocks above it.

Q. I think your counsel described that as a place where you saw steam coming from?

By Mr. VREDENBURGH: No, sir; I did not say that; I said steam came out of the same place.

Q. Was this up stream from the pipe or down the stream where you saw fecal matter?

A. That is where the intersection of the canal is, where it runs into the river.

Q. And was fecal matter on the shore or in the river?

A. Well, the culvert is in the river bank, and it was on a slab of stone forming the mouth of it.

Q. Was there any water running in the culvert at that time?

A. Yes, sir; a small quantity of water.

Q. Who took you to that place and showed you that drain?

A. Mr. Griffin.

Q. He was the guide of your party in all of your inspections?

A. Yes, sir.

Q. Junior or senior?

A. Both.

Q. Was it near the bridge?

A. Yes, sir; a small bridge.

Q. And near the canal?

A. No, not near the canal; it is where the canal runs into the river, they meet there.

Q. Was it upon the right bank or left bank as you go down?

A. It was on I should judge the east bank.

Q. That is the right bank?

A. Yes, sir.

Q. You have spoken of the Liondale print works, and you mention three dams of big stones you saw

across the ditch and you gathered that that was the method of purification adopted?

A. That is the impression I got because above the first dam the water was so disturbed and cloudy, so apparently foul—

Q. Did you make any more examination of that place than to look at the 3 stone dams?

A. I went along the banks of this wide brook about 20 feet or 18 feet wide.

Q. Water is discharged from the mill into the brook?

A. That I could not say.

Q. Don't you know Doctor, from fifteen to twenty thousand dollars has been spent there in putting in an elaborate system for taking care of the sewage?

Objected to.

Q. You thought these three stone dams was all the provision that was made there for taking care of the effluent from that mill?

A. I would not like to say that.

Q. Well, did that have any office at all except merely to collect the scum or whatever there is on top of the water?

A. That I understand was the refuse, the wash water or whatever they use in the way of rinsing—that water flowed into this stream.

Q. Didn't you see an arrangement for treating all that water with sulphate of aluminum?

A. Yes, sir.

Q. What is the effect of that upon dye stuff?

A. It is supposed to purify it.

Q. What is the action of sulphate of aluminum supposed to be upon the water?

A. It is supposed to kill bacteria and purify the water.

Q. Where did you get that information?

A. What information?

Q. That sulphate of aluminum is supposed to kill bacteria?

A. I did not get it from anybody, I did not ask anyone to give me that information.

Q. You don't pretend to be an expert on those matters?

A. I certainly don't.

Q. You don't know the conditions of the effluent that really goes into that ditch or canal?

A. I do not.

Q. You don't know the condition of it as it comes out below into the river?

A. Well, I saw it, and from physical appearance, I saw that the water was still discolored.

Q. That is all you have to pass your opinion upon?

A. Yes, sir.

Q. You did not go down the river to see how far the discoloration continued?

A. No, sir.

Q. That rather shocked you and you thought a circular was necessary to be issued to Jersey City?

A. That had nothing to do with it, I should issue a circular again to-morrow or any common sense mad-man would with respect to that water shed where there are 2 towns of 14,000 people, sewerage emptying into our water shed without any protection whatever; I certainly advise the boiling of the water from that water shed.

Q. Did you ascertain that two towns of 14,000 people were sewering into the water shed?

A. In a general way because Boonton and Dover in that neighborhood certainly had no disposal sewer, and they must be sewering into our water shed.

Q. Did you find one sewer emptying into the water shed?

Testimony of Dr. Frederick E. Lambert.

A. I saw these pipes and culverts and all these outhouses along the banks of the stream within a few feet that had improperly built vaults underneath them.

Q. Did you go into any of them and examine them?

A. Yes, sir; I saw those tests made as I stated before, and I noticed cement was placed upon the upper layer of stones just a flimsy attempt to deceive the public, as it seemed to me.

Q. What was the flimsy attempt to deceive the public?

A. That cement placed upon the top layer of stones whereas underneath you could pull the stones off and see the fecal matter a few feet from our stream.

Q. The walls of all those vaults are mostly made of loose stone without any attempt to make them tight, are they not?

A. Well, they are cemented at the top of the wall of the privy vault.

Q. Did it happen to occur to you that that was done intentionally?

A. Well, there is no cement underneath where the ground and the stones met; there was no cement there whatever.

Q. Wasn't it dry all the way up to the top? In some cases you found that so, didn't you?

A. I could not say that, it was too dark to see all the way down.

Q. Now, you speak about towns sewering into the stream—on the contrary didn't you find privy vaults at each house?

A. There are privy vaults but they are not sanitary vaults that I found there.

Q. I don't care for your sanitary opinion, you say you don't know anything about that, but didn't you

find privy vaults such as they use in country places all through there, now please answer that question?

A. I found privy vaults on the banks of the stream all through these two towns.

Q. All along the water shed here on the banks of the stream or not?

A. Yes, sir.

Q. And your idea is that if you had concentrated all these 14,000 people into one disposal works and let that go into the river, that it would make it safer for Jersey City?

A. No, sir.

Q. Well, do you know anything about that subject?

A. Well, I have inquired about it, read something about it since the inspection of the water shed.

Q. That is within the last two or three weeks?

A. Yes, sir.

Q. But you never examined any other water shed before this did you?

A. No, sir.

Q. In view of the lapse of time from last February until this time, since the typhoid case was brought from Burlington to Wharton, you would not suspect any trouble from that cause at this date, would you?

A. Our experience shows that you can't tell, and from my knowledge and reading about typhoid bacillus you cannot tell for the life of it how long it will live; some live two or three months, some say they will live a year.

Q. You think you could find them in water a year afterwards?

A. I don't mean to say you could in water but they could live on silk or some other fabric in a dry state, and then afterwards get into the water.

Q. Did you make an investigation of that case at Wharton?

A. We made an investigation of the privy vault.

Q. Did you make an investigation of what was done after the patient was brought from Burlington to Wharton, and how matters were treated there?

A. We saw the vaults where the stools were thrown.

Q. Don't you know that before he was brought there it was known that he had typhoid fever, and that there was a protest by the people there against his coming, and that from the day he came in there he was under the charge of a skilled physician and the health officer of the place, and had everything done in a sanitary way that could be done, didn't you learn that?

A. I did not learn that he was under the protection of an apology for an officer. I know the attempts they make up there.

Q. Do you call the health board of Wharton an apology for a board?

A. No, sir; at Dover.

Q. Well, they might retort on you for that?

A. No, sir; I don't mean Wharton, I mean Dover.

Q. Didn't you learn that he was under the charge of a physician or health officer from the time he came?

A. I learned that he was under the charge of a physician.

Q. You did not find anything to lead you to suspect trouble from that case, did you?

A. I should feel that the close proximity of that privy vault to the stream would be an unsafe condition there.

Q. You are assuming that he used that privy vault when he had typhoid fever without disinfecting?

A. Well he might have done so before the germs of the fecal matter were dead.

Q. Where was the place where you saw steam coming into the river?

A. It was in the brook alongside of the river about two blocks from where the intersection of the canal and the river is.

Q. Left bank or right bank?

A. I am not positive about which side of the river it was.

Q. The steam was coming out into the river?

A. I didn't see that at the time, there was steam coming out into the river, I did, some of those brooks up there that led into the water shed I saw steam coming out of.

Q. You saw the houses sewered into the river, what houses are they?

A. Well, there are a whole row of houses there.

Q. Well, what street?

A. Well, there is one running along Blackwell street.

Q. Who told you they sewered into the river?

A. Who told us they sewered into the river?

Q. Yes.

A. We could see with our eyes.

Q. You could see they sewered into the river, doctor?

A. That there was no other place for the sewer to go to but into the river.

Q. Don't you know there are cesspools all along behind that row of houses on Blackwell street, connected with those houses?

A. Well, I have seen these cesspools, as I said before, and taken tests.

Q. Did you on the Blackwell street houses?

A. I beg pardon.

Q. On the Blackwell street houses I am talking about?

A. Yes, sir.

Q. Did you see the cesspools—how many did you see?

A. I saw the privy vault—you are speaking about the 99 1-2.

Q. You are speaking about the row of houses; now you mean the same row in which 99 1-2 stands, don't you?

A. No, sir; I don't mean the same row.

Q. Can you identify it in any way.

A. We have it here in our notes, I don't know just exactly the geographical situation there of which row it is, I know there is a row there that sewers into this brook, or the drain of the houses.

Q. Why do you mean that assertion that they sewer into the brook, what evidence have you of that?

A. We took tests of the urinite.

Q. In 99½, but where else that you found any such result as that?

A. Well, we didn't in this particular brook that you speak of; we didn't take any tests there, but we could see the drains of the houses running into this brook.

Q. You saw the drain of the houses running into it?

A. Yes, sir; those little pipes they have under the ground that lead into this drain.

Q. Behind what house was that?

A. I don't know just the particular house.

Q. You assumed that was the sewer of the house?

A. I didn't see the sewer of the house, it was a house drain.

Q. What water do you mean by that?

A. Washing old rags or clothes or anything of that kind.

Q. Do you mean the kitchen sink?

A. Yes, sir.

Q. How do you know the kitchen sink went there?

A. Why, we took tests in one.

Q. Which house?

A. In the house on Canal street.

Q. Number?

A. Why, I was next to the house where the young man was sick with typhoid fever.

Q. Oh, that is in Wharton?

A. Yes, that is in Wharton.

Q. Well, I was trying to find out at Dover; you made some pretty broad assertions, doctor, and I want to know where they are—the Water Company wants to know where they are.

A. There was another cesspool or privy—

Q. No, just let us take that row of houses first; you said there was a row of houses on Blackwell street?

A. Yes, sir.

Q. And you added that they were discharging sewerage into the river, how do you know that; any of them, except 99½ where you had certain evidence?

A. Well, we didn't take tests of those.

Q. Then we will drop those?

A. Yes.

Q. Now, what was—

A. There was another cesspool.

Q. You didn't go inside of these houses, except 99½?

A. No, sir. Well, we did at Wharton; I went inside of the house where we took the test.

Q. The house next door to where the man had been sick with typhoid?

A. Yes, sir.

Q. What did you see?

A. Took a test of the kitchen sink water there.

Q. What was the result?

A. Ran out into the canal for about four or five minutes.

Q. That is the Morris Canal?

A. Yes, sir.

Q. That is the only test you took there?

A. Yes, sir, at that particular place, yes, sir; there was another test on Blackwell street that we took of a privy there, with one of the Inspectors of the East Jersey Water Company.

Q. You mean the Jersey City Water Supply Company; the East Jersey has nothing to do with it and never did.

A. Well, the company that is supplying Jersey City with water.

Q. That is the Jersey City Water Supply Company.

A. And we found a privy there that had been advised by the inspector, I believe Mr. Gibson, to move it, so the woman stated; they had an overflow of the banks—the stream.

Q. What street and what house?

A. On East Blackwell street; I forget the number.

Q. She said the inspector had advised them to move further back from the stream?

A. Advised them to move to another part of the lot.

Q. Was it being moved?

A. It had been moved and we took tests of that, and it came out within a few minutes.

Q. Came out where?

A. Into the stream—Rockaway river.

Q. Can you locate that?

A. Yes, sir, I can locate it, it was on East Blackwell street.

Q. Street, name or number.

A. East Blackwell street, and the name of the woman on the place, Mr. Griffin has that in his memorandum.

Q. I wish you could get it and give it to us.

A. 372 East Blackwell street; no that is not the

one. There was a test made at that place, at 372 East Blackwell street; the man who owns it his name is Jenkinson; the privy vault was full and within five feet of the water; put ten pails of water in and after waiting twelve minutes green dye appeared in the water, having soaked through the dirt and cinders.

Q. Is that the one you had reference to?

A. No, that is another test.

Q. Are you able to give any other? You need not do it now, but you can hand it to us at any time. In consequence of these trips did you do anything?

A. Yes, sir.

Q. Except to have a circular issued in Jersey City?

A. Passed resolutions in our Board, appealing to the State Board to aid us in the fight of the purification of the water shed.

Q. Anything else?

A. Also to the Board of Finance.

Q. Asking them for money?

A. And also to the County Board.

Q. Well, that is all, is it?

A. Yes, sir.

Q. Did you give a list of these suspected places to the Jersey City Water Supply Company or any of its officers?

A. I believe they have that.

Q. Well, did you give any such—we haven't it at all, sir?

A. I don't know then.

Q. Well, you knew they had Dr. Leal and inspectors there for the very purpose of watching these things, didn't you?

A. I was so informed.

Q. Have you ever since you have been on the Board given the company information of so much as one spot that you suspected, or called their attention to any place where you thought their attention ought to be directed to?

A. I have not.

Q. Has the Board ever done it?

A. I don't think they have.

Q. Have you taken any steps to have anything done at these places in Dover or Wharton, that you have mentioned?

A. Why, simply as I said, we appealed to the State Board to help us in the fight against the pollution.

Q. But you haven't fought any yet.

A. Well, we are going to.

Q. Well, now, why didn't you notify the people?

A. We are going to keep pounding at the East Jersey Water Company until they get pure water.

Q. Did you call upon the Board of Health of those places to do anything?

A. We have, yes, sir; when we weren't shown the common courtesy of calling. They said they would call a meeting and they didn't call it.

Q. Did not the President of the Board of Health at Dover offer to you that if you would call his attention to anything you thought was wrong, he would investigate it and abate any nuisance found?

A. I never heard him say any such thing.

Q. Mr. Rudean?

A. Yes, sir. He promised he would call a meeting of the Board and co-operate with the Jersey City Board too.

Q. Didn't he say he would abate any nuisance found?

A. No, sir, but when we went up there the second time we asked him in the presence—when we were testing this Swedish Church, we asked him if he would call the meeting and he said no, he wouldn't call the meeting; he couldn't, and he wouldn't call the meeting, because it cost $3.00 a member to call the meeting and he couldn't do it.

Q. That is what he said to you first?

A. Yes, sir.

Q. Didn't he afterwards say substantially what I have said—that the Board would co-operate with you and abate any nuisance found?

A. No, sir. If you want to know what statement he did make—

Q. I asked you whether he made that statement in your presence?

A. If you want to know the statement he did make I will tell it to you.

Q. Did you do anything to make conditions safer at Barton's house?

A. Did we do anything?

Q. At Barton's house, did you do anything there?

A. Why, I understood that the woman was so informed after she had been told, at least informed by the doctor in attendance to take care, to take care of the stools properly.

Q. But you didn't take any steps to do anything?

A. No, sir.

Q. And you didn't notify the Water Company?

A. We didn't notify the Water Company, no, sir.

Q. You are aware, doctor, that the Water Company since you have been a member of the Board has twice filed bills in chancery to restrain nuisances there, are you not?

The COURT:—Well, that don't make any difference.

Q. In the name of your city?

Objected to.

Objection sustained.

Q. To whom do these reports from physicians in Jersey City come of cases of typhoid known or suspected?

A. Why, I believe they come to our Board, the death notices—

Q. No, the cases; the death notices go to the County Board.

A. They go to the County Board.

Q. In these publications in the Observer which you have mentioned, I notice a table purporting to give comparative numbers of typhoid cases reported in the past few years; did your Board furnish that?

A. I don't know.

Q. But, as a matter of fact there have been few cases reported previous to your circular?

A. Well, I am not the superintendant of the bureau of contagious diseases; he is here and will answer all those questions.

Q. Isn't it a fact, doctor, that less cases have been reported to your Board in typhoid than the actual number of deaths reported to the County Board, up to October?

A. Up to October?

Q. Previous to October?

A. Oh, no; oh, no. There are more cases of typhoid reported than deaths if that is what you mean.

Q. Previous to October?

A. Previous to October.

RE-DIRECT EXAMINATION.

Q. Doctor, just one question. This sewer vault of privy that was at Wharton, about which they have asked you, it was the privy connected with the house in which this young man had typhoid fever in February—that water closet was how near the river?

A. I should judge about eight feet—the canal.

Q. And did you make any examination of that privy and vault to see whether it was tight, or what tests did you make?

A. Yes, sir, I did.

Q. What tests did you make of it?

A. We pulled the stones out and looked right into the vault; the appertures or crevices there were quite large, enough to allow the drain into the soil and into the river or into the canal.

Q. And from your examination of that what was your conclusion as to the contents of that closet, going into the river?

Objected to as not competent.

Q. Did you make any other tests to see whether the contents were going into the river?

A. Not in that vault; no, we made no test.

Q. Why not?

A. Why, I don't know why we didn't, but we didn't.

Q. Did you make any test in the house?

A. Yes, sir.

Q. What part of the house?

A. In the sink that is next door; we couldn't get in this house of Rowes; they lived next door to the house.

Q. You didn't make any test in the Rowe house?

A. No, sir.

Q. Why was it that a test in the next house furnished you any information as to the Rowe house?

A. Well, it didn't in a sense furnish any information, only as I say, the vault being so close to the stream that like the rest of the vaults polluting the stream it could readily go into the water.

Q. That is all, sir.

Testimony of Dr. Samuel H. Culver.

DR. SAMUEL H. CULVER sworn:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Are you a member of the Board of Health of Jersey City?

A. I am.

Q. And you have been a member how long?

A. For months.

Q. You have lived in Jersey City how long?

A. All my life.

Q. You practiced medicine there how long?

A. Since 1897.

Q. And as a physician have you any connection with the St. Francis Hospital in Jersey City?

A. I have; I have been on the staff there for a good many years.

Q. St. Francis Hospital is situated where, in Jersey City?

A. East Hamilton Park, Jersey City.

Q. In lower Jersey City?

A. It is the lower portion of the city.

Q. About the central part of the lower part of the city?

A. Yes, sir; central lower portion.

Q. It is the largest hospital in Jersey City, or not?

A. I cannot answer that question.

Q. There is another hospital in Jersey City called Christ Hospital?

A. Yes, sir.

Q. And that is in charge of the city, is it?

A. No, sir.

Q. There is also the City Hospital?

A. Yes, sir.

Q. Now, you know the St. Francis Hospital, will you please state how many cases of typhoid fever you have in St. Francis Hospital at the present time?

A. Eighteen cases there today.

Q. Eighteen cases?

A. Yes, sir.

Q. In all your experience in that hospital, have you ever had as many as eighteen cases there before?

A. No, sir.

Q. What is the highest number that you ever had before in St. Francis Hospital since you have been connected with it?

A. I have never seen more than ten there.

Q. Now these cases, can you tell us in what respect they are distributed through the city; do they all come from the same ward or are they fairly distributed through the city?

A. I don't know anything about that.

Q. Are these seventeen cases in the hospital at the present time?

A. Eighteen cases there today.

Q. Eighteen there at the present time?

A. Yes, sir.

Q. And how long do you suppose the longest has been there?

A. I cannot tell you in regard to that; I suppose some of the cases are convalescent, and I know that some of the cases were discharged during the week, so that would even up matters; you might say there is eighteen absolute cases of typhoid fever, no question about them at all. There are always cases sent into hospitals that are not typhoid fever, we find that out after we have them there twenty-four hours or longer, but these are all genuine cases.

Q. Doctor, did you, as a member of the Board of Health go at any time to the water shed at Dover and Wharton?

A. I went there on September 1, 1906.

Q. September, do you think it was?

A. November first I mean, I beg your pardon.

Q. A few days ago?

A. Yes, sir.

Q. Who went with you, what doctors?

A. Dr. Lambert and Dr. Finnerty and Dr. Sauer.

Q. Where did you go?

A. We went to Dover.

Q. Yes?

A. And from there to Wharton, and from there to Boonton.

Q. While being in Wharton, did you examine the closet there in the house in which this person Rowe was sick at Wharton?

A. Yes, sir.

Q. It is testified that he was sick in February. Do you consider there is any danger to those who use the water in Jersey City from that case at Wharton?

Mr. CORBIN:—I object to that; the witness has shown no competency to give an opinion on that subject.

Mr. VREDENBURGH:—He is a physician, may it please your Honor. They cross examined Dr. Lambert when I had not asked the doctor about such things as that and they have the benefit of that cross examination.

Mr. CORBIN:—I submit that Dr. Culver has shown no competency to give an expert opinion on that question.

The COURT:—Well, I think you better find out whether this witness is competent to speak on that subject.

Q. Doctor, as a physician, have you investigated the subject of typhoid fever among others?

A. No, sir; I might say that I am not qualified to enter into a discussion of this matter; I am not here

as an expert, simply to state what I saw at these places.

Q. Well, what did you see at Wharton?

A. I was taken to Wharton, and at that place I was taken into a back yard, and there saw a privy vault, and we tried to enter a house and couldn't get into it, so we went next door and asked the people if they would mind letting us make a test; they said no, so we borrowed a pail from them and at first we took a little dye material and threw it into the sink and allowed some water from the faucet to wash this dye material out; we immediately went to the bank of the canal and saw that the water was discolored. Then we took a pail of water and put some dye material in it and went to the toilet in the yard, which was about eight or ten feet from the bank of the canal and threw this dye material into the vault; the vault was practically full to over-flowing with excretia. The dye material solution went right through the stone work of the vault, and there is quite a decline toward the canal, and the material went right down into the water, had passed out in about, well, I should say, four places any way; there might have been more that I didn't observe, and the stream was as big as my finger from each place.

Q. You said it went down into the water; do you mean the water of the canal?

A. Water of the canal.

Q. What other examination did you make in the watershed?

A. We went to another place and made a test, borrowing a pail of water and throwing the dye material into the toilet, which was very close to the bank of the stream; I don't believe that was more than five feet.

By Mr .CORBIN:

Q. Where was this?

A. I cannot tell you where it was; the material went into the canal.

Q. Do you know what town?

A. I think it was on the outskirts of Dover; I wouldn't be positive in regard to that.

FURTHER DIRECT EXAMINATION:

Q. Well, what was the contents of that vault; did you look at that to see as to its contents?

A. No, I didn't go into that one, but I watched for the result of the test, and we didn't get the result for some time, and we wondered why we didn't get it, so we looked in the canal and found that a lot of ashes were thrown where we expected to find the result of our test, so Dr. Sauer poked a stick through those ashes and found the result of the test very quickly; if we had waited a little bit longer undoubtedly the test would have come through in the center of the stream.

Q. How near was that vault to the canal, do you say?

A. It didn't seem to me it was more than five feet.

Q. What else did you do?

A. Previous to that I looked around Dover a little bit.

Q. Yes, made any tests there?

A. No, sir.

Q. Did you see anything there?

A. I saw a barn there where they had a number of horses, right on the stream, and it appeared to me as though the contamination must pass into the stream; and I also went to Boonton afterwards and at that place I saw the sewerage of the town empty into the canal. There is a board, sort of a lock between two portions of the canal at that place, to protect the water of the canal from flowing back; a little further on there is a break in the canal, where

the canal and the river run along just a few feet from each other, and in times of a severe storm I should think it would be an easy matter for this drainage material to pass through this sluice-way into the river.

CROSS EXAMINATION by Mr. Corbin:

Q. Where do you see a break in the canal at Boonton?

A. Might have been about four hundred feet below the lock.

Q. And water passing through it?

A. Not at the time I was there; no, sir.

Q. Well, why did you call it a break in the canal, then?

A. Well, it is a break; the bank between the canal and the river at that point is not at the same height, it is at other portions.

Q. The tow path washed away; something like that?

A. It might be that, I don't know what made the depression there.

Q. You say you saw what you took to be a break in the Morris canal tow path, about four hundred feet from this lock that you have spoken of?

A. Yes, sir.

Q. Were they repairing it?

A. No, sir.

Q. Were the dredgers at work in the canal dredging out the bottom?

A. No, sir.

Q. This break you saw on November first?

A. Yes, sir.

Q. And your theory is that if the waters in the canal should be raised they would flow over at that point?

A. I should think so.

Q. How much would they have to be raised to flow over at that point?

A. About a foot.

Q. You didn't follow down the canal to see where the overflow was, did you?

A. I went down to the reservoir.

Q. You followed down the tow path for a distance and then down to the reservoir?

A. Yes, sir.

Q. But you didn't observe where the overflow of the canal was?

A. No, sir, I didn't.

Q. You also made a statement to the effect that you saw the sewers of Boonton coming into the canal; where did you see any such thing as that?

A. At the left hand side, I might say, of the canal, facing Jersey City.

Q. You refer to the drainage you saw going down the inclined plain in a cement drain that is built there, didn't you?

A. Yes, sir.

Q. You didn't go any further up to see where this came from or what they were?

A. No, I didn't.

Q. You say that water was coming down into the ditch at the head of the Plain and thence into this concrete trough that runs down into the Plain?

A. Into the canal, yes.

Q. Did you ever inspect water sheds before this, doctor?

A. No, sir.

Q. I suppose you made no special study of sanitary matters in this line?

A. No, sir, I don't wish to go into that matter at all.

Q. Now, of those eighteen cases of typhoid in the St. Francis Hospital, in some cases are there two or more from one family or household?

A. I don't know anything about that.

Q. You have no knowledge about that at all?

A. The only knowledge I have about them is what I obtained this morning from telephone message to the sister at the hospital.

Q. You don't know then whether they have come from the country with it or anything of that kind; you haven't investigated that?

A. Couldn't say in regard to that.

Q. You said that you never before had noticed so many there; how long have you been in the medical ward or the typhoid ward?

A. About eight years; I might say nine years.

Q. Have you been on duty in the fall heretofore?

A. Yes, sir; all portions of the year; go on duty every three months.

Q. That is all.

Testimony of Dr. John H. Finnerty.

Dr JOHN H. FINNERTY sworn:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Are you a member of the Board of Health of Jersey City?

A. I am.

Q. Have been a member how long, sir?

A. About six months, I guess; six or seven months.

Q. You have been a physician in Jersey City how long, sir?

A. 22 years.

Q. And did you visit this water shed?

A. I did.

Q. Lately?

A. Yes, sir.

Q. When did you first go up there?

A. October 24th.

Q. What did you do after you got to the water shed; who went with you first—what doctors?

A. Dr. Lambert and Dr. Sauer, that was all.

Q. Well, Dr. Lambert is President of the Board of Health, and Dr. Sauer, what office does he hold?

A. He is the Superintendent of contagious diseases.

Q. Now when you got to Dover what did you do?

A. Well, we went first to a—

Q. The Board of Health of Dover?

A. No, we first went to a silk mill that is up above Dover, on the way to Wharton.

Q. But after you got to Dover what did you do?

A. Well, I was going to say we went up there on the way up to Wharton.

Q. Well, go on; then from the silk mill where did you go?

A. We went to Wharton, and the first thing I saw was a drain that came out from a water closet and

went along under a hen coop, it seemed to me, and down through the rear of a school yard and along down through the valley, through the meadows or through the grass and emptied into the canal.

Q. Well, what do you say as to that; did you see anything in that brook?

A. Well, there was water in it; it was a running brook with those contents on them that I have just stated.

Q. Well, then, what next did you see, doctor?

A. Then we saw the house where the typhoid case was supposed to be—a Mr. Rowe—and that was the construction of the vault, and we made the test there and received it in the canal, inside of a few minutes.

By Mr .VREDENBURGH:

Q. You made a test in the vault?

A. I made a test in the vault and also in the sink.

Q. Well, what was the result of the test of the vault?

A. The water poured out and went down a little drain from the closet down the bank into the canal.

Q. Then where did you go? Before you go on, doctor, permit me to ask you how far this vault was from the canal?

A. About ten feet.

Q. Now, go on.

A. We went from there back to Dover, and we saw where the different pipes were entering into the canal above the bridge. And then we saw the canal where it united with the river below the bridge. We saw the square drain that emptied into the canal there, and the faeces in it.

Q. Human?

A. Yes. It was brown on top. Good healthy color. And there was water pouring out of that; and the foam looked as if it might be quite handy

to some beer saloon off a little extra pressure. We looked at the canal there, and it was covered with scum—thick scum— and the water was dirty, cloudy. There was vegetable matter in it above the lock, and we went along down the river then. On the left, going down, there is a drain that started in the neighborhood of some houses that were there, and it seemed to get larger and larger as it went down until it eventually ran right into the river.

Q. Yes, go on; just state what you did next.

A. Farther down on the left we came to a place where a drain came out from under the road, as it were, and passed around the corner of a house where the sink drain was running in it, and down around until it swept right by the water closet, and on down under the railroad and into the river.

Q. Yes, what—

A. Further down the river, on that side, on the left side, we made a test in a sink drain right near the bridge, and inside of three minutes the river was all green.

Q. Up to that time you hadn't seen the Board of Health of Dover?

A. No.

Q. Did you see the Board of Health?

A. I saw, I think it was, the Health Inspector, Mr. Taylor.

Q. Did you make any investigation from him as to any typhoid fever?

A. He said there wasn't any typhoid fever around; they hadn't had any reported to their office. Still, they woudn't allow us to look at their statistics or their records.

Q. Did you find whether there had been any typhoid fever there subsequently?

A. Yes, we heard of two cases there; one at—we

heard of one case at Dover.

Q. And who did you hear that from?

A. Well, we heard it from—it seemed it was known before I got there.

Mr. CORBIN:—I think you had better answer the question, doctor.

Mr. VREDENBURGH:—He is answering it to suit me.

WITNESS:—I don't know who I heard it from. It was said, but I heard it afterwards from Dr. Cook who attended the case.

Q. Did you go to visit the house where that case was?

A. I visited at the house.

Q. That was on the 24th of October?

A. No, I didn't visit the house on the 24th of October.

Q. You didn't?

A. I visited the house on the 29th of October—my second visit.

RECESS UNTIL TWO P. M.

AFTER RECESS.

Dr. JOHN H. FINNERTY on the stand:

FURTHER DIRECT EXAMINATION by Mr. VREDENBURGH:

Q. Doctor, you were just about describing the house where this Barton was, in Dover or East Dover. Will you please continue that description of that house; did you see the sick patient there?

A. No.

Q. Well, did you see the house?

A. I did.

Q. Well, did you see the cesspool—the closet?

A. Yes.

Q. Won't you please describe that in connection with the drain in the street?

A. The closet stood about, I supose, twenty-five or thirty feet from the brow of the hill, and five or six feet from the closet; the closet was filled to overflowing, and it was all wet between the closet and the brow of the hill five or six feet away. And the drain was down below, perhaps fifteen or twenty feet below this high bank.

Q. Was there anything that you saw to prevent a shower or a rain from carrying that stuff down into the drain and so on into the brook?

A. On the contrary, it would wash everything there down.

Q. This drain ran down to a brook did it? And about what distance do you think it was?

A. I suppose five or six feet off.

Q. And about what was the grade from the street in front of this cesspool down to the brook? About what grade?

A. Oh, I suppose a grade of 45, likely.

Q. A descent from the house to the stream?

A. Oh, from the house to the street drain?

Q. In front of the house to the stream.

A. The rear of the house to the street drain was almost perpendicular.

Q. The rear of the house?

A. Yes.

Q. And how far was the closet from that perpendicular?

A. Perhaps twenty-five feet.

Q. Now, the second day that you were there was when?

A. That was the day I saw this place, the second day. Some places I saw the first day and some places I saw the second, and I saw most of them three times. And the third day I saw Rockaway and Boonton, Powerville and so on, Lyondale, the factory, and one thing and another.

Q. You heard Dr. Lambert testify to these various places. Did you see substantially the same places that he testified to, or not?

A. Yes.

Q. And the tests that were made in his presence you saw also?

A. Yes.

Q. Where you made the tests, what was the result as to its reaching the river?

Mr. CORBIN: I object to that unless the details are given.

A. It got into the river all right.

The COURT: Is it worth while to go over the same thing?

Mr. VREDENBURGH: Each one? I don't think so.

Q. And, doctor, what action did you take with reference to the drinking of this water after you returned?

A. I ordered my wife to boil it.

Q. Did you have any conversation with the Board of Health there in Dover? Did you have any conversation with the President of the Board of Health?

A. The President of the Board of Health was there at the Swedish Church when we made the test the second day. We made a test also the first day at the Swedish Church.

Q. The second day did he see the test?

A. Yes.

Q. Did you hear any appeal made to him to act as to the Board of Health?

A. Yes; but he said it wouldn't pay to call the Board of Health together. The town was poor, and it would cost twelve dollars. Dr. Lambert asked him what he thought of the condition of things after he had seen the test. "Well," he said, "the fact of the matter is this—"

Mr. CORBIN: I object to his statements; it isn't evidence.

Mr. VREDENBURGH: That answer is ruled out, is it, your Honor?

The COURT: It is hearsay evidence, and it is objected to.

Q. Suppose you tell us what you saw down at Rockaway.

A. We saw that canal there, flowing down through the yard of the Lyondale Print Works and uniting with the river; muddy, cloudy water, with a heavy scum on it, dammed up by means of a stone wall.

Q. Dr. Lambert has testified to that?

A. Yes, saw all that.

Q. Did you see anything else in Rockaway, other than what Dr. Lambert has testified to?

A. No, I guess he testified to it all. I saw across from this canal that runs down the rear of the mill towards the bank, through the brush and vegetation, there were several little piles of stone almost out of sight. There was also a gully running down on the outside of that.

CROSS EXAMINATION by Mr. Corbin:

Q. Did you ever inspect any water sheds before?

A. Yes, I have seen water sheds before; I saw the Metropolitan water shed.

Q. Did you make any inspection in your profession?

A. I made no professional inspection, no; but you asked me if I saw any.

Q. I asked you if you had inspected any. But you have never made any such study of sanitary matters except as a physician, I suppose?

A. That is all.

Q. That is sanitation of cities, water supplies; that isn't in your line, is it?

A. No, that isn't in my line. You ask me if I am an expert, I suppose?

Q. I asked you the question. Have you made any study of that subject?

A. I am not an expert in that matter.

Q. Did you ever see one of these tests with color made before until you went to Dover?

A. I don't remember that I have.

RE-DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Doctor, do patients with typhoid fever ever die with pneumonia?

A. Oh, yes; we have cases of typhoid pneumonia, and they are as apt to die of pneumonia as they are of the typhoid; somethimes, even more quickly, perhaps.

By Mr. VREDENBURGH:

Q. The baccili of typhoid pass from the patient, doctor, at what stages of the disease, do you know? Have you any knowledge on that subject?

A. Oh, you mean about the condition of the bowels, I suppose.

Q. Yes.

A. Yes, they have a diarrhoea sometimes before they come under a physician's care oftener than otherwise; and that is apt to continue all the way through. Sometimes they don't have a diarrhoea.

Q. When they have that diarrhoea from typhoid fever, do they then pass typhoid germs?

Mr. CORBIN: I object to that. The witness isn't qualified to speak as to that.

The COURT: I suppose any physician can tell that.

WITNESS: Any physician can say that. That isn't scientific. I have got to know that; if I don't I couldn't be practicing medicine in New Jersey.

A. Yes.

Testimony of Dr. Richard L. Cook.

Dr. RICHARD L. COOK, sworn for the complainant:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Doctor, you are a resident of Dover?

A. Yes, sir.

Q. And practice your profession as physician there?

A. Yes, sir.

Q. And how long have you practiced there?

A. In the neighborhood of eighteen years.

Q. Eighteen years?

A. About.

Q. Do you recollect this case of Joseph Barton?

A. Yes, sir.

Q. Were you the physician that attended him?

A. Yes, sir.

Q. On what date did you first see him?

A. On the 19th of September.

Q. What condition was he in when you saw him?

A. Well, at that time he had had a chill that morning, and a high fever, and general aching all through him.

Q. Was he in bed?

A. Yes.

Q. He had been in bed how long?

A. Well, that day, that morning. He had been working two days before that, Monday and Tuesday. I saw him Wednesday morning.

Q. Had he had any chill before that?

A. He had a chill on Sunday before that.

Q. On the Sunday previous?

A. Yes, sir.

Q. That was the 16th of September?

A. 16th of September.

Q. Now, what did you diagnose his complaint?

A. At that time he represented a patient who had taken cold. He had some cough also.

Testimony of Dr. Richard L. Cook.

Q. How long was it before you determined that he had typhoid fever?

A. Well, several days or a week, I think; about one week before he developed any typhoid symptoms.

Q. Did you determine subsequently that he had typhoid fever?

A. Before that?

Q. No, after that.

A. Oh, yes.

Q. There was no doubt about that? A typical case, wasn't it?

A. Sure.

Q. And he remained sick how long, doctor?

A. Well, he is in bed now. He is convalescing, but he isn't well yet. He is around the house; he isn't out.

Q. Did you ascertain how long he had lived in that house?

A. He has lived there several years.

Q. Several years?

A. Yes, sir.

Q. Did you ascertain where he worked?

A. At the Kingsland shops of the Lackawanna Railroad.

Q. How often would he come home?

A. Every night.

Q. How about Sundays? Would he be at home on Sundays?

A. Yes, sir.

Q. How far is his house, doctor, from the business portions of Dover?

A. Oh, I should judge it was a quarter of a mile from Blackwell street, the main business street; in that neighborhood.

Q. On that street, I suppose, are the grocery stores and the butcher shops and those things, you mean?

A. Yes, on Blackwell street; that is the main business street of the town.

CROSS EXAMINATION by Mr. Corbin:

Q. He is on the south side of the Lackawanna Railroad?

A. Yes, sir.

Q. And the business street is on the north side of the railroad?

A. Yes; well, that is the dividing line of the town.

Q. And the river is on the north side of the railroad, isn't it?

A. Yes, sir.

Q. His house is on the corner of Millbrook Road and South Morris street?

A. Yes, sir.

Q. Isn't that about three-quarters of a mile from the business street, instead of one-quarter?

A. I don't think it is as far as that, hardly.

Q. He lives at the most extreme south margin of the town, does he not?

A. Nearly to the corporation, yes.

Q. Nearly to the corporation line?

A. Yes.

Q. When you discovered he had typhoid fever, did you take precautions with reference to the excreta?

A. I did.

Q. What precautions?

A. They were ordered to be disinfected with boiling water and carbolic acid; also chloride of lime to be put in the vessel before they were removed. Then I told them to dig holes and bury the contents in the yard, not to put it in the vault.

Q. You are accustomed to typhoid fever?

A. Yes.

Q. You are in active practice?

A. Yes.

Q. Did you take all the precautions that are usually taken in such cases?

A. I did.

Q. Do you feel that you took all that were necessary?

A. Yes, sir; all that I knew of being taken, any way.

Q. In your opinion, was any infection of any sort communicated to anybody by reason of that case?

Objected to.

The COURT: You can ask the doctor as to the nature of the disease, if you want to.

Q. How is the disease communicated?

A. It is considered more of an infectious than a contagious disease. It can be communicated through the stools.

Q. Doctor, is there any way of a man getting typhoid fever unless he gets it from somebody else that had typhoid fever?

A. Well, no; I don't hardly think there is.

Q. It is communicated generally by the excreta?

A. Yes, sir; so considered, always.

Q. Well, if this was buried the way you directed it to be, and treated the way you directed, was there any chance there to communicate it to anybody else?

Objected to.

The COURT: I don't understand exactly what you mean by that.

Q. How big a lot is this on which the house stands?

A. I can't tell you.

Q. Any other houses near it?

A. Yes.

Q. Where?

A. There is one across the road on the opposite corner.

Q. On the same side of the road?

A. On the same side of the street.

Q. Of Morris street?

A. Yes.

Q. But the other side of Millbrook Road?

A. Other side of Millbrook Road.

Q. No other house near, is there?

A. Yes, to the left of the other house; I should judge possibly fifty feet on the Millbrook Road further. And then there are houses opposite, across Millbrook Road.

RE-DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Doctor, this patient, I suppose, lived in the house with his wife only?

A. Lived with his wife?

Q. Was there any one in the house with this patient except his wife?

A. Oh, yes; he has a family of four or five children

Q. Small children?

A. Well, they are probably 12 to 18 or 20 years.

Q. And that family occupied the house?

A. Yes, sir.

Q. And what did you see the woman do with his urea or his excreta?

A. I didn't see her do anything with it.

Q. What did you see her do as to washing his clothes?

A. I didn't see her wash any.

Testimony of Dr. Henry W. Kice.

Dr. HENRY W. KICE, sworn for the complainant:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Doctor, you are a practicing physician in what part of Morris County?

A. Wharton.

Q. You have practiced there for how many years?

A. Eighteen years.

Q. And were you the physician attendant on this patient who had the typhoid fever in the house in Wharton that has been testified about?

A. I was.

Q. What was his name?

A. John Roe.

Q. What was his age?

A. I am not quite sure, but past twenty; I don't know.

Q. Between twenty and thirty?

A. Yes; I don't know exactly.

Q. Married man?

A. No.

Q. And who occupied the house?

A. His father, John Roe.

Q. His mother lived there, too?

A. Yes.

Q. Did the family consist of the father, mother and this boy?

A. And brothers and sisters; I don't know, half a dozen of them.

Q. How long had they lived there?

A. In that house?

Q. Yes.

A. Oh, I don't know; a number of years.

Q. Now, when you first saw this boy, where was he—in bed or sitting up?

A. In bed.

Q. In bed?

A. Yes.

Q. And did you diagnose his complaint?

A. I did.

Q. As what?

A. Typhoid fever.

Q. Was it a typical case?

A. Yes.

Q. What day was it that you first went there?

A. What day of the month?

Q. Yes.

A. It was the 7th of February.

Q. Seventh?

A. Seventh of February.

Q. And how long did you attend him?

A. Why, I think I finished making visits there sometime in May.

Q. Was he still sick with typhoid fever?

A. He was convalescing from the general debility.

Q. Had he convalesced at that time?

A. He wasn't able to go to work; he wasn't over his sickness entirely, but it was more a general debility, more the results of the fever than the fever itself.

Q. He still was weak from the disease?

A. Certainly so.

Q. Has he begun to work yet?

A. Yes, he came from work this morning to come here.

Q. Is he here now?

A. He is here now.

Q. Do you know when he went to work?

A. I don't know.

Q. He is here; probably he can tell.

A. He can tell you that; I don't know.

Q. How long does it usually take a patient after they are sick, to reach the stage that he was in when you first saw him?

A. Well, I should judge, two weeks. Of course, from the first symptoms—premonitory symptoms—might take three or four weeks; but I should judge he was in what we call the second week.

Q. What do you call the premonitory symptoms?

A. Not feeling well; weariness, headache.

Q. How long will those symptoms last?

A. A few days, sometimes a week, before he suspects anything.

Q. Then when does the chill begin?

A. It isi't necessary to have a chill.

Q. Well, the other typhoid case had a chill.

A. That doesn't make any difference.

The COURT: What are the next symptoms?

Q. What is the next symptom?

A. The early symptoms, general weariness, headache, dizzy feeling. Sometimes there is a little diarrhoea in the beginning. All cases don't have it And a rise of temperature generally. The second week a little higher, and on up to the third week. That is the typical case.

Q. Did this boy have diorrhoea?

A. His bowels had a tendency to constipation when I saw him. I don't know what he had previously. Sometimes a patient starts in with diarrhoea and then becomes constipated.

Q. You don't know how it was with this man?

A. No.

Q. What do you include in the word "excreta?"

A. The excreta is the discharges. I suppose I would include the urine and the stools.

Q. Spittle?

A. Not necessarily that. I wouldn't term that excreta.

Q. Do these include the urine?

Testimony of Dr. Henry W. Kice.

By the COURT:

Q. I would like to ask you at what period of convalescence does the patient cease to give off these typhoid germs?

A. That I don't know. That would take somebody who has a better knowledge of typhoid bacilli than I have. Just when it stops, that is a different question. I haven't any positive knowledge on that point.

CROSS EXAMINATION by Mr. Corbin:

Q. The young man had come home from Burlington when you went to see him, hadn't he?

A. Yes.

Q. Had he just got home?

Objected to as hearsay.

The COURT: Oh, I think that question is proper. It would necessarily form part of the doctor's inquiry, and be one of the facts upon which he no doubt based his diagnosis. I will let you ask that.

Q. (Question read.) Had he just got home?

A. I believe he arrived home, they told me from the history of the case, the day before.

Q. And did you immediately diagnose the case as typhoid fever?

A. I suspected the case, yes; suspicious. He was a very nervous patient, and had typhoid symptoms, so I told them what I thought; and I pronounced it typhoid the next day.

Q. Did you take any steps of a sanitary nature?

A. I did.

Q. Are you health officer of Wharton?

A. Yes, President of the Board of Health.

Q. And are you conversant with the modes used in this disease?

A. The ordinary precautions, yes, sir.

Q. And what precautions did you order?

A. I directed them to dig a trench and bury all the discharges and everything into this trench. They were, in the first place, to put in boiling water and carbolic acid, the usual precautions, and bury it in this trench.

Q. How frequently did you call?

A. In the first place I called twice a day as long as necessary. Later on, once a day, and during his convalescence once a week.

Q. For how long a period did you see him daily?

A. I can't tell you that; for some weeks. Maybe three or four weeks.

Q. When he recovered he was much weakened and debilitated?

A. Certainly he was, yes.

Q. This debility that you mention as having continued so long, that isn't typhoid fever, but the weakness induced by it?

A. General debility, yes, resulting from the fever.

Q. Did you see where the trench was dug?

A. I saw, yes.

Q. Where was it dug?

A. In the back yard; in the garden which is behind the house.

Q. Was it properly done, so far as you saw?

A. I wasn't there, I saw it from the window, and I saw the trench was dug. Of course, I didn't see them bury the excreta at all.

Q. Was the trench a proper trench for the purpose?

A. Yes.

By the COURT:

Q. How long did you direct them to use this trench?

A. Why, as long as he was in bed.

By Mr CORBIN:

Q. Did anybody else in the house get typhoid fever?

A. Nobody.

By the COURT:

Q. He was in bed how long?

A. About two months, I should judge, altogether. I am not positive of the time.

RE-DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Did you say you saw a trench from the window?

A. Yes.

Q. This was in the winter time that you saw this trench?

A. Yes, sir.

Q. And how near was the trench to the window?

A. It was about, I suppose, maybe thirty feet.

Q. Was it open or closed at the time you saw it?

A. It was open, or I wouldn't have seen the trench

Q. Sometimes it is covered, you know; you can see where it is covered. This was an open trench?

A. Yes, just been opened.

Q. Did you see anything in it?

A. I did not.

Q. How near was it to the canal?

A. Well, I am not positive of the distance there. I presume this lot is perhaps 50x75; I don't know whether it is 100 feet or not. But the trench might have been perhaps fifteen or twenty feet from the canal.

Q. Is it higher than the canal?

A. The yard is higher than the canal, certainly.

Q. Does the yard slope down to the canal?

A. Not directly. Of course, it does abruptly towards the back part of the yard.

Q. Wasn't the ground frozen at that time?

A. Yes.

Q. And you say what direction you gave was to continue as long as he was in bed?

A. Yes.

Q. Did you see whether they covered the trench?

A. No, I didn't; no.

Q. You don't know when that was done?

A. I don't.

Q. It was open as long as you saw it? In fact, you only saw it once?

A. Ashes were used, I believe, in the bottom, or something to cover it.

Q. Did you see that?

A. No, that is what they told me. That is all I know about it.

Mr. VREDENBURGH: I move that be stricken out; that part of it.

The COURT: Strictly speaking, I don't suppose it will do much harm one way or the other.

Q. Do you know anything about how the clothes were treated, of this sick person. Were they washed in the house?

A. I think they were washed in the house. I haven't positive knowledge.

Q. What became of the water that came off of these clothes?

A. That I don't know.

Q. Did you give any directions as to that water?

A. Yes, to put all the discharges in the trench; whether they did or not, I don't know.

Q. Did you speak distinctly of the wash water from the clothes?

A. Two or three times, yes.

Testimony of Norman L. Rowe.

NORMAN L. ROWE, sworn for the complainant:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Doctor, you are a physician in Jersey City?

A. I am.

Q. And a member of the Board of Health of Jersey City?

A. I am.

Q. And have been such member how long?

A. About five or six months.

Q. Did you inspect this water shed?

A. I did, on one occasion.

Q. Why?

A. I was given to understand that it was water of a suspicious nature, and that some effort should be made by the Board of Health to stop this pollution, and in order to stop this we should have some knowledge of the water shed; and I was asked to go up there and look it over with other members of the Board.

Q. Did you go up?

A. I did.

Q. On which occasion did you go up?

A. October 29th.

Q. What did you see that day you went up?

A. We went directly to Dover and were taken first to the vault belonging to the Swedish church.

By the COURT:

Q. You have heard what the other witnesses said about it?

A. I believe I have.

Q. Is that in accordance with your recollection?

A. I haven't heard the entire testimony; I was absent part of the time.

The COURT: It seems unnecessary to go over this so many times.

Testimony of Norman L. Rowe.

Mr. VREDENBURGH: This is a member of the Board of Health, and acted. That is the reason I produced him.

The COURT: A general question, I imagine, would answer every purpose. There is no question of veracity here. These gentlemen have all testified to what they saw, and I assume, to nothing but what they saw.

Q. Doctor, from what you saw of the water shed, and what you heard as to the character of the water in Jersey City from the expert, what did you do?

Objected to as incompetent.

The COURT: Do you mean what he did in his official capacity? An official act he did?

Mr. VREDENBURGH: No; I don't know whether in his official capacity or not. I only want to know what he did.

The COURT: That makes some difference. If he went home and told his wife to boil all the water, I don't think that would be evidence of anything in this case.

Q. You saw the tests made there, did you, at the Swedish church?

A. I did.

Q. And the result was what?

A. The result was positive, in my opinion, that the refuse in that vault was seeping through the ground into the river.

Q. And did you go anywhere else except the Swedish church?

A. Yes; from there we went up along the canal; went up to the twin sewer pipes, I believe, at the

foot of Morris street; and from there up to the junction of the canal and the river at the bridge, where we inspected that sewer that empties into the river there.

Q. Did you make tests at those places?

A. No, I didn't make tests.

Q. What did you do there?

A. Why, as far as the twin sewers, we simply walked down on those pipes to the edge of the water and looked the water over at that point. And the time I was there there was a very thin stream coming out of both sewer pipes, cloudy; very slight at that time, however. And from there we went up to the sewer at the bridge, at the junction of the canal and the river. And there one of the members, Dr. Finnerty, I believe, took a stick and picked up that faeces.

Q. Did you see it?

A. I saw it.

Q. Was it human faeces?

A. It was human faeces to my sight and smell.

Mr. VREDENBURGH: I understand your Honor to rule that I cannot ask these witnesses whether, in their judgment, from what they saw there, the water in Jersey City was contaminated; that I had not laid a sufficient ground for that because I didn't show that they were experts in that matter. I did propose to ask all these witnesses that question, but I understood that your Honor ruled it out, and so I didn't do it. I will perhaps ask this witness that question.

The COURT: I don't rule it out on general principles; I only ruled upon that question once, and on that occasion my ruling was that you had not shown that the witness

was qualified to speak upon the question and to express an opinion. Of course, if you can show that the witness is qualified to express an opinion, I will permit you to pursue the inquiry.

Q. Doctor, what study have you made of the question of impurity of water?

A. None whatever.

Q. You also went to Wharton, didn't you?

A. I did.

Q. And you heard the witnesses describe what they saw there—the water-closet, situation of the closet, &c.?

A. Yes.

Q. Is your remembrance of it the same as theirs?

A. That coincides with my remembrance of the occasion.

NO CROSS EXAMINATION.

ALEXANDER KANOUSE, having been produced as a witness on the part of the complainants, Mr. Vredenburgh stated that this witness would merely reiterate what had been said by Mr. Blickley.

Mr. CORBIN: I make no dispute as to what Mr. Blickley said as to the character of the soil. I have no doubt that is entirely correct.

Testimony of John Rowe.

JOHN H. ROWE, sworn for the complainant:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Mr. Rowe, what day did you arrive home in the spring sick? What day of the month, do you recollect?

A. In the spring?

The COURT: What day in February?

WITNESS: Sixth, I think.

Q. You think it was the sixth?

A. It was the sixth.

Q. And where did you come from?

A. Burlington, New Jersey.

By the COURT:

Q. How long had you been in Burlington?

A. I left home a year ago last July.

By Mr. VREDENBURGH:

Q. How long had you been sick before you came home?

A. Since I was first taken was about four weeks.

Q. Four weeks before that?

A. Yes, sir.

Q. When you got home, did you use the water closet?

A. No, sir.

Q. Not at all?

A. Not till after I got well.

Q. When did you first use the closet?

A. Oh, gee, I can't tell you the day and the month now.

Q. How long after you got home did you use the closet?

Testimony of John Rowe.

By the COURT:

Q. How long were you in bed?
A. I was nine solid weeks.
Q. Nine solid weeks?
A. Yes, sir.
Q. Now, after you got up, what did you do? Did you use the closet?
A. No, sir; because I wasn't able to go out of the house, not for, I guess, three weeks after I got out of the bed.
Q. After that you used the closet?
A. Yes, when Dr. Kice gave orders.

By Mr. VREDENBURGH:

Q. Where did you urinate? Urinate in the closet?
A. I don't understand you.
Q. Where did you make water?
A. Why, indoors.

The COURT: He says he couldn't go out.

WITNESS: I couldn't go out until three or four weeks after I got out of bed.

Q. Where were the cups washed that you drank out of, and the vessels?
A. The clothes washed?
Q. No, the things that you drank out of, or cups that you drank from. Did you see where they were washed?
A. No, because I didn't know anything, not for the first five weeks, not that I can remember.
Q. You didn't know anything for five weeks?
A. Yes.
Q. You were pretty sick?
A. I guess I was. I think I pretty near had my share.

Q. Do you know what a hemorrhage is?

A. Well, I know what it is, but I can't remember anything of that kind when I was sick.

Q. That is a passing of bleeding discharges from the bowels. Do you understand that to be a hemorrhage?

A. I know what a hemorrhage is.

Q. Did you have any bleeding?

A. I can't tell nothing about it.

Q. You don't know anything?

A. No, sir.

Q. How soon did you get out of your mind after the doctor saw you?

A. I got home that night between 10 and 11, and that was the last I knew until over five weeks.

Q. When did you go to work?

A. When I started after my sickness?

Q. After your sickness, when did you go to work?

A. Somewhere around the last of July.

Q. Where did you go to work?

A. Down at the Furnace—Wharton Furnace Machine shop.

Q. In Dover?

A. In Wharton.

Q. Been working there ever since?

A. Yes, sir.

Testimony of Ferdinand N. Sauer.

FERDINAND N. SAUER sworn:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. You are a physician?
A. Yes, sir.
Q. Where?
A. Jersey City.
Q. How long have you been in business there?
A. A little over five years.
Q. Are you connected with the Board of Health?
A. Yes, sir.
Q. In what capacity?
A. Superintendent of the Bureau of Contagious Diseases.
Q. Have you brought here the record of typhoid cases in Jersey City?
A. I have the contagious disease book here, yes, sir.
Q. Will you please produce it?
A. (Witness did so.)
Q. It has been testified to by Dr. Lambert that you called his attention to the fact that there was an increase of typhoid fever in Jersey City, do you recollect that?
A. Yes, sir.
Q. When did you do that?
A. That must have been, or was, two or three days before we made the first trip to the water shed.
Q. What lead you to do that?
A. The unusual prevalence of typhoid fever in Jersey City.
Q. Does your record show how many cases of typhoid fever there was reported for the month of October?
A. Yes, sir.
Q. Will you please turn to it and see how many there were reported on the first day of October?

A. I have that all down on paper.

Q. Very well, read it right from the paper.

A. Can I use my paper?

Q. Yes, you can use your paper without the book.

A. On the first of October we had one case.

Q. And on the second?

A. October fourth we had one case.

Q. Yes; on October fifth?

A. We had two cases.

Q. October sixth?

A. One case.

Q. Yes?

A. October eighth, one.

Q. Yes?

A. October ninth, two.

Q. Yes?

A. October twelfth, two.

Q. Yes?

A. October thirteenth, two, and on that day I had a notice sent out right away to the physicians of Jersey City.

Q. Why?

A. Because, up until that day we had twelve cases of typhoid fever reported to the place, and I had heard about some cases of typhoid fever that were not reported; I had been investigating all those cases up to that time, and I thought it was wise to notify the physicians in general of the prevalence of typhoid fever, and ask them to be kind enough to give in a prompt report of every case.

Q. Have you got a copy of that notice with you?

A. Yes, sir.

Q. Have you got it here?

A. Yes, sir. (Producing same.)

Q. You may read it.

A. (Reading) October 12th, 1906; that was in the evening. This was given to the Clerk with instructions to copy it off on a Simplex printer; I don't

just remember the number of copies printed, but I think a hundred and fifty or two hundred on postal cards. They were printed the next morning, Saturday, October 13th, and sent out Saturday noon, and got in the hands of the physicians on Monday, the 15th of October. "Dear Doctor: Owing to the increased prevalence of typhoid fever in our city a prompt report of any case you may have will be very much appreciated." I may say right here that it has always been compulsory as long as I have been connected with the Board for every doctor to report every case of contagious disease, and that of course includes typhoid fever.

Q. This, as I understand it, was sent out on the 13th, which was Saturday, and would reach the physicians on the following Monday, which would be the 15th. Now, how many cases were there on the 13th?

A. On the 13th two cases were reported.

Q. Sunday, the 14th?

A. Not any.

Q. The 15th?

A. On the 15th we had five cases reported to us.

Q. 16th?

A. One.

Q. 17th?

A. Three.

Q. 18th?

A. None.

Q. 19th?

A. None.

Q. 20th?

A. We had three cases reported.

Q. 22d?

A. One.

Q. 23d?

A. One.

Q. 26th?

A. Two.

Q. 27th?

A. One.

Q. 29th?

A. One.

Q. 31st?

A. One, and by the way, on October 27th we had twenty-one cases reported from the hospitals—St. Francis, thirteen; Christ Hospital, seven, and the City Hospital, one.

Q. That was up to November?

A. Up to November 1st.

Q. Did you give us October 30th?

A. There was none reported on October 30th; one was reported on October 31st.

Q. That makes how many during that month?

A. Well, altogether, with the hospital cases it made fifty-four, excluding the hospital cases we had thirty-three.

Q. How long have you been Clerk of the Board, or rather President?

A. President off and on for the last—well, I was appointed in 1903; that is as Chief Deputy Health Officer, and I have been in charge of the contagious diseases for the last year and a half.

Q. And you received fifty-four notices, and without the hospitals thirty-three?

A. Yes, sir.

Q. While you have been in office have you ever received notices of as many as thirty-three cases in any other one month?

A. Not in any one year.

By the COURT:

Q. I don't understand what that means.

A. Counsel asked if I had ever received that many

cases before in a single month. I said I never had received that many in an entire year before. In the year 1905, in the entire year we had a report of seventeen cases, that is, we received seventeen reports.

RE-DIRECT EXAMINATION:

Q. Now, won't you look at the month of March, 1906, and say how many were reported for that month?

A. Sixteen cases were reported that month—eleven cases in one family; no, I believe it was thirteen cases in one family, the family of Neills.

Q. In that month you had thirteen in one family?

A. Yes, sir.

Q. Where was that family?

A. They were located down by the corner of Grove and Sixth streets.

Q. When you say in one family do you mean thirteen in one father and mother's family?

A. Yes, sir; the father was the only one that escaped.

Q. His wife and all his children had it?

A. Yes, sir; they simply infected one another.

Q. Wife and twelve children?

A. Yes, sir.

Q. All had typhoid?

A. Yes, sir; one after another.

Q. Now, in the month of October of this year you had this increased number of typhoid patients, and I understand you to say that you told Dr. Lambert of it about three days before the 25th?

A. Yes, sir; two or three days before.

Q. What was the result of your report to him as to visiting the water shed?

A. I had told Dr. Lambert that I had investigated those cases that were being treated at these houses,

and that I found that there was no history of their having been out of town. They were scattered throughout the city in different parts of the city, and that I could not put my finger on any one milkman or any one vegetable stand or any one oyster store or oyster shop, so as to say they got their typhoid there, and I told Dr. Lambert that I thought our water shed or our water supply should be examined, because it is the usual rule whenever there is an increased prevalence of typhoid fever, and where everything else has been eliminated, and every possible injury has been eliminated, and it is always the rule to look at the water supply and to look for the infection there.

Q. Yes. Well, now you and Dr. Lambert did what?

A. Dr. Lambert and Mr. Whipple and I met in the Health office.

Q. What is Mr. Whipple?

A. Water expert, and we had a conference there and Dr. Lambert said—

Objected to.

Q. What was the result of your conference?

A. The result was a trip to the water shed.

Q. On what day?

A. That was on Wednesday, the 24th of October.

Q. Of this year?

A. Yes, sir.

Q. Who went?

Q. Dr. Lambert, Mr. Whipple, our Health officer, Mr. Smalley, Mr. Griffin, senior, and his son, Mr. Weldon Griffin, myself and Dr. Finnerty.

Q. Did you know when you went up there about this typhoid case of Mr. Barton?

A. I didn't.

Q. You heard the testimony of Dr. Lambert as to

some of the tests that he made, and some of the sewers and drains that he saw; can you confirm what he said as to those?

A. Yes, sir; I can.

Q. You heard his testimony?

A. I did.

Q. Does that correspond with your recollection?

A. Well, I think Dr. Lambert may be a little bit mixed in the ditch he spoke of.

Q. In what respect? What ditch was it?

A. The ditch on the right hand side of the bank of the river which had its origin at the electric plant, and the seven houses that Dr. Lambert tried to tell you about, known as the seven sisters, at the corner, just one block this side of the street corner where the canal and river commingle; one block on this side there was a church on the corner, we saw there a drain pouring bad smelling water into this ditch, and there was vapor and steam coming from this ditch; we followed this ditch down to the river, five or six blocks and found it emptied into the Rockaway River. Now I was at the Lyondale Print Works up there, and that water there—

Q. Well, you heard what he testified to?

A. Yes, sir; but they had a sort of precipitating plant there, supposed to be alum water which passed through a perforated tube, and this water keeps pouring into the stream; it is supposed to be there to purify the water, but to my eyes it did not appear to purify it very much; it did not remove the coloring entirely. My special purpose in going to Dover and Wharton was to find typhoid cases. The first thing we did was to go to the Board of Health officer at the Bureau of Vital Statistics there—the Registrar; we could get no information there. The Registrar, Dr. Hunter, didn't have the books in his office, and he refused to get them for us; he had them in some fire house, locked up in a safe. We

went around to see the different members of the Board. He said perhaps if we did that they might let us have the books. We went around to several members of the Board and they said they couldn't give us the books until they held a meeting. I think the man's name was Jenkins; he keeps a grocery store there. He promised to call a meeting of the Board of Health, but he didn't do it. Finally we had to go around to the different physicians to find these cases, and we finally found the case at Wharton, and the Barton case.

Q. Did you visit the Barton house?

A. I did.

Q. Did you see Barton there?

A. I did.

Q. Did you see the closet there?

A. I did.

Q. Did you examine the lay of the land?

A. I did.

Q. What have been your opportunities of studying in connection with the sanitary subjects with reference to typhoid fever?

A. I am a licensed health officer of the State of New Jersey, I hold a certificate issued by the State.

Q. Have you made any study of the subject?

A. I certainly have; I had to make a study of it, in order to pass my examination, in order to get a certificate.

Q. Did you pass the examination?

A. Yes, sir.

Q. Now, as you saw the situation at the Barton house—Mr. Barton's closet and vault—what is your judgment as to the effect from that source reaching Jersey City—

Objected to.

The COURT: You may cross examine him as to that.

Testimony of Ferdinand N. Sauer.

CROSS EXAMINATION by Mr. Corbin:

Q. Did you ever make a test with this coloring matter?

A. No, sir.

Q. Did you ever inspect the Rockaway water shed before?

A. I never had occasion to before that.

Q. Did you ever inspect any water shed before that?

A. No, sir.

Q. Did you ever make a study of bacteriology?

A. Yes, sir.

Q. What study?

A. I have had various courses in bacteriology in the New York College of Pharmacy, twenty or fifteen years ago.

Q. When you were studying medicine?

A. No, sir; I am a graduate of pharmacy; I am a pharmaceutical chemist. That was before I studied medicine.

Q. You were a druggist or chemist before that?

A. Yes, sir.

Q. Were you a drug clerk?

A. Yes, sir; I commenced as a druggist boy behind the drug counter.

Q. And in that connection studied pharmacy?

A. No, sir; I graduated from a public school, then spent four or five years in a drug store, then attended two years in the New York College of Pharmacy.

Q. When did you graduate as a physician?

A. Five years ago last July.

Q. Since that time you have been in the Jersey City Health Board?

A. Yes, sir.

Q. As inspector or assistant inspector?

A. Assistant Health Officer.

Q. You have never been a practicing physician?

A. Yes, sir.

Q. Do you practice still?

A. Yes, sir.

Q. Did you ever investigate any outbreak of typhoid fever?

A. Yes, sir, I have.

Q. Where?

A. Right here in Jersey City.

Q. The thirteen cases you found in the Neill family?

A. Yes, sir.

Q. Did you trace it to anything?

A. I traced that to—I supposed I traced it to celery.

Q. You made no special sanitary study?

A. I certainly have made a sanitary study. I had to in order to get my diploma; it was absolutely necessary.

Q. I want to know what books you studied and what studies you have made in the matter of sanitation.

A. Bacteriology and public health.

Q. Are you a bacteriologist?

A. I am not a practicing bacteriologist, no, sir.

Q. Never made any analysis of water?

A. I have years ago, yes, sir.

Q. That was when you were studying?

A. When I was studying, yes.

Q. Your experience is what you have told us in Jersey City?

A. How is that?

Q. In the practice of sanitation your experience is what you have rehearsed to us in connection with Jersey City government?

A. Yes, sir.

Mr. CORBIN: Now I submit he is not competent.

Testimony of Ferdinand N. Sauer.

By Mr. VREDENBURGH:

Q. Have you also, doctor, had examination of other diseases, investigation as to the case of other diseases besides that of typhoid?

A. Certainly have; I am being employed by the Department of Health for that.

Mr. CORBIN: I submit the witness is not qualified.

By the COURT:

Q. Have you ever studied the question of how the typhoid germ is propagated and how long it lives and under what conditions it lives and dies?

A. I certainly have.

The COURT: I think the witness is competent to speak; his lack of practical experience will of course have to be taken into account when you come to consider the weight of his testimony, but I think he is competent to testify. You may proceed.

Q. Considering the situation that you found at the Barton house, the lay of the land, the cesspool and its overflow, do you think, in your judgment, it is possible for the infectious matter from that man to have reached Jersey City in its water?

A. It would be a natural result. The condition of the privy vault, the situation, situated on the top of that hill, and on such an incline and such a short distance from that ditch, the water would just have one free path all the way straight down to the brook, which is about six hundred feet away. I traveled from that top of the hill right straight down to the brook, which I understand is a branch of Mill Creek. There is no rolling ground in between, it is simply

a straight right down incline from the top of the hill; the privy is situated, the vault is leaking, there is a depression there where the stuff that has overflowed from the privy vault has run in there; you can see where it ran along the ground, ran right down the hill; the evidences are right there, run right down the hill into this ditch or roadway.

Q. Did you examine the premises at Wharton where this young man was sick with typhoid fever, extending from February to—

A. I did, on October 24th, in the presence of Mr. Griffin, father and son, Weldon Griffin, poured some of the dye in the sink in the Wharton house and a few minutes afterwards the results were to be seen in the canal. There was nobody there that day, that first day, on October 24th, none of the other men were there. Mr. Griffin, Weldon Griffin and myself, and Dr. Finnerty was there, but I believe he was outside on the road in the automobile; there was just us three men there.

Q. Did you go into the house on that occosion in which this person was sick?

A. I did, yes, sir; from the sink and it—

Q. You did go into the house?

A. We certainly did, the first day.

Q. And you put something in the sink?

A. Yes, sir.

Q. What did you put in the sink in that house?

A. A pinkish dye; it was put in that sink in the presence of Dr. Hunt, who was connected with the State Board of Health. The day before I telephoned to the State Board of Health and asked Dr. Mitchel to come on and help us clean up the water.

Q. Who did come?

A. Dr. Hunt came on; Dr. Mitchell said he couldn't come himself, and he sent Dr. Hunt, and in the presence of Dr. Hunt we poured this dye in

the Rowe house, and it showed in the canal a few minutes afterwards. The ground about the privy vault and for a foot from the canal is covered with rags, garbage and refuse, most likely through from that house.

Q. Now from that point to the canal what was the grade of the surface of the land?

The COURT: From what point?

Q. From where this garbage was?

A. It was almost perpendicular.

Q. Now you said you had investigated these cases in the month of October; did you find any of these cases that you could attribute to any other source than the water; if so how many of them?

A. Out of the thirty-three cases?

Q. Yes.

A. There were thirty-one which the book will show out of the thirty-three; there were but eleven that gave an out-of-town history, that had really been away; only eleven out of the thirty-three had been out of town, all the others hadn't been out for a day. There had been only three out of that number that had eaten oysters—only three had oysters. I couddn't find any typhoid patients that had eaten oysters.

Q. When you say they came from eating oysters, how can you tell; you only guess?

A. It is a well-known fact that typhoid bacilli is found in oysters, of course.

Q. Eh?

A. It is a known fact that typhoid bacilli is found in oysters, yes, sir.

Q. Will be found in an oyster?

A. Yes, sir.

Q. Well, is it a fact that it lives there—

The COURT: What the witness means to say is this: that if he finds that a patient has been drinking water, the Jersey City water, and at the same time been eating oysters, that he would rather infer that the typhoid germ was derived from the oyster than the water, I understand him to say.

Mr. VREDENBURGH: That is it.

Q. Now, also that celery case, you spoke of celery; how could you say that the typhoid came from the celery?

A. Well, I can tell you how.

Q. Yes?

A. I found this to be the fact.

Q. Yes?

A. Of course the fecal water in the vaults at Jersey City are gathered by scavengers and is dumped in a scow and used by farmers for fertilizers; of course this excreta would certainly contain excretia from typhoid patients, and certainly would just at the present time, and in that way this fertilizer would certainly infect celery, and all raw vegetables.

Q. Then your idea is that the germ coming from the human body would get into the garbage?

A. Yes, sir.

Q. And from the garbage it would live until it got into the fertilizer, and then from the fertilizer it would live until the celery had grown big enough for this germ to get on that, and then that the person who ate that celery would have typhoid fever, is that what you mean?

A. Yes, sir; well, of course, this fecal matter that they use, they simply dry it and use it for fertilizer; there isn't anything else mixed with it.

Q. They put fertilizer on before they plant celery?

A. Yes, sir; if they saturated the ground with the

typhoid and along comes a rain storm it is bound to affect that celery.

By the COURT:

Q. Well, now there has been some testimony this morning to the effect that the best way to kill the typhoid germ is to put it near the surface of the earth; if that is so why should you say that this sort of manure be like to get into growing celery and infect the growing celery?

A. Well, the surface—the germ wouldn't all stay on the surface, I wouldn't say that. A great many of the germs would certainly be killed by the rays of the sun and heat, but then there are bound to be some germs live.

By Mr. VREDENBURGH:

Q. Well then, you think that this family of eleven who were using water and also who have eaten celery you conclude it came perhaps from the celery because of this chain of reasoning?

A. It is the only thing I could trace it to at the time.

By the COURT:

Q. Did you find out where the celery came from?

A. It came from out in South Amboy, and that is just exactly where we sent our material from the vaults; somewhere out around there.

By Mr. VREDENBURGH:

Q. Well, now this celery, isn't it more probable, doctor, that if it came from eating celery it came because they washed the celery in water that was impure; I mean that water that was impure with typhoid germs?

A. That could be possible, yes, sir; they may have used some old well water.

Q. Well, they might use the water in Jersey City?

A. You mean the family itself?

Q. Yes; that is where they washed it and ate it?

A. Well, they might have got it from the water itself, they drank the water, you know.

CROSS EXAMINATION by Mr. Corbin:

Q. Doctor, you say that it was always compulsory in Jersey City on the doctors to report the cases of typhoid fever; what compulsion was there upon them?

A. All cases of contagious diseases.

Q. Well, as a matter of fact they haven't been reporting cases of typhoid fever until lately, to any extent, have they?

A. Certainly have, as much as ever.

Q. Well, the typhoid cases that exist, about how many of them are fatal; have you got learning on that subject?

A. Oh, they have cut the mortality down considerable.

Q. Well, one-tenth of them; as many as one-tenth of them fatal?

A. No, sir.

Q. One-twelfth of them fatal?

A. I think they have got it down to about two or three per cent.

Q. Well, now you just told us that last year, in the whole year 1905 there were only reported to your Board seventeen cases of typhoid fever, is that correct?

A. Yes, sir.

Q. Yet there was reported in Jersey City thirty-six deaths from typhoid?

A. We know nothing about the deaths.

Q. You don't keep the run of that?

A. Not in our Board.

Q. The County Board keeps it?

A. No, sir.

Q. Don't you keep yourself advised?

A. We don't get any such reports.

Q. Don't you know that is the fact?

A. I dont' know it to be the fact.

Q. You haven't informed yourself of that fact, that there were thirty-six deaths from typhoid fever in Jersey City last year, and reported to the official boards; haven't you informed yourself of that?

A. I called up Mr. Rooney here a few days ago and he told me there were nineteen deaths last year.

Q. That is all you know about it, calling Rooney up the other day?

A. Yes, sir.

Q. Don't you know that the number of deaths from typhoid fever is the best test we have of the purity of the water supply?

A. Yes, sir.

Q. And yet you hadn't informed yourself of the number of deaths in Jersey City last year from typhoid fever?

A. No, sir; we only go by what is reported to our Board.

Q. Don't know what is reported to the others?

A. We supposed the County Board would notify us but they never have.

Q. The deaths are not reported to your Board?

A. No, sir.

Q. They are reported to the County Board?

A. Yes, sir.

Q. And Mr. Rooney told you last year there were nineteen deaths in Jersey City?

A. Yes, sir.

Q. My information is thirty-six; we will say nineteen that indicates at least ten times that number

of typhoid cases, doesn't it?

A. Well, that takes in the county, you know, Mr. Corbin.

Q. Well, the nineteen, I understood you to say, were in Jersey City?

A. Well, he told me there were seventeen deaths reported to his office in the year 1905.

Q. That seventeen deaths would mean at least a hundred and seventy cases last year in Jersey City, wouldn't it?

A. It would.

By the COURT:

Q. Do I understand you to say that the nineteen deaths were deaths in Jersey City or deaths in all the parts of the county; what do you say to that?

A. I understood Mr. Rooney to say nineteen deaths for Jersey City during the year.

FURTHER CROSS:

Q. Doctor, is not this what Mr. Rooney said to you, that from January 1st to October 1st, this year, 1906, the deaths in Jersey City from typhoid had been nineteen; is not that what he told you?

A. I don't remember him saying that; I didn't understand it that way.

Q. You understood it as the year 1905, did you?

A. Yes, sir.

Q. I guess you will find that is thirty-six. Well, if there were thirty-six deaths from typhoid fever in Jersey City in the year 1905, you would estimate that meant at least three hundred and sixty cases of typhoid fever, wouldn't you?

A. I certainly would.

Q. And possibly more; then, if that is so, and they reported—

Testimony of Ferdinand N. Sauer.

By the COURT:

Q. Well, how many more, you say about?

A. About three per cent.

Q. Does that accord with your own study and observation?

A. My own study; yes, sir.

Q. Three per cent?

A. Yes, sir.

FURTHER CROSS:

Q. That would amount in all to some nine hundred cases in Jersey City last year, wouldn't it?

A. Yes, according to that.

Q. And yet only seventeen of them were reported to your Board, where is the compulsion about reporting typhoid fever cases that exist in Jersey City?

A. That is just it, doctors haven't been reporting their cases.

Q. But when you sent out this postal card on the 13th of October they immediately did begin to report somewhat, didn't they?

A. It looks that way, but up to that time we already had twelve cases reported.

Q. Twelve cases in thirteen days of October?

A. Yes, sir.

Q. Or one a day?

A. Yes, sir.

Q. Isn't it true, doctor, that the month of October is about the time when the most typhoid fever developes?

A. Usually September, October and November; yes, sir.

Q. Is there anything extraordinary in a city of a quarter of a million people having a case a day reported?

A. It certainly is when there wasn't one case re-

ported a year ago, in the month of October one year ago there wasn't a case reported; in 1904 there were but four cases reported.

Q. Do you consider reports of cases to your Board where you don't enforce your rule of any value whatever in former years?

A. I think so ,it has not really been enforced up to the present time.

Q. Well, you concede that all the cases reported to you last year are less than the deaths, don't you?

A. Yes.

Q. How many deaths from typhoid fever occurred in Jersey City in October, 1906?

A. There were six cases, according to Mr. Rooney.

Q. Six deaths; how many in September?

A. Three, I believe.

By the COURT:

Q. And in August?

A. I don't know in August; no, sir.

FURTHER CROSS:

Q.Can you speak of any of the months of this year?

A. No, sir; I cannot; you see, this is a separate department entirely, we don't issue any burial permits in our office, they are all issued at the County Board and for that reason we don't have a record of the deaths.

Q. These cases reported to you now, including hospital cases and the others received throughout the month of October, fifty-four in all, indicate about one case of typhoid fever for each five thousand population, don't they?

A. Yes.

Q. Wouldn't you consider that a most admirable showing in this climate?

The COURT: That depends upon whether all those cases have been reported; your statement is that as many as thirty-six deaths occurred last year and that that indicates nine hundred cases?

Mr. CORBIN: That is not my assertion; I think the deaths are much greater than that in proportion.

The COURT: Suppose they are ten per cent., as your question would seem to indicate, that would be three hundred and sixty; now, doesn't that demonstrate beyond all possibility of doubt that the records in the city office are utterly untrustworthy, and that you cannot draw any deduction from them one way or the other.

Mr. CORBIN: I think so.

Q. What was the death rate in 1905 in Jersey City from typhoid per hundred thousand of population?

A. I don't know.

Q. What was it for 1906, thus far?

A. I don't know.

Q. The usual typhoid statistics which we have available to ascertain the health of the city are the death rate per hundred thousand, are they not?

Objected to.

A. They are not, to my mind,—nothing to do with the death rate at all.

The COURT: Well, we have had that a number of times.

Testimony of Frederick Herring.

FREDERICK HERRING, sworn:

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Where do you reside?

A. Jersey City.

Q. What is your business there?

A. I am employed at present as sanitary officer, detailed from the Police Department.

Q. How long have you been a policeman?

A. Since 1894.

Q. You have been a policeman in Jersey City since 1894?

A. Yes, sir.

Q. But of late you have been acting in the Health Department—been assigned there?

A. Yes, sir.

Q. Now, were you assigned to go to Dover?

A. I was.

Q. Did you go to Dover?

A. I did.

Q. When did you go to Dover?

A. November 1st.

Q. Where did you stay in Dover?

A. At the Mansion House.

Q. Did you make any test to find whether the water closet of the Mansion House in Dover was emptied into the Rockaway or not?

A. I did.

Q. Just tell the Court what test you made?

A. I observed on Friday morning a very slight discharge from the pipe at Morris street and the river, and in order to satisfy myself that there was something being discharged from there; I went to the toilet in the Mansion House.

Q. What time in the morning did you go there?

A. Just exactly eight o'clock.

Q. In the morning?

A. Yes, sir.

Q. Now, what closet did you go to?

A. In the rear of the cafe or saloon.

Q. And is that the closet for guests?

A. Yes, sir.

Q. How many closets are there there?

A. There are two water closet bowls and two urinals.

Q. You went into one of those closets?

A. Yes, sir.

Q. Did you use it?

A. I did.

Q. Then what did you do, on top of your using it?

A. I put in a dose of urinite.

Q. How much?

A. About a table spoonful.

Q. What did you do then with it, as to flushing it?

A. I flushed it three or four times.

Q. Then what did you do?

A. Then went out to see if the result would show at the pipe at Morris street and the river.

Q. Where did you go to from the Mansion House?

A. Walked right down to the river and then down along the rear road there along the river bank.

Q. To where?

A. To the corner of Morris street.

Q. What is there there that goes into the river?

A. There are two iron pipes, ten inch iron pipes.

Q. When you got there what did you see, any of this discharge?

A. Not at first; no, sir.

Q. How long did you wait before you saw the discharge?

A. It was about thirty minutes after I left the Mansion House.

Q. What time was it them?

A. About 8:35.

Q. What did you see then?

A. The discoloration of the water being discharged very slowly out of the pipe.

Q. What was the discoloration?

A. Greenish in color, a very bright green.

Q. Was it the green that you had put in?

Objected to.

Q. What was the color—

A. It was the result of the powder I put in the closet; yes, sir.

Q. That was November first of this year?

A. Yes, sir.

CROSS-EXAMINATION by Mr. Corbin:

Q. Who was with you?

A. There was no one with me.

Q. Nobody with you when you put it in?

A. No, sir.

Q. And when you were waiting down there nobody with you there?

A. No, sir.

Q. How long did you wait?

A. About ten or twelve minutes.

Q. But you say you saw it coming out at 8:35, which was half an hour after you put it in?

A. Yes, sir.

Q. You didn't watch there continuously?

A. Just walked around right close by there.

Q. For the whole half hour?

A. No, for about ten or twelve minutes.

Q. You didn't go down immediately?

A. Not immediately; no.

Q. But after twenty minutes or so you went down?

A. Yes, about twenty minutes past eight when I left the Mansion House.

Q. Did you see anybody in the meantime from the time you put it in?

A. No, sir.

Q. Nobody staying there at the hotel with you?

A. No, sir; there wasn't; I didn't know anybody there.

Q. You saw a very slow trickling stream coming out of this pipe?

A. Yes, sir.

Q. And then finally saw some green coming out?

A. Yes, sir.

Q. Not much water coming out at any time you saw it?

A. No, sir.

Q. Which of the two pipes was it, the one further down stream, or up stream?

A. The down stream pipe.

Q. That was a ten inch iron pipe?

A. Yes, sir; it was the pipe usually used for water pipe.

Q. What do you mean; oh, you mean the kind of pipe that is used for water?

A. Yes, sir.

REDIRECT EXAMINATION:

Q. How long did you watch this green color coming out of the pipe?

A. Oh, until nearly nine o'clock.

Q. This green color continued to come out of it?

A. Yes, sir.

Q. Did you stay there until it all came out or not?

A. No, sir; it was still coming out when I left there.

Q. That is all.

New Jersey State Library

WELDON G. GRIFFIN, recalled:

FURTHER DIRECT EXAMINATION by Mr. Vredenburgh:

Mr. VREDENBURGH: I want to show by this witness that the day before your Honor went up to see this water shed there was comparatively a small amount of water in the river bed, and the evidences of the sewage in the river bed was quite forcible; that that evening the water was turned on by somebody, so that when your Honor got there the river was full.

Mr. CORBIN: Well, why don't you go ahead and prove it.

Q. Now, Mr. Griffin, were you at Dover the day before the Chancellor visited Dover?

A. I was; yes, sir.

Q. What was the condition of the bed of the stream of the Rockaway river as to running water in there on that day before the Chancellor visited it?

A. There was no part of the stream that you couldn't easily walk across, without getting your feet wet, possibly in the middle there was a slight flow of water, but very little.

Q. How long had it been substantially in that condition?

A. Been in that condition off and on, except at times of heavy rain or showers, for a month or more back.

Q. Now, on that day before the Chancellor went there what was the condition of the bed of the stream as to evidences of sewage?

A. The river—the bed of the river was very slimy and a rather disgusting appearance.

Q. What occurred that night—was there any rain

that afternoon or evening?

A. No, sir; none at all.

Q. What occurred that night, within your knowledge?

A. At half-past four I crossed the river and the river was then practically dry; at seven o'clock I again visited the river and found the river was quite deep and in an entirely different condition.

CROSS-EXAMINATION:

Q. What part of the river are you speaking of, when you say it was comparatively dry and you could walk across it?

A. I am speaking of the river east of Sussex street.

Q. East of Sussex?

A. Yes, sir.

Q. Have you any knowledge of the amount of water flowing by Dover in the Rockaway river at that day?

A. Not of the quantity, only from what I could see; I didn't measure the amount of water running by; no, sir.

Q. This point that you observed must be below the point where the river and the canal come together?

A. Yes, sir; it was.

Q. How was it up above where the river and canal are not together?

A. There was some water in there, it was fairly filled up to that point.

Q. When you first looked at it, the canal was diverting the water from the river?

A. No, sir; wasn't diverting it, the gates were not opened at that time, had been in the same condition for possibly a month.

Q. Where was the water of the Rockaway going?

A. Through the canal.

Q. But after seven it wasn't going all through the canal, but some over the river, is that right?

A. Yes, sir.

Q. That is all.

The COURT: Now, I understand that counsel are not ready to go on with this case next week, and that both sides request an adjournment; I can only give you two days in December, the 27th and 28th of December, unless I put the case over until February,—late in February; I think it would be much better if counsel would take all the testimony that remains to be taken, before the Master, except such evidence as they desire to take before me on those two days.

Mr. VREDENBURGH: That permission, I suppose, extends to me also.

The COURT: Certainly; I think you ought to put in your testimony before the other side are called upon to put in theirs.

Mr. VREDENBURGH: Certainly, I will put in any testimony I have, and if possible should like to have the case closed in December.

ADJOURNED.

IN CHANCERY OF NEW JERSEY.

Between

THE MAYOR AND ALDERMEN OF JERSEY CITY,

Complainants,

and

PATRICK H. FLYNN, et al.,

Defendants.

Taking of depositions, etc., in the above stated matter, before the subscriber, a Master in Chancery of New Jersey, at the hour of 10:30 in the forenoon of Wednesday, the 28th day of November, A. D. 1906, at the office of Messrs. Vredenburgh & Wall, No. 1 Exchange Place, Jersey City, New Jersey, in the presence of Mr. Vredenburgh and Mr. Record, counsel for the complainants, and of Mr. Corbin and Mr. Edwards, counsel for the defendants.

By agreement and consent of counsel said depositions are taken in shorthand, question and answer in full, and when written out are to be deemed and taken as the original depositions in this case, and the signatures of the witnesses waived.

Testimony of Dr. George W. C. Phillips.

DR. GEORGE W. C. PHILLIPS sworn:—

DIRECT EXAMINATION by Mr. Vredenburgh:

Q. Doctor, you reside in Jersey City?

A. Yes, sir.

Q. And have resided there how long?

A. Some forty years.

Q. What is your present business?

A. I am a pharmist and chemist.

Q. Where is your office?

A. Corner of Grove street, Jersey City.

Q. Are you one of the persons who signed Exhibit 1 for complainant, November 23, 1906, which I now show you?

A. Yes, sir.

Q. That is your signature?

A. Yes, sir.

Q. Did you accompany that committee?

A. I did.

Q. Have you been present before at this examination?

A. No, sir, I have not been called before.

Q. Do you recollect on that visit of going to the house or the property in which J. H. Barton, on Morris street, lived. I will recall to your mind, it was the house in which a typhoid case had been confined?

A. Yes, sir; I think I recall that.

Q. Did you look at the privy in that house?

A. Yes, sir.

Q. And in what condition did you find it?

A. Well, the slime and stuff was flowing through the back. I think that is the first place we visited, Barton's. My recollection is that there was an over-flow there, if that is the one. I can tell if you allow me to look at the report. It was right on that hill. (After referring to report.) That is the one, yes ,sir.

Q. Now, do you remember visiting Eugene Cooper's six houses with one family each, on First street?

A. Yes, sir.

Q. Did you notice the privies at those houses?

A. Yes, sir.

Q. In what condition were they?

A. I think there were two or three, and there was quite an over-flow from those; I remember particularly that we looked at them. Those are the ones, yes, sir.

Q. The George Park's house on Byron and Second street, do you recollect that?

A. I cannot say that I do by name. I don't recall that by name, not that particular one, whether it was the one down at the foot of the hill near the water, or not, where they put in the urine solution. May I ask the guide about that?

Q. No, only what you remember yourself?

A. I know that we did put it into several of them, but I don't place that house exactly.

Q. Now, do you recollect the Lawrence house on Second street, privy in the rear about six feet deep, on the edge of the bank; do you recollect that?

A. I remember that, yes, sir.

Q. Do you remember how far that was from the brook?

A. Well, to my recollection that was about, at a rough estimate, ten or twelve feet, something like that.

Q. This report says eight feet.

A. Eight feet—well, I say eight or ten feet would be a rough estimate, a guess at it.

Q. Did you measure it?

A. No, I don't think so.

Q. You didn't measure it?

A. I didn't measure it.

Q. Did you see anybody else measure it?

A. I didn't see it measured—I don't recall that I did.

Q. Now, the Richardson Boynton Company's works, do you remember going to those, that is the stove works?

A. Yes, I remember going to that.

Q. Did you see anything on the ground under their closets of human excrement?

A. Yes, we saw a large closet there, accommodating a number of people at once, and underneath a wagon, and that was pretty well filled with excrement ,and I remember underneath was quite a little pond from the drainage of that, and accumulated water.

Q. Underneath what?

A. Underneath the wagon.

Q. Now that wagon, did it have horses in front of it or how?

A. No, there were no horses that I saw; it was standing there.

Q. What kind of a wagon was it?

A. A four wheel wagon, I suppose about that deep (illustrating).

Q. And what would that depth be, the body of the wagon?

A About two feet deep, the body of the wagon.

Q. Was the body of wood or iron or what?

A. I cannot say as to that; I cannot say as to the make of it.

Q. Now, Doctor, do you recollect going to the bridge in Dover where the Morris Canal crosses from one side of the river to the other, using the river in crossing?

A. Yes, I think I know that place.

Q. Now, from that point, looking down the Rockaway river, do you recollect how the river is lined on both sides?

A. No.

Mr. EDWARDS:—Is this his report?

Mr. VREDENBURGH:—Yes, sir.

Mr. EDWARDS:—Did he make it himself?

Mr. VREDENBURGH:—He signed it.

BY MR. EDWARDS:—

Q. You were not the man that wrote the report, you simply signed it?

A. I signed it and read it carefully before I signed it. Yes, I recollect it.

BY MR. VREDENBURGH:—

Q. What did you see?

A. We saw these houses on the side of the river there, abutting on the river, we saw those protruding pipes, but I don't think there was anything flowing from any of them except one pipe lower down, under a bridge or near a bridge.

Q. Did you notice the privies?

A. No, I don't recollect that I do.

Q. Did you see the Electric Power Works?

A. Yes, sir.

Q. Do you recollect any tests made there?

A. Yes, I recollect Mr. Griffin went into the place, he said that there was a connection between that and a little stream which ran along side the water that the bridge covered there, and he went in there and came out and we waited for about fifteen minutes, I think it was about that, and it appeared, coming from under the bridge, and also—

Q. What appeared?

A. That is, the coloring matter.

Q. And also what?

A. A yellowish green, and then we went back across the bridge to the other side and saw it coming along there, so that evidently it came from that building.

Q. Do you recall what may be called, or is called the Seven Sisters,—the houses there?

A. I remember they were pointed out to us; I didn't go over to them.

Q. Now, coming to the Patrick Varley house, 270 East Blackwell street; do you remember that house?

A. Yes, sir; I remember that quite distinctly.

Q. Well, will you please tell us what you saw there?

A. Well, we went over to the house, Mr. Varley came out and made some protest about our tramping through his gardens and so on, and we went over to the out house—

Q. Privy you mean?

A. —which was about, I should judge, eighteen or twenty feet from the water.

Q. When you say out-house you mean the privy?

A. Yes, sir, the privy. And Mr. Griffin went out and poured some—he presumably poured it in, because we waited there for some little while and saw it coming out at the bottom near the canal.

Q. Near the river?

A. Near the river.

Q. Now do you remember the two houses of Mr. Neighbor, agent?

A. Two houses on Samus avenue; yes, I remember those distinctly, I went over to them.

Q. Do you remember that double privy there?

A. Yes.

Q. In what condition were the privies?

A. In pretty bad condition, that is, in case of a rain storm there was nothing to prevent it running into a little brook or drain that passed near there.

Q. Where did the drain go?

A. We followed that drain up for quite a distance, and it empties down towards the river there.

Q. Passes into the river?

A. I don't say as to that, I don't think we followed it all the way to that.

Q. Do you remember the privies for the Italians, where there were Italian people?

A. Yes.

Q. In what condition were they?

A. They were exposed, open; you could look in under the back of them.

Q. How far were they from the brook?

A. Well, I cannot say; I should judge they were about—must have been eighty feet or more than that; I don't recall exactly how far they were from it.

Q. Do you recall 52 Samus avenue, Andrew Baker?

A. I cannot say that I place this by name, sir.

Q. Mr. Peterson, owner, 44 and 46 Samus avenue?

A. Is there anything by which I could identify it? (After looking at report.) I don't recall that distinctly, no, sir.

Q. Now the Jenkins house, 373 East Blackwell street, privy in back of house; do you recollect that?

A. I think that is where he put the urinine in; yes, I recollect that one well, that is where I saw him put the stuff in.

Q. And by the stuff you refer to this green—

A. Green coloring matter.

Q. Now the Lyondale Bleach Works, did you go there; those are down at Rockaway.

A. That is not the rag place?

Q. No. You don't now recall—there was a hogshead there.

A. Oh, with the alum water?

Q. Yes.

A. Yes, I remember that. They claimed that it fed the excrement with this alum water to purify it, and then it flowed into a pool, I think, from there.

Q. Now the Rag Works at Powerville, you saw those?

A. Yes, we saw those but were not admitted to the place, they refused to let us in.

Q. Did you notice what is called the cemented open sewer which runs down the incline of the Morris Canal at Boonton?

A. Yes, I saw that.

Q. Did you notice any sewage matter coming down that cemented—

A. Well, I didn't go over to it; Doctor Spence went over and took some of the liquid contents up, at the foot of it, where it drains, and he said it had a bad odor.

Mr. EDWARDS:—I object to what he said.

Q. You yourself did not notice the odor?

A. No, I didn't notice it.

Q. Now did you notice the device that they had there for keeping the water from the lower level canal passing into the Rockaway river?

A. You mean the gates?

Q. Yes.

A. Yes, sir.

Q. What did you observe?

Mr. EDWARDS:—Objected to on the ground that it does not appear that this gentleman is an engineer or acquainted with constructions of that kind in any way.

A. I observed that the water over-flowed at one of those gates.

Testimony of Dr. George W. C. Phillips.

Q. When you say over-flowed, just what do you mean by that?

A. It went over the top of the gate, apparently.

Q. Which way?

A. Towards the Lord works.

Q. From the canal towards the Lord works?

A. Yes, sir.

Q. What was your opinion from the condition seen by you there as to the river—purity of the river as it enters the reservoir?

Mr. EDWARDS:—Objected to on the ground that it does not appear that this gentleman is an expert to form any conclusion on that subject, and that he has not sufficient knowledge of the situation on which to form any opinion which would be of any value.

Q. Before answering that question, Mr. Phillips, I will ask you this. Were you ever connected with the City Government in any way?

A. Yes.

Q. And if so in what capacity?

A. I was analysist of the Board of Street and Water Commissioners here for some four years.

Q. And as such did you analyse the water?

A. The waters of the Passaic at that time.

Q. What years was it?

A. Somewhere about 1889 or 1890.

BY MR. EDWARDS:—

Q. The analysis you made was purely a chemical analysis?

A. Yes, sir.

Q. Not bacteriological at all?

A. Yes, sir.

Q. And was of the Passaic river water?

A. And of the Passaic river water.

Q. As taken at Belleville?

A. As taken at Belleville and the city faucets.

Q. You made it at both places?

A. Yes, sir.

Q. You found a difference in the water at the faucets and the water at Belleville?

Objected to.

Q. Did you find a difference?

A. Yes, sir.

Q. Between the water in the river and the water in the reservoir?

A. Yes, sir.

Q. Which was the better water?

Mr. VREDENBURGH:—Now don't answer that question.

Mr. EDWARDS:—I insist that the witness shall answer.

Mr. VREDENBURGH:—I will go on with my examination.

BY MR. VREDENBURGH:—

Q. What was your opinion from the condition seen by you there as to the river—purity of the river as it enters the reservoir?

A. Well, I think that it was considerably contaminated, and liable to become more so in more aggravated conditions.

Q. Now, after you had returned from that visit, was a report made up—this report that you see here?

A. Not at once. Doctor Dickinson wrote out the report and then from the—had the stenographer make it up from his notes and he read from that—I am unable to say, but I know that Doctor Dickinson called a meeting shortly after and had typewritten

copies for each member of those people and we all read it, and we agreed that it was substantially correct, and signed it as you have it there.

CROSS EXAMINATION by Mr. Edwards:—

Q. You did not see everything that is stated in that report, did you?

A. Yes, pretty much everything, except if that states that they went around to those houses that backed on the canal, the Seven Sisters—what is the name of that?

Q. Well, there were some of the places you didn't go to?

A. That place I didn't go to see, no.

Q. Now, Doctor, you say your profession is that of a pharmaceutical chemist?

A. Pharmist and chemist.

Q. You keep a drug store?

A. Keep a drug store.

Q. Did you ever analyse the Rockaway river water?

A. Never did.

Q. Were you ever in the Rockaway water shed before?

A. Never before.

Q. Did you ever make an examination of any watershed before?

A. Well, I made it of water supplies; of a watershed, no.

Q. You don't claim any expert knowledge on that subject?

A. I am not an expert on watersheds.

Q. You don't claim to be a sanitarian either, do you?

A. No, I could hardly say that.

Q. You are not accustomed to making bacteriological examinations?

A. Not at all.

Q. In the years back in 1889, when you made examinations, it was entirely chemical examinations?

A. Entirely chemical.

Q. And bacteriological examinations were practically unknown at that time?

A. Practically unknown as they are known to-day.

Q. To-day it is not the chemical examination that counts, but the bacteriological examinations?

A. That is true.

Q. There is an entire change?

A. Well, they still make the chemical examinations.

Q. But they pay very little attention to it?

A. That is subsidiary to the other.

Q. An entire change has come over the method of testing water since your day?

A. Considerable change, yes.

Q. What day was it you went over the watershed?

A. I think it was about the 5th or 6th.

Q. Your recollection of the detail is not very clear now, is it?

A. Not very clear, no.

Q. You have just a sort of—

A. Not hazy; I visited most of those places but I don't remember them by name?

Q. You don't claim your recollection is good as to the details is it now?

A. Well, not as good as it was when I signed that report, no.

Q. Who is this Mr. Griffin, was it Captain Griffin, J. Walter Griffin or young Mr. Griffin?

A. Both of them.

Q. When you say one of them put in coloring, which one do you refer to?

A. The younger man.

Q. Now, had you ever seen a privy tested before by urinine?

A. Not by urinine, but I have by other colors; we did that occasionally; Mr. Leak used to do that on the Passaic.

Q. On the lower Passaic?

A. On the lower Passaic.

Q. That was Mr. Thomas W. Leak?

A. Yes, sir.

Q. Now, you said at the Lyondale Print Works that there was some human excrement that went into the river?

A. Which place was that?

Q. The Lyondale Print Works at Rockaway, where they had the alum?

Mr. VREDENBURGH:—I object; he didn't say so.

A. Let me ask you—can I ask a question. I would like to know if that is the place where they had the barrel for the alum and where they ran it out into an old mine?

Q. No.

A. Claimed that it flowed into the old mine?

Q. No, sir.

A. That was the silk mill, I guess.

Q. No, the Lyondale is where they had the barrel with the sulphate of alum over the top of the water closet; now you say in your testimony that was proposed to kill the effects of the human excrement; are you sure any excrement went in that?

A. Well, supposed to purify it, I take it.

Q. You think that was human excrement?

A. I suppose that was the notion of it, I don't know.

Q. Don't you know?

A. My recollection is that they told us they added some of that to it.

Q. Don't you know that no excrement went in there; that was simply the water waste of the mill?

A. Cannot say as to that, it was impure stuff.

Q. You are not sure about that?

A. No, I don't recollect it.

Q. You don't know whether excrement went in there or not?

A. I don't recall that, the way you put it there, distinctly.

Q. As a matter of fact, Doctor, there is no excrement there; we all understand that.

A. Yes.

Q. Now, then, Doctor, you say the water flowed down toward the Cooper-Lord, from the lower level of the canal?

A. That is my recollection of it.

Q. How many gates did it flow over?

A. Well, according to my recollection there was one gate.

Q. Are the gates all of the same height?

A. I cannot say as to that; I don't recall it.

Q. How could it flow over one gate and not over all of them?

A. Well, this place as I understand it was—here comes down in Boonton the big sewer, here is the canal, and there is the Incline where they slide boats over (indicating) and now right along by that is where this sewer empties in close to that, and across the way on this side from that is the gate I speak of, and it is down towards the works.

Q. Now, you saw the water flow over that?

A. Yes, I think so.

Q. Don't you mean the sluiceway to the works, you mean where they have the moveable gates?

A. The sluiceway or whatever you call it, but it

has evidently a gate there that allows the water to flow over.

Q. Is it where that water goes down to drain the mill?

A. It may be used for that purpose; I cannot say what purpose it is used for.

Q. You are not an engineer and don't understand the working of it?

A. I am not an engineer, no.

Q. Now, Doctor, you say that you think the water was contaminated?

A. I take it from this sewer emptying there.

Q. I mean the water as it went into the reservoir?

A. Yes, sir.

Q. You said it was contaminated?

A. Yes, sir.

Q. Did you make an examination of it?

A. Not at all.

Q. Any chemical examination?

A. No, sir.

Q. Why do you say it is contaminated?

A. I simply went on the broad ground that any water into which as much sewage as we saw or thought we saw flowing into the water must necessarily be contaminated.

Q. How do you know it went in?

A. Well, you can take two cases where it is absolutely sure it went in, where they put in the urinine test and saw it come out into the water.

Q. That is the only reason you know it went in, because of the urinine test?

A. That is the only proof, practically the only proof we have, and the lay of the ground, it could not have gone in any other direction.

Q. Then that is the only thing that makes you feel that the water is contaminated?

A. Yes, sir.

RE-DIRECT EXAMINATION:—

Q. The character of these cesspools, the bottoms of the privies, was what, do you recollect, as to stone?

A. Well, you mean were they cemented or—

Q. Yes.

A. Well, that I don't know, that I don't know; all I know is that it soaked through and showed up in the water outside.

Q. Were there not also some closets that you saw that were over-flowing?

A. That was I think on the first that we visited up there, where there were four or five houses together, at the top of the hill, and then the Barton house, was it, and the others, they over-flowed; that is, a slimy substance flowed out from underneath the houses on to the ground for a distance of some feet.

Q. Well, what was your judgment as to that stuff that you saw overflowing and getting into the river?

Mr. EDWARDS:—I object; it does not appear that this man is an expert on that subject and he does not say that he did go to it.

A. This didn't reach to the river, this flowed towards a little brook that lead down to the river.

Q. You are speaking of the Barton case, the other five or six houses?

A. There are six houses, that is the Eugene Cooper's houses.

Q. Now as to the Eugene Cooper houses?

A. Well, that is over-flowed and was a disgusting slimy looking stuff.

Q. What was your judgment as to its going to the river?

Mr. EDWARDS:—I object to his judgment; what does he know as to the fact.

A. Well, the fact— the lay of the land was such that in case of rain it would be bound to go down to this brook, and should be carried down to the river at Ford's pond.

RE-CROSS EXAMINATION:—

Q. Might it not soak into the ground?

A. Well, it might, yes, sir, but considerable rain would soon charge the ground, I think.

Q. That is all.

Sworn to before me,
(the signature being waived)
this 27th day of November,
A. D. 1906, at Jersey City,
N. J.

GEORGE T. BOUTON re-called:—

FURTHER DIRECT EXAMINATION by Mr. Vredenburgh:—

Q. I recall you for the purpose of having you produce, as clerk, the request which this Report states that it was made in pursuance of,—is that a copy of the request?

A. Copy of the request.

"Jersey City, November 3, 1906.

Dr. G. K. Dickinson,

My Dear Sir:—

In view of the fact that there exists in this city at the present time a greater or less feeling of unrest, due to the agitation as to the purity of our water supply, the undersigned much desire that a representative body of the medical profession of our city should, of themselves, and in their own way, make an investigation of the source from which the city is now receiving water, the result of such investigation

to be promulgated by themselves. An agent representing the city will accompany such investigating body to aid it only when such aid is requested, and we trust that you, as a representative member of the profession and a good citizen, will see your way clear to aid the city in the matter by consenting to become a member of such committee and with its other members, make such visit to the water shed on Monday, the 5th instant.

Very respectfully yours,

ANTHONY HAUCK, President. THOS. F. ROONEY, Chairman of Water Committee.

For the Board of Street and Water Commissioners."

Marked Exhibit 1 of this date.

CROSS EXAMINATION:—

Q. Are you the author of this Johnsonian document?

Mr. VREDENBURGH:—I object; you need not answer the question.

Q. (Question repeated.)

Mr. VREDENBURGH:—Don't answer.

Q. Why do you decline to answer; do you fear it would incriminate you, writing such a document?

Mr. VREDENBURGH:—Don't answer, because it is not necessary.

WITNESS: On the advice of counsel for the city, I decline.

Q. Now, you sent this to Doctor Dickinson, did you?

A. I took it.

Mr. VREDENBURGH: I object to the question as not cross examination, but I don't mind the witness answering it.

Q. Did you send it to Dr. Dickinson?

A. I took it.

Q. Did you give any notice of this meeting on the watershed on Monday, the 5th of November, to the Water Company, so that they might have a representative there?

Mr. VREDENBURGH:—I object to that as not cross examination, and advise the witness not to answer.

A. I will not answer, for the same reason.

Mr. VREDENBURGH:—Mr. Vredenburgh declares that the testimony taken by permission of the Vice Chancellor, when the case was opened to permit him to take the testimony, is now closed, and by this I mean all my testimony except in rebuttal.

Sworn to before me,
(the signature being waived)
this 27th day of November,
A. D. 1906, at Jersey City,
N. J.

GEORGE T. BOUTON called:—

BY MR. EDWARDS:—

Q. Did you or the Board give any notification to the Water Company so that they might send a representative to be present at this investigation of the watershed on Monday the 5th?

A. No, sir.

Q. That is all.

Sworn to before me,
(the signature being waived)
this 27th day of November,
A. D. 1906, at Jersey City,
N. J.

ADJOURNED.

IN CHANCERY OF NEW JERSEY.

Between

THE MAYOR AND ALDERMEN OF JERSEY CITY,

Complainants,

and

THE JERSEY CITY WATER SUPPLY COMPANY,

Defendants.

Examination of witnesses, etc., in the above stated matter, purusant to notice, before the subscriber, one of the Masters and Examiners in Chancery of New Jersey, at the office of Messrs. Collins & Corbin, 243 Washington street, Jersey City, N. J., at the hour of 10:30 in the forenoon of Tuesday, December 18, 1906, in the presence of Mr. James B. Vredenburgh and Mr. George L. Record, counsel for the complainants, and Mr. William H. Corbin and Mr. William D. Edwards, counsel for the defendants.

By agreement and consent of counsel said depositions were taken in shorthand, question and answer in full, and the signatures of the witnesses waived.

Testimony of Albert Richards.

ALBERT RICHARDS, sworn on behalf of the defendants:—

DIRECT EXAMINATION by Mr. Corbin:—

Q. Mr. Richards, where do you live?

A. Dover.

Q. Were you formerly the proprietor of the Mansion House in Dover?

A. Yes, sir.

Q. How far from the bank of the Rockaway river is that situated?

A. It is just about one block, I suppose; about two hundred and fifty feet direct.

Q. When did you cease to be proprietor and leave there?

A. It will be two years the first of next April.

Q. That is, it was April, 1905?

A. Yes, sir.

Q. What arrangements did you have in the hotel there for water closets, etc., were they indoor or outdoor, at that time?

A. I had closets indoors.

Q. Where did they empty?

A. A cesspool, finally.

Q. Well, where did they originally empty?

A. Into the sewer that emptied into the Rockaway river.

Q. Did you cut that sewer off?

A. Yes, sir.

Q. When?

A. I cnnot recollect just about the date; it is about five or six months previous to my leaving there.

Q. At whose request did you do that?

A. I think Mr. Gibson notified me.

Q. That is the inspector of the Water Company?

A. Yes, sir.

Q. What arrangements did you make in place of

the sewer pipe that had formerly led to the river?

A. I dug a cesspool in the yard.

Q. You had one built, did you?

A. Yes, sir.

Q. Did that arrangement continue until the time you left?

A. Yes, sir. Well, I built one previous to this time, and didn't use it until I was notified to get out of the river, but I afterwards built an additional one to that.

Q. Then you had two?

A. Yes, sir.

Q. Was there any connection between the river and your cesspool, after you built these, when you left the hotel?

A. No, sir; not when I left the hotel.

Q. Had been entirely disconnected, had they?

A. Yes, sir.

CROSS-EXAMINATION by Mr. Vredenburgh:

Q. Who did you sell to, Mr. Richards?

A. Mr. John Bennett.

Q. And you moved out of the hotel?

A. Yes, sir.

Q. Do you still live there?

A. In Dover?

Q. Yes.

A. Yes, sir.

Q. You cleaned the cesspools in what way after you cut off the connection?

A. I had a wagon—a tank wagon built for the purpose of carrying away the sewage from the cesspool.

Q. And where was it carted to?

A. It was carted to a farm that ran to Port Oram.

Q. By whom?

A. I hired Mr. Totten, the liveryman, to do my carting.

Q. Did you own the tank wagon, or did he?

A. I owned the tank wagon and he owned the horse.

Q. How often did you have it cleaned?

A. Well, I think probably that would run three or four weeks.

Q. That is, you had it cleaned once in three or four weeks?

A. Yes, sir; have it emptied.

Q. How many closets were there leading to this cesspoll?

A. How many closets in the hotel? There was one on the first floor, and there were three all told.

Q. How many closets were there at each place?

A. One on the first floor and one each on the second and third floors.

Q. How many urinals?

A. Two on the first floor and one on the second and third.

Q. And while you ran the hotel how many guests had you, about?

A. Well, that was irregular; the house would hold —I had forty rooms in the house, and as a general thing the first three or four nights of the week I would be pretty well filled up, and the latter end of the week I would be pretty quiet, the commercial men generally left the town.

Q. Your help consisted of how many?

A. About twelve.

Q. And you had a barroom?

A. Yes, sir.

Q. Where was that?

A. What part of the hotel?

Q. Yes.

A. On the first floor.

Q. Did the water closet open into the barroom?

A. There was a little entry-way from the barroom to the closet.

Q. And the barroom opened on the street?

A. Yes, sir.

Q. Was it one of the principal places of resort in Dover—your barroom, for that business?

A. It done its share of its business in that line.

Q. Do you still have any interest in the hotel?

A. No, sir.

Q. Do you know where that tank wagon is now?

A. I do not.

Q. When did you last see it?

A. Not since I left the hotel.

Q. When did you last know of that cesspool being cleaned out?

A. When did I last know if it?

Q. Yes, personal knowledge of it?

A. Well, that is previous to my leaving there, a short time. I don't know just the exact time.

Q. You haven't known of it since?

A. No, I have no knowledge of it at all, since I left there.

Q. Did you see to the building of this cesspool?

A. To the building of it?

Q. Yes.

A. No, it was done by my architect; it was during the time I was making some changes in the hotel, and he had it built, under his directions.

Q. Your architect built it, but, did you see it while it was being constructed?

A. I did, yes, sir.

Q. Was it a tight bottom?

A. No, sir.

Q. What kind of a bottom was it?

A. Earth bottom, natural earth.

Q. And the sides were what?

A. The sides of the first one I built were cemented.

Q. And the second one?

A. The second one were open loose walls.

Q. Was the second one the last one you built?

A. Yes, sir.

Q. Did you make the bottom, or did you leave the bottom as you found it?

A. Left it, after digging it the required depth.

RE-DIRECT EXAMINATION:—

Q. What was the depth?

A. The depth, I think, of the first one was twelve feet.

Q. And the second one?

A. The second one was about nine, I think.

RE-CROSS EXAMINATION:—

Q. About how much above the bed of the stream is the surface of your ground—of your former hotel?

A. Well, I cannot say just how much fall there is from there; I never measured it; there is more than seven or eight feet, but that may not be correct.

Q. Seven or eight feet from what to what?

A. I mean above the level of the Rockaway river; that is as I understand your question.

Q. That is above the surface of the river?

A. Yes, sir.

Q. Do you refer to it as surface when it is full, or ordinary times?

A. Well, the bed of the river, it is generally a shallow river, if it was high water why it is liable to flow its banks.

Q. You think the surface of your hotel is about seven or eight feet?

A. I should judge so; I am not positive about that; I am not sure.

Sworn to before me,
(the signature being waived)
this 18th day of December,
A. D. 1906, at Jersey City,
N. J.

Testimony of John B. Bennett.

JOHN B. BENNETT, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:—

Q. Where do you live?

A. Dover.

Q. Are you the proprietor of the Mansion House at Dover?

A. Yes, sir.

Q. You bought it from the former witness, Mr. Richards?

A. Yes, sir.

Q. How long have you been there in possession of the house?

A. Since two years ago next April.

Q. That is, since April, 1905?

A. Yes, sir.

Q. How do you dispose of the sewage from the hotel?

A. In the same manner that Mr. Richards did, in this old cesspool, original cesspool, and with an over-flow, I think, to the other one; the two he speaks of; since that time I have dug,—I think it was last October, I dug another over-flow, and from this first over-flow another one in April.

Q. So that you have four now?

A. I have four cesspools, yes, sir.

Q. Where are they, between the house, or where?

A. Right alongside of the building, outside.

Q. How did you build them, the two that you built?

A. Of stone, loose walls.

Q. How as to the bottom?

A. Loose, just dirt.

Q. How deep?

A. Well, the two I dug, one is about fourteen feet

in diameter and fifteen feet deep, and the other one is about the same diameter, and sixteen feet deep; I went about three or four feet under water.

Q. There is an over-flow from each one to the next one?

A. From the original to the others.

Q. Are they connected with any pipe to the river?

A. No, sir, no pipe connection, outside of from one to the other.

Q. Did you see them when they were being built?

A. I helped dig the dirt and helped built them myself.

Q. Have you emptied any of them since you have been there?

A. Yes, sir, shortly after I went there I got this tank that Mr. Richards—

Q. The tank wagon, you mean?

A. Yes, and I made arrangements with a man named Ford to empty my cesspools, for the use of my tank and apparatus, and he continued that until I built my first over-flow and then I didn't need him.

Q. When did you build your first over-flow?

A. The first over-flow in October.

Q. What year?

A. 1905.

Q. And when did you build the second one?

A. In April, 1906.

Q. You haven't needed to empty them since that?

A. No, sir—I commenced yesterday to empty them.

Q. They hadn't filled up before?

A. Hadn't filled up before.

Q. It has been testified here, or intimated that you had some pipe or means of letting out the contents of your cesspools at night, so that they would flow into the river, is that true?

A. It is not true.

Q. Is there any such pipe or connection at all whereby you could do that?

A. No, sir.

Q. Do they in fact empty into the river, or towards the river at all?

A. My cesspools?

Q. Yes.

A. Don't empty anywhere, one is here along side of the building, another one here (indicating). Here is the first over-flow, and here is the second, and there is twenty feet distance between the cesspool and the river.

Q. Are the new ones you built larger or smaller than the ones that were formerly there?

A. Larger than the original, I think, that is, they are deeper, I don't know whether they are any larger in diameter.

CROSS EXAMINATION, by Mr. Vredenburgh:—

Q. How long have you lived in Dover?

A. Five years next April.

Q. Where did you come from?

A. Morristown.

Q What did you do at Morristown?

A. I was with my uncle in the hotel business; clerk or manager, something of that sort.

Q. What hotel?

A. United States Hotel?

Q. In Morristown?

A. Morristown, New Jersey, yes, sir.

Q. When you came to Dover what business did you go into?

A. Into the hotel business, I opened the Hotel in Dover five years ago next April.

Q. Where is the Hotel Dover?

A. One block above the Mansion House.

Testimony of John B. Bennett.

Q. Did you work for Mr. Richards before you bought him out?

A. Worked for him? No, sir.

Q. After you bought him out, you say you made some arrangement with a Mr. Foley?

A. No, Ford.

Q. What Ford was that?

A. Fred. Ford.

Q. When did you make that arrangement?

A. As soon as I saw I needed him, as soon as the cesspool commenced to fill up.

Q. At what date?

A. I cannot tell the date, I had an agreement drawn up with him.

Q. Was it in writing?

A. Yes, sir.

Q. Where is it?

A. I looked for it this morning and couldn't find it, I had no use for it I dissolved the agreement with him as soon as I dug my first over-flow, and tore it up.

Q. You had an agreement with him which you cannot find now?

A. No, sir; I cannot find it now.

Q. You don't remember the date of that agreement?

A. I don't remember the date, I think it was about—well, it was possibly a month after I went there, shortly after I went there.

Q. You told us the contents of that paper apparently, won't you please repeat now what the contents of that paper was?

A. It was that this was my tank and hose and pump, and he was to have the use of that to do outside work for taking care of my cesspool and keeping it empty whenever it required emptying.

Q. Who drew the paper?

A. I just wrote it up on a slip of paper and had him sign it.

Q. Did he have a copy of it?

A. No; I just wanted it in case we came to a dispute or something.

Q. Where was the tank then?

A. Where was it before I let him have it?

Q. At the time you made this agreement?

A. It was back of Mr. Jenkins' blacksmith shop.

Q. Being repaired?

A. No, sir, it stood down there in storage, I had no place in the yard for it.

Q. What became of it after that?

A. After Ford got through with it?

Q. After it stood at the blacksmith shop?

A. Then I sold it to Ford, that is, I let Ford have the use of it, he took care of it.

Q. You say you sold it to Ford?

A. I didn't sell it to him I let him have the use of it for cleaning out my cesspool.

Q. What became of it after that?

A. When he took care of it?

Q. After you saw it at the blacksmith shop what became of it?

A. He took it up to his stable and took care of it, and used it whenever he had occasion to use it.

Q. When did he first use it at these cesspools?

A. I don't remember the date.

Q. Did he ever use it at these cesspools?

A. Did he ever use it?

Q. Yes.

A. Yes, sir, whenever it was needed, quite often.

Q. Well, how often?

A. I don't know how often.

Q. How soon did he do it after you had sold it to him?

A. I cannot tell, it might have been a day or it

might have been three weeks.

Q. You cannot tell between a day or three weeks?

A. I cannot remember, I didn't jot it down in my memory, I didn't think I would have occasion to.

Q. When did he next come, how soon after that?

A. I cannot tell you the dates, as soon as it needed emptying he emptied it.

Q. How do you know?

A. Because I know that, I was there.

Q. Did you ever see him empty it?

A. Yes, I used to help him.

Q. How did you help him?

A. With the pump.

Q. Where is the tank now?

A. I think a man named Smith owns it.

Q. When did you sell it?

A. I sold it to a man named Newkirk.

Q. When?

A. I think Ford and I dissolved this contract about the time I built the first over-flow, and then I had the tank for about a month I think, and sold it to Newkirk.

Q. When do you figure out that was. In October, 1905?

A. About that time, yes, sir.

Q. Did you use it after Ford gave it back to you?

A. After he gave it back to me?

Q. Yes.

A. Then I sold it to Newkirk, shortly after that, and he emptied my first cesspool, and then is when I had the first over-flow dug, and I didn't have occasion to use it until this second over-flow, to get ready for building this second over-flow, then I had it emptied again.

Q. With that same tank?

A. Same tank, yes, sir.

Q. Do you know where Ford took this stuff?

A. Upon the Baker flat I think he took it, he got permission from Mr. Baker.

Q. Where is the Baker flat?

A. Well, it is about half a mile above Dover, I guess, in the suburbs of Dover.

Q. Now you say in October you built an over-flow?

A. In October I built the first over-flow, yes, sir.

Q. What do you mean by over-flow?

A. The first cesspool with an over-flow from the old one,—cesspool 14 feet in diameter, by about 15 feet deep.

Q. How did you connect it with the old cesspool?

A. By an over-flow, I think it is about a four inch pipe, four inch pipe with an elbow bending down about a foot, so that nothing but the clear water would flow in that over-flow.

Q. And that leads from one of the cesspools that was there when you went?

A. When I went there, yes, sir.

Q. To the first over-flow that you built?

A. To the first over-flow, yes, sir.

Q. Which cesspool does that lead from, the one he built first or the one he built second?

A. That I don't know, it is the largest cesspool, it is the main cesspool.

Q. The largest one?

A. Yes, sir, it is the one that the matter flows into first from the toilets and all over, all over the building, it is the receiving vault.

Q. How far are the two old cesspools that were there when you went—how far apart are they?

A. How far apart? Probably thirty feet.

Q. Thirty feet?

A. I should think so, twenty-five or thirty.

Q. How are they connected?

A. I don't know, I never was into this one, this first one, I never had it opened, never saw into it.

Q. Never examined it?

A. Until preparing to dig a new kitchen building and then I took away an old privy, and in doing so this privy was next to this cesspool, and I punched a hole in the wall and let the contents out.

Q. Now the pipe that does connect from the larger of the old cesspools to your new cesspool, you say is a ten inch pipe?

A. Ten inch pipe.

Q. Yes.

A. No, it is a four inch pipe.

Q. Four inch pipe?

A. Yes, sir.

Q. That is how far below the surface of the ground?

A. Well, I cannot tell, it is probably three feet, I should think.

Q. How far are the two cesspools a part that that pipe connects?

A. Probably ten feet or twelve feet, they may be fifteen feet apart, I cannot tell exactly, I never measured them, I think possibly fifteen feet.

Q. And that was built in October?

A. That was built in October, yes, sir, about that time.

Q. 1905?

A. 1905.

Q. Now the second cesspool that you built was built in April, 1906, you said?

A. About April, 1906, yes.

Q. Who did that?

A. A man named Fanning.

Q. What is his first name?

A. Thomas Fanning, he walled up the second cesspool, I helped dig it myself.

Q. You dug it and he walled it up?

A. Yes, sir.

Q. And he walled it up, I understood you to say with loose stone?

A. Yes, sir.

Q. Where did he get the stones from?

A. Well, I had some around there, and he carted some, I don't know where he got them from.

Q. Did it by contract?

A. No, sir, just rendered a bill for the number of days and the number of loads of stone, etc.

Q. Now in which direction is that cesspool from the old cesspool?

A. From the old one?

Q. Yes.

A. Well, I will show you.

Q. Speak with reference to the compass, east or west or north or south?

A. Both east of the original.

Q. And are they east of each other?

A. East of each other, about east of each other, a little north.

Q. The one you built you say in April is how far from the one you built in October?

A. About thirty feet, I think.

Q. Do you know where the pipe is that runs to the river?

A. No, sir.

Q. Did you ever see it?

A. No, sir.

Q. Have you any tenants?

A. Tenants? Yes, sir, some times have the house full,—transients—, oh, tenants?

Q. Yes.

A. Yes, there is Totten's livery stable, and Wurms cigar shop.

Q. Owned by a man named Totten?

A. The livery business is, yes, sir.

Q. He has a lease with you?

A. A lease with me, yes, sir.

Q. Where is the stable situated?

A. On the southerly end of the property.

Q. Does that drain to the cesspool too?

A. No, sir, no, sir, not in these cesspools.

Q. Where does that drain?

A. Well now I have never been down into there, but there is a cesspool in his wagon house; I don't know where it drains, I have never seen, and never heard, and never inquired, and never had reason to.

Q. Do you own the land where that cesspool is?

A. Yes, sir.

Q. And you don't know where that drains, that cesspool, do you?

A. Well, that cesspool don't drain anywhere, because I had that pumped out and saw it, it is just a small cesspool to take care of the old—where it used to be the old chinese laundry, and Price's photographic studio.

Q. Well, there are water closets connected with that cesspool?

A. No, sir.

Q. Are there any water closets in the stable?

A. No, sir, I don't think there is, no, they use the back house in the yard; I have never been in the stable a whole lot, I don't know all about it, but I am quite sure there are none.

Q. Has it been rented ever since you have been there?

A. Yes, sir.

Q. Now you said there was a cigar store that you rented?

A. Yes, sir, a cigar shop.

Q. Is that a separate building or part of your hotel?

A. It is a separate building, at the other end of the block.

Q. And has that a cesspool too?

A. No, sir, I don't think he has any water.

Q. He has closets, has he not?

A. I don't think so, I have never been in there, never been any further than the little cigar store that he runs in one part of this shop. I don't think he has any, though.

Q. What do you say his name is?

A. William Wurm.

Q. Have you any other tenants?

A. The next is John Williamson, harness maker.

Q. Is he in your building?

A. Up along—coming towards the hotel.

Q. A separte building?

A. A separate building, yes, sir, well, it is a row of buildings; a store he occupies.

Q. Has he a closet?

A. No, sir.

Q. Where does his drain go?

A. That goes into this same cesspool in Totten's livery stable, it is the carriage—the place where they drive in and tie the rigs, a carriage yard, or something like that.

Q. That is the third tenant?

A. Yes, sir.

Q. Have you any other tenant?

A. The next is John Price, photographer.

Q. Where does his drainage go?

A. His drainage goes in this cesspool, in Totten's stable that is the way I understand it; I have never dug them up, any more than empty this one in Totten's stable, a couple of times.

Q. Has he no closet in the photographic establishment?

A. No closet in the place, no, sir.

Q. Now, Mr. Bennett, did you threaten either of these tenants to break their lease, because they had

told about the sewage at your place?

A. No, sir.

Q. What?

A.No, sir.

Q. Have you said nothing to any of them about that?

A. No, sir, nothing. To my tenants?

Q. Yes.

A. No, sir.

Q. Nor to any of the employees of your tenants?

A. No,sir, never in my life.

Q. How do you happen to be here?

A. Because I was supoenaed.

Q. Who subpoenaed you?

A. Mr. Gibson served the subpoena.

Q. Who spoke to you about coming.

A. Who spoke to me?

Q. Yes.

A. Nobody spoke particularly, he handed me the subpoena yesterday.

Q. Nobody spoke to you about your drainage situation there, at all?

A. Oh, I have heard—nobody from here, in particular; I have talked it over with all these people.

Q. Never talked it over with Mr. Gibson?

A. Not in particular.

Q. What do you mean by not in particular?

A. Well, we talked about sewage, we have all talked it over, half of Dover is talking about it.

Q. But I am speaking about your coming here today, who you talked it over with, either Mr. Gibson, or Doctor Leal, or who you talked with about it?

A. I talked it over in this way,—when they came in and wanted to make a test we would naturally chew it over, when they were making the test.

Q. Who came into make the test?

A. Mr. Gibson made a test and Doctor Leal and

his party, and these gentlemen, I believe, made a test—claimed they had.

BY MR. CORBIN.

Q. Who do you mean by "these gentlemen?"
A. These Griffins.

FURTHER CROSS EXAMINATION.

Q. Well, Doctor Leal came in to make a test, when did he come in?

A. I don't remember the dates, they have been up there several times, made two or three tests I think.

Q. Did they threaten you?

A. No, sir.

Q. Didn't ever threaten you?

A. No, sir.

Q. What?

A. Threaten me?

Q. Yes.

A. No sir.

Q. Never said they would stop you if you were doing it?

A. If I was doing it, sure.

Q. They did say they would stop you?

A. If I was wrong, I suppose, and had no right to be on the river.

Q. What did they say about that?

A. Well, now I don't know what in particular they said, any more than they wanted to know if I was connected, and I told them no.

Q. Who asked you that?

A. Perhaps some of these parties, I don't remember the instance particularly.

Q. Did Doctor Leal ask you that?

A. I don't remember that he asked me in particular.

Q. He didn't ask you anything about it?

A. I don't think so.

Q. Doctor Leal was not interested in it?

A. He asked to make the test.

Q. When did he ask you to make the test?

A. Well, two or three he made.

Q. When?

A. I don't remember the dates, they probably have got them somewhere.

Q. About when?

A. Well, they made a test last week one day.

Q. Who did?

A. Why Doctor Leal and Doctor Chandler, and Herold and Mr. Gibson.

Q. Who?

A. Mr. Gibson, Herold, Chandler, Leal and Gibson, I think it was last week one day, and then they made a test some time ago; the same party was up there.

Q. The same men?

A. The same party.

Q. How long before that?

A. Well, I don't know, I cannot tell exactly how long before, I don't know, two or three months possibly.

Q. Did they dig up the yard?

A. No, sir.

Q. Found the pipes?

A. They went down in my cesspool.

Q. Went down into it?

A. Went down into it, had a plumber go down into it and look it over.

Q. They didn't go down?

A. They looked into it, and had a plumber go down into it, and look it all over, and look at the sewer pipe, and saw the out-let of the sewer pipe, where it ran in; they all listened to the sewage empty into this cesspool.

Q. What do you mean by the sewage pipes?

A. Connections from the house to the cesspool,, put the stuff in and listened to it come in there.

Q. Put the stuff in the closets and listened to it going into the cesspool?

A. Yes, sir.

Q. I would like to know who you mean by Chandler?

A. Well, I don't know, his name is David Chandler, I believe, I never met him until he came up this time.

Q. Who do you mean by Herold?

A. Well, that is all I know, his name was Herold, according to the Register in the hotel.

Q. They registered in your house, did they?

A. Yes, sir.

Q. How long did they stay in your house?

A. Well, they stayed—they came up there two or three times and stayed at different intervals, some times a day.

Q. Who paid you for coming here?

A. Sir?

Q. Who paid you for coming here today?

A. For coming here?

Q. Yes.

A. Who paid me?

Q. Yes.

A. I don't understand you. Nobody paid me for coming here.

Q. Did you come voluntarily?

A. I was subpoenaed.

Q. Well, didn't they pay you anything with the subpoena?

A. $3.00.

Q. Who paid you that?

A. Mr. Gibson.

Q. Gibson paid you that?

A. Yes, sir, it was supposed to be car fare, booze money or something like that.

Q. How much do you think is booze money and how much do you think is car fare?

Mr. CORBIN:—I object to this as not competent. You need not answer the question, Mr. Bennett.

A. I cannot tell.

REDIRECT EXAMINATION.

Q. How far is it from Dover to Jersey City?

A. From Dover to Jersey City?

Q. Yes.

A. Well, about forty miles to Hoboken, I think.

Q. And two more here?

A. About two more here.

Q. About forty two miles?

Mr. VREDENBURGH:—I object to counsel telling the witness.

Q. About forty two miles coming, and about forty two miles going back?

A. I think so, yes.

Q. The water from the roof of the Mansion House goes where, the rain water?

A. It goes into this sewer main somewhere, I don't know where.

Q. That still runs to the river?

A. That still runs to the river.

Q. Through this pipe that was spoken of, that was originally connected, as you understand with the—

A. That I heard, but I never seen it.

Mr. VREDENBURGH:—Objected to as leading.

Q. Now you spoke of these over-flows from one cesspool to the other, and you say the pipes were bent down so that they would take only the water?

A. Only the clear water, they were bent about a foot below the level of the pipe so as to catch nothing but the clear water.

Q. Then the solid matter is all in the first one?

A. Yes, sir.

Q. And the others contain nothing but water?

A. Yes, sir.

Q. How do they look?

A. It has just about half an inch, probably of slime over the top, otherwise it is perfectly clear. I opened one yesterday.

Q. Is that so as to the other?

A. I haven't seen the third one.

Q. When you looked at them have they been that way?

A. I never looked at the others, I never had occasion to .

Q. That is the one that was there when you went there?

A. That is the firrst over-flow I dug.

RECROSS EXAMINATION.

Q. When did you say you last cleaned the first over-flow or cesspool that you built?

A. The first over-flow?

Q. Yes.

A. I have never cleaned the first over-flow.

Q. Never cleaned it?

A. Only cleaned the original one, and nothing but the clear water is in the over-flows.

Q. You never cleaned anything but the original cesspool?

A. That is all.

Q. The one that you call the larger cesspool of

the two, that Mr. Richards says he had built before he left?

A. The receiving vault, yes, sir.

Q. That is all.

Sworn to before me,)
(the signature being waived)
this 18th day of December,)
1906, at Jersey City, N., J.) 10

ALBERT RICHARDS, recalled on behalf of the defendants.

FURTHER DIRECT EXAMINATION, by Mr. Corbin:—

Q. When you spoke of having the cesspool cleaned, which one did you mean having cleaned by the cart? 20

A. No. 1, you would call it, the one that was first built, in which the connections were made to—

Q. Well, did any of the solid matter reach No. 2?

A. No. sir.

Q. What was in No. 2, when you saw it?

A. The pipe which connected the two had a screen over it, so that the solid matter would remain in No. 1. 30

Q. What is the condition of No. 2, what would be in that?

A. Well, it was comparatively clear water, some thickening, but nothing to speak of.

Q. When the pipe leading to the river was cut off, of which you have spoken, did you see it yourself cut off?

A. Saw the original cut off?

Q. Yes.

A. Yes, sir. 40

Q. Does that pipe go on any further, does it go on towards the house, for instance, to take water from the roof, or anything like that?

A. Well, I don't understand your question.

Q. Well, the pipe is still in the ground?

A. Yes, sir.

Q. What does it take, what is it used for now?

A. The pipe which was cut off?

Q. Yes.

A. Well, here is the pipe and the elbow was put in here, connecting it with this cesspool.

Q. What was done with that?

A. Now, about the other connection, this main pipe is only used now to take this water from the roof.

Q. And you saw that elbow taken out yourself, did you?

A. I saw that put in.

RECROSS EXAMINATION.

Q. You say you saw the elbow put in?

A. Yes, sir.

Q. Who did you employ?

A. Mr. Thomas Fanning, a mason there in Town.

Q. Did you see what he did, did you personally see what he did?

A. What he did?

Q. Yes.

A. Yes, sir.

Q. You were there when he did it, were you?

A. When he made this connection, yes, sir.

Q. When he made the connection?

A. Yes, sir.

Q. Well, now I am talking about when he cut it off?

A. Well, when he cut it off he was connected with

the cesspool, I mean, when he cut off from the river he connected with the cesspool.

Q. What elbow was this you speak of?

A. An elbow which was necessary to put into connect with the cesspool.

Q. And that elbow connected what pipes with the cesspool?

A. It cut the main line off from this sewage pipe and connected it with the cesspool.

Q. That is, the sewage pipe ran—

A. From the house which formerly connected with the river was connected with the cesspool.

Q. What was the size of the pipe.

A. I think it was about an eight inch elbow, an eight inch pipe must have been.

Q. How near is the sewer pipe to the pipe that runs to the river, at the point where this elbow was put in?

A. How close is the sewer pipe to the elbow.

Q. Yes.

A. Well, the one length was taken out of the sewer pipe and the rest of that remains in the ground still, I suppose.

Q. What was the length of that part that was taken out?

A. I suppose the lengths are thirty inches or possibly three feet.

Q. That is all.

Sworn to before me,)
(the signature being waived)
this 18th day of December,)
A. D. 1906, at Jersey City,)
N. J.)

JOHN K. COOK, sworn on behalf of the defendants.

DIRECT EXAMINATION, by Mr. Corbin.

Q. Where do you live?

A. In Dover.

Q. What is your business?

A. Laundryman.

Q. Where is your laundry work—your place of business?

A. On Blackwell street, in Dover, West Blackwell street.

Q. How far from the Rockaway river or rather from the Morris canal?

A. I don't know, I should judge about three hundred and fifty or four hundred feet.

Q. Is the canal at that point between you and the river?

A. Yes, sir.

Q. Where do you discharge the wash water from the laundry, and how?

A. Into a drain that runs back of the laundry.

Q. And into what?

A. And into the canal.

Q. What kind of a drain?

A. Well, it is a tile runs through there from the street.

Q. A tile drain?

A. Yes, sir, about a six inch pipe I should judge.

Q. What is the temperature of the water which you discharge into it?

A. Well, it is from 185 to 200.

Q. What kind of laundry work do you carry on at that place?

A. I don't understand the question.

Q. What kind of laundry work, is it domestic laundry, hotel laundry or house laundry or what?

A. It is principally shirts and collars and cuffs; bundle work we call it.

Q. From Dover or other places?

A. Dover and other places too, I have agencies at other Towns.

Q. To what temperature do you heat the water in using it, in washing?

A. About 185 to 195.

CROSS EXAMINATION by Mr. Vredenburgh:—

Q. Ho long have you been there, Mr. Cook?

A. I have been—in Dover do you mean?

Q. In this business, yes.

A. Eleven years last August.

Q. Is your business growing?

A. Yes, sir.

Q. Now the water from the wash of these clothes that you wash, pass as from your laundry in what way, did you say?

A. Through a drain pipe.

Q. What size drain pipe?

A. I don't know the size, I suppose it is—well, it might be from eight inches to a foot I should think —eight to twelve inch pipe.

Q. How far is your laundry from the canal, the nearest part of your laundry to the canal?

A. I should judge about four hundred feet.

Q. And is it a drain pipe all the way, or is it open part of the way?

A. No, it is closed all the way.

Q. Closed all the way?

A. Yes, sir.

Q. How many men have you in your employ, or women?

A. I have about—well, it varies, you know, according to the business; in the summer time we have

more business than we do in the winter; I have from sixteen to twenty employees.

Q. And where is the closet that they use?

A. Back of the laundry, right along side of the laundry.

Q. Is it connected with this pipe?

A. No, sir.

Q. In what way does that drain?

A. That doesn't drain at all, it is just a hole dug there, and we clean it out when it needs it.

Q. A hole dug?

A. Yes, sir; just a hole in the ground; just a hole about, well I should suppose it is about four feet wide; three or four feet wide, and six or eight feet long.

Q. And how deep?

A. Probably five or six feet; not more than five.

Q. And the bottom, how is the bottom; do you know what the bottom is; did you ever see the bottom?

A. Not since we filled it; no, sir,—not since we built it.

Q. What was the bottom when you built it?

A. Just the earth bottom; just dug a hole and walled it up with dirt wall, stones,—loose stone.

Q. How near is that hole to this pipe that you speak of,—this drain?

A. Oh, it is thirty-five or forty feet.

Q. Nearer the canal, or further from the canal?

A. Further from the canal.

Q. The water from your roof, etc., runs in which direction?

A. It runs on the ground.

Q. To the canal?

A. It runs on the ground.

Q. Well, from the ground does it run to the canal?

A. I suppose it goes in the ground; soaks in.

Q. When it rains you mean all the rain from your building goes into the land?

A. Well, when there is a hard rain, I suppose it drains towards the canal; there is no cesspool or anything for it to go in; it runs out through the leader down on the ground.

Q. You don't know where it runs from, after it leaves your leader?

A. No, sir; it runs out on the ground.

Q. Is not there an open drain of some sort from there, to the canal?

A. No, sir.

Q. How does it go to the canal?

A. I don't know that it does go there.

Q. You think it goes down into the ground; how much are you above the level, the surface of your ground, at the factory, above the level of the canal?

A. You mean the bed of the canal?

Q. The surface of the water?

A. Well, really, I cannot tell that.

Q. About?

A. I should judge probably eight or ten feet, may be not so much.

Q. Do you know how far the canal is from the river, at that point, about?

A. No, sir; I do not; I cannot tell.

Q. Fifty feet or a hundred feet?

A. I should think it is more than a hundred feet; well, no; I should think a hundred feet, possibly.

Q. How much is the surface of the canal above the river, at that point?

A. Well, there is a lock canal, a lock right back of us; the canal is quite some higher than the river along there.

Q. So that near you there is a lock in the canal?

A. Yes, sir.

Q. Five or six feet lock—a drop of five or six feet

in the canal there, at that lock?

A. More than that, I think.

Q. Now, does the water from your factory enter into the canal above or below that lock?

A. Below the lock.

Q. Is there any other connection to that pipe than yours, or that drain, than yours?

A. Not that I know of.

Q. Run through other people's property, does it?

A. It runs through the one man's property, the man that owns the building.

Q. You are a tenant there?

A. Yes, sir.

Q. Did you put in that drain, or did he?

A. The town put it in.

Q. It is a town drain?

A. It comes from the street, above the laundry.

Q. It is a public drain, then?

A. Yes, sir.

RE-DIRECT EXAMINATION:

Q. For how long a time do you keep the water at this temperature of 185 to 195, which you have mentioned?

A. Not very long.

Q. Well, about how long?

A. Oh, as soon as we get it hot enough why we discharge it; probably there is some water; for instance, what we call the principal washing water; why, we leave it run in that from a half to three-quarters of an hour after it gets hot; we keep heating it up a little all the time.

Q. That is where you are washing the clothes?

A. Yes, sir.

RE-CROSS EXAMINATION:

Q. When these clothes that need to be laundried come to your place, what is the first operation?

A. The first operation is marking them in, as we call it.

A. Yes?

A. Taking a record of them.

Q. Then what next?

A. Then they are washed, we start to wash them.

Q. What is the first operation in washing them?

A. I don't understand the question.

Q. Well, you put the soiled clothes in water?

A. Yes, sir.

Q. Now, what is the temperature of that water that you first put those clothes in?

A. Cold.

Q. Cold water?

A. Yes, sir.

Q. How long do they remain in cold water?

A. Well, we start them in that, and then there is a steam pipe runs in the wash wheel, and after they run in the cold water a while we turn on the steam and gradually heat the water.

Q. When you turn on the cold water and leave them in the cold water, a while, does that cold water run off?

A. No, sir.

Q. What becomes of that water?

A. We heat it up.

Q. When do you let the water run off, when do you renew the water on those clothes?

A. After it is running in there possibly from a half to three-quarters of an hour; it depends on the kind of a wash we have, the size of it, etc.

Q. Well, what then; then you let that water run off?

A. Yes, sir.

Q. Then you turn on a second water?

A. Then we turn on a second water.

Q. That is hotter water, is it?

A. Yes, sir.

Q. Well, the water that runs off, runs off through this drain that you spoke about?

A. Yes, sir.

Q. Do you use any chemicals there in the washing of these clothes?

A. No, sir.

Q. No chemicals at all?

A. No, sir.

Q. What do you clean the clothes with?

A. Soap.

Q. And which water is it that you use the soap with the clothes, the cold water or the warm water?

A. The cold water we make warm, and we use soap in that water; yes, sir.

Q. The first water that you use?

A. Yes, sir.

RE-DIRECT EXAMINATION:

Q. When that first water runs off into the pipe is it hot or cold?

A. It is hot.

Q. That is all.

Sworn to before me,
(the signature being waived)
this 18th day of December,
A. D. 1906, at Jersey City,
N. J.

Testimony of George Singleton.

GEORGE SINGLETON, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:

Q. Where do you live?

A. Dover, N. J.

Q. Are you connected with the Singleton Silk Mill, up above Dover?

A. Yes, sir.

Q. In what capacity?

A. As proprietor.

Q. What are your arrangements at that Silk Mill for sewage, and for water closets, etc.?

A. Cesspool.

Q. Where is your cesspool?

A. Within, I should say, six feet of the west wall.

Q. Of your west wall?

A. Yes, sir.

Q. In the building or outside?

A. Outside.

Q. How was it built?

A. Of loose stone.

Q. How big is it?

A. I should say fifteen feet long, and about five feet wide; not more than five feet deep.

Q. There is a stream of water near your property or running through your property?

A. Yes, sir.

Q. What is that stream called?

A. Grannie's brook.

Q. Are all your water closet fixtures connected with this cesspool you speak of?

A. Yes, sir.

Q. Are any of your effluents of that sort connected with the brook in any way?

A. From the dye house.

Q. I mean from the water closets?

A. No, sir.

Q. Is there any connection from the cesspool to the brook?

A. From the cesspool to the brook?

Q. Yes.

A. No, sir; none at all.

Q. You have dye stuffs there?

A. We have.

Q. Where are they discharged?

A. In the brook.

Q. What is the character of the dye stuffs?

A. Well, it is chiefly—at present nothing but soap water, almost no dye stuffs at all; as an explanation, I want to say we have but one man dyer, and he is not engaged in dyeing silks more than probably one day in a week.

Q. What is the nature of your business transacted there?

A. A silk throwster.

Q. This dyeing then is only incidental, in the way you have mentioned; how many people do you employ there?

A. About 165.

Q. How much dye stuff do you use in a month?

A. I don't think it would amount to twenty dollars a month; it is very little.

Q. How far is your place from the center of Dover, say the Mansion House in Dover?

A. It is fully half a mile.

Q. Well, isn't it a good deal more?

A. More? It probably is; they say it is three-quarters of a mile, or a mile; I supposed it was about half a mile.

CROSS-EXAMINATION by Mr. Vredenburgh:

Q. Mr. Singleton, you have been located at this place for several years?

A. Since 1882.

Q. And is your business decreasing or increasing?

A. About the same; it doesn't increase.

Q. It don't increase?

A. No, sir.

Q. And these cesspools were built when?

A. The last one was built about a year ago.

Q. About a year ago, that would be last December?

A. About that time, I think; I am not sure about it.

Q. Wasn't it built this year?

A. Well, it might have been, I don't remember; I know it was quite recent.

Q. Before that where was your closet material carried?

A. It was discharged into two cesspools.

Q. How near were they to this brook that you spoke of?

A. Oh, I should say fifteen to twenty feet.

Q. And this cesspool is how far from the brook?

A. I think seventy-five feet.

Q. Now, from the old cesspool was there any overflow to the brook?

A. There was of one of the cesspools, just before my attention was called to it, there was a small pipe from one of the cesspools taking the over-flow to the brook.

Q. And when did you stop that?

A. As soon as I learned that it was contrary to the wishes of the people that were concerned.

Q. When was that?

A. It is probably, I should say, maybe a year ago; about that time.

Q. Well, has it been removed, that pipe?

A. There is no connection whatever with it at all.

Q. Has that pipe been removed?

A. That pipe was shut off the moment the test was made. Gentlemen came there and made a test

and showed that we were polluting the stream, and the moment that our attention was called to it, and we knew of it, we cut it off at once.

Q. You mean then, Mr. Singleton, I suppose, that the pipe is there yet, but the connection has been cut off?

A. There is no connection with the closets to that cesspool, whatever.

Q. No, but the connection from that cesspool to the brook remains?

A. There is nothing running in that brook from that cesspool, because it is not a cesspool; it ceased to be a cesspool.

Q. You ceased to use that cesspool about a year ago, I understand?

A. About that, yes, sir.

Q. Did you clean it out then?

A. No, sir, we did not.

Q. It remains then in the same condition as when you ceased to use it?

A. Yes, sir.

Q. I think you told us how many employees you had?

A. 165.

Q. And they are there continuously.

A. Yes, sir.

Q. Week in and week out?

A. They are.

Q. When did you clean this new cesspool?

A. It has not been cleaned.

Q. Never was cleaned since you built it?

A. No, sir.

Q. How do you account for that—165 people useing it, and it has never been cleaned since you have been using it?

A. No, sir.

Q. And it has been there a year. How near are the closets to it?

A. How near are the closets?

Q. To the cesspool?

A. The closets are in tiers on the outside of the building; each tier has three closets; there are three floors, and one is within twelve feet of it.

Q. Above it?

A. No, sir, off a distance from it, and the other is probably forty feet from it.

Q. And is there still a third—did you say three tiers?

A. There are two tiers and three closets in each tier.

Q. That makes six closets?

A. Yes, sir.

Q. How many urinals?

A. There is none.

Q. Use the closets?

A. Use the closets.

Q. What else goes in this cesspool, in the way of wash?

A. Nothing.

Q. Where does the wash from your property go, the washing of the floors and such things?

A. We don't wash the floors.

Q. Don't you use any water in the way of washing your floors, or your property there?

A. No, sir.

Q. Windows?

A. We generally clean the windows with a preparation of something that we buy for that purpose, I don't know what it is.

Q. You sweep the floors I suppose?

A. Yes, sir.

Q. And therefore there is no other refuse that goes into the cesspool?

A. No, sir.

Q. The fact is, I suppose Mr. Singleton, that the

stuff from the water closet goes through the ground?

A. I suppose it does, I don't know, because—I want to explain; you go down five or six feet in any part of that property around there and you will strike water, or seven feet.

Q. You are not more than seven feet above the river then, I suppose?

A. No, I don't think we are,—about seven or eight, I mean above the brook.

Q. Did you notice the bottom of the cesspool when you dug it?

A. I did.

Q. Was it the ordinary stone of the river bottom there?

A. There was just the earth bottom.

RE-DIRECT EXAMINATION.

Q. Sandy and gravelly soil?

A. No, sir; it is something of a clay.

Q. These closets you speak of are flushed with water, in the usual way?

A. Yes, sir.

RE-CROSS EXAMINATION.

Q. Do you have the Town water there?

A. Yes, sir.

Q. And that water runs through the closets?

A. No, sir.

Q. Don't you use that water for the closets?

A. No, sir.

Q. Do you flush the closets?

A. We have a tank in the attic and pump the water from the brook to the tank.

Q. And do you let that water from the tank run continuously through the closets and keep them clean?

A. No, sir.

Q. Only flush them as they are used?

A. Yes, sir; flush them as they are used.

RE-DIRECT EXAMINATION.

Q. You said that some gentlemen made you aware that you were contaminating the stream, and then you stopped it?

A. Yes, sir.

Q. Who was it called your attention to it?

A. I think our attention was first called to it by representatives from Jersey City. I have other factories and I am away a great deal, and on my return they told me about it, and it was stopped.

Q. Do you remember who it was?

A. No, sir; I don't know, I was only told that there were representatives from Jersey City.

Q. Did you see Doctor Leal at your place?

A. He has been there, but I don't think the names were mentioned at that time.

Q. That is all.

Sworn to before me,
(the signature being waived)
this 18th day of December,
A. D. 1906, at Jersey City,
N. J.

Testimony of Andrew K. Baker.

ANDREW K. BAKER a witness sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:

Q. Where do you live?

A. Dover, N. J.

Q. Are you the proprietor of the building known as the post office building in Dover?

A. I am.

Q. On what street does it front?

A. Blackwell street.

Q. And numbered what?

A. 27 and 29, I think.

Q. How big is the building?

A. Fifty feet front.

Q. What is it occupied for?

A. Dwellings and stores and Post Office.

Q. Do you live on the premises yourself?

A. No, sir.

Q. What arrangements are there in the place for the sewage, how is it disposed of?

A. Cesspool.

Q. Where is the cesspool?

A. Back of the building.

Q. Is it connected in any way with the river?

A. None whatever.

Q. Did you have it built?

A. Yes, sir.

Q. When?

A. The year I built the building, 1899 I think it was.

Q. How big is it?

A. I built it for a building, and I don't just remember, I think it is about 15 by 20.

Q. Are there water closets in the building?

A. Yes, sir.

Q. Are they connected with this cesspool?

A. Yes, sir.

Q. Where does the water from the roof go, the rain water?

A. It is led from the roof by tile, into the river.

Q. How far is it from the building into the river?

A. About seventy-five feet, I think, from the building.

Q. How far is the cesspool from the river? **10**

A. I should say about fifty feet.

Q. It is in your back yard I suppose?

A. Yes, sir.

Q. Where does the pipe run that runs from the river, to carry the rain water in the street or in the lot?

A. Through the lot, across the street into the river.

Q. Across the street?

A. Across the lane, there is a lane back of the lot. **20**

Q. The rear of your lot is towards the river?

A. Towards the river, yes.

A. This rain water runs through this pipe, the whole rear part of your lot?

A. Yes, sir.

Q. To the rear end, across the lane and to the river?

A. Across another property, across my property, across the lane and across another property.

Q. Anything connected with that rain water pipe **30** except your refuse?

A. None to my knowledge.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. You built the cesspool, Mr. Baker, I understand you to say, when you built the building?

A. Yes, sir.

Q. And your intention was to put a building over the cesspool? **40**

A. At that time.

Q. The cesspool is—you mentioned the size of it, but not the depth?

A. I should say about as deep as the cellar; I went down to water; a little deeper than the cellar, I dug down deeper than the cellar I suppose, about six or seven feet, I intended to raise the foundation higher than the ground. This is below the ground now.

Q. Is it filled in there at all; is it filled in ground?

A. Yes, it is; the lot was lower than it is now, the original lot.

Q. Have you done anything to cement that bottom since you built it?

A. It is a gravel bottom.

Q. The sides, when you built it, was it dirt wall?

A. It was built with lime and sand, a tight wall, built for a house.

Q. You don't own to the river?

A. No, sir.

Q. There is another party there?

A. Yes, sir.

Q. Well, when it was built did that cesspool overflow into this drain that you speak of?

A. Not that I know of, not to my knowledge, there was no drain there that I know of.

Q. When did you clean it last?

A. I cleaned it about twice a year, I think last Spring I cleaned it.

Q. You cleaned it last Spring?

A. Yes, sir.

Q. When did you clean it before that, to your recollection?

A. Well, about the Fall before.

Q. The Fall before?

A. Yes, sir.

Q. You recollect doing that, do you?

A. Yes, sir; I have it done twice a year.

Q. Who does it?

A. A man by the name of Coss.
Q. Do you know where he takes his stuff?
A. I don't know what he did with it.
Q. You have no regulation with him about that?
A. I had nothing to do with that.
Q. He comes and takes it out?
A. Yes, sir.
Q. How many tenants use that cesspool?
A. There are six dwellings, three on the side, and two story flats.
Q. Are there bath rooms in each?
A. Bath rooms, yes, sir.
Q. And the water used is the Town water?
A. City water, yes, sir.
Q. How many bath rooms are there?
A. Six.
Q. Six bath rooms?
A. Yes, sir.
Q. And six families?
A. Yes, sir.
Q. In addition to the families are there other tenants?
A. The Post Office and one store.
Q. And have they closets too?
A. They have closets, but no bath rooms.
Q. Mr. Baker, when you built that cesspool, I understood you to say you intended it for a house upon it; you intended to build a house upon it?
A. That was the idea, I was going to move the old building back.
Q. How was the sewage from that house to go then?
A. The old building had no connection with it; they had an out house, that is all.
Q. Yes, but when you built this hole which you afterwards used as a cesspool, you intended it for a house, as I understand it; how was the water from that house to go to the river?

A. The house was never finished; there was no house ever finished there.

Q. Well, you say you don't know whether there was any connection made between that hole, which was afterwards a cesspool, and this pipe that takes the water to the river?

A. There is none.

Q. There is none now?

A. There was none then.

Q. Did you not say, Mr. Baker, that when you built this place that was used for a cesspool, you didn't know whether there was any connection with the river or not?

A. There is none.

Q. There was none then you think?

A. No it was never finished for a house at all.

Q. Well, how near is this pipe which leads to the river, to that cesspool, at the nearest point?

A. Well, I should judge about six or seven feet.

Q. How much below the surface of the earth is that pipe?

A. It starts at the building about a foot below the surface, and gradually runs to the river.

Q. What is the character of that pipe?

A. Tile pipe.

Q. How is it joined?

A. In the usual way, I suppose; it was put in by contract, I didn't have anything to do with that.

Q. That leads directly to the river in the nearest way, I suppose?

A. Yes, sir.

Q. That is all.

Sworn to before me,
(the signature being waived)
this 18th day of December
A. D. 1906, at Jersey City,
N. J.

Testimony of Mrs. Thomas Barton.

MRS. THOMAS BARTON sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:

Q. Where do you live?

A. Dover.

Q. Are you the Mrs. Barton whose husband had Typhoid fever in South Dover here?

A. Yes, sir.

Q. When did he have Typhoid fever?

A. He was taken sick the 19th day of September.

Q. 1906?

A. This year, yes, sir.

Q. Where had he been working?

A. Kingsland car shops.

Q. Go down every day?

A. Yes, sir.

Q. And came back every day?

A. Yes, sir.

Q. How long had he been working there?

A. I think he went in May, if I am not mistaken, when he started.

Q. How soon did you call in a doctor, after he was taken sick?

A. Why, he came home sick Tuesday night, and we had the doctor Wednesday morning.

Q. Who was the doctor?

A. Doctor Cook.

Q. Did the doctor give you directions as to what to do with the dejections from the patients?

A. Well, not right away he didn't.

Q. How soon did he give you instructions about that?

A. I think he was taken sick on Wednesday, and this was a week from that Thursday.

Q. What did he tell you to do and what did you do?

A. He said I should disinfect it and bury it.

Q. Did you do it?

A. Yes, sir.

Q. What had you done before he told you?

A. Well, we used the closet and had used disinfectants since Sunday; he was taken sick on Wednesday, and on Sunday morning—

Q. What do you mean by the closet?

A. The privy is built out a few feet from the house.

Q. You had since Sunday used disinfectants,—what kind of disinfectants?

A. Chloride of lime.

Q. Did you put that, from the time you began to, on Sunday, did you put that on all the material you put in?

A. Yes, sir.

Q. You did that yourself without instructions?

A. Yes, sir.

Q. After you got instructions from the doctor, just describe how you disposed of this material?

A. I used to put the disinfectant in the vessel before it was used, and also in the pail, and carried it out and buried it.

Q. Buried it where?

A. In the garden.

Q. Covered up?

A. Yes, sir.

Q. What disinfectant did you have?

A. Chloride of lime.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. Did he stay home on Sundays, or did he go to the factory on Sundays?

A. He stayed home Sundays.

Q. You say that you disinfected, and did it by putting chloride of lime—

A. What is that?

Q. You disinfected it with chloride of lime?

A. From the Sunday after he was taken sick; he was taken sick on Wednesday or Tuesday night, rather.

Q. What did you disinfect with it?

A. Why I sent down Sunday morning and got the chloride of lime and disinfected the closet, and then used it also in the vessel.

Q. What did you do with his urine, did you disinfect that also?

A. Well, that we always threw in the pail we had in the room, and then we would put the disinfectant right in the pail, and always used it in the vessel, before it was used.

Q. Did you put the urine always in the pail?

A. Yes, sir; always and buried it with the rest.

Q. Buried the urine with the rest?

A. Yes, sir.

Q. What did you do with his spittle?

A. Well, that always went in the pail too.

Q. The spittle went in the pail, too?

A. Yes, sir.

Q. Will you tell me what your family consisted of?

A. How many there was.

Q. Yes, yourself and your husband?

A. And four children.

Q. And did you keep the whole house?

A. No, we rented two rooms to a maiden lady.

Q. That is all.

Sworn to before me,
(the signature being waived)
this 18th day of December,
A. D. 1906, at Jersey City,
N. J.

Testimony of John Rowe.

JOHN ROWE a witness produced and sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:

Q. Where do you live?

A. Wharton.

Q. What is your business?

A. Blacksmith.

Q. Are you the father of the young man who had Typhoid fever at Wharton,—came home with Typhoid fever last winter?

A. Yes, sir.

Q. When did your boy come home sick?

A. The sixth of February.

Q. Morning or night?

A. Somewheres about half past ten at night.

Q. Was he sick then?

A. Yes, sir.

Q. How soon did you call in a doctor?

A. Called in the doctor the next morning.

Q. Who?

A. Doctor Titus.

Q. Did the doctor tell you it was Typhoid fever?

A. He told us he had every symptons of it coming on, and he watched him, and then I think, to the best of my knowledge now, it was about three days before he pronounced it Typhoid fever, I think, as near as I can get at it now.

Q. Did he give you any instructions as to what to do with the dejections of the patient?

A. Yes, sir.

Q. How soon did he give you those directions?

A. As soon as he pronounced it Typhoid fever.

Q. Where had the boy been those three days?

A. At my home, in my house.

Q. Had he gone out doors at all?

A. No sir.

Q. Pretty sick?

A. Yes, sir; he didn't understand the way from Dover to my home at Wharton, after he got off the train, and he was making for Rockaway.

Q. You mean he was delirious?

A. He didn't know what he was doing, and two young men that saw him took him on the trolley car and took him to my front door.

Q. Was he delirious from the time he got home?

A. He had little senses for a while in the evening, and he said, "Mama, you need not be alarmed, I shall be out of this in a short while, it is only malaria." The doctor told me—

Q. Did the Doctor give you any directions as to what to do with the dejections of the patient?

A. Yes, sir.

Q. What directions did he give you and what did you do?

A. Told us to use carbolic acid, in boiling water

Q. Did you do it?

A. Yes, sir.

Q. What did you do with the dejections?

A. Buried it in a pit.

Q. Where?

A. In my back yard.

Q. When did you begin to do that?

A. At the time that he gave the orders.

Q. What had you done with the dejections before that, for those three days—the first three days the boy was home?

A. I don't know that there was any pit dug at that time, or whether he had anything in that way, or needed it or not, I cannot say.

Q. Well, how long did you keep up this method of disposal?

A. Until he said that everything was all right, and he was out of danger.

Q. The doctor said it?

A. Yes, sir.

Q. Did you put anything in the privy itself, in the water closet I mean, any disinfectant in the water closet?

A. Do you mean the doctor?

Q. Did you?

A. No, I didn't.

Q. Did the doctor?

A. I cannot say.

Q. Did you find the ground frozen during that time, sometimes?

A. Yes, sir.

Q. What did you do then?

A. Thawed it out with cord wood.

Q. Then you buried it after you got the ground thawed?

A. After it was thawed out I dug the pit. The first day I was working, when the doctor pronounced it Typhoid fever, and my son dug the first one, and that wasn't so bad at that time, but it was freezing right along, you know, and then I turned around and thawed out the second one, and then thawed out the third one; dug three pits.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. This first pit that was dug was dug by your son, you say?

A. Yes, sir.

Q. And then the ground was not frozen?

A. Not so bad.

Q. How long was that after your son came home?

A. I cannot say,—well, at the time he pronounced it Typhoid fever.

Q. Was it within ten days after he came home that your son dug that pit?

A. Less time than that, I guess.

Q. Did you go home every night?

A. Yes, sir, I went home every night.

Q. Well, how long was it then after your son came home?

A. I said just now that it was from three to four days from the time that the doctor was first called, until he pronounced it Typhoid fever.

Q. And he was called the next day after your son came home?

A. Yes, sir, the next morning.

Q. And three or four days after that he pronounced it Typhoid fever, and then your son dug this pit?

A. Yes, sir.

Q. You didn't see him dig it, but you seen it after you came home that night?

A. Yes, sir; I saw it that night when I came home.

Q. How deep was that pit that he dug?

A. The first pit that my son dug, the nearest I can get at it now, it was about thirty inches.

Q. Deep?

A. Yes, sir.

Q. How long?

A. Perhaps it might have been somewhere about three feet.

Q. How long?

A. About three feet.

Q. Three feet long and thirty inches deep?

A. Yes, sir.

Q. Was this pit between your house and the brook, or the canal?

A. The canal?

Q. Yes.

A. Well now, it might have been, from that pit it might have been twenty-five or thirty feet.

Q. To the canal?

A. Yes, sir.

Q. How does the ground slope there towards the canal, or towards your house?

A. Towards the canal.

Q. How high is your house above the canal?

A. Above the canal? Let me see.

Q. Surface of your house, of course, surface of the ground at your house?

A. You mean the foundation that it stands on, or the surface of the ground?

Q. Surface of the ground?

A. About ten feet I should judge.

Q. The second pit that was dug, how near was that to the canal,—about the same distance?

A. Well, I cannot say exactly, perhaps that might have been about two feet nearer to the canal.

Q. You dug that yourself?

A. I dug that one.

Q. How deep did you dig that?

A. About three feet deep.

Q. How wide was that?

A. Well, that was about twenty inches wide, I should judge, as near as I can get at it, because I never thought I was going to be called on for any such a thing, and never took particular notice; but that was about three feet.

Q. Why did you dig three pits, why did you use more than one?

A. Well, because we hadn't had the time to do it. Now the first one we didn't want for anything to come up near the surface, my son dug that, while I was getting ready for the other, and when that was dug, this one was filled up, and when I seen that this second one would not be enough I turned around and thawed out the third one and dug that down four feet, thought I would make sure of enough at that time. I told that gentleman before about that, he knows all about it.

Q. You dug the third one four feet?

A. Yes, sir; and I showed him the ground.

Q. Was that the same distance from the river?

A. Well, that was somewheres about the same distance, as the second one.

By Mr. CORBIN:

Q. The canal you mean?

A. From the canal, yes, sir.

FURTHER CROSS EXAMINATION:

Q. You think the first one was about twenty-five feet from the canal, I understood you to say?

A. Somewheres around there, somewheres about twenty-five feet as near as I can get at it.

Q. How far is your house from the canal?

A. Well, the house from the canal—let me see?

Q. Yes.

A. Might be about fifty feet from the edge of the water.

Q. In the nearest direction?

A. Yes, sir.

Q. Now, what did you do with the urine of the boy?

A. Everything was put in the pit, everything was put right there in the pit.

Q. The urine also?

A. Everything was put in, and very cautious.

Q. You poured the water in this pit?

A. Yes, sir.

Q. After you poured in this stuff—

A. Carbolic acid.

Q. Then you poured in subsequently carbolic acid?

A. Yes, the carbolic acid first, and then the boiling hot water, and then when my wife was ready to take it out I had a pail of boiling hot water waiting and that was hurried out to that pit, and everything was washed clean, and the boiling water poured in

that, and the ashes on top of that again, everything was kept clean.

Q. First you poured in boiling water?

A. Yes, sir.

Q. Then you waited until your wife was ready?

A. No, carbolic acid first, and then boiling hot water.

Q. On top of the carbolic acid?

A. Yes, sir, and then that was all covered, everything, and when I was ready with the boiling hot water, I would try to manage to get waiting until she gave her word that she was ready, and I would have that boiling hot water ready, and she would say, now ready, all right, and I would take this boiling hot water and go right to that pit, and my wife would come after me with this here, and the boiling hot water would be washed through it, and the boiling water would be thrown in that pit and the ashes on top.

Q. Were you there all day to do this?

A. Yes, sir; I was paid by the Lodge to stay there.

Q. Every day?

A. Yes, sir.

Q. Paid by the Lodge?

A. Yes, sir.

Q. When did you commence to do that?

A. As soon as ever he pronounced it Typhoid fever.

Q. You stayed home from that time, four days after he was sick, you stayed home, did you?

A. I stayed home.

Q. For how long?

A. Until he was out of danger.

Q. How long was that?

A. I cannot give you the number of days, it must have been somewheres about a month.

Q. About a month?

A. Somewheres about a month, I think.

Q. Well, he was still unable to work in July, wasn't he?

A. He was in the bed nine weeks altogether.

Q. Well now, Mr. Baker, after the four weeks when he was declared out of danger?

A. I won't say for certain it was exactly four weeks, it might have been a little more.

Q. Or a little less?

A. Yes, I cannot say exactly.

Q. Well, after that period when he was declared out of danger what did you do with his stools then?

A. After the doctor pronounced it all right we took it to the closet.

Q. And what did you do with the water that came from the washing of his clothes?

A. The water from the washing of his clothes was boiling, and that was thrown in the sink, and that was reached to the canal, that was boiling, that was done every day, everything was boiling. My wife was the next thing to a trained nurse.

Q. His clothes were washed every day?

A. Yes, sir.

Q. And that matter was in the sink, and from the sink to the canal there is a drain, is there?

A. Led through there with pipes.

Q. A pipe that runs from your sink to the canal?

A. To the canal, yes, sir.

Q. And is that still there?

A. It is broken now, we have a cesspool now.

Q. When did you dig the cesspool?

A. Well, they have been at it since they first started I cannot tell the number of days, but they started quite a while, and they have been using it for the last week, commenced last week; the connections from the canal is broken off.

Q. Where is the cesspool dug, how near the canal?

A. Well, it is dug on our next neighbor's right, I cannot say exactly what that is, it must be—I don't

know, it might be twenty-five or thirty feet, might be twenty-five feet, I cannot say.

Q. Twenty-five feet from the canal?

A. Yes, sir.

Q. Is it built of loose stone?

A. Built with loose stone?

Q. Yes.

A. I cannot say, I never seen it, that is all inside of course I looked from my stoop and saw them digging it, because here is my house here(indicating) and there is the next one there, and there is the cesspool(indicating).

Q. How is your water closet connected with that cesspool?

A. The water closet?

Q. Yes.

A. That is not connected with that at all.

Q. It is not?

A. No, sir; not the water closet.

Q. Well your sink?

A. Yes, sir.

Q. How is your sink connected with that?

A. Pipe leads from the sink right down, and buried under the ground about thirty inches and leads right through to the cesspool, and all covered.

RE-DIRECT EXAMINATION.

Q. For how many weeks did you continue to take the stools out and put them in the pits?

A. Now, I cannot give you the account of that, because I never thought I was going to be called on for any such a thing as that, but I can say this much, from the time the Doctor pronounced it Typhoid fever, until he said he was out of danger.

Q. After he said that he was out of danger, did you not continue after that to put it in the pit?

A. When he said that everything would be all right for the closet we did so.

Q. He gave you directions when to stop putting it in the pit?

A. Yes, we worked under his directions from the first to the last.

Q. You don't know how many weeks that was?

A. He was in bed nine weeks, that is all I can say, before he was able to get out.

Q. When you washed his clothes where did the wash water go from those, while he was sick?

A. The wash water ran from the sink and lead away to the canal, this boiling water.

Q. Were they washed in boiling water?

A. Were they washed in boiling water? Yes, sir.

RE-CROSS EXAMINATION.

Q. Did you wash them?

A. No, sir; I am no woman, I don't wash no clothes.

Q. That is all.

Sworn to before me)
(the signature being waived)
this 18th day of December,)
A.D.1906, at Jersey City, N.J.)

Testimony of Edward Jenkins.

EDWARD JENKINS, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:—

Q. Where do you live?

A. Dover.

Q. What is your business?

A. General store.

Q. Do you own some houses in East Blackwell Street, and what is their number?

Q. Yes, sir; 319, 321, 354, 372 and 374.

Q. 372 and 374 are side by side, are they not?

A. It is a double house, two family house.

Q. It bears two numbers?

A. Yes, sir.

Q. What was the arrangement for the water closet in that house?

A. There are no water closets in the house.

Q. What is the arrangement?

A. A vault outside.

Q. How far from the house?

A. About twenty feet in the rear.

Q. Did you build them?

A. I had them built.

Q. How long ago?

A. The original house burned down, and that vault stood there for probably twelve years, and I rebuilt the house, and have been using the same vault.

Q. When did you build the vault?

A. When I built the first house, and that is about twelve years ago.

Q. Is there any connection between these vaults and the Rockaway River?

A. No, sir.

Q. Was there ever at any time?

A. Yes, sir.

Q. When?

A. When I first built it.

Q. When did you break the connection, or when was it taken away?

A. When the Water Company made complaint I moved it according to their direction.

Q. When was that?

A. Soon after I first built it.

Q. You say you moved it, you mean you built a new pit and moved the building?

A. Built a new vault further back from the river, and set it up.

Q. Who directed you to do that, or warned you to do it?

A. Mr. Gibson.

Q. Had that any connection with any drain or anything of that sort?

A. None whatever, sir.

Q. How big is it and how deep is it?

A. It is a double closet, and when it was originally built I instructed it to be seven feet deep.

Q. What is at the bottom of it?

A. Natural ground.

Q. What is that, gravel or clay or what?

A. Well, that is flat ground there, it is composed of cinders and gravelly material.

Mr. VREDENBURGH: I object to this question, because counsel said that he would not dispute that this property was as testified to by one of the former witnesses.

Q. At the bottom of the pit, I mean, when you went down seven feet, what was it there?

A. That was muggy low ground there.

Q. Did it go below the filling to the natural ground?

A. Yes, sir.

Q. How much had it been filled in at that point?

A. Well, in digging the vault we struck water, and went below the surface of the river.

Q. You have two houses known as Nos. 319 and 321 East Blackwell Street, haven't you?

A. Yes, sir; it is one house, double house, two family house.

Q. What is the arrangement there for water closets?

A. The same as the other, privy vault.

Q. Now, some testimony has been given here to the effect that the sinks from those houses is connected with the river?

A. That is not true; there is no connection whatwhatever.

Q. Where does the sinks drain?

A. The sinks drain into a stone cesspool, filled in with stones; that cesspool is situated fully twenty feet from a little brook which finally empties into the river, after going across some seven or eight hundred feet.

Q. Is there any connection or anything from those premises by any pipe or drain with the river or the brook?

A. There is not.

Q. Do you hold any official position in Dover?

A. Member of the Board of Health.

Q. How long have you been a member of it?

A. One year.

Q. Does your Board give attention to these matters of cesspools and drains, in the course of their duties?

A. It does.

Q. You have no public sewer system there, I believe?

A. We have not.

Q. The system is just as you have described, the system of cesspools throughout the city?

A. Generally, yes, sir.

Q. Does your Board take jurisdiction of the question of seeing that cesspools are emptied at proper times?

A. Yes, sir.

Q. Have you a health officer?

A. Yes, sir.

Q. Who is he?

A. His name is Mr. John G. Taylor.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. What is your salary, Mr. Jenkins, as member of the Board of Health?

A. Two dollars per meeting, I believe is what they pay.

Q. Do they pay you that?

A. They have so far.

Q. How many meetings have you had?

A. We have a meeting every month, regular meeting night.

Q. You get two dollars a month from that position, then?

A. Two dollars a meeting.

Q. And you have a meeting a month?

A. A regular meeting.

Q. Now this Mr. Taylor, what is his salary as inspector, did you call him?

A. He is inspector, yes, sir.

Q. What is his salary?

A. If that question is essential I will answer it.

Q. Yes, I would like to know.

A. $65 a month.

Q. Who pays it?

A. The Town.

Q. Does the Water Company pay any part of it?

A. Water Company—what Water Company?

Q. The same Water Company you spoke of?

A. No, sir.

Q. What Water Company did you have reference to?

A. The East Jersey Water Company, when I spoke of Mr. Gibson as instructing me to move on. I understood that was the name, the East Jersey Water Company.

Q. Now there is a Water Company in Dover, is there not?

A. No, sir, Water Commissioners.

Q. And the water there is not a private company but belongs to the city?

A. Yes, sir.

Q. Where do they get their water from?

A. From the reservoir.

Q. And the reservoir comes from this river?

A. No, sir.

Q. Well, where does it come from?

A. It is up on the hill; it is built up on the hill, the new one, built not long ago.

Q. Well, how does the water get up on the hill, is it pumped up there, I mean?

A. Yes, they have pumps there.

Q. It is pumped from a driven well, something of that sort?

A. Well, now, I don't know exactly how that source of water is supplied, but I might ask Mr. Taylor, he could tell more about that than I could.

Q. He is here?

A. Yes, sir.

Q. You know they don't take it from the river?

A. I am sure of that, yes, sir.

Q. You spoke of the cesspools at 372 and 374 East Blackwell Street?

A. Yes, sir.

Q. How near are they to the river?

A. When it was moved I gave instructions that it be from ten to twelve feet, not less than ten; I

haven't measured it; I suppose it was about that distance.

Q. About ten feet from the river?

A. At least that, yes.

Q. Now, did you ever see the bottom of that cesspool?

A. When they were digging it I saw that the water was coming in.

Q. At that time did they dig below where the water came in?

A. Yes, sir.

Q. Did you see the bottom of it then?

A. I couldn't see the bottom from the water.

Q. Was there any artificial bottom to it?

A. They went below the artificial ground.

Q. Was there any artificial bottom built by them to this cesspool?

A. No, sir.

Q. The sides of the cesspool, were they loose stone, or what they call dirt masonry?

A. What masons call dirt wall.

Q. It wasn't circular in form but rectangular?

A. Square.

Q. Was it nearly square?

A. It is longer than wide.

Q. And that cesspool is for the use of both houses?

A. Two families.

Q. Are there only a family in each house?

A. That is all.

Q. Now, going to 319 and 321, you say the sink from that house, the water from the sink goes into a drain?

A. No, sir, I didn't say so.

Q. Where does the water from the sink go?

A. It runs in a pipe that is connected with the sinks, and in this pipe the roof water also runs down to this stone cesspool, that I spoke of.

Q. Then the water from the house, both the rain water on the house, and the water, whatever water is used in the house, in the sinks or what not, all go into the same drain or pipe and thence down to this stone cesspool?

A. Yes, sir.

Q. The stone cesspool is how near the little brook?

A. It is at least twenty feet from this brook.

Q. When was that cesspool built?

A. Last Spring.

Q. And how did the water go before last Spring?

A. It went down into this little brook.

Q. But last Spring—what time last Spring did you build this stone cesspool?

A. Early in the Spring, as the Spring opened up.

Q. What was the bottom of that?

A. That is made ground, the same as the other; it is composed of cinders and stone and ashes and material that was carted in to fill the ground up; it was originally low marshy ground there.

Q. How deep is that?

A. Well, I don't know; it is simply an excavation and filled in with stones, all filled in with stones, loose, dumped in there.

Q. The stones are all dumped in?

A. Yes, sir.

Q. And the hole was dug and the stones dumped in?

A. Yes, sir; and the pipe empties right in there.

Q. And there is no side walls?

A. No side walls, no, sir.

Q. And that is what you mean by a stone cesspool?

A. That is what I mean by a stone cesspool.

Q. Your cesspool at 372 and 374 was cleaned out when, last?

A. It has not been cleaned out for two years.

Q. Has it ever been cleaned out?

A. Yes, sir.

Q. When was it cleaned?

A. Two years ago.

Q. About what time of year?

A. It was in the Spring, during the Spring of the year.

Q. In the Spring of two years ago that was cleaned out?

A. Yes, sir.

Q. How did you happen to clean it out then?

A. I had it cleaned.

Q. Why?

A. Because it was necessary.

Q. It would over-flow you thought?

A. It was full.

Q. It was full, was it?

A. Yes, sir.

Q. Have you ever cleaned it more than once, since you opened it?

A. Yes; I cleaned it, I think, that was the third time only since it was built.

Q. Third time in the twelve years?

A. Yes, sir. Understand there were two years it wasn't used; the house burned down.

Q. Two of the twelve years?

A. Yes, sir; and during that time it became emptied, absorbed.

Q. During that time what was in that cesspool became emptied?

A. Yes, sir.

Q. In what way?

A. By natural filtration, high waters and rain, etc.

Q. Does the water enter this cesspool at high water?

A. Well, the water rises to its level in the flood

conditions, of course the cesspool would become empty.

Q. How high is the surface above the river?

A. At that particular place?

Q. Yes, where the cesspool is?

A. Well, I should think to-day it would be, carrying it in my mind, five or six feet.

Q. And some times the river rises so that it is more than five or six feet above its present level?

A. I have known it to be over-flowed.

Q. Now your other cesspools at 319 and 321, when were they last cleaned out?

A. If my memory serves me right I cleaned them both at the same time.

Q. About two years ago ?

A. Yes, sir.

Q. How often had they been cleaned previous to that?

A. I think two years before that.

Q. Once two years before?

A. Yes, sir.

Q. So that they have been cleaned twice since they have been built?

A. Well, I don't know about that being built, I didn't build that one.

Q. Well, how do you clean that kind of a cesspool, filled with stone?

A. Well, this vault I am speaking now of the privy vault, that is not filled with stone.

Q. You are speaking of the privy vaults to 319 and 321?

A. Yes, sir.

Q. The stone cesspool as you call it, that has never been cleaned.

A. No, sir.

Q. But the privy vaults has been cleaned once two years ago, and once two years before that?

A. Yes, sir.

Testimony of Edward Jenkins.

Q. Do you know where the stuff is placed which is taken from this cesspool, or which was taken from this cesspool?

A. Yes, sir.

Q. Where?

A. Buried.

Q. Where?

A. Near the gas place; taken from that and buried in near the gas house.

Q. It was taken over near the gas house?

A. Nowhere near the river, however.

Q. Taken over near the gas house?

A. Yes, sir.

Q. How do you know?

A. By the same instinct that I know that is you and this is me; I was there.

Q. You saw it, did you?

A. Yes, sir.

Q. You saw it buried there two years ago?

A. Saw the hole dug in the ground and this thrown in it and covered?

Q. And how near was that to a brook?

A. No brook anywhere near it.

Q. How near is it to the nearest brook?

A. The brook would be across the railroad entirely, on the other side of the railroad; I suppose two or three hundred feet; buried in high ground, as high as we could find.

Q. Is not that place a marshy place there?

A. No, sir; there is some high ground there.

Q. Near the gas house?

A. Most of it, yes.

Q. Was this buried in the marsh?

A. No, sir; it was buried in the highest ground we could find.

Q. How much is that ground above the marsh, how many feet?

New Jersey State Library

A. The ground runs in veins as a general thing along there, there is marshy clay substance and then you will find a strip of high ground, knolls like, and gravelly substance.

Q. And that was buried there, you say, two years ago?

A. Yes, sir.

Q. Who did it?

A. A man by the name of Ford.

Q. What ordinance was it that you referred to with respect to the cleaning of cesspools?

A. I didn't refer to any ordinance.

Q. Have you any such ordinance?

A. Yes, sir.

Q. Is the ordinance lived up to, Mr. Jenkins?

A. So far as I know.

Q. Do you make it a point to find out?

A. We have an inspector for that purpose, and pay him for it.

Q. That is all.

Sworn to before me,)
(the signature being waived)
this 18th day of December, A.)
D. 1906, at Jersey City, N. J.)

Testimony of Eustace F. Rudine.

EUSTACE F. RUDINE, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:—

Q. Where do you live?

A. Dover.

Q. What is your business?

A. Manager of the Park Avenue Lumber Company.

Q. Are you the president of the Board of Health of Dover?

A. Yes, sir.

Q. How long have you been a member of that Board?

A. In the neighborhood of three years.

Q. It has been testified here that the Jersey City authorities,—some of the officers of the Jersey City government, a squad of them came up there, and you refused to give them information, and refused them to do anything there?

A. I don't remember that I refused them any information

Q. Have they ever called the attention of the Board to anything they thought ought to be done in the water shed?

A. No, sir.

Q. Have they ever served a notice of that kind upon you at all?

A. No, sir.

Q. Have you ever communicated with them as to the willingness of your Board to act, if they had any suggestions to make?

A. I did at one time, to young Mr. Griffin.

Q. How long ago?

A. I cannot say just the time; I guess it was the last time I spoke with him, or had a conversation with him. He came along in a carriage and stopped near the office, and I went out and talked to him—

Mr. VREDENBURGH: I object to the conversations had as hearsay.

A. —and we got in conversation about the thing, and I told him that we would be only too glad to help him out any time, if they showed us that there was anything wrong that needed cleaning up, or of direct sewage in the river that would be the only way to have it stopped.

Q. When you say young Mr. Griffin, do you mean the inspector of Jersey City, that has been up there for some months or a year?

A. It is the Mr. Griffin here.

Q. How long has he been up there?

A. I don't know; he has been there quite often, anyhow, I cannot say how long it is; I saw him often, I cannot say how long.

Q. Has the City or its Inspectors or its officials ever called the attention of your Board to any place there, with a view to its abatement, or complained of any place in your City?

A. Who?

Q. The Jersey City authorities, or any of their officials?

A. Not that I know of, no, sir.

Q. Ever send any communication to your Board?

A. Not that I know of.

Q. Has your City an ordinance regulating the cleaning of cesspools?

A. Yes, sir, we have that, I cannot just word what it is.

Q. Do you happen to have a copy of it with you?

A. No, sir, I haven't. We have the Inspector here to-day; he can give you points on that.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. You were a witness before, weren't you, here?

A. Yes, sir.

Q. And at that time you testified that you saw some experiments attempted in the closet of this old church there, did you not?

A. Yes, sir.

Q. Did you subsequently see a test made there in which the green did go into the river?

A. A short time ago, of course—it is perhaps a couple of months ago; I cannot say just exactly the date; there were some gentlemen up there, five or six, and Mr. Griffin called me over from the office to go over with him; that he was making a test of the closet; I didn't see anything put in the closet, and they were bailing water out of the river, and while standing there ten or twelve or fifteen minutes some green coloring came out under the stone wall.

Q. You saw them baling water out of the river and putting it into the cesspool?

A. In this vault.

Q. And you waited there for ten or fifteen minutes, did you?

A. I stayed longer than that, but it took about that time before the coloring came out.

Q. Where did the coloring come out from?

A. Under the stone wall.

Q. That cesspool, did you look into it at any time?

A. This vault?

Q. Yes.

A. Yes, sir.

Q. Was it full of matter?

A. No, sir; it was built up in the back part of it, the wall had fallen in, and it was kind of open there, wasn't very deep, just a little hole in the ground, perhaps two feet deep; I don't think it was any deeper than that.

Q. Well, that is nearly opposite your place, isn't it?

A. Yes, sir.

Q. When was that cleaned?

A. It was cleaned since that time.

Q. When was it cleaned before that time?

A. That I cannot say; I don't think it was ever cleaned before, because it was used very little.

Q. Never was cleaned before, as far as you know?

A. No, sir.

Q. You are referring now to the vault of the Swedish Church, are you?

A. Yes, sir.

Q. Have you ever examined the jail there, at Dover?

A. No, sir; I have not.

Q. Have you ever examined any of the cssspools in Dover?

A. Why, once in a while; once a year we used to go out on an annual inspection, the whole Board, and for the last two years we have not gone out on that, or the last year, we didn't go out on that annual inspection.

Q. Two years ago the pipe from the Mansion House emptied into the river, didn't it?

A. That I don't know anything about.

Q. Never investigated that?

A. No, sir, didn't investigate anything like that.

Q. Do you keep minutes?

A. Yes, sir.

Q. Who is your clerk?

A. Doctor J. H. C. Hunter.

Q. He has minutes of what you do?

A. Yes, sir.

Q. Do you know Doctor Leal?

A. Well, I have heard the name; I don't know as I just know him.

Q. He has never made any complaint to you, has he?

A. Doctor Leal?

Q. Yes.

A. Not that I remember.

Q. You know Doctor Leal here, don't you?

A. I know the gentleman, but I don't remember the names; there were so many doctors came up there.

Q. Well, has he made any complaint to you?

A. Not that I remember.

Q. Has never made any complaint? 10

A. Not that I remember.

Q. Has the Jersey City Water Supply Company ever made any complaint to you?

A. It called our attention to things.

Q. Well, now, who, of the Jersey City Water Supply Company called your attention to anything?

A. Mr. Gibson.

Q. How do you know he is connected with the Jersey City Water Supply Company?

A. I have understood so. 20

Q. Do you know what company that is?

A. That is the company that has subpoenaed me down here at Newark, last May.

Q. What complaint did Mr. Gibson make to you?

A. That I cannot remember, any special one.

Q. Was it entered in your book?

A. No, sir, not officially.

Q. Well, did he make it to you personally, or to the meeting?

A. To me personally. 30

Q. What did he say?

A. I cannot recollect what he said. He has called our attention to these matters and we have cleaned it up.

Q. What matters?

A. Anything that should be cleaned up, along the river bed.

Q. What matters, cannot you tell us one matter that he has called your attention to?

A. I didn't charge my mind with it; I am busy 40

from morning until night with other business, and if he asked me to go along with him to see anything I would go with him, if I had the time.

Q. What do you mean by saying, cleaned it up?

A. The last time I was out with Mr. Gibson was down at Samus avenue, and he said that there were some vaults down there that needed cleaning out, they were liable to sewer into the river, from a heavy rain or something like that, and I went down with him.

Q. What did you do?

A. Notified the Inspector to see that it was cleaned.

Q. When was that?

A. It is not a month ago.

Q. Just before the Vice Chancellor visited the place, wasn't it?

A. I don't know.

Q. You remember when the Vice Chancellor came there, don't you?

A. No, sir.

Q. That is all.

Sworn to before me (the signature being waived) this 18th day of December, A. D. 1906, at Jersey City, N. J.

Testimony of Eugene Woodhull.

EUGENE WOODHULL, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:—

Q. Where do you live?
A. Dover.
Q. What is your business?
A. Plumber.
Q. Do you follow your trade in Dover?
A. Yes, sir.
Q. Are you familiar with the places known as Nos. 16, 14, 12, 10 and 8 East Blackwell Street?
A. Yes, sir.
Q. Are you familiar with the sewage arrangements there?
A. Yes, sir.
Q. What did you have to do with them?
A. I disconnected them from the tile sewer and connected them with the cesspool.
Q. Is No. 16 in any wise connected with the river?
A. No, sir.
Q. What is it connected with?
A. Cesspool.
Q. Where is the cesspool?
A. Directly in the rear, between 14 and 16.
Q. Is no. 14 in any wise connected with the river?
A. No, sir.
Q. How is that disposed of?
A. The same way.
Q. Is any other house connected with that same cesspool which No. 14 is?
A. I think so; yes, sir.
Q. Which one?
A. I think the house in the rear.
Q. On what street is that?
A. That is on Morris Street.

Q. Is there any outlet at all from the cesspool?

A. No, sir.

Q. How do you know?

A. I was down in it, and I examined all the sides after we had cleaned it out.

Q. How about No. 12, is there any connection between that and the river?

A. No, sir.

Q. Or any outlet to it?

A. No, sir.

Q. How about No. 10?

A. There is none there.

Q. How about No. 8?

A. No. 8 there is none.

Q. Are these houses connected with the cesspools, in these different numbers?

A. No. 8 has a cesspool, and the others are closet vaults.

Q. Well, what do they drain into?

A. They don't drain into anything; they are just a closet vault and are cemented up.

Q. There is no water closet there?

A. Yes, sir.

Q. You mean an out door privy?

A. Yes, sir.

Q. And No. 8 has a water closet, flushed with water?

A. No, sir.

Q. What then?

A. There is nothing but a sink, and they have a cesspool for that.

Q. They then all have simply out-door privy vaults, have they?

A. Yes, sir.

Q. With no water closet flushed by water in any of them?

A. No, sir.

Q. Nos. 16 and 14, the first ones you spoke of?

A. They have closets inside.

Q. What do they empty into?

A. Into the cesspool.

Q. Now there has been some evidence given here intimating that Nos. 12, 10 and 8 have water closets inside which empty into those cesspools, are there any?

A. None to my knowledge.

Q. What have you had to do with those houses?

A. Been through them a number of times making repairs, in fact I made repairs in the waste pipe in No. 10, I think only this last week.

Q. What does that empty into?

A. Nothing but a sink; there are two sinks in there.

Q. What does that empty into?

A. Into this vault outside.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. Which of these has sinks?

A. No. 10.

Mr. CORBIN: You mean kitchen sinks?

Mr. VREDENBURGH: No, I mean the sinks he said; he said they had sinks.

WITNESS: No. 10 and No. 12. No. 8, 10 and 12 all have sinks.

Q. Nos. 8, 10 and 12 have sinks?

A. Yes, sir.

Q. Nos. 14 and 16 have water closets inside?

A. Yes, sir.

Q. They have public water?

A. Yes, sir.

Q. And those water closets lead, as you understand it, to a cesspool on the outside?

A. Yes, sir.

Q. And that cesspool is how near the brook, or the river, whichever is nearest?

A. Well, it is nearly a block and a half.

Q. From the brook?

A. From the stream, there is no brook there.

Q. The river?

A. We call it the river.

Q. How near are they to the sewer in Morris Street?

A. Well, I should think probably back fifty feet from Morris street.

Q. These cesspools into which the water closets from these two houses go is about fifty feet from the sewer in Morris Street?

A. From Morris Street? From the sewer in Morris street.

Q. Do you know where the pipes are that connect this cesspool with the sewer?

A. There is none.

Q. Never was any?

A. No, sir.

Q. How do you know there never was any?

A. Well, I have been down in it; I was in the two vaults, and I was in the cesspool after it was cleaned, and there was no opening at all.

Q. When were you in there, in this particular cesspool?

A. Some time last winter, I think last Spring, early in the Spring.

Q. Why did you go there?

A. Why, I went there to make a change in the water closet, or in the waste pipe that came from No. 14.

Q. What was the character of the change?

A. Well, it was supposed to have been changed, and I was supposed to have done it myself. I was there and had a man dig the pipe up, as I supposed was the tile pipe that connected to the sewer, and I

disconnected it and ran that to the cesspool; and later on we found that I had cut the wrong pipe; I had cut simply a pipe that ran from the rain water of the roof; so then we dug it up again, and made the connection direct to the cesspool.

Q. Well, at that time you found that the closets in the house were connected with the sewer?

A. There was one of them; yes, sir.

Q. And you then made this change that you speak of?

A. Yes, sir.

Q. First you made a mistake, and then you subsequently made—

A. The mistake had been made two years before.

Q. There was a mistake made, and then you went there and examined it and you found there had been a mistake made, and you attempted to correct it?

A. Yes, sir; I didn't attempt to, but I did correct it.

Q. Well, you corrected it so that the water from the roof went down into the cesspool, didn't you?

A. No, I just didn't change that at all; I left it the same as it had been connected; that goes into the vault.

Q. So that now the water from the roof and from the house all go to this cesspool?

A. Yes, sir.

Q. You didn't build this cesspool?

A. No, sir.

Q. When you were in it, could you see the bottom?

A. Yes, sir.

Q. Was it an artificial bottom, or just the bottom as dug?

A. Just the natural earth.

Q. The sides, were they stone wall?

A. It was what they call a laid up wall, I suppose, lime and sand, probably, and cement; it wasn't ce-

mented tight inside, but the joints were cemented.

Q. It was not what would be called exactly a dirt wall?

A. No, sir.

Q. Now, these sinks that you speak of in the other houses, where do the pipes from them go?

A. Well, there are two cesspools—three cesspools in the rear there, and these sinks go into these cesspools.

Q. Now, when you say sink do you mean a kitchen sink, or a sink for the house?

A. I mean the common ordinary kitchen sink.

Q. Now, those cesspools, how are they laid out?

A. They had a dirt wall and natural bottom.

Q. How much are these above the river, ordinary river?

A. Well, I suppose the ground probably is in the neighborhood of five or six feet.

Q. Is it filled in ground or natural ground?

A. I think the most of it is natural, there may be a little filling at the top.

REDIRECT EXAMINATION:

Q. And the river is about a block and a half away?

A. Yes, sir.

Q. Who employed you to do this work of correction there?

A. Mr. Hummer.

Q. I mean who paid you, the Water Company, or the town, or the people, or who?

A. I think the Richards estate paid it, but I am not sure about that; I cannot say.

Q. That is all.

Sworn to befopre me,
(the signature being waived)
this 18th day of December,
A. D. 1906, at Jersey City,
N. J.

Testimony of John G. Taylor.

JOHN G. TAYLOR, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Corbin:

Q. What is your occupation at Dover, N. J.?
A. Inspector for the Board of Health.
Q. How long have you been their inspector?
A. For seven years.
Q. By whom are you paid your compensation as Health Inspector?
A. The Board of Health pays me, of the Town of Dover.
Q. Has the Jersey City Water Supply Company ever paid you anything at all?
A. Yes, sir; they gave me three dollars to come down here.
Q. Anything more than that?
A. No, sir.
Q. Do you know Doctor Leal, the representative of the Jersey City Water Supply Company?
A. I do.
Q. Has he called upon you at different times, calling your attention to places needing your attention in the city of Dover?
A. Yes, sir.
Q. For how long a time has he been accustomed to do that?
A. I think, as near as I can remember, somewhere along last spring.
Q. Mr. Gibson, do you know him?
A. Yes, sir.
Q. Has he been accustomed to call upon you for such matters?
A. He has.
Q. For how long a time?
A. I should judge for three or four years, I guess, probably longer than that.

Q. What kind of cases have they brought to your attention?

A. The cases where the water closets were too near the river, or where they would be liable to percolate or go into the river,—the contents.

Q. Have there been many of such cases brought to your attention?

A. A great many; yes, sir.

Q. How many?

A. Well, I cannot say, but upward of a hundred I should think, anyway.

Q. Have you given your assistance towards the removal of such places?

A. I have.

Q. Have you gone upon the premises to do it?

A. I have.

Q. When your attention was called to such places did you personally inspect them?

A. Yes, sir.

Q. How frequently have you done that since the company has been calling your attention to them?

A. I cannot say as to that, every time my attention was called to a place, I, together sometimes with Mr. Gibson, we would go and see the people, instead of serving notice on them; we would go and talk to them; we did that in the Board of Health in a great many cases.

Q. Without legal measures you tried to induce them to do it?

A. Yes, sir.

Q. Did they generally do it?

A. Yes, sir.

Q. Did you serve notice some times?

A. Yes, sir.

Q. Have you, in the course of your duties, tried to co-operate with the Water Company in keeping the possible source of pollution clean?

A. We have.

Q. Do you know the temper of your Board on that subject, whether they have discussed it?

Mr. VREDENBURGH: Objected to as illegal and incompetent.

A. Yes, sir; at first they rather objected to it, but I think later, after they found out that they held an ordinance themselves, that they had already passed that provision about polluting the river and imposing a penalty for it; I think they changed their minds.

Q. Have you got the ordinance with you?

A. No, sir; I haven't.

Q. Have you got printed copies that you could send to us?

A. Yes, sir.

Q. Will you send one to Mr. Vredenburgh and one to me?

A. Well, they are in book form.

Q. How long ago was your ordinance passed, on that subject?

A. In 1899.

Q. To what ordinance do you refer?

A. The town ordinance of the Board of Health.

Q. Ordinance for what purpose?

A. For to stop the pollution of streams—water that is used for potable purposes.

Q. That is not the ordinance that refers to the cleaning of cesspools?

A. No, sir.

Q. That is another ordinance?

A. Well, it is something under the same head, they run down in chapters.

Q. Was your attention called to No. 16 Blackwell street?

A. Yes, sir.

Q. When?

A. I think it might have been in March.

Q. Did you make an examination?

A. We did; we tested the closets and we found that they were not connected.

Q. Is No. 14 connected?

A. It was connected; it is not now.

Q. When was that corrected?

A. I think some time in May, probably.

Q. Did you take up the others, Nos. 10, 12 and 8?

A. Yes, sir.

Q. Are they connected with the river in any way?

A. No, sir.

Q. How far are these houses from the river?

A. I should judge—do you mean directly across?

Q. Yes, I suppose so.

A. Well, the cellars intervene between them and the river.

Q. Morris street intervenes, doesn't it?

A. Yes, sir; probably three hundred feet, I should say; that block is two hundred feet, and the other ones might be a hundred feet, near that.

Q. Have you looked into the question of the post office building?

A. Yes, sir.

Q. Did you hear complaints about that?

A. Yes, sir.

Q. What did you find there?

A. I know there was a cesspool there, and at one time I remember, it is probably two years ago, I think, that they had the water turned, I think, from the building into this cesspool, and it filled up, and Mr. Baker had to pump it out, and then he turned the tile pipe and ran it to the river.

Q. What do you mean by the water from the building?

A. The roof water.

Q. But are the closets in any wise connected with the river?

A. No, sir.

Q. Have you inspected that place?

A. Yes, sir.

Q. Do you know the Schwarz building?

A. Yes, sir.

Q. Was that called to your attention?

A. Yes, sir.

Q. You know there was litigation over that?

A. Yes, sir.

Q. Is it connected with the river now, in any wise?

A. No, sir.

Q. What is the arrangement there for sewage?

A. They have cesspools; it was connected at one time.

Q. That was at the time the litigation commenced?

A. Yes, sir.

Q. Do you know Doctor Hunter's office?

A. Yes, sir.

Q. Have you examined that place?

A. Yes, sir.

Q. Is that connected with the river?

A. No, sir.

Q. Where does that drain?

A. Into a cesspool.

Q. Have you been in the cesspool?

A. Yes, sir.

Q. When did you examine that?

A. I cannot remember exactly the date, but it is within the last six weeks.

Q. Do you know Muller's saloon?

A. Yes, sir.

Q. Near the railroad?

A. Yes, sir.

Q. Did you make an examination there to see the situation?

A. Yes, sir.

Q. What is the condition there?

A. There is a cesspool there.

Q. Connected in any wise with the river?

A. No, sir.

Q. Did you know about the construction of the cesspool?

A. Yes, sir.

Q. Did you see it constructed?

A. Yes, sir.

Q. When was it constructed?

A. About two years, I think since, when the new building was put up.

Q. Have you examined the Mansion House to see if that was connected?

A. Yes, sir.

Q. What did you find there?

A. Found no connection; they have a chain of cesspools there.

Q. Have you examined the other Muller's saloon near the river?

A. Yes, sir.

Q. On Sussex street?

A. Yes, sir.

Q. What did you find there?

A. Cesspool; the wash, where they wash the glasses in the saloon runs to the river, and the sink and the others go in the cesspool.

Q. Have you examined the jail?

A. Yes, sir.

Q. What have you to say about that?

A. The Jail?

Q. Yes.

A. Well, there was originally a pipe there, but I think they plugged that pipe.

Q. You mean a pipe from the surface?

A. Yes, sir; where they washed it out.

Q. Any fixtures connected with the river from that, or any drainage from it?

A. No, sir.

Q. Did you inspect 301 Richards avenue?

A. Yes, sir.

Q. You examined that?

A. Yes, sir.

Q. What conditions did you find there?

A. Well, it was in bad condition, we had that taken care of.

Q. When?

A. Two or three months ago.

Q. What was the trouble there?

A. Why the closet was over-flowing.

Q. You had it emptied, did you?

A. Yes, sir.

Q. Any connection with the river or any stream?

A. No, sir; not to my knowledge.

Q. Did you examine Nos. 12, 16 and 20 Hoey street?

A. Yes, sir.

Q. What did you find there, are they connected in any wise with the river?

A. They were, but are not now.

Q. When were they corrected?

A. I think last—either May or June, as near as my memory serves me.

Q. What was the trouble there?

A. Why there was a ditch ran in back there, and they apparently had run their pipes from the sinks into this here ditch.

Q. And the ditch ultimately lead to the river?

A. Yes, sir.

Q. What was done there to correct that?

A. Dug cesspools.

Q. Did you examine No. 321 East Blackwell street?

A. I cannot remember just where these numbers are.

Q. Jenkins' was the occupant, does that recall it to you at all?

A. Yes, sir.

Q. Did you inspect that?

A. Yes, sir.

Q. What did you find the condition there was?

A. Well, we found that the stuff was running to the river.

Q. When was that?

A. I think along last March.

Q. Was it in a drain or running on top, or what?

A. Kind of a drain that ran—

Q. What did you do there?

A. Had it changed or filled in a place to take the water, and dam up the drain.

Q. What does he use now?

A. It is kind of a rocky place, kind of filled in with rocks and damed up.

By Mr. VREDENBURGH.

Q. Who damed it?

A. Mr. Jenkins.

FURTHER DIRECT EXAMINATION.

Q. 180 Richards avenue, has that any connection with the river, Aker is the name?

A. I should think not, except it might be through see page, I don't just remember as to that property.

Q. If you don't remember then say so.

A. I don't remember.

Q. 158 Richards avenue, do you remember that?

A. No, I don't remember that.

Q. Do you remember inspecting 87, 89, 91 and 93 East Blackwell street—is this property connect-

ed in any wise with the canal—the Pierson property?

A. No, sir.

Q. You inspected that, did you?

A. Yes, sir; they have a new cesspool.

Q. Is 99 1-2 East Blackwell street in any wise connected with the river, the Smith properjty, next to Fanning?

A. I don't remember, I cannot remember where 99 1-2 is. I don't think it is.

Q. Did you inspect it?

A. I remember Mr. Fanning digging a cesspool.

Q. Some of these I am not sure whether you inspected or not, if you didn't inspect them just say so. Do you remember 78 Richards avenue, Mrs. Howell?

A. The system is changed there, there has been a cesspool dug.

Q. When?

A. Probably along in May or June.

Q. What was the trouble?

A. They connected with the sewer drain that ran down Richards avenue.

Q. Do you remember No. 68 Richards avenue, the same party?

A. Yes, sir.

Q. Was that corrected in the same way?

A. Yes, sir.

Q. What was done?

A. Cesspool dug in the back and the system changed.

Q. When the inspectors of the Water Company first came up into your City several years ago, a great many changes of this kind were made?

A. Yes, sir.

Mr. VREDENBURGH: I object.

Q. Do you know about changes made at that time?

A. I helped to make some.

Q. How many do you suppose, of moving back privies, etc and changing vaults?

A. I should judge there was over a hundred all the way through, from start to finish.

Q. Do you keep the run of Typhoid fever cases that occur in the city?

A. Yes, sir.

Q. How many have been reported that you know of in the last three years?

Mr. VREDENBURGH: I object, the record is the best evidence.

A. I think within the last three years it appears to me there were three cases, and one of those was a questionable case, where one doctor said it was, and another doctor said it was not.

Q. Was Barton's case one of the three?

A. Yes, sir.

Q. When were the other two, the questionable one and the other?

A. It would be two years ago; I can tell I have a record of it.

Q. How long ago?

A. Two or three years, within that time.

Q. When a case of Typhoid fever does occur, do you have any duty with regard to it?

A. We instruct the physician to instruct the people—we don't quarrantine Typhoid people, but take all precautions.

Q. You, as inspector, do you go to the place?

A. As a rule, yes, sir.

Q. Do you give instructions as to the proper care?

A. As a rule the doctor does that, in some cases where the doctor has not given instructions then I go and give it.

Testimony of John G. Taylor.

CROSS EXAMINATION by Mr. Vredenburgh.

Q. Now you say the Barton case; did you do anything with reference to the Barton case?

A. No, sir, the doctor reported to me, all precautions taken.

Q. You did nothing?

A. No, sir.

Q. Now the case before that that wasn't Typhoid fever, or about which there was doubt, did you do anything there?

A. Yes, sir.

Q. What did you do there?

A. Went and saw the people, and the doctor—the poor doctor is dead now—he gave me instructions, as the gentleman told you here, of boiling water and carbolic acid.

Q. Now the third one that you spoke of, how long ago was that?

A. That was a case of a man by the name of Breid, I cannot tell you, I haven't the records here, it was down near the car shops.

Q. What did you do as to that?

A. The doctor reported the case all precautions taken.

Q. Can you mention any other case within the seven years you have been there?

A. Seven years.

Q. You say you have been inspector seven years?

A. Yes, there was another case.

Q. What did you do as to that?

A. There were two physicians in attendance there, Doctor Cummings and Doctor Hand.

Q. Did you do anything with regard to that?

A. No, sir; the physicians made the report, all precautions taken.

Q. So that in point of fact you never done anything in regard to any patient that was sick with Ty-

phoid fever, in the City of Dover, have you?

A. No, sir; I am not a nurse.

Q. Is not there a patient sick there now with Typhoid fever?

A. Not to my knowledge.

Q. Is not there a Miss Thompson?

A. Not reported.

Q. Don't you know of a case of Typhoid fever there, a Miss Thompson, on Richard avenue?

A. No, sir.

Q. Haven't heard of it?

A. No, sir.

Q. Now you spoke of seepage, what do you mean by seepage?

A. Water that might ooze through the ground and percolate through into the river.

Q. You mean ooze through the side of the cesspool?

A. Yes, sir.

Q. When you say there is no connection with the river from these cesspools you mean except seepage, I suppose?

A. Well, of all the cesspools that I have seen there it doesn't run very far—the discoloration in the ground does not go more than about four to four and a half feet.

Q. Which cesspool have you dug up to see that the discoloration from it only goes four feet?

A. There is a place on Morris street known as the Mays property, when that building was built there, that is within, I should think about seventy-five feet of the river, there were three closets there.

Q. Three vaults?

A. Yes, sir; and when they were dug up the discoloration was not further than that from the main wall.

Q. About four feet?

A. About that.

Q. Four or five feet?

A. Yes, sir.

Q. That is one case; where is there any other case?

A. That is the only one I seen.

Q. That is the only one you have reference to?

A. Yes, sir.

Q. Then the answer to my question, as to whether you except seepage when you say there is no connection between these cesspools and the river, is yes, is it?

A. That there is none?

Q. That there is no connection except seepage?

A. No, that is all I know of.

Q. You refer to 68 Richards avenue; now what sort of a house is that?

A. 68 Richards avenue, that is a house on the corner of Hudson street and Richards avenue, I believe; I think it is 68, 70 and 72.

Q. How many people are there in that house?

A. 68?

Q. Yes.

A. Well, there is one family there, and I believe Mrs. Searing, that is, Mr. Searing's mother lives with them.

Q. Have they a water closet in the house or is it on the lot?

A. I think they have a bath.

Q. A bath room?

A. Yes, sir.

Q. When was that cesspool cleaned out?

A. It has just been built a short time ago.

Q. When?

A. I think I told you in either May or June.

Q. Has it been cleaned out, since?

A. No, sir.

Q. No. 117 Richard avenue, do you remember that?

A. No. 117?

Q. Yes.

A. Well, that must be the Butterworth property.

Q. Well, the cesspool there has been in existence for how long?

A. It was built last Spring.

Q. Has that ever been cleaned out?

A. No, sir.

Q. 99 1-2 East Blackwell street, has been in existence how long?

A. The Fanning property?

Q. Smith property, I think; I have it so marked here.

A. About two years, as near as I can remember.

Q. Has that ever been cleaned out?

A. Not to my knowledge.

Q. 87, 88 and 89 Richards avenue, known as the Pierson property?

A. That is Blackwell street.

Q. Yes, Blackwell street, known as the Pierson property?

A. Yes, sir.

Q. How long have those cesspools been there?

A. They were built some time last Spring.

Q. Have they ever been cleaned out?

A. No, sir, it is a very large cesspool.

Q. Never has been cleaned out to your knowledge?

A. No, sir; it has only been built a few months.

Q. How long?

A. Several months, built since Spring.

Q. I thought you said it was built in the Spring, in March?

A. Somewhere along there.

Q. Well, that is more than three months ago?

A. I said several months ago.

Q. It has never been cleaned out since?

A. No, sir; and it will last for some time yet.

Q. 158 Richards avenue do you remember that house, that was the one that you said except seepage?

A. That is the Ackhart property.

Q. Yes; the cesspool is built how long?

A. I don't think there is much of a cesspool there, I think there is more of an out door closet.

Q. A vault?

A. Yes, sir.

Q. That vault has been there how long?

A. Since the house was built I guess, and I don't know how long that is.

Q. Before you were inspector?

A. Yes, sir.

Q. How often has that been cleaned out?

A. That I cannot say.

Q. Has it ever been cleaned out?

A. Not to my knowledge, there are times they clean these closets without a complaint being made; there are a great many closets in Dover that are cleaned without being brought to the attention of the Board of Health.

Q. That is not the question, the question is whether you ever knew this one was ever cleaned out?

A. No, sir; I don't.

Q. 180 Richards avenue, do you remember that place, Howell's?

A. That was an out door closet.

Q. How long has that been there?

A. Must have been there fifteen or sixteen years.

Q. Has that ever been cleaned out, to your knowledge?

A. Not to my knowledge.

Q. 321 East Blackwell street?

A. That is Mr. Jenkins' property.

Q. Yes, that cesspool has been there twelve years, I think he said.

A. The cesspool was put there about last Spring, I should judge, or last Fall.

Q. That the cesspool was built?

A. Yes, sir.

Q. Was there a vault there before?

A. Sure; there is an out door closet.

Q. Well now, that out door vault, was that ever cleaned, to your knowledge?

A. No, sir. The gentleman is a member of the Board of Health, he probably looks after that.

Q. 12, 14, and 16 Hoey street.

A. These are out door closets.

Q. How long have they been there?

A. The out door closets have been there ever since the houses were built.

Q. And that is many years?

A. Several years.

Q. Have you ever known them to be cleaned out?

A. No, sir; they are in fair condition, though.

Q. They are in fair condition yet, are they?

A. Yes, sir; they probably have been cleaned without instructions.

Q. 301 Richards avenue, you said something about three months ago.

A. That was an out door closet; that was cleaned.

Q. That out door closet has been there how long, Mr. Taylor?

A. Well, I don't know, it was there when I first knew it.

Q. Have you ever known it to be cleaned?

A. Recently.

Q. When?

A. Since May.

Q. Since May is a good while; about when was it cleaned?

A. If I had my records I could tell you just when, but I haven't them here; I keep a record of those

things at home.

Q. You have a record of all these things somewhere?

A. Yes, sir.

Q. I suppose it is in your desk?

A. Yes, sir.

Q. You didn't bring it?

A. No, sir; I didn't know what you were going to ask me.

Q. Your judgment of when that was—

A. I should say somewhere along June or July of this year.

Q. How long before that was it that that closet was cleaned out?

A. I never knew it to be cleaned before.

Q. Now the Mansion house; did you know that there was a connection, when Mr. Richards was there, between the water closet and the sewer pipe, that led down to the river?

A. I don't think there has been in my time.

Q. You heard Mr. Richards testify, didn't you?

A. Yes, sir; but I did not pay particular attention to it.

Q. You didn't pay any attention to it?

A. I did yes, but I say no particular attention.

Q. You don't dispute but what he knew when he did it?

A. Did what?

Q. That he knew when he changed that pipe?

A. Oh, when he changed the pipe?

Q. Yes.

A. I think I heard him say something about taking out a length of pipe and putting in an elbow.

Q. Your recollection is that there was no connection with the sewer pipe during the seven years you have been inspector?

A. None that I knew of, except grate in the back yard, that took water from the roofs in the yard.

Q. But you never knew that there was any connection between the water closet and the pipe that runs down into the river until to-day?

A. When Mr. Jolly owned the property then they went in there.

Q. How long ago was it ,Mr. Jolly owned it?

A. Ten or eleven years ago, I guess he is dead now, I think he is the gentleman.

Q. You knew that when Mr. Jolly was there there was connection between the water closet and the sewer pipe, did that run down to the river?

A. Never saw the pipe put in, I have often heard them tell about the tile pipe, and where it ran to, down Morris street and into the river.

Q. How do you know that was ever taken out?

A. Which was taken out?

Q. Why, the connection?

A. I don't know that it was ever taken out, I know they dug new cesspools, and I saw those cesspools connected up by Mr. Bennett.

Q. Do you know there have been cesspools dug?

A. Yes, sir.

Q. But you don't know of your own knowledge that the connection between the water closet and the pipe has ever been broken, do you?

A. Only by testing, and we got no results from test.

Q. Now you say test, when did you test it?

A. It may have been in September.

Q. Who was with you when you tested it?

A. Mr. Gibson.

Q. How did he test it?

A. By putting the dye in the water.

Q. What dye did he put in the water?

A. He put in red.

Q. In what water did he put it?

A. Put it in the toilets at the closet.

Q. When, what time of day?

A. I think in the afternoon we were there.

Q. Was he careful to inform Mr. Bennett that he was going to do it?

A. I didn't know his business between him and Mr. Bennett.

Q. When he put that in how much did he put in?

A. I think we had three packages, I cannot tell you exactly the amount that was in each package, it was put up in packages.

Q. Did you see him put it into the water closet?

A. I did.

Q. How many packages did he put in?

A. One in each toilet and one in the urinal.

Q. So he had four packages?

A. Three, I said, and then we afterwards went back and tested upstairs and put it in the toilet there.

Q. Did he use the whole package in each one?

A. Yes, sir.

Q. You said he put it in the two closets and the one urinal?

A. Yes, sir.

Q. And that used up the three packages?

A. Yes, and then he went back and get some more, he used a number that day.

Q. The same day?

A. Yes, sir.

Q. And you say it was red?

A. Yes, sir.

Q. How do you know it was red?

A. Well, we tried it in the water, you could easily tell.

Q. When it got in the water it was red?

A. Yes, sir.

Q. Was it red before it got in the water?

A. No, it was more of a gold color.

Q. How much in each package, a quart?

A. No.

Q. A pint?

A. No, sir.

Q. A gill?

A. I should judge about a couple of table spoonfuls.

Q. Now after he put it in the Mansion House closet, you saw him put it in there?

A. Yes, sir.

Q. What did you do then?

A. Flushed the closets several times and went down to look at the pipe.

Q. Yes, well, how long did you stay at the pipe?

A. Probably an hour.

Q. You stayed there an hour?

A. Yes, sir.

Q. Did you see where Mr. Gibson got this dye from?

A. Yes, sir.

Q. Where?

A. Mr. Kilgore.

Q. You went with him to Mr. Kilgore's?

A. No, sir; I saw him go in after it.

Q. You saw him go in Mr. Kilgore's, and saw him come out again?

A. Yes, sir.

Q. You stood out on the street?

A. Yes, sir.

Q. That was before you put any package in the Mansion House closet, was it?

A. Yes, sir.

Q. Then you and he went to the Mansion House closet?

A. And tried the downstairs closet.

Q. And he put in the stuff?

A. Yes, sir, in my presence.

Q. In your presence?

A. Yes, sir.

Q. Then you flushed the closet?

A. Yes, sir.

Q. And then you went down to the river and stayed there for an hour?

A. Yes, sir, I should say about an hour, and we got no results, and then we went back and got another package and went upstairs and tried it there.

Q. That was the only time you have tested it? **10**

A. Yes, sir; at that place.

Q. Now, then, on that testimony you swear that it is not connected with the river, do you?

A. That is my judgment, yes, sir.

Q. Now the Morris street property, the Hunter property?

A. Yes, sir.

Q. That cesspool, did you see it built?

A. I seen part of it built, yes, sir I didn't see it **20** finished.

Q. When was it built?

A. When the building was built, I should judge a couple of year ago.

Q. How many tenants used that building?

A. Three.

Q. Water closet and bath room?

A. Well, there are three closets and two baths.

Q. How near is that cesspool to the river?

A. I should judge it is seventy-five feet or more. **30**

Q. Have you ever made any study of the question of how near it is safe to put a cesspool to the river?

A. Well, I never have studied the thing very thoroughly, but I should judge it would be owing to the condition of the ground.

Q. Did you ever read any books on the subject?

A. Some, yes, sir.

Q. What books?

A. I cannot give you the author just at present. **40**

Q. When did you read it?

A. Up to three years ago.

Q. Three years ago?

A. Yes, sir.

Q. Who did you get the book from?

A. Bought it.

Q. And you cannot remember the name of it?

A. "Municipal Sanitation of the United States" is one of them.

Q. Now this Hunter's cesspool you say is about forty feet from the river?

A. About seventy-five, I should say.

Q. There was formerly a pipe there leading from that to the river?

A. No, sir; the pipe ran down the center of the street, but they had connected the inside plumbing with this outside pipe, and in the way they did lead the sink water down into this pipe and ran it in and down that way.

Q. How near was this cesspool to the pipe in the street?

A. I should judge that is fifty feet.

Q. And how near is it to the sewer in the other street?

A. That is what I say, about fifty feet, I should say, from the sewer in the street to the cesspool.

Q. Is that a pipe or a sewer or a—

A. It is a tile pipe in the street and runs down and connects with an iron pipe.

Q. How do you know that that is not connected with the river?

A. How do I know it now?

Q. Yes.

A. Why I had the cesspool pumped out.

Q. Did you have it pumped out?

A. I didn't; no, sir.

Q. Who did?

A. Mr. Mays, I believe.

Q. Is he the owner of the place?

A. He did own it; he is dead now.

Q. He had it pumped out?

A. Yes, sir.

Q. How did you find out it didn't connect with the river?

A. We went down in the cesspool and tried all the pipes and we found the pipe from Mr. Hunter's came in the cesspool and the one from Mr. Collard and the other from the building all emptied into the cesspool and we found no connection with that in the river.

Q. When you say "we" who do you mean by "we"?

A. There was a plumber up there from Newark

Q. Yes who else?

A. I think Doctor Leal was there I think Mr. Gibson was there and I think Mr. Griffin was there the second time he and some other gentleman.

Q. What was the character of the wall of this Hunter cesspool, a dirt wall?

A. Yes, it is just a laid up wall stone, not a cemented wall.

Q. Do you know whether there was a pipe running from the outside of that wall to the sewer?

A. There was at one time; that was cut off.

Q. How do you know?

A. I saw the pipe and dug it up.

Q. You dug the pipe up yourself?

A. No, sir, I did not, Mr. Mays was there and had it dug up.

Q. Did you see it?

A. Yes, sir, and Mr. Griffin saw it.

Q. What did you see?

A. Saw that the tile pipe led from the leader in, and it looked as if the ground had been broken at some time and it had been connected, but at this time it wasn't.

Q. What did you dig up, any pipe?

A. No, sir, we left it there.

Q. But there was an apparent connection between that?

A. There had been at some time.

Q. Had been what was apparently a former connection between the cesspool and that pipe?

A. Yes, sir.

Q. You say that was up?

A. Yes, sir.

Q. What was the distance?

A. Between the cesspool and this pipe? Well, I would say five or six feet, something like that.

Q. What was it that was apparent, that showed that there had been a pipe there before?

A. Well, the ground was loose.

Q. What was the character of the ground, stone?

A. Stone and sand.

Q. When did you make this examination that you refer to?

A. The last one I think was along in October, if I remember.

Q. October of this year?

A. I think along there.

Q. When had that cesspool been cleaned out before that examination?

A. It strikes me in October.

Q. In October?

A. It was only a few days before that we made the examination.

Q. It had been cleaned out?

A. Yes, sir.

Q. Had it ever been cleaned out from the time it was built up to that time, to your knowledge?

A. No, sir, it wasn't full then until the second time, it was full, plum up, filled in three or four days

through some reason or other.

Q. Then this cesspool that prior to that time had never been necessary to clean, filled up immediately after that, did it?

A. No, sir, it went, I think from Monday until Thursday, and there was about eighteen inches of water in it, and from Thursday to Sunday afternoon it filled up.

Q. Why did that fill up in three days?

A. I guess somebody let the water run.

Q. Somebody let the water run?

A. I should judge so, yes, sir.

Q. It wasn't because someone had stopped the water from running out?

A. No, sir, I think the plumbing was out of order in the second story.

Q. Was it cleaned out a second time then?

A. Well, it was cleaned down to about two or three feet.

Q. Has it been cleaned since?

A. No, sir, there is no occassion for it,—fixed the plumbing.

Q. Did you make tests there?

A. In that building?

Q. Yes.

A. Yes, sir.

Q. When?

A. The first time we had it cleaned out.

Q. What was the result of the test?

A. We found that the water was all coming to the cesspool from Mr. Hunter's and from Mr. Collards—no, I think Mr. Collard's sink was off, and that was changed, so it all went into the cesspool.

Q. Now, let me see, you made a test in October some time?

A. Somewhere along there.

Q. Of this year?

A. Yes, sir, September or October.

Q. And you then found that by the test the water went from the cesspool to the river?

A. No, sir.

Q. What then?

A. We found that the water came from these sinks into the cesspool.

Q. Didn't you think they did?

A. What?

Q. That the water came from the sink into this cesspool, didn't you know it did, before?

A. We were getting color—somebody was putting color in somewhere, and we didn't know just where it was coming from, and we tried to find out. I asked Mr. Griffin on one occasion to tell me where it was coming from, and he said he would tell me in Court; that is all the information I could get from him, so I had to search for myself.

Q. What had you to do with it?

A. With which?

Q. Searching for yourself?

A. According to my ordinance I had taken an oath of office.

Q. It was your oath of office that lead you to make this search?

A. Exactly.

Q. What did you find?

A. We found it was going in there, we tested it one time previous to that, if you wish to know, we put red in, and that time it went to the river and then that was changed.

Q. When you put red in and it went to the river, that is one time after, when was that?

A. I think along last May.

Q. Where did you put that in?

Testimony of John G. Taylor.

A. We went in Doctor Hunter's office.
Q. In the sink in his office?
A. Yes, sir.
Q. Was it the water closet or the sink?
A. The sink that I put it in.
Q. You put it in the sink?
A. Yes, sir.
Q. You found it down in the river, did you?
A. Yes, sir.
Q. What was it, red or white or what?
A. Red.
Q. At that time had the pipe been taken up or not?
A. Taken up after that.
Q. That is all.

Sworn to before me,
(the signature being waived)
this 18th day of December,
1906, at Jersey City, N. J.

Further examination of witnesses etc., in this matter stands adjourned until Friday, December 21, 1906, at the same time and place.

IN CHANCERY OF NEW JERSEY.

Between

THE MAYOR AND ALDERMEN OF JERSEY CITY,

Complainants,

and

THE JERSEY CITY WATER SUPPLY COMPANY,

Defendants.

Taking of depositions in the above stated matter, before the subscribed, a Master in Chancery of New Jersey, pursuant to the adjournment last had, at the hour of eleven o'clock in the forenoon of Friday December 21, 1906, at the office of Messrs Collins & Corbin, 243 Washington street, Jersey City, N. J., in the presence of Mr. James B. Vredenburgh and Mr. George L. Record, counsel for the complainants, and of Mr. William H. Corbin and Mr. William D. Edwards, counsel for the defendants.

Said examination being taken in shorthand, question and answer in full, and the signatures of the witnesses to their depositions waived.

Testimony of George R. Hough.

GEORGE R. HOUGH, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Edwards.

Q. Where do you reside?

A. Jersey City.

Q. Are you connected or have you ben connected with the Government of Jersey City, in the past?

A. I have.

Q. And in what capacities?

A. City Comptroller.

Q. Will you tell us how long you were City comptroller, between what years, about?

A. The last time it was from January, 1902, until January, 1906.

Q. And before that?

A. From 1889 until, well, I was out two years and eight months.

Q. 1889 to 1900, then?

A. Yes, sir.

Q. And before 1889 how were you employed; were you employed by the City?

A. Clerk in the Comptroller's office.

Q. How long were you so employed?

A. September, 1880 until April, 1889.

Q. Then up to 1906 you were in the employ of the City, from 1880, baring two years and eight months?

A. Yes, sir.

Q. And always in the financial department?

A. Yes, sir.

Q. And of course you are familiar with the finances of Jersey City during that period?

A. I was.

Q. And kept track of them down to the present date?

A. I did.

Testimony of George R. Hough.

Q. Prior to January 1, 1906, was any attempt made by the authorites of Jersey City to provide by bonds or taxation or otherwise for the purchase of water supply, under the Flynn contract?

MR. VREDENBURGH: I object to the question as immaterial, illegal and incompetent.

A. No.

Q. Mr. Hough, prior to January 1, 1906, for the period of three years, in your opinion could Jersey City have issued and sold bonds sufficient to purchase the water supply, under the Flynn contract, amounting to about the sum of $7,000,000?

Mr. VREDENBURGH: Objected to for the same reason.

A. No.

Q. That is all.

NO CROSS EXAMINATION.

Sworn to before me, (the signature being waived) this 21st day of December, A. D. 1906, at Jersey City, N. J.

Testimony of Edlow W. Harrison.

EDLOW W. HARRISON recalled on behalf of the defendants.

DIRECT EXAMINATION by Mr. Edwards:—

Mr. VREDENBURGH. I object to the recalling of Mr. Harrison, his testimony having been closed on his direct examination.

Mr. EDWARDS: He is going to testify on entirely new questions.

Mr. VREDENBURGH: Well, I object to recalling him without permission of the Court.

Q. Now, Mr. Harrison, you were the chief engineer of the Jersey City Water Supply Company?

A. Yes, sir.

Q. Do you remember the change in the dam site from the Kingsland site to the Banta site?

A. Yes, sir.

Q. Will you tell us what changes were made in the work by reason of such change in the dam site, with the comparative costs?

Mr. VREDENBURGH: Objected to as incompetent, illegal and immaterial.

A. The original pipe was nineteen miles of seventy-six inch pipe, and there were three miles of tunnel and conduit six feet ten inches in diameter; that is twenty-two miles.

Q. Was that calculated on the head of the old dam site to furnish the water at the required head in Jersey City?

A. Yes, sir.

Q. Was there any provision in the specification that called for these particular sizes?

Mr. VREDENBURGH: Objected to for the same reason, as incompetent, illegal and immaterial.

A. No, sir; there was no provision that specified the exact size of the pipes, but the requirement was that the pipes should conform to a certain co-efficient under the Kutter formula, and the grade being found and the height beng found to serve, why there was only one size pipe that would fit that co-efficient in any particular place. Now the amendment,—this plan of carrying the dam further up stream was as follows: Seventeen miles of seventy-two inch pipe and five and six-tenths miles of eight feet six inch tunnel and conduit masonry work, or twenty-two and six-tenths miles.

Q. Well, now then, the out-let from the reservoir was about how much further from Jersey City than originally?

A. Six-tenths of a mile.

Q. Did that cause any change in the elevation of the outflow?

A. Yes, the elevation of the out-let was changed not because of that six-tenth mile, but because we had gone further up the valley, and the elevation of the reservoir was about 13 feet higher than the elevation at the first point.

Q. Then you gained that in head?

A. That gained some head, it gained more head than the proportionate increase in length.

Q. Now then, did that change in the main dam site affect the back dyke?

A. Yes, sir.

Q. If so, how?

A. It increased the back dyke about thirteen feet, I should say about thirteen feet was the difference;

it increased the back dyke about thirteen feet, maybe,—thirteen feet higher.

Q. How high was it originally?

A. Increased it from seventeen feet to thirty.

Q. Well, did it make the back dyke longer or shorter?

A. Made it longer, because it had to cross the wider part of the valley. Originally it was about eighteen hundred feet long, and it increased it to thirty-five hundred feet long—about thirty-five hundred feet long, an increase of some seventeen hundred feet, about double.

Q. Can you tell us how much was saved by the contractor on the steel pipe, by cutting off the two miles?

Mr. VREDENBURGH: Question is objected to as immaterial, incompetent and illegal.

A. About $67,000 a mile; made $134,000 on pipe.

Q. Well, now, did the change in the dimension of the pipe give any saving?

A. Well, that saved the contractor about $3,300 a mile for seventeen miles, $56,100, saved about twelve and a half to fifteen pounds of steel to the running foot, and worth four and a half to five cents a pound.

Q. Was there any saving to the contractor on the tunnels and conduits?

A. Yes, they worked out a saving on the tunnels, but there was a loss there in the total. On the rock conduits, (throughout in the tunnels), there was a gain of $170,000. We had one and 6-10 miles in the final work of eight feet six tunnel which cost about $36.00 per foot, in place of three miles of six feet ten tunnel at $30 a foot; the saving there was $170,000 on that.

Q. Then how do you figure out that saving of $170,000?

A. Why, three miles of six feet ten tunnel, through tunnel line, $30.00 a foot, and the value of that is $475,000; that was cut out, and in its place in through tunnel, there was one and 6-10 miles of eight feet six tunnel, that is an increase of nearly two feet diameter, costing $36 per foot, and making $305,000, and left a net saving there in the rock tunnel part of $170,000.

Q. And that makes a total saving of how much?

A. That made the total saving, of items on which we saved, $360,100.

Q. Were there any added costs, to off-set this saving, by reason of the change?

A. Yes; in the place of the additional tunnel and the cut off pipe, we put in a concrete masonry conduit, we had four miles of this, and they cost $80,000 a mile; that is 320,000. This back dyke had to be raised, and the additional work on this back dyke was about 80,000, that made a total cost of $400,000 in the way of additions, as against $360,000 of saving and left the net added cost to the compaany $40,000.

Q. Then it cost the company $40,000 more, by reason of the change in the dam site?

A. It cost probably more than that, taking all the items in detail; there would be certain items which would be for incidental work; but taking the items of the actual construction, about $40,000, not less than $40,000.

Q. Can you give us an estimate of how much the City will save by reason of this change in the location of the dam and the construction of the pipe line, when it comes to enlarge the works, and I call your attention, in that regard, to Mr. Ferris' report on that subject, already in the testimony?

Testimony of Edlow W. Harrison.

Mr. VREDENBURGH: Objected to as incompetent, immaterial and irrelevant.

A. At the time this change was made, an estimate was made of this saving to the City, the saving principally would be that whenever the work was increased to from fifty to seventy million there would be two miles less of pipe to be laid, but that was cut down by the City, the City having to put some little more work upon the back dyke, it being a longer dyke, but the balance at that time was figured out and agreed to, both by Mr. Ferris and myself, at about $100,000.

By Mr. VREDENBURGH. I object to that part of the answer in which the witness speaks about Mr. Ferris, and ask that it be stricken out.

Q. Did Mr. Ferris so state in his report to the Board of Street and Water Cimmissioners?

Mr. VREDENBURGH: Objected to, because the report shows for itself, and on the ground that it is incompetent, illegal and immaterial.

A. He did so report.

Mr. VREDENBURGH: I ask that the answer be stricken out, because the question was incompetent, the report showing for itself.

Q. Was this estimate made up, after consultation with you?

A. Yes, sir.

Mr. VREDENBURGH: Objected to for the same reason.

Q. What have you to say as to the accuracy of that estimate of $100,000 saving by the City, at the present time?

Mr. VREDENBURGH: Objected to for the same reason.

A. It was all right.

Mr. EDWARDS: Mr. Harrison has made up a short resume of this testimony which may be of convenience to the Vice Chancellor, showing the detail of the additional cost and saving. It is consented that that paper shall be put in as an exhibit, and it is marked Exhibit No. 1 of this date.

Q. Now, Mr. Harrison, do you know about the construction of the drain into the canal at Boonton, for the purpose of disposing of drainage?

A. I know the drain from Brook street down to—

Mr. VREDENBURGH: Objected to, because the witness has already testified to that.

Q. Will you tell us how that drain came to be built?

Mr. VREDENBURGH: Objected to as immaterial and incompetent and illegal.

A. Mr. Ferris reported a complaint, that there was suspicion that the Brook street culvert—

Mr. VREDENBURGH: I object to the answer.

Testimony of Edlow W. Harrison.

A. —or drain in that village,—in Boonton, had connection with some house drainage, and that as it then went across the plane and discharged into the levels—one of the upper levels of the Copper-Lord works, it directly reached the river and the reservoir. I agreed to look over it with him, and to go on the ground and see if there was anything to be done,—that we would consider his complaint and see if there was anything to be done to remedy it. Mr. Ferris went out there with me, and we met Doctor Leal on the ground, and looked into the thing and went up to the plane, and studied out about what would be the best way to handle that water; and the plan which was decided and agreed to by all, and I think Mr. Ferris has as much credit for that as anybody else there, was that we should put a drain down betwen the rails of the plane and cut off the Brook street drain and run it into this new drain, and then continue that drain smaller, up the plane to the top of the plane, and then continue an open ditch which had been partially built by the Canal people along the north side of the canal to the westward. Now the only question that arose was how far that ditch should go. Mr. Ferris wanted the ditch carried to the bridge, the upper end of the Town of Boonton, near the dam, and the last four hundred feet of that would be in the side hill, and the only water that would reach it would be the water from two or three culverts or pipes which drained the surface water—rain water—off the highway. We demurred to going as far as this, as we did not consider that we had anything to do with the wash of the highway at that point; so instead of carrying the pipe sixteen hundred feet—carrying the ditch sixteen hundred feet, which would then have been the length he wanted we carried it about twelve hundred feet, and we built the drain as we all agreed to.

Now, in regard to the over-flow in that drain. That matter was talked of. We knew the drainage area of the Brook street drain, and we put a flume down there, which would carry, year in and year out, that water.

Q. And by flume you mean the concrete construction running along the plane of the canal?

A. Yes, sir. But if there should happen to be a cloud burst on this drainage area and it should overflow that flume, it might wash out a great part of the plane and do a great deal of damage to the Morris Canal Company, and we therefore talked over putting in a waste weir there, which would only act in times when the flow increased over fifty million gallons per day, that is perhaps in some years it might not act, only in times of very extraordinary storms, and then it would not commence to act until the drain and everything was pretty well cleaned out. We talked that over, and my memory is that we talked it over at the time, and I am pretty certain we talked it over with Mr. Ferris; we both had the same idea in regard to that as I have to-day—that at the time that over-flow commenced to work there would be clear water coming out of the drain; nothing but rain water, and that the drain would be throughly washed out if there was anything in it deleterious, that is, as far as the drain went. That is how that came to be built; we had it built right after that, within a very few weeks, and it has been working ever since.

Q. Was there any complaint ever made of it before this suit was brought?

A. No, sir, I didn't hear of it. I thought it was doing very good work until it got into this case.

Mr. VREDENBURGH: I object to this as incompetent, and ask that the answer of the witness be stricken out as stating what occurred between himself and a third party, and not a party to this suit.

Mr. EDWARDS: Who is the third party, Mr. Ferris?

Mr. VREDENBURGH: Yes, he is the third party. I refer to Mr. Ferris as the third party, and also Dr. Leal.

Q. What about the construction of the flap gates below the plane?

A. That drain discharged into the lower level of the canal, the Montville level, or the on that runs down toward Montville, and the City thought there might be a back flow in that lower level of the Cooper-Lord, which level discharged into the river,—the lowest level to the Lord mills. I went there and took a number of tests when this question was raised, and tried floats at different points, and my own opinion was that the water of that canal level did not go into that. The water of the canal level did not go into the Cooper-Lord level at all except in such a very small quantity as to be negligible, and what water did go in was only the water that a few seconds before worked out, that is, there was a sort of balancing of the waters there.

Q. Worked out of where, out of the Cooper-Lord?

A. The way it acts is this,—The Cooper-Lord people start their mill going to roll iron, and they use all the power in the mill, and they will then draw down the water, perhaps an inch or so, and when that is drawn, as that passes, the iron is going through, it is automatic, the wheel is using all the water, but

the moment that is through back comes the water again and up comes the level and flows out into the canal.

Q. Then the water which is drawn back does not go down the power flume?

A. The water which is drawn back does not go down to Montville, as far as I could see by any float measurements there; I drew a number of floats and I found that there was a current of the Brook street drain following along the north side of the canal, and hugging the shore. Then in regard to this reflex action which now works, as all of you have seen, closing the gate and opening it, I found that when a boat went into the lock there was a wave transmission back, but not a moving of the water, just the transmission of a wave, just the same as happens when you shut down a gate in a pipe; if you close a gate quickly in a running pipe you will feel it for miles, the sudden stop of the water; I didn't think there was anything in these gates, but we put them in and there they worked and I think they worked all right; I have seen the water going back from the canal level into them, and I have seen, a few minutes after, the water coming out, and there is practically no movement,—wave, in that canal level along the shore, the water that goes out from the Cooper-Lord level goes back again, so that it is a movement back and forth.

Q. Does the water that comes out of the canal at that lower level into the feed toward the Cooper-Lord, go down over the wheel and into the reservoir?

A. I doubt if there are five gallons of water a day that does that, on that lower level; it would be absolutely impossible if they drew the lower level out.

Q. Would it be possible for any of this water to go down?

A. No, it would not be, it is not possible, if they did, they would draw—that lower level only fed from above and from there, and there is no other place to feed it, and the moment you turn it down on the mill this wheel there would take it out in a very few minutes. I have known that property for a good many years; I studied it very thoroughly ten or twelve years ago, in this water question, and there was never any intention, in all those years, to use this water of the lower canal level on these wheels.

Q. Well, then, Mr. Harrison, as I understand you, the water that flows through those gates at the lower level does not go into the reservoir below, but comes back into the canal and goes toward Montville?

A. My observation there, Mr. Edwards, has been that the small amount of water that flows in on this reflex action moves perhaps eight or ten feet, and almost following this reflex action is another movement in the other way, in which a small quantity of water goes out, but the amount of water going out is always greater than the amount of water coming in, because it is that water that supplies the lower level of the canal.

Q. Has the Cooper-Lord Company any power to feed its wheels from that lower level?

A. No, sir; when that water reaches that lower level it belongs to the Morris Canal, and is clear of any rights of the Cooper-Lord Company.

Mr. VREDENBURGH: I object on the ground that the witness is attempting to give the contents of a contract.

Q. You are conversant with these rights of the Cooper-Lord?

A. I think so; I have worked a good many years over them.

Q. Then for whose benefit is that connection at the lower level of the canal with the Cooper-Lord property?

A. Well, that is the point. When the Cooper-Lord people put in all the water nccessary for the maintenance and navigation of that canal, now the Cooper-Lord people have the right to use the waters of the canal; they gave the canal their right of way, and in return for the right of way they were to use the canal waters where they came then, instead of coming down the plane they would turn around their wheels, and they were to restore the canal waters and they always have restored the canal waters at that lower gate into that level, and in sufficient quantity to maintain the canal, and the canal always draws upon them there; if the canal is working they draw out there so much water that they interfere with the use of the lower wheel. The Cooper-Lord people never claimed, never have and absolutely cannot draw water from the lower level to run their wheel, by drawing on the canal.

Q. Do you know, Mr. Harrison, what the expense of taking care of this Brook sreet sewer was?

Mr. VREDENBURGH: The question is objected to as irrelevant and incompetent, unless the books are produced.

A. I forget exactly what the amount was; I could get it off the files; it was considerable.

Q. Now, Mr. Harrison, have you made a study of the effect of the sedimentation and clearing of large reservoirs, such as we have at Boonton?

A. Yes, I have made a study of that in connection with this work and also in connection with other work.

Testimony of Edlow W. Harrison.

Mr. VREDENBURGH: Objected to because the witness has heretofore been examined upon this subject, and also because he is not an expert, and that the evidence is incompetent, immaterial and illegal.

RECESS.

Mr. EDWARDS: Do you want to cross examine him as to his expertness on this question?

Mr. VREDENBURGH: Yes, I would like to ask him a question or two.

By Mr. VREDENBURGH:—

Q. What study of sedimentation have you made, Mr. Harrison, and when?

A. I made an examination and report as to the new gravity water supply for St. Louis.

Q. When?

A. About 1899; the gravity supply drawn from the Merrimec River, about ninety miles from St. Louis. The question was Gravity Supply vs. Mississippi River, with sedimentation and filtration. The gravity supply was to be from the storage reservoir, the present supply as pumped from the river, without filtration. One party were in favor of using the river water with filtration and sedimentation, and another party were strongly in favor of new supply by gravity brought eighty miles. I, in company with Mr. Hershel, made a report on that, out of which report a commission was drawn which has now re-

ported on the gravity supply in favor of gravity supply, and the matter is still pending. When I first took hold of this water question—

Q. Who is Mr. Hershel?

A. Mr. Clements Hershel of New York City, and was then chief engineer of the East Jersey Works, or had been chief engineer of the East Jersey Works. When I first took hold of this water question with Mr. Flynn as consulting engineer I had before that been interested in the water matter for a number of years; I took hold of this water matter for Jersey City away back in 1882 when they were pumping from the Passaic River, and I then had an opportunity, in the summers of 1881 and 1882, to study the sedimentation question as shown by the chemical reports in Dundee Lake and the upper river, and the effect of pollution upon the purity of the river.

Q. What reports?

A. That was a report made by the Board of Street and Water Commissioners of Jersey City for the year 1881, and contained a full statement and report on the effect of pollution upon the Passaic River from Little Falls to the Newark Bay. I was engaged in the engineering work on that report, and I wrote the report for the Board; Sites was chief engineer, and the chemical work was done by Professor Leeds of Stevens Institute. There was no bacteriological work in those days; it was all chemical. When I took hold of this matter for Flynn the first thing that I entered into was this question we have now been debating, this large reservoir, this large storage reservoir at the lower end of the river, at the Intake above it—the Valley, more or less polluted; and the statement of the company that this large storage reservoir was—

Q. Now, I object to this; I am asking you what

reports you studied, and I object to your going into this sort of talk or giving your testimony in this way; it is very unfair to answer this way, and you are doing it intentionally, too.

Mr. EDWARDS: Mr. Edwards submits that the witness is simply answering Mr. Vredenburgh's question.

Q. I am asking you from what books you studied; I want the name of the books?

A. I haven't studied the books, I have studied the things, and the books also.

Q. Give the name of the books?

A. I read Frankland on Water Supply Purification of Waters.

Q. Let me get that down; Frankland, what date, what year is that?

A. I will get it for you if you want it.

Q. I ask you what year it was published?

A. It was published in the last five or six years, that one that I have.

Q. And you read his works on sedimentation?

A. Yes, on sedimentation.

Q. He has work on Sedimentation, has he?

A. Yes, he has work on Purification of Water Supplies.

Q. What other works?

A. I have also read the report of the Massachusetts State Board of Health.

Q. What year?

A. All the years, practically.

Q. What do you mean by that?

A. They make their report every year—

Q. How many years?

A. —and I made a study of their report.

Q. For how many years?

A. For the last ten years.

Q. You have read the last ten years' reports?

A. On that question; looked at them for the purpose of sedimentation, not for this case.

Q. When did you read them?

A. In the last four or five years I have been making a study of this subject, for over five years. I made a report to the Governor on the study of sedimentation of the New York Bay.

Q. What Governor?

A. Murphy.

Q. When?

A. For the Passaic Sewage Commission.

Q. When did you make that report?

A. About three years ago.

Q. What was that?

A. It was on the effect of the sewage in the New York Bay, and I took samples from the Bay.

Q. The effect of sewage of the New York Bay?

A. Yes, sir.

Q. What had that to do with sedimentation?

A. That is the main thing we relied upon, sedimentation.

Q. I say what had the sewage report to do with sedimentation, did that deal with sedimentation, the sewage report?

A. Yes, and the effect of large bodies of water upon the sewage. Since I have been engineer of this work I have studied up the figures for the Lakes Geneva, Lucerne and Como.

Q. What have you got to say about Lake Geneva?

A. I have the bacteria conditions of the Rhone River coming into Lake Geneva, and I have seen the Rhone River come in full of sediment, so that the Lake is colored for quite a way out; and I have also looked over the analysis of the bacteria conditions

of the Lake towards the center.

Q. I want to know where those Works are, you say bacteria works on Lake Geneva; what works are those; what is the name of them?

A. The Rhone River runs into the upper end of Lake Geneva—

Q. I want to know the names of the works,—the books?

A. That is cited in Frankland, and it is also cited in the Massachusetts reports, and I cannot name the others; it is cited in a number; I have all those works on that question.

Q. Well, I want to know what works you have?

A. I have four or five right in the office; I will bring them up.

Q. Four or five what?

A. On the question of the effect of sedimentation upon sewage.

Q. Well, what Massachusetts reports are you referring to?

A. Well, there are Kiersted and Riddall.

Q. Have you Kiersted?

A. On sewage, yes, sir; and then there is a little work that touches on the subject by Fuertes; he wrote a little monograph upon the question.

Q. And you have that?

A. Yes, sir, I have got it. I also have the reports of the Committee or Commission on New Water Supply for the City of New York. I also have the last three years' reports from our bacteriologist, handed to me for study of the condition of the reservoir water coming in and the water going out.

By Mr. EDWARDS:—

Q. In the Rockaway?

A. In the Rockaway; water coming in and water going out.

By Mr. VREDENBURGH:—

Q. You refer to Dr. McLoughlin's reports?

A. Yes, to me.

Q. Does he make reports to you?

A. He makes reports to me, as well as to Dr. Leal; and also the amount of flow, when the last rain took place, and a number of facts in regard to the river which have an important bearing upon the subject.

Q. Now, then, when did you buy Frankland?

A. I borrowed Frankland from McLoughlin.

Q. When?

A. I borrowed it about four years ago; I borrowed it a dozen times, I suppose, in the last four or five years since he has got it.

Q. Now these Massachusetts reports, do you take them?

A. Yes, I have got some of those.

Q. Do you take them?

A. No, but I send for them and get them.

Q. How many have you got?

A. Four or five, and the Doctor has let me go over his list; he has got them all for the last ten or twelve years.

Q. What doctor?

A. Doctor McLoughlin.

Q. Now, Kiersted, when did you buy that?

A. Let me tell you what I have done besides, last summer; I made a study of the London Out-falls and have their reports; went through all the underground work of theirs; sedimentation is a great feature in their work on sewage. I have also been on the Paris Pollution works.

Q. Upon what?

A. In the sewage of Paris, and had the figures from there. I have a memoranda of that.

Q. What figures?

A. I got it right from the superintendent.

Q. Got what from the superintendent?

A. I got the bacteria conditions of the sewer that came into the tank there; and the bacteria conditions that went out, after sedimentation. I have also—

Q. One moment; let me understand; went out of what?

A. Why, the water of the sewers. The sewage water of Paris is brought into what we would call a septic tank; it is not exactly that, but it is a large tank, an ornamental tank in the center of a large garden, where I was, one of its principal works, and it is taken out of there. From this tank there is a certain amount of sedimentation drawn which passes over the ground, and there is a system of broad irrigation—garden irrigation, and then it passes through drains and then at last it passes back again to the Seine River. I have tested the water as it came out and went in, about two or three million bacteria per cubic centi-meter goes in, and comes out about ten or fifteen thousand and goes into the river with very little; about a hundred.

Q. What kind of bacteria?

A. All kinds of bacteria, the regular sewage bacteria; I have not gone into the details.

Q. When you say all kinds, what do you mean by that?

A. Well, the sewers of Paris—

Q. Bacteria at what temperature?

A. Well, the temperature there is about the natural temperature of the garden; the day I was there it was about 85.

Q. Do you refer to the number of bacteria found by the microscope or by analysis?

A. That is by analysis furnished from the bacteria counts every few hours there.

Q. Is that bacteria analysis made at the temperature of the blood or of the temperature of the air there?

A. I think it is made in the same method as we use here,—48 hours plated.

Q. What do you know about that?

A. Because we used—

Q. No; I say what do you know about their doing it there in Paris?

A. I don't know; I only saw the comparison; I know the difference of the amount he found of bacteria there; always tested in the same way.

Q. What is his way?

A. I don't know his way.

Q. You don't know then, whether what you saw was the number of bacteria which was discovered by the microscope or analysis?

A. You couldn't see this.

Q. Do you know which it was?

A. He told me—I asked him how much, what was the bacteria, the average bacteria, the day I was there, that was running between one and a half to two million.

Q. Did you ask him in French or English?

A. I asked him in English; he talked English very broken. I also asked him what was the effluent as it goes on to the ground. Now we will say one is 1,500,000, the lowest amount, the amount that goes on the ground was between fifteen and twenty thousand and the amount as it came out. I then went with his first assistant, with a glass down to the river bank, the out-let, and the assistant stooped down and put the glass into the water and filled it, and drank it, and then offered me a drink. I didn't drink it because it was so full of nitrates, but the bacteria count was a little over a hundred.

Q. How do you know?

A. Well, I asked the gentleman who had charge there; I gave him my card as an engineer of America—

Q. The same man?

A. The same man, yes. My work has been practical work for practical water companies, not paper water companies or laboratory work.

Q. Now this third work that you spoke of, do you remember what it was?

A. I don't understand.

Q. The third book you spoke of that you read?

A. I cannot give you the whole list of all the books I have got on that subject; I have given you Riddall, but I will produce and give you a list of the books on the subject which I have read; I have read about all I could put my hands on in the last five or six years, on this particular subject.

By Mr. EDWARDS:—

Q. And you have followed up your reading by practical experiment?

A. Followed up by practical experience; results from our own work here, which I have made a study of, and also results in Glasgow and Manchester and Thirlmere.

Q. That is Thirlmere, in England?

A. Yes, sir; and Lock Katrine of Glasgow; and I saw all that was possible, all that I thought was necessary to study for the last five or six years, to see whether the true effect of that reservoir was to clear the water, and I am satisfied it does.

Mr. VREDENBURGH: I still insist that the witness is not a competent man to testify as to the effect of sedimentation.

Testimony of Edlow W. Harrison.

By Mr. EDWARDS:—

Q. Mr. Vredenburgh asked you about making count with the microscope; is that possible or not?

A. Count of all the bacteria,—I don't think it is. You could make a count of the mica organism and the living organism, but not of the bacteria of that kind.

Q. On the culture?

A. Yes.

By Mr. VREDENBURGH:—

Q. Do you mean to say that they counted the number of bacteria on the plate by eyesight?

A. Yes, sir.

Q. And not by the microscope?

A. You can do it; a man with very poor eyesight would not be able, but you can count it on the plate where the colonies have grown.

Q. You can do that without a microscope?

A. Yes, sir.

Mr. VREDENBURGH: I still object.

By Mr. EDWARDS:—

Q. That is the ordinary way?

A. That is the way the doctor does it, and I have seen it done that way over and over again.

By Mr. VREDENBURGH:—

Q. What doctor does it that way?

A. Doctor McLoughlin.

By Mr. EDWARDS:—

Q. Now, will you tell us in your own way what is the effect upon the water of the Rockaway River en-

tering the reservoir at the upper end, at Boonton, as compared with when it leaves in the effluent pipes to Jersey City, explaining and giving the reasons for it, and illustrate it, if you will, Mr. Harrison, from what has happened in other cities, from your experience and reading?

Mr. VREDENBURGH: The question is objected to for the same reason already stated, and also because the evidence is incompetent and illegaal.

A. Well, as to the general effect of a reservoir, storage in a reservoir and a sedimentation upon the water, in St. Louis I found this—

Mr. VREDENBURGH: I object to this statement of what was in St. Louis, unless he produces that report.

A. In June, 1899, the raw St. Louis water contained from fourteen to sixty-nine thousand bacteria per cubic centimeter, and the water from the taps gave from six to fourteen hundred bacteria.

Q. Where did that water come from?

A. The water came from the river, the raw river; those figures were given to me from the bacteriologist of the City to use in making up our examination and report in June, 1899.

Q. For St. Louis?

A. For St. Louis.

Mr. VREDENBURGH: I object to the use of those papers now.

A. (Continuing.) Now that water had been on an average of sixty hours in the sedimentation basin there; they draw their water and pumped it out from

the river, and then put it into large basins where it moves very slowly, over baffle weirs; it runs very slow and drops, and then runs on a little further and drops again, and the average of the water so tested at that time, as being used by the City had been about sixty hours in these sedimentation basins, and the rest of the time of course passed into the pipes of the city. Now the raw water there contained about ten to twelve cubic yards of foreign matter—silt, bacteria and everything else, and sand, etc., per million gallons as it came out of the river; the sedimentation of thirty-five hours reduced this amount about seventy-five per cent. and the sixty hours reduced it about eighty-five per cent.

Q. Well, now, how does the sedimentation—

A. That is just plain sedimentation for sixty hours, eighty-five per cent. out of the Mississippi river, which holds about ten to twelve cubic yards per million gallons of water; that is the water is coffee color, anybody could see it there.

Q. How does that water compare, the raw water, with the Rockaway raw water?

A. The Rockaway water is remarkably clear water in ordinary times; it carries considerable sedimentation in freshets.

Q. How much would it carry in sedimentation in ordinary times?

A. To the ordinary Mississippi river?

Q. Yes.

A. It would not carry, in heavy freshets, the Rockaway, I do not believe would carry ten per cent. of the ordinary flow of the Mississippi's in the heaviest freshet, and ordinarily would be practically clear water.

Now the Boston test showed the Cochituate. In the London sedimentation basins, from the Thames river there is more than a clearing up of seventy-five

per cent. between the first basin and the last before they get on the filters; they filter all their water. Now since we have been using the reservoir supply, we have had continuous and systematic examinations made of the water; that is, over two years ago we started, and it has been continuous and systematic, and always made in the same way and with the greatest care and made by adepts—men skilled in their work; collections have been made by skilful engineers and the result of that is apparent. I have had the reports every week and tabulated them and worked them up from time to time, and the results, generally speaking, governed my opinion that between the points where the river enters the reservoir and the gate house at the intake, the reductions in bacteria are from 95 to 99 per cent.—reductions from the bacteria conditions shown by the count.

Q. You mean by that that the reservoir acts as a filter, to that extent?

A. The reservoir acts as a destroyer of bacteria to the extent that the water comes out five to one per cent. of the amount of bacteria in it that there was when the water goes into it from the river, and that has been continuous right along, that is the result of two years systematic work, not taking any one day or another, in all waters and all times.

Q. You had these reports made, did you?

A. They are made once a month; the reports are taken from the river and the intake and the tap every week; the reports are taken from the taps and from time to time special reports were made to me.

Mr. VREDENBURGH: I object to any testimony about these reports unless the reports are put in first and we can cross examine upon them.

Mr. EDWARDS: Mr. Edwards states that these reports will be put in in due course, but that cannot govern entirely the order of proof.

Mr. VREDENBURGH: I object unless they are put in first.

Q. Now, Mr. Harrison, have you got these reports here?

A. I haven't got them here, but they will all be presented; I presume they will be presented by the man who made them.

Q. How did those reports get into your possession?

A. He makes the report and sends it to Paterson to be blue printed, and I have one copy sent to me and another copy is sent to Dr. Leal, and he keeps one himself; they all came to me at first and were then copied in my office and sent to the other parties interested. Mr. Ferris has received some of those reports, I think he has a number of them; I think I let him have some of them from time to time. I have given you the reduction as shown across the reservoir. Now, between the intake and the taps there is a general and practically uniform reduction, amounting to about seventy-five per cent., that is if there is five per cent. of bactteria.

Q. Let me put it a little different way. Putting the bacteria that enters the reservoir at 100 per cent?

A. Yes.

Q. What amount of this bacteria would exist when the water enters the intake?

A. From 95 to 99 per cent.

Q. No, 1 to 5 per cent. exists?

A. About 5 per cent.; yes, 5 to 1, 5 to 1 per cent.

Q. The highest is 5 and the lowest 1?

A. Yes, sir.

Q. Now then of the bacteria that entered the pipe at the dam—entered the pipe at the dam coming to Jersey City?

A. A reduction of about 75 per cent.

Q. Well, now then, if 5 per cent. came to the dam, what proportion came to Jersey City, to the tap?

A. About one and a quarter per cent.

Mr. VREDENBURGH: I object to all this testimony until the reports are produced.

A. Let me illustrate here by this little memorandum—

Mr. VREDENBURGH: I object to reading a memorandum and not producing the report itself.

Q. Give us an illustration.

A. Take a case—

Q. Can you give us the date of that?

A. I haven't the date here, I have just a memorandum, and then eighty-five thousand bacteria in a cubic centimeter of the river, that was after a rain; 140 bacteria at the intake and 40 at the tap in Jersey City. Another case is 53,000 at the river, 550 at the intake and 50 at the tap.

Q. Mr. Harrison, will you have these reports for submission, over the whole period?

A. Those reports have been got together over the whole period and all tabulated, and they are to be, as I understand it, presented by the gentleman who made them, Dr. McLoughlin; I am taking them as they are reported to me, and giving you what I deduce from them as an engineer.

Q. Now, what do you deduce from those reports as an engineer?

Mr. VREDENBURGH: Objected to for the same reason.

A. The fact is that I am acquainted with the work of filters, the principal and best filters in the country, and the actual fact is that this reservoir is reducing the bacteria to as great an extent as the most improved modern filters.

Q. What kind do you refer to?

A. Sand filters at Albany, East Jersey filter at Little Falls.

Q. And are they modern examples of filters of the best character?

A. The filters at Little Falls, I believe, is considered the best plant in the United States, and the Albany plant is very fine, and when the filter gets down to 97 to 98 per cent. they are doing excellent work; that is at the tap.

Q. Outside of these figures is there any method in which this method of deep reservoir filtration is better than sand filters?

A. Well, what do you mean? Deep reservoir, you mean the effect of a deep reservoir, a large reservoir?

Q. A large, deep reservoir?

A. Well, theoretically the sand is the best. Practically, in a water works, my opinion is that deep water is the best.

Q. And why?

Mr. VREDENBURGH: Objected to for the same reason.

A. For this reason there is no human agency; the water comes in and goes out again and is taken care of by nature, and we have seen the results, we have them and know what has been done. We found those results worked up through filtration. Now, you could pollute the waters of the Rockaway above this reservoir so that that lake would not be large enough to take care of it; so far that effect does not

seem to have been shown at all, because you see we are getting the result as an effluent which is equal to filter effluent, but you couuld also polute the river so that your filters would not be able to carry it off unless you had more of them. But the trouble with the filter is that a filter must be run by intelligent people, it must be run carefully. A mistake in a filter means epidemic. Such a mistake did happen in the best filter in the United States a few years ago, and it came to our knowledge in the St. Louis work. The people on one side of St. Louis wanted a filter, wanted to filter the water, and the side I was with, Mr. Hershel and I, thought that the gravity supply from the Ozark Mountains was the best. During that time, of course, each side brought in all the facts they could, and arguments. They had used the Lawrence filter. Mr. Hasen was on the other side, and my friend George Fuller on the opposite side, and Mr. Wissmer.

Q. Mr. Whipple?

A. No, he wasn't with us—Mr. Wissmer.

Q. Mr. Wissmer, of Detroit?

A. Mr. Wissmer, yes, who has just died; he was the engineer of the Inland Water Ways and a very prominent man, and I think he was on the Panama Canal, one of the consulting engineers there, and Mr. Williams, of Chicago. They cited the Lawrence filter, which is the filter of the Massachusetts Board of Health, and the filter is quoted from time to time by experts as showing the best work of filtration, and it is from that filter that most of our best knowledge comes as to what we can do with the filter plant. Looking over the records we found a certain rise in the death rate—an enormous rise all of a sudden, and we wanted to find out what was the trouble and wrote to the superintendent, and the answer was

that that was a case of where a green man had allowed the raw water of the river on to a new bed and had drained it through the pipes; before the schmutzdeck had formed—that is the gelatine which accumulates on top of the filter and really is what takes care of the bacteria and passing through holds them there. This green man had allowed this water to run on the filter, on the clean sand, and then enter the pipes, and the result was a number of deaths in Lawrence. Now they didn't do anything with the green man, but the people of Lawrence had more deaths; my memory is that the deaths were greater than the total average death rate of Jersey City from typhoid in the last few years. That is a well-known point. There was a filter plant running for years by experts, and yet that error took place. The trouble is that—I am looking at this from a practical point—I have had considerable experience in municipal works as you know, and it is my opinion that a municipality cannot take care of a filter plant with safety to the people who drink the water. I would just as leave trust the Mayor of Jersey City to run the Pennsylvania Railroad as I would to trust him to run a filter plant.

Q. Does that care have to be exercised with the reservoir?

A. There is nothing in the reservoir; the water goes in and out again, as long as it always takes care of itself, and so it is shown to take care of itself, and that taking care of itself is exactly on a par with the work of such reservoirs and such lakes all over the world. There is nothing new and nothing astonishing about it. The only thing is what will be the degree of purification. Now, as I found the degree of purification it is equal to the best filter.

Q. Mr. Harrison, will you tell us what is the dan-

ger of typhoid germs being carried into the pipes across this reservoir?

Mr. VREDENBURGH: Objected to for the same reason, and because the witness has been examined upon this question before and his examination closed.

A. I consider that these results show two things. All the bacteria coming into the lake from the river is diluted regularly, passing through the whole lake; there is no such thing as a currant across, because it is just the same as if we would throw some flour or coloring matter into the river, that is it would mingle. You put in one hundred per cent. and you could only take out at one place ninety-five per cent. and you would consider that you had got the full saturation. I think that these figures show that that is what is happening, and for that reason I think there is no more danger, no more chance of a typhoid germ reaching the pipe than it would be for a typhoid germ going through a filter. I think the danger in Newark is much greater than the danger at our reservoir.

Q. Why?

A. Why, the Newark works, the last lowest reservoir, some nine miles above the intake, that nine miles of river is entirely unguarded; it has a slim population, but there is a population, there is nothing to prevent a typhoid case upon the Newark water shed above the intake at the lowest end reaching the stream; it would be almost immediate; in a very few hours it would be into the Newark pipe, and the only thing that now helps them is the new Cedar Grove Reservoir, which was built partly for that purpose.

Testimony of Edlow W. Harrison.

Q. And that is between the Macopin intake and the city?

A. Yes, between the intake and the city; that is back on the hill below Paterson.

Q. Wasn't it principally built for that purpose, the Cedar Grove Reservoir?

A. That is what Mr. Sherred told me.

Mr. VREDENBURGH: I object to this witness telling what it was built for.

Q. Now, have you studied up these cases of typhoid epidemics?

A. Yes, all these cases have been reported in our books, and I have also looked these cases over, and as far as I have looked over there are well-known cases which are cited from time to time and I cannot find a case in which infection has taken place from a large storage reservoir; there has been some infections from a small over-polluted reservoir, where a large polluted stream has run into a small reservoir, but in the case of a large reservoir I can find no case. The principal case noted of importance is the case of the typhoid epidemic of Detroit; that was well studied up. There was a case where the typhoid took place in the islands in the river above Detroit. There was a very swift current in the Detroit river, and the case of infection took place on the Michigan side of the river, the same side as the—

Q. Pumping station?

A. Yes, the pumping station at Detroit. The Detroit pumping station is above the city.

Mr. VREDENBURGH: I object to this testimony; this witness has not qualified himself to be an expert on infectious diseases, and I object to it on that ground.

Testimony of Edlow W. Harrison.

Q. Go ahead.

A. The Detroit pumping station is above the city, and they pump direct from the river from a crib, and the point where this infection took place is some few miles up the river, quite a summer resort. The river is a rapid stream, and the current of infected water runs right along on the same shore down to the gate house, and the experiments show that just at the right time for the flow of the stream and the time for pumping through the mains, and the fourteen days, I believe something of that kind, for infection, the case of typhoid took place. They actually proved how it came. Now, there was a quick passage from the intestines of the patient into the victim.

Take the Ithaca case. That is the case where Cornell suffered so greatly. There they were drawing water from that river and stream and had been for some years, and using it; drawing it from a small reservoir. The freshet came along and swept the dam away. Instead of stopping drawing water they kept on pumping, and in a little while after pumped right from the raw river instead of the reservoir and brought on an epidemic of typhoid fever.

Take Philadelphia and Trenton. They pumped right direct from the Delaware river and Schuylkill. There is a kind of a reservoir on the Schuylkill overburdened and terribly polluted, and the intake comparatively small, and they suffered greatly from typhoid. I have not been able to find a case of typhoid epidemic where there has been any intervening—ordinary intervening time of storage in a reservoir to lengthen the time of the typhoid germ leaving the patient and the time it gets into the system of the city where the epidemic takes place.

There is another case that is cited, and I have seen the water works and know, and that is Geneva. They

had typhoid fever there a number of years ago; Lake Geneva was absolutely, almost, sterile in the center, but Geneva drains its water from the river after it leaves the lake. Now the city is around the lower end of the lake,and the river runs through the city. Of course the Europeans are very careful about sewage pollution, but still the pumping works were in the heart of the city, and there is where, between the lake and the water works is where the river became infected, and resulted in an epidemic of typhoid. There they had the lake up above and drew right from a raw river.

Q. Well, now, are there not cases, however, of typhoid epidemic where they have pumped the water from the great lakes?

Mr. VREDENBURGH: Objected to for the same reason.

Q. How do you explain that?

Mr. VREDENBURGH: Objected to because the witness has not shown himself to be an expert upon this question, and also on the objection heretofore made.

A. Take Cleveland and Chicago. Now in Chicago the sewage, before the new canal was put in there, most of the sewage went into the river and then out to the lake. Now if that water had gone shooting out into the river as the theory—the city's theory is in regard to the reservoir; why, they probably would have—

Mr. VREDENBURGH: I object to what the city's theory is.

A. They probably would have avoided this; if this stream of water cut out in the river towards the cen-

ter of the lake they would have no trouble with their water works, but the sewage seems to mingle with the wind, as the wind moves across the lake in one direction and the other and the temperature changes in the lake, which always keeps up a motion, and every now and then the sewage gets near the intake and the city of Chicago put out a sign, advertises in the papers: "Boil your water today." That is the way it has been done, and it shows that the intakes they are not far enough away, and they put an enormous amount of sewage into the river, or did put an enormous amount of sewage in the lake which now goes the other way, and did not go out in a channel but spread all over by the wind just as we say it spreads now. Now the same thing happened at Cleveland, and some of the other lake cities, they had the same current; the current stops as the water gets into the lake.

Q. Then they were pumping back their own sewage?

A. Bringing back their own sewage very quickly, took it out and pumped it in within a few hours into their pipes.

Q. Then do they have any sedimentation after that?

Mr. VREDENBURGH: I object.

A. There is a large amount—must be a large amount of sedimentation.

Q. But after it gets into the pipe?

A. Well, I don't think; they have a pumping plant and force the water through, right direct.

Q. So that there is no chance for sedimentation?

A. The water is on a continuous movement from the time it leaves the crib in the lake; that is, they have no storage reservoir.

Testimony of Edlow W. Harrison.

Q. What then, to sum up your opinion, Mr. Harrison, is the effect of this large reservoir at Boonton, upon the water of the Rockaway river flowing into it and thence delivered to Jersy City?

Mr. VREDENBURGH: Objected to for the same reason as already given.

A. As it is today?

Q. Yes.

A. I consider the water delivered to Jersey City is good water, and I think it shows in the reports made to me and compared with the analysis of other cities that it is better. I drink it myself and use it myself and watch it all the time. I consider that the reduction is shown by the records which are given to me; I know the reduction is great, or somewhat greater than the best filter plants would do. You cannot get any natural water from a natural water course equal. Waters passing through a filter I should not want to drink. Water drawn from—raw water I would not drink—drawn from the Adirondack streams or Racquet river; I know Racquet, and it is a great Adirondack stream coming out of the woods, and there is a lot of typhoid along its banks. One case of typhoid in a mountain stream would do as much harm as ten cases anywhere else. One case is enough if you get it quickly. The point is that it must come quickly in a rapid stream—quick passage from the intestines of the patient to the victim. That is what I can say as a layman on that subject and practically.

Mr. EDWARDS: I want to say that on this matter we shall withdraw Mr. Harrison until we have other testimony put in showing the action of floats in the reservoir, and you may now cross examine him as far as I have gone.

Testimony of Edlow W. Harrison.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. You said that you had examined the Cooper-Lord mill and the power house some ten years ago, and you told us about the rights of the Cooper-Lord?

A. Yes.

Q. Now, when you examined it ten years ago, how did you find out what their rights were in the water?

A. There are the papers.

Q. You produce two papers now and hand them to me?

A. I produce a paper, William Scott and wife to Morris Canal and Banking Company. William Scott was the owner of the land of the Cooper-Lord. And I also have here an opinion of John W. Griggs on the right of the Cooper-Lord property, just what their rights were in the use of that water. I was engineer of the company that made a bid to use that water.

Q. You produce two papers; what is the first paper?

A. A deed from William Scott and wife to the Morris Canal and Banking Company.

Q. Dated what?

A. 11th day of August, 1829.

Q. Is that the only paper that you have examined on that subject?

A. Well, that is the basic paper.

Q. Have you any other deed?

A. Yes.

Q. Have you examined any other deed?

A. No, I don't think I have.

Q. When did you get that?

A. This paper was given to me at the time when the Cooper-Lord were interested and I was making up the bids.

Q. When?

A. About 1892 or 1893.

Q. 1892 or 1893?

A. Yes, sir.

Q. And the second paper is what?

A. The second paper I received from Mr. Nichol who was the managing trustee of the Cooper-Lord estate, and is the opinion of John W. Griggs, their counsel.

Q. When?

A. This I got about the same time, about 1892 or 1893.

Q. When is the date of the opinion?

A. The date of the opinion is July 6, 1899.

Q. And the deed is an original or a copy?

A. No, the deed is a copy.

Q. Certified copy?

A. No, it doesn't appear to be certified. We have had certified copies of this, this is correct.

Q. This one that you have got, is that a certified copy?

A. No, sir, it is not.

Q. Have you ever compared it with any copy?

A. I think I have.

Q. When?

A. At the time when we were making the bids.

Q. Where did you get the original from?

A. There was a certified copy given to the counsel, sent down and got a certified copy from the deed on record.

Q. And do you recall comparing that with the certified copy?

A. Yes, sir.

Q. Why did you compare it with the certified copy?

A. Because I was quoting from this in my report

and bid, and I was negotiating with Jersey City in regard to it, and this question of the amount of water to use was a very important question.

Q. That is the reason you compared it?

A. Yes, sir.

Q. You had doubts as to whether it was true and so you compared it?

A. I had doubts.

Q. And that occured in 1892?

A. This is one of a number of copies made.

Q. When did you compare it?

A. It must have been about the time.

Q. 1892?

A. 1892 or 1893, I won't be sure.

Q. You compared it with a certified copy?

A. All the papers I have used have been compared.

Q. How did you know it was a certified copy?

A. Which one, this?

Q. No the one you compared with it.

A. I think I got a certified copy at the request of our counsel.

Q. Who was your counsel?

A. Mr. Holmes.

Q. At Mr. Holmes' request where did you send to get the certified copy?

A. I don't exactly remember, but I rather have an idea this was filed in Essex; I think it was filed in Essex.

Q. I didn't ask you where it was filed, I asked you where you sent for a certified copy?

A. I got the certified copy from the Clerk of the County where it was filed, and I think it was Essex. I think it was filed in Essex, I know there was some little trouble about where it was.

Q. The opinion, is that signed by Mr. Griggs?

A. This opinion?

Q. Yes.

A. No, this was given to me by Mr. Nichol, the superintendent.

Q. Who was Mr. Nichol?

A. Mr. Nichol is the managing trustee of the estate of J. Cooper-Lord.

Q. Now, it is upon those two papers that you told us what the rights of the Cooper-Lord in this water are?

A. No, sir; it is not upon those two papers alone; I know the situation there.

Q. What other papers?

A. There are maps of the buildings, and I have knowledge from the people—the trustees.

Q. What you heard the trustees say?

A. And also the opinion of Allan L. McDermott, William D. Edwards, and I think you gave an opinion. This matter is not any mystery at all, it has been thrashed out by nearly every lawyer and engineer in this vicinity and in this city.

Q. Now, Mr. Harrison, what company did you make the examination for?

A. Rockaway and Hudson.

Q. When you examined it how many miles—first, where is the Cooper estate exactly?

A. Boonton.

Q. How near the Rockaway?

A. Well, it lies on both sides of the Rockaway, some four or five hundred acres all told, partly residences and partly manufactories.

Q. The manufacturing part of it, how much is that above the level of the river?

A. How far above the river?

Q. How much is it elevated, the manufacturing part of it?

A. It runs from an elevation up along the slope of

the hill, probably from a level with the river up to fifty or sixty feet above.

Q. How many acres are there, about, on a level with the river?

A. On the level of the river, I cannot say.

Q. About; you said you made a thorough examination of it?

A. That part didn't come into the examination about how many acres were on the level of the river.

Q. You don't know?

A. I can only tell from my map; I have a contour map.

Q. Haven't you any judgment about it?

A. I have a map, but it has passed from my mind just what it was.

Q. Is there ten acres?

A. I should think there were more than ten.

Q. Fifty?

A. That is nearer right than ten.

Q. Sixty?

A. I don't think it goes as high as that.

Q. How many mills are there on that portion of it?

A. I cannot say now, I did know; I had the map in my hands about an hour ago.

Q. But you said you made a thorough study of it in 1892?

A. Yes, sir.

Q. How many mills were there then?

A. Do you remember about the cases you tried in 1892— what you asked the witnesses. I don't remember how many there were. I have encountered so many other mills since that time, but I have a map in my office.

Q. How much power did they use?

A. They couldn't use any more than they have now.

Q. How much?

A. I don't remember now, I have a record, a memorandum of what they could use, what they could get.

Q. You said you made a study of it?

A. I did.

Q. How much power did they use?

A. I will bring the report.

Q. I am asking you now.

A. I will answer again the same way, that I don't remember what I said about power fourteen years ago.

Q. Cannot you give an estimate?

A. I don't give estimates; I don't like to give estimates, I want to give facts.

Q. You made a thorough study of it?

A. Yes, sir; I made a thorough study and figured out how much he ought to pay them for the power.

Q. The reason you don't tell us is that you don't know, isn't it?

A. I do know.

Q. What is it then?

A. I don't remember now; I would have to go through my papers and look it up.

Q. How many mills are there?

A. I cannot tell you now, I had the map in my hands an hour ago.

Q. Are there two mills there?

A. There are more than two mills.

Q. How many?

A. Five or six.

Q. How many?

A. And more than that.

Q. How many are fed by the water from the high level canal and how much from your level—how many?

A. That I don't remember.

Q. Don't you know?

A. No, I don't remember now.

Q. You don't know how many mills get their power from the low level?

A. I don't think I ever went into details of that kind; there was no necessity for it, for what I was doing.

Q. Well, why wasn't it; you told us how much power they took from the lower level?

A. All I wanted to know about the power was I wanted to know the fall and the amount of water there was in the Rockaway; that is all you need for power.

Q. How many wheels do they turn with the water from the lower level; you said in your testimony one wheel?

A. No, I didn't.

Q. You didn't mean that?

A. I didn't say one wheel; I spoke of the lower wheel, at the lower place.

Q. How many wheels are there in the lower place?

A. I only know what I call the lower wheel; there may be two wheels in that lower flume.

Q. Is not there more than two?

A. No, I don't know whether it is two or a hundred; it don't make any difference whether there is or not.

Q. You don't know whether there are two wheels or a hundred wheels getting their power from the lower level?

A. I don't know whether there are or not; it don't make any difference, if they were they couldn't get any more power.

Q. You said that when the water passed out from the lower level it was taken out by reason of their using the water for their foundry?

A. No, I said for rolling iron or something of that kind; a heavy load on.

Q. Did you see that?

A. Yes, they have some sort of a factory down there.

Q. Now, about that factory, how many men are there in that factory?

A. I don't know, I never counted.

Q. Are there a thousand?

A. No.

Q. Seven hundred?

A. I haven't the slightest idea.

Q. Haven't the slightest idea?

A. No, sir.

Q. Now, how much iron do they roll there?

A. I don't know, different in different years; they didn't roll but very little when I was there.

Q. How much?

A. I don't know, the business was poor.

Q. Well, how much?

A. I don't know; all I know is that the business was poor; I don't know.

Q. You say they do more now?

A. My understanding is that they have been doing considerably more in the last few years; everybody has been doing more business since 1896.

Q. And therefore they have?

A. Yes, in that line of business.

Q. Do you know how much iron they use up in the foundry now?

A. No, I don't; I haven't the slightest idea.

Q. Never inquired into that?

A. No, sir; I didn't know that there was any necessity for it.

Q. When you made a thorough study of this thing didn't you study the number of men that were used there?

A. What would be the use of that; I studied what the water power was there.

Q. What did you find the water power was there?

A. I studied the flow of the Rockaway, and how much they had to put back in the Morris Canal if necessary.

Q. How much did they have to put back into the Morris Canal?

A. We came to the conclusion that they didn't have to put any back; they didn't take any water out of the Rockaway river; they turned back the water from Lake Hopatcong into the canal; that has been my idea of it. I thought you knew all about that, you were in the case.

Q. You didn't inquire to ascertain how much water they could take out of the Morris Canal?

A. My dear sir, I spent a good while in finding out and going to lawyers and hunting it up.

Q. How much?

A. Why I found they had the whole—that is, in my opinion and my ideas—and I consulted counsel, and I think it is covered by these documents that the Cooper-Lord estate had the right to use the whole waters of the Rockaway water shed. Let me tell you, all they had to put back was into the lower level; they had to keep it full.

Q. Keep the lower level full?

A. Yes, sir, down toward Montville. Now the amount of water necessary to keep the lower level full, if the canal is operated properly, is the amount of water that comes out of Lake Hopatcong, that operates the level above Dover, and that comes down into the Rockaway water, and is returned into the lower level below the Cooper-Lord; and that is the idea I have always had and our counsel have always had.

Q. Well, now, Mr. Harrison, you say that the water from the lower level, some few gallons an hour, or five gallons an hour or five gallons a day,

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or five gallons a week, or some other time, gets from the lower level into the Boonton reservoir; how does that occur?

A. I said that I did not think that five gallons in a day would go through into the river; there was no current to avoid, up the level; what happens to that level is that when you close the gates or the lock, or use the lock, there is a wave action similar to the action that takes place in a pipe when the pipe is running rapidly and you shut it down quickly you get what you call a ram action back, and there is no movement to the water; and my float measurements don't show any movement to the water, but it does show some through the water at the gate, a small amount of the water immediately in front of the gate; I am talking about the gates—

Q. I don't think you are answering my question, but if you want to go on I have no objection.

A. That is the question you asked me.

Q. I asked you how you account for it going through?

A. I am telling you how I account for it going through; I say that is the way it goes through, and that goes through into the—

Q. Rockaway was the question.

A. I told you that; I said I didn't believe that five gallons a day would go into the Rockaway.

Q. I am talking about that five gallons a day.

A. I say I don't believe that five gallons a day got in.

Q. Then four gallons?

A. I have been there a great many times and stopped and looked at that action, and all I could see was a movement of water from the lower level, that wave movement, into the sluiceway, and almost after that, some few seconds after that a reverse movement.

Q. What would cause the reverse movement?

A. Why your gates are closed down towards lower Boonton, the lock gates are closed suddenly, and that sends the shock up, and the moment they are steadied—

Q. What is steadied?

A. That shock; the return of that shock or wave action.

Q. What makes the shock?

A. Closing the lock gates.

Q. Which lock gates?

A. In the Morris Canal.

Q. Between the Morris Canal and this sluiceway?

A. No, sir; into the lower part of that first level below; the level below the plane; there is a lock just below that.

By Mr. EDWARDS:

Q. How far below Boonton?

A. It is not below Boonton; there is a lock right down below there, near the coal yard in Boonton.

FURTHER CROSS:

Q. How far below this sluiceway?

A. A few hundred feet; not very much.

Q. Two hundred feet?

A. A few hundred feet; I cannot tell.

Q. And the closing of that gate causes a wave in the lower level canal?

A. That is what usually happens.

Q. And then that move forces the water from the lower level canal into the sluiceway?

A. Provided the sluiceway is not too high.

Q. When you saw it it was forced in there?

A. Yes, sir.

Q. Then after it went in the sluiceway a little way it came back again, you think?

A. You might say it moves in very slowly and moves out very slowly, and then our flap opens again and the normal condition of those gates is to allow the water into the canal.

Q. Well, there is water running all the time?

A. Into the canal.

Q. And also into the flume, is there not?

A. You can only use in the flume the over-plus that is not used in the canal.

Q. If at any time they use more water in the flume than is needed in the canal the water in the flume draws water from the canal?

A. No.

Q. Why not?

A. No, that is the over-plus; you may be feeding the canal and flume at the same time, and the amount of water coming down from above, part of it goes into the flume and part into the canal; that is the normal condition of affairs, and that is the condition when the canal is being operated and when the man down below is drawing for his power.

Q. That never occurs except when the canal is being used?

A. Capsticks is always drawing water below; the canal is always being used for that purpose.

Q. Are the gates being opened for that purpose below?

A. It runs through.

Q. These gates that you refer to as being shut, when are they used?

A. For letting boats through.

Q. When?

A. For navigation season.

Q. That is when?

A. That depends on how quick the ice comes out; it changes around so.

Q. You cannot tell when it is?

Testimony of Edlow W. Harrison.

By Mr. EDWARDS:

Q. It is in the summer?

A. Summer, spring and fall; some times runs to Christmas and sometimes stops in October.

FURTHER CROSS:

Q. Then when the canal was not being used you think no water at all would go in the sluiceway from the lower level?

A. I don't think so; very little gets in any way.

Q. I am asking you whether when the water is being used whether any would get in?

A. When the canal is being used the water is very low.

Q. None would go in when the canal was not being used?

A. No, sir.

Q. When the gates were not being opened and shut no water would go from the lower level canal into the sluiceway?

A. No, sir.

Q. That is your judgment?

A. Yes, sir.

Q. If it did go in, notwithstanding the water was going through the flume, it would go back into the lower level canal?

A. It is practically dead water there.

Q. That is your judgment?

A. That is my judgment and my observation.

Q. You cannot tell us, or you don't remember, with regard to the amount of power that is used in those works, or how many men are there?

A. I don't think I ever counted the number of men; I don't know how many.

Q. You don't know whether it is ten thousand or one thousand?

A. No; there may be a hundred thousand men there, I don't know how many there are.

Q. As far as you know there may be a hundred thousand men there; and you don't know how many mills there are; so far as you know there may be fifty?

A. No, I have a list of all those mills.

Q. You don't know how they are situated with regard to the lower level, and how many are in the upper level?

A. I cannot remember anything about that; I have all those things, but it is now ten or twelve years since I looked them up.

Q. Have you ever been at this point where the water runs from it into the lower canal, from that sluiceway of which you spoke, when the water in the sluice-way was at least a foot below the water in the canal?

A. No, I have never seen that, but in that case—

Q. Well, now, you have never seen that, that is all I asked you whether you ever seen that. Now, as to these reports of the New York Board of Health, did you speak about reading those?

A. New York Board of Health?

Q. Yes.

A. No, I don't remember; I have some, but I don't remember those; I read most of those reports as they came out.

Q. Did you read the last report of the Board of Health of the State of New York, including New York City, for 1905?

A. Yes, I have got that. Are you alluding to the reports on Lake Champlain and on the Bay?

Q. No, I wasn't referring to that then, I was referring to the case of the typhoid fever at Mt. Savage, on the Potomac river; do you recall that in that report there was quite a good deal made of that?

A. No, I don't remember that.

Q. You didn't notice that?

A. No; I know the Potomac pretty well, though.

Q. Did you know of the epidemic at Mt. Savage in 1904?

A. That was a direct draft from the river.

Q. You do remember that then?

A. Well, I remembered at the time, but I have a dim recollection of it now.

Q. You remember now that the epidemic at Mt. Savage was followed by an epidemic at Washington. That was the whole point of that report?

A. I should expect it.

Q. You remember then that there was a case of an epidemic at Mt. Savage and subsequently an epidemic at Washington?

A. Yes, sir.

Q. And when the epidemic at Mt. Savage stopped, then the epidemic at Washington stopped?

A. Yes, sir.

Q. Well, do you recollect that Mt. Savage is a hundred miles by the river from Washington?

A. Yes, sir, I remember it is a pretty fast river.

Q. That is a fast river, but at that time, in 1904 they had the filter bed there, didn't they, and they put it through a filter bed?

A. Oh, well, you know I haven't a great deal of faith—I told you just now some filter beds would work and some would not.

Q. You recollect they did have a filter bed there?

A. I recollect something about it.

By Mr. EDWARDS:

Q. Do you mean in 1904 they had the filter bed?

Mr. VREDENBURGH: I object.

A. I don't recollect; I know there was an epidemic at Mt. Savage, and it was followed by—there was an epidemic there, but I didn't read that in reference to this case at all.

By Mr. VREDENBURGH:

Q. Is not there a reservoir at Washington—in the City of Washington?

A. No.

Q. You are sure about that?

A. I am sure; there was only a small one if there was any; and another thing about Washington, even with the filters they haven't been able to get down the death rate of typhoid.

Q. And that small reservoir, what was the size of that small reservoir at Washington, what was the size of it?

A. I can't tell you exactly, but in my own opinion I think it was probably—that reservoir like our city distributing reservoir here, somewhat larger than that;not much.

Q. And the water from the river as you recollect it was pumped into that reservoir?

A. I know that the water of that river was.

Q. The water from the river was pumped into the reservoir?

A. The water from the falls was taken into this conduit—the brick conduit that runs down to this reservoir.

Q. How many miles?

A. Seven or eight miles about, and the Potomac river comes down as fast as a railroad train; I think it takes twenty-four hours from Mt. Savage down to Washington.

Q. Now, you didn't answer my question at all about the water being pumped from the river into

the reservoir. I understood you to say it was taken by a conduit from the river, is that so?

A. Why the river; have you ever been up there?

Q. I never have.

A. Well, the Potomac river, about six or seven miles above Washington comes over a great fall, about six or seven miles above Washington, and there at the top of the falls is a low dam, and the water runs into Washington acqueduct and follows the ridge above the river right down to Washington.

Q. Don't it follow it down to the reservoir; that is what I am after?

A. And then it runs into a small distributing reservoir.

Q. Then it is distributed from that reservoir. Where is the filtering plant?

A. The filtering plant was built since; they were commencing it then.

Q. When did they commence to use it?

A. A couple of years ago, after 1904.

Q. You say it was after 1904?

A. When they commenced to use it.

Q. Do you say it wasn't used in 1904; and do you say that this report you read don't say that the water went through the filter?

A. Well, my opinion is that the water at the time of Mt. Savage epidemic didn't go through filters; if it did, Lord help the filters. I don't think the Washington filters are as bad as that.

Q. You are not speaking from your recollection as to when the filters was put in, but only from your judgment that if the filters were there this would not occur; is that the idea?

A. I think if the water of the Potomac river was carried through those filters they would have had no epidemic at Washington from that source; the filters would have taken the place of a big reservoir.

Q. Now, you stated and produced a memorandum from which you said that some day or other there were eighty-five thousand bacteria at the outlet of the river Rockaway into the reservoir?

A. Yes, sir, per cubic centi-meter.

Q. In one cubic centi-meter?

A. Yes, sir.

Q. Now what day was that?

A. I can tell you, I can get that that you will have in the report.

Q. You don't remember it now?

A. No, sir.

Q. Have you any idea when that was?

A. I think it was the middle of June or early in this year.

Q. Early in 1906?

A. Yes, sir.

Q. June or earlier?

A. Yes, sir, early in the summer.

Q. Where was that sample taken, do you know?

A. Where we always take it, above the bridge.

Q. Above the bridge in the reservoir?

A. No, at the mouth of the river where the river comes down over the locks and joins the reservoir; we took the river sample right there.

Q. You tried to get it just where it enters the reservoir?

A. Yes.

Q. Now, that sample was analysed by some gentleman and this number of bacteria was discovered in that cubic centi-meter of water; now at what temperature was that water when that number of—

A. I have got that temperature; let me tell you this, we always take the temperature of the water when we take it; we always go there with an ice-bag full of ice, and all the water we take is put right on ice and the temperature exactly taken.

Q. What we do I object to your going into. I ask you whether you know what the temperature of the water was when you found there were eighty-five thousand bacteria in one cubic centi-meter?

A. Well, the record which you will have before you will show; I will pick it out for you, and show you where that was; there was a big lot of them, and it will give the temperature of the air and the temperature of the water.

Q. You cannot tell now?

A. No, sir, not now, but I have it in the office.

Q. But you cannot tell me now?

A. No, sir.

Q. You don't know then whether it was the number at the temperature of the blood or at the temperature of the room?

A. It was the river temperature.

Q. It was the number of bacteria at the river temperature?

A. Yes, sir.

Q. Then it was some time before June of this year?

A. Yes.

Q. Now that eighty-five thousand bacteria, whatever they were, of whatever temperature those were discovered, there was a sample made on the same day; there was a sample taken at the same day from the mouth of the inlet?

A. Yes, sir.

Q. Of the inlet from the reservoir into the acqueduct or into the pipe?

A. Yes, sir.

Q. Now how long after, on that same day, was that sample taken from the inlet?

A. Why very shortly after, but it was not the same water.

Q. What do you mean by very shortly after?

A. It was shortly after; it wasn't the same water.

Q. Well, that sample was no criterion at all of the number of bacteria that would be in the water; it was the same water that would come in the river when there was eighty-five thousand in?

A. Not that exact one sample; when you take a great many samples running over a great deal of time then you arrive at some results.

Q. Why did you read us from your paper that the sample taken from the inlet showed only a certain percentage, I think 97 per cent. of them you said destroyed, what did you mean by that?

A. Why, because that is the avrage taken.

Q. No, but you read those two figures to show?

A. I figured on a lot of them.

Q. Well, you read those two figures?

A. No, I didn't read them; I gave the percentage of a number that wasn't from those books at all.

Q. It had no bearing, had it, those two figures on each other?

A. Those two figures would not have any particular bearing by themselves; you cannot take one or two tests of one month.

Q. I am asking you whether those two figures had any bearing whatever on each other?

A. No, sir; they would not if alone; they would be valueless.

Q. You also said that your employees on the same day took a sample from the tap in Jersey City?

A. Yes, sir; the same afternoon.

Q. Same afternoon?

A. Yes, sir.

Q. Well, that sample had nothing to do with the water?

A. Let me say to you—

Q. Had it?

A. No, it had nothing to do with that particular one sample that day, but if you took this every day

for a hundred days or every twenty-four or twenty-five times, different months, and so on, you will get a rating.

Q. Well, you didn't give us the different samples you had taken, you only gave us two samples, one of them you have just spoken about; now what was the second one?

A. Why, here we have them like this.

Q. The second one that you gave us?

A. Sixty-three thousand.

Q. You have got it on a piece of paper?

A. I noted it down.

Q. You have got on a piece of paper one that was sixty-three thousand at the mouth of the river; that was where the river was pouring into the reservoir?

A. Yes, sir.

Q. And your employee found that in a cubic centimeter of water that day there were sixty-three thousand bacteria?

A. Yes, sir.

Q. And on the same day you took a sample from the outlet of the reservoir?

A. Yes, sir.

Q. And you read that number?

A. Yes, sir.

Q. Those had no bearing on each other, had they, —I only want to ask you?

A. I will show you how they had a bearing. They didn't have any bearing on each other, but—

Q. That is all I asked you, whether they had on each other.

A. Not on each other.

Q. Then you took a sample on the same day from the tap?

A. Yes, sir; but they would not have any bearing.

Q. Those three figures you read were all on the same day?

A. Not alone by themselves they would not have any bearing. You have to have them over a number of years to do that thing right. If you will let me tell you I will show you where they had any bearing on the result.

Q. I don't care about the result. You don't know whether the sample from the outlet of the reservoir, and the sample from the tap,—at what temperature those samples were analysed; whether at the blood heat?

A. I have it all on the record; you can find it there.

Q. I am asking you whether you know?

A. I don't know now.

Q. Well, is it your information that it makes no difference at what temperature you analyse the water as to the number of bacteria you find in it?

A. There is a great deal of difference; it is very foolish to take and put these things in your pocket and carry them around; they ought to be put on ice.

Q. You want to get a crack at the way our men do that. You have been asked to do that; well, now, you have that in, and don't say that any more, you have it in now. You know the man that analysed it?

A. Yes, sir.

Q. He is your brother-in-law?

A. Yes, sir.

Q. And you are very anxious to sustain him?

A. No, that is not it.

Q. Well, now then, Mr. Harrison, do you know that at different temperatures, the samples that have not been tampered with at different temperatures,—the same sample, will give a different number of bacteria?

A. Of course I know they increase enormously.

Q. Do they increase as the temperature goes up?

A. They increase enormously as the temperature goes up.

Q. You think the higher you get the temperature the more bacteria there are?

A. No, I say as the temperature goes up, up to a certain point.

Q. Don't it often increase when the temperature goes down, don't that increase the number of bacteria?

A. I don't know as they do.

Q. The same water at different temperatures will have a different number of bacteria in them; is not that so?

A. The same water,—that is, the particle of water taken?

Q. Yes, when isolated properly. If Dr. McLoughlin took the same water he would find a different number of bacteria there at different temperatures, wouldn't he?

A. Well, when you say the same water, do you mean the whole body of water in the river, or the water in the bottle?

Q. In the bottle?

A. Certainly, if the water in the bottle was taken at the temperature in the river; now then if that is put in a place where it has a chance to rise in temperaure, the bacteria will increase.

Q. As you understand it will increase as the temperature rises?

A. Yes, sir; I understand that.

Q. At what point will they become stationary in the temperature, as you understand it?

A. As I understand it if the temperature is kept below a certain—around thirty-two, thirty-three or something of that, Fahrenheit, you can almost stop the growth; that is, you hold it back.

Q. That is, if you reduce the temperature to thirty-two Fahrenheit?

A. That is freezing point.

Q. You say you stop the growth?

A. Yes, if you freeze them out.

Q. I ask you about the number of bacteria?

A. That is the growth; they grow in number.

Q. At what point in the temperature, in the heating of the temperature does the number of bacteria cease to grow?

A. Well, you are asking me a question as an expert bacteriologist; I am not an expert bacteriologist; I know the results, but I am not a laboratory man or bacteriologist, no more than I would be a laboratory man in making cements; I know what cement is and how it is tested, and so on, but I am not the man to make it.

Q. From what information you have they continue to increase in number until they got to boiling heat?

A. I think they continue to increase; of course boiling point would kill them.

Q. Now you said that you were something of an expert on injurious germs, on germs which cause sickness?

A. Well, as an engineer of a water supply would know; I know what we have to look out for; it don't do to get typhoid germs carried down into the river.

Q. How about the germs of diarrhoea?

A. The same way, and a number of other things.

Q. What is?

A. That is a disease of the cattle, a very nasty one very much like lockjaw.

Q. Does it affect men, too?

A. In certain cases.

Q. Deadly?

A. I think so; if anybody gets it he dies in terrible agony; it has affected men, I believe.

Q. That is to be guarded against in water?

A. Yes; but we don't have much of it in this part of the country; but it has been found and given a great deal of trouble in some places.

Q. You don't pretend to have studied the question of the longlivity of these things?

A. Only what the men who have studied it tell me and write about.

Q. You say that the river Potomac, from Mt. Savage down to the Great Falls, runs at such speed?

A. I didn't say such speed; I said it was very fast; and I have been all along it and know it is very fast.

Q. You said it would run down in twenty-four hours?

A. That is my best judgment in regard to that.

Q. That it would run a hundred miles in twenty-four hours, that is your judgment.

A. Yes, sir; it is almost rapid all the way.

Q. Now, as to the Newark water shed, you told us something about that; you say it has an open shed for a distance of fifteen miles, I think you said; where is that fifteen miles?

A. Why, from the Intake at Macopin up to the first reservoir; I am not sure of the distance; I think it would be somewhere about nine miles.

Q. For that distance it is an open stream?

A. The last reservoir on the Newark works is; the last storage reservoir is, as I say, about nine miles above the Intake, and the Intake at Macopin is only a small area, and that nine miles of river flows into it and they get the raw water in the river.

Q. What do you mean by the raw water in the river?

A. The City of Newark gets the raw water from the river.

Q. In those nine miles?

A. Yes, sir.

Q. That is nine miles above the last reservoir?

A. Above the Intake.

Q. Above the Intake?

A. Yes, sir.

Q. And from the Intake down to Newark is about 21 miles of pipe?

A. Oh pipe, yes.

Q. Now that nine miles is an open brook, or does it run through—

A. It is the Pequannock river with branch streams coming in out of the hills and farms on either side, whatever it may be.

Q. And in thinking it over you say it is nine miles?

A. Well, that is what they tell me; I wasn't quite sure of it.

Q. It is an open stream?

A. Yes, sir.

Q. Now do you say there are any houses on that stream?

A. Yes, sir; there are buildings up on that nine miles; it is a polluted water shed.

Q. How close is the nearest building to that stream?

A. I cannot tell you; there are some very close to it; there is a hotel on it.

Q. What do you mean by very close?

A. There is a building just above the Macopin dam.

Q. That is what you call it?

A. Macopin dam, or Intake dam.

Q. And there is a hotel just above that?

A. There is a hotel just above.

Q. How near is that to the stream?

A. The other side of the road.

Q. How near is it to the stream?

A. Probably 150 feet.

Q. Has it any water closet?

A. I don't know whether it has or not; probably have some; they have to have something.

Q. Do you know what they have?

A. No, sir; I don't.

Q. Is there any other—is that the nearest house?

A. I don't know whether it is the nearest or not; I know there are houses up above, and a lot of side streams running in.

Q. Is there any down dam up there?

A. No.

Q. At the end of those nine miles, what is there there, at the upper end?

A. Above that you have a storage reservoir, and all the water that comes in there of course has a chance of sedimentation and filtration and clearing.

Q. Mr. Harrison, had you in mind any particular house when you said that if there was typhoid fever there it would go down to Newark?

A. No, I haven't in mind any particular house; but I say it is an unprotected water shed, and if there was typhoid in that shed and it got into the stream, there would be nothing on earth to prevent it from getting to Newark in about twenty-four or thirty hours.

Q. Is not there a fence along that stream, isn't it fenced all the way?

A. No, sir.

Q. It is not?

A. No, sir.

Q. No fence at all?

A. Some, but not all the way, but that wouldn't keep water out.

Q. When were you last there?

A. I haven't been there in about three years.

Q. Then you think that this reservoir, at what you call the Intake reservoir, that is not large enough to prevent the germs of typhoid fever from getting down into Newark?

A. No, sir, it is not; it is nothing but a little pool left in the stream, I think the Intake reservoir is—I don't know how many days' supply; I have had it, but it is only a very few days.

By Mr. EDWARDS:—

Q. Is it not only one day?

A. Practically; it was never intended to be a reservoir for that purpose.

Q. Mr. Harrison, who has succeeded to the William Scott title?

A. Cooper-Lord estate.

Q. You say that in making this examination in 1892 or 1893, you represented the Rockaway & Hudson Co.?

A. Yes, sir.

Q. What were they doing?

A. The Rockaway & Hudson were proposing to use the Cooper-Lord estate and its water rights as a supply of water to Jersey City.

Q. They were rival bidders to the Jersey City Water Supply Co.?

A. Yes, sir; against the East Jersey and against you, too; they bid several times.

Q. Where does the water in the lower level of the canal come from?

A. It comes, part of it, from the sluice-way of the wheel that operates the plane.

Q. That is where the moveable gates are?

A. Yes, sir, and the other part comes from the waste water that passes down from the Cooper-Lord mills, and then passes out.

Q. And which is the principal source?

A. The water of the Cooper-Lord.

Q. The first source?

A. The first source? No, the water comes down through the mill, the second source, I suppose.

Q. But it all comes through that sluice-way, does it not?

A. There is only one way; that is the only way it can come, from the upper levels down.

Q. In other words, the plane cuts off the canal?

A. Yes, sir; and the water from above the plane runs down from the Cooper-Lord mills, a part of it, when they are using the wheel, the waste water from the wheel goes down, when the wheel operates the plane, goes down along the plane to the lower.

Q. But it all reaches the lower level of the canal through these flap gates?

A. Until the lower level is full, and then the excess goes into the river; that is, the Cooper-Lord estate have got to keep the lower level full, under all the agreements, and always have done so.

Q. Where is the next feed, below that, for the canal?

A. Down at Pompton.

Q. How many miles?

A. Nine miles.

Q. Now, are you familiar with the Potomac river?

A. Well, I am familiar with the Potomac up as far as the Great Falls, and that is in an enginering way; but I have come along the Potomac several times.

Q. You have made some investigation, as an engineer, of that river, have you not?

A. Made a report of the power of the Potomac river in Washington for the dams above and another dam below the falls.

Q. You said that the samples or amounts of bacteria had a bearing on the genral result of the work of the reservoir; what did you mean by that?

A. Why, I meant this,—now for instance that eighty-five thousand,—take a day like that, when we found eighty-five thousand in the river; now that water with eighty-five thousand bacteria don't reach

the gate house probably for weeks. Now we have the water from the tap. Suppose the water from the tap, we know there has been an enormous amount of bacteria brought into that river, eighty-five thousand and the next week we find the tap the same as the week before, and the next week the same as the week before; then we know that the eighty-five thousand bacteria has not had any effect whatever on the outlet of the water delivered to Jersey City. Now we have gone all over that for two years, so that we can tell; and the fact is that we have been unable to find any connection whatever with the floods and low water in the river, with the bacteria carried. That there is no relation between them and the water as delivered at the taps. When I say eighty-five thousand that sounds awful high, and one might think it was an enormous pollution, but that eighty-five thousand is mainly hay baccilus, washing from the fields after the summer rains.

Q. Are they harmless?

A. Yes, they die very quickly.

Q. Now you have told us that there are different kinds of bacteria; do they die at different temperatures?

A. I understand so.

Q. And do they also cease to grow at different temperatures?

A. Yes; but the general proposition is below forty, around thirty-five to forty and down to freezing point and below it; they don't increase.

Q. What, practically, is the only germ in water that sanitarians and water engineers guard against in this region?

Mr. VREDENBURGH: I object on the ground that the witness said, in answer to my question, that he is not a bacteriologist.

A. The typhoid germ is the one we look for; that is the most pressing danger.

Q. Is not New Foundland—is not the village of New Foundland between Macopin and Clinton reservoir?

A. Yes, sir, and a number of small villages; there are no big towns up there; four or five hundred population in New Foundland, and there is a settlement right along the river, pretty well built up.

Q. Well, now, have you considered what the capacity of the Macopin rservoir is?

A. I said it was two or three days; it is only one day, thirty-two million gallons.

Q. What is the capacity of the Boonton reservoir?

A. Seventy-two hundred million gallons above the plane of draft.

Q. Now, Mr. Harrison, if there was a case of typhoid allowed to pollute the stream on the Pequannock and another case, similar on the Rockaway above the reservoir, which would be the most dangerous and most apt to show in the water supply?

Mr. VREDENBURGH: I object for the same reasons, as illegal and incompetent.

A. The Pequannock.

Q. And why?

A. Because there would be direct pollution into the pipes; there is no storage to stop it and hold it.

Q. Well, how does the Cedar Grove reservoir modify that?

A. Well, that modifies it to a certain extent, but they only had the Cedar Grove reservoir for a very short time.

Q. Does it modify it to the extent that the Boonton reservoir does?

A. No, sir; I don't know the exact capacity, but it is a small reservoir compared with the Boonton.

Testimony of Edlow W. Harrison.

Q. Well now, Mr. Harrison, do you know how your samples were taken for examination of the water?

A. Yes, I know; I have been present when they were directed and have the report.

Mr. EDWARDS: That is all I want to ask Mr. Harrison on this point, but I do want to recall him again on a point I have not touched on at all to-day.

By Mr. VREDENBURGH:—

Q. How long did it take the water to get from this Cedar Grove reservoir to the Taps in the City of Newark?

A. Well, that depends upon the condition of the tap, they have one high service and their small reservoir there, and another down below; probably inside of fifteen or twenty hours after leaving the reservoir.

Q. How long did it take the water from the Boonton reservoir to get to the Jersey City tap?

A. On the hill about eighteen to twenty-four hours; that is on the Bergen section and high service, and for the lower City probably double that time, and it lies in the reservoir probably some time.

Q. Does it go faster in the Newark pipe than it does in the Jersey City pipe, do you say?

A. Well, yes, it goes faster.

Q. Goes faster in the Newark pipe?

A. Yes, sir; because the Newark water pipe has a bigger head.

Q. It does go faster?

A. Yes, goes faster.

Q. You don't know that it goes faster, but you guess so?

A. They use the same quantity of water and drain it through a forty-eight inch pipe and forty-two part

of the way, and we are using a seventy-two inch pipe.

Q. You say it takes six hours longer for the water to run that twenty-one miles in the Jersey City pipe than it would in the Newark, twenty-two miles in the Newark pipe, is that so?

A. I think so, yes.

Sworn to before me, (the signature being waived), this 21st day of December, 1906, at Jersey City, N. J.

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The following is a copy of Exhibit No. 1, of this date, offered by Mr. Edwards:—

"CHANGES IN WORKS BY REASON OF CHANGE IN DAM SITES, WITH COMPARATIVE COST.

	Original.	Amended.
Pipe.....	19 miles 76"	17 miles 72"
Tunnel & Conduit	3 miles 6' 10"D	5.6 miles 8' 6" D.
Total	22 miles.	22.60 miles.

Back dyke,	17 feet high	30 feet high
Back dyke	about 1,800 ft. long	about 3,500 ft. long
Saved on pipe, 2 miles at $67,000.....		$134,000
Saved on pipe, reduced size, 17 miles at $3,300		56,100
Saved on tunnels and conduits:		
3 miles 6' 10" at $30 per foot....	$475,000	
1.6 miles 8' 6" at $35 per foot...	305,000	
		170,000
Total saving		$360,100
Added cost:		
4 miles concrete conduit at $80,000.....		$320,000
Added cost of back dyke about $80,000..		80,000
		$400,000
Net added cost to Company by change..		40,000
Saving to City, when works are enlarged		100,000

Testimony of Cornelius J. Rooney.

CORNELIUS J. ROONEY, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Edwards:

Q. Mr. Rooney, where do you reside?

A. Jersey City, sir.

Q. What is your occupation?

A. Clerk of the Hudson County Board of Health.

Q. How long have you been clerk of that Board?

A. Since 1874.

Q. Continuously?

A. Yes, sir, well, including part of 1874.

Q. Your Board has charge of the vital statistics of the county?

A. Yes, sir.

Q. Has had charge of that since 1874?

A. Yes, sir.

Q. Continuously?

A. Yes, sir.

Q. Who does the actual work of compiling for the Board?

A. I do, sir.

Q. How many years have you been doing that?

A. Since 1874.

Q. Have you the record with you of the deaths in Jersey City since 1889?

A. I have some of them, yes, sir; some of the deaths; not all, of course.

Q. Well, you have since 1889, have you not?

A. Yes, sir; but I mean to say they don't cover every death, but only certain specified deaths.

Q. Since 1889?

A. Yes, sir. I want to say that under typhoid fever I have always grouped it, and it may be that at one time we had typhoid malarial fever, not typhoid fever, but I don't know whether that is so since 1889.

Testimony of Cornelius J. Rooney.

Q. Then if any error has been made in classification, it is against the typhoid deaths, increase of typhoid deaths?

A. Yes, sir.

Objected to.

A. —I say I don't know; it may be.

Q. Now, then, will you tell us the number of deaths in 1889, from typhoid fever?

Mr. VREDENBURGH: I object on the ground that the method in which these are kept is no basis for a statement of the number of deaths from typhoid fever.

It is consented that instead of offering the original records that Mr. Rooney shall testify from them.

Q. In 1889?

A. Yes, sir. Jersey City, typhoid fever, 123 deaths, in 1889 in Jersey City.

Q. Now 1890?

A. Jersey City, total typhoid fever, 148.

Q. 1891?

A. Jersey City, total typhoid fever, 148.

Q. And I notice in 1891 and in these others you have a separate column for malarial fevers?

A. We have in all those cases.

Q. Now 1892?

A. I don't know, it may be different in the other years. 1892, typhoid fever for Jersey City, 90.

Q. 1893,

A. 105.

Q. 1894?

A. 119.

Q. 1895?

A. 134.

Q. 1896?

A. 114.

Q. 1897?

A. 41.

Q. That is when the East Jersey Water was turned on, is it not, in 1897?

Objected to.

A. I cannot positively answer that.

Q. 1898?

A. 71.

Q. 1899?

A. 30.

Q. 1900?

A. 44.

Q. 1901?

A. 31.

Q. 1902?

A. 35.

Q. 1903?

A. 29.

Q. 1904?

A. 45.

Q. 1905?

A. 35.

Q. 1906, to the first of December, can you give us that?

A. Well, I have these by months.

By Mr. VREDENBURGH:—

Q. Let us have them each month.

A. January, 5; February, 2; March, 1; April, none; May, none; June, none; July, 3; August, 2; September, 3; October, 5; November we haven't got written up.

Mr. EDWARDS: I think we will offer one of these sheets. Can we have one of those to keep?

WITNESS: I can give you all of those if you like.

Mr. EDWARDS: Any one sheet, if you can give us one report for one year. We will take this one, 1905, and have that marked.

By Mr. EDWARDS:—

Q. Have you produced your report on Vital Statistics, for the year 1905, complete?

A. Yes, sir; it is here.

Q. And are the others kept practically in the same form?

A. Well, they have been since 1900; it may have a little more than the others, but practically kept in the same way.

Mr. EDWARDS: Then we offer this as a sample, with the right for either side to use any of the other years that they may desire.

Mr. VREDENBURGH: I object to the whole of this testimony on the ground that it is no evidence of what the number of deaths from typhoid fever really were.

Q. Where did you get, Mr. Rooney, the data for your reports?

A. From the certificates of death.

Q. Furnished to you by whom?

A. Sent by the doctors.

Q. Is that required by law?

A. Yes, sir.

Q. Is such a certificate a pre-requisite to burial?

A. They have to get a permit for burial, and have to hand in the certificate in order to get the permit.

Q. And you don't grant the burial unless you get a certificate?

A. No, sir, except the case of the County Institution at Snake Hill.

Q. How often do you get your reports from the County Institution?

A. At the end of each month.

Q. Are these reports made to you on blanks?

A. Yes, sir, the death certificate blanks—forms.

Q. And are they carefully tabulated by you?

A. Well, I try to tabulate them carefully.

Q. Are the methods which have been used in your office adopted in other parts of the country?

Objected to as leading.

A. I cannot say about that.

Q. Do you make report to anybody, your Board?

A. I send all the certificates to the State Board of Health, of deaths and births and marriages.

Q. Well, now, doctor, what becomes of these burial certificates that you issue; to whom do they go?

A. The burial permits?

Q. Yes.

A. Well, they go to the different cemeteries or out of town.

Q. And are they accepted?

Objected to as leading.

Q. Is that a pre-requisite to burial?

A. Yes, sir.

Q. And is that habit of giving certificates followed by the other cities in the vicinity of New York?

Objected to as leading.

A. Of course I have a general impression with regard to it.

Q. What is that?

Objected to.

A. That it is.

Mr. EDWARDS: We offer this as a sample.

Mr. VREDENBURGH: Objected to for the same reason already stated.

A. I mean by that burial permits are necessary through the whole State.

Q. And they are issued by the various County Boards of Health?

A. In the other counties of the State they are issued by the City Clerks, in some cases, and registrar and town clerks, etc.

Q. But in Hudson County it is all under the care of your Board?

A. Excepting Hoboken and Kearny.

Q. Where they have local boards?

A. They have local boards in those places.

Q. But you have the reports from those places?

A. In Jersey City they had the local board established some time ago, I don't know whether they are doing any business though.

Q. From all over the county you receive the reports of death?

A. Excepting Hoboken.

Q. But you do from Jersey City?

A. Yes, excepting those that went down to Jersey City at the time that they were issuing permits there.

Q. How long did that time continue?

A. Well, I don't know whether they are not doing so still.

Testimony of Cornelius J. Rooney.

Q. But they are sent to your Board, however, from all the doctors in Jersey City?

A. Well, excepting those that go to the Jersey City board, if there are any such now I don't know.

Q. You don't know of any such?

A. I don't know of any such at the present time. Of course it may be that they do.

Q. I ask you now to produce records of your Board showing deaths from certain diseases for the year 1906, in months do you produce them?

A. Yes, sir.

Q. 1906 up to July 31st?

A. Yes, sir.

Q. Do you produce those records?

A. Yes, sir.

Mr. EDWARDS: I offer these records in evidence.

Mr. VREDENBURGH: Objected to as not complete.

Mr. EDWARDS: I offer those records for 1904, for 1905 and for 1906, up to July 31st.

Mr. VREDENBURGH: I object to these papers because they do not show all the deaths from typhoid fever in the City of Jersey City, and the way in which they are made up.

Mr. EDWARDS: We offer them and ask that they be marked as exhibits.

Marked Exhibits Rooney No. 1, Rooney No. 2 and Rooney No. 3, of this date.

Q. I also ask you to produce your reports on Vital Statistics for the years 1900, 1901, 1902, 1903, 1904

and 1905, and ask you if they are the copies of the original reports in your Board?

A. Yes, sir; those are all our reports.

Q. And they are copies of the originals on file?

A. They are made up from these sheets.

Mr. EDWARDS: I offer these and ask that they be marked.

Marked Exhibits Rooney, 4, 5, 6, 7, 8 and 9, of this date.

Mr. VREDENBURGH: Objected to for the same reason.

CROSS EXAMINATION by Mr. Vredenburgh:—

Q. There are no figures changed there in ink in any of these reports, to your knowledge, are there?

A. Not that I know of, unless they were errors the printer made, and after it came back from the printer, after the proofs had been read we might have found an error and changed it.

Q. Is there any such in these?

A. I don't know of any such.

Q. Doctor Rooney, will you please tell us—

A. By th way, I am not a doctor.

Q. Oh, I thought they called you doctor. Mr. Rooney, the number of deaths from zymotic diseases during this same period, can you give them, commencing with 1895?

A. Yes, sir.

Q. Now, then, the number of deaths from zymotic diseases in Jersey City?

A. Yes, sir, zymotic diseases in Jersey City, 715.

Q. And the number from malarial fever?

A. 35, malarial fever, including in this report, intermittent, remittent, typhoid malarial fever.

Testimony of Cornelius J. Rooney.

It is agreed that either party may call the attention of the Vice Chancellor, on the argument, to not only the deaths from typhoid fever or from any other diseases as they may appear upon these reports.

Mr. VREDENBURGH: Subject to my objection to this kind of evidence as before stated.

Q. Now 1896?

A. 775 in Jersey City.

Q. And in the whole county?

A. 117; we didn't include Hoboken at that time in the county.

Q. And malarial diseases?

A. Malarial fevers?

Q. Yes.

A. 29, including intermittent, remittent and typhoid malaria.

Q. And in the county how many did you say?

A. Exclusive of Hoboken, 1,117.

Q. Now passing from 1896 to 1900, how many from zymotic diseases?

A. 431 in Jersey City.

Q. And in the whole county?

A. 873.

Q. And of malarial diseases?

A. Including Hoboken.

Q. Malarial?

A. Nine in Jersey City.

Q. And in the whole county?

A. 17 malarial, including some remittent, intermittent and typhoid fever.

Q. Now go to 1904, take the number of deaths from zymotic diseases?

A. For the year 1904 is 628 in Jersey City.

Q. And in the whole county?

A. 1016 including Hoboken.

Q. Now will you give us the deaths from pneumonia, in that same year?

A. 616 in Jersey City.

Q. How many in the county?

A. 1192.

Q. When you found a death certificate to read typhoid pneumonia, in which column did you put it?

A. I put it in pneumonia.

Q. And that has been your constant practice, has it?

A. Yes, sir, to the best of my belief and recollection.

Q. Now in 1905 how many died from zymotic diseases, in that year, in Jersey City?

A. 482.

Q. How many in the county?

A. 972 including Hoboken.

Q. How many from malarial fevers?

A. Malarial fevers in Jersey City, four.

Q. In the county?

A. Nine malarial, including remittent, intermittent, typhoid and malarial fevers.

Q. And from pneumonia?

A. 437 in Jersey City.

Q. What proportion of them are typhoid pneumonia?

A. That I cannot say.

Q. How many in the county?

A. Pneumonia, including Hoboken, 910.

Q. Now in that year the City Board gave burial prmits did they not?

A. That is my impression.

Q. Have you any list of how many they gave?

A. No, sir.

Q. Do the deaths for which they gave permits appear in these reports at all of yours?

A. No, sir.

Q. Well now the return of these doctors is entirely voluntary isn't it, there is no compulsion upon them in any way to make out a certificate?

A. I understand that the State Law requires them to do so.

Q. What State Law?

A. The law of 1888, February 1888.

Q. Requires them to do what?

A. To make out a certificate of the death of a person who they have attended and who has died, and to furnish it to the family, or to the Undertaker.

Q. Well, sometimes they furnish it to the family then?

A. Well, yes.

Q. That Law does not require them to state accurately the cause of death?

A. That I don't know, what the meaning of the Law would be, it tells them to state the cause of death as I understand it, and remember it.

Q, They often have deaths from heart failure?

A. Occasionally, yes, sir.

Q. How do you index those deaths?

A. Well, we have no space for that; we put those under the other cases, we don't make a special column for them.

Q. What cases do you put them under, if from the certificate of the doctor it appears that the patient died from heart failure, under what head do you put that?

A. We group them under all other deaths in making out our large sheets, to make up our report we add them up in the total, in other words, without specifying them.

Q. It don't appear in these reports at all?

A. No, sir, we only have certain deaths from certain diseases but we have the totals here, you know.

Q. But where they die from heart failure that does not appear here?

A. No, sir, that is, it don't appear specifically.

Q. These certificates that do come, you don't know whether they are signed by the physician or not, they don't come from the physician to you?

A. No, sir.

Q. You don't know who signed them?

A. I cannot swear, no, sir.

Q. You don't know whether the Undertaker don't often sign them?

A. Of course, all those things are possible.

Q. Well now, as to whether they are the Doctors or not, how do you find that out, whether the man that signs them is the doctor or not, do you examine into that at all?

A. Well, the Board used to require them to produce the authorities for their practice.

Q. But when a certificate comes into you, purporting to be signed by a doctor—certificate purporting to be signed by a doctor, for a burial permit, do you make any examination to find out whether the man is a doctor?

A. No, sir, the Board, in former years, used to compell them to produce their diplomas or other authority before the Board.

Q. What was that for?

A. In order that the doctor might be allowed to register his name in our office,which they all have done. Now since the State has been granting licenses to them why they tell me—let the doctor register, and on producing a State License from the State Board of Medical Examiners they don't have to go before the Board any more.

Testimony of Cornelius J. Rooney.

Q. Well, the signing of that book before you is to enable them to practice, is it not?

A. Well, the Board will not grant a permit for a burial or certificate of death unless they have signed their name in our register. Of course there are occassionally outsiders that come in here to practice that have not registered.

By. Mr. EDWARDS.

Q. You know the signature of nearly all the doctors of the county?

A. Without speaking positively I would say yes I could come pretty near it, but I wouldn't swear to it.

Q. Well now there is a penalty, isn't there, under the Law, for sending in false certificates?

A. Yes, sir, there is, under the Law of 1885.

Q. And your Board would follow those things up, if brought to their attention?

A. Well, we never had any case that I know of.

Sworn to before me,
(the signature being waived)
this 21st day of December,
1906, at Jersey City, N. J.

Further examination of witnesses etc, in this matter stands adjourned until Saturday, December 22, 1906, at the same time and place.

Testimony of Frank McIntosh.

IN CHANCERY OF NEW JERSEY.

Between

THE MAYOR AND ALDERMEN OF JERSEY CITY,

Complainants,

and

THE JERSEY CITY WATER SUPPLY COMPANY,

Defendants.

Examination of witnesses, etc, in this matter continued pursuant to the adjournment last had, before the subscriber, a Master in Chancery of New Jersey, at the hour of ten o'clock in the forenoon of Saturday the 22nd day of December 1906, at the office of Messrs. Collins & Corbin, 243 Washington street, Jersey City, N. J., in the presence of Mr. James B. Vredenburgh and Mr. Gorge L. Record, counsel for the complainants, and of Mr. William H. Corbin and Mr. William D. Edwards, counsel for the defendants.

Said examination being taken in shorthand, question and answer in full, and the signature of the witnesses waived.

FRANK McINTOSH, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Edwards:

Testimony of Frank McIntosh.

Q. Where do you reside?

A. Boonton.

Q. How old are you?

A. 26.

Q. And what is your occupation?

A. Gatekeeper.

Q. For whom?

A. Jersey City Water Supply Co.

Q. Where are you on duty?

A. At the Boonton dam.

Q. When do you go on duty?

A. I am on duty at all times, 24 hours a day.

Q. And in addition of taking care of the gates at the Boonton dam do you have any other work to do?

A. Looking after the dam and the reservoir.

Q. Anything else?

A. That is all.

Q. Do you have anything to do with the gates running into the sluice-way at the Morris Canal, at the foot of the plane?

A. I look after them occassionally.

Q. How often do you go there?

A. No steady period, I have a man that I send there at least every day or else I go myself.

Q. And what does that man do besides that?

A. He works for me at the dam.

Q. At the dam?

A. Yes, sir.

Q. Have you ever found any trouble with those gates?

A. Very seldom anything.

Q. What do you find at times?

A. Well, a short time ago we had a fire there at the rolling mill, and that is about the only trouble we had.

Q. And what was the cause of that?

A. The embers floating down from the ruins.

Q. How many times a day do you or your man go to visit those gates?

A. At least once a day.

Q. And that is in addition to your regular duties at the dam?

A. Yes, sir.

Q. And in addition to his regular duties at the dam.

A. Yes, sir.

Q. What does he do at the dam?

A. Well, he is the general workman, cleaning up and takes care of the ground.

Q. And he is needed at the dam also?

A. Yes, sir.

Q. This taking care of the gates at the sluice-way is an extra little work you do?

A. Yes, sir.

CROSS EXAMINATION by Mr. Vredenburgh.

Q. When were you employed by the Jersey City Water Supply Company?

A. In this position?

Q. In any position?

A. I think it was in April, 1902, if I remember right.

Q. And in what postion was that?

A. I was on the engineering corps.

Q. When were you employed in your present position?

A. I think it was in July, 1903, I won't be sure.

Q. And what is your present position?

A. I am still gateman.

Q. You are gateman—well, what is the meaning of that,—gateman?

A. I have charge of the gates at the gate house, at the dam,—looking after the reservoir.

Q. Well now what is the duty of a gateman?

A. To make any changes that is to be ordered in the flow of the water.

Q. Cannot you explain a little more fully what you do as a gateman?

A. Well, I take also the readings at the spillway night and morning.

Q. Go on.

A. And see that my screens are kept clean in the gate house.

Q. See what?

A. That the screens that the water passes through are kept clean.

Q. Well now, what do you mean by gate?

A. Gates? The only means we have of controlling the flow in the conduit.

Q. To control the flow into the conduit?

A. Yes sir.

Q. And is that a complicated thing?

A. Well no, it is not, not to me.

Q. Whatever this is, how do you raise it, you call it a gate, how do you raise it?

A. By means of gear wheel and shaft.

Q. By steam power or hand power?

A. No, sir, by hand power.

Q. And what is it you raise?

A. We raise the gate.

Q. What is the gate?

A. Well, it is an iron construction placed in the masonry of the dam over an opening, and by raising this gate we increase or decrease this.

By Mr. EDWARDS.

Q. And increase or decrease the amount of water that goes to Jersey City?

A. Yes, sir.

FURTHER CROSS.

Q. And this iron gate is a solid piece of iron and slides up and down in front of this hole?

A. Yes, sir.

Q. And it is connected by chains or wire rope?

A. By a shaft.

Q. A shaft?

A. Yes, sir.

Q. Connected with some geer wheel in some house or other?

A. In the house on top, yes, sir.

Q. In the house?

A. Yes sir.

Q. How near is the house to the gate?

A. It is immediately over it.

Q. Your duty then is to see that those geers are properly handled?

A. Yes, sir.

Q. How often do you raise them or lower them?

A. As occasion demands it.

Q. Well, how often does occasion demand it?

A. That will vary.

Q. Cannot you give the average? Once a day?

A. Well, often times once a day.

Q. Yes.

A. And again it may go for a week, it all depends on the consumption.

Q. Is there more than one gate?

A. Yes, sir.

Q. How many?

A. We have four gates in what we call the upper gatehouse, four gates in the main dam.

Q. Are those the only gates that you control?

A. Those are the only gates that we use, yes, sir.

Q. Now those four gates, how do you determine which of the gates you shall open?

A. That is furnished to me from the Paterson office.

Q. The Paterson office tells you which gate you shall open?

A. Yes, sir.

Q. Is there any regularity in the opening of these gates?

A. You mean the use of them?

Q. There are four of them; do you use one for a week, and the second one for another week, and the third for a third week, and the fourth for a fourth week?

A. No sir, just the one right along unless it is ordered otherwise.

Q. Which one are you using now?

A. We are using the lowest one now.

Q. The lowest gate?

A. Yes, sir.

Q. How long have you used that gate?

A. I don't remember the time.

Q. Well, about?

A. I cannot recollect the time.

Q. Have you used it a month?

A. Yes, sir.

Q. Two months?

A. Yes, sir, we have used it longer than that.

Q. Longer than two months?

A. Yes, sir.

Q. What change have you made in it since you commenced to use it?

A. We have made no change in the gate, with the exception, as I say, to increase or decrease the quantity.

Q. And you increase or decrease the quantity as often as once a day, do you?

A. Well, it will vary, some times it will be at least once a day and then again possibly once a week.

Q. Well, is it usually an increase or a decrease?

A. It depends also on the state of the reservoirs in Jersey City.

Q. On the state of the reservoir in Jersey City?

A. Yes, sir.

Q. Your purpose is to keep the reservoir in Jersey City at a certain height, is it?

A. I believe so, yes, sir.

Q. You know nothing about that?

A. No, sir.

Q. Except as you get information from the Paterson office?

A. Yes, sir.

Q. What office is there in Paterson?

A. The Jersey City Water Supply Co.

Q. The Jersey City Water Supply Company's office in Paterson, and from whom do you get this order?

A. Mr. Cook is the hydraulic engineer.

Q. Your orders come from Mr. Cook, do they?

A. Yes, sir.

Q. Over the telephone?

A. Yes, sir.

Q. And he tells you to raise or lower the gates a certain number of inches?

A. No, Mr. Cook governs the use of the different gates; the opening and decreasing of the gates comes from Jersey City.

Q. And who in Jersey City?

A. The gate man at the reservoir.

Q. You don't know his name?

A. His name is Herold, I believe.

Q. What is his first name?

A. I don't know.

Q. And he telephones you whether to raise or lower the gates?

A. Yes sir.

Q. Does he tell you how much to raise them and how much to lower them?

A. He gives me the quantity he desires put on or taken off.

Q. Just explain that?

A. Two millon gallons per twenty four hours.

Q. What does he say over the telephone?

A. For instance, he wants me to take off two million gallons a day.

Q. That means a day?

A. Two millon gallons per 24 hours.

Q. When you get that order what do you do?

A. Immediately take it off, decrease two million gallons.

Q. How do you get it?

A. By going to the gate house and lowering the gate.

Q. A certain number of inches, which you can tell by your gauge?

A. Yes, sir.

Q. Now then you said that the water passes through a screen?

A. After it leaves the gate, yes, sir.

Q. Where is that screen?

A. In what we call our lower gate house, immediately before entering the conduit.

Q. Then there are two gate houses, the upper gate house and lower gate house?

A. Yes, sir.

Q. The upper gate house is in the dam?

A. Immediately on top.

Q. Where is the lower gate house?

A. At the foot of the dam, just below.

Q. And the house at which your geering is is still further from the dam?

A. That is the same building, on top of the dam.

Q. Well, what is the building below the dam used for?

A. That acts as a chamber where we screen the water before it is delivered to the conduit.

Q. And the only purpose of that building is to screen the water as it passes from the reservoir into the conduit?

A. Yes, sir.

Q. Now you say you cleaned the screens, what do you mean by that?

A. We raise them up to the level of the floor and take off anything that is found on them.

Q. Who does that?

A. I do or my man.

Q. How many men have you?

A. I have one at present.

Q. Well that one is the man you mentioned?

A. Yes, sir.

Q. And you say you remain there the whole 24 hours?

A. Yes, sir.

Q. That is, one of you 12 hours and the other 12 hours?

A. No, sir, I am on duty 24 hours.

Q. When do you sleep?

A. I have my house near by and a telephone.

Q. Then you mean by being on duty 24 hours that you are there part of the time and part of the time in your house?

A. I am always within call of the Jersey City man.

Q. Well, are you ever called at night?

A. No, sir.

Q. The last call to you is about what time in the day?

A. Usually in the forenoon, about 9 o'clock.

Q. Well, does this cleaning require any special experience?

A. None whatever.

Q. Most anybody can do it?

A. Yes, sir.

Q. This man that you have to assist you is an ordinary laborer, is he?

A. Yes, sir.

Q. Now you say that you go up to the Boonton gate?

A. Yes, sir.

Q. In the lower level canal once a day, you or your man?

A. Yes, sir.

Q. How far is that from your gate house?

A. Well, it is possibly a mile or a mile and a half.

Q. And what do you go up there for?

A. If I am going to Town I usually slip down there and look at it and pass along.

Q. Then you have no regular time to go?

A. I have no regular time, no, sir.

Q. Has your man any regular time?

A. He usually stops on his way down from home in the morning at the dam.

Q. He lived at Boonton?

A. Yes, sir.

Q. And he walks down and stops there and take a look at it?

A. Yes, sir.

Q. When were you told to do that?

A. I don't remember the time, shortly after the dam was put in.

Q. What were you told to do?

A. To see that it was working properly and report anything that was found out of order.

Q. Now at the time of this fire how were you informed that the gate wasn't working?

A. By my man.

Q. What did he tell you?

A. He told me that the embers had lodged in the gates.

Q. Well, what did you do?

A. And this man cleaned them out at the time.

Q. That is he told you?

A. Yes, sir, and he cleaned them out.

Q. How do you know?

A. Because I went up there and saw that he did it.

Q. When did you go up there, that day?

A. In the forenoon, I cannot remember the time.

Q. When you got up there did you find any embers?

A. No, sir, none whatever then.

Q. How had the embers interfered with the working of that gate?

A. These gates worked on hinges.

Q. Yes.

A. And the flow from the power canal into the navigation side worked them out, and these embers floating under them would keep them open, unless they were removed.

Q. And the fire was in some part of this Cooper-Lord works, was it?

A. Yes, sir.

Q. Did you go to the fire?

A. No, sir.

Q. How did the embers from that fire get under this gate?

A. Came down the raceway.

Q. Well, how did it get into the raceway?

A. I suppose naturally fell in, as the buildings were burning.

Q. Well, are the buildings over the raceway?

A. Yes, sir; over it and on the banks.

Q. How far is that building from this gate?

A. Possibly two or three hundred feet.

Q. When did the fire occur?

A. I don't remember; I think it was in October; I won't be sure.

Q. What time of the day or night?

A. In the early morning about two o'clock.

Q. When did your man go there?

A. At 7.

Q. How do you know he got there at 7?

A. Because he was down at the dam shortly afterwards.

Q. Shortly after 7?

A. Shortly after 7; yes, sir.

Q. Did you notice any boats in the canal at that time?

A. No, sir; I did not.

Q. While you were there that day did you see any boats?

A. No, sir.

Q. Were there any boats in the canal at that time?

A. I cannot say; I didn't see any.

Q. You didn't notice any?

A. No, sir.

Q. Were you paid anything more after they told you to attend to the dam at Boonton than you were before?

A. No, sir.

Q. Is this workman paid anything extra for stopping there as he comes by?

A. No, sir.

Q. He receives the same wages as he did, before?

A. Yes, sir.

REDIRECT EXAMINATION:

Q. These embers, did they clog the gates both ways?

A. Prevented the gates from closing.

Mr. VREDENBURGH: He didn't see them and don't know anything about them?

Q. You don't know which side they clogged the gate on?

A. Only on one side, the gates worked only one way.

Mr. VREDENBURGH: I object to this testimony, because he didn't see it at all; I object, because he swears he did not see them, when he got there they were out.

Q. Now, how do you decide how much to raise or lower the gates when you get an order for two million more?

A. By means of a diagram.

Q. It takes some skill to read those diagrams, doesn't it?

A. It does; yes, sir.

Q. That is an engineering problem?

A. Yes, sir.

Q. Do you some times change from the gate on one side to the other?

A. Very rarely.

Q. But you have to do that some times?

A. I do occasionally; yes, sir.

Q. Does that take judgment?

A. Why, yes; more or less.

Q. Do you also make reports on the color of the water?

A. I do; yes, sir.

Q. To whom?

A. I have made none yet.

Q. Eh?

A. I have turned in no reports yet, but I take the color of it.

Q. You are taking the color of it, though?

A. Yes, sir.

Q. You have how many telephones in your place?

A. I have one in the gate house and one in the house.

Q. Where does the one in the gate house connect with?

A. Paterson and Jersey City.

Q. That is the private line of the company?

A. Yes, sir.

Q. And the one in the house?

A. On the same line, with also a connection in Boonton.

Q. Then you are there on the public line, too?

A. Yes, sir.

Q. Do you also have supervision of the reservoir there?

A. Yes, sir.

Q. And any work that has to be done by the workmen is done under your orders?

A. Yes, sir.

RECROSS EXAMINATION:

Q. Now, as to changing the gates from one side to the other, what is that; what do you mean by that?

A. Our buildings are constructed so that we can use one side or the other, independent.

Q. What do you mean by one side or the other?

A. By using one half of the building independent of the other half.

Q. I don't understand that; you have four gates, what do you mean by saying you use one half of the building or the other half?

A. Two gates are placed in each house, and we can supply from either set of gates into the conduit.

Q. That is, there are four gates?

A. Yes, sir.

Q. And you can supply water to the conduit from any one of those four gates?

A. Yes, sir.

Q. And you say that you can change from one gate to the other?

A. Yes, sir.

Q. And you say that requires judgment; now what judgment does it require to change from one gate to the other; you never do it unless you are told to do it?

A. Never, unless I am told.

Q. When you are told to do it, what do you do; you shut one gate that is open, and you open the other gate that is not open?

A. Yes, sir.

Q. Does that require any judgment?

A. Yes, sir.

Q. What?

A. Because as we open our gates, when we first open them the quantity is greater per inch, for instance, than it would be after we got the gate nearly open, and in closing the gate it is just the reverse, and we have to close one gate and open the other so as to get the quantity passing through the gates the same.

Q. You have to be careful how you close the gates and how you open the gates?

A. Yes, sir.

Q .Cannot any ordinary laborer do that after he has seen you do it once or twice?

A. No, sir.

Q. Why not?

A. He has to read these quantities from the diagrams.

Q. Then the skill is not in opening or shutting the gates, it is in reading the diagrams?

A. In reading the diagram, to get a correct quantity.

Q. What is there so skillful about reading a diagram?

A. It is the nature of the diagram and the way they are gotten up.

Q. Can anybody that can read read that diagram, as well as you can?

A. I don't think so.

Q. What has been your experience that gave you such an advantage in reading a diagram?

A. I have been connected with that work quite a while.

Q. Any other engineer that had been there a week could he not do the same thing as you do, read the diagram?

A. Yes, sir.

Q. Then the skill is in the fact that you are an engineer?

A. Any intelligent man can learn it in time, he doesn't have to be an engineer.

Q. Don't have to be an engineer?

A. No, sir.

Q. Any intelligent man can in a week's time learn to read that diagram cannot he?

A. Well, I won't say as to that.

Q. Well, Senator Edwards can learn to read that in half an hour, cannot he, from you?

A. I don't think so.

Q. Now, you say that you do examine the color of the water?

A. Yes, sir.

Q. Does that vary from time to time?

A. Very little.

Q. In what respect does it vary?

A. The number of points.

Q. What is the most that you have ever seen it vary?

A. About four points.

Q. And what do you mean by four points?

A. I am not acquainted with that part of the read-

ing of the colors; my tubes are furnished to me by the company, and I read between the tubes, comparison.

Q. Now, what tubes are furnished you by the company?

A. The standards that we read the water by.

Q. Well, what are they?

A. They are tubes that are prepared, I have no knowledge of that.

Q. When you say tube, what do you mean?

A. There are tubes filled with liquid.

Q. Do you mean a glass bottle, when you say tube?

A. Well, it is a tube that is open at one end, in the form of a test tube.

Q. Is it made of glass?

A. Yes, sir.

Q. And it is filled with some coloring matter, is it?

A. Yes, sir.

Q. What are those coloring matters?

A. I don't know, sir.

Q. What is their color?

Q. Of a greenish cast.

Q. What other cast?

A. All the same.

Q. Four green colored glasses?

A. Beg pardon?

Q. Four glasses filled with some green color?

A. Well, more than four glasses, but the colors are of different densities.

Q. That is, it is a deeper and a lighter green in these different glass tubes?

A. Yes, sir.

Q. And how many are there,—colors?

A. I think we have ten?

Q. And when you spoke of four you meant four from the tube or four from the bottom of this—

A. I didn't mention four; four points is what I said.

Q. Well, when you said four points you mean there are four of those colors, of those ten coloring tubes?

A. There are five tubes usually between two tubes.

Q. When you said four points between 12 tubes, had you reference in your mind—

A. Between the tubes bearing No. 25 and 30.

Q. The one tube bears the number 25?

A. Yes, sir.

Q. And another tube bears the number 30?

A. Yes, sir.

Q. When you said four you meant four points between those?

A. Between those two tubes.

Q. And there are altogether five tubes between those tubes?

A. Yes, sir.

Q. Now, you say that it varied four points; now, how long did it take the water to vary those four points?

A. It would vary sometimes about a point a day, perhaps a point in two days.

Q. A point a day, and sometimes two points a day?

A. Sometimes a point in two days.

Q. Can you tell us when it varied a point more than a point a day?

A. No, sir.

Q. You don't recollect?

A. No, sir.

Q. Can you say that there was no occasion when it did not vary a point a day?

A. I think there were days that ran, two and three days in succession that it did not vary any.

Q. Well, that is not quite the question; do you

recollect when it varied more; can you say that it didn't vary more than a point a day at any time?

A. It didn't vary more than a point a day at any time; no, sir.

Q. Now, how long did it take to vary the four points that you speak of?

A. I should judge possible about a week.

Q. And after it got up to four points, how long did it stay at four points?

A. Well, it is still there at that point yet; it had dropped from the highest down to about four points, and it is still there.

Q. Then it has never varied since it got to that point, it has never varied any?

A. It has not gone up since it dropped; no, sir.

Q. When did it drop?

A. I cannot say.

Q. Well, about when?

A. Possibly about two weeks ago it started to drop.

Q. It dropped about two weeks ago and there has been no change at all in the color since that drop, so far as you have observed it?

A. There is a gradual drop in color.

Q. Has it dropped since that two weeks?

A. No, sir; but during the two weeks it had dropped to four points.

Q. During the two weeks it dropped four points?

A. Possibly ran three or four days on one point, and then three or four more, and dropping an additional point.

Q. Well, since that two weeks has it changed no point at all?

A. That two weeks included up to the present time, the last two or three observations have been the same.

Q. When did you make those observations?

A. Every day at 12 o'clock.

Q. For how long?

A. Since I began.

Q. No, how long do you make the observations?

A. Why, there is no length of time.

Q. How long do you look?

A. Possibly 5 or 10 minutes.

Q. Do you make a record of that?

A. Yes, sir.

Q. When did you begin these observations?

A. About the middle of November.

Q. Of this year?

A. Yes, sir.

Q. And when did the drop commence of those four points?

A. I think—I don't remember—I think about 2 weeks.

Q. Before that was there any change in the color?

A. Very little.

Q. When was the increase of change in the color?

A. I don't remember of any increase unless it was a point.

Q. And when was that?

A. That was in the fore part of—about the middle of November, I should say.

Q. You said that sometimes it varied as much as four points—now, what do you mean by that?

A. Between the highest reading that I have and the lowest.

Q. You said that that took place also in a week, when was that week?

A. I said I thought the four points took place probably about two weeks ago, it began two weeks ago to decrease.

Q. Two weeks ago to do what?

A. The color, the number of points, to decrease, to drop.

Q. It commenced about 2 weeks ago to drop?

A. I think so; yes, sir.

Q. And since then it has dropped four points?

A. I believe so; yes, sir.

Q. Before that it varied up a point some times and down a point some times?

A. I think so, not over a point I don't think it went up.

Q. And whatever those records are you have them at your place?

A. Yes, sir.

Q. Do you know why it is that you have been ordered to have dropped, as you say, the gate and open another gate?

A. I don't; no, sir.

Q. You have been using the present gate for a number of months?

A. Yes, sir.

Q. Well, this gate that you are drawing from, is that the lowest in the dam or the highest in the dam?

A. The lowest one.

Q. When you say lowest just what do you mean, the lowest from the surface of the water?

A. Yes, sir; the lowest gate opening into the conduit.

Q. The lowest gate from the surface of the water emptying into the conduit?

A. Yes, sir.

Q. Do these gates differ in height?

A. The lower gate is 3 x 8 feet, and the upper gate is 3 x 4 feet.

Q. Are they at different levels?

A. Yes, sir.

Q. How much is the highest gate above the lowest gate?

A. I don't know the distance.

Q. Have no idea?

A. No, sir.

Q. How do you know that it is higher?

A. Because I saw them placed.

Q. You saw them placed there?

A. Yes, sir.

Q. But you didn't look at them enough to form any jugdment of how much one is higher than the other?

A. No, sir.

Q. Now, you say that there is a private telephone line from somewhere to Paterson; what do you know about its being a private line?

A. We are not connected with central.

Q. Whose private line is it?

A. I don't know, sir; unless it is the Water Company's.

Q. You don't know unless it is the Water Company's, but you know that the telephone line that runs from your house to Paterson is not connected with the switch board of the public company?

A. It is not; no, sir.

Q. And that is the reason you call it a private line?

A. That is the reason; yes, sir.

Q. Now, the other line; the second line runs from the gate house, and that runs, you think, over the public line?

A. Over this same line, runs from the gate house to the house.

Q. The same line?

A. Yes, sir.

Q. Now, the one from Jersey City, is not that a private line, too?

A. That is the same line.

Q. Well, which one is the public line, then?

A. The one that runs from my residence to the Boonton central.

Q. Then, as I understand it, you have a private line to Jersey City and you have a private line to Paterson?

A. No, sir; the same line that runs to Jersey City runs to Paterson.

Q. Runs down to Jersey City first and then around to Paterson or vice verse?

A. I don't know the construction of the line.

Q. Now, you say you have supervision of the reservoir; what do you mean by that?

A. Looking out for any trouble along the reservoir, keeping the drift wood out and keeping it clean and stopping pollution if there is any.

Q. Did you ever have any drift wood there?

A. Yes, sir.

Q. Where was it?

A. That will vary.

Q. Well, tell us one place?

A. Well, all around the shore, for that matter, it would vary with the wind.

Q. Well, on all parts of the shore?

A. Yes, sir.

Q. What do you mean by saying it will vary with the wind?

A. Which ever way the wind blows it will take the drift wood.

Q. Is there any at the gate house?

A. Some.

Q. Any on the side towards the spillway?

A. Some there; yes, sir.

Q. Any on the other side?

A. Yes, sir.

Q. How often does that occur?

A. Only in times of freshets.

Q. Well, freshet is rather an indefinite word; how often do you go out to take care of this drift wood?

A. I am on the lookout for it all the time, possibly have two or three heavy rains in the season that will bring down a quantity of the stuff.

Q. And by a season you mean a year or six months?

A. In a year.

Q. Then two or three times a year only you find this drift wood in the places which you have just mentioned?

A. In quantities; yes, sir.

Q. And other times there are smaller amounts?

A. Yes, sir.

Q. Now, you also said that you look out for pollution; what pollution do you find?

A. Nothing whatever.

Q. Then what did you look out for, when you were looking out for pollution; what particular thing?

A. No particular thing; there would be several causes.

Q. What?

A. Well, fishing, boys in swimming and dogs, and people camping out, and there are numerous causes.

Q. Those are the kinds of pollution that you had reference to?

A. Yes, sir.

Q. Men shooting ducks there, for instance?

A. Yes, sir.

Q. You haven't seen that,—you have heard of that, but you never stopped anybody from shooting, have you?

A. I stopped them; yes, sir; I have ordered them off.

Q. And they didn't obey you or what?

A. Yes, sir; they left.

Q. Now, have you ever stopped anybody fishing?

A. Yes, sir.

Q. When last?

A. I don't remember the date, it is the latter part of November.

Q. Where were they fishing?

A. On the shore, near the bridge.

Q. Well, is that the bridge that crosses the—

A. The highway bridge, Washington street bridge.

Q. Do you refer to the bridge that crosses a portion of this reservoir near where the stream enters the reservoir, that bridge?

A. Yes, sir.

Q. There are people fishing on that bridge all the time?

A. On the bridge; yes, sir.

Q. You don't pretend to interfere with them?

A. No, sir.

Q. When you see them along the shore you tell them not to?

A. Yes, sir.

Q. Now, as to camping out, have you been troubled with that?

A. Nothing to speak of, only one instance I know of.

Q. How long ago is that?

A. That was in the spring of this year.

Q. Were they polluting the lake?

A. No, sir.

Q. I thought you said it was pollution that you were stopping?

A. Well, they possibly would have if I hadn't ordered them off.

Q. You think they might, and therefore ordered them off?

A. Yes, sir.

Q. Now, as to dogs being washed in the river; do you stop any of that?

A. I didn't see any.

Q. Well, you said that was one of the causes?

A. I said there was a chance of it.

Q. And boys swimming there; have you stopped that, too?

A. Never found any.

Q. Never found anybody swimming; well, any other pollution that you stopped, that you know of?

A. Nothing else that I know of; no, sir.

REDIRECT EXAMINATION:

Q. This drift wood would be out at any particular part of the reservoir?

A. Principally on the south shore.

RECROSS EXAMINATION:

Q. You said something about cleaning the screens, how often do you clean that screen?

A. That will vary; I look at them at least once a day, and oftentimes they are cleaned probably a dozen times a day.

Q. Cleaned a dozen times a day?

A. In the fall we have heavy rains, and we get the leaves, and have to keep at them continuously.

Q. What is the mesh of this screen?

A. One quarter inch, I think.

Q. Quarter inch holes?

A. Yes, sir.

Q. And those holes are stopped up by leaves?

A. Yes, sir.

Q. And often so much so that you have to do it a dozen times a day?

A. Some times; yes, sir.

Q. And anything else but leaves?

A. Well, sediment; I don't know the nature of it.

Q. What is its appearance?

A. It looks to me like small particles of grass and usually swept off.

Q. And does that get upon the screen so as to interfere with the water?

A. That will collect there; yes, sir.

Q. How often does that collect there?

A. Cannot say as to that; I don't know allow it to collect; I look at it at least once a day; never less than that.

Q. How do you clean it?

A. By raising it up with a block and fall.

Q. You raise it up?

A. Yes, sir.

Q. Now, you have them up—how do you clean them after you get them up?

A. Place a platform under them or take them on a truck out doors.

Q. When you get them out doors how do you clean them?

A. With a broom or hose.

Q. Hose and broom?

A. Yes, sir.

Q. And do you use anything but water?

A. No, sir.

Q. Any acid or anything of that sort?

A. No sir.

Q. Only just ordinary water?

A. Yes, sir.

Q. And a broom?

A. Yes, sir.

Q. Give it a scrubbing?

A. Yes, sir.

Q. Do you use soap some times?

A. No, sir.

Q. Was there ever any fish on this screen?

A. We do get fish sometimes.

Q. Alive or dead?

A. Both.

Q. And necessarily odors coming from it?

A. Not necessarily, no, sir.

Q. Well, from the dead fish there would be odors?

A. There would be if they were out of the water any length of time, I suppose.

Q. What is the size of the fish?

A. Well, that will vary; principally small ones.

Q. Well, they are large enough so that they cannot go through this mesh, I suppose?

A. Yes, sir.

RE-DIRECT EXAMINATION:—

Q. Is there but a single screen?

A. Double screen.

Q. One behind the other?

A. Yes, sir.

Q. How far apart are they, about?

A. Well, possibly a space of about a foot.

Q. Now when you take the screens out do you take them both out at the same time?

A. No, sir.

Q. Always leave one screen in?

A. Always leave one in.

Q. You say you wash them with a hose?

A. Yes, sir.

Q. Do you get any head of water on the hose?

A. Have had; yes, sir.

Q. Where do you get that head from?

A. Over the dam we have a syphon.

Q. Now you say that the principal trouble you have there is with the leaves in the Fall?

A. Yes, sir.

Q. Now, relative to this drift wood, where have you found the most of it, in the reservoir?

A. Principally on the southern shore.

Q. The south shore?

A. Yes, sir.

Q. That is on which side of the dam, is that looking up the reservoir?

A. That would be on the left of the dam, as you are facing the dyke.

Q. Whereabouts on that south shore?

A. Nearer the Parsippany end than at the dam.

Q. That is where you get most of the drift wood?

A. Yes, sir.

Q. Do you get very much drift wood at the dam?

A. Not very much.

Q. More at other places in the reservoir?

A. Yes, sir.

Q. You can see the telephone line, cannot you, running down over the right of way?

A. For a short distance; yes, sir.

Q. You haven't been down over the right of way the whole distance?

A. No, sir.

Q. Now you told us that you matched this color in the tubes?

A. Yes, sir.

Q. Just describe the process that you go through?

A. I get my sample at 12 o'clock from the reservoir, at the upper gate house.

Q. What is that sample dipped into?

A. I use a pint milk bottle, and I take that water down at the lower gate house where I have my standard and fill a tube.

Q. How long is this tube?

A. Possibly 12 inches.

Q. How large in diameter?

A. I won't be sure, but I think it is about half an inch or five-eighths, or something like that.

Q. Then you put the water into the tube,—what do you compare that with?

A. With my colors that I have prepared for me;

I compare it to the nearest tube, and I will get a color, one above and one below it.

Q. Now are there other tubes just like this tube?

A. Yes, sir.

Q. How many of them do you have?

A. I think I have ten colors.

Q. They are prepared for you?

A. Yes, sir.

Q. Are they numbered?

A. Yes, sir.

Q. What is the lowest number and what is the highest on the tube?

A. 15 to 60.

Q. From 15 to 60?

A. Yes, sir.

Q. What color are they?

A. They have a greenish appearance.

Q. Which is the whiter color, the 15 or the 60?

A. The 15.

Q. Then when you get the tube that is nearest, you hold them to the light?

A. I look through them on a piece of white paper.

Q. Prepared for it?

A. Yes, sir.

Q. Then when you match them as near as you can what do you do then with the tube that you have matched?

A. I compare the color, and if it does not match the tube I judge the difference.

Q. You guage it?

A. Yes, sir.

Q. You put your tube in between the other two tubes?

A. Yes, sir.

Q. The tube above it and below it?

A. Yes, sir.

New Jersey State Library

Q. Have all those colors been between 25 and 30?

A. Yes, sir.

Q. Ever fallen below 25?

A. No, sir.

Q. Ever gone above 30?

A. No, sir.

Q. Since you started it has the tendency been downward or upward?

A. Downward.

Q. Has there been such a tendency downward?

Mr. VREDENBURGH: I object to this unless the records are produced.

Mr. EDWARDS: Mr. Edwards states that on the direct examination he simply asked the man if he made these color tests. Mr. Vredenburgh then went into a long and elaborate cross examination on how he made them, and that this redirect examination was occasioned by and brought out entirely by the cross examination.

Mr. VREDENBURGH: The witness has these records, and Senator Edwards knew he had them and he did not produce them, and therefore I had to do the best I could when the records were not produced here. Now then having had my examination I think it unfair for the Senator to go on and examine this witness— his own witness—about a record that he keeps back from me.

Q. What is the lowest that you get?

Mr. VREDENBURGH: Objected to on the ground that the record should be produced.

Q. Can you remember?

Objected to.

A. I think 25, I won't be sure.

Mr. VREDENBURGH: I ask that that last answer be stricken out, because the witness has the record and he ought to produce it and not trust to his memory.

RE-CROSS EXAMINATION:—

Q. Now as to the sample, you said you took a sample somewhere from the gate house, where did you take that sample precisely?

A. Just outside of the gate house on the face of the dam.

Q. Did you hold the sample in your hand when you took it, or did you use a rope?

A. I used a rope on a bottle; I have a milk bottle.

Q. What depth did you sink it in?

A. Possibly about three feet.

Q. Well, possibly; how do you guage it anyway; do you do it an intentional distance every time?

A. I usually try to get it a uniform distance.

Q. What is the uniform distance that you try to get it?

A. About three feet.

Q. How far is the water from where you stand?

A. Five feet.

Q. And the rope, then, must be 8 feet long?

A. Six to eight feet; yes, sir.

Q. Did you take any of your samples from the water as it passed through the lower gate?

A. No, sir.

Q. Now you never have made any test of the

sample of the water running down to the city then, have you?

A. No, sir.

Q. These samples, you say, are prepared for you; who prepares them?

A. I don't know, sir.

Q. Who gives them to you?

A. Mr. Green at Little Falls gives them to me.

Q. Who is Mr. Green?

A. I believe he is in charge of the filter plant.

Q. Of the filter plant?

A. I think it is the East Jersey Water Co.

Q. And some Mr. Green there gives you these ten tubes that you speak of?

A. Glass tubes, yes, sir.

Q. And he gave them to you some time before the middle of November?

A. I should say about the middle of November; yes, sir.

Q. You know accurately at your office when it was, I suppose?

A. Yes, sir.

Q. How did Mr. Green happen to give you those ten tubes?

A. I don't know, sir.

Q. What did he say to you when he did give them to you?

A. He brought them up and said I was to compare the water with those tubes.

Q. Brought them up from where?

A. I don't know, sir.

Q. Brought them up to where?

A. To Boonton.

Q. Oh, he came up to Boonton with them?

A. Yes, sir.

Q. You didn't get them at Little Falls, but you got them at Boonton?

A. Yes, sir.

Q. He came up to Boonton and gave you these ten tubes and told you to compare the water?

A. Yes, sir.

Q. Did he tell you how to do it?

A. Yes, sir.

Q. How did he tell you to do it?

A. Just as I explained.

Q. Well, he showed you how to compare them, as you have told Senator Edwards?

A. Yes, sir.

Q. But how did he tell you to get the sample?

A. As I am doing, with the bottle, a wide neck bottle.

Q. How deep did he tell you to get it from the surface?

A. He didn't specify any depth.

Q. Then that part of it was your own judgment; the three feet was your own judgment?

A. I took the first sample as he saw me, and I have taken them the same since.

Q. Did you ever sample water before, as to color?

A. No, sir.

Q. Then between 25 and 30—it depends entirely on your judgment, doesn't it?

A. Yes, sir.

Q. Then you have had no experience prior to this in sampling at all?

A. No, sir.

Q. Now you answered the Senator that there were two screens, about a foot apart, I understood you to say. Now when you took out one you left the other in?

A. Yes, sir.

Q. So that there is always one screen?

A. There is always one in; yes, sir.

Q. How long do you keep this out, when you take it out; take it out in the yard to wash it some times it would be out there twenty-four hours?

A. No, sir; not over half an hour at the outside.

Q. And then you put it back and when you do you take the other one out?

A. Immediately after.

Q. First you take one out?

A. Yes, sir.

Q. And clean that?

A. Yes, sir.

Q. Then you take the second one out and clean the second one?

A. Yes, sir.

Q. Now, on which one do you find the most of those leaves, etc., that you have spoken of?

A. The one immediately in front of the pipe that leads from the upper gate house.

Q. The one nearest to the river?

A. You mean which one of the two?

Q. Yes.

A. The one nearest to the water, yes.

Q. Do you ever clean one without cleaning the other?

A. Not without looking at the other.

Q. Well, when you have to clean one do you always find something on the other?

A. No, sir.

Q. There has been occasions when you hadn't found anything on the other?

A. The lower screen is quite often clean.

Q. Where are the fish that you catch?

A. They are on the upper screen, the screen nearest the gate.

Q. Any of them over on the lower screen?

A. Not unless they drop off from the upper one.

Testimony of Frank McIntosh.

Q. Are the holes in the screens opposite each other?

A. I cannot say as to that; with wire netting of a quarter inch mesh it would be almost impossible to get them opposite each other.

Q. There is no effort made to bring them so that they shall not be opposite each other?

A. No, sir.

Q. So that if a leaf or a fish is small enought to go through the first mesh it would probably go through the second?

A. Possibly not, because there is a space of a foot between the two screens of water, and it would not travel directly from one screen to the other.

Q. There would be retardation of the flow between these two screens, you think?

A. Yes, sir.

Q. The screens themselves are mere wire, you say?

A. Yes, sir.

Q. So the only retardation would be what the wire—resistance of the wire?

A. Yes, sir.

Q. That wouldn't amount to much, would it?

A. Not very much; no, sir.

Q. That is all.

Sworn to before me, (the signature being waived,) this 22nd day of December, 1906, at Jersey City, N. J.

Testimony of Andrew Bardner.

ANDREW BARDNER, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Edwards:—

Q. Where do you reside?
A. Bloomfield.
Q. What is your occupation?
A. Civil engineer and surveyor.
Q. In the employ of whom?
A. The East Jersey Water Company.
Q. How long have you been in their employ?
A. I first started with the East Jersey in 1889.
Q. Been with them ever since?
A. With the exception of four years.
Q. During that four years where were you?
A. Different places.
Q. Have you been employed in the United States Coast Survey?
A. River and Harbor Improvement.
Q. When was that?
A. In the summer of 1889.
Q. Have you made current observations?
A. Yes, sir.
Q. For various parties?
A. Chiefly for the United States Government at that time.
Q. Now did you have charge of current observations made in the reservoir of the Jersey City Water Supply Company at Boonton?
A. I made them.
Q. When were those observations made?
A. Last September, November and December.
Q. How long a time did they extend over?
A. I think ten days during the three months.
Q. And were the days in each month consecutive?
A. No, sir.

Testimony of Andrew Bardner.

Q. Who choose the days that you were to go there?

A. I went up at my own convenience.

Q. And who did you take with you?

A. I had two transit men part of the time.

Q. Will you explain how you made these tests?

A. The portion of the upper end of the river I did first, with fifteen foot bambo poles, weighted with strips of lead, and only a small portion sticking out on the top, and a very small flag on that with the number on it. Those I located from intersection points without the aid of the transit.

Q. What is that?

A. Those I located from intersection points, measurements and different ways that I set up along the shore, flag poles which I could use for intersection points and also on the island, and the other ones at the lower end were located absolutely by two transients at different points on the shore.

Q. Where did you start these floats?

A. Well, I covered most all the reservoir.

Q. Starting them at different points?

A. Different points.

Q. Did these floats move rapidly or slowly?

A. Generally according to the velocity of the wind.

Q. Then when it was windy they would move?

A. They would move faster than when it was still.

Q. When it was still how did they move?

A. They would move slowly.

Q. And when there was wind in what direction would they move?

A. Generally the same way as the wind, as a rule, but not always.

Q. Was there any part of this float exposed to the wind itself?

A. Only the bambo floats; there was about six inches of the top of the pole exposed.

Q. How much was in the water?

A. 15 feet.

Q. Have you one of those floats here?

A. Not the bambo ones I haven't. (Witness produces float.)

Q. That is the bottom of the float?

A. There is the top, and this is the bottom connected with the line.

Q. And between the two was a thin bambo pole?

A. No, this is a different float altogether; this is the float I used the last four days; bambo poles I used first.

Q. Describe the bambo poles you used the first day?

A. They were fifteen feet in the water with strips of lead pipe nailed on to them, from the bottom up about half way, so that they would just float about four or six inches; leave about four inches above the surface of the water.

Q. Float in the water perpendicularly?

A. Yes, sir.

Q. What was the diameter of those bamboo poles?

A. About an inch; ordinary fishing poles, from an inch down.

Q. They were so weighted that they would extend down into the water almost perpendicularly?

A. Absolutely perpendicular.

Q. How much of their surface would be exposed?

A. From four to six inches.

Q. Now have you made up a statement of these observations accurately?

A. Yes, sir; pretty much so.

Q. Now the first day, September 22nd, was that the first day?

A. Yes, sir.

Testimony of Andrew Bardner.

Q. What was the direction of the wind that day?

A. North north east, light breeze all day.

Q. Now then just where did you put your first tubes in?

A. Up near the long bridge.

Q. That is at Washington street?

A. Yes, sir; I had three tin tubes that I found up there, and I used them to start in.

Q. What say?

A. I had three tin tubes to start with, tin floats.

Q. That wasn't bambo floats?

A. No, sir; I put those in but found they didn't answer as well as the bambo poles.

Q. Was there any water going over the spillway that day?

A. I believe not, sir; no, sir, there wasn't any water going over the spillway.

Q. And what was the natural flow of the Rockaway then?

Mr. VREDENBURGH: I object to the witness using a map or paper. He is now reading from some map in the hands of Mr. Harrison and Mr. Edwards, which I object to.

Q. Are you reading from notes made by yourself?

A. Yes, sir.

Mr. VREDENBURGH: I object to him reading from notes made by himself.

Q. They were made contemporaneous at the time you did the work—these notes?

A. I compiled them as I went along.

Testimony of Andrew Bardner.

By Mr. VREDENBURGH:—

Q. Are you reading from those that you compiled at that time,—those typewritten ones?

A. These were typewritten since.

Mr. VREDENBURGH: I object to them.

By Mr. EDWARDS:—

Q. Compared with your original notes?

A. Yes, sir.

Q. Where are your original notes?

A. In Paterson—my original notes are right here in this book.

Q. Now then will you tell us what was the first tube you put in?

Mr. VREDENBURGH: Are you reading from the original notes or the typewritten notes?

Q. You can read from the original notes or the typewriting.

By Mr. VREDENBURGH:—

Q. Which do you perfer to do?

A. I prefer to read from this.

Mr. VREDENBURGH: Then I object.

A. I can read from the original notes if you wish.

FURTHER DIRECT:—

Q. Now float No. 1, how long was that?

A. Four feet; a tin tube four feet long.

Q. How far did that travel down the stream or up the stream?

A. It traveled up the stream.

Q. Where to?

A. To a point above the bridge.

Q. How far above the bridge?

A. About 150 feet.

Q. What time did it reach that point of 150 feet?

A. About 5 o'clock in the afternoon.

Q. How long had it been in the water?

A. Since 11 o'clock.

Q. What was the date of that?

A. 22nd.

Q. Well now, what other float did you put in that day?

A. No. 2, ten feet long, that traveled—

Q. When did you put that in the stream?

A. At 11 o'clock.

Q. Whereabouts in the stream?

A. At the same place as No. 1, directly on the lower side of the bridge, in the center of the channel.

Q. How long did that remain in the stream?

A. That remained in until the next morning.

Q. Where did it go to?

A. It traveled down stream, to start with 150 feet directly down stream, and then it headed across to the east shore of the inlet just below the bridge, and the next morning I found it 1,000 feet up the inlet, and above the bridge.

Q. Above the bridge?

A. Above the bridge on the east shore.

Q. What was the third float you put in that day?

A. That was a 15 foot tin tube. That traveled directly down stream 175 feet from half-past three in the afternoon, and I accidentally sunk it there and I didn't see it any more.

Q. What was the next tube you put in, and what number was it?

A. Four and five bamboo poles.

Q. When did you put that in?

A. At 3:30 same afternoon.

Q. Where did you put it in?

A. At the same place as Nos. 1, 2 and 3, immediately below the bridge.

Q. Where did it go?

A. I think it traveled easterly, towards the easterly shore at the inlet, almost parallel with where I put them in.

Q. How far had they traveled at 5:15?

A. Not more than 100 feet.

Q. And where was the next that you put in?

A. Nos. 6 and 7, fifteen feet bambo.

Q. When did you put them in the stream?

A. At 4:15 P. M.

Q. Where did you put it in?

A. 600 feet northeast of the island, that is up the reservoir.

Q. Towards the Parsippany dyke?

A. Yes, sir.

Q. About 600 feet northeast of the island?

A. Yes, sir.

Q. Do you know whose house that was opposite?

A. I don't.

Q. About how far from the shore was it?

A. Probably 2,000 feet.

By Mr. VREDENBURGH:—

Q. Do you find that in your notes?

A. I have them all in here, sir.

Q. Do you find that in your notes?

A. I haven't the distance from the shore, but I can remember it exactly.

Q. That you tell from memory?

A. That is about that distance.

Testimony of Andrew Bardner.

FURTHER DIRECT:—

Q. How did these floats travel?

A. They traveled westerly practically with the wind.

Q. Where did you find them?

A. Found them aground the next morning.

Q. Whereabouts.

A. What I call the north shore; that is the shore nearest the Boulevard; one had traveled about a thousand feet and the other had traveled 2,000.

Q. Had they traveled toward or away from the main dam?

A. Away from the main dam.

Q. What was the next experiment you made?

A. No. 8, 15 foot bambo put in at 4:30 P. M., 800 feet east of Island, traveled northeasterly about 2,500 feet dead against the wind, and was found next morning at 11 A. M., about the center of the reservoir, opposite the Mound; from this point the float circled around with the wind and went aground on the south shore a little west of Old Road, having traveled about 4,000 feet from where it was put in.

Q. Any other floats put in that day?

A. No, sir.

Q. Now then, when was the next day?

A. September 23.

Q. 1906?

A. Yes, sir.

Q. How was the wind that day?

A. Southwest in the forenoon, northeast in the afternoon.

Q. Was the reservoir filling or depleting that day?

A. That I don't remember, without looking at the plan.

Q. Well, come and look at the plan; you made it?

A. There was no water going over the spillway that day.

By Mr. VREDENBURGH:—

Q. What are you looking at?

A. The plan I drew myself.

Q. Looking at a memorandum made by yourself?

A. Yes, sir.

Q. From what source?

A. From my notebook.

Q. All in your note book that you have here?

A. Yes, sir; with the exception of the quantity of the flow; that was furnished me by Mr. Cook.

Q. And by flow you mean the flow over the spillway?

A. Natural flow of the Rockaway.

FURTHER DIRECT:—

Q. Tell us what was the flow in the river that day, from this map?

A. 65 and 2-10 millions.

By Mr. VREDENBURGH:—

Q. Who did you get that figure from?

A. Mr. Cook; he gave me all the river flow.

FURTHER DIRECT:—

Q. You have delineated on your map, haven't you, the direction and force of the wind?

A. Yes, sir.

Q. Now tell us what floats you put in that day?

A. On the 23rd I put in No. 2 and No. 3, tin tubes, put in at 10:20 A. M. in the center of the stream in the inlet, about 700 feet below the bridge.

Q. Now then, how did those floats—

A. Both floats traveled directly out into the reservoir.

Q. Then what became of No. 2?

A. No. 2 never found again; I lost it; and No. 3 I found aground on the south shore.

Q. Of the reservoir?

A. Of the reservoir, near some woods, near the point of the woods.

Q. Was that practically across the reservoir from the river?

A. Almost directly across the reservoir from the Intake.

Q. And away from the dam?

A. And parallel with the dam.

Q. But not toward the dam?

A. No, sir.

Q. What was the next float you put in?

A. No. 6, 11:50 A. M. That is the number of the float.

Q. What kind of a float was it?

A. Bambo, 15 feet and put in 250 feet west of the island, and traveled in a southerly directly with the wind about six hundred feet, around the west end of the island, and I anchored it there over night.

Q. At what time. about?

A. Between five and six o'clock.

Q. Now then, what was the other float you put in?

A. Nos. 10 and 11, put in at 3:20 P. M.

Q. What were they?

A. Bambo.

Q. From those on are they all bamboo.

A. All bamboo.

Q. Until you tell us to the contrary?

A. Yes, sir. Nos. 10 and 11, putin at 3.20 P. M., about the center of the channel, at mouth of inlet, traveled southeasterly about 500 feet in an hour. No. 10 was lost.

Q. Sank you think?

A. Sank I think.No. 11 went aground, and I found

it on September 26th, about 2,000 feet south of the island, having traveled a distance of about 6,500 feet.

Q. Well, that 2,000 feet south of the island, is that close to the Parsippany dam?

A. Near the Parsippany dam.

Q. Were there any more put in that day?

A. No, sir.

Q. When was the next day you were there?

A. September 25th.

Q. How was the wind that day?

A. South, southeast, light to fresh.

Q. Was the water going over the spillway that day?

A. Yes, sir.

Q. Will you tell us what the flow of the river was that day?

A. 47 and 9-10 millions.

Q. Now then, what floats did you put in that day?

A. No. 16 at 12:15 P. M., 700 feet southeast of the island, traveled 600 feet with the wind in four hours and sank. Sank in my sight; I was looking at it.

Q. Now then, the next?

A. No. 15, put in at 12:30 P. M., 900 feet southeast of island, traveled 700 feet with the wind in four hours.

Q. What was the next float?

A. No. 17, put in at 12:35 P. M., 550 feet southeast of island' traveled about 300 feet with the wind, and went aground on south shore of island.

Q. What was the next float?

A. No. 12, put in at 12:50 P. M., 450 feet northwest of island, traveled 400 feet in 3 hours against the wind, and went aground 200 feet north of island.

Q. The next?

A. No. 17, put in at 1:50 P. M., 700 feet northwest of island, traveled easterly about 400 feet at right angles to the wind in 2 hours.

Q. Any more that day?

A. No, sir.

Q. Now the next day?

A. September 26th.

Q. How was the wind that day?

A. South southwest in forenoon, south southeast in afternoon; no water going over the spillway; 37 and 6-10 million gallons.

Q. Going down the river?

A. Natural flow of the river.

Q. What floats did you put in that day?

A. No. 1 put in at 12 noon, 500 feet east of island—

Mr. VREDENBURGH: No. 1 wasn't bamboo.

WITNESS: I changed the number; I didn't use the tin floats any longer after that.

A. No. 1 put in at 12 noon, 500 feet east of island, same place where I took out No. 15 the evening previous; traveled 3,000 feet with the wind in five and a half hours and went aground opposite the Mound.

Q. Any other float?

A. No. 2, put in at 12:10 P. M., 750 feet southeast of island, traveled 3,000 feet with the wind in five and a half hours and went aground opposite the Mound, nearly the same place as the last one.

Q. Any other that day?

A. No. 3 put in at 12:30 P. M., half way between island and dyke, traveled with the wind 200 feet and went aground. No. 5, put in at 12:45 P. M., half way between island and dyke, 800 feet westerly from where No. 3 was put in, traveled with the wind 2,300 feet and went aground on north shore of reservoir opposite island.

Q. Any more that date?

A. No, sir.

Q. What was the next time you went there?

A. September 28th.

Q. How was the wind that day?

A. Southeast all day, very light breeze.

Q. Was there any water going over the spillway?

A. No water going over the spillway.

Q. What was the flow of the river?

A. 19 and 6-10 millions.

Q. Now then what floats did you put in that day?

A. No. 1, put in at 10:40 A. M., 650 feet southeast of island, traveled westerly at right angles to the wind 2,000 feet in 6 hours and was anchored over night.

Q. The next float?

A. No. 7, put in at 10.45 A. M., 400 feet southeast of island, traveled westerly at right angles to the wind 400 feet in 3 hours, and went aground on south shore of island.

Q. Next?

A. No. 8, put in at 12 noon, 800 feet northeast of island, traveled southwesterly at right angles to the wind a distance of 2,000 feet in 26 hours and was still afloat when taken out.

Q. Any other float that day?

A. No. 10, put in at 12:15 P. M., 250 feet northeast of island; it circled under the lee shore of the island all day and was anchored at night. No. 9 put in at 12:45 P. M., 700 feet west of island, traveled at about right angles to the wind 1,000 feet in four hours and was anchored over night.

No. 11, put in at 1:00 P. M., 1,000 feet southeast of island and traveled at about right angles to the wind 700 feet in 4½ hours and was anchored over night.

No. 3 put in at 2:15 P. M., 250 feet southwest of island and traveled southwesterly at about right angles to the wind 300 feet in 3 hours and was anchored over night.

No. 7, put in at 2.15 P. M. 1000 feet southeast of Island and travelled with the wind 500 feet in 3 hours and was anchored over night.

No. 12, put in at 3.15 P. M., 400 feet east of Island, and travelled 600 feet against the wind in 3 hours and was anchored over night.

Q. Is that all for that day?

A. Yes, sir.

Q. Now, will you please tell us the next day you were there?

A. September 29th.

Q. Tell us about the wind?

A. Very light breeze from the northeast until 10 A. M. Light breeze from the south from 10 A. M. to one o'clock, then fresh to southwest.

Q. Any water going over the spillway that day?

A. No water going over the spillway.

Q. What was the flow of the water?

A. 49 and 3-10 millions.

Q. Now then where did you put your floats in that day,—were these the same kind of floats you had been using?

A. I used pine rods, 15 feet pine rods No. 1, 2, 3, 4, 5 and 6.

Q. Describe those rods?

A. About one and a quarter pine sticks tapering off at the top from about three quarters to an inch, that projected above the surface of the water.

Q. How much projected above the surface of the water?

A. About four inches, and a very small flag about three inches square on top with the number.

Q. Weighted?

A. Weighted in the same manner as the bamboo; I also had them in water over night, for 24 hours to get them thoroughly soaked.

Q. What was your object in having such a small proportion of the float out of the water?

A. So as to get the least resistance to the wind as possible.

Q. Would the wind blowing over the surface water have any appreciable effect on these floats?

Mr. VREDENBURGH: Objected to as incompetent.

A. Not very much.

Q. Did the wind have any effect upon the currents in the water itself?

A. Yes.

Q. Now then will you tell us what floats you put in that date?

A. I put in 1, 2, 3, 4 of these pine floats at 9 A. M. 1,000 feet from the dam and parallel with it, about 500 feet apart. They all travelled generally with the wind and went on shore, on the north shore; there were two that did not go ashore.

Q. Any of them go down to the dam?

A. No, sir, they went practically with the wind.

Q. Was that parallel with the course of the dam?

A. About parallel with the dam.

Q. What else?

A. No. 5 and 6, 15 feet pine, put in at 10.30 A. M. at the mouth of Inlet 350 feet apart and travelled with the wind up to the Inlet and went aground on the east shore of the Inlet.

Q. What other ones did you put in?

A. Those were all pine floats used that day, the others were bambooes, the rest of them.

Q. All right?

A. No. 12, weighed anchor 10.50 A. M. 700 feet east of Island travelled 1500 feet with the wind in 4 hours.

No. 10 weighed anchor 10.05 A. M., 350 feet N. E. of Island travelled with the wind 800 feet in 4 hours and went aground on the north shore of Reservoir.

No. 3, weighed anchor 11.10 A. M. 450 feet west of Island, travelled with the wind 1500 feet in 3 1-2 hours.

No. 11 weighed anchor 11.15 A. M. lost.

No. 1 weighed anchor 11.25 A. M. 1200 feet southwest of Island, travelled 500 feet easterly at right angles to the wind in 1-2 hour; then travelled with the wind 1200 feet in 2 1-2 hours.

No. 9 weighed anchor 11.35 A. M. 1700 feet west of Island travelled with the wind 300 feet and went aground.

No. 7, weighed anchor 12.10 P. M. 600 feet south east of Island, travelled about with the wind 700 feet in 3 hours.

Q. Any more that date?

A. That is all that day.

Q. What was the next?

A. November 17th. Wind, very light breeze from the south southeast, almost dead calm.

Q. Can you tell us whether there was water going over the dam that day; over the spillway?

A. Yes, sir.

Q. What was the flow of the river?

A. 67 and 2-10 millions.

Q. Now will you tell us what happened?

A. On this day Doctor Parks was with me in the boat.

Q. Was there any other gentleman there that day, making investigations in the reservoir?

A. Mr. Kutterbach was up.

Q. Anybody not connected with the Water Company there?

A. Doctor Park.

Q. Now where was he from?
A. I believe New York.
Q. But not connected with the Water Co.
A. No, sir.

By Mr. VREDENBURGH:

Q. He was in your boat, wasn't he?
A. He was in my boat?

Mr. EDWARDS:

Q. Watching the experiments?
A. He assisted in making them?
Q. He wanted information on the subject?
A. Yes, sir.

By Mr. VREDENBURGH:

Q. Dr. Parks did?
A. Yes, sir.
Q. Assisted in making them?
A. Yes, sir.
Q. Did I understand you to say he was not connected with the Water Company?
A. Not that I know of.

By Mr. EDWARDS:

Q. What happened on that day?
A. I put in three of the big floats at the bridge before Doctor Park came up there.
Q. What were they?
A. 15 feet long, and they traveled up stream only a short distance probably; they traveled slowly up stream and found next morning 200 feet above the bridge; they traveled very slowly, it was almost a dead calm at that time.

Q. Now the next float?

A. We took out No. 3 and put it in at the other side of the Inlet and it traveled in the same direction as the first three.

No. 5. 15 foot bamboo 10 feet line and sinker, put in at 3.15 P. M. in the center of the Inlet about 800 feet below the bridge, traveled slowly up stream during the remainder of the afternoon, and was found next morning aground opposite Fanny Road on the west shore of the Inlet.

Q. The next one?

A. No. 6.

Q. What was that?

A. We put in Two 15 foot bamboo poles put in at 3.30 P. M. in center of Channel at mouth of Inlet, traveled up stream during the remainder of the afternoon, and were found aground next morning on the east shore of the Inlet 200 feet above the point. No. 7 traveled in comething the same manner to start with, but was found on the west shore the next morning.

Q. Whereabouts?

A. 600 feet from the point at the Mound on the west side of the Inlet.

Q. What other?

A. No. 8, 15 foot bamboo 30 feet line and sinker put in at 3.45 P. M. about 1000 feet S. S. E. of point at east side of mouth of Inlet, traveled easterly during the remainder of the afternoon and was found next morning about 7 o'clock 800 feet southwest of where put in.

Q. What was the object of putting the sinker on?

A. I believe Dr. Park wanted to try if there was a different current deeper than in the surface.

Q. This made a total depth then of how much?

A. 45 feet.

Q. What was the next?

A. No. 8 1-2, surface float put in at same time and place as No. 8, and traveled with the wind during the afternoon to a point opposite the point at the east side of the mouth of the inlet about 200 feet from shore when last observed.

Q. By the way, on this particular day who dictated the experiments that were to be made?

Objected to.

Q. Did anyone dictate them?

Objected to as incompetent.

A. No, sir, Doctor Park suggested some and I suggested the others; he only had to satisfy himself.

Q. Some of them he directed?

A. Some of them he directed.

Mr. VREDENBURGH: Question and answer objected to because Doctor Parks does not appear to be any authority to make any direction whatever, and a statement by this witness of what Dr. Parks said is heresay.

Q. What is the next?

A. No. 9, one 15 foot bamboo, 50 feet line and sinker put in at 4.00 P. M., traveled southwesterly at about right angles to the wind and was found next morning at about 7 o'clock about 650 feet southwest of the point where put in.

Q. Was there anything peculiar about the wind that day?

A. Wind remained about the same until the floats were collected next morning.

Q. Now then when was the next day yau made your experiments?

Testimony of Andrew Bardner.

A. November 30th. Wind light, steady breeze all day from the southwest.

Q. Could you give us any estimate of the velocity of that breeze?

A. On that day?

Q. Yes.

A. Probably between three and five miles an hour.

Q. Now what kind of floats were used that day?

A. The same as these.

Q. Well, what is these?

A. Tin floats, fiilled, or nearly filled with water, to act as a sinker and line attached to them, and this surface float.

Q. How deep down were they?

A. They float level with the cone of the float, so that there is nothing but the cone of this wooden float projecting above the surface of the water.

Q. How long was the line?

A. I had them various distances.

Q. Will you tell us as you go along?

A. Yes, sir, there were three floats, one ten feet, one twenty and one thirty. Nos. 1, 2, and 3, put in at 1.55 P. M. about center of channel at mouth of inlet traveled about with the wind. No. 1, 650 feet in 2 hours, 26 minutes. No. 2, 400 feet in 2 hours 20 minutes. No. 3, 400 feet in 2 hours 20 minutes and were found aground next morning on east shore of inlet in cove around point.

Q. Tell us which ones went the slower, the deeper or the shallow one?

A. The deep float traveled slowest in every instance.

Q. What was the next float you put in that day?

A. 4, 5, and 6. No. 4 was ten feet. No. 5, thirty feet and No. 6, fifty feet.

Q. All of those were tin floats ?

A. Yes, sir. Put in at 2.30 P. M. about 1600 feet

from the Dam opposite the Gate house. No. 4, traveled directly with the wind 1300 feet in 1 hour, 54 minutes; and would in all probability arrive at the over-flow about 5.30 P. M. By chaffing on the masonry of the spillway, the line cut as I found the wooden float down the river below the dam.

No. 5, 750 feet in one hour 52 minutes, a little more to the north than No. 4 and would in all probability arrive at the over-flow about 8 P. M. and was found at the over-flow next morning. No. 6 travelled 530 feet in one hour and fifty four minutes, a little more to the north than No .6, and was found aground next morning 200 feet from over-flow.

Q. Then most of the 4, 5 and 6 were toward the over-flow?

A. Yes, sir, in that direction the deeper floats traveled more to the north than the shallow float.

Q. They traveled toward the overflow and not toward the gate house?

A. Toward the over-flow.

Q. Where were they put in, relative to the gate house?

A. About 1600 feet from the dam, opposite the gate house.

Q. But they were between the mouth of the river and the gate house?

A. Yes, sir.

Q. Direct line?

A. Yes, sir, almost a direct line.

Mr. VREDENBURGH.

Q. In order to ascertain that you look at the map?

A. Just to refresh my memory on it, that is all.

By Mr. EDWARDS.

Q. You made the map?

A. I made the map.

Q. Now then the next place?

A. That was all that day.

Q. Yes.

A. December 5th. Wind was light breeze from 6 A. M. to 11 A. M. from the southwest; from 11 to 2 P. M. blowing one-half gale from northwest; from 2 P. M. to 3 P. M. steady breeze from west, northwest; from 3 P. M. to 5 P. M. light breeze from west, southwest.

Q. Tell us the condition of the river on November 30th, was there any water flowing over the spillway?

A. No, sir.

Q. Are you sure about that?

A. Yes, sir.

Q. What was the flow of the river?

A. 56 and 5-10 millions.

Q. Wasn't the water going over the spillway?

A. November 30th, there was water going over, excuse me.

Q. December 5th, tell us what was the natural flow of the Rockaway that day?

A. 47 millions.

Q. Was there water going over the spillway?

A. Yes sir.

Q. Now tell us about the floats on that date?

A. Tin floats.

Q. What kind of floats were you using?

A. Same as this one. No. 4, 10 foot float; No. 5, 30 feet float, and No. 7, 40 foot float. Put in at 9.-25 A. M. about center of reservoir opposite inlet; they all travelled almost directly with the wind and went aground on south shore of reservoir. No. 4 travelled nearly twice as fast as No. 7; 6 and 7, travelled at about the same rate.

Q. How did Nos. 5 and 7 compare with each other in rapidity?

A. They traveled about the same rate of speed, that is the 30 foot float and the 40 foot float.

Q. What other floats did you use that day?

A. No. 1, ten foot, No. 2, 20 foot, No. 3, 30 foot.

Q. When did you put them in?

A. Put in at 9.55 A. M. 400 feet south of inlet opposite center of same; they all traveled almost directly with the wind and went aground on south shore of reservoir. No. 1 traveled about twice as fast as Nos. 2 and 3.

Q. And that was the south shore of the reservoir away from the dam?

A. The shore opposite the inlet, at the other side of the reservoir from the inlet.

Q. Now then what other?

A. Nos. 1, 2, 7, 5, 3 and 4, the same depths that I had been using them; put in about 3 P. M. 700 to 1000 feet from the dam and about 300 feet apart. All floats traveled in the general direction of the wind, the deep floats traveling the slowest.

Q. What happened, give us the weather conditions?

A. Weather conditions had not changed.

Q. Did it veer after that?

A. Yes, sir.

Q. What happened then?

A. The weather conditions weren't changed by the time they arrived at the dam, and that would be during the night some time.

Q. Yes.

A. And the wind veered around by the south, the next morning it was very light from northeast.

Q. What happened then?

A. Well, the floats, some of them had gone back up the reservoir, only one of them remained at the dam.

Q. What were they, give us the number, where they went?

Testimony of Andrew Bardner.

By Mr. VREDENBURGH.

Q. That was the next day was it?

A. Yes, sir, the next day, it was almost calm at the time, very light breeze. About noon next day No. 1 was 350 feet from the dam. No. 2 was 2500 feet from the dam. No. 7 was 500 feet from the dam. No. 5 was 1600 feet from the dam. No. 3 was at the dam, and No. 4 was aground on the north shore 1300 feet from the dam.

Q. That completed the experiment for that day?

A. Yes, sir.

Q. What was the next day you were there?

A. December 14th. Light wind to fresh steady breeze all day from the east northeast.

Q. Tell us what the condition was at the dam, was the water going over the spillway?

A. Yes, sir, water going over the spillway?

Q. What was the flow in the river?

A. 134 and 1-10 millions.

Q. Was that the largest flow of the experiments?

A. Yes, sir.

Q. What happened that day?

A. Used the same tin floats. No. 1, ten feet. No. 2, twenty feet, No. 3, thirty feet, put in at 9.50 A. M. in center of reservoir between Mound and point of woods, traveled directly with the wind and went aground on north shore. Then where I put in Nos. 4, 5, 7 put in at 10 o'clock, 500 feet nearer mound than Nos. 1, 2 and 3 traveled the same as Nos. 1, 2 and 3 and went aground.

Q. What else?

A. Then I put in No. 1, 4 and 7 put in at 2.10 P. M. in center of reservoir 1200 feet southwest of Mound and 1600 feet east of island, traveled with the wind and was taken out.

Q. That is toward the Parsippany dyke?

A. No, they were travelling towards the north shore, the northwest shore.

Q. Away from the—

A. Away from the dam.

Q. Now, in all your experiments where did you find the greatest movement with the same amount of wind?

A. A little northwesterly of the island.

Q. Towards the Parsippany dyke?

A. Towards that end; yes, sir.

Q. In all your experience did you find any indication of any well defined,—or indications of a current in the reservoir?

Mr. VREDENBURGH: Objected to as illegal, incompetent.

A. No, sir.

Q. Did you find any indications of a current from the river to the dam?

Mr. VREDENBURGH: Objected to for the same reason.

A. No, sir.

Q. Did you make a map upon which these experiments were traced?

A. Yes, sir.

Q. Was it a map made accurately?

A. Practically so.

Q. Is this the map that I have before me?

A. It is.

Sworn to before me,
(the signature being waived)
this 22nd day of November,
1906, at Jersey City, N. J.

Mr. EDWARDS: I offer the map in evidence.

Said map marked Current Map, December 22, 1906, for identification.

Adjourned until Monday, December 24, 1906, at the same time and place.

IN CHANCERY OF NEW JERSEY.

Between

THE MAYOR AND ALDERMEN OF JERSEY CITY,

Complainants,

and

THE JERSEY CITY WATER SUPPLY COMPANY,

Defendants.

Taking of depositions, etc., in the above stated matter, before the subscriber, Walter J. Knight, Master in Chancery of New Jersey, at the office of Messrs. Collins & Corbin, 243 Washington street Jersey City, N. J., on Monday, the 24th day of December, 1906, at the hour of ten o'clock in the forenoon of said day, in the presence of Mr. Vredenburgh and Mr. Record, counsel for the complainants, and Mr. Corbin and Mr. Edwards, counsel for the defendants.

Said depositions being taken in shorthand, question and answer in full, and the signatures of the witnesses thereto waived.

Testimony of Andrew Bardner.

ANDREW BARDNER, recalled for:

FURTHER DIRECT EXAMINATION by Mr. Edwards:

Mr. EDWARDS: Do you want me to prove by Mr. Cook the flow of the river and all those things, Mr. Vredenburgh?

Mr. VREDENBURGH: Yes, sir.

Q. Now, Mr. Bardner, do you wish to change—you called my attention to some testimony you gave on the first day, December 22nd, 1906, with regard to the numbers of the floats?

A. Yes, sir.

Q. Have you any change to make in your testimony?

A. No. 3 on that statement I used, I described as No. 1; float No. 1 is No. 3.

Q. How did that happen?

A. I was testifying from memory at that time; I had an idea in my mind that the short float was No. 1; it was merely a mistake in the number.

CROSS EXAMINATION by Mr. Vredenburgh:

Q. Mr. Bardner, this map that has been marked for identification, I understood you to say that you made?

A. Yes, sir.

Q. The inscription "Jersey City Water Supply Co. Map of Boonton Reservoir, showing float experiments, September, November and December, scale 200 feet to the inch, 1906," was written on it by you?

A. Yes, sir.

Q. Now, you say scale 200 feet to the inch; how did you determine that scale?

A. By measurements.

Q. What measurements?

A. Measurements on the dam.

Q. By the dam, you mean the main dam?

A. Yes, sir.

Q. You have marked on this map the main dam?

A. Yes, sir.

Q. What measurements did you make on the main dam to determine the scale?

A. I measured off on the main dam at every five hundred feet; I measured the whole dam to ascertain the number of feet which corresponded with the original map,—the outline map from which I traced this map.

Mr. EDWARDS:

Q. From which yau traced the outline of the reservoir as shown on this map?

A. Yes, sir.

FURTHER CROSS:

Q. You say you measured the main dam?

A. I measured this on the main dam.

Q. What part of the main dam did you measure?

A. From the center of the gate house both ways.

Q. Is the gate house shown on this map?

A. Yes, sir; here it is (indicating).

Q. Now, from the gate house, you measured towards the overflow,—what you have marked on here "over-flow?"

A. Yes, sir.

Q. And when you speak of the over-flow you mean the same thing as is sometimes called the spillway?

A. Yes, sir; exactly.

Q. Now, from the gate house to the over-flow is how many feet?

A. 1333.

Q. And from the gate house, measuring in the other direction on the dam was how long?

A. Well, the object of measuring this was to set the flags over here (indicating).

Q. Well, don't say that,—the object of measuring from the gate house in the opposite direction was to put the flags on the land, or earth filling?

A. Yes, sir.

Q. In the opposite direction from the spillway?

A. Yes, sir.

Q. To fix a datum line?

A. Yes, sir.

Q. What was that part there for?

A. I put the flags all along the dam every five hundred feet to assist me in locating points upon the reservoir, when I would be out in the boat, and I put flags back of them so as to produce a line with the two flags at right angles behind them.

Q. Now, what was the distance, do you say, from the gate house on the dam measuring in the opposite direction?

A. I did not measure exactly to the end of the dam; I did not want to use the end of the dam at this point; it is probably two hundred feet.

Q. I wanted to find out how you determined that the scale was two hundred feet to the inch, and you say that you measured the dam, you did not measure the whole dam, for that purpose; you only measured for that purpose, from the gate house to the over-flow; is that what you mean?

A. Yes, sir.

Q. How did you determine when you found that distance that this map was on a scale of two hundred feet per inch?

A. I also tri-angulated from this line to the base of the dam at different points on the shore, and set up the transit line.

Q. You tri-angulated from what point?

A. From the base line that I measured along the dam.

Q. Do you refer to the base line from the gate house to the over-flow?

A. One hundred feet THIS way; the base line I used was 1100 feet,—well, 1000 feet THAT way (indicating), and 100 feet THIS way (indicating); I used an established point to take the floats from.

Q. But how do you fix your scale as 200 feet per inch; I understood you measured the dam; then you said you measured the dam from the gate house to the over-flow; now, you say you measured 1100 feet on the dam.

A. I measured the total distance, but only used 1100 feet of that distance, and the base line is THAT side of the gate house.

Q. How did you ascertain that two hundred feet to the inch—you say you measured 1000 feet from the gate house to this spillway and one hundred feet from the gate house in an opposite direction?

A. I measured the total distance of the whole thirteen hundred and thirty-three feet.

Q. Well, how did you ascertain from that, that the scale of this map was two hundred feet per inch?

A. Because it scaled that; that is one reason; and from the base line I tri-angulated along the shore to different points, and up to the other end of the dam; and it plotted out with the original map from which I drew the outline, on this tracing, of the reservoir, and the original map was so stated to be two hundred feet to the inch.

Testimony of Andrew Bardner.

By Mr. EDWARDS:

Q. And you proved it?
A. Yes. sir; I checked it.

FURTHER CROSS:

Q. When was it—where did you put your flag mark on this map—where you put your flags—for the purpose of triangulation in order to ascertain or help you ascertain that two hundred feet per inch was the proper scale?

A. One hundred feet from the gate house.

Q. Put some little mark on the map in pencil?

A. I put a flag here (indicating).

Q. Well, where did you put your flags.

A. Flags were put every five hundred feet.

Q. On the dam,—every five hundred feet on the dam?

A. Yes, sir.

Q. Where did you put your flags on the shore?

A. One here (indicating) 1000 feet on a point in my base line, 7 feet back from the base of the dam parallel with the base of the dam.

Q. That second flag you speak of was one thousand feet; did you put a flag there?

A. No, sir; not in that exact spot.

Q. Then you put no flag?

A. I did have a flag there at one time.

Q. Well, when you waited to make this tri-angulation for the purpose of ascertaining the two hundred feet to the inch,— where did you put your flag?

A. The point I used for tri-angulation was one thousand feet from the gate house, measured on the dam.

Q. Did you put a flag there for tri-angulation purposes?

A. No, sir; I set up an instrument there.

Q. Did you put a flag at a point one hundred feet from the gate house?

A. No, sir; I put another instrument there.

Q. Where did you put flags up, is the question?

A. I put flags up every five hundred feet along the dam.

Q. For tri-angulation purposes?

A. No, sir.

Q. Where did you put flags up for the purpose of tri-angulation?

A. The point I determined upon was there (indicating).

Q. Mark that?

A. And another here.

Q. You put up flags there?

A. Yes, sir.

Q. And you used those flags for the purpose of tri-angulation?

A. Yes, sir.

Q. Where are your figures showing tri-angulation —give them to us?

A. I produce a page in my book; the book which I produce is my book of original entries, and I show you on that page a pencil diagram or sketch, and in that I have marked certain figures and angles, which represent,—the bottom represents the dam, and the upper point the two flags on the shore.

Q. To which you have referred?

A. Yes, sir.

Q. Now, this one on the shore is near where, the old road?

A. Near the point of the old road.

Q. Angle in the old road?

A. Yes, sir; on the south side of the reservoir.

Q. Which you call the south side of the reservoir?

A. Yes, sir.

Q. Now, you say you have shown the dam on this

sketch, according to the scale you have made?

A. As regards the length of it; it may not be absolutely the width of the dam.

Q. Did you put that there yourself,—that dam?

A. On this paper?

Q. Yes?

A. Yes, sir.

Q. Now, you say you took this from some other map; the second point at which you put your flag, is on what you call, the north side of the reservoir, and is shown here by a pencil mark with a dot between, and it is what you have designated in your testimony as the mound, is that it?

A. The mound; yes, sir.

Q. Now, the old Rockaway river you have also shown upon this map by a continuous line below the dam, and a dotted line above the dam, where did you get those facts from?

A. From the original map.

Q. Then this map is a sketch or tracing from another map?

A. Outline of the reservoir,—the flow line of the reservoir and the dam, etc., is a tracing from the original map; I used that to show the flow.

Q. Well, what map was it you traced it from?

A. The original property map; it is here in evidence.

Q. Do you know it has been in evidence of your own knowledge?

A. No, I could not say that.

Q. Now, this map that you traced it from, who gave it to you?

A. It is on file in the Paterson office.

Q. Well, you say the Paterson office; what Paterson office do you refer to?

A. The Jersey City Water Supply Company, 158 Ellison street, Paterson.

Q. Is the building owned by the Jersey City Water Supply Company?

A. I don't know.

Q. Do they occupy the whole building?

A. The Jersey City Water Supply Company does not occupy the whole building.

Q. What place in their office did you get it from?

A. Out of the safe vault.

Q. Whose vault?

A. Jersey City Water Supply Company.

Q. Are they the only ones that use the vault?

A. No, sir.

Q. What others use it?

A. East Jersey Water Company.

Q. How do you distinguish what part of the vault is the Jersey City Water Supply Company's, and what part is the East Jersey Water Company's?

A. The plans were kept in the same vault, but under a different index and in a separate place.

Q. What do you mean, index in a book or what?

A. There is a card index there.

Q. And under that card index there is a different name for the Jersey City Water Supply Company?

A. There is a different index,—a separate index for the Jersey City Water Supply Company.

Q. What do you mean by a separate index?

A. Well, I mean an index that only contains maps belonging to the Jersey City Water Supply Company.

Q. How did you get access to that index?

A. I had access to it every day.

Q. In whose employment are you now?

A. Well, I work for the Passaic Water Company, the East Jersey Water Company and the Jersey City Water Supply Company.

Q. What do you do?

A. Anything that comes along.

Q. What do you mean by anything that comes along?

A. Drafting, leveling, designing, any office work.

Q. Any kind of office work?

A. Chiefly drafting work and office work.

Q. Drafting work; now. this map that you found; you found it merely by looking at an index and finding it in that way in the vault; is that the way you found it?

A. I didn't have to look at the index, but found it because I knew where it was.

Q. You knew whereabouts in the vault it was?

A. Yes, sir.

Q. How long have you been working for the East Jersey and the Passaic Company, do you say?

A. I first commenced with the East Jersey Water Company when they went into business in 1889, and I have been working for them ever since, with the exception of four years.

Q. When did you go back to that last?

A. A little over a year ago.

Q. That is some time in November, 1905?

A. Yes, sir.

Q. How do you know that the map from which you took this map was in their papers in the vault and was known to you that you did not have to go to the index?

A. Before I had occasion to use the original map to get this outline from, I had on several occasions worked on that map.

Q. As a draftsman?

A. Well, taking information from it, property lines, etc.

Q. You had occasion heretofore to work some on this map?

A. Yes, sir.

Q. And so you knew where it was?

A. Yes, sir.

Q. And you went and got that without anybody telling you, and you had a tracing of that map which is the foundation of this map?

A. Yes, sir.

Q. What, on this map, did you get from that map?

A. Nothing inside the outline of the reservoir.

Q. Nothing inside of the flow line of the reservoir shown on this map?

A. And the bridge, and the island, and the old river bed.

Q. You have mentioned all now, have you?

A. I believe I have, sir.

Mr. EDWARDS:

Q. You got those adjoining streets, I suppose?

A. Yes, sir; those were outside of the line.

Mr. VREDENBURGH:

Q. Was the Parsippany dyke shown upon it, too?

A. On the original map?

Q. Yes?

A. Yes, sir.

Q. Now, the flow line as you show on here was the flow line as shown on that map; is that so?

A. This is traced from it, sir.

Q. Well, then, it is?

A. Yes, sir.

Q. Does it vary from day to day?

A. The flow line?

Q. Yes, actually in the reservoir?

A. Not noticeable.

Q. Not sufficient to notice it?

A. No, sir.

Q. Now, you have shown on here a compass being the ordinary arrow at the north point; from what source did you get that?

A. I took that from the original map.

Q. You didn't test it in any way?

A. Not that line that is there; I did these.

Q. Well, now, there?

A. I didn't test the arrow near the top of the map, but I did test those in the circles.

Q. How did you ascertain the long bridge shown on this map?

A. I already stated that that was taken from the original map.

Q. Long bridge was also?

A. Yes, sir.

Q. Now, you say that the circles you did test, the points of the compass?

A. Yes, sir.

Q. Do they show the magnetic north or the true north?

A. The magnetic north.

Q. How does that differ from the true north?

A. Between eight and nine degrees, I believe.

Q. Which way?

A. The west.

Q. Does the arrow show the true north or the magnetic north?

A. Supposed to be the magnetic north.

Q. Well, the true north then is some degrees to the east?

A. Yes, sir; about eight and a half to the east.

Q. Why did you show the magnetic north instead of the true north?

A. Most convenient and most generally done.

Q. Well, it also has a tendency to show the river as flowing in accordance with your contention, more than if you showed the true north, don't it?

A. Not that I know of.

Q. Isn't it apparent on the face of it?

A. The relation is relative to the magnetic north just the same.

Q. Did you ever know of any map that was made with a magnetic north instead of the true north, in the compass?

A. Yes, sir.

Q. Now, Mr. Bardner, I see that the marks inside of the reservoir are shown of different colors; what is the meaning of that?

A. The colors; I used one color for the day, and the same color corresponds with the direction of the wind shown here.

Q. The different colors indicate each day?

A. Black on September 22nd.

Q. What on September 23rd?

A. Excuse me for one moment; in the second few days I had to use the same colors over again; the second two last days the same color as the first day, and the fifth.

Q. The first day is black?

A. Yes, sir.

Q. That is on the 22nd; now, the 23rd was what?

A. Neutral.

Q. What color is neutral?

A. It is quite dark, and shown on the tracing; it shows quite dark.

Q. Now the 24th?

A. 25th was the next day, and that was brown.

Q. 26th?

A. Blue.

Q. 28th?

A. Green.

Q. 29th?

A. Red.

Q. November 17th?

A. Yellow.

Q. November 30th?

A. Black again.

Q. December 5th what color?

A. Blue again.

Q. December 14th?

A. Green again.

Q. Now, you said you worked for the Government one season,—what season was that?

A. 1889.

Q. 1889?

A. Yes, sir.

Q. And for how long did you work for them that season?

A. From early spring until late fall.

Q. You don't remember dates?

A. No, sir; it was some time in March—until October.

Q. Where did you work?

A. In the vicinity of New York and the River and Harbor Improvement.

Q. Where did you work personally?

A. In the field.

Q. And by the field you mean, what?

A. I was first transit.

Q. And on what, on land or boat?

A. Always on land with a transit.

Q. And what did you do as transit man?

A. We were using two transits, and the points that were in the water were located by taking angles on to them.

Q. You were trying to get angles?

A. Reading angles on a given point in the water.

Q. Did you also act as draftsman?

A. No, sir.

Q. For what purpose did you make these angles?

A. They were for the improvement on the different channels for dredging purposes.

Q. Well, what did you do yourself in the way of ascertaining about currents?

A. Made up the notes.

Q. Whose notes did you make up?

A. Well, I was making up all the notes in the party.

Q. Well, what notes did you make up?

A. All field notes.

Q. Field notes, but with reference to the currents?

A. I don't quite understand you.

Q. Well, you say that you made up the notes of somebody,—what do you mean by making up the notes, and whose notes did you make up?

A. The other transit men and my own, and the men in the boat, compiled them into form and turned them into the New York office.

Q. That is, you took your transit notes—you took the notes of the other men who were also making transit angles,—and then what other notes,—the notes of who else?

A. The man in the boat.

Q. What do you mean by that?

A. Taking soundings.

Q. There were men in the boat taking soundings?

A. Yes, sir.

Q. What soundings—where in New York Harbor?

A. Different places.

Q. In New York Harbor?

A. No, sir; Raritan river, South river, Passaic river and Hackensack river, and a number of other places.

Q. Taking soundings—that is the depths of the water, you mean?

A. Yes, sir.

Q. What other notes did you have?

A. We had also float measurements.

Q. No, you personally, that you made up, what notes did you make up besides those you mentioned?

A. Those were all that had to be made up, except tri-angulation.

Q. You told us you made up the transits and you made up soundings, were there any other notes you made?

A. Float measurements, that is the current measurements.

Q. Who made the measurements?

A. Well, all parties combined.

Q. What had you to do with the floats, if anything?

A. I located them.

Q. Located what?

A. The floats.

Q. How?

A. By the transit.

Q. Well, how, with the transit?

A. By the aid of another man, two transits, by angles.

Q. How did you know where the float was?

A. There was a party out in a boat.

Q. They told you where the float was?

A. They would be right along side of the float.

Q. What was the size of the float?

A. It had a flag on it.

Q. What was the size of the float?

A. Well, the flag on the float would be at least a foot square.

Q. What was the size of the float?

A. Used various kinds of floats.

Q. What was the size of the float that you tri-angulated?

A. The flag was a foot square with probably from 12 to 18 inches of rod holding it up above the water.

Q. What was the size of the float?

A. That stick was on a piece of wood on the surface.

Q. What was the size of that piece of wood?

A. Various sizes.

Q. The one you measured?

A. We took an eight inch board.

Q. What did you do?

A. About eighteen inches long and stuck the stick in it.

Q. Eighteen inches long and stuck a stick in it?

A. With a flag on the stick.

Q. What other kind of float did you use?

A. From that was suspended a deep float,—some deeper.

Q. What do you mean by that—that particular board that you refer to, you say from that was suspended a float underneath?

A. No, sir; that board that I have described acted as the surface float, and then it was weighted with another float at any given depth that might be required; we some times used ordinary soap boxes and put stones in to sink it, and connected that with a line to the surface float on the top of the water.

Q. Well, how did you connect it with a line?

A. With a piece of rope.

Q. What was the size of this soap box?

A. About so thick, perhaps, (indicating).

Q. How many feet?

A. A little longer than square, about two feet by eighteen inches; something like that; and we used tin tubes.

Q. Now, this soap box, did you have anything to do with the soap box?

A. Yes, sir.

Q. What?

A. I guess I went and bought it at the start, filled

it with stone and weighted it.

Q. Where did you buy it?

A. In a store on Staten Island.

Q. And you put stone into it yourself?

A. Yes, sir.

Q. Then where did you take it?

A. It was put into the boat and taken out into the channel.

Q. Who had charge of that party?

A. C. L. Kelsey.

Q. Who was the first assistant under him?

A. I was, and I had charge in his absence.

Q. Now, that float was used where?

A. In Arthur Kill.

Q. For what purpose?

A. Determining the current.

Q. What current?

A. In the channel.

Q. In what channel?

A. Arthurs Kill.

Q. Whereabouts in Arthurs Kill?

A. Between Elizabethport and Staten Island and up as far as the Central Railroad bridge.

Q. Between the Central Railroad bridge over what?

A. Over the Newark Bay.

Q. The Newark Bay, that was used for the purpose of determining the current between the Central Railroad bridge and Arthurs Kill, between Elizabethport and Staten Island?

A. Yes, sir; a little lower than Elizabethport.

Q. And what depth of current was it?

A. I don't remember.

Q. That you wanted to find out?

A. I don't remember just exactly, we used several of them at various depths.

Q. For what purpose?

A. To determine what current there was there.

Q. For what purpose?

A. For dredging purposes, for the improvement of the canal.

Q. Did you use that soap box for determining the depth of the current you wanted?

A. Not for determining the depth of the current? 10

Q. What then?

A. Determining the velocity of the current.

Q. At what depth?

A. At given depths, different depths; I don't remember the depths we used.

Q. Well, why did you need the velocity of the current at the certain depths, in order to enable the Government and contractor to do dredging?

A. Well, I believe, I don't know personally, but 20 I believe it was to determine on what would be the best available depth to make the channel, or to dredge the channel to a given depth.

Q. Now, you said you used something else besides soap box, what else did you use,—barrels?

A. Tin tubes.

Q. What was the tin tube you used?

A. What we generally use for such purposes.

Q. Describe them, won't you?

A. About an inch and a half in diameter, some- 30 thing like that.

Q. A tube about an inch and a half in diameter, and how long?

A. From five to ten feet.

Q. Well, which—five to ten feet?

A. Both.

Q. You had one tube of five feet and one tube of ten feet?

A. I believe we had three tubes, varying depths from one to ten feet. 40

Q. One was five, one was ten and one between?

A. Yes, sir.

Q. How did you use those tubes?

A. They were weighted with water.

Q. Yes.

A. And a little flag put in the top of them, put in just the same as we put in the soap box, and located with the transit.

Q. And the question to determine was what the speed of those tubes was, when placed in the Kill or in the waters of the Newark Bay east of the Central railroad bridge?

A. Yes, sir.

Q. Those tubes were, I suppose used so that they should be full of air, no water allowed in them?

A. We nearly filled them with water to make them float perpendicularly.

Q. Weighting them with water made them float perpendicularly?

A. Yes, sir.

Q. And a little was left above the water on which you put this flag?

A. We didn't quite fill them.

Q. Now have you had any other experience except that in ascertaining the direction of currents?

A. I have assisted in taking measurements at various times.

Q. When first?

A. Since I have been employed by the East Jersey Water Co.

Q. When?

A. I don't remember just the time now, it was in the Morris Canal.

Q. Where?

A. At Little Falls.

Q. You don't remember when. A year ago?

A. It is quite a number of years ago.

Q. What was the purpose of ascertaining the current in the Morris Canal?

A. I don't know.

Q. How long were you engaged at that?

A. One day I think.

Q. How did you ascertain the current there?

A. I said by a tin tube.

Q. And where?

A. On the flume over the Passaic river, the Acqueduct.

Q. Now how long was the Government experimenting that year with these floats in the Newark Bay.

A. I think we ran floats there about three days.

Q. And what other experience have you had in the ascertainment of the current up to the time that you went to the reservoir?

A. I think that is about all.

Q. Did you ever see the floats which the Government has made for the purpose of measuring currents?

A. Only the ones we made there.

Q. That is all you have seen?

A. Yes, sir.

Q. Did you make any soundings—are there any soundings indicated on this map?

A. There are none indicated on the map.

Q. Did you make any yourself?

A. Yes, sir.

Q. Where did you sound?

A. At different places where I put in a set of floats, I think I sounded there.

Q. Well now there, what is that—you sounded where?

A. At the point marked "A" on the map, eighty feet of water.

Q. At "A" you made a sounding and found eighty feet of water?

A. Yes, sir.

Q. What did you make the sounding with?

A. Steel tape, weighted.

Q. Where else did you make a sounding?

A. At four other points.

Q. At four other points you made a sounding?

A. Yes, sir.

Q. Now at "B" did you make a sounding?

A. Yes, sir, December 5th.

Q. How many feet did you find there at "B"?

A. Forty-four feet.

Q. Now, what was the next one?

A. At the place marked "C" on the map, I also sounded, sixty-six feet.

Q. What is your next one?

A. On December 14th, at place marked "D" on the map; forty-five feet.

Q. Now where is the next one?

A. 31 feet, 34 feet and 32 feet at the place marked "E" on the map.

Q. The one nearest the dam is how deep?

A. 31 feet.

Q. And the next nearest the dam?

A. 34 feet.

Q. And the one furthest from the dam?

A. 32 feet.

Q. And they are all marked "E," that is you have marked "E" for all of them?

A. Yes, sir.

Q. And they are all in a bunch?

A. Yes, sir.

Q. They were made on December 14th, and I suppose the soundings were all made in the same way?

A. Yes, sir, with a steel tape.

Q. Where is the next one?

A. On December 14th, thirty-six feet at the place marked "F" on the map.

Q. What is the next one?

A. That is all.

Q. On this map you have shown a square thing marked "Key" what is the meaning of that?

A. It is a reference; it is a key to the map.

Q. And it is accurate, is it?

A. Yes, sir.

Q. Those things that you have marked on outside of the map, except the circles indicating the compass are taken from the other map, I suppose?

A. Yes, sir.

Q. What you have added in on the other map, outside of the flow lines are these circles indicating the compass point?

A. Yes, sir.

Q. Now how did you ascertain the compass point for those circles?

A. The last three days I ascertained that the transit—these ones which represent these floats up here, the upper part of the reservoir I located just in a general way, from the direction I knew the north was in.

Q. Then as I understand you the circle marked the 30th of November and the 5th of December and the 14th of December, you found from the compass and the transit?

A. Yes, sir.

Q. And all the others you found in what way?

A. From the way the direction I knew in which the north line was.

Q. The general knowledge of the way the north was?

A. Yes, sir.

Q. Did you use the compass on your own map—on this map here—this big arrow that you have here?

A. No, sir.

Q. Didn't use that at all?

A. No, sir.

Q. Now when you say you knew where the north was, do you refer to the true north or the megnetic north?

A. The magnetic north.

Q. How did you know where the magnetic north was?

A. The dam runs almost north and south.

Q. Do you refer to the true north or magnetic?

A. Magnetic.

Q. When did you find that out?

A. Found it, the day I had the transit.

Q. And that was on the 30th of November, as I understand?

A. On the 30th of November, but I knew that before that; that is when I found out myself that the dam ran pretty nearly north and south, but I knew that was the direction of them before I went there.

Q. Somebody else had found it out, but that day you found it out, is that the idea?

A. Yes, sir.

Q. Now you found it out by comparing the transit in the compass, did you say?

A. Reading the compass, yes, sir.

Q. The compass indicates the magnetic north?

A. Yes, sir.

Q. And by putting the transit on the dam you could tell whether that transit ran north and south according to the magnetic north?

A. Yes, sir.

Q. You have marked on here, on the 22nd of September, you have the different points of the compass shown, and you also mark on here the natural flow of Rockaway river equals 26,000,000 gallons. Now, where did you get that from?

A. From Mr. Cook.

Q. When did you get it from Mr. Cook?

A. Quite lately some day last week I believe.

Q. And that you wrote on then, some day last week?

A. Yes, sir.

Q. Now, "No water going over the spillway" you wrote on when?

A. The same time that I wrote that on.

Q. That is some day last week?

A. Yes, sir.

Q. How did you find that out?

A. I knew it personally on that day.

Q. How did you know it on that day?

A. Because I went up there and saw it.

Q. But the day you wrote it on, how did you know it?

A. That was taken from the gate compass records.

Q. You haven't it in your record anywhere, have you?

A. I think I have.

Q. Well, look on the 22nd of September?

A. I didn't write it down.

Q. When was the compass put on the map?

A. I plotted each day's float experiments the same night that I took them, and I put the compass on at the same time.

Q. What do you mean by the same time?

A. At least I drew the north line of—do I understand you when did I put the compass on this map?

Q. When did you put the actual compass on this map that is now before you?

A. I think it would be about the end of September.

Q. You have no memorandum to tell you when you put it on this map?

A. No. sir.

Q. But you think it was about the end of September?

A. Yes, sir.

Q. Why did you think it was about the end of September?

A. Because I think that was about the time I made this map, or commenced to make it.

Q. You commenced to make this map some time about the latter part of September, the 29th?

A. I didn't put these on this map until I had plotted the measurements.

Q. Then you didn't put it on until after December 14th?

A. Yes, I had these on here before that time, and I added those on later, afterwards.

Q. When did you put on the compass mark 22nd of September, when did you put that on this map?

A. At the same time that I put those on, I don't remember.

Q. Well now, we cannot tell what those are?

A. Up to the 29th of September it was some time after the 29th of September.

Q. Some time after the 29th of September you put on the circles marked the 22nd of September, 23, 25, 26, 28 and 29 of September?

A. Yes, sir.

Q. How long after the 29th of September?

A. I don't remember.

Q. Well, about how long?

A. Might be within a day or two.

Q. Might be anything, but how long was it?

A. That is the best of my remembrance.

Q. That it was a day or two afterwards?

A. Very shortly, or immediately afterwards.

Q. There is nothing on your notes to show when you put it on, is there?

A. Not on those notes, no, sir. I haven't a note of the day I did put them on; not here.

Q. When did you put on the one marked 17th of November?

A. Some time shortly afterwards; shortly after that date.

Q. When did you put on the one market 30th of November?

A. The same answer applies to the whole of them.

Q. Now I notice that under each one of them is marked the number of millions of gallons, and from what source did you get each one of those?

A. From Mr. Cook.

Q. Under some of them there is marked "No water going over the spillway" where did you get those from?

A. From Mr. Cook.

Q. And you got it some day last week, I understood you to say?

A. Yes, sir.

Q. When did you mark on the map the different colors which you say showed each day?

A. I plotted the course of each days float the same night; I don't remember when I put it on this map, I worked it on and off at different times.

Q. Did you put it on this map before you put on the compass or afterwards?

A. Before I put on the compass.

Q. How long before you put on the first compass?

A. I put on these courses after each day that they were run, the night of the same day they were run; these compasses I didn't put on until afterwards.

Q. You said you did not commence to make your map until after the 29th of September, how did you get your 22nd of September on that date?

A. I commenced to make my map the first day of my plotting, my plotted map I went on as soon as I commenced making floats, each night.

Q. I am talking about this map?

A. I made this from my original plotting.

Q. When did you put the plotting on this—shown on this map of your recollection of the way the floats went?

A. I made these tracings after the 29th of September.

Q. So you put them on after the 29th of September?

A. Yes, sir, on those tracings.

Q. Now you say you have some other maps, where are they?

A. I had the original of those, that those are made of; this was just a copy.

Q. But the map on which you mark something each night?

A. I haven't it here.

Q. You haven't the maps on which you marked the courses of these floats here?

A. No, sir, this is a copy of it.

Q. This you produce here is a copy of some original papers which you have in your possession?

A. My original plotting of the floats.

Q. And those originals you have not produced. Now this compass attempts to show in which direction the wind was blowing on the 22nd of September doesn't it?

A. Yes, sir.

Q. Which way was the wind blowing on the 22nd of September, according to this compass?

A. North northeast—from the north northeast.

Q. The direction of the wind is shown by a line across this circle representing the compass and marked on it direction of wind?

A. Yes, sir.

Q. How did you ascertain how the wind was blowing?

A. From my knowledge of the direction of the north line.

Q. Well, how did you find out how the wind was blowing,—did you wet your finder and put it up or how?

A. It was easy to tell which way the wind was blowing out there.

Q. How?

A. Some times by flag, other times without a flag.

Q. How did you do it on the 22nd of September?

A. I don't remember how I did it on the 22nd of September, I took a note of how the wind was blowing several times during the day.

Q. Give us the different times of day you took it on the 22nd of September, and how you think it was blowing?

A. I saw the general direction of the wind, north, northeast, light breeze.

Q. When?

A. 11 A. M.

Q. At 11 A. M. the wind was blowing a light breeze?

A. North northeast.

Q. Well, how did you distinguish between the north and northeast—the wind was blowing?

A. From my knowledge of the reservoir, I knew the direction of the north, and I used my own judgment to get the rest of it.

Q. When you have marked this exactly between north and northeast you don't mean to say that is accurate?

A. I speak of general direction.

Q. It might be a little nearer northeast or a little nearer south?

A. It might be a little way one or the other.

Q. You mark in the center so as to indicate that that was the general direction?

A. Yes, sir.

Q. You had no instrument there to tell you which

way the wind was blowing?

A. No, sir.

Q. How fast was it blowing?

A. Couldn't say.

Q. Did you make any measurements at all to show how fast it was blowing?

A. No, sir.

Q. Do you know how the Government indicates for the Local Observers, the speed with which wind —indicate by the name the speed with which the wind is blowing?

A. Not exactly.

Q. Was this a light breeze or a gentle breeze?

A. A light breeze.

Q. Is that less of a wind than a gentle breeze or more?

A. I should say it would be three or four miles an hour.

Q. Your idea of a light breeze is three or four miles an hour is it?

A. Yes, sir.

Q. Your idea was that on this 22nd of September at eleven o'clock the wind was blowing about three or four miles, in the general direction, between north and northeast?

A. Yes, sir.

Q. How long did it continue to blow with that same speed?

A. The wind was constant about the whole day.

Q. As long as you were there?

A. Yes, sir.

Q. When did you go there that day?

A. I got up to the dam about nine o'clock.

Q. Who was with you?

A. The gate keeper.

Q. Who else?

A. No one.

Q. Won't you please read from your notes exactly the first thing you have in your records of that day?

A. The first thing I did was to get a number of floats ready.

Q. And by the number of floats I think you refer to these tin floats?

A. Well, they were ready.

Q. The tin floats were ready?

A. I found them up there.

Q. Where did you find them?

A. In the gate house.

Q. The tin floats, when you arrived there on that morning were in the gate house?

A. Yes, sir.

Q. At nine o'clock. Now what do your notes say —just read your notes?

A. I got ready eleven floats.

Q. All your notes say is this—"Boonton reservoir, float experiments, September 22, 1906."

A. We got ready eleven floats.

Q. Your record don't say that you got ready seven floats, but you did get ready seven floats?

A. Yes, sir.

Q. Of what kind?

A. Three tin tubes were ready and the rest were bamboo poles, and I put them in the water and left them there to get water soaked, so that I could float them.

Q. Where did you get the bamboo poles from?

A. Bought them in Boonton, some of them.

Q. That day when you were going up?

A. That morning, as I was coming through.

Q. You took them over to the dam?

A. There were also some there before.

Q. There were some bamboo poles there before at the gate house, were there?

A. Yes, sir.

Q. You made up seven of those?

A. I made up eight bamboo poles.

Q. And you had three tin ones?

A. Yes, sir.

Q. You say the size of the bamboo poles was fifteen feet long?

A. Yes, sir, float fifteen feet?

Q. Were there any longer than fifteen feet?

A. About four or six inches more, fifteen and a half feet long .

Q. And how thick were they?

A. About an inch at the butt end, tapering down to an ordinary bamboo pole that they use generally for fishing in the country.

Q. Which end did you weight?

A. I weighted both ends, different ways, I tried them which way they would work best.

Q. The first day which did you weight?

A. I weighted the butt end.

Q. Does your record show that?

A. I don't believe it does.

Q. That you state from recollection, that you weighted the but end?

A. Yes, sir.

Q. Your first experiment was with the tin tubes, wasn't it?

A. Yes, sir.

Q. What was the size of the tin tubes?

A. One was 15 feet long, and the other ten and the other four, and an inch and a half in diameter.

Q. When you went up there that morning on the 22nd, you went up with the intention of making these experiments?

A. Yes sir.

Q. Who told you to do it?

A. Mr. Kutterbach.

Q. In Paterson?

A. Yes sir.

Q. Now what was the temperature of the water that day?

A. I don't know.

Q. You made no observation at any time with regard to the temperature of the water?

A. No sir.

Q. Either at the surface or at any depth?

A. I made no temperature records at all.

Q. Nor of the air?

A. No. sir.

Q. Now did you at any day measure the velocity of the wind?

A. No sir.

Q. Did you at any day ascertain the direction of the wind in any other way than you have stated with regard to September 22nd?

A. Yes sir.

Q. Which day was that?

A. The last three days, November 30th, December 5th and December 14th.

Q. Now on November 30th, how did you ascertain the direction of the wind?

A. By the compass and the use of a flag.

Q. And on the 5th of December and the 14th, the same way?

A. The same way; I might also state that we have a weather vane up there that I consulted, that shows the directions of the wind.

Q. Where is that weather vane?

A. On the barn.

Q. On whose barn?

A. Barn belonging to the company. There are four points of the compass on it, and an arrow, as far as I remember.

Q. Arrow?

A. Yes, sir.

Q. Didn't have any northeast point, did it?

A. It has the four points of the compass.

Q. North, south, east and west?

A. Yes, sir.

Q. And it was by consulting that that you ascertained which way the wind was blowing?

A. I always looked at it when I passed it.

Q. What is the size of that arrow?

A. I guess it is two feet long.

Q. Where is it?

A. On the barn.

Q. Where is that barn situated, anywhere on the map here?

A. It is here somewhere.

Q. It is below the dam?

A. Below the dam, yes, sir.

Q. Well, the surface of the land below the dam is a hundred feet below the dam, isn't it?

A. Well, it is not, in the lowest part of the valley, it is up towards the side more,—the barn is.

Q. How high is the barn?

A. I suppose the weather vane would probably be thirty feet above the ground.

Q. You could see over the dam and see that weather vane, could you?

A. Not when you are above the dam, not when you are the upper side of the dam.

Q. Well, you say that the wind was constant in that direction all that day,—you could not see that vane all that day, from where you were, could you?

A. No, sir, I only used that as a check for anything making a note of it when I passed it in the morning or evening.

Q. When you passed it in the morning or evening you made a check of it?

A. Saw how it compared with my idea of the way the wind was blowing that day.

Q. If it didn't compare which did you go by, did you go by the arrow, or your judgment of how it was blowing?

A. I went by what I found where I was at the time.

Q. How could you check it by the arrow?

A. Merely as a reference.

Q. If you found the arrow disagreed then what did you do?

A. Considered the wind had changed in the mean time.

Q. Now on the 22nd of September you put in a tin float,—what was the size of the tin float?

A. No. 1, sir.

Q. No. 1?

A. 15 feet long.

Q. And about half an inch you said—

A. About an inch and a half in diameter.

Q. And out of the water how much?

A. About six inches.

Q. Did you measure to see whether it was six inches, or is that your judgment?

A. That is my judgment.

Q. Now where did you put that in?

A. Below the long bridge, about the center of the channel, I put the three in at that one point.

Q. Now I see on this map you have shown what is the bed of the Rockaway river, where did you get that fact from?

A. From the original map.

Q. Well, when you put this No. 1 in how did you put it in the water; were you in a boat?

A. Yes, sir.

Q. Who was with you?

A. I was alone in the boat.

Q. All alone in the boat?

A. Yes, sir.

Q. Who was with you in the party that was doing this thing?

A. This upper part I did alone.

Q. No, this particular day.

A. Well, the gate keeper went over with me in the boat, and was on shore at that time when I put those three in.

Q. And those were the only people that were with you?

A. Yes, sir.

Q. And you then put a float—this tin tube in what substantially, as far as you can now recollect, is where the circle is joined to the road or bridge?

A. Yes, sir.

Q. At the word "long?"

A. Yes, sir.

Q. Now you put that in at what hour, I want you to read from your record?

A. That is the condensed copy of my record.

Q. Well, I don't want the condensed copy, I want the original record, if you have any such?

A. I have them.

Q. When did you put that in?

A. At eleven o'clock.

Q. Read what you have in your original record?

A. 1, 2 and 3 at Bridge, in center of channel, 11 A. M. Light wind blowing directly up stream at that point, general direction of north wind, north, northeast and light breeze.

Q. When you say blowing up the stream, what do you mean by that?

A. Blowing up this way (indicating).

Q. Is that direction north northeast?

A. No, sir.

Q. What direction is that?

A. The wind in the inlet would not be the same as it is on the river on account of the high banks at each side of it, swept around them some times, when it is not the general direction of the wind.

Q. How did you ascertain that the wind was blowing up the river?

A. I could feel it blowing up.

Q. And what direction is that?

A. That would be about northwest, north-northwest or northwest.

Q. Then it was blowing either north-northwest or northwest up the river?

A. Yes, sir.

Q. What do your notes say?

A. General direction of the wind in the reservoir was north-northeast.

Q. But up the river it was blowing northwest, north-northwest, or northwest by your judgment?

A. Yes, sir.

Q. How long did it blow that way, that day, up that river, north-northwest or northwest?

A. All the time I remained there.

Q. How long did you remain there?

A. Until about 12 o'clock.

Q. And for an hour it blew in that direction?

A. Yes, sir.

Q. What experience have you had in ascertaining the direction of the wind?

A. None but a general one.

Q. Such as you suppose every man has?

A. I sailed a boat a good deal.

Q. And what information do you have as to that?

A. That is about the best I can remember.

Q. Now, No. 1, direction was apparently down stream; is that right?

A. Yes, sir.

Q. And you watched it how long?

A. I left it at 12 o'clock and went back to the gate house, and had my lunch and brought some bamboo floats back with me up there.

Q. Where was it then?

A. It was then about 175 feet below the bridge.

Q. What did you do with it?

A. I wanted to see if it was floating or not, and I lifted it up and let it drop down and it filled up and sank.

Q. You wanted to ascertain whether it was—

A. Whether it was afloat or not.

Q. And that was a tube ten feet long?

A. Fifteen feet long that one was.

Q. Did it sink immediately after you put it in the second time?

A. I only raised it up a very little bit, and it sank into the water, the water got under the lid and filled it.

Q. What was the cause of that?

A. The lid was not perfectly tight.

Q. Did you take the lid off?

A. Didn't have a chance, it never came up, and didn't have a chance to get hold of it, it came up once but it sank.

Q. You say when you went there after lunch you found it in the channel of this stream below the dam?

A. No, below the bridge.

Q. And you took it up, I understood you to say?

A. I raised it up a little out of the water, raised the top a little to see if it was touching bottom, and I found it wasn't, and I let it go gradually, and it went down into the water, and the water got under the lid of it, or cap.

Q. Why did it go under the lid at that time and not before, when you put it in?

A. Because I didn't let it go down; I was in the boat and I let it go perhaps a little bit too suddenly, and it sank just a little bit below the lid; this is a tin tube, and we filled the tube up with water and it sank.

Q. Did you say that you let it down too suddenly and that was the cause of it, or do you say a current struck it and that was the cause of it?

A. I say I let it down too suddenly.

Q. You say you did?

A. Yes, sir.

Q. You let it down too suddenly?

A. Yes, sir.

Q. Now, you have marked on the map here, a course which is near the center of the channel, do you say that that is the course it took, or is that your guess of the course it took?

A. Well, I took observations from the pier that is there, the different piers, and I also measured it in different ways.

Q. How did you measure it from the bridge, for instance?

A. So many strokes, rowing.

Q. How many strokes was it, have you a record of it there?

A. No, sir; I didn't keep a record of the strokes; I put it down in feet.

Q. What did you put down in feet at the time?

A. 175 feet.

Q. Have you got it there in your record ?

A. Yes, sir; 175 feet.

Q. Now, the No. 2; did you put that out in the same place?

A. Same place and same time.

Q. Immediately afterwards?

A. I put the three out, one right after the other.

Q. A minute or two afterwards?

A. Not more than a minute.

Q. Did you put them exactly at the same place?

A. Well, they were certainly within three feet of each other.

Q. Did you watch No. 2?

A. Yes, sir.

Q. How long?

A. I watched them all until 12 o'clock.

Q. Well, what had happened in No. 2 by 12 o'clock?

A. Directly in that direction that is indicated there.

Q. Where was it at 3:30?

A. Here.

Q. Was it aground or was it afloat?

A. No, sir; it was afloat.

Q. Still afloat?

A. Yes, sir.

Q. What happened to that?

A. Then I left there and put in some floats up around the island here, and after I got these running I went back there and I found then at five o'clock at night, or 5:15 it was, in that position there.

Q. At 5:15 you found it on the east side of the reservoir?

A. Near the east shore.

Q. Now, the line that you traced here, between where it was at 12 o'clock—

A. At 3:30.

Q. You didn't go there at 3:30?

A. Yes, sir.

Q. At 3:30 it was there?

A. Yes, sir.

Q. You have marked the line between where you saw it at 3:30 and where you found it at 5:15; that is an imaginery line, you didn't see it—

A. Imaginery line.

Q. Was it aground at 5:15?

A. No, sir.

Q. What did you do with it?

A. Left it in over night.

Q. Left it in that night?

A. Yes, sir.

Q. Where did you go from there?

A. I went to the gate house.

Testimony of Andrew Bardner.

Q. What time did you go to the gate house?
A. 5:45.
Q. Where did you go from the gate house?
A. Changed my clothes and got my supper.
Q. At the gate house?
A. No, sir; at the place I boarded, a little further down the road.
Q. Some distance below the gate house?
A. Quarter of a mile.
Q. Where did you go then?
A. Came back to the gate house.
Q. Where did you go?
A. Stayed there until bedtime.
Q. Then went back to your boarding house?
A. Yes, sir.
Q. Then did you see that float after 5:15 P. M.?
A. Not that night.
Q. You found it the next day at what hour?
A. The next morning at 10 o'clock.
Q. Who was with you when you found it?
A. No one.
Q. Did you have a boat?
A. Yes, sir.
Q. Was it aground?
A. No, sir.
Q. How did the wind blow that night?
A. I have got no record of how it blew during the night.
Q. You couldn't very well know, you went to sleep, didn't you,—you went to bed, didn't you?
A. Yes, sir; certainly.
Q. Then you indicate on this map where you found that by the figure 2, and September 23rd?
A. Yes, sir.
Q. And it was still floating?
A. Still afloat.
Q. Now, No. 3, that you put in; where was that?

A. Put in at the same place.

Q. And at the same time?

A. Yes, sir.

Q. Where did that go?

A. It traveled up stream.

Q. How long did you watch it?

A. Until 12 o'clock.

Q. Where was it then?

A. A little above the bridge.

Q. Then yon went to your lunch?

A. Yes, sir.

Q. When you came back,—at 9:40, is that?

A. That is the next morning.

Q. Did you see it after 12 o'clock?

A. I didn't see it that day, after that; I couldn't find it when I came back; I don't think it went so far up, and I didn't look for it up there.

Q You didn't see it at all until the next day?

A. Not after 12 o'clock until the next morning.

Q. And have you indicated on this map where it was 12 o'clock?

A. No, sir.

Q. But at 9:40 you found it as you indicate here by the figure 3, September 23rd?

A. Yes, sir.

Q. Then the line you mark on the map is an entirely imaginery line?

A. After it was about twenty or thirty feet above the bridge it is.

Q. Is not it an imaginery line up to twenty or thirty feet above the bridge?

A. No, sir.

Q. It is imaginery the way you put it in here, you don't mean to say you put it in just where you got it on the map?

A. Pretty nearly.

Q. Well, which part of the circle; the cirle here

covers a great many feet—which part of the circle do you refer to as being where you put it in?

A. The center, of course.

Q. You are ready to testify you put it in the center of that circle, are you?

A. No, I am not.

Q. That is your best judgment?

A. It is merely an indication point.

Q. And so that line that connects it with No. 3 is your best judgment, that is all?

A. That is all.

Q. You don't know where it went under the bridge?

A. I saw it go under the bridge.

Q. Do you know how far it was from the bridge that went under the bridge—did you measure it in any way?

A. It was just north of the bridge at 12 o'clock.

Q. How far had it gone in that hour, from 11 until 12 o'clock?

A. About 50 or 60 feet.

Q. How far had No. 2 gone in that hour?

A. I don't know how far it had gone in that hour.

Q. How far had No. 1 gone in that hour?

A. I don't know.

Q. How did you happen to recall how far No. 3 went in that hour?

A. Because it was traveling up stream, and I was wondering where it was going to get to.

Q. No. 4 was a bamboo with the big end weighted, and the small end above the water, about from four to six inches?

A. Yes, sir.

Q. Where did you put that in?

A. Same place.

Q. Did you have your boat anchored?

A. No, sir.

Q. Didn't your boat move?

A. Very little current there, it was practically the same place.

Q. Whatever movement there was to the boat, you took no record of that; you put it in right from your boat?

A. Yes, sir.

Q. You were alone and did not anchor your boat, but put it in from your boat?

A. Yes, sir; I should judge the distance between the piers.

Q. No. 4 you watched for how long?

A. Only a very short time, they were heaving over to the east shore.

Q. When did you put it in?

A. Around 3:30, little after 3:30.

Q. Which do you call the east shore,—according to the compass, that seems to be the north shore, the one you point to?

A. The northeast shore.

Q. The northeast shore?

A. Of the inlet.

Q. And you have attempted to show the way, in your judgment, in which it went by the black line here and the arrow?

A. Yes, sir.

Q. How long did you watch that?

A. I only watched it a very short time.

Q. What do you mean by short time,—five minutes?

A. Perhaps 15 minutes.

Q. How far had it gone then?

A. It was only moving gradually, about ten or twelve feet.

Q. When did you see it next?

A. Little after five o'clock.

Q. Where was it then?

A. No. 4 was about a hundred feet below the bridge, about the center, and No. 5 was about fifty feet below the bridge,—about 150 feet from the northeast shore of the inlet.

Q. What did you do with them at 5:15?

A. I took them out.

Q. Why did you take them out?

A. I took them out and took them up to the gate house over night.

Q. Any reason for taking them out?

A. None particularly.

Q. Now, how did you measure the distance that the floats traveled; I now refer to the floats in question, on the first day?

A. I assumed the distance, they were so close to the bridge, that I assumed the distance from the bridge and from the shore.

Mr. EDWARDS:

Q. You mean estimated?

A. Yes, sir.

FURTHER CROSS:

Q. Now, you said in your testimony that the floats —these floats traveled westerly with the wind, what did you mean by that?

A. Six and seven are you alluding to?

Q. Yes, did you say that—that they traveled westerly with the wind, in your direct testimony?

A. That is what they did.

Q. What did you mean by that—the wind was north-northeast, wasn't it?

A. Yes, sir; but it was traveling south-southwest.

Q. It was traveling south-southwest, was it; you said westerly; you mean by westerly, south-southwest?

A. Well, I used the general term westerly.

Testimony of Andrew Bardner.

Q. But you mean south-southwest, eh?

A. They both did not travel in the same direction, exactly, but they both traveled in a westerly or southwesterly direction.

By Mr. EDWARDS:

Q. Practically with the wind, you say?

A. Yes, sir.

FURTHER CROSS:

Q. At what hour was your last observation of 6 and 7?

A. I watched them float off in this direction.

Q. At what hour was your last observation of 6 and 7—is the question?

A. Probably about fifteen minutes after I put them in, I should think.

Q. Well, when did you put them in?

A. At 4:15.

Q. You watched them for 15 minutes?

A. Yes, sir.

Q. You put them in, you feel quite confident, at 4:15?

A. Yes, sir.

Q. How do you fix the time?

A. Watch.

Q. How do you remember it?

A. Got it on a book.

Q. Where is it in your book?

A. There it is (indicating).

Q. Won't you please read what you have in your book about that?

A. Put in Nos. 6 and 7 north side of island on line with old fence, little nearer the island than the north shore, at 4:15 P. M.

Q. What else?

A. That is all about those, just at present; that is all the note I kept about them at that day.

Q. When you say you watched them for fifteen minutes, you are speaking entirely from recollection?

A. Yes, sir.

Q. What do you mean by the north side?

A. I determined them to be the north shore of the island.

Q. By the compass it looks to be the west?

A. Northwest, it might be—I call it the north shore for convenience sake, as the dam was running north there; I call this north shore, and that south, and that the west, and that the east (indicating) merely for convenience.

Q. When you testified here with respect to the north shore and the west shore, the east shore and the south shore, you referred to the dam as the north?

A. As the east.

Q. As the east shore?

A. Yes, sir.

Q. And the Parsippany dyke as the west shore?

A. West; yes, sir.

Q. Whenever you spoke of the shores, with reference to the points of the compass, that is what you meant?

A. Yes, sir.

Q. Now, you say your last observation of Nos. 6 and 7 was about 15 minutes after four, and that you state from recollection?

A. Yes, sir.

Q. Where were they then?

A. Then traveling west.

Q. Where were they then?

A. They would be about there (indicating on map).

Q. Well, how many feet—from where you put them in?

A. Hadn't gone more than a hundred feet.

Q. And they had gone in the direction that you have marked on here, on this map?

A. Yes, sir; they started off with the wind.

Q. When did you next see No. 6?

A. Next morning.

Q. And they had traveled about a hundred feet in the first 15 minutes, had they?

A. About that.

Q. They were traveling then at the rate of a hundred feet in 15 minutes, or 400 feet an hour, were they?

A. That is what they were traveling when I put them in.

Q. When you last saw them?

A. But I don't say exactly that, about, I imagine. —about that.

Q. That is your best judgment?

A. Yes, sir.

Q. And the breeze then was also blowing at about three to four miles an hour?

A. It had freshened somewhat in the afternoon, the wind increased in velocity, considerably, during after noon from the north-northeast.

Q. What time in the afternoon?

A. About four o'clock, between half-past three and four o'clock—about four o'clock.

Q. How fast was the wind blowing then?

A. I don't remember; it had freshened considerably to what it was in the forenoon.

Q. You cannot give us any idea of the velocity, but it had freshened?

A. Yes, sir.

Q. The velocity in the morning was between three and four miles an hour?

A. Yes, sir.

Q. And in the afternoon freshened some?

A. Yes, sir.

Q. This particular float traveled with the wind at the rate of one hundred feet every fifteen minutes, in your best judgment?

A. That is when it started off.

Q. How was it the next fifteen minutes?

A. I don't know.

Q. As far as you know it continued to float in the same way the breeze was freshening, and it was being blown by the wind?

A. Yes, sir.

Q. When did you next see that?

A. Next morning.

Q. Where did you find it?

A. Both of them were aground.

Q. I ask you about No. 6?

A. It was aground.

Q. Well, where was it aground?

A. On the north shore.

Q. Then your idea is that the water you have marked on this map as the end of this No. 15 is 15 feet deep at that point?

A. Yes, sir.

Q. And you found it there 11:30, September 23rd?

A. Yes, sir.

Q. Now, No. 7, was that traveling any faster or slower than No. 6, when you last saw it?

A. Both started off about the same speed.

Q. You didn't find that until 5:15 the next day?

A. Yes, sir.

Q. Is that right?

A. That is right.

Q. And at 5:15, on September 23rd, you found it up where it is marked on this map, as near as you can judge?

A. Yes, sir; aground on the north shore.

Q. Was that aground also?

A. Yes, sir.

Q. Then your idea was that there were 15 feet only of depth where that grounded?

A. Yes, sir.

Q. And that was the depth between it and the north shore?

A. Yes, sir.

Q. When you say aground on the north shore, you refer to finding it this distance from the north shore, indicated on the map?

A. Yes, sir; about fifteen feet of water.

Q. How far is that from the shore?

A. Between four and five hundred feet,—450 feet.

Q. The line, of course, between the point where you put it in, and the point where you found it, as shown on this map, is imaginery?

A. Yes, sir.

Q. Now, No. 8,— where did you put No. 8 in on the 22nd day of September?

A. About a thousand feet east of the island.

Q. A thousand feet east of the island marked Hoos Island, on your map?

A. Yes, sir.

Q. I interrupt you, Mr. Bardner, and ask you what is the meaning of the dotted line which is south of this particular point—what is the meaning of the dotted line?

A. Indicates the probable course of a float which was lost, and found afterwards up here.

Q. And the other dotted lines still further south of that —that indicates the probable course of some float, does it?

A. Of another float.

Q. That was lost?

A. Lost and found afterwards.

Q. No. 8, when did you put that in?

A. 4:30 P. M. on the 22nd.

Q. How did you put it in, from a boat?

A. Yes, sir.

Q. And that was bamboo?

A. That was bamboo.

Q. With the thick end down?

A. Yes, sir.

Q. Weighted with what?

A. Lead.

Q. How much?

A. Sufficient to make them float, leaving about between four and six inches out of the water.

Q. You put that in at 4:30?

A. Yes, sir.

Q. How do you account for it that you put No. 6 in at 4:15, and watched it for fifteen minutes, and then put in, on the opposite side of the reservoir, on the opposite side of the island, another float at 4:30?

A. I said about 15 minutes; it only takes a couple of minutes to get from one side to the other, with a boat.

Q. Did you put it in at 4:30?

A. I must have put it in at 4:30.

Q. Did you put the other one in at 4:15?

A. Yes, sir; I said I watched the other about 15 minutes.

Q. You couldn't watch it more than five minutes, could you?

A. Yes, sir.

Q. You had to row, you were all alone, weren't you?

A. Yes, sir.

Q. You had to row across and put this in on the opposite side of the island?

A. Yes, sir.

Q. And you put that in on the opposite side of the island at 4:30 exactly?

A. Yes, sir.

Q. Looked at your watch?

A. Yes, sir.

Q. Now, when did you last see that float that day?

A. I last saw that when I was leaving up this upper section to go back to the Long Bridge.

Q. What hour was that?

A. It must have been around 5 o'clock.

Q. Then you watched that for half an hour?

A. Probably.

Q. From 4:30 to 5 o'clock?

A. About that; I was at the Long Bridge at 5:15.

Q. So that would give you time to watch this for half an hour?

A. I watched that until I started off to go to the Long Bridge, and it was 5:15 when I got to the Long Bridge.

Q. Did you watch it for half an hour?

A. Yes, I should say about a half an hour.

Q. Where was it when you last saw it, half an hour after you put it in?

A. It was traveling against the wind.

Q. I didn't ask you that; I asked you where it was?

A. I didn't locate the point.

Q. How far from where you put it in, when you last saw it, that date?

A. About 200 feet.

Q. And that had traveled about 200 feet in substantially the direction that you have indicated on this map, in the time you watched it, a half an hour?

A. Yes, sir; dead against the wind.

Q. Dead against the wind; when did you next see that float?

A. The next morning.

Q. Where was it?

A. At 11 o'clock.

Q. You have sought to indicate on this map where you found it, according to your best judgment, by a round circle, with the No. 8 marked on it?

A. Yes, sir.

Q. What was it doing when you saw it?

A. Still afloat.

Q. Which way was it floating?

A. It was floating in the direction indicated there.

Q. To the best of your pudgment?

A. Yes, sir.

Q. How long did you watch it after 11 o'clock?

A. Only a very short time.

Q. What do you mean by a very short time?

A. Only a few minutes.

Q. Continued to float in the same direction?

A. Some had.

Q. When did you see it next?

A. 4:30 same afternoon.

Q. Where did you see it then?

A. Indicated by this point here.

Q. Round ring on the same direct line,—black line?

A. What I determined on the key location point.

Q. How long did you watch it then?

A. I didn't watch it particularly for any length of time.

Q. You saw it there?

A. I saw it there, and located it.

Q. Did you row over to it?

A. Yes, sir; right up to it.

Q. When did you see it next?

A. I found it aground some days afterwards.

Q. When?

A. I think I had lost it, and I finally found it.

Q. When?

A. On the 23rd.

Q. You found it on the 23rd; what does 15 mean?

A. 15 feet in depth, the float was a 15 foot float.

Q. 15 foot float?

A. Yes, sir.

Q. You think that that was on the bottom?

A. It was on the bottom; I tried it.

RECESS.

Q. These distances that you have here on September 23rd are estimates?

A. Yes, sir; they are located approximately from intersection points and different points on the shore, and different points on the dam where I had a flag up.

Q. You didn't fix the point of your transit in any way?

A. No, sir; not in these tests.

Q. September 23rd, look at that; float 2, that day, was a bamboo, wasn't it?

A. Yes, sir.

Q. And where did you place that in?

A. Float 2 and 3 are tin tubes.

Q. No. 2 was a tin tube and was placed in the reservoir on the 23rd; how long did you watch that?

A. Well, I saw them occasionally during the whole of the day.

Q. I am now referring to No. 2; how long did you watch it, after you put it in?

A. Not very many minutes, not without going somewhere else.

Q. And you put it in, as I see, at 10:20 A. M.—when did you next see it?

A. I located it here at this point in the evening, as I was going home, and I also saw this float.

Q. You located No. 2 in the evening when you were going home?

A. Yes, sir.

Q. At a point which is at the end of the dark line connecting No. 2?

A. About 500 feet outside of the inlet.

Q. And the wind that day was blowing in which direction?

A. Light to fresh in the forenoon from the southwest.

Q. From the southwest?

A. And fresh to light in the afternoon, from the northeast.

Q. Now, when did it turn?

A. At 12 o'clock it was still from the southwest; at 2:30 it was fresh from the northwest.

Q. And when you say fresh from the northwest, what velocity do you intend to indicate—how many miles an hour?

A. Fresh, would be about nine or ten miles an hour.

Q. Well, by that fresh, you mean to indicate nine or ten miles an hour?

A. Yes sir.

Q. What time in the evening did you see it?

A. About a quarter after five.

Q. And by a light breeze in the morning what velocity do you mean?

A. About half that of the afternoon, four or five in the morning.

Q. How near did you come to it?

A. Right up to it.

Q. What did you do with it?

A. Left it in.

Q. Did you touch it?

A. No, sir.

Q. How did you locate its position?

A. By estimating the distance from the shore.

Q. Read me from your notes what you have as to No. 2, on September 23rd?

A. About in the center of stream, opposite first point down on west shore 500 or 600 feet below the bridge; that is what I put it in, at.

Q. Is that all you have in your notes?

A. That seems to be all I have in my notes, sir.

Q. You have nothing in your notes about seeing it at 5 o'clock?

A. I remember seeing it at 5 o'clock.

Q. But you have nothing in your notes about it?

A. No, sir.

Q. When you said that this statement that you produced was from your notes, what did you mean?

A. The statement is from the notes.

Q. Well, there is nothing in your notes about seeing that at 5 o'clock?

A. I remember distinctly seeing it.

Q. Why didn't you put it down on your notes?

Q. I don't know why I didn't put it down, but every evening I plotted each float in the evening,—I plotted the day's work, while it was fresh in my memory.

Q. Where are your notes?

A. I haven't a note of that particular place.

Q. When did you see that float after 5 o'clock that evening?

A. I didn't see it again; it was lost.

Q. Never saw it after that?

A. No, sir.

Q. Did you see float 10 on that day—Now read me from your notes what you have with regard to that, will you?

A. No. 10, 4 o'clock, 700 feet further out in the reservoir.

Q. What do your notes say as to putting it in?

A. 3:20 put in 700 feet opposite first point, on the east side about center of channel.

Q. That is September 23rd you are speaking of?

A. Yes, sir.

Q. Now read the rest of your notes with regard to it,—what else have you?

A. 4 P. M. 700 feet further out in reservoir.

Q. You saw it at 4 P. M. 700 feet further out in the reservoir according to your notes.

A. Yes, sir; according to my notes.

Q. Go on.

A. No. 10 on line between Point and Island.

Q. When?

A. At this time, at 4 o'clock, center line of channel where they were put in, a little south of—south of gate house, that is merely a note for intersection, for locating it by.

Q. Now, is where you put in No. 10 the mouth of the Inlet?

A. Yes, sir; I call that the mouth of the Inlet between the two points, between the mound and that east point.

Q. The east point is shown here on the opposite side of the inlet to the reservoir; and at 4 P. M. you saw it still in the mouth of the Inlet, did you, or a little west of the mouth of the Inlet?

A. Yes, sir.

Q. What did you do with it?

A. That was the last I saw of that float.

Q. You never found it after that, you mean?

A. I didn't find it next day at all, nor afterwards.

Q. How was the wind blowing then?

A. Fresh breeze from the northeast.

Q. A breeze of eight or nine miles from the northeast?

A. Yes, sir.

Q. How long did it take it—what is this distance that it went between the time you put it in and the time you saw it at 4 P. M.?

A. Approximately four hundred feet.

Q. And how long did it take it to go that distance?

A. Forty minutes.

Q. What time did you last see No. 11 that day?

A. I put in No. 10 and 11 at the same time; No. 11 I saw at 4 o'clock likewise.

Q. Where was it then?

A. It was a little further out in the reservoir than No. 10.

Q. And about how far?

A. About a hundred feet further—a little over a hundred feet.

Q. When did you next see it?

A. That was the last time I saw No. 11, until I found it up there, several days later—on the 26th.

Q. On the 26th you found it up somewhere in the reservoir?

A. Yes, sir.

Q. Why didn't you continue to observe No. 11?

A. Because it was dark.

Q. At 4 P. M. was it dark?

A. I had other floats to attend to after that.

Q. That was the only reason that you now can give why you did not observe that after four o'clock —that you had others to look after, is it?

A. Yes, sir.

Q. Well these two were the most important ones that you put out, weren't they?

A. I don't know.

Q. They were coming towards the gate house, weren't they?

A. They were heading directly out into the reservoir.

Q. They were the ones that gave indication of coming to the gate house, and those were the two that you did not observe after 4 P. M. Was that intentional?

A. No, sir; it wasn't.

Q. Then your idea of its course, as you have marked on this map, is entirely imaginary, is it?

A. What is that, sir?

Q. It is an imaginary course on the map?

A. Yes, sir; that is imaginary to this point here (indicating).

Q. You didn't see it from 4 P. M. on the 23rd until the 26th?

A. At 5 P. M. on the 26th.

Q. I see that you have other dotted lines on this map, for instance this blue color?

A. Yes, sir

Q. What do those dotted lines mean?

A. Imaginary course the floats would travel, to the best of my knowledge.

Q. You also spoke of a Point of Woods, in one of your answers; what do you refer to; you did not designate what you meant by Point of Woods?

A. Well, that point there (indicating).

Q. You designate a point near the west of the old road here on the main land, west of the old road and on the southerly side of the reservoir?

A. Yes, sir.

Q. And you make a circle and put a cross in the circle?

A. Yes, sir.

Q. In pencil, and that indicates the Point of Woods?

A. Yes, sir.

Q. What did you do on the 24th of September?

A. I spent half a day fixing a set of new floats, and the rest of the day I was out on the reservoir looking for the floats that had been traveling.

Q. You didn't find any that day?

A. On the 24th, sir?

Q. Yes.

A. No, sir.

Q. Turn to the 26th; what do your notes say about float No. 2?

A. On the 26th, 12:10 P. M. put in 700 feet from south shore of Island line.

Q. In your direct testimony you said opposite mound as to float No. 2; is that incorrect—which is correct—your notes or what?

A. Put in at 12:10, 750 feet southeast of Island —went aground opposite the mound.

Q. What you did testify to in your direct examination was that it went aground opposite the mound?

A. Yes, sir.

Q. And the mound is—you have marked here with a pencil, haven't you?

A. Yes, sir.

Q. With a round mark?

A. Yes, sir.

Q. Now float 8 on the 28th, just read me what you say about float 8 on the 28th?

A. Put in at 12 noon, 800 feet northeast of Island. Put in in the channel, that is between the Island and the north shore, about center of buoys.

Q. Then when you testified in your direct examination that it was northeast of the Island, that was an error?

A. I was in error; it was the northwest.

Q. It was really northwest and between the reservoir and the island you have shown it here. It is the probably course in green color?

A. Yes, sir.

Q. Now when did you put that in, 12:05 you have it here?

A. Yes, sir; 12:05 noon.

Q. And you found it at 2 P. M.?

A. On the following day.

Q. Well, how long did you observe that, after you put it in?

A. That float I did not observe any length of time after it started off, to see which direction they were going on.

Q. You don't know how far it went or how fast it went?

A. No, sir.

Q. Now it was afloat when you took it out, was it?

A. Yes, sir.

Q. Why did you take it out?

A. I don't remember why I took it out; it was afloat and I took it aboard.

Q. Turn to September 28th and look at float 12?

A. Yes, sir.

Q. What does your record say as to float 12 on September 28th?

A. 3:15 P. M.

Q. You put it in the water?

A. I put it in the water.

Q. Where?

A. 400 feet east of "A" on gate house line.

Q. How long did you watch it?

A. I located it again at that point on the same day and also that point (indicating) on the same day.

Q. On September 28th?

A. I located it the next time here at 4:30 P. M.

Q. What you testified to was it went against the wind for three hours, toward gate house, how about that; you testified No. 12 you put in at 3:15 P. M 400 feet east of island?

A. Yes, sir.

Q. And traveled 600 feet against the wind in 3 hours; is that right?

A. Well, I have got it four hundred feet.

Q. 400 feet. You testified that it travelled 600 feet?

A. Probably 600 feet.

Q. Against the wind in three hours, is that right; do your notes say that—look at your record and see what your record says. It says it traveled against the wind in three hours, 600 feet?

A. It headed south—started off south.

Q. Didn't start off south according to your notes?

A. Southearterly—it started east.

Q. It started east?

A. Yes, sir.

Q. How far did it go east?

A. At 4:30 it went about 200 feet in a southeasterly direction.

Q. Which way was it going when you stopped it?

A. In a southeasterly direction.

Q. Why did you stop it?

A. I had so much trouble in finding the floats that I had put in and let go over night that it would take me half a day to wind them up the following day, so I tried to anchor them at night.

Q. How did you anchor them?

A. With a line and piece of lead pipe to a stone.

Q. You tied a piece of lead pipe to them and a string to it, and anchored them that way?

A. Yes, sir.

Q. Where did you find them the next morning?

A. I found it here the next morning.

Q. You found it at the end of the red line marked?

A. No. 12.

Q. No. 12, 3:15 P. M., September 29th?

A. Yes, sir.

Q. Then the red line between where you anchored that float No. 12, on September 28th—

A. 6:10 P. M.

Q. Indicates the probable course of that during the night, notwithstanding you had anchored it?

A. No, sir; it didn't move from there during the night.

Q. You said you found it the next day?

A. I found it the end of the next day; I started it off from the same place in was anchored in at 10:50 A. M. on the 29th.

Q. You have got here 6:10 P. M.

A. That is the night it was anchored, and the next morning it was 10:50 A. M. when I started it off on the 29th, and it traveled to there (indicating) on the same day at 3:15.

Q. That is what it did the following day, and therefore you have marked it in red?

A. Yes, sir.

Q. How was the wind on the 29th?

A. Very light in the morning until ten o'clock; fresh in the morning from the northeast. In the afternoon—this is the general direction of the wind—it was fresh in the afternoon from the southwest, almost veered around.

Q. When you say fresh, what do you mean by that?

A. I mean about eight or nine miles an hour.

Q. Now on the 29th just look at floats 1, 2, 3 and 4, what were they—what kind of floats?

A. 15 foot pine rods.

Q. Where were they started off?

A. About a thousand feet west of the dam, and parallel with it.

Q. And shown in red on this map?

A. Yes, sir.

Q. When were they put in?

A. 9 A. M.

Q. How fast did they travel?

A. I don't know how fast they traveled; I stayed there a little while to see which way they were traveling, and they all seemed to be traveling with the wind, and I went further up the reservoir and looked after the other floats, and I didn't pick those floats up again until that evening.

Q. They were started, as near as possible, at the same time, were they?

A. One after the other.

Q. One after the other, as fast as you could row from one place to the other?

A. Yes, sir.

Q. The distance apart being about how many feet?

A. About four or five hundred feet apart.

Q. Now five and six, that same day?

A. 15 feet pine.

Q. They were pine?

A. Yes, sir; the same as 1, 2, 3 and 4.

Q. Now was there any water coming down the river at that time?

A. There was no water flowing over the spillway on that day.

Q. I didn't ask you anything about that; I asked you whether there was any water coming down the river?

A. I don't know; I wasn't up in the river.

Q. You don't know whether there was any water coming down in the river or not; you stated on your map here that there were forty-nine and three-tenth million gallons—what was that doing?

A. That was the natural flow of the river.

Q. That was coming down the river at the time you put that float in wasn't it?

A. I didn't know that; Mr. Cook supplied these quantities.

Q. Well, if there was that amount of water coming down the river where, from these floats and your judgment was that going?

A. Diffusing into the reservoir.

Q. These went up the river, didn't they?

A. They went up the inlet, yes.

Q. Where was the water then that was coming

down the inlet; it must have been underneath those, eh?

A. It must have been diffusing into the reservoir in some shape or another.

Q. What do you mean by that?

A. It must have been mingling into it.

Q. Didn't affect those floats any?

A. Apparently not.

Q. Must have gone underneath them?

A. Might have.

Q. Is there any other way to account for it, unless they did go in underneath them?

A. I don't know.

Q. You don't know of any other way, do you? What was the depth of water there—have you any idea?

A. I didn't make any soundings on that day.

Q. Did you attempt to discover a bottom current running out under the bridge?

A. Long Bridge?

Q. Yes, the bridge up there?

A. I never used anything deeper than a fifteen foot pole there.

Q. Do you think there was a current there running out into the—

A. There might have been, there was, according to a fifteen foot float that I used there.

Q. Now float 12 on that day, started out 10:50 A. M. That traveled from 10:50 A. M. a distance of 1,500 feet in less than four hours, didn't it?

A. Yes, sir; 1,500 feet in four hours, about.

Q. 1,500 feet in four hours?

A. Yes, sir.

Q. And the wind was blowing at the rate of eight or nine miles an hour?

A. Yes, sir; about that time.

Q. From the southwest, according to the magnetic needle?

A. It was also blowing there, from 10:50 to 3:15.

Q. During that time the wind was blowing a light breeze from the south, a little east of south untill 1 P. M.?

A. From about 10 until 1 o'clock; yes, sir.

Q. You mean by that three or four miles an hour?

A. I should say about four miles an hour.

Q. And after 1 P. M. it was blowing from the southwest at the rate of eight or nine miles an hour?

A. Yes, sir.

Q. Did that float in a straight course?

A. That floated pretty nearly in a straight course; I saw it a great portion of the time; I had a pair of field glasses there and was on the Island as soon as I got my floats running and watched them.

Q. Float 10, that same day. Was there any angle in its course?

A. Very little, sir; traveled from there to there, and went aground.

Q. Float 11, that same day, where did you put that in, according to your notes?

A. That float was lost; I put it in; it had been anchored over night.

Q. The question is where did you put that in, and when. Don't your notes tell you?

A. Yes, sir; I put that float in the day before, the day previous.

Q. Well, when did you see it first that day, the 29th?

A. At 11:15.

Q. 11:15?

A. Yes, sir.

Q. Where was it when you saw it on the 29th?

A. That is it, sir (indicating).

Q. You saw it at 11:15 A. M. on the 29th?

A. Yes, sir, that was the last I saw of it.

Q. Which way was it going then?

A. Well, I didn't sight it for more than a couple of minutes and took no particular notice which way it was going.

Q. Was it aground?

A. No, sir; it was afloat.

Q. But you never saw that float after that, eh?

A. No, sir.

Q. On the 29th was anyone with you any of those days—you were alone all those days up to the present time?

A. Yes, sir.

Q. On the 17th you said a gentleman by the name of Doctor Parks was with you—where did you meet him?

A. On Long Bridge.

Q. By appointment?

A. I met Mr. Kutterbach and him by appointment.

Q. He was with Mr. Kutterbach?

A. Yes, sir.

Q. Who else was there?

A. The gatekeeper, Mr. McIntosh.

Q. Anybody else?

A. No, sir; except some people fishing on the bridge.

Q. But none of your party?

A. No, sir.

Q. That constituted your party?

A. Yes, sir.

Q. Why did you take him in the boat?

A. Because he wished to put in some floats himself.

Q. Did you get Mr. Kutterbach's permission to do it?

A. Well, I think Mr. Kutterbach told me,—he said that Mr. Park would like to go out in the boat with you and put down some floats himself.

Q. What was the wind that day when you went in the boat?

A. It was almost a dead calm.

Q. We are talking about November 17th, now the wind was then in what direction—what little there was of it?

A. From the south-southeast.

Q. From the south-southeast, and by very light you mean, what velocity per hour?

A. When I put the floats in, the first floats up at the brodge at 2:30 it was a dead calm, and the wind increased a little after that, in about an hour or an hour and a half to a very very light breeze; probably not more than a mile and a half or two miles an hour.

Q. How long did that continue that way?

A. The remainder of the afternoon.

Q. That No. 5 was a bamboo pole; is that a bamboo pole?

A. Yes, sir; that was a bamboo pole.

Q. And to that you attached?

A. A line and a sinker.

Q. What was the size of the line—first as to the bamboo pole, how was that put in, with the big end down or the big end up?

A. At that time that pole was the small end down.

Q. The opposite direction to what you put in poles before that?

A. Yes, sir.

Q. You tied to that a string; what was the thickness of the string?

A. Excuse me; I had used previous to that day the bamboo poles with the small end down.

Q. In some of the other experiments?

A. Yes; I found they worked better that way than with the small end on top.

Q. When did you find that out?

A. After three or four days' trial.

Q. About the 26th or 25th?

A. I believe it was on the 24th that I made them.

Q. And from after that you used them with the big end up and the little end down?

A. Yes, sir.

Q. What do you mean by working better?

A. I had some difficulty in getting them to float perpendicularly or plum with the big end down; there didn't seem to be sufficient buoyancy at the surface, and I reversed them and weighted them at the small end, and they floated better and kept in position better.

Q. Now the cord was what size?

A. The cord that we used that day was about three-sixteenths.

Q. And the sinker was what?

A. The sinker was either a test of iron nipples or lead pipe, I forget which.

Q. What size?

A. Perhaps make a bunch as big as your hands.

Q. As big as your fists?

A. Not so much as that,—about as big as your fist.

Q. Float 8 that day—that was started when?

A. At 3:45 in the afternoon.

Q. What was that?

A. 15 foot bamboo thirty foot line and a sinker something similar to the other but a difference in length.

Q. What was the sinker for, in that case?

A. We had to lighten up the 15 foot pole; had to take one or two rings of lead off it, when the bottom sinker was put on.

Q. Why was the bottom sinker put on?

A. To carry it down to the full extent of the line.

Q. Was that the only purpose?

A. To try if there was a current at that depth.

Q. At the depth at which the sinker was?

A. Yes, sir.

Q. Then the sinker you intended to act as a bottom float?

A. Yes, sir, a dray.

Q. Can you tell us whether it was an inch across section or two inches or how many inches it was cross section?

A. The cross section of the bottom float?

Q. Yes.

A. It could not have been more than three or four square inches.

Q. The cross section of the pole was how much?

A. You mean the pole at the butt end?

Q. The cross section for the whole length?

A. The longitudinal section?

Q. Yes.

A. The rings of lead pipe were put on and flatened out and projected about that much (indicating) to tighten them up, and I considered we would get the same cross section at the bottom of the pole as there would be at the top.

Q. Longitudinal section—how much of the pole —or vertical section?

A. I would say that the section of the pole would be equivalent to half the diameter, multiplied by the length.

Q. How much would that be?

A. Seven and a half inches.

Q. Seven and a half inches?

A. Yes, sir.

Q. Then the string was— how much cross section of the string, in the same way,—vertical cross section?

A. Probably about six inches.

Q. So the relative cross sections of this float was four to five inches of the iron sinker and six inches

of the twine and seven and a half inches of the pole, is that right?

A. About that.

Q. Now that float No. 8, about which you were speaking, that day travelled easterly and was found next morning eight hundred feet southwest of where put in. I suppose you did not see it from the time it was put in until you found it the next morning?

A. Well, we observed it some little time during the afternoon, while we remained around there.

Q. No. 8?

A. Yes, all of them.

Q. How far east did it go towards the dam?

A. It did not travel towards the dam at all.

Q. Did not?

A. Not while we were observing it.

Q. Did this Doctor Parks put in any float?

A. He put in that one.

Q. Well, that was your float, wasn't it?

A. Well, we both had a hand at it.

Q. He asked you to put in some floats, as I understood?

A. We assisted each other in fixing them and putting them in.

Q. Did he have the iron or did you have it?

A. He had these pieces of iron—the iron nipples.

Q. They were iron nipples and not lead pipe?

A. I had some lead pipe in the boat, and we probably used both of them, whichever was most convenient to lay our hand on.

Q. He produced the string?

A. He produced the string.

Q. Was he there any other day except that one?

A. Not to my knowledge.

Q. How long was he there?

A. From two o'clock until five, not quite five o'clock; from two until about half past four.

Q. Anybody in the boat except you and he?

A. No, sir.

Q. Mr. Cudderback remained on the shore?

A. Yes, sir.

Q. And Mr. McIntosh remained on the shore?

A. Yes, sir.

Q. Was Mr. Harrison there?

A. No, sir.

Q. At any of these investigations?

A. I never saw him.

Q. Now, November 30th, you put in that day three floats,—1, 2 and 3; what were those floats, bamboo poles?

A. No, sir; tin tubes.

Q. That you produced here?

A. Yes, sir.

Q. 1, 2, 3 and 4 were tin floats such as you produced here?

A. Yes, sir.

Q. And 4, 5 and six were also tin ffoats?

A. Also tin floats.

Q. Now those floats were of what size?

A. About six inches in diameter.

Q. And what height?

A. Practically circular.

Q. And made of tin?

A. Made of tin.

Q. And hollow?

A. Yes, sir.

Q. Now the cross section of those tin floats were how much—the vertical section?

A. I don't consider the vertical section equal to the diameter of the sphere.

Q. What is the vertical section?

A. They equal about fifteen inches—those floats.

Q. Now, how deep were those floats from the surface?

A. No. 1 was ten feet, No. 2 twenty, No. 3, thirty.
Q. And No. 4 was how deep?
A. No. 4 was ten.
Q. No. 5?
A. Thirty.
Q. No. 6?
A. Fifty.
Q. What was the vertical section of the cord?
A. Practically nothing.
Q. Why what was the size of the cord?
A. Sixteenth of an inch—fish line.
Q. How much was that for fifty square inches?
A. About an inch—how many feet?
Q. Fifty feet?
A. About three square inches.
Q. It must be more than that. It is a square inch every sixteen inches, is it not?
A. No, sir.
Q. Well, how much is there in the fifty feet?
A. A little over three inches.
Q. For how many feet is that?
A. Fifty feet.
Q. Now, No. 1, 2 and 3 traveled what distance in what time?
A. No. 1 travelled 650 feet in two hours and 26 minutes. No. 2 traveled 400 feet in two hours and twenty minutes.
Q. No. 3 traveled 400 feet?
A. No. 3 travelled 400 feet in two hours and twenty minutes.
Q. Now No. 4?
A. Ten foot float.
Q. Yes.
A. That was put in at a different place.
Q. Where was that put in?
A. 1, 2 and 3 were put in there.
Q. Put in in the outlet?
A. The mouth of the inlet.

Q. And where were 4, 5 and 6 put?

A. They were put in at 2:30 P. M. about 1,600 feet from the dam opposite the gate house.

Q. Now the one that was No. 4 traveled 1,300 feet in an hour and fifty-four minutes, didn't it?

A. Yes, sir; directly with the wind.

Q. What was the wind?

A. Light steady breeze all day from the southwest.

Q. What do you figure a light steady breeze,—what velocity?

A. That would be I would say about six miles an hour.

Q. Light wind is six miles an hour, is it?

A. I would say I considered this breeze to be about six or seven miles an hour.

Q. Light wind you said it was between three and four.

A. Light and steady.

Q. Light and steady is wind of more velocity than light wind?

A. Yes, sir.

Q. Light and steady wind you mean about six miles an hour?

A. That is what I mean.

Q. Now this traveled—No. 5 traveled thirty feet, at the rate of 750 feet in one hour and 52 minutes?

A. No. 4 or No. 5 you mean?

Q. No. 5.

A. No. 5 travelled 750 feet in one hour and fifty-two minutes.

Q. That was thirty feet deep?

A. Yes, sir.

Q. That means that the current thirty feet below the surface was treveling at the rate of seven hundred and fifty feet in one hour and fifty-two minutes, does it?

A. Yes, sir.

Testimony of Michael J. Kennedy.

(Mr. Bardner was then withdrawn from the stand to permit of the examination of Mr. Michael J. Kennedy).

MICHAEL J. KENNEDY, sworn on behalf of the defendants.

DIRECT EXAMINATION by Mr. Edwards:—

Q. Where do you reside?

A. 261 Sixth avenue, Brooklyn, N. Y.

Q. What is your occupation?

A. Commissioner of Parks, City of New York, having jurisdiction in the Boroughs of Brooklyn and Queens.

Q. What has been your business through life?

A. Contracting.

Q. Were you connected with Patrick H. Flynn in the years 1898 and 1899?

A. I was.

Q. And in what capacities?

A. Confidential man in many undertakings.

Q. And looking after structural work for him?

A. Yes, sir.

Q. Mr. Flynn had a number of contracts, did he not?

A. Yes, sir.

Q. Large ones?

A. Yes, sir.

Q. Will you just give us—

A. Well, at that time we had the building of the foundation for the East River Bridge; we had the construction of the Pennsylvania avenue subway.

Q. Philadelphia and Reading?

A. That is the Pennsylvania avenue subway, Philadelphia, and we had this water works here, and works in Maine, quarries and one thing and another.

Q. Did you take an active part in the preparing of the bid for this contract?

A. I did.

Q. And in the showing of the water shed to the City?

A. I did.

Q. Did you make any visits to the water shed with the City officers?

A. Several.

Q. Can you tell us generally who was along on those views?

A. The Board of Water Supply.

Q. You mean the Board of Street and Water Commissioners?

A. Board of Street and Water Commissioners; sometimes some members of the Finance Committee,, I think on some occasions the Mayor. Mr. Ferris was there several times.

Q. That was showing the water shed and the proposed construction?

A. Yes, sir.

Q. Were there a number of such views?

A. There were.

Q. Was some of them before and some after the bids were put in, or were they after the bids were put in and before the contract was awarded?

A. There was some before the bids were put in, but I think the most I can speak of was subsequent to the putting of the bid in, and before the award of the contract, and some after.

Q. Who was present, on those trips, on behalf of Mr. Flynn?

A. I was, and Mr. Nicholas K. Connelly Mr. Henry Beldon, Mr. Wlliiam D. Edwards.

Q. And Mr. Nicholas K. Connelly, is he living or dead?

A. He is dead.

Q. And Henry Beldon?

A. Dead.

Q. What was the proposed method of keeping the water pure that you had?

Mr. VREDENBURGH: Objected to as immaterial illegal and incompetent, and testifying to the contents of written papers, being the same testimony ruled out by the Chancellor already in the case.

Q. What precautions were to be taken for the doing away of any polluted matter in the water?

Mr. VREDENBURGH: Objections repeated.

Q. Tell us, Mr. Connelly?

A. It was the idea at that time that we submit a different proposal to the City than they had ever considered heretofore, and one of the particular advantages that we contended that our system of water supply would give to the City of Jersey City, was the fact that we had a very deep reservoir, and that there was some sixty feet in depth of a settling basin which would never be touched, and that such a basin would act as a sort of filtration or sedimentation basin for any deleterious matter that might enter into the reservoir.

Mr. VREDENBURGH: Answer objected to because it is an attempt to give the contents of written papers, and is illegal and incompetent.

Q. Was that fact brought to the attention of the City officers at any time by you?

Mr. VREDENBURGH: Objected to for the same reason and also as illegal, incompetent and immaterial.

A. It was.

Q. When, and to whom?

Mr. VREDENBURGH: Objected to for the same reasons.

A. At the different hearings and meetings—in fact whenever we met any of the representatives of the Finance Committee and the Board of Street and Water Commissioners—I don't know the exact title—and I think on several occasions the Mayor was present at those hearings, and some of the members of the Local Board here.

Mr. VREDENBURGH: Objected to for the same reason.

Q. Were you present, Mr. Kennedy, the night the contract itself was signed?

A. I wasn't.

Q. Did Mr. Flynn and his associates ever have any other plans for the purification of the water than the deep reservoir that you have told us of?

Mr. VREDENBURGH: Objected to for the same reason, and also because it is leading.

A. We considered the objection to a paper mill or rag mill, I am not clear now which it was, at Powerville, and we thought possibly that it might have some effect on the water works as contemplated, and I rather think that we agreed to have that removed, that is, with relation to Powerville. I think at some time subsequent thereto there was a question of the possible pollution from Dover and while we never

considered it serious, in view of the fact that we considered the sedimentation basin or settlement basin whichever you wish to call it, of the existing reservoir to be ample for all purposes, we did, nevertheless consider it in view of the fact that should it prove not to be satisfactory that it might be necessary for us to take care of the possible pollution at Dover, and I think on one occasion Mr. Nicholas K. Connelly and myself looked at some land adjacent to Dover, in that connection.

Mr. VREDENBURGH: Answer objected to for the same reason.

Q. Did you bring this matter to the attention of the City that you might possibly have to provide such works?

Mr. VREDENBURGH: Objected to for the same reasons.

A. I don't know that it was brought to their attention specifically at any rate any public meeting, but my best impression is that I did mention it to some of the officers.

Mr. VREDENBURGH: Answer objected to for the same reason.

Q. Was any agreement ever made or inducement or promise made that Dover should be sewered?

Mr. VREDENBURGH: Question objected to for the same reason and as leading.

Q. Was any agreement ever made or inducement or promise made that Dover should be sewered?

Mr. VREDENBURGH: Question objected to for the same reason, and as leading.

A. No.

Q. Mr. Kennedy, the contract was afterwards assigned to the Jersey City Water Supply Co.?

A. It was.

Q. Were you an officer of that company?

A. I was.

Q. What officer?

A. Treasurer.

Q. And the works were afterwards built by Mr. Flynn, under a contract?

A. Under a contract with the Jersey City Water Supply Company.

Q. In the building of the works did you act for anyone?

A. I acted as disbursing man, for all the moneys that were spent in connection therewith.

Q. Down to what time?

A. 1902, I think the early part of 1902.

Q. That was when Mr. Gardner became president?

A. When Mr. Gardner, and the Jersey City Water Supply Company as now constituted, became in possession of it.

Q. Then the contract with Flynn was abrogated?

A. It was.

Mr. VREDENBURGH: I object to the question and answer.

Q. Then the building contract with Flynn was abrogated?

Mr. VREDENBURGH: Objected to, if it was abrogated it was abrogated in writing and should be produced.

CROSS EXAMINATION by Mr. Vredenburgh.

Q. You spoke about the purchase of some land in or near Dover, that was contemplated, where was that land?