

land upon which the spring arose which would entitle them to this water. Now, I don't know what they are going to show, but I hardly see the theory upon which you object to the admission of the evidence.

MR. JACOB EVANS: My theory was, as I tried to state it, they could not show any ownership to this water by merely showing they had possession of it. The court I take it agrees with that.

THE COURT: certainly.

MR. THOMAS: We would admit that, of course.

MR. JACOB EVANS: I wanted to bring this matter clearly to the attention of the court at this time so that it would be clear in the mind of the court as this evidence proceeded that there is a sharp conflict between us and the defendant respecting the ownership of this particular spring.

THE COURT: I assumed that would be the case, and yet the fact you may be the owner of the spring would not be a valid objection to their introduction of the evidence of facts whatever they might be, with reference to what they have done. They might introduce the evidence.

MR. JACOB EVANS: That might be so.

THE COURT: And the fact you might be the owner of the water would not be a valid objection to it, yet in the end it would entitle you to a decree you were the owner of the water. It is on that theory the court overrules your objection.

MR. JACOB EVANS: Take an exception.

THE COURT: Now, you may answer the question.

MR. THOMAS: Please read the question.

(Question read)

Q Now, I ask you a question relative to what you had to do with the streets and the sewers and water works and laying<sup>out</sup> and installation of the system. Please state?

A As part of my duty the construction of new sewers.

Q Tell what you did?

A I made a study of the character of the soil and conditions, for the purpose of making estimates that would enable me to make proper estimates in carrying on new construction. I had the laying out of the sewer connections, made two houses. I laid out the pipe lines for the water works and there was some other part of that question you asked matters in connection with the sewer and the water works system?

Q You may state whether or not you were present at any time when the trenches were open and dug in various parts of the city for the installation of the pipes both for sewer and water?

A Very frequently, almost in every case where sewer connections were made the connections would be opened and the trench dug a portion of the way at least before I made the survey and I would later observe these trenches.

Q Have you seen these trenches open in different parts of the city?           A. Yes sir.

Q Please outline upon the map Exhibit 58, if you can, with that exhibit the territory that you have covered and that you have seen open by trenches. Have you another map that shows that more specifically, or will this map answer.

A I think this map will answer.

Q All right, use that one then.

A In addition to this I have had considerable to do with the location of the pole lines, the telephone company and the electric light company <sup>been</sup> ~~have~~ making a great many changes, and I have observed the ~~poles~~ poles holes and I have also seen other trenches opened at various times which were not directly made at these particular times this work was going on.

Q Directing your attention now to exhibit 58, <sup>indicate</sup> ~~if we take~~ there the territory that you have thus covered and examined through the open trenches, both for sewer, water and poles and the like?

A The territory examined which I have seen open covers practically the whole of the platted portion of Provo City as shown on the map, as far west as 7th west and in some portions farther west on Center Street and some of the territory to the south of Center Street several blocks. I have also seen some excavations in the southwestern portion of the city along the pole lines and places of that character and have observed carefully the courses of the ditches through the territory to the southwest.

Q I direct your attention to Exhibit 59, and I will ask you to described it?

A This exhibit is a map of a small scale of the platted portion of Provo City, showing the soil conditions that exist throughout that portion of the city as to the depth of soil.

Q Will you tell me how the data was obtained upon which this map was made?

A The data was obtained from observations made by myself and by ~~my~~ men who have been in the practice of excavating sewer trenches.

THE COURT: When you ask from what data this map was made, do you mean the map itself, or the notations upon the map?

MR THOMAS: I should have made that qualification, your honor, that is what I should have said, as to the data with reference to the soil notations. Now, with that statement the answers are more intelligible.

Q These men who made the investigations other than you have made personally, were under your direction from time to time, were they not?

A They were working under contract on the sewer connections and on the sewer extensions.

Q And as city engineer, you had a somewhat official way supervision over their work?

A An indirect supervision over their work.

Q And were familiar, were you not, with the country they ~~was~~ were then excavating and made examinations at the time or times close to the time they made investigation as to the soil conditions?

A Yes sir.

Q Now, I will ask you to describe the soil conditions here, Mr. Swan -- directing your attention to Exhibit 59, beginning on the street marked 8th North, I will ask you to describe the soil conditions that there exist?

A Extending east from Academy Avenue for about two blocks the soil is very shallow being variable and generally less than two feet in depth, with a very open, gravel, porous condition beneath. From that point to the east the soil is more of a sandy clay surface with a bottom of a clay nature. On 7th North the gravel condition and shallow soil extends to one block from there east before the clay subsoil is encountered. The line marking the division between the shallow soils with the porous subsoil and the more impervious soils of a clay nature extends ~~was~~ almost due south on 3rd East from 7th North Street down to a point south of Center Street. From there it extends in a westerly direction to the center of the first block east of Academy Avenue and south of First South Street. From this point takes a southerly course until it reaches South 5th Street and then a southeasterly direction. The land in the southeast portion of the city is of a more sandy character, and the subsoil is a quicksand, very porous, with the water plane at about six feet as a general condition. That condition extends from Center Street to the southern or southeastern border of the platted portion of the city.

MR. A. C. HATCH: If the court please, I don't understand that our admission of the competency of this witness goes

to the extent of admitting that he is competent to testify as to geological conditions, and it seems that he is going ahead and doing that as though he were an agricultural engineer. Unless he is qualified to testify to these matters we object to him doing so. He has started out to testify to the quality and porosity of the soil.

THE COURT: If the admission as to his qualification was made without the understanding that it was to include this character of examination, you may withdraw the admission to that extent and may qualify him.

MR. A. C. HATCH: Our admission ~~as~~<sup>went</sup> to his qualification as a civil engineer. I don't understand that goes --

MR. THOMAS: Then we will ask for no further remarks and will start out by asking you, Mr. Swan your age?

A I am forty-two years of age.

MR. A. C. HATCH: Object to that as being immaterial.

THE COURT: Objection is overruled.

Q Where were you educated?

A In Utah.

Q At what schools?

A I attended the public schools first in Logan, later in Salt Lake City. After completing the public schools, I attended the L. D. S. College for two years. I was ~~at the~~ out of school then for two years and a half.

Q What did you do during those two years and a half?

A I worked at carpenter work and planing mill at the Burton-Gardner Company.

Q Then what followed?

A After that time I went to the university of Utah and with the work that I had had at the L. D. S. College and special studies, I passed the examination of the preliminary course at the University, and I had four years of college work.

Q University of Utah ?

A. Yes sir.

- Q Did you take a degree?
- A I did not. The work which I did at that time was in the nature of mining and civil engineering work, and at that time they had no course in the University giving a degree of that character, so that my studies were selected and special. The course was a specially selected course.
- Q You may state whether that course was selected and elected by you with a view of taking up a course in engineering?
- A It was.
- Q Then what did you do after you left your University?
- A After leaving the University my first work was on railroad surveys, and to work for the Salt Lake and Pacific Railroad, which was running a line --
- Q How long did you work with them?
- A I worked with them during that season and until the work was discontinued in the fall.
- Q What year was that?
- A I don't recollect exactly, I think it was about 1895.
- Q Since that time you may state whether or not you have followed your profession as a civil engineer?
- A I have, civil and mining engineer.
- Q Ever since? A. Yes sir.
- Q In what states?
- A In the state of Utah, Nevada, Idaho, and ~~six~~ during one year I was in Colorado with the Union Pacific Railway Company.
- Q During that time you may state what experience you have had, if any, in irrigation engineering?
- A In irrigation engineering, I was employed by the Oneida Irrigation District. This will not be consecutively --
- Q State your experience, what experience you have had as an irrigation engineer?
- A I was employed by the Oneida Irrigation District for three years.
- Q That is in Idaho? A. Yes sir.

Q What were your duties as irrigation engineer there?

A I first went there for the purpose of laying out laterals, operation of their lateral system. Later I was given charge of the work and became engineer in charge of the work at that district.

Q Have you had any other experience with any other company as as irrigation engineer?

A Not directly as an irrigation engineer, but considerable experience in hydraulic work.

Q During your experience as an engineer covering the period of years that you have indicated, you may state if you have become familiar with the application of water upon lands for the purpose of raising crops?

A Yes sir.

Q You may state if you have become familiar with the amount or quantities of water ordinarily required to produce and mature crops on various kinds of land?

A Yes sir.

Q In the State of Utah and elsewhere?

A Yes sir.

Q You may state if, as an engineer, you have conducted experiments at different times to determine the duty of water upon lands for the purpose of maturing crops.

A Yes sir.

Q When I will ask you to state if during your experience as an engineer and also during your college career, you have had occasion to become familiar with the subject of geology?

A I have.

Q And are you familiar with the soil conditions in this valley and in Provo City, limiting it to Provo City?

A In Provo City and vicinity.

Q Through your education and experience and training, you may state if you have been able to discern and distinguish a

sandy loam, as it is called, from a clay loam, and either or both from that class of soil and deposit known as gravel and quicksand?

A I have.

Q Have you been able during your experience as an engineer in the city of Provo to determine the various kinds of soils that are here exhibited or discerned in the city of Provo and vicinity?

A Yes sir.

Q As an engineer you may state if you have becoming so familiar, been able to discern when the trenches were open, the various kinds of soil that were exhibited to the eye in Provo City.

A I have.

Q Now, Mr. Swan, I want you to show on Exhibit 59, just what territory you have covered or been upon and where the trenches are or were that you have seen, and to show the kinds of soil that are existing in Provo City and vicinity, describing the depth of each strata as near as you can at this time.

MR. A. C. HATCH: Just a moment.

MR. THURMAN: I wish to ask a question or two.

CROSS EXAMINATION by Mr. Thurman.

Q Mr. Swan, which character of soil requires the most water for the production of crops, leaving out the question of subsoil, soil of average depth?

A Soil of average depth, which character requires the most water?

Q Yes.

A Subsoil has a very important effect on that, a soil of a sandy porous condition --

Q No, I want to leave that out, let us get exactly the purpose of my question, to make it clear to your mind, however what I mean, suppose you have a sandy soil to an indefinite or unknown depth, to such a depth at least as not to affect the growing of crops as regards the use of water, and the same with a clay soil

or any other soil; which requires the most water for the production of the crops, the average crop raised thereon?

A The sandy soil would require more water. The clay will take more water than the sand will, but it doesn't give up as much water to the plant. However, owing to the fact that it will, when saturated, hold more water it will give up more to the plant, that is more actual water, but not as great a proportion of the water contained in the soil. The clay, however, retains the water longer than the sand.

Q How much water will a cubic foot of dry clay soil hold?

A A cubic foot of clay would take about 60 per cent of its weight in water.

Q Sixty per cent of the bulk?

MR. RAY: Weight he said.

Q What percentage of the bulk.

MR. THOMAS: I object to that as improper cross examination because the question has already been answered.

THE COURT: By this witness.

MR. THOMAS: If I understand the question. He has just asked him the same question in another form, as I understand it.

THE COURT: The court didn't so understand it.

MR. THOMAS: I understood the question to be as to what per cent of water in weight, and I understood the witness to answer about 60 per cent of its weight.

MR. THURMAN: Now, I asked about the bulk.

MR. THOMAS: I think that is virtually the same question in different form.

THE COURT: The first question was what percentage would a cubic foot of dry clay hold. He gave the percentage in weight. Now, the question is what percentage would it be in bulk, It is not the same question, I think it is proper.

A I could not give you that without making some qualification;

we very seldom have a clay that is absolutely pure clay, generally a mixture ~~with~~ with other soil or other characters of soil, either loam or sand.

Q Well, I will ask you this question. Suppose a cubic foot of dry clay and what depth of water on the surface will saturate or moisten it to the bottom of a foot ?

A I could not give you that off hand now, Judge.

Q You cannot give that off hand?

A No sir.

Q Isn't that one of the most common propositions connected with the determining the duty of water and the character of the soil, and its requirements for water, capacity to hold water?

A As I say, I haven't had any experience with an absolutely pure clay soil. There are other conditions, they clay generally contains loam.

Q Haven't you, outside of your experience, haven't you in your reading and education found ~~the~~ what the standard authorities say upon that subject?

A On soils which are mixed.

Q But none on clay soils?

A Not on an absolutely pure clay.

Q Well, we will take what you call a clay loam then, what percentage -- going back to the first question what percentage of water will that hold?

A It will hold possibly 40 per cent and if it contained considerable humus it would hold relatively larger amounts.

Q Well, I asked you about dry clay a while ago and you gave me 60 per cent.

A. Yes sir.

Q How did you get that opinion if you have no experience whatever with dry clay?

A I got it by my studies of experiments conducted by other parties to determine that.

Q You did experiment some or witness other people experiment on

dry clay?

A My studies.

Q What?

A I say my studies on that subject, yes sir.

Q And in the study with relation to dry clay, you never ascertained how much water on top of the ground would saturate or mdsten it to the extent of a foot in depth?

A I think I have, but I don't recall it.

Q Well, take your clay loam, I will ask you the same question as to that. How much water on top of the clay loam will saturate with moisture to the extent of one foot in depth?

A Of the dry clay loam?

Q Dry clay loam?

A It would take in the neighborhood of three or four inches.

Q Three or four inches, and what would it take in sandy loam in depth, approximately?

A Approximately?

Q Yes. This is not in any sense a catch question, I take it it is right to the point?

A It would take an inch ~~and~~ and a half.

Q Take less water to saturate then to saturate a sandy loam than it would a clay loam?

A Yes sir.

Q Now, I think I will just ask you one more question. Go right to the point of the case, what depth is it necessary to saturate the soil on either a sandy<sup>or</sup>clay loam for the proper irrigation of a crop of grain?

MR. THOMAS: Object to that as not being proper cross examining question, as it assumes conditions which counsel has not indicated as being present, which it may or may not involve, depending upon similar conditions?

MR. THURMAN: I am leaving out all questions of sub-soil, and he may assume the soil I mention goes to an indefinite

depth, I simply want to know how deep it is necessary to moisten the soil for the irrigation of a crop.

MR. THOMAS: I withdraw the objection.

A To make an irrigation, or are you speaking now with regard to the crop requirements or are you speaking with regard to the amount of water necessary to make one irrigation?

Q One irrigation, Mr. Swan.

A One irrigation.

Q One surface period, that is now a proper irrigation of that crop?

A If the soil were a sandy soil to indefinite depth the irrigation requirements would be about -- it would depend upon the coarseness or thinness of the sand. If the same were coarse it would take four or five inches to make an irrigation.

Q That is not exactly the question I asked you. I asked you to what depth of the soil should it be moistened, a foot, a foot and a half or two feet or six inches, or what, for the purpose of irrigating a grain crop. I limit it to grain,

7 because there may be different depths required for different crops.

A You mean how deep the soil must be moistened?

Q That is what I asked you, yes.

A If you could apply the water so as to moisten only what was necessary it would not need to be moistened below two feet, but in the irrigation, that is impossible.

THE COURT: Below two feet, you say?

A It is impossible --

THE COURT: No, the distance you said.

A I said it would not be necessary to moisten the soil below two feet for a grain crop.

Q Is it necessary to water ground two feet for grain assuming the most favorable conditions with regard to the subsoil?

A With regard to the subsoil?

Q Yes.

A You have introduced another factor in there.

Q You have insisted on bringing in another factor, Mr. Swan, yourself. I didn't want to introduce it, but if I understand the question I am asking, it was not necessary to introduce the factor of subsoil, I was willing to take a sandy loam if that is what we are dealing with, down to an indefinite depth.

A Which I did.

Q Now what would it take to irrigate in depth, how deep is it necessary to moisten the ground for one irrigation of a crop of grain?

MR. RAY: I submit that has been answered and object to it as ~~repx~~ repetition.

MR. THURMAN: Did he say two feet?

THE COURT: Not to exceed two feet, as I understood him, it would be unnecessary to moisten it below the depth of two feet.

Q Well, is it necessary to moisten it to that depth under the conditions named?

A How is the water to be applied?

Q On top.

A Is it available at all times, is it subject to rotation, what is the period between the water turns?

Q Mr. Swan, I am talking about one irrigation of that crop without regard to any other.

A Without regard to any other?

Q Yes.

MR. RAY: I submit, your honor please, not because I am interested in this, ~~but~~ that the question Mr. Swan asked affects the hypothesis very seriously here. The soil serves two functions apparently, one to furnish moisture at the root in the dissolving of the plant food, and the other by capillarity

to continue the furnishing and dissolution and the question of when it is going to have another irrigation in order to supply that function may be very material thing or might not as to how much ought to be beneficially given at a particular time.

MR. THURMAN: I haven't any doubt myself about the validity of my question, if I have made myself at all clear.

THE COURT: Mr. Swan, you may answer it if you can. If there is any reason why you cannot answer it, if it is not complete enough so that you understand just what is wanted you may ask.

A The statement made by Mr. Ray is exactly the idea I had in view. If the periods are considerable distance apart, periods of irrigation, and you are subject to those conditions it will be necessary to moisten that soil more than it will if the periods are more frequent, and in order to obtain sufficient moisture in the soil so that by capillarity the plant may draw from it.

Q If you can't answer it, I withdraw it.

Q I can't answer it in the way you put it.

Q And asked you another then, try to bring myself within your requirement. What would be the depth of moisture necessary for one irrigation of grain, assuming that you have water as it is ordinarily used here on these lands in this valley?

A With your previous assumption of an indefinite depth of sand soil?

Q Yes.

A Coarse?

Q I leave all the conditions named before in and add this to it, what depth is necessary?

A It would be necessary to have four to five, enough water to cover the land four to five inches in depth to make an irrigation.

Q I asked you about that a while ago, I am now asking you about

the depth of moisture in the soil.

A When I didn't catch the question. Will you read the question.

(Question read)

Q To what depth must the soil be moistened under the conditions named to constitute one proper irrigation?

MR. THOMAS: I submit the question has been answered.

THE COURT: I didn't hear it if it was. What did you understand the answer to be?

MR. THOMAS: Two feet in depth.

MR. THURMAN: That was under other conditions.

A I understood the conditions were the same, an indefinite depth of coarse sand soil.

Q You said two feet and then I asked you the question and you said you wanted to know something about other irrigations.

THE COURT: The situation was this. He was asked what depth. He said not to exceed two feet. Then he was asked whether it was necessary to moisten to that depth two feet and objection was made it did not contain the necessary factors.

MR. THURMAN: Then I gave the necessary facts, or tried to.

THE COURT: The question is now whether it is necessary to moisten it to a depth of two feet.

A It would not be necessary under the condition that you mentioned for the necessity of the plant to moisten it two feet.

Q What depth would you say would be sufficient, Mr. Swan?

A It would be sufficient to moisten it to a foot in depth.

Q Foot in depth, and you think three or four inches of water on top would accomplish that.

A Three or four inches on top would accomplish that, if there was-- I said four to five, if the soil was sand of an indefinite depth, great depth, it would accomplish that, but it would take the --

Q Sand of an indefinite depth take four or five inches?

A It would take four or five inches to apply the water to that

soil that would moisten it below the one foot in depth.

Q That is what I asked you, that would moisten it below a foot, wouldn't it, four or five inches?

A Yes sir.

Q How ~~x~~ much below?

A I couldn't say how much below it would go, the soil being open and porous.

Q Sandy all the way down?

A Yes, it is sand all the way down and consequently is porous, and large portion of the water would be loss through deep percolation, and I couldn't say to what depth it would go.

Q That is all.

DIRECT EXAMINATION by Mr. Thomas continued.

Q Directing your attention, Mr. Swan to Exhibit 59, I will ask you to please indicate there on that map the character of soil, the streets over which you went, the depth of the surface soil, the depth of the subsoil, the conditions of the soil generally as you have investigated it in Provo City?

A As stated, the territory that I have covered in my investigation embraces -- of that character, embraces all of the, practically all the territory in the platted portion of the city.

Q What is the total of miles of streets of Provo City? can you answer?

MR. JACOB EVANS: Object to it as immaterial.

THE COURT: Objection overruled.

A Total miles of streets in the city is fifty-three and a half miles, some of which are outside of this district, I could not give the exact amount in this district.

Q That is close enough. Have you in your investigations in the platted portions of Provo City traversed the major portion or all the fifty-three miles of streets as indicated?

A The major portion, yes sir.

Q You may state if on the major portion or practically all the portion of the city you have been on in the map inspection of sewers and water drains and trenches the major portion of the fifty-three miles?

A Yes sir.

Q Go ahead and answer the question.

MR. JACOB EVANS: I don't understand there is fiftythree miles of sewer here.

MR. THOMAS: I haven't said there was, I haven't indicated there was fifty-three miles of sewers or fifty-three miles of water mains.

Q Go ahead and answer the question.

A I think that question was answered.

Q All right, direct your attention now to that map, and look carefully at the notations which have been made thereon and indicate upon each street the character of soil, the depth if you can give it, the depth of the subsoil upon each of these streets as indicated upon that plat or map?

MR. JACOB EVANS: I would like to ask a question concerning that before we proceed.

MR. THOMAS: I will object to any further cross examination at this time with this witness, let them hold it to the proper time.

MR. JACOB EVANS: I will withdraw it.

A The soil in the northeast portion of the town is a clay soil, with a clay sub-base.

MR. BAGLEY: Hasn't this been gone over?

MR. THOMAS: It has not, Mr. Bagley, I have started it several times but it has not been gone over.

A It is five feet deep, up in the northeast portion along 8th North Street -- as you go farther south there is some gravel in the soil, the top soil being there about three feet in depth

of a clay loam character. When 4th North Street is reached the soil there, or the clay, becomes deeper again, there appearing to be a wash that comes down in between 3rd North and 5th North which has deposited a gravel in there underneath the soil, cut the subsoil out some way and later the clay deposited over the top again. From 4th north on all of the intersecting streets as you go south, the soil is of a sandy clay nature, is about five feet in depth and the character of the soil changes near Center Street, or little bit to the south becoming then a sandy soil, top soil, and the character of the sub-base changes, being a quick sand with a water plane at six or seven feet deep. West of 3rd East Street in the northern portion of the city and extending west as far as Second West Street the soil, the top soil is very thin, and of somewhat gravelly character, the subsoil being open, porous gravelly subsoil. Along on 1st North street, or I should say 3rd North street, and from there down to Center street or very close, between 1st North and Center street the soil is varying, average of one foot in depth. It is somewhat deeper than that in places being very irregular in depth.

MR. HACON EVANS: Where is that, Mr. Swan?

A That is north of Center and from Academy Avenue out to 3rd East along from the middle of the block between Center street and 1st North and extending up to 3rd North street. West of Academy Avenue and over as far as the 2nd West street millrace there is a cement gravel condition that comes very close to the surface, the soil being as in the other portion, of an irregular character, or an irregular depth, and somewhat deeper than in that portion that I have just previously described? West of the mill race in the northern portion of the city, platted portion of the city, for about three blocks west of the mill race, extending over to 5th West street on 5th North, the soil is a sandy clay loam underlaid by a

clay stratum. As you go farther south the width of that strip becomes narrower. On the south of Block 114 the edge of that strip is near the center of the block, and it runs in a somewhat southeasterly course, the marginal line towards the southeast corner of Block 89. West of this line and to the south the soil is very thin of variable depth, but an average of less than two feet, and the subsoil is of a gravelly character and very open, very porous, the gravel becoming coarser with depth. There is, as you reach going south on 5th West street, there is a hardpan or a cement gravel bottom of variable depth, but generally five or six feet below the surface and going deeper as you proceed south. From the 5th north street on 5th West as you go north on the State road the clay character of the soil extends up on the eastern side of the 5th West street. There is a portion of the block to the west of the North Park through which that extends taking in practically the whole of that block but north of that the character of the soil becomes more gravelly on the west side of the street with an open gravel, very porous condition of the soil. The water plane--

MR. A. CHATCH: Mr. Swan, pardon me for interrupting, but did you refer in any of your testimony to what is known as the City park?

A I referred to the North Park only, it is a city park, but it is called the North Park.

Q Was there another park designated as the City Park?

A This park to the west of this block is called the City Park.

Q But it is a different one to the one designated by you as the North Park?

A It is, and there is also another city park on the block west of 5th West and south of Center.

MR. A. CHATCH: What did you give as the character of the soil in that park?

A I didn't state the character of the soil in that park. I stated

the character of the soil on the block west of there. I can give you the character of the soil on that block.

Q give it then, it is asked for.

A The soil on there is of a clay nature, and it is underlaid with a subsoil of clay which extends down about -- well, in the north portion, northeast portion of the park the depth there is about three and a half feet down to a gravel which has quicksand fill. To the south side of the park, on the south side of the tract the clay subsoil extends somewhat deeper and that condition prevails from the park, portion of Block 115 and portion of Block 114 and in a generally southeasterly direction from that point toward the southeast corner of Block 89.

Q That is in Center street?

A Excuse me, I should have said toward the southeast corner of Block 91, which is on 2nd West Street, next to the mill on the west side of the Factory Race. On the east side of the Factory race the character of the soil is gravelly with a cement gravel in portions of it, an open, loose, boulder condition in other portions of it. These places are irregular and come in streaks. This fine top soil and open subsoil covers all of that territory to the west of the line which is here indicated on the map and which I have previously described as embracing most of that territory between 3rd East street to the north of Center and Block -- the center of the tier of blocks east of Academy Avenue to the south. As you go to the southwest, however, the soil becomes somewhat deeper down in the southwest portion of the city, down on 5th West and 4th South. On the west side of that street there is a depth of three or four feet to the top soil which is of a sandy clay loam -- to the east of 5th West street. The soil along on 3rd South and in that neighborhood is about two and a half feet in depth of very loose porous character, somewhat gravelly but of more depth

than it is in other portions. The soil covering to the east of 3rd West street along on 3rd south is thinner but not of such a porous character, it being only about one foot in depth to the east of there. East of 5th West Street, but on the tier of block south of 5th South Street, the soil is very thin, averaging less than a foot in depth and having an open gravel or open boulder condition in the subsoil.

MR. JACOB EVANS: What tier of blocks is that?

A That tier of blocks along between 5th and 6th South street and extending across from 5th West street nearly to 1st East street.

MR. JACOB EVANS: From 5th West to --

A Nearly to 1st East Street, in the southern portion of the city. The thin top soil and the gravelly sub base are also found in the northeastern and northwestern portion of the city, even out beyond the platted portion. Up in the fields to the northwest, James Wood field and up in that neighborhood, the soil is somewhat deeper in there, but it is of a sandy character, the top soil being of a sandy condition and beneath that -- that is about a foot in depth and beneath that there is for another foot a very coarse sand, and then comes an open gravelly condition of subsoil beneath that. That gravelly character extends west on Center street down as far as the city irrigation system goes and even beyond that out as far as the railroad track I have noticed it particularly and there is a portion of the land out toward the northwest beyond the city irrigation system where there is a loam, sandy loam, and has some considerable depth. This, I think, covers the platted portion of the city even beyond that extending out on the county road to the southeast, there is -- on the east side of the county road at varying distances a coarse gravelly top soil, with a gravelly subsoil right from the corner of 3rd East or 3rd

South Street. From the county road there is clay streak that extends east on 3rd South street out beyond the lines of property owned by Wilford Giles, but that runs -- from there the division line between the clay lands and the gravelly surface soils extends in a direction somewhat west of south and reaches the State road down nearly opposite the gates of the cemetery. To the west of that line there is a sandy clay soil with a clay subsoil portion of the way, but as you go west the sand becomes coarser, and on the bench along toward the western portion of the cemetery there is a sand soil with a quicksand sub-base similar to that that I have described in the southeast portion of the platted portion of the city. Southeast of the platted portion of the city the soil is of a clay nature with a clay sub-base and --

- Q I wish you would give approximately the depth wherever you can, of your own knowledge, Mr. Swan of the soil.
- A Out in that portion of the city or out beyond the platted portion of the city in that district my investigations there have been confined to the ditches and the excavations of that character which were not deep enough to reach beyond the clay subsoil and I could not state just what the depth of those soils is.
- Q The land that you have just designated as being northeast of what is platted there as end of the ditch?
- A To the north of Center Street and east of the platted portion, that is under the East Union Ditch.
- Q Have you made any investigation -- let me ask you first, if you have now practically covered in your statement all of the platted portion of Provo City?
- A Yes sir.
- Q And you have indicated there upon that map I think by red lines the approximate area of territory wherein the soil is about two feet in depth, have you not?

A Yes sir, two feet and over.

Q And here in the center portion of the city occupying a large portion of the plat you have marked soil less than two feet?

A Yes sir.

Q That would vary from a very thin surface as I understood you to say, to about two feet?

A On a general average it would be less than two feet, it may be from eight inches to some places two and a half feet.

Q But of varying thickness?

A But of varying thickness.

Q Have you made any investigation as to the character of the soil under the East Union Ditch?

MR. A. C. HATCH: I would like to ask a question there.

A Yes sir.

MR. A. C. HATCH: If you would name some place within the city limits where the soil is only 8 inches deep.

Q Can you do that? A. Yes sir.

Q Please name it?

A There is a garden down on 8th West between 2nd and 3rd North.

Q Do you remember whose lot it is, Mr. Swan?

A I think the man's name is Rasmussen, Niels Rasmussen.

Q Did you make a personal investigation there?

A I have observed it, I didn't make any ditch there in his garden to observe it. He had some pole holes down.

MR. THURMAN: Is that the eight inch soil?

MR. THOMAS: That is the eight inch soil.

MR. JACOB EVANS: Are there any other places?

A Yes, there are other places.

Q You took some samples of soil personally, did you not?

A Yes sir.

Q Please state from what parts of the city and when you took those samples for examination?

A On September 16, 1914 I took some samples.

Q Within the city?

A They were within the city limits, they were south of the platted portion and the first sample --

MR. THURMAN: Just a moment, I want to ask a question, if you intend introducing these samples would you have him number them as he goes along.

Q Have the samples been brought up?

A Yes sir.

MR. THURMAN: Giving the place he took them from.

MR. THOMAS: Yes, we have some samples here and want him to particularly identify them.

A Sample No. 1 was taken from the Stubbs' place just west of the First Ward pasture.

MR. THURMAN: Is that No. 1?

A Yes sir.

Q Now, give it to me again?

A Sample No. 1 was taken from the Stubbs' property.

MR. A. C. HATCH: Are the samples marked?

A Yes sir.

MR. THOMAS: Mr. Swan advises me he has them.

Q Mr. Swan, get your samples and then as we proceed and number them they can be marked.

MR. A. C. HATCH: In what part is it.

A There is a road which runs from the gate across to these houses.

MR. A. C. HATCH: Kindly give us the part?

A I can locate it from that road, it is north of that road about a hundred feet and two or three hundred feet out in the pasture, or out in the field, where the first sample was taken, the surface soil which I have in the lower portion of the sack.

Q Are you now referring to the first sample?

A First sample.

Q Have you got a tag on it?

A It is tag No. 1, north of road.

MR. A. C. HATCH: Give us the depth of the surface soil.

MR. THOMAS: We will get to that, Judge.

Q You have got Sample No. 1, which is marked as Exhibit 60?

A Yes sir.

Q In the bag?

A The sample, the Exhibit is in three portions, the one in the lower portion of the sack, one sack containing two portions of the sample is the top soil.

Q And that you designate as what?

A As a gravelly sandy loam.

Q And this is the second part of the bag, let me ask you how deep was this first layer of gravelly sandy loam?

A Twelve inches.

Q And this second division?

A Second ~~is~~ division was taken just below the top soil, and is the one in the top of the bag containing the two samples.

Q And the third.

A The third portion was taken down about twenty-one inches extending from twenty-one inches in depth down, and is the one that is in the other bag attached to this.

Q Will you state the depth of the second sample?

A There is no ~~depth~~ definite line between the second one and the third. I took the second portion of the sample just below the surface soil. There is quite a well defined line between those two, and the third one I merely dug deeper in the soil and took it from about twentyone inches to two feet down--

Q What is made up almost wholly of cobblestone, is it not?

A Yes sir.

Q Varying in size from the end of your thumb to pretty nearly the size of your fist in the third sample?

MR. THURMAN: I thought these were samples of soil.

MR. THOMAS: This is soil, this is Provo Soil.

MR. A. C. HATCH: Just a moment, he has described the sample from the size of his fist -- up to the size of his fist, we want the measurement of his fist.

MR. THOMAS: If you want the exact size we will get it, measure that one.

Q I hand you one out of the third sample, Mr. Swan and ask you to give its measurements.

MR. A. C. HATCH: Largest one you can find in the bag.

A The stone which I hold is of an irregular shape nearly square and about three inches in each direction inside of the square and its thickness is an inch and an eighth.

Q I hand you three other stones and such as I have picked out of that division.

MR. A. C. HATCH: Three next largest you could find in the bag.

MR. THOMAS: That happen to be in this particular bag.

Q I will ask you if you made a special effort to get the largest stones you could find?

A No sir.

Q Did you take them just as they came ?

A I did.

Q Could you have found a larger stone if you had made a special effort for it?

A I could.

Q Could you have found them as large as your head?

A At a slightly lower depth than this I could have.

Q All right, answer the question now and get the measurement of those stones.

MR. THURMAN: Object to that as leading.

A The one is three and three-fourths inches in length, one and seven-eighths inches in thickness.

MR. JACOB EVANS: Thickest place?

A No, I have taken that about the center.

MR. JACOB EVANS: That is the thickest part of the stone, isn't it?

A No, it is not the thickest portion of the stone.

MR. THOMAS: You can cross examine, Mr. Evans, we will preserve these stones.

THE COURT: The court will suggest you wait.

MR. A. C. HATCH: If they can be <sup>marked</sup> so we can identify the particular stone measured.

MR. THOMAS: I will suggest they be left in Judge Hatch's custody as an officer of the court, I will trust them.

MR. A. C. HATCH: If the court will permit me, if they be marked so that we could identify them we could cross examine later. If they be not marked we can not identify them as the particular stone to which he gave the measurement.

MR. RAY: I shall object, your honor please, in the interest of time, to the identification and measurement of these stone. They are before the court, if they are of any value at all.

THE COURT: I am inclined ~~tax~~ to favor this objection. It seems to me we are wasiting considerable time in the detail.

MR. THOMAS: I think so, your honor, I admit it, but did it to show the utter absurdity of counsel's objection.

MR. THURMAN: We move to strike all that with reference to measurement of these stones then.

MR. A. C. HATCH: To the size of them.

MR. THOMAS: That I resist.

MR. A. C. HATCH: My interruption was because of counsel defining the size of the stone as being the size of somebody's fist instead of allowing the witness to describe the stone,

counsel described it and y interrupted for that purpose alone, to show that his description was not a proper description of the size of the stone.

THE COURT: All of this material has now become a part of the record, it is an exhibit in the case and can be examined by the court if it is deemed material when the court comes to make up its decision. Can be examined by counsel at any time to base any argument upon it, and if the case should be reviewed at any time by another court the exhibit can be taken to the reviewing court, so I take it it is hardly necessary to put into the record a complete description of all parts of these exhibits. I am inclined to sustain the objection in the interest of time.

MR. THOMAS: I am glad the objection was made, but I made it, as y stated, to show the utter absurdity of such an objection.

THE COURT: You may now proceed.

Q I direct your attention to your second investigation.

A My second investigation was made to the west of the Stubbs place.

MR. THURMAN: Do I understand this is sample No. 2 now?

MR. THOMAS: Yes.

A I haven't the exhibit for this portion, I made an investigation there, but obtained no sample from that. The investigation was made in the cellar on the Bruce Reese place, the basement of a house. It is marked here on the plat Edna Reese, Bruce is her husband. I stated Bruce Reese because Bruce Reese is her husband.

Q Describe the character of the soil you found there?

A The soil there is very gravelly in the first fifteen inches, and from there down there is practically no soil. There is some gravel or some sand among the boulders the quantity of

which becomes less and the boulders larger in size with depth in the basement. The basement was about six feet in depth. I might state with regard to the first piece, first sample here that this sample was taken north of the road. I have another sample which I will introduce later which was taken at a later date, toward the south, on the Gubbs tract as you go south from the roadway described which is nearly opposite the north portion of the pasture ground.

THE COURT: Is this the one you are going to introduce?

A I was going to describe the character of the land.

THE COURT: Of the one you expect to present later?

A I say I have a sample taken in a different portion but want to describe the character of the land between those two portions. The land extending south is of very much this same character found down to the line which runs diagonally from a point about a hundred feet south of the north line of the Agnes Cummings land.

Q Mr. Swan, have you a sample of that soil here?

A I have a sample that was taken south of this line I am describing.

Q Is it here?

A Yes.

Q Dig it out please, and we will introduce it.

A This one, I marked it on the sack.

Q Just hand it so the reporter can mark it.

(Exhibit 61)

A From this line that I have described.

MR. THURMAN: What are you on now? Sample No.

1 or 2?

A I started in to describe the land between the point where I took sample No. 1 and the sample that I am next going to introduce.

Q That is the sample that is now 61?

A Yes sir.

Q You took 61 on whose land?

A On Fred Stubbs' land.

Q At what time?

A Last Saturday.

Q Of this year?

A Of this year, and the sample was taken at the lower end of his sugar beet patch which is --

Q You may get that data during the noon recess.

A I wanted to get the distance.

Q Give it approximately.

A From the patch it is between three and four hundred feet south of the north end of the Agnes Cummings place, and from the land I have described south to that point the gravel streak in the sub-base runs out towards the surface, and stratum below that of clay comes in nature of a sandy clay, the top soil being of a sandy character. The sample I have here is a sample of the clay ~~subspet~~ subsoil.

Q Now, you are speaking of --

A Of Exhibit No. 61.

Q And the depth of the sample that you have there is of the subsoil?

A. Yes sir.

Q What is its depth?

A Its depth from the surface is about fifteen inches to the top of the sample.

Q This is sample --

A This is Exhibit 61.

MR. THURMAN: Taken from the cellar?

MR. THOMAS: No, that was not taken from the cellar. This sample was taken of the subsoil, 61 was taken of a subsoil at a distance away from the cellar some distance away.

A It was taken south on the same tract as sample marked Exhibit No. 60, lower end of a sugar beet patch.

MR. JACOB EVANS: What was the soil overlaying this?

A The soil overlaying this was of a sandy loam.

MR. JACOB EVANS: How deep?

A Gradually graded in from surface down into this clay soil. This was taken the top of this sample was about fifteen inches from the surface and extended down in it.

Q Did you take any other sample?

A Not on this tract.

Q Did you take another sample?

A I took another sample to the west of this, and to the west of the Reese place.

Q You have it here with you.

A I have the sample here with me .

Q And have that marked please,

(Exhibit 62)

A This is sample No. 3 marked Exhibit No. 62.

Q Now, when and where did you get it?

A This was taken on September 16, 1914, from the cellar or basement on the Caroline M. Johnson tract as it is marked on the plat here. The sample is ~~marked~~ marked William Cox, he has since bought the land and has a building on it, and the sample at that time was taken from his basement. This sample was taken from the subsoil, the surface soil on this tract being -- as examined there in the cellar, being only four inches thick.

Q Of what character?

A Of a sandy and gravelly nature.

MR. THURMAN: The soil four inches thick ?

A The soil was four inches thick.

MR. JACOB EVANS: The surface soil?

A Yes sir, and this sample was taken of the subsoil just below.

Q What is its character and depth?

A It is of an open boulder character, having -- not having sand among it to fill its voids.

Q Open it up, Mr. Swan?

MR. THURMAN: Did you bring any of the surface soil.

A No, the surface soil is very similar to the character of that in No. 1.

Q When you say No. 1, you mean Exhibit 60?

A Exhibit No. 62, or Exhibit No. 60, I should say.

Q Did you take any other samples of soil?

A I did,

Q Where and when?

A On the same date, September 16, 1914. I took a sample from the land belonging to Thomas Evans. I see on the plat it is in his wife's name, Elizabeth A. Evans. This was taken about a hundred feet south of the road and near the center of that tract of land.

MR. THURMAN: Whose land?

A It is in the name of Elizabeth Evans on the plat.

(Exhibit 63)

Q In that bag you have two samples of dirt, have you not?

A I have,

Q Put them over further this way so as to be out of the court's way. What is the character of the soil, what kind of soil constitutes the surface soil in that sample?

A The surface soil is gravelly, sandy, open soil, and there is well defined line between the surface soil and the subsoil. It grades very rapidly from the surface soil into an open gravelly boulder subsoil. The sample, Exhibit No. 63, the bottom portion of the sack contains a sample of soil taken right at the surface.

Q How deep is that surface?

A There is no well defined line between the surface soil and the subsoil.

Q Well, approximately?

A It grades very rapidly from the surface soil. You can hardly see that there ~~is~~ is any surface soil, it grades very rapidly into the open gravelly condition of the subsoil which is shown in the sample Exhibit 63, that portion contained in the top of the bag which was taken at about a foot and a half in depth.

Q Now, did you take any other samples?

A I did. The next sample taken was from the Taylor and Roberts farm.

Q Have that marked.

(Exhibit 64)

Q when did you take that sample?

A It was taken on September 16, 1914, same day.

Q In that bag you have two samples of soil, the bottom part of the bag.

A The bottom part of the bag.

Q Is made up of surface soil?

A Surface soil.

Q How deep is it?

A Twelve inches in ~~at~~ depth.

Q Of what character ?

A Of a gravelly loam.

Q And the subsoil.

A And the subsoil is of an open, gravelly, rocky character.

Q At what depth did you take the subsoil?

A The subsoil was taken a little below the dividing line between the surface, between the top soil and surface soil, beginning about a foot and a half in depth.

Q Did you take any other samples yourself, Mr. Swan?

A I made an examination, I haven't the sample, I made an examination.

Q Did you take any other samples, have you any other samples of the soil which you made examinations personally?

A I have it here.

Q All right, introduce them.

MR. JACOB EVANS: Like to find out where this Taylor and Roberts farm is.

Q Describe the location of the Taylor and Roberts farm.

A The Taylor and Roberts farm is located west of what is known as the Scott lane, and this sample --

MR. A. C. HATCH: What part of the farm?

A This sample was taken just inside of the gate opening onto Scott lane, and nearly opposite the DeLong Avenue.

Q Go ahead, Mr. Swan?

A I made other examinations that day of which I haven't samples. The next sample I have --

Q Has that one been marked, the one you have in your hand?

A It has not.

Q Have it marked please.

(Exhibit 65)

A It has been marked Exhibit 65, it was taken from the Abraham Smith property in the northwest portion of the city from a piece of land on which he has strawberries planted. The sample was taken last Saturday, this year. The land being located on the township line between Townships 6 and 7 South and west of the 5th West Street and west of the property marked on the plat James E. Smith.

Q What is the character of that soil?

A The character of that soil is a very coarse gravelly surface soil with an open subsoil.

Q By open you mean made up of what, of gravel of larger size?

A It is gravel and larger size, containing less of the finer

materials.

Q Can you give the depth of that surface soil, Mr. Swan?

A Yes sir, the top soil was about between eight and ten inches in depth.

Q And the subsoil?

A And the subsoil that was taken down below about a foot and a half from the surface.

MR. THOMAS : Just before adjourning if the court please, we offer now Exhibits 60 to 65 both inclusive.

MR. RAY: I object to the admission of these exhibits, not because I have any objection to them but I do object to encumbering the record with them. A rock is a rock and the evidence of it is here. Just as well try to bring the post holes in. Samples are here so opposing counsel may examine what he has, but I don't see why they should become a part of the record in this case.

THE COURT: What have you to say, Mr. Thomas, to encumbering the record with these exhibits. Of course, if they are admitted in evidence they must be preserved, must be preserved in a situation where they would be of some benefit in the record.

MR. THOMAS: Frankly I shall not feel offended if the court sustains the objection.

THE COURT: Of course, the court doesn't take into consideration whether counsel are offended or not, the court cannot take that into consideration, but I am not disposed, unless there is something to be gained to encumber the record with such exhibits as this. Of course, if it is material enough so that you desire it the court will hear your suggestions on it, but they are here, they are here, as suggested by Mr. Ray, and they may be examined by counsel in the cross examination of the witness or for any purpose that you may have, inspect them, but I hardly am disposed to make them part of the record.

MR. THOMAS: We shall not insist on it. They are here and are pretty thoroughly described.

THE COURT: If you don't particularly insist upon it, the objection will be sustained as to their admission in evidence. They will be retained until the close of the trial, so that any party who desires may inspect them and put into the record such verbal descriptions as they may desire.

MR. THOMAS: That is entirely satisfactory.

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12:00 NOON, RECESS TO 2:00 P.M.  
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GEORGE C. SWAN - - - -

DIRECT EXAMINATION BY MR. THOMAS continued.

Q Mr. Swan, have you the map which you prepared showing the location of the places where these various samples of soil were taken?

A Yes sir.

Q I direct your attention to Exhibit 66, Mr. Swan, and will ask you if that is an entire plat of Provo City?

A Yes sir.

Q You have on that map indicated by marks the location and places from which you took these samples of soil?

A Yes sir.

Q How are they marked?

A They are marked with a small cross.

Q And have you marked them --

A Samples that I took on September 16th, locations are --

Q Let me interrupt and ask if you can mark them on the map as they are exhibited here in the same number, samples 1, 2 and so forth?

A I have marked the numbers here opposite the cross for the samples

that I took in 1914.

Q Samples you have taken in 1915?

A The samples that I took in 1915 are marked with a cross only, that is the point.

Q You have shown certain shaded portions upon that map, I will ask you to describe those portions and to state what is meant by those shades?

A These shaded portions were put in as I made investigations as to the character of the ground, the territory covered by difference classes of ground. They are not completed as I have finally observed the ground and described it this morning.

Q Are there any changes made, you wish now to make to that map any additions?

A The shaded portions on the map may be neglected at present from the descriptions that I have given.

Q Are you able to state now what those shaded portions indicate?

A They indicate the portion of territory --

MR. A. C. HATCH: If the court please, just a moment, if he doesn't claim anything for them and if they are limited why testify in regard to them. Object to it as being immaterial and irrelevant and incompetent.

MR. THOMAS: The witness said they may be eliminated as I understood him, from the --

MR. A. C. HATCH: Map.

MR. THOMAS: Surface samples taken this morning, is that what you meant?

A No, I meant in regard to the shaded areas, ~~shades~~ shaded areas may be neglected.

Q Do you wish now to ignore those shaded portions upon this map?

A Yes sir.

MR. A. C. HATCH: Then --

MR. THOMAS: There will be no argument about that then.

MR. A. C. HATCH: The objections sustained them or the question withdrawn?

THE COURT: Yes, I understand the question is withdrawn.

Q Where is the other map you had this morning showing the areas of soil depth, put that up.

A I have it here.

Q Mr. Swan, now are you able to state the length in miles of the irrigating ditches within the platted area of Provo City?

A I haven't taken the laterals within the irrigated portion separate from the other. I have the length of the laterals in the system separate from the main canals.

Q Give those?

A There are 71.78 miles of laterals.

Q You may state if you are familiar with the character of those channels? A. Yes sir.

Q I will ask you to describe those channels?

A The channels are mostly small ditches carrying in the neighborhood of a second foot of water, large portion of them are in the platted portion of the city, and run through a gravelly soil.

Q They run through--

A Through the soil.

Q Through the whole of the city, do they not?

A Yes sir.

Q Whether the land is gravelly and whether it is otherwise?

A Yes sir, their location is indicated on the other map in red.

Q Just let us use that other map then and turn to that Exhibit?

MR. A. C. HATCH: What is the number of that exhibit?

MR. RAY: 59.

Q Now, directing your attention to Exhibit 59, I will ask you to give the length in miles of the main channels?

- A The length in miles of the main channels, the Factory Race is 2.46 miles, the City Race is 3 miles in length, the East Union Canal is 5.3 miles, and the Tanner Race is 1.73 miles.
- Q Now, that is from the Provo River up to what particular point in each channel?
- A That is from the Provo River on the East Union down to the end of the canal.
- Q Beyond the point shown on the map?
- A Beyond the point shown on the map, And the City Race, it is the length of the canal down to the lower end of the distribution system here at the Nelson place.
- Q Referring to your answer, you say from the point where it leaves the Provo River, you mean the measuring device?
- A Where it leaves the City Creek.
- Q Is there a measuring device at that place?
- A There is a measuring device just below the head of the City Creek.
- Q And the distances which you have given are those from the measuring devices to the end of each canal, or main channel, are they?
- A The distances that I have given are from the heads of the ditch just above those measuring devices, practically would be at the measuring devices in each case.
- Q Can you state the character of those channels?
- A Well, the channels -- I don't think I thoroughly understand your question.
- Q Describe the character, how are they constructed, are they a substantial part flume or open ditches.
- A No, they are all of them open ditches, cut in the earth, natural earth channels.
- Q Is that true of the Factory Race?

A That is true of the Factory race except in those portions where the water passes through the penstocks of the mills which are in some cases of lumber flume for a short distance. The Provo Cold Storage and Ice plant has quite a long flume.

Q Now, directing your attention to the laterals within the Provo City, I have not spoken to you about those, Mr. Swan, but are you able to give the number of laterals leading from the ditches in each block into the lots?

A No, I could not give the number of those.

Q You may state whether or not --

A There is a lateral leading from the ditch into each block.

Q Is there one or more than one lateral leading from the ditch into each block?

A In some cases there are two laterals leading into a block. In some cases the laterals runs through one block and into the next where the character -- where the slope of the ground is such that the lateral would be on the -- or the center of the block would be high and the water had to be distributed both ways from the lateral, the lateral would be run down in the center of the block, and that occurs in a number of cases.

Q Depending upon the most economical way of distributing it?

A Yes sir.

Q Is there a separate lateral for each tier of blocks?

A Perhaps I can give it best by giving the ditches or the streets on which there are ditches and number of ditches on the street.

Q Give it in your own way?

A On 7th East Street the lateral runs from the East Union canal down to 3rd South Street. On 6th East the lateral comes across from 5th East on 6th North Street and runs, one lateral as far as Third South Street and another lateral running on the east side of the street, one about the center, opposite the center of Block 23, Plat C down to 2nd North street. On 5th East street there is a lateral running from the East Union

canal down to a point about half way between the 5th and 6th south streets.

MR. RAY: Mr. Swan, just a minute. your honor pardon me, Mr. Swan, are those things all platted upon the map correctly?

A They are all platted upon the map correctly.

MR. RAY: I object to any further description of it as irrelevant and immaterial and loss of time if they are properly located and platted upon Exhibit 59.

MR. A. C. HATCH: His testimony indicated the particular marks upon the plat representing the city water system, that was his testimony at the time of the admission of the exhibit in evidence. It is simply burdening the record.

MR. THURMAN: Can't the answer how many laterals are running through the city without giving each one?

MR. THOMAS: Frame the question yourself, Judge Thurman.

MR. THURMAN: Do you know how many laterals run through the city to water city blocks?

A They are so irregular, Judge, they run part way on one street, on a large number of the streets there are two laterals, on some of the streets there are two laterals part way and on some streets no laterals.

MR. THURMAN: I will waive the question.

MR. JACOB EVANS: Can't you tell how many places it is taken out of the main canal?

A I can tell how many places it is taken out of the main canal by going over it here on the map, but I have not counted these.

THE COURT: It is all apparent upon the face of the map, isn't it?

A It is all apparent upon the face of the map. I haven't made a separate count.

THE COURT: The map has been admitted.

MR. THOMAS: It has been admitted in evidence, your

honor.

Q Now, I want to direct your attention Mr. Swan, to the water that is used, that has been been used in Grove City, if you know. Do you know what the daily consumption of water is and has been within this city during your term of office?

MR. THURMAN: You mean culinary water?

MR. THOMAS: Within the city aside from the amount used through the irrigation ditches?

A Aside from the irrigation ditches and canals?

Q Yes.

Q The consumption is varied, some part of it is taken from the irrigation ditches that would be used for culinary uses, and for some other purposes. There is about altogether, there would be in the neighborhood of fifteen second feet.

Q You have reference now to the water within the pipe system known as the waterworks system, of Grove City?

A That amount is not in the pipe system at present. If the pipe system were extended over the whole town and these uses all came from it, it would go to that amount.

Q Do I understand you then such uses that are not made, such demands that are not made through the water works system are supplanted by water taken from the irrigation ditches?

A Yes sir.

Q Now, state what the use of water is within this city, have you made any estimate at all as to the amount of water that is being used daily?

A I have made an estimate of the needs of the city for these purposes.

Q Have you the data at hand?

MR. JACOB EVANS: Let me see if I get the idea of that, fifteen second feet taken through the water works as well as all the ditches.

MR. THOMAS: No, he said there isn't that amount

taken through the city at present.

MR. JACOB EVANS: But through that system as well as the water taken through the irrigation ditches would irrigate the city lots?

A Yes sir, for culinary and domestic uses and such uses as are indicated on this estimate that I have made.

THE COURT: Did you say ten second feet or fifteen?

A Fifteen, fourteen and eighty-eight hundredths.

THE COURT: Approximately fifteen second feet?

A Approximately fifteen second feet.

THE COURT: I understand approximately fifteen second feet is consumed by the city for other than irrigation and power purposes?

A Yes sir.

THE COURT: For the use of the inhabitants.

Q Now, state how that amount of water is used?

A I have divided the uses of that water into various heads. The consumption for ten thousand population at fifty gallons per capita for culinary uses amounts to five hundred thousand gallons. For street sprinkling purposes 53½ miles of streets, at the rate of twenty-four thousand seven hundred and fifty gallons per mile 3,972,375 gallons. Twenty-six and a half miles of sewer flushed with the use of 377 gallons per mile, ten thousand gallons. Nine public drinking fountains, 1440 gallons per day, 12,960 gallons. Three horse troughs, fifteen thousand gallons of five thousand gallons per trough, 153,521 square yards of lawn using 345 gallons to each hundred square yards 529,647 gallons; City cemetery has seventeen hose which are running constantly during the summer season delivering 92 cubic feet per hour or 117,300 gallons in eight hours.

MR. RAY: Just an interruption there. Do you figure eight hours per day they do run?

A Eight hours per day they do run.

MR. RAY: So that is a full day's use from that source?

A Yes sir. At times they have run these extra hours in order to do that work, but I have figured it on the basis of eight hours. Public Parks and parked streets there is 135,253 gallons used for this purpose. Schools 60,000 gallons. Provo General Hospital uses 650 gallons per day. State Mental Hospital 200,000. Besides the lawns given there are lawns which are under meter service, but this I have figured the population on the basis of ten thousand population and allowed for the culinary uses I have taken these lawns separately. There are 4,258 square yards of lawn.

MR. THURMAN: How much did you say the State Mental Hospital?

A 200,000 gallons a day.

MR. THURMAN: And 650 per day for the general hospital?

A Provo General Hospital. These meter lawns not included under the other total are 4,258 square yards figures on the same bases as the lawns above 14,690 gallons. There are seventy-seven services out of the city and I have figured those services --

MR. JACOB EVANS: We object to the introduction of any evidence with respect to service outside of Provo City, on the theory the city has no authority or right to serve water to people outside of the city limits.

MR. THOMAS: That is a matter of law that I think could be well discussed.

THE COURT: The objection is overruled pro forma and you may discuss it later. I will let the data go into the record so that it may be considered.

A I have estimated these services on the basis of five persons to the family and putting in 250 gallons per service 19,250

gallons?

MR. A. C. HATCH: How many families?

MR. JACOB EVANS: Seventy-seven services, five persons so the family.

Q Total of seventyeven thousand --

A 19,250 gallons. County road sprinkling from the water works six thousand gallons per day.

MR. JACOB EVANS: Is that outside of the city?

A Yes sir.

MR. JACOB EVANS: We make the same objection, if the court please.

THE COURT: Objection is overruled.

MR. JACOB EVANS: Take an exception.

A The fire fighting reserve of 2,100,000 gallons, and the loss in mains and service of 25 per cent, making a total --

THE COURT: What would the loss be?

A 1,923,281.

MR. THURMAN: What is that for?

MR. THOMAS: That is the estimate of loss, 25 per cent.

A Making a total of 9,616,406 gallons.

Q reduced to second feet?

A Amounts to 14.88 second feet.

THE COURT: Fifteen second feet would amount to 9,720,000 gallons, that is what you said first.

A I said approximately, it amounts to 14.88 second feet.

MR. THURMAN: That I understand is merely an estimated quantity?

A Yes sir.

MR. A. C. HATCH: You were asked, as I understood, what had actually been used. Read the question that was asked him now, will you?

(question read)

MR. A. A. HATCH: We move to strike out at this time

testimony of the witness for the reason that during the giving of the figures he has stated that this is not in effect the statement -- in effect the statement is this is not an estimate, not based upon any facts in other words from which he could draw or make an estimate.

THE COURT: I don't just understand myself what Mr. Swan says this is. He says it is an estimate, whether it is an estimate of what has been actually used, or whether it is an estimate of the necessities of the city, which is it?

A It is an estimate of the necessities of the city.

MR. A. C. HATCH: Of course we would object to his testifying as to that until he is further qualified.

MR. THOMAS: That is not the question I asked Mr. Swan.

MR. A. C. HATCH: We renew our motion to strike.

THE COURT: The question may be read again.

(Question read)

MR. A. C. HATCH: Now, if the court please, the question as put indicated that he should answer as to the water actually used within the city. The witness has treated it as meaning he should give his judgment as to the necessity of the city and has answered along ~~our~~ that line. For that reason our motion to strike.

THE COURT: The motion would not come from you to strike. If it is material evidence and competent your motion would not lie to strike it. Mr. Thomas could move to strike it because it was not responsive to his question, but it would not be a motion you could make.

MR. A. C. HATCH: If the court please, we would say it is incompetent.

THE COURT: I will consider your motion upon that ground.

MR. A. C. HATCH: As coming from one who has not

qualified to testify as an expert.

THE COURT: I am inclined to think he may give his estimate, I think he has qualified himself. The question as to the degree of qualification goes to the ~~next~~ weight of his evidence and not the admissibility of it where he has shown he has had the experience he has had and study he has made of these questions.

MR. A. C. HATCH: Note our exception.

THE COURT: The answer may remain in unless Mr. Thomas desires to have it stricken because it does not respond to the question.

Q I would like Mr. Swan, if you can, to state what amount of water is being used under these various heads which you have given daily in Provo City, can you state approximately what amount of water is being used per day ?

A I think the uses are very close to this amount, but the amount supplied directly from the water works at present is between five and a half at some periods of the year and 12½ second feet at other periods of the year. The quantity in the ~~an~~ system fluctuates.

Q Now, when the amount in the mains then is as low as you have indicated, or there is heavy demand under these various sub-heads as you have indicated here in all of these subdivisions?

A No sir, this amount is based upon the amount in the period when the springs are the highest.

Q Then as I to understand that the figures which you gave as estimates approximate the daily consumption of water under those various divisions as you have given them?

A Yes sir.

Q In Provo City? A. Yes sir.

MR. A. C. HATCH: I don't understand, Mr. Thomas. about the figures you refer to as being the approximate quantity of water used, whether it is the last figures given as to the

five and a half or twelve and a half second feet or whether it is the estimated necessities.

THE COURT: Which did you refer to in your last answer. The uncertainty occurs by reason of your last question where you asked the witness to make the approximation, whether the amount used now was approximately the figures given and he said yes. Now, it is uncertain whether you meant the figures in which he stated five and a half to twelve and a half second feet were taken through the pipes, or whether he referred to the estimated necessities which he gave in detail.

Q To which figure did you refer, to the estimated necessities?

A To the estimated necessities.

Q Those figures which you gave in gallons?

A Yes sir.

Q Before I leave that water system I want to ask Mr. Swan is there is any portion of the water of the city in the open canal that is used for flushing the sewers or for carrying off sewerage?

A The lower end of the Factory Race is used for that purpose. The sewer system terminates just west of the north end of the First Ward pasture and at that point empties into the Factory Race and that is used for that purpose. There is also the upper portion which is used for carrying off dye stuff and washings from the woolen mills, Knight Woolen Mills.

Q And is that a constant stream?

A Yes sir.

Q And is it a necessity of the city to require or is it a necessity that such a stream be constant to move off that sewerage?

A I it is?

Q Mr. Swan, you may state if you have made since the institution of this suit any experiments within Provo City to determine

the duty of water per acre?

A I conducted a series of experiments on --

Q Now where and when?

A I was going to give the number of tracts. These experiments were conducted during the year 1915. The first one was conducted on the land of Mr. George Clark, lying just -- it is marked here on the plat George Clark, lying in the north portion of the city east of 5th West street and west of the 5th West street ditch.

Q May I interrupt you there and ask you if you have a map showing the location of these tracts where you conducted the experiments?

A I havenot marked them. This map shows the --

Q As you proceed will you please mark on the map exhibit 59 the location of these tracts?

MR. RAY: You have been referring to that as 59, I think it is 58.

MR. THOMAS: Yes, you are right, it is 58, that is the first map introduced.

Q Have you a colored pencil?

A I have a red pencil that I will mark the location of the tracts. The north portion of this tract belonging to George Clark marked with a pencil and cross line it, the portion included was an alfalfa field, containing 4.47 acres.

MR. A. C. HATCH: Are you testifying as to the duty of water now?

A Testifying as to the experiments made. The first irrigation was on May 14, 1915, the quantity of water applied at this irrigation was 2.579 acre feet, that would give a depth over the land of .577 feet.

MR. RAY: Mr. Swan, I don't understand that then.

A This many acre feet applied over 4.47 acres.

MR. A. C. HATCH: When was it done?

A May 14th, beginning in the afternoon and extending into the

evening. On June 11th second irrigation was made and there was applied during this application 2.387 acre feet. June 19th--

THE COURT: Give us the depth that made?

A That made .534 feet. That was the depth at the second irrigation on June 11th. The water was applied approximately every two weeks. There were eight irrigations if you are going to --

Q You follow exactly as you have given it in your report?

A On June 19th.

Q You didn't give the second one so these gentlemen got it.

THE COURT: Yes, I have it.

MR. THURMAN: Nearly a month between the two first ones?

A Yes.

Q Proceed with the third irrigation?

A On June 19th there was 2.140 acre feet giving a depth of .479 feet. July 2nd, there was 3,300 acre feet, giving a depth of .738 feet. On July 16th there was 3.218 acre feet, giving a depth of .720 feet. On July 30th there was 3.011 acre feet giving a depth of .674 feet. On August 13th there was 4.160 acre feet giving a depth of .930 feet. On August 28th there was 4.674 acre feet giving a depth of 1.045 feet in depth. Total quantity was 25.469 acre feet. The total depth 5.697 acre feet.

THE COURT: Not acre feet.

A Or feet in depth.

MR. A. C. HATCH: Does that complete the irrigation?

A That was the last irrigation that I have. During the irrigation of this tract there was .416 acre feet that run off the tract at the lower end, estimated, leaving the true value of the water on the land 25.053 acre feet, or a depth of 5.604.

Q You are through with the measurements of that experiment, Mr.

A No sir, I am through with the measurements I wish to explain the method of this irrigation.

MR. JOHN E. BOOTH: May I ask a question?

MR. THOMAS: Surely.

MR. JOHN E. BOOTH: I understand you, Mr. Swan, the total depth put on was 5.697 feet, is that correct?

A Yes, and there was .416 acre feet run off the lower end.

MR. JACOB EVANS: Estimated?

A Estimated.

MR. JOHN E. BOOTH: Run off?

A Yes sir.

MR. JOHN E. BOOTH: What was the actual used on the land, did you give that?

A I gave it as 25.053 acre feet.

MR. JOHN E. BOOTH: That is the amount applied?

A No, the amount applied was 25.469.

MR. JOHN E. BOOTH: I didn't catch all those figures, just give them again on the whole tract.

A The total in depth applied was 5.697.

MR. JOHN E. BOOTH: Yes, I have got that.

A And the net amount on the land was 5.604.

MR. JOHN E. BOOTH: That was the amount that didn't run off?

A That didn't run off.

MR. JOHN E. BOOTH: So the difference was only about 91/1000 of a foot?

A Yes sir.

MR. JOHN E. BOOTH: That was actually wasted?

A Yes sir.

MR. JOHN E. BOOTH: I thought you got it the other way.

MR. A. C. HATCH: That actually run off the land, three-fourths of the water was wasted.

A The stream that was used in irrigating this tract during the first irrigation was 4.64 second feet. It was measured through a standard orifice after the pattern of the U. S. Reclamation Service, and measurements were taken every fifteen minutes to half an hour apart?

MR. A. C. HATCH: What did it measure?

A 4.64 second feet.

MR. JACOB EVANS: That was the size of the stream?

A That was the size of the stream in the first irrigation. I have those for every irrigation. The second was 7.73;

Third 5.83;

Fourth 6.6;

Fifth 5.87;

Sixth 5.56;

Seventh 6.24, and the

Eighth 6.41.

Q Give the hours or the time spent in each irrigation?

A Time spent in each irrigation, the first one was six hours and forty minutes;

The second five hours;

The third four hours and twenty minutes;

Fourth six hours;

Fifth six hours and thirty-five minutes;

Sixth six hours and thirty minutes;

Seventh eight hours and the

Eighth eight hours and forty-five minutes.

Q Now, give the results of each experiment and state fully what you did?

A The water was measured at the northeast corner and run in a head ditch across the north end of the tract, and the center ditch was run down the center of the tract, the total length of the tract being 842 feet, and width 224 feet. From the

center ditch the water was conducted across toward the edges of the tract in a diagonal direction, making the runs a little longer than 112 feet from the center ditch. Along the west side of the tract was a ditch which turned back into the piece about two hundred feet from the north end and ~~xxxx~~ another one at approximately 400 feet, and run back on to the patch so that any water that escaped from the upper end was carried back in and turned on to the patch. The method of irrigation was by flooding from openings out in the center ditch. There was also in the center of each piece at the north end an opening cut into the head ditch, that is in the center of each half into which the center ditch divided the tract, there was an opening out and water was conducted in ~~an~~ the north end of the tract in addition to the stream which went down in the center. The water which run off at the lower end was water which found its way off the patch along towards the lower end of the irrigation, in trying to reach the end of the piece or cover all the ground in there, and the amount was very small quantity in each irrigation.

Q Can you give now the duty in second feet? Judge Thurman asks that you give that.

MR. THURMAN: That would be substantially one hundred twenty days.

A That would be close to a 43 acre duty. little bit lower.

MR. A. G. HATCH: For what length of irrigation period?

A Figured on one hundred and twenty days. It amounts to more than one hundred and twenty eight days between the irrigation periods the total.

MR. A. G. HATCH: What period did you give, one hundred and twenty days?

A On the basis of one hundred and twenty days. It amounts to somewhat more than one hundred and twenty days here.

MR. JOHN E. BOOTH: Would it be less, May 14th to August 18th, less than one hundred and twenty days?

A Yes, it would.

MR. RAY: One hundred days, I was figuring from May 14th to August 14th.

MR. THURMAN: It would be fair to go two weeks from that last measurement and make one hundred and twenty days. that would be fair enough.

Q Now, proceed Mr. Swan, with your answer before the interruption.

A Read the question.

Q I stated to proceed and detail the results of the experiments what you did upon this tract, what the results were and how you conducted the experiment and so forth. You have gone so far as to state what you were doing with the water having irrigated by the flooding method. You have given the length of ditches. Now proceed.

MR. RAY: I understood the witness had given the full history of this irrigation.

MR. THOMAS: He has, now I want him to proceed with the rest of the experiments.

Q Before leaving this phase of it, Judge Thurman desires to know what character of land this was, please describe the soil.

A Yes sir, I was just going to describe that. The soil on this land, top soil is a black loam which varies in depth from sixteen inches on the north end to six inches on the south end of the piece. The tract is underlaid with a peculiar white granulated joint clay. Beneath the joint clay --

Q Of what depth is that, the joint clay?

A Which is at the south end of the piece, about three feet below the -- extends about three feet below the surface of the ground and to a slightly greater depth at the north end there is an open rock strata.

MR. JACOB EVANS: Below the clay?

A below the clay.

Q Go ahead, Mr. Swan.

A During the period of the -- during the time of the irrigation I noted that some portions the tract was irrigated generally during the night time, his water turn began late in the evening, and water had to be applied during the night. I noticed that in some case where a small tract was not covered thoroughly that before the next irrigation the alfalfa on that tract would be burned, that is, would just be in small pieces, because the tract was pretty thoroughly covered and just a small patch where the water did not seem to penetrate far horizontally, and the top soil before every irrigation was examined and in every case it was found to be in a dry condition. I did not make any determinations to determine the absolute amount of moisture left but the soil was dry and the surface dusty before the succeeding irrigation, and the water, the streams were put through there, put over the ~~piece~~ piece as rapidly as the man could push them over and every endeavor made to keep the water running off of the tract, and shut the water off just as quick as it reached the limits of the tract.

Q What can you state as to the cultivation of the tract, was there any harrowing done during the intervals?

A The tract was not harrowed during the intervals except that it was gragged after the first crop was taken off in order to kill weevil. The weevil took the most of the first crops. I did not get the actual weight of the crops taken off. The second and third crops were fairly good crops.

Q Can you state what the tonnage was per acre there.

A I say I didn't get the weight of it.

Q Now, have you any other?

MR. THURMAN: That was entirely alfalfa, was it?

- A That was entirely alfalfa. The clay there is of a different nature from the clay in the eastern and northeastern portion of the city.
- Q That is the surface soil?
- A The subsoil.
- Q The surface soil?
- A Yes sir, and it appears to be very porous and allows lot of the water to run through.
- Q Now, can you take up the next experiments, take up the next experiment which you made?
- A The next experiment I will give is the L. H. Bean tract, which lies to the north of the Clark piece and is marked here as Marcellus Bean on the plat Exhibit 58, and lies --
- Q Mark it heavily in red, Mr. Swan, please, don't be afraid to mark up the map, mark it heavily.
- A I have marked this similar to the Clark piece with cross lines of red.
- Q Whose tract did you say this was. L. H. Bean?
- A L. H. Bean, I see there are two tracts here, I took the Marcellus Bean tract. The tract is in the name of Leonidas <sup>marked</sup> Bean's name here on the map. It is my error.
- Q This is L. H. Bean's tract?
- A This is L. H. Bean's tract.
- Q You have marked it in red there?
- A I have marked it in red.
- Q What was the acreage?
- A The acreage on this tract is 2.663 acres.
- Q What was the crop?
- A The crop was alfalfa.
- Q The whole of it was in alfalfa?
- A The whole of this tract was in alfalfa.
- Q Now, Mr. Swan, there has been prepared a tabulation here and I wish you would follow this tabulation showing the date of

A that was entirely alfalfa. The clay there is of a different nature from the clay in the eastern and northeastern portion of the city.

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A The subsoil.

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A This is L. H. Bean's tract.

Q You have marked it in red there?

A I have marked it in red.

Q What was the acreage?

A The acreage on this tract is 2.663 acres.

Q What was the crop?

A The crop was alfalfa.

Q The whole of it was in alfalfa?

A The whole of this tract was in alfalfa.

Q Now, Mr. Swan, there has been prepared a tabulation here and I wish you would follow this tabulation showing the date of

irrigations, the head in second feet and the time in hours and minutes spent in irrigation, the quantity of acre feet and the depth on the land in acre feet, then give the totals as heretofore, you first irrigation.

A On May 16th, a head of 6.15 second feet was applied to this land seven hours and fifty minutes, giving 4.013 acre feet, or a depth of 1.506 feet.

Q Next, Mr. Swan?

A I see it is marked in the table here June 13th. I think that is meant for June 3rd, I will look that up later and have it corrected on the copies made. The water applied was 6.63 second feet during four hours of time giving 2.208 acre feet or a depth on the land of .829 feet.

On June 11th there was 6.6 second feet during four hours and thirty-five minutes, or 2.520 acre feet giving a depth of .947 feet.

On June 25th there was 5.62 second feet for five hours and fifty minutes, giving 2.730 acre feet or a depth on the land of 1.024 feet.

On May 30th --

Q Is that an error, would that be July?

A There has evidently been an error in typewriting this. I did not typewrite it. I think I can find it, I will check it up later. There was 6.4 second feet.

MR. A. C. HATCH: Give us the date there.

A Judge, I didn't typewrite this, and I think there is an error has been made in placing it here in typewriting. I will correct this during the recess, I will look them up and correct these.

(RECESS)

Q Now, begin where we left off, Mr. Swan?

A Referring to my notes in regard to these irrigations I found that the date which I gave as July 11th or June 11th should be July 11th.

MR. A. C. HATCH: That was the first date?

A No, that is the third one, and the date given as June 25th should be July 25th. The ~~at~~ date of May 30th is out of place here and comes at the last, and the date which I first stated was in error, June 13th, is correct.

MR. JOHN E. BOOTH: Is that the first irrigation?

A No, that is the third irrigation, June 13th. May 30th comes between.

Q It should read then May 16th, then May 13th, then June 13th?

A July 11th and July 25th.

Q Was there a turn missed in there an irrigation period that you didn't get?

A Not in there. May 30th is put out of order, it is put at the last of the list.

Q You have so stated.

MR. JOHN E. BOOTH: Was there no irrigation from June 30th to July 11th?

A June 13th to July 11th. There may have been an irrigation in there. There were three irrigations altogether that we didn't get on this piece because of the lack of cooperation with the farmer, he would not cooperate with us in the irrigation of this and made irrigation without notifying us of the time, and we didn't have his schedule.

MR. THURMAN: You will straighten this out in your tabulation, won't you?

A I will straighten this out in the tabulation. The five irrigations that we have tabulated here gives a depth of 5.357 feet on the land.

MR. THURMAN: That is the Bean land?

A This is the Bean tract.

Q Did you make personal examination of the land before each of these irrigations that you have tabulated?

A I didn't make personal examination, I was unable to get away every time, and had a man who made them under my supervision.

Q Who was it?

A Mr. P. E. Houtz.

Q Did you make any personal examinations of these.

A I did in some instances, but on account of the lack of cooperation there was not sufficient time in all cases before the irrigation to examine the tract and see the condition.

MR. JACOB EVANS: Did you make these measurements you are about to give?

A The measurements were made under my supervision by Mr. Houtz. Some of the measurements I made myself.

Q State which you made yourself?

A I was with Mr. Houtz on some occasions.

Q You might state here, Mr. Swan, how these measurements were made, what method did you adopt?

A These measurements were made through a rectangular suppressed weir that was placed in the ditch just outside of the Bean tract that was being experimented upon.

Q Was that weir installed by you or under your supervision and direction?

A It was, and was examined after its construction to see the condition in which it was placed, and it was in good condition. The weir was three feet wide and the crest of the weir a foot above the bottom.

MR. JACOB EVANS: I would like to ask one question concerning the experiments made on the George Clark farm, whether or not you made those measurements yourself?

A I made a large part of those measurements myself.

MR. JACOB EVANS: Some of them you did not?

A Some of them were made by Mr. Houtz.

MR. JACOB EVANS: In your testimony I understood you to say you had made these experiments, now, can you point out what particular ones you made and what particular ones Mr. Houtz made?

A I could by going over the details of the notes and find them. I was there with Mr. Houtz on part of them and he kept the record, and some of them I was there and Mr. Houtz wasn't there. The irrigations were made --

MR. JACOB EVANS: Where is Mr. Houtz?

A Mr. Houtz is out of the state, I don't know his exact location at present.

Q Now, go ahead, Mr. Swan.

MR. JACOB EVANS: Just wait a minute.

MR. THOMAS: If you are going to examine now I shall object. If there is something special all right. We object to this method of cross examining.

MR. JACOB EVANS: I draw attention to the fact we were ready to believe, as I think everybody was that these experiments were made by this witness, that he conducted them and carried them on. It now appears in this case that he did not conduct them, all of them, or carry them on, but is testifying as to what somebody else made not in his presence.

THE COURT: You have reference to this first experiment?

MR. JACOB EVANS: We have reference to the first experiment.

THE COURT: You may develop that and find out what the situation is when we come to the cross examination, and the court will determine what part was made by Mr. Swan and what was not.

Q Proceed, Mr. Swan.

A This tract is an irregular tract, it is 284 feet wide in the

north end.

MR. A. C. HATCH: That is the Bean tract?

A That is the Bean tract, and 315 feet wide, toward the south end with an extension on the east -- on the southeast portion extending to the south 55 feet and 12 $\frac{1}{2}$  feet wide. Measured across near the center of the main tract the width is 260 feet, and the main tract is an average length of 472 feet. The water enters through the head of the ditch at the northeast corner of the tract and there are three ditches running the length of the tract, the first one being 75 feet from the east line and the other two 75 feet from each other, placed 75 feet apart. Measuring from the east side of the tract the larger of these ditches runs about 150 feet from the east side of the tract and parallel with the east side. The water was ~~mainly~~ conducted down these ditches and flooded from these ditches across the section in a diagonal direction. As soon as the water reached the bottom of the tract we turned the water off, but during the irrigation on July 25th -- excuse me, it is the irrigation on May 30th, I was present during the irrigation, and there was sufficient water to give a depth of about 64/1000.

MR. A. C. HATCH: Over the entire tract?

A No, there was a waste of one second foot for ten minutes, off of that tract, that is, it run off of that tract and on to some ground that he had under cultivation to the south of that tract. There was very little overflow reported on the irrigation of July 25th, run only very short time, very small stream, could hardly estimate the amount.

Q You haven't any data as to the tonnage upon this land?

A No sir.

Q Can you state the condition of the soil prior to each irrigation or application of water?

A The soil from the examinations that I made of the lower ends of

tract was dry on each occasion when I was present and made the measurements and so reported by Mr. Houtz who made the measurements other times.

MR. JACOB EVANS: We object to what Mr. Houtz reported, more to strike it out.

THE COURT: That may go out, what Mr. Houtz reported.

Q In what way were these reports brought to you ?

A These reports were brought to me after each irrigation showing the depth that had been measured at the gauge on the weir at each period and the time when the measurements were taken, time when the water was started and the time when the water was turned off, and notes of anything that would affect the quantity of water that was put upon the land, any overflow of things of that kind.

Q Were these details furnished you by Mr. Houtz at your request and under your direction and instruction?

A Yes sir.

Q You may state if you give some instruction and direction to Mr. Houtz as to any other work that he did for you under this experimentation?

A I did.

Q And you may state if you supervised the work which he did from time to time?

A I did, was present with him on a number of occasions and quite frequently on the tract where I thought there was likely to be any question and watched his method of doing the work, and gave him instructions with regard to things desired noted.

Q You may state if your inspection of his work was to determine whether or not your instructions were being carried out with reference to these experimentations?

A It was.

Q And state if you found the -- that your instructions were so carried out from time to time by him?

M. THURMAN: I object to that because he can't answer whether this man carried his instructions out when he was absent from him or not.

THE COURT: He is not asked that, he is asked whether he found he carried them out at the times he went and was present. I don't know the object of it.

MR. THURMAN: I took it the other way.

THE COURT: Wasn't that the question, read it.

(Question read)

A Yes sir.

THE COURT: I don't know from the question what the answer means really, whether he found when he made investigation in his opinion his instructions had been carried out in his absence, or whether he found when he went there they were being carried out at that time.

MR. THOMAS: I will ask both questions.

Q Just answer both of those questions as they were suggested by the court.

A May I have the questions read again.

(Question read)

THE COURT: Now, the objection will be sustained to the question if it is meant what I stated first, if he found upon investigation that his instructions had been carried out because he can state what he found, he cannot state what was done in his absence. If he meant to answer the other construction of the question then the objection will be overruled.

Q State what you found in each visit that you made to this tract of L. H. Bean's with reference to what had been done?

A I found, I went immediately upon going to the tract and measured the depth on the gauge of the weir, depth passing over the weir and then I asked Mr. Houtz to allow me to see his record, and see what he had recorded and noticed whether he had his

record show that the measurements were in reasonable accord with what  $\tau$  measured on the weir at his last measurement, noted the time before that when the last measurement was taken. I observed his method of watching the irrigation, and allowed him to take his own course and observed as to how he conducted his measurements, and how he watched his gauge and checked him up after he had made his reading to see as to his accuracy in making his reading.

Q Now proceed, or did you state the condition of the soil prior to each of these irrigations?

A I stated from my observation of the lower portion of the tract where the water had not yet been put on that the soil was dry and required the application of the water.

Q Take up the next, have you anything else to add as to this tract?

A I made an examination of the soil on this tract and found the soil gravelly, coarse soil, having a depth of from eight inches to a foot, and was underlaid with an open rock subsoil. In the northwest corner and in the southwest corner there is a small area which is about ten inches deep, of sandy loam, and below that there is a coarse open sand about fourteen inches deep with the gravel below that. That is only a very small triangle in each case, being about twenty-four feet by about fifty feet and in a triangular shape, in the northwest corner and in the southwest corner triangle slightly larger than that, but very small areas, the balance of the tract is as described with a coarse gravelly soil from eight inches to a foot in depth, and reaching the open rock.

Q Take up the next tract, which is that you have marked there, is that the Stubbs or Taylor and Roberts tract?

A It would be the Stubbs tract.

Q What was the area of that?

A The area of that was 2.71 acres.

Q Property of Mrs. Elizabeth Stubbs?

A Property of Mrs. Elizabeth Stubbs.

Q Will you mark it upon the map please?

A It is located west of the First Ward Pasture and lying alongside of the Agnes Cummings piece and south of the roadway which crosses the tract in an east and west ~~sixx~~ direction at the north end of the Agnes Cummings tract. I have marked the piece with the cross line.

Q In red?

A In red.

Q Now, that was planted to what?

A The crop on this was sugar beets. The tract was farmed by Fred Stubbs. The first --

Q Do you know anything as to his general reputation as a farmer?

A He is considered a good farmer.

MR. A. C. HATCH: That is not an answer.

A General reputation as a farmer being good and he is very successful with his farming.

Q Go ahead?

A The date of the first application was July 1st.

MR. JACOB EVANS: I would like to inquire here whether or not you were present and measured this water on the various applications and know of your own knowledge of just these irrigations?

A Not on all occasions I wasn't, I was on some.

MR. JACOB EVANS: Object if the court please, to his testifying to any of these measurements when he was not present and knows nothing of them, as being incompetent and testifying from hearsay testimony.

MR. THOMAS: He has not said he knows nothing of it.

MR. JACOB EVANS: I mean at the time he was not present.

MR. THOMAS: I suggest before a motion to strike out

this testimony that some of it be given.

MR. THURMAN: Let him give what he knows.

MR. THOMAS: I assume that is what he is going to do, but you don't let the witness have a chance.

THE COURT: He may state what he has personal knowledge of in relation to this test.

MR. A. C. HATCH: And he will confine himself to his personal observation.

THE COURT: Personal knowledge.

MR. JACOB EVANS: I make the objection at this time because of the fact I understood the witness to say on this first tract while he gave testimony concerning each and all of the irrigations he did state that he was not present when those irrigations were made, and I assume he would probably do the same thing here.

THE COURT: That did not appear at the time the evidence was given and I suggested that might be gone into on your cross examination with reference to this, but in this it appearing there is some question about it, he may give those matters that occurred under his immediate direction and measurements and application of the water at the times when he was there and directing what was done, so that he will be in a position to know what was done, but as to something that was told him by someone else, he need not make any statement with reference to that. The objection will be sustained as to that part of the matter.

Q Following the admonition of the court as to your testimony, proceed, Mr. Swan?

A The water was conducted upon this tract of land through a ditch which enters the tract at the northwest corner of the land.

MR. A. C. HATCH: Will you give the date again?

MR. JACOB EVANS: He has not got to that yet.

A And was measured through a weir located in the ditch just north of the land. This is a suppressed rectangular weir, similar in construction to that through which the water was measured upon the Bean tract.

Q You may state whether or not these weirs were standard weirs?

A They were standard weirs and were three feet wide and one foot in depth below the crest. The water was run half way down the tract and there it was picked up by a cross ditch and redistributed to shorten the length of the run, and the water during the irrigations when I was present was rushed through as rapidly as it could be conveniently concentrated in large streams and run rapidly over the land.

Q What was the length of these runs?

A The length of those runs, I have not noted that upon my --

MR. JACOB EVANS: Can't you give it from the map?

MR. THOMAS: No, it is too small.

A I haven't those noted upon my table. I have the notes somewhere but it will take sometime to get them.

Q Did you give the length proper of that tract?

A No sir, I didn't give the length, the area was 2.71 acres.

Q Proceed, the character of the soil.

A The soil toward the north end of the tract is gravelly, very gravelly nature and very shallow, and the subsoil is open rock. About half way down the tract the gravel comes to the surface, and the character of the soil is more sandy farther down and the --

Q Mr. Swan, is that the same tract from which you took the your first sample that was introduced today?

A Yes sir.

Q You have already described that character of soil?

A I have already described it.

- Q All right, don't describe it any more then. Now proceed with the irrigations or applications of water?
- A The first application was made on July 1st, I was present during the application, there was 1.77 second feet of water run during seven hours and forty minute, total quantity was 1.31 acre feet or .417 feet in depth on the land.
- Q Now the irrigation at which you were present ?
- A I could not state that definitely without looking up the individual report on this matter.
- Q Well, make a note of that and get those individual reports by the next session of court.
- A I was not present at as many irrigations on this tract as on the other one.
- Q Can you state on the Stubbs tract what irrigations you were present at?
- A I cannot state without looking up those.
- Q Then we will hold that until the next session of court, and you will be present. Now take the next situation that you experimented upon?
- A ON the Taylor and Roberts tract.
- Q Locate that on the map, please?
- A I havemarked upon the Exhibit 58 the location of this tract which is in the John T. Taylor land in the northwest corner of that tract.
- Q There is one question I wanted to ask you pertaining to all of them. Under what ditch or system of irrigation was this tract irrigated?
- A This tract was irrigated under the Tanner Ditch.
- Q And the Stubbs tract was irrigated from what ditch?
- A The Stubbs tract was irrigated from the Factory race.
- Q And what was the Clark tract irrigated from?
- A The Clark tract was irrigated from the 5th West ditch or City Race and the Bean tract was also irrigated from the City Race.

Q No ahead now with this Taylor and Roberts, did you obtain a sample of soil from the Taylor and Roberts tract?

A I did.

Q Has that been described here this morning?

A That has not been described so far, the land on this tract. I described one --

Q Describe this tract?

A Sample this morning that was farther east on this piece. Do you want the sample?

Q Please describe the soil?

A The soil on this tract is a sandy loam soil, fifteen inches in depth, and overlaid with a sandy clay subsoil.

Q To what depth?

A I didn't dig to the bottom of the depth.

Q How far did you dig?

A I went down about three feet, and found this as deep as I went in that portion.

Q What is the area of this Taylor & Roberts tract?

A The area of the tract is 3.9 acres and the crop was sugar beets, the water was measured through a suppressed rectangular weir located in the ditch north of the tract near the line between William Park & land and the Henry Wayne land. Three measurements were made upon this tract.

Q How was the water applied?

A The water on this tract was applied from a cross ditch at the head and run half the length of the tract, and there redistributed, the same as on the Stubbs tract.

Q And in the same method?

A And in the same method.

Q Go ahead?

A Owing to the lack of cooperation the measurements on this tract were only taken during three irrigations. The first one was July 4th.

July 4th.

MR. JACOB EVANS: Are you testifying to days when you were present?

A No, I was not present during the irrigation of this tract at any time.

Q All right, we will take the next tract then where you were present. Let me ask, on this Taylor & Roberts tract such data as you have was that which was furnished by somebody else?

A Yes sir.

Q All right, proceed with the next tract then ?

A The next tract is the A. L. Smith land which was described this morning located near the township line and west of the 5th West street.

Q Is a sample of that soil here in court?

A It is.

Q What sample was it that you gave this morning.

A The sample that I gave was the sample that was taken by me on last Saturday.

Q What was the number of it, do you remember?

A It is marked Exhibit 65. The crop on this tract was strawberries, different amounts of land were irrigated at different irrigations. The average irrigation was of 1.02 acres. The water for this land was measured through a rectangular weir of the form previously described and was located on the Leo Warner land to the north of the Smith land, about the center of the Leo Warner piece. The first irrigation --

MR. JACOB EVANS: Just the same question, were you present?

A I was present during the first irrigation and the area irrigated at that time was 1.02 acres. The waters -- the irrigation was made on May 12th. There was 2.72 second feet of water run on the tract for four hours and forty minutes giving 1.06 acre of a depth on the land of 1.04 feet. The water on this

piece was run across the head of the strawberry patch, the head of the ditch, running in an east and west direction, and the length of the runs was 216 feet. The water was started in thirteen furrows and as fast as the water reached the bottom it was transferred to other furrows until the whole tract had been covered, when the measurements ceased and he took his water onto other lands that were not being experimented on, or turned it on.

Q Next application of water?

A The next application was made on June 8th, I don't remember whether I was present or not.

Q To the best of your recollection would you say you were present?

A As I recollect it I was present on this -- during this irrigation also.

Q All right, give it?

A And there was 2.6 second feet run for four hours and five minutes, giving .384 acre feet or a depth upon the land of .866 feet. There were twelve irrigations on this tract reported and one irrigation not reported.

Q How many irrigations did you witness?

A I could not say without looking up the record, I was not present on this tract more than three irrigations, and I could not say what the next one was.

Q Now, you will get that data exact both for the last tract mentioned and for this?

A Yes sir.

Q Now, as to those irrigations which you did attend -- let me withdraw that question put it this way. Can you state of your own knowledge the condition of the soil on this tract prior to these irrigations which you did attend?

A The condition of the soil was dry and it in fact very dry each time before the application was made at the times when I was present.

Q Have you anything else to say as to this tract, as the character of the investigation?

A Nothing more except what has already been said, the same care being used on this tract as on the other tracts.

Q Did you have the cooperation of the owner of this tract at this time?           A Yes sir.

Q Do you know if the owner was present at these irrigations, was he present when you were there?

A He was present when I was there. He did the irrigating, we measured the water and watched his method of application.

Q And these other instances in the Stubbs experiment or Bean experiment and that of Taylor and Roberts and George A Clark, were the owners of these respective tracts present at each time to your knowledge?

A On the George A. Clark piece his son did the irrigating.

Q What was his son's name?

A I don't know his first name.

Q Well --

A He has two sons, and on the Taylor and Roberts the property was under lease to a lessor.

Q Who was he?

A I don't recall his name, he ~~lives~~ lived out on the lake bottom-- Willard was the name, I remember it now.

Q In the Bean tract?

A In the Bean tract the irrigations were made by Mr. Bean, and he was necessarily there. On the Stubbs tract Mr. Stubbs made the irrigations on some occasions and on some occasions they were made by a man in his employ.

Q Now, until you get your other data I will not be able to examine further upon that point.

THE COURT: I think we had better suspend at this time then.

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4:45 P.M., Recess to 9:30 A.M., June 19, 1916.  
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DIRECT EXAMINATION by Mr. Thomas continued.

Q Mr. Swan, at our last session you were to check up on the data that you had with reference to the experimental observations and tell us how many of these irrigations you yourself attended?

A Yes sir.

Q In addition to that I will have you state any other thing that you wish now to state with reference to any correction of the testimony with reference to what you gave heretofore?

A I can state that the Clark piece I was present on May 14th, June 11th, July 2nd and August 28th.

Q What piece was that?

A On the Clark piece.

Q Give me those dates again, please.

A On May 14th.

MR. JACOB EVANS: Now, you are repeating?

A Just repeating, he asked me to give it again. <sup>June 11th,</sup> May 14th, <sup>July</sup> 2nd, August 28th.

Q Next?

A In the Stubbs piece, July 1st, July 1st, July 13th and August 3rd. On this piece on August 27th and September 25th, Mr. Stubbs, Fred Stubbs kept a record of the measurements. On the Smith piece I was present on May 12th, June 8th and that was all on that one. On the Bean piece I was present on May 16th, May 30th and June the 13th.

Q There is one other tract, Taylor and Roberts?

A The Taylor and Roberts, I was not present during the irrigation on that piece at any time.

Q Were those and all of these applications of water made under your direction?

A Yes sir.

Q Were the applications of water on the Taylor and Roberts

tract made under your direction and supervision?

A Yes sir. There was one further matter, on the Stubbs piece I made an error on the statement with regard to the cross ditch. The water on this piece was run through the full length. The piece is composed of two rectangles, one is 550 and the other is 600 feet long. The tract that is 550 feet long is 63 feet wide and the other rectangle is 139 feet wide.

Q So that the length of ditches in these and the other tracts were the average length of ditches used by farmers generally in this community?

MR. JACOB EVANS: Wait a moment, object to that as immaterial and irrelevant.

MR. THOMAS: It certainly is material.

THE COURT: Objection is overruled.

A The length, these are rather extreme lengths on this piece.

Q On the Stubbs piece?

A On the Stubbs piece.

MR. RAY: Mr. Thomas, perhaps I have forgotten, but was the run cross-wise or length-wise?

A The run was length-wise of the piece.

Q MR. RAY: So that there were five and six hundred foot runs substantially?

A Yes sir.

Q Can you give us, Mr. Swan, the number of lots in the city?

A I have checked these over with Mr. Goddard, but he and Mr. Stewart have been checking the matter over, and the lots are as stipulated, I will say.

Q MR. JACOB EVANS: That has already gone into the record.

MR. THOMAS: The acreage has but I was not sure as to the lots.

MR. JACOB EVANS: I believe a paper was introduced

that shows the number of lots.

MR. THOMAS: That shows the number of blocks.

THE WITNESS: There are eight lots to the block.

Q Can you give the number of blocks in the platted area?

A There are some of those that are outside of the city.

Q Were there any other investigations as to soil that you made of which you have not made report heretofore?

A I think my report covers, my statement the other day, covers the conditions as I observed them there.

Q And all the soil samples which you personally took?

A All the soil samples which I personally took and made a record of?

Q Mr. Swan, have you made any observation or observations in Provo City to determine any advantage to be gained in this valley through heavy application of water during the early season?

A Yes sir.

Q State when you made those observations and what they were?

A I have observed the applications practically ever since I first went to work in this position, and even before I worked as the city engineer. I have observed and it has been the custom during the early -- during the high water season, to apply considerable quantity of water to the lands. These waters during this time carry large quantities of alluvial matter and plant food in the water and the application of these waters to the land serves to renew the land and improve it.

Q Have you had occasion to familiarize yourself with the course of the Provo River from its source to where it empties into the Utah Lake?

A Yes sir.

Q And have you made any observation to familiarize yourself with those conditions?

A Yes sir.

Q Have you at any time visited the locality in which the plaintiffs reservoirs are situated?

A I have.

Q Have you made any examination or investigation to determine whether or not there be any seepage from those lakes to the Mr Weber or to the Provo Water sheds?

Q The seepage --

Q Have you made those observations?

A Yes sir.

Q State what they were?

A I have observed the general condition of the country in which these reservoirs are located, and the condition of the ground, the slope of the bedding planes of the strata rock and all the conditions surrounding.

Q What has been the result of your observation?

A The result of my observation is that my judgment I would say there was very little, if any seepage which would find its way out of these reservoirs, and the slope of the strata is rather towards the Provo system than toward the Weber system. The dip is very slightly north of west as you pass from the Union -- from where the Union reservoirs is located, Union System, over into the north fork of the Provo, for instance, after reaching the divide between the two as you go toward the North Fork, you travel on a slope that conforms very closely to the bedding plane, except that it is a little steeper. You will travel for a considerable distance along on the bedding plane and then drop off and then travel on the bedding plane again and then drop down again, so that you are traveling almost as you go down there just a very little faster than the slope of the country -- slope of the bedding plane.

MR. JACOB EVANS: You say that is in the North Fork?

A As you pass from the Union system over into the North Fork. Now, that also applies on the east of the union system too, on

the divide between the Duschene and Provo and again as you pass over the divide from the North Fork into the boulder, although on the boulder side the drop is much more abrupt, and you cut through most of the bedding plane.

Q Have you made any observation to determine the loss by seepage and evaporation in the river course from the reservoirs to the -- well, to any part of the river course?

A I have made no measurements, I have noted the general conditions.

Q Have you made any observation, have your observations been sufficient to enable you to form a judgment as to the probable loss in seepage and evaporation in the river course?

A I would say no.

Q Now, will you please describe the general conditions of the river?

A As you leave the lake on the main river, the river ~~descends~~ descends over the ledges, the channel, until you get down to near the turn that the river makes below what has been mentioned here as the Meldrums Cabin. The river in that portion is in rather a narrow perpendicular walls, almost ~~cut~~ cut through the ledges of rock. After passing that point --

Q Let me ask you right there, if, in your judgment, the loss by seepage and evaporation there would be appreciable?

MR. JACOB EVANS: Wait a moment, we object to this because the witness has already stated he made no observation from which he could determine.

THE COURT I think he so stated, Mr. Thomas, that he hadn't made sufficient investigation to state anything on that subject. If he has made such examination along that part of the river he can so state and then I will permit him to express his opinion.

THE WITNESS: I understood Mr. Thomas' question to which I made that answer to state whether I could express judgment as to the quantity of loss.

THE COURT: Read this question, I didn't so understand it.

(Question read)

Q Let me precede that question with this one and ask you if the upper part of the river course you have made any observation to determine whether or not there would be a loss by seepage as well as by evaporation?

A I have made observations of that.

Q Now, I will renew the question then and ask you if, in your judgment, the loss by seepage and evaporation at that point where you describe the river as going in a rocky channel would be appreciable or substantial?

MR. JACOB EVANS: Object to that as being indefinite and uncertain, wouldn't aid the court or anyone else in determining what the loss was.

THE COURT: No, I take it not. The witness stated he has made such investigations and determinations to enable him to determine him whether it is a losing channel or not. If you desire to cross examine whether he has made sufficient observations and experiments you may do so. I understand this includes a determination, this answer would, whether there is more water leaving the channel by reason of evaporation and seepage than comes in from other sources, so as to determine whether this is a losing channel.

MR. JACOB EVANS: I didn't so understand it. I understood him to say he had made no measurements whatever.

THE COURT: He has said now that he has. You may cross examine if you desire.

CROSS EXAMINATION by Mr. Jacob Evans.

Q Have you made any measurement whatever to determine whether there is a loss in the river channel?

A I have not made any measurements, as I before stated.

Q You base then your judgment merely upon walking over the stream and looking at it and the manner in which it runs down the gorge or channel?

A And conditions of the river bed.

Q And that judgment would be unaided by any measurement of any kind as to determining whether the river is a losing channel or whether it is a gaining channel between the points mentioned?

A I made no measurement as conducted by Mr. Tanner at different points there .

Q At any points along the river have you made any measurement to determine whether the river channel was a losing channel or a gaining channel?

A Yes.

Q Have you in this particular locality?

A In this particular locality I have not made any measurement except at the head and my judgment would be based merely upon observations of the channel and the flow of the water.

Q And that of course would be very indefinite and uncertain, would it not?

A As to absolute quantities it would.

MR. JACOB EVANS: We renew our objection.

THE COURT: The objection is overruled. The situation would go more to the weight of the evidence.

A The channel in the upper portion is such that the water in descending is very much agitated and greatly of spray form, and it would be very conducive to high rate of evaporation.

I would judge from my observations of the channel that the seepage losses would be very light in this portion of the channel. Immediately above the Meldrums Cabin there is extended over the full width of the bed of the canyon, there is a marsh or swamp area in which there is considerable water rising and below this point there is -- below the Meldrun's Cabin there is considerable water coming in from the east side

of the canyon, and that stream comes in there, is increasing all the way down the side of the canyon, and would probably also have some return seepage in or near the bed of the river. Below this point the river bed widens out and is not between the perpendicular bank. It is more level in the bottom of the channel, the channel being considerably -- or very much shallower and the banks not steep so that -- and the bottom is gravelly. There are a number of points along this course where there is return seepage comes in. There are a number of places where there are marshes or swamps and the extent is such and the nature of the country is such they have been forced to corduroy the road there in order to pass over. This condition would extend to the river bed, and the water would be returning in those places to the river bed by return seepage that would come up in the bottom of the river. This is the case practically all the way down to the Soapstone creek. Beyond that the river channel is steeper again and is quite wide and filled with large rock and boulders and the water is very swift and is great deal of spray produced in here, in this section, and the loss by evaporation there would amount to -- would be relatively high. In this course and portion of the river bed I don't recall any places where there would be springs though there would probably be return seeps from the dip of the strata, but they would not be indicated as above because of the rocky nature of the channel. Below this, after you reach the pine valley there is return seepage coming practically all the way down the river, but it is heaviest along the lands which have been irrigated, or just below them.

MR. A. C. HATCH: I would like to ask the witness what time of year this examination was made.

A The examinations were made in two years, Judge, in 1912 and in 1915. In 1912 observations were made in the latter part of

July and in 1915 in the forepart of August.

DIRECT EXAMINATION by Mr. Thomas continued.

Q During the height of the irrigating season in both years?

A Yes sir.

Q Let me ask you a question there, when you spoke of the return seepage coming in all the way down the river, did you make any investigations of the river to determine whether or not there was seepage after you left the Kamas bench country?

A There is a large volume of water comes in at one place just where you leave the bench, Kamas Bench, on the road going down into Provo canyon below Woodland and along through Woodland there are springs and seeps all the way along the bed of the canyon.

Q Do you know whether or not that the seepage is heaviest during the irrigation season and just after and prior to the irrigation season?

A I can state merely on my judgment as to the time when I made the observation, it was about the same during both years.

Q Now, go on?

A It would be my judgment that ~~as~~ it would be heavier sometime after the irrigation had commenced, that is, after the irrigation had been conducted sufficient length of time to allow the water to make its way through the soil.

Q Pardon that interruption, you were going down the stream now?

A After leaving, or after you reach the Midway dam there I made measurements at the Midway dam and made measurements farther down the canyon and between the Midway dam and the Hoover ranch, the seepage is -- the return seepage is very heavy, coming in in large streams in places. At the time I made the measurements there was in the neighborhood of seventy second feet increase in the stream between those points.

Q Between the Midway dam --

A Between the Midway dam and the Hoover's ranch.

Q What is the distance between the Midway dam and Hoover ranch?

A Approximately I think it is in the neighborhood of five miles, may be an error about that now.

Q You are giving your best judgment?

A I am giving it now.

Q From memory?

A I mapped the whole thing, I may be in error in regard to that.

MR. A. C. HATCH: Will you allow me, did you say the Hoover ranch?

A The Hoover ranch, yes sir, John W. Hoover.

Q Isn't the distance more than five, the Judge suggests nearly twelve miles from the Hoover ranch to the Midway dam.

MR. A. C. HATCH: I call attention of the witness it is eight miles from Heber to the Wahlburg switch.

A Yes, I was thinking of the distance from Charleston. The Midway dam is farther north than Charleston. It would be more than five miles.

Q It would be nearer twelve miles?

A It would be nearer twelve miles, it is the full length of the township.

Q Before proceeding any further on that, Mr Swan, let me ask you if you have made any observation in the upper valley, the Kamas Valley and Provo Valley, to determine the effect of the heavy applications of water in those valleys upon the water supply in Utah Valley, do you understand the question?

A Yes, I have observed the effect of the application.

Q State what that effect is?

A The effect of heavy application of water there during the early part of the year is to increase the supply in this portion of the river later on in the low water season.

Q Go on with the result of your observation on the river from

the Hoover ranch down?

A From the Hoover ranch down there is return seepage ~~is~~ coming in practically all the way down the river. There are two places in the river bed where there are large faults across the river bed where would probably be loss, also along where the Pole Canyon forks crosses. A little below the region or little below the Spring Dell country there is a fault that crosses here and farther down near the mouth of the canyon, the fault along the face of the Wasatch crosses so that there would be loss there in all probability. The return seepage is, however, very heavy along through this country. There are just above Spring Dell, particularly, there are springs on both sides of the canyon clear down to the water edge and probably large return of seepage water coming up in the bed of the river just above the Spring Dell and from there on down. It is also the case higher up the river along opposite the Deer Creek along from there up as far as the Wahlburg switch, along through Hoover's ranch below the point where the measurements were taken, lower end of the Hoover's ranch. There is considerable return seepage along in this section, so that the channel would be an accumulating channel from these return seepages all the way down as far as the mouth of the canyon and from the mouth of the canyon down the river during the low water stage is dry below the dam at the head of City Creek, and all the water being turned out of there there is in the latter part of the season enough water to supply a large part of the flow of the Tanner race, all of the Fort Field and the Little Dry Creek streams, that comes in below the head of City Creek, return seepage to the channel.

Q You have used the words or the phrase, "return seepage", do you mean by that springs that come forth along the sides or in

the bed of the channel?

A I have used, <sup>it</sup> to mean both the springs that -- where it would come in large bodies and the flow of percolation that comes in through the open bottom of the stream in places.

Q Used as a blanket term to cover all waters which come back into the river bed?

A Yes sir.

Q Whether they have been applied artificially upon upper lands or not?

A Yes sir.

Q Now, have you any other observation to make or give us now with reference to your experience in the Provo River. Can you tell, Mr. Swan, whether or not the waters which have come in as you have described it by return seepage into the various canals under the Provo City system, whether those waters have been charged by the commissioner against the amount to be taken by Provo City from the river?

MR. JACOB EVANS: We admit that they have.

A Yes sir, they have been measured and charged.

Q Whether those waters have arisen within the channels of the canals or otherwise?

A Yes. As an example, the waters measured to Provo City are measured near the Pressed Brick, Provo Pressed Brick Company's wheel, and the waters are turned out of the river near the mouth of the canyon so that they run -- all the return seepage or all the seepage that comes into the City Creek between the mouth of the canyon and the head of the canals there is measured to Provo City.

Q Is Provo City charged with any of the waters that come in by seepage into the canals after the measuring point is passed?

A It has not been in the past.

Q I want to direct your attention to the reservoir country again for a moment and ask you if in your judgment, based upon

your investigation and your experience, if the retention of the waters there by the plaintiff company has the effect of holding back the precipitation which ~~not~~ would otherwise come directly into the river? and be reached by the water users in what is called the intermediate stage?

A My judgment would be --

MR. JACOB EBANS: Wait a moment, we object to that as incompetent, and I would like to ask a few questions concerning his knowledge about that before he answers it.

THE COURT: You may do so.

CROSS EXAMINATION By Mr. Jacob Evans.

Q What do you call the intermediate stage of Provo River?

A The intermediate stage of provo River, I would call that stage between the time when the river had descended to about twenty four thousandths minute feet down to the eighteen thousand.

Q How long a period of time does it take in ordinary years for the waters to descend from twenty-four thousand minute feet to eighteen thousand minute feet?

A From my study of the records on the river. I would say about two to three weeks until the last two or three years. The last two or three years it has been -- it has made the descent in two or three days.

Q Did you see the map that was introduced by the plaintiff and which Mr. Wentz testified to, showing the government reports on that river for ten years, and which shows that the intermediate stage has been uniform for the past ten years?

A I didn't see the map, I don't recall it.

Q Your idea then is it is <sup>the</sup> a reservoir that is ~~pre~~ preventing the water from holding up for about three weeks?

MR. RAY: I think that is not proper cross examination.

MR. JACOB EVANS: A<sup>1</sup> right, I will withdraw it, I don't care to ask any more questions.

DIRECT EXAMINATION by Mr. Thomas continued.

Q just answer the question.

MR. JACOB EVANS: We object to it as incompetent, he has not shown that he has any knowledge that would aid the court or anyone else in answering such a general question.

THE COURT: I am disposed to let him answer the question if I understand just what is meant by holding back the precipitation. I don't understand just what counsel intends to present by that question. Now, read the question again, I may not have understood it, may have gotten the language wrong.

(Question read)

THE COURT: Now, I don't understand what you mean by holding back the precipitation.

MR. A. C. HATCH: I understand he means if it should rain would the reservoirs catch and hold the water that would come down into the river.

MR. THOMAS: Now, just a minute. By holding back the precipitation I mean the retaining of such waters as come through the summer rains and the melting of the late snows or the late melting of the snows.

A The summer rains would come at a period which would not be the intermediate stage. The late melting snows I would say would be held back. This water shed is the highest water shed on the river and it would at natural be the latest snow on the whole of the water shed of Provo River to melt and those reservoirs would catch the precipitation or would catch the run off from those late melting snows and hold it back. They would also hold back the rains that fall during the summer season because -- that is, if the water sheds that are tributary

to them which cover practically the whole of the water sheds of the main river, because the water would have to go through them, <sup>that would be</sup> and at a time when they were already drawing water from reservoirs, and the lakes would otherwise have flooded to a point where they would catch all this water and hold it. There would be no overflow in that. The late melting snows, the intermediate stage coming just before they begin drawing, would under normal conditions come at a time when, if it were not for the reservoirs the water would have found its way through those lakes and down into the river. On account of the reservoirs being located in there they would catch it and hold it.

Q So that instead of being-- those waters instead of being released during the intermediate stage if it were not for the dams and reservoirs would come down in the low water stage?

A The late melting snows would come down in the latter end of the intermediate stage.

Q At the time you made the examination and measurement at the Midway dam to determine the inflow there at that point in the river, was the river at the ~~Midway~~ Midway dam dry?

A No, there was the water in there which was being turned to the Provo Reservoir Company.

MR. THOMAS: That is all with this witness except we will wish to recall the witness later on the subject of the irrigation investigations. I have understood he was present at all the times.

MR. JACOB EVANS: While we are on that, I ask to have stricken from the record his testimony concerning the measurements of the George A. Clark property which he testified to and which he now states he was not present except on four occasions, and he testified to ~~eight~~ measurements and gave the amount that it required. He said he was present on May 14th, June 11th, July 2nd and August 28th.

He testified to measurements having been made on June 19th, July 16th, July 30 and August 15th, at which he was not present, and I move to strike from the record his testimony concerning those measurements.

THE COURT: The court is not entirely clear as to just how those measurements were made. Now, there was a question asked this morning, I had it re-read so that I might be certain I had it correctly, in which if I understood Mr. Swan, he testified those measurements which he did not take himself were made under his direction and supervision. If that be true they would<sup>all</sup> be admissible. If he was at the place and supervised -- he could not supervise them unless he was there of course, and I had it re-read so that I might know. As the evidence now stands I think that evidence is admissible, because he stated they were made under his supervision, and until you have cross examined him and it is determined that he did not intend to say that if that be the case, it may remain in the record. The question was framed that way, whether it was under his supervision. If it was it would be admissible, even though he was not personally making the measurements himself, if he was there to supervise it and oversee it it would be admissible. Of course, if it was not, he would be cross examined as to its being under his supervision. You may cross examine and I will entertain a motion to strike later if you desire to make it.

MR. RAY: May it please your honor prior to that cross examination, I understand Grovo City intends to prove by other witnesses the measurements independently that Mr. Swan didn't make, and if so, it would become competent<sup>even</sup> in his calculations and it would leave our calculation here in such form as they would be useless.

THE COURT: I will not pass upon it until the evidence

on that subject is all in.

MR. THOMAS: For that reason I ask this witness may be recalled subsequently on those very points and there will be other witnesses to furnish other data.

CROSS EXAMINATION by Mr. A. C. Hatch.

Q Calling your attention to the holding back of the precipitation by the reservoirs when the reservoirs are full they ~~have~~ have an overflow at each reservoir, do they not?

A Yes sir.

Q And they are filled during the time when there is water for every one and water running into the lake, are they not?

A From the report of the commissioner, no.

Q What commissioner?

A Mr. Wentz, last year in 1915, the water --

Q Mr. Wentz made his report, I am asking you as to what you know.

A The water in May in this Valley reached the lowest point that it has reached --

Q In the history of the territory?

A No, not in the history of the territory but a very low point below the low water, what we usually call the low water season, lower than it was ~~at~~ along in July and August, and at that time --

Q Just a moment, last year was the dryest year known in this history of Utah?

A It was one of the dryest years, yes sir.

Q Wasn't it the dryest year that has ever been known in this the history of Utah?

MR. RAY: You mean during the irrigation?

A Throughout the State I would say yes.

Q And through this particular irrigation district, was it not?

A There was -- the water was not as low in this, in the river in this valley as it has been.

Q What year was it lower?

A Along in '89, about that time, I wouldn't say that was the exact year.

Q There has been much land brought under cultivation in the Wasatch county and Summit county since that time, irrigated from the Provo River?

A Yes sir.

Q And you attribute the difference of the water in this valley to that fact, do you not, last year?

A Partly.

Q Principally, do you not?

A To which fact?

Q The fact that the land irrigated above furnished the reservoir supply for this valley?

A No, I don't attribute it principally to the irrigation of new lands in the Wasatch county.

Q What do you attribute it to?

A I attribute the low water here at that time --

Q I am asking you about the water staying up.

A Oh, the water staying up?

Q Yes. A. Yes.

Q Last year better than it did in 1889?

A Yes, principally isn't that the irrigation above?

Q Yes.

Q The snow fall generally was lighter than it had ever been before on the head waters of the Provo River, wasn't it?

A I believe that is the case, yes sir.

Q Now, do you know whether or not Timpanogos and other large canals that have recently appropriated water from the Provo River were taking out large quantities of water from the river at the time of your shortage in May?

A They were.

Q

Q So that that might have contributed as well as the reservoirs in the supply being short at Provo?

A yes sir.

Q And might have been the sole cause of the shortage at provo/ and not the reservoirs at all, so far as you know?

A It is possible.

Q Isn't it quite probable?

A I would say no, it is not probable.

Q Why not.

A Because the reservoirs were being filled at that time, and they would be taken --

Q How do you know the reservoirs were being filled at that time?

A I take that from the report of the commissioners?

Q Mr. Wentz?

A Mr. Wentz.

Q Which of the reservoirs were being filled at that time, the Provo Reservoir Company's reservoirs or the South Kamas reservoirs or the Washington reservoirs or the Union reservoirs?

A The Union and the Provo Reservoir Company's reservoirs and the South Kamas Company's reservoirs may have been, I think probably they were.

Q Now, why do you think so, just because you want to think that was or from some knowledge or information?

A I would say ~~there~~ they were and the South Kamas reservoirs were being filled at that time.

Q Why do you say that?

A They had not opened their gates at that time, and the gates had been closed since the previous year.

Q Had you been up there?

A I had been up to the South Kamas Company's reservoir.

Q Do you know whether they have an overflow and spillway?

A They have not.

Q Sir?

Q They have no spillway?

A No sir.

Q And their reservoir is never filled, is that right?

A I think that is right, yes sir.

Q That it is never filled and they have no spillway?

A Yes sir.

Q Do you know the quantity of water appropriated, diverted from the river by the Midway Irrigation Company at the time of which you speak, in May, when it was the shortage here?

A I don't know the amount they were taking at that time, no sir.

Q Do you know the quantity that was being appropriated by the Timpanogog Irrigation Company?

A No sir, I don't know the exact quantity.

Q Do you know that the Wasatch Irrigation Company is a canal that carries about 150 second feet?

A I know they have a large canal, I never measured the capacity.

Q Do you know whether or not their canal was full, to its capacity at that time?

A I don't know whether it was full to its capacity, no sir.

Q Do you know whether the South Kamas has increased the capacity of its canal within the last year or two?

A I wouldn't say--

Q Do you know whether the Washington --

A --it has not, but I don't think it had.

Q Do you know whether the Washington Canal has been increased in capacity within the last three years?

A Within the last three years, no sir.

Q You don't know?

A No sir

Q Do you know whether or not each of those canals were full to their capacity at the time of which you speak?

A No sir.

Q So that you don't know anything at all about whether ~~the~~ or not

the filling of the reservoirs was the cause of the shortage at the time of which you testify?

MR. RAY: I didn't understand the witness has testified anything to that effect, that it was the cause of the shortage, or was asked anything.

MR. JACOB EVANS: That was certainly the inference of his testimony, could not have been anything else.

A I said I attributed part of the shortage to that fact.

Q If they had been running the same quantity out of all of them that ran into them, you don't know whether or not the taking of the water and filling of the canals above would have made a shortage here?

A If the reservoirs had been running the same quantity out as they were running in?

Q As was running<sup>in</sup> yes.

A If they were running out the same quantity as they were running in they would not be contributing to the shortage.

Q But you don't know whether or not if that condition had existed there would not have been a shortage at Provo?

A There might have been some shortage, probably would.

Q But the same shortage?

A I would say no, there would not have been the same shortage.

Q Might not some of the canals above have diverted the excess?

A I don't understand the question, Judge.

Q I say, might not some of the canals in the upper valley have diverted the excess even though the Provo Reservoirs had not held it in their dams?

A It is possible that they could have done.

Q You know at that season of the year they all take all they want, don't you, if it is in the river?

A Yes sir, that has been the custom.

Q Even to the damming of the river dry in those upper valleys?

A Yes sir.

Q And do you know whether or not the river was dammed dry except the quantity --

A Allow me to correct that, along in May they never dam the river dry.

Q Just a minute, you didn't wait until I finished my question. DO you know whether or not the river was dammed dry in the Provo Valley except the quantity that was distributed to the reservoir company coming from these reservoirs?

MR. RAY: At what time?

MR. A. C. NATCHL I<sub>w</sub> May of last year.

A In May of last year the reservoir company was not drawing from their reservoirs.

Q DO you know anything about that except from the report of Mr. Wentz?

A I don't, I wasn't up to the reservoirs at that time.

Q Well, do you know whether or not the river in Heber Valley was dammed dry at that time?

A I don't know, but I think not.

Q Well, why do you think that way?

A Because the volume of water flowing in this portion of the river at that time was more than the return seepage coming back at that time from the Wasatch or from the Provo Valley, and the other tributaries here would have amounted to.

Q What is the return seepage from the Wasatch Valley?

A At that time of year?

Q Yes.

A It would be rather light.

Q What is the quantity?

A It would be variable in different years, various amounts.

Q Give it to us last year, that is what we are testifying about, what was it last year?

A I cannot state what it was last year. Last year it would have

been less than normal years.

Q What was the inflow from other sources last year at the time of your shortage here other than seepage?

A Well, I couldn't state that.

Q So that you don't know what the quantity of water ought to have been except for the holding of it back by the canals and reservoirs?

A Except relatively.

Q And last year was not a relative year was it?

A No, it was lower than a relative year.

Q Now -- A. Lower water.

A Now in coming down the -- now going back to the reservoirs, you say you think the bedding plane dipped more toward the Provo River than toward the Weber river in the vicinity of the reservoirs?

A Yes, dip a very little north of west.

Q Did you put a compass on them?

A That would make it more toward the Provo than toward the Weber.

Q Did you put a compass on them?

A No sir, I did not.

Q How did you determine the direction of the dip?

A I was traveling over the country and crossing from the one watershed to the other and traveling along the country.

Q What direction does the Provo River run from the reservoirs to Soapstone, what general direction?

A From the reservoirs to Soapstone?

Q Yes.

A You mean the main river?

Q The main river?

A The general direction down as far as --

Q Soapstone, I am asking?

A Well, there are two directions in there, the river makes a bend above the Soapstone, very sharp one.

Q What is the general course of the river?

A The general course of the first portion --

Q Just a moment, from the reservoirs to Soapstone what is the general course of the river?

MR. RAY: I submit, your honor please, the witness has a right to tell its course, if he bends he has a right to say so.

A There are two courses, the general course in the first portion is a very little west of south and after it makes the bend below the Meldrun Cabin it makes a considerable bend and above Soapstone for about two miles the course is nearly west, general west direction.

Q So that it is southwest and west, is the general course?

A Not southwest and west, but a little west of south and west, nearly south.

Q If we had a blackboard there, I would like to have him illustrate that ditch, I cannot understand how it dips to the northwest of the ~~megx~~ bedding plane, and dip toward the Provo River, and it running nearly south and nearly west, can you explain it?

A Toward the North Fork of the Provo.

Q That is this fork upon which the reservoirs are situated, isn't it?

A I say the dip of the strata as you pass from where the Union System of reservoirs are located and pass over into the North Fork, the dip is nearly west, a very little north of west, and that would be toward the north from the Provo. Then as you pass from the North Fork into the boulder the same dip prevails and the dip would be toward the boulder from the Provo.

Q Are the Union reservoirs on the North Fork of the Provo river?

A The Union reservoirs are on the main fork of the Provo.

Q Which is the main fork of the Provo?

A No sir, not so-called, the Provo Company reservoirs in the

North Fork system are on the north fork of the Provo, but the Union reservoirs are on the main fork.

Q How far are they apart?

A Well, the lakes are nearly up to the top of the divide on both sides. From the highest lake on the main fork over to the highest lake on the North Fork, I don't know the exact distance, approximately a mile or little more.

Q Now, going <sup>down</sup> ~~in~~ the river to the point below all ~~the~~ of the reservoirs of the plaintiff to the bedding planes at that point where would the dip be, toward the Weber or toward the Provo?

A Down the river beyond all of the --

Q Below all the reservoirs?

A Below all the reservoirs, the last reservoir on that, on the south side is just up on the point of the canyon. I was going to ask if you meant to include that Alexander Lake?

Q I mean the reservoirs of the plaintiff here? and those with whom it is associated, Timpanogos, Wasatch and Sege Irrigation Companies. I don't mean to include any reservoirs that may be on the Boulder or on Shingle Creek, tributaries that come in miles below. I mean that system of reservoirs, and all of them, that are at the head or near the head of the north fork of the Provo River. Coming down the river to a point below the lower one of those reservoirs immediately below, what is the dip of the strata?

A General dip of the strata in all of those ridges that run down is toward the -- is in that same course, little north of west.

Q And the river is running south or southwest or nearly south or west?

A At which point?

Q All the points ~~has~~ between the reservoirs and Soapstone, isn't that right, it nowhere runs to the north or northwest?

A No, it no where runs to the north.

Q Or northwest?

A No sir -- yes, it does run nearly northwest after passing the Soapstone.

Q Above Soapstone, I am asking you?

A Not above Soapstone it does not.

Q Then the dip of the bedding plane being to the northwest at depth wouldn't reach the Provo River, would they?

A I don't know whether you get the distinction, Judge, but when I speak -- when you say northwest I concluded you mean half way between north and west. North of west is not northwest.

Q Anywhere between north and west they would not reach the Provo River bed at depth, would they?

A They would not reach the main river. They would reach a portion of the river shed of the Provo, because the bedding planes between the union system and the North Fork dip toward the North Fork of the Provo, and the bedding planes between -- or west of the North Fork dip toward the Boulder Fork of the Provo.

Q And do you mean dip or strike?

A I mean dip.

Q Then the dip would be directly opposite from the dip given of those bedding planes by Mr. Wentz, would they not?

A Not directly opposite, no.

Q I wish you would illustrate that with a pencil, if you can -- erase that stuff on the board.

A Just roughly, say this is the union system of reservoirs. The river runs ~~thxxx~~ nearly in a southeasly direction, little west of south, kind of a bend turns west and runs west toward the Soapstone then in a southwesterly direction and then in a westerly direction and then south, as Mr. Wentz stated the dip of the -- of this strata --

Q Pardon me just a moment, I am asking you what you saw, the record shows what Mr. Wentz said.

A I would say the dip of the ~~stats~~ strata in this region here between the Union Reservoir and the North Fork --

Q Mark the north fork.

A This is the North Fork, it comes down here.

MR. THOMAS: Mark it "N.F."

Q You have it coming in here below Soapstone?

A I have the Boulder runs in --

MR. THOMAS: Mark it "Boulder".

A To the North fork before the North Fork enters the Provo.

MR. THOMAS: Where is Soapstone located?

A The entrance of the Soapstone would be located about here.

MR. THOMAS: Mark it.

A The dip in this divide here and also in the one toward the west would be in the same general direction, about in that direction would be the dip.

MR. THOMAS: As your arrows point?

A As the arrows point, so that the dip of this -- of the strata between the Union system and the North Fork system would be toward the North Fork system and the dip of the divide between the North Fork ~~xxx~~ system and the Boulder is toward the Boulder, which ~~is~~ is a fork of the Provo.

MR. RAY: Mr. Thomas, what is the relative elevation of the three streams, the main channel, North Fork and Boulder?

MR. THOMAS: State that if you know, Mr. Swan.

A The North fork is considerably lower than the main river, that is, lower than the reservoirs here, The reservoirs on this side and the river channel here is very much lower than the elevation here.

MR. THOMAS: That is, when you say "here".

A I I mean at the Union system or reservoirs.

MR. A. C. HATCH: That doesn't give us any idea,

MR. THOMAS: That is on the strike of the bedding plane.

A The dip is on the dip of the bedding plane, direction of the dip of the bedding plane.

Q Mr. Swan, you were asked to give us the elevation, approximate elevation of those several streams at the reservoirs, you said one was considerably lower than the other, that gives us no idea.

A As I understood, I was asked to give the relative elevation.

MR. RAY: That is what I said.

Q What is the difference between them, if you know?

A I don't know the exact difference. The lakes in the union or in the North Fork are not as they are in the Union system. There are a great many lakes in the Union system are very nearly on the same elevation, they are about ten thousand feet high. Lakes on the North Fork system are -- well there are one or two lakes way up on the upper end of the North Fork system that are above this location. They are located way up in the divide between the North fork and Weber, but a large number of lakes on the North Fork system are below the ten thousand foot elevation.

Q Now, will you mark on the board approximately the divide between the Weber watershed and Provo watershed.

A Well, the divide would come above where my diagram shows here.

Q General course of the divide?

A General course would be considerably ~~at~~ above this, the course right north of the union system is nearly east and west direction, and then the divide passes toward the south to Mt. Watson, and then in a direction a little north of west and then in a northerly direction again, or turns more toward the north in a northwesterly direction.

Q Now going down the river you described it to Soapstone, you said at Soapstone the river channel widens, is that correct?

A I said that after you passed the bend of the river below the Meldrun's Cabin the channel widens out and then I said beyond the Soapstone the bed was still wide, it wasn't between perpen-

dicular banks.

Q Isn't it between practically perpendicular banks from Soapstone down to the goulder? A. No.

Q And in a narrow channel?

A No, for a considerable --

Q Where is there any place that it is wider than usual?

A For a considerable distance after leaving Soapstone down the river there is -- the channel is quite wide, the bed, the stream flows in a very shallow form there.

Q How wide is the channel between the banks there?

A Oh, the channel along in there is fifty to eighty feet in width. The bed of the river, the channel varies in width according to the amount of water flowing. After you get farther down and the river turns more toward the west then it passes into a narrow channel.

Q Do you know what the inflow of the water is between the measuring gate where it is measured to Provo City and the lower point of diversion for irrigation purposes under the city system, the inflow by seepage as you have defined seepage?

A I haven't made any measurement to determine that.

Q Have you made any estimate of the quantity by observation?

A No sir.

Q But you do know there is a considerable quantity of inflow into the several canals of the city between the point where it is measured to the city and the lowest point where water is diverted for irrigation, do you not?

A Not in all the channels.

Q Well, in some of the channels.

A In some of them there is some seepage or some return. In some there is a return and also a loss.

Q Do you know what became of the water, or where it was diverted, that used to spring up right here in the city down on Center Street, just north of Center Street?

A On Center Street?

Q Yes.

A I know of some water that used to spring up ~~up~~ under the Palace Drug store.

Q What became of that stream?

A The stream is running into the sewer now, I think.

Q Two or three second feet of that, isn't there?

A No sir.

Q Do you know how much there is of it?

A No, I don't, but there isn't any such quantity as that. They take it out of a very small pipe.

Q What other springs are there that are piped underground from the original surface source to the channels used by Provo City for irrigation?

A I don't know of any that ever came to the surface that are now being piped.

Q Isn't that one piped?

A That one is piped to get rid of it out of their cellar.

Q I am asking how many others there are in the city that are piped to get rid of them?

A I don't know of any others.

MR. THOMAS: Just a moment, are these private springs you speak of?

MR. A. C. HATCH: No, they were originally bog holes here in the city that had to be gotten rid of in some way, either by drainage or piping.

Q Do you know of a spring that <sup>was</sup> is down here by Stubbs on Academy Avenue formerly?

A There was a spring coming out there somewhere.

Q What became of that?

A I don't know what became of it.

Q Do you know to what water system of the city it now becomes a source of supply?

- A I don't think it becomes a source of supply to any of them.
- Q You think it has just dried up and gone away, notwithstanding the irrigation above here?
- A These springs, a great many of them, have dried up.
- Q Weren't they dried up, much of the water that formerly flowed to the surface in Provo City dried up at the time you constructed your sewer system in the city?
- A I think so, yes.
- Q To what depth does your sewer trenches go?
- A They are different depths, the shallowest is about four feet.
- Q Have you --
- A And the deepest is eighteen feet.
- Q Have you noticed any difference in the requirements of the lands within the city as to water since the drainage created by your sewer system to that depth?
- A In some localities there is possibly some little difference, but as a general rule the difference is not great.
- Q In some places where the water came to the surface it is now, by reason of the sewer system four or five feet beneath the surface?
- A There was only a few places that came to the surface, that that you mentioned along that bench, that came out there running from the Palace Drug store down towards the Stubbs place. The water did come out on that bench in three or four places, but doesn't now.
- Q Furnish supply to irrigate all the lands lying beneath it at one time, didn't it?
- A I don't think so.
- Q Now, your sewers are 12 feet deep trenches in ~~places~~ places?
- A Yes sir.
- Q And eighteen, did you say?
- A Eighteen is the deepest, that is on the point of the hill out here.

- Q And at the bottom of those trenches were running large streams of water at the time you put your pipes in, your sewer pipes, weren't they?
- A In some of them there was down toward the bottom of the trenches.
- Q And up toward the top there was a little water in all of them wasn't there? A. No.
- Q Did the water that was developed in the digging of those trenches enter into the ~~sewer~~ sewer pipes? A. No sir.
- Q It just runs on beneath the pipes or surrounding them and on to the lake, does it?
- A I have noticed it flowing along the outside of the pipes in a number of places where we have gone down.
- Q Now, do you wish to be understood as saying that the system of drainage created in Provo City by the sewer system did not take from the soil practically all the waters that theretofore stood in it straight down to the depth of your sewer trenches?
- A You are making that cover the whole city?
- Q The whole of the city where the sewer system extends.
- A Where the sewer system extends?
- Q Yes.
- A Yes, I would ~~xx~~ say that it did not.
- Q That, notwithstanding that drainage created by the sewer system the water level would be the same in Provo City, is that what you wish to be understood?
- A Practically in large part of the territory in the city, yes.
- Q Has it been your experience as an engineer that you could drain a tract of land and still retain the water in it as it stood before it was drained?
- A That country was all drained before, Judge, big part of it.
- Q How?
- A Through the kind of under strata that I have illustrated with these samples, open rock.
- Q All of it?

A A large part of it, the larger part of it.

Q What part of it was drained as extensively before the sewer system was constructed as it is now drained by the sewer system?

A All that country that lies west of the line on the map that we had here the other day, Exhibit 59. All of this country west of the line of 3rd East street.

MR. THOMAS: Just pfn that up again .

A All of this country to the west of here, of this line running down 3rd East street north of Center and through the first tier of blocks east of Academy Avenue on the south of Center, excepting a portion along close to the mill race on 2nd West street in the northern part of the city, two or three blocks in there, they have probably been ~~not~~ drained to a lower depth, the sub surface water had been lowered, but over the balance of that territory the waters are practically the same now as they were before the sewers were put in there.

Q Have you any sewers in the southwestern portion of the city, that is, taking Center Street as the dividing line east and west and Academy Avenue as the dividing line north and south?

A Yes, there are sewers in that.

Q What about the southwestern part, hasn't it drained it some?

A I don't think the water plane has been lower-ed there materially, it was too far down to be available at the surface.

Q You say the sewer is too deep to have the effect of draining it near the surface?

A Yes, carrying off water that would be available in the surface soil.

Q How long since you first came to Provo ?

A I came here first about, I think it was 1893.

Q Do you remember whether or not at that time there was a bog beginning out about the north side of the Academy Square and extending up to the road running east and west just south of

the old Smith mill. Without going to the map, you understand my question, I presume?

A You mean between the mill race and Academy Avenue and north of--

Q North of Academy Square.

A Of the Academy Square?

Q North of 6th North?

A Yes, I remember there was land in there.

Q What drained that?

A They dug ditches to drain it and carried it over into the mill race.

Q And made farm land of what was before a bog hole, didn't they?

A A portion of it was boggy, yes sir, and they made farm land out of it.

Q Now, what was the condition to the west of the mill race before it was drained, as to being boggy or otherwise between the mill race and the State road east and west, taking in the North Square?

A That also was swampy, and north park.

Q Until they put the drainage system in that whole territory there wouldn't produce crops because of the excessive water supply, isn't that true?

A I wouldn't say the whole territory in there.

Q Between the old Smith mill on the north about a mile in extent north and south and mile east and west, mile square in there?

A No.

Q How much of it was unfit for cultivation because of its boggy, swampy nature?

A I don't remember the exact extent of it, but the Clark farm and Haws and Richmond farm, all along there on the west side of the 5th West ditch and portions of the lands to the east of there that were under cultivation.

Q All produced crops without irrigation, any irrigation whatever, didn't they, such crops as they produced?

A No, they didn't all produce crops without irrigation. The

lands there --

Q They sometimes irrigated? A. Yes sir.

Q They irrigate it all now, don't they?

A Yes sir.

Q And one of those was a tract upon which you put five acre feet of water in order to produce a crop in one of your experiments ~~didn't~~ isn't it?

A The Clark land you refer to?

Q Yes, that is one of the tracts upon which you testified you put over five acre feet of water?

A Yes.

Q To produce a crop? A. Yes.

Q But you didn't say that was necessary to produce a crop on that land, did you?

A I don't think I stated it in just those words, Judge.

Q Will you now say that it was necessary ~~to~~ in order to produce the crop that was growing upon that land to furnish it with that supply of water?

A It might <sup>possibly</sup> be done with slightly less than that.

Q It might be done?

A By going to considerable expense.

Q It might be done with two-fifths of that quantity even now, after it has been drained, might it not?

A That has ~~not~~ been drained that I know of, that piece in there that you refer to.

Q You don't mean to say that this whole territory has not been drained?

A Yes, I do.

Q By reason of the trenches that have been dug?

A Yes, I would say that territory in there has not been drained, because there has been no sewer ~~is~~ put that far north, and that territory in there has not been drained.

Q Then you think the lowering of the water level in all the territory immediately south of it wouldn't have any effect upon the water level in that particular tract?

A I have not stated it lower the water level in the territory immediately south of it.

Q It has lowered the water level, if I understood you correctly, in all of that area where your sewer system is,

MR. THOMAS: No, the witness didn't so state it.

A I didn't state it.

MR. THOMAS: Object to it as not proper cross examination, assuming something the witness has not said.

THE COURT: I understood it to be a question directed to the witness whether that was not the substance of his testimony. Read the question.

(Question read)

THE COURT: While technically speaking that is a statement made to the witness, yet, I think it is intended as a question.

MR. A. CL HATCH: It is a question.

THE COURT. Whether that is not the substance of his evidence?

A No, I would say not all the territory.

Q Do you say that the water, subsurface water level was not reduced through all the area where you sewer system was constructed?

A Yes, I would say it ~~xxxx~~ was not reduced. throughout all the area where that system was constructed.

Q Then if I understand you correctly, to dig trenches from four to eighteen feet deep throughout a territory only a few hundred yards apart, the trenches will not reduce the sub-surface water level within the area where the trenches are dug?

A That would all depend on the nature of the country through, <sup>which</sup> it was dug and conditions of the underground water it had before

or not.

Q Your reason for that statement is that the water level was below the water trenches then?

A In some cases.

Q Was the waterlevel below the bottom of the trenches immediately south of the Bean land? A. No.

Q Was the water level below --

A And is not now.

Q The water trenches immediately south of the other tract of land to the north of the city upon which you made the experiments, other than the Bean lands ?

A Was the water level below the level of the trenches?

Q The bottom of the trenches,

A No sir.

Q Well then, why wouldn't the trench reduce the water level?

A Because the land, the sewer trenches there are at a great distance from the lands on which these experiments were made, and the water plane on portion of those lands now is higher than the sewer trenches and close to the -- very much closer to the surface than it would be to have any effect on draining the country above.

Q How far beneath the surface is the water level under the Clark land upon which you experimented?

A I don't know, deeper than I judge, I think it would be below the rock or in the rock stratum underlying the clay subsoil.

Q How far is the water surface below the surface of the soil on the Bean tract?

A I don't know.

Q Upon which you experimented?

A I don't know.

Q What other tract up there did you experiment upon?

A Smith tract.

Q How far is the water level below the surface on the Smith

tract?

A I don't know .

Q Then why do say the water level is now higher on those tracts of land than the bottom of the sewer trenches?

A Because the sewer trenches don't extend up there. I didn't state it was on those pieces of land, but I say on some of these other lands lying to the south of this that you speak of as having ~~been~~ been drained the water plane is now higher on some of those pieces than the level of the sewer trenches.

Q Now, do you know the outflow of the water from the sewer system? A. No sir.

Q Do you know the outflow of water from the pipes in the system?

A From the pipes in the system?

Q Yes. A. No sir.

Q The quantity I mean, the quantity of water flowing out of the trenches at the end of the sewer system.

A Out of the trenches at the end of the sewer system?

Q Yes.

A You mean running outside of the pipe?

Q Yes, the outflow from the tr-enches, do you know that?

A There is practically none goes out at the end of the sewer, none that I know of, except that that goes out through the sewer.

Q Goes out through the pipes?

A Yes sir.

Q Now, another part of the city to the east, were there not a large area of swamp lying just to the east and southeast of the city? when you first observed it?

A To the east and southeast?

Q Yes, well, to the east of the city.

A In the northeast?

Q From the north side of the city down to the State Road, taking in that east of the mountain, was there not a large area of swamp land there when you first observed it?

A From Center Street south?

Q From the east side of the city to the mountain?

A From the east side of the city to the mountain there was on the north side of Center and extending a little below Center street, there was territory in there, but not south -- let's see--

Q That is east of the city, isn't it?

A It would not extend so far south as the block south of Center street.

Q Is it all east of the city, isn't it?

A Yes.

Q Am asking you if there wasn't a large area of swamp land lying east of the city, between the city and mountains?

A Yes.

Q How many acres?

A Yes, but you confused that by asking another one.

Q How many acres?

A I could not give the exact extent it took during different times of the year?

Q And that was drained, was it not, by sub drain?

A Number of years ago, yes sir.

Q And called the East Drain? A. Yes sir.

Q To what depth was that drained?

A Well, on Center Street the drain where it first comes into Center Street is possibly three feet in depth.

Q By some damming that drain or those drains would raise the water level back to any height you wanted it under those lands, wouldn't you? A. No.

Q And by damming the drain would make swamp of it again, wouldn't it?

A Not of the whole territory.

Q All that was therefore swamp would be swamp again if the drain was blocked.

A You could possibly do it by building a dam along around the

Center street and along Center street and around the territory, you could possibly raise it high enough to make it swamp.

Q Couldn't you create the same condition in that territory again that formerly existed by stopping the drain?

A Not by stopping the mouth of the drain at Center Street, you could not.

Q Suppose you put in a half a dozen dams in the drain at different points along, wouldn't it raise the water level again to where it was before?

A You would have to go back onto that land and stop up the ditches all over that land, that run down toward that drain, and back the water up sufficiently to cover it.

Q And all of that drainage from that land is waste now, is it not?           A No.

Q What is done with the water?

A It is conducted on to the First Ward Pasture down south of the city and some other lands bordering that.

MR. THOMAS: May it please the court, may I ask if counsel take the position that land ought not to have been drained, that water ought not to have been taken out of the soil.

MR. A. G. HATCH: No, but I am saying this, that as against subsequent appropriators, or rather prior appropriators they can not drain the land and then claim as against them water rights for it to the extent of five acre feet for the land simply by putting a dam in the ditch would restore the lands to swamp or to any condition less than swamp they wanted it to be restored to.       In other words in answer to counsel where the water is upon the land and appropriation of water from another source to irrigate is not necessary appropriation.

Q Now, coming to your irrigation system within the city, do you have measuring devices at the different points where you divert water from your main canals by races, as you call them?

A On some of the ditches we have, at the head of the smaller laterals we have measuring devices.

Q And what is the nature of those measuring devices?

A We have two or three Keeler gates and then we have the -- I could not give you the exact number, we are putting in some all the time.

Q When were the first ones put in?

A The first Keeler gates were put in last year.

Q At what time last year?

A One of them was put in in the early part of the year, I don't remember the exact day.

Q Had you prior to that ever measured the water to the consumers or users within the Provo City area?

A No, only by judgment of the water.

Q What was your system of distribution of the water to the different ditches or system through which it was distributed?

A The ditches were practically all of the same size, and the water master--or most of them ~~are~~ about the same size, and the water master distributed from the different laterals within the city as near as he could. judge to the same stream.

Q Just looked at it and guessing at the size of two or more streams?

A Yes, and he also had a <sup>head</sup> gate there, different head gates.

Q Now, in the manner of distribution to the individual, how was that done?

A The individuals are given a certain time according to the amount of land they have, and the schedule is arranged so that they, so that the people within the city, those having garden water, take the water once each week, and their time for taking it is allotted to them so that they take it at the same time each week, and for a certain length of time, according to the amount of land they have.

Q Now, could you give me the time that was distributed to this

block for last year?

A No, that is under the charge of the water master.

Q Under the charge -- well, can you say whether or not any distribution was made last year to this block?

A Yes sir, there was distribution made to this block but I could not tell you the time.

Q Was there any water diverted to and used upon this block, or any portion of it from your irrigation system?

A There was.

Q Whereabouts?

A On these lots on the east side of the block here, were watered from the irrigation ditches.

Q To what depth?

A I could not state the exact extent.

Q East of the jail and south of the court house, is that right?

A Yes.

Q And that is the only portion of this block that was irrigated from your ditches last year?

A That, I think, is the only portion of the block that was irrigated from the ditches.

Q Now, prior to last year, when was it before irrigated from the ditches?

A I think it has been irrigated for -- well, I don't know of any time when it was not.

Q What would be the time allowed for irrigation to this block?

A To this block?

Q Yes.

A This block would perhaps, would, I judge receive the same quantity as any other block in the city.

Q What would be the hours and flow of the stream and number of hours and quantity in second feet or water in the stream.

MR. THOMAS: The witness has stated that was under the supervision of the water master.

MR. A. C. HATCH: Yes, but if he knows he can testify about it, he is an expert.

A The amount, I think, would be an hour and a half to the lot, I am not certain about that.

Q That would be six hours to the block?

A No, more than that.

Q How many lots are there?

A Eight.

Q Eight lots, that would be twelve hours?

A Twelve hours.

Q And the quantity of water in the stream?

A Quantity of water in the stream?

Q Yes.

A The quantity would be approximately a second foot at the head of the ditch and suffer whatever loss there was.

Q Have you any measuring device at the head of the ditch that conveys water to this block?

A No, only just a gate through which it passes.

Q Might be a second foot, might be a second and a half?

A Well, as a general rule it would be slightly more than a second foot, I believe.

Q So that there would be a second foot when it reached the lot or block?

A No, I think there would be less than a second foot when it reached the block.

Q Now, what is your judgment as to the quantity?

A The loss in transit along this street is -- has been measured at different times during the year, and it has been found to vary considerably.

Q Have you any judgment as to the quantity of the flow that would reach this block?

A Yes, I have a judgment as to what that would be. It would be approximately a second foot that would reach this block, that

is when there was plenty of water in the ditches., if they were turning in a second foot and a quarter at the head of the ditch.

Q Now, about one-eighth of this block was irrigated last year, and for years prior to that from the ditch?

A Yes sir.

Q About one lot? A. Yes sir.

Q Running that second foot of water for twelve hours upon the area contained in one lot would be aht quantity of water?

A They didn't do that.

Q They didn't do it?

A No, they didn,t run it twelve hours on that lot.

Q Well, where would it go to, it was their turn?

A Well, part of it was used in flushing the gutters around the block.

Q Flushing the gutters? A. Yes.

Q And I thought you estimated a certain quantity for that purpose, as a city necessity?

A I don' think--

Q In addition to your irrigation water?

A I don't think you will find I made any estimate for that in my table.

Q Well, how much of it would be used to flush the gutters?

A The water is turned into the gutters on these business blocks twice a day for flushing the gutters and they use for flushing the gutters approximately as much time as it would take to irrigate the block, on those blocks where they irrigate.

Q There is only one gutter on this block, is there?

A Yes, there is only one gutter on this block on this side.

Q Take about ten minutes to flush that, wouldn't it?

A They have to run the water down the west side. for the trees and suply those trees down on the west side.

Q The water that flushes the gutter, that would irrigate the

trees, wouldn't it, running up Academy Avenue, you flush that gutter, don't you?

A What?

Q You flush the gutter on the east side of Academy Avenue?

A Yes sir.

Q The water you irrigate flush that which would irrigate the trees on the west side of this block, wouldn't it?

A Yes.

Q Twice a day is all that the trees require irrigation, isn't it?

A. Yes.

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12:00 Noon, Recess to 2:00 P. M.

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GEORGE C. SWAN - - - - -

CROSS EXAMINATION by Mr. A. C. Hatch continued.

Q Can you tell me how often the turns come to the city lots?

A Once every week.

Q And the turns come to all alike, do they?

A Yes sir.

Q That is, each city lot has the water each week?

A Yes sir.

Q And approximately the same quantity of water?

A Yes sir, except for the loss in transmission in the ditches which the lower lots suffer.

Q You say the lower lots suffer?

A Lots at the lower end of the ditch suffer from the loss in transmission.

Q Whose lots suffered last year?

A Well, I could only judge of that from the telephone messages that came into me, people calling for water. I didn't note those carefully.

Q I am asking you, of course, Mr. Swan only for what you know about it yourself.

A I stated to you the distribution was under the water master.

Q Was there ever a period in your connection with the city water system in Provo City when there was not some howling about not having enough water?

A No.

Q Even right now you get complaints about somebody not getting enough water for the city lots, don't you?

A I have only received one complaint this season.

Q When was that?

A That was three or four days ago, man complained that he had missed his turn and wanted to know if he could not get an extra turn.

Q What is done with the water that is distributed to the block immediately north of this?

A I could not say with regard to that, I don't know.

Q Do you know of your own knowledge of any water ever having been applied for irrigation purposes upon any portion of that block?

A. No sir.

Q Or for any other purpose except that it came through the city water pipes and furnished use in the building?

A And flushing of the gutter.

Q Sir?

A And flushing of the gutter.

Q They never had any gutters there until within the last year or two, did they?

A Oh, yes, they have had gutters on two sides of that block for a number of years. I don't remember when the gutter district was established -- the No. 1 District.

Q But the water is distributed to that block a second foot for ninety-six hours each week, is it?

A I don't remember with regard to that.

Q Uniform distribution?

A I didn't make out the schedules, I don't remember now, I have checked them over, but I don't remember.

Q The block immediately west of that on which the Provo Commercial & Savings Bank is situated, do you know what is done with the water distributed to that block?

A My answer with regard to that would be the same except for a portion of the block near the north end that has taken water.

Q Now, how many blocks are there?

A I don't know whether they are taking it this year or not.

Q pardon me for interrupting you, how many blocks are there in Provo City that are in the same condition as to the use of water as are these two blocks, these and the one immediately north?

A The water master can tell you more about that than I can.

Q You know something about it, don't you?

A I could not give you the details now, there are a great many blocks which would take water one year and won't take it the next, but I could not tell you how many of them are taking it now, or how many took it last year.

Q You made a survey of the city to determine the necessity for the use of water in the city, did you not?

A Only in the way that I have stated here.

Q You testified as to what your duties were?

A Yes sir.

Q And as to your examining the several parts of the city to determine .

A The character of the soil.

Q And the necessity for water within the city, that was the purpose, was it not? A. Yes.

Q And you made observations to determine where the water was used and the purpose for which it was used, didn't you?

A I observed the lots in a general way, yes, and took some notes at the time.

Q Now, as city engineer, you were trying to determine the number of acres that were actually irrigated within the city, weren't you?

A I was trying to determine the area which was entitled to water.

Q Do you understand that was one purpose of this action, didn't you, to determine that very question?

A Yes sir.

Q And you were out seeking evidence to support the city contention in the matter, weren't you?

A Yes sir.

Q Trying to determine the facts? A. Yes sir.

Q And in that you took into consideration everything that would in any way require water for city purposes?

A My mind when I was on one thing would be concentrated on that thing, and I would not be paying so much attention to the other things in connection with it.

Q Now, in your direct examination you gave in detail your estimates as to the necessities of the city for all purposes, didn't you?

A I gave it in detail the necessities as to my estimate of the necessities for the water works system, if that is what you refer to.

Q And for irrigation, didn't you?

A I didn't include that in this except so far as the lawns were concerned.

Q The lawns are irrigated from the water system?

A Yes sir.

Q From the pipe line, do you know the number of acres of lawns within the city?

A No, I know the number of square yards that are watered from the water system.

Q How many are there?

A There is 153,521. and 4258 makes a total of 157,779.

Q Now, do you know the quantity of water per hundred square yards that has been actually applied on the lawns?

A I would say that it has been in excess of the quantity that I gave he re.

Q How do you determine that?

A My determination of that was made by taking -- by attaching a leter to a line of hose and making a test as to the quantity of water which would pass through the hose in the length of time, taking a standard hose and nozzle and the length of time allotted to the --

Q And then did you make an estimate as to the number of hydrants or water pipes used?

A I made an estimate as to the number of square yards receiving water and an estimate as to the time allotted for each hundred square yards and the quantity that would flow during that time, based upon those measurements through the meter and the amount of water which it would take for all the square yards of lawns that received water from the water system on that basis.

Q Do you know whether or not they all used the water the entire allotted time?

A I am satisfied that they used it more than the allotted time, because we have had to put men on to ride the town and check them from using it over their time.

Q What kind of water meter did you use?

A The water meter used was a Neptune meter.

Q What quantity of water flowed from the pp pipe that you took the -- made the experiment with?

A Ninety-two cubic feet per hour.

Q What kind of a nozzle did you use?

A The standard nozzle, standard hose and nozzle as described by the ordinances of the city.

Q What kind it that?

A It is a quarter inch smooth bore nozzle.

Q What size is the pipe leading from the main to the lawn.

A From the main to the lawn?

Q Yes, what is the size?

A Those sizes are different. The lawn on which I made this measurement was out here on the city lawn. There is a two inch pipe leading there to fit a number of taps on that lawn and the pipe to which I had the nozzle attached was a three-quarter inch leading out of this two inch pipe.

Q Now, suppose you had a half inch pipe and had connected to that a three quarter inch hose, with the same nozzle, what would be the difference in the flow?

A Depends upon the length of pipe, length of half inch pipe and the --

Q Say that it is twenty feet long, half inch pipe leading from the main into the lot area, what would be the difference of flow through that one inch hose fed by the half inch pipe from what it would be with the same hose fed from a two inch pipe?

MR. BAGLEY: I object to this as not cross examination, unless it is to test the credibility of the witness.

MR. A. C. HATCH: He gave the quantity of water necessary to use upon the lawns. Now, it is how he determined that quantity. I think it is clearly proper cross examination.

THE COURT: I am inclined to think you are entitled to it, objection is overruled.

A Loss of head would not be very material, I can calculate it for you, it will take a little time.

Q You may do that later and I will defer it?

A All right.

Q You said that the city furnished water sprinkling of county roads?

A. Yes sir.

Q Where is that water obtained from?

A Part of it is taken from the conduit that leads across the

bench.

Q That is the Upper East Union?

A No sir, the conduit.

Q The city mains?

A The city water works conduit which leads across the bench.

Q And where is the rest obtained from?

A The rest is taken from the ditches now.

Q They are taken from points above the point of measurement of the city's water, are they not?

A No sir.

Q Where is the water obtained from to irrigate the county road between here and Pleasant Grove?

A Between here and Pleasant Grove, that water was not included in my estimate.

Q Between here and Springville?

A That is taken out of the lower end of the East Union, a portion of it.

Q And where does the balance come from;

A The balance of it is up here in the north portion of the city, and is taken out of the ditches up there.

Q Now, you made an estimate as to the necessities for domestic culinary purposes, what was that?

A Fifty gallons per capita.

Q Fifty gallons per capita? A. Yes sir.

Q What was the total amount given for that purpose?

A The total amount given for that purpose was based on a population of ten thousand and was five hundred thousand gallons.

Q What is the population of Provo?

A Ten thousand.

Q when.

A Approximately in 1914.

Q Do you know what the population was when the last census was taken?

A When the last census was taken in 1910?

A No, any kind of a census, or counting of the people?

A The population was taken by the Bell Telephone Company in 1914, and was slightly under ten thousand, according to their calculations.

Q You don't remember the figures?

A I don't remember them. It was so very close to ten thousand that it was practically ten thousand.

Q That included, did it not, the system reached from the central office at Provo, not the people alone within the city limits?

A No, they made their count of the portion within the city limits and the portion without the city limits separately, and that count included only those within the city limits.

Q Now, how much water comes to the city through its mains, pipe line?

A The amount is variable according to the flow of the springs between five and a half second feet, the highest being twelve and a half second feet.

Q When did you have twelve and a half second feet?

A In 1912.

Q For how long a period?

A That was the highest point reached, it was over twelve second feet for a period about two months and a half.

Q Have you a gauge or table showing the amount?

A I made measurements at different times on the system. I have those measurements, I haven't them here with me, they are down stairs. Made measurements at different times at the weirs on the system.

Q The intake of the pipe line?

A Yes sir.

Q When was the water system changed from the mouth of the canyon and put into pipes from there up?

A In 1900-- sometime between 1902 and 1904, I think, I don't

remember that just exactly, no, I looked up the records,

Q MR. THOMAS: You can get that exactly?

A I can get that exactly, the date when that was extended up the canyon.

Q What was the increase of the appropriation of water for the pipe line at that time?

A There were not any measurements as I know of taken on the actual flow before that time.

Q But there was a considerable increase in quantity, wasn't there?

A I couldn't say with regard to that, I don't think the quantity was materially increased at that time.

Q The intake of the pipe lines are at a <sup>very</sup> great elevation above what they were before?

A Yes, some increase.

Q About how many hundred feet?

A I don't know. The pressure head was increased in the neighborhood of --

Q About three or four hundred feet, wasn't it?

A It does not affect the pressure head to that amount. The pressure head is not affected to the amount of the difference in elevation between the settling basins and the springs. It would be three or four hundred feet, I think from the basins up to the springs.

Q Do you know whether or not at the time the pressure was increased the time of use was cut down to the users for sprinkling purposes?

A I don't think it was immediately, no.

Q But has it been up to the present time?

A Yes, they were put on limitations, I think before that time. they were allowed to sprinkle as they chose, but they were afterwards put on limitations.

Q Is the mental hospital within the city limits?

A It is.

Q I want to ask you now about which of these farms it was upon which

you made the duty of about ten acre feet last year, Clark farm.

A I don't remember any of them on the ten acre --

MR. JACOB EVANS: A. L. Smith was 8.

A A. L. Smith was eight, the Bean land was five and nearly -- and  $36/100$  measured and three irrigations not measured.

Q The eight plus second feet duty, which one was that?

A Well, the Bean land would have that, and the Smith land would have that.

Q Now, you observed those two tracts of land during the entire summer, did you not?

A I observed them off and on throughout the season.

Q And the purpose for which your observation was made was to determine whether or not they were properly irrigated, was it not?

A As to how they were getting along.

Q From your judgment did those lands receive sufficient irrigation for the crops they had on them? or would more water have increased -- been a benefit to the crops?

A I don't think that more water in those instances would have helped them.

Q You think they received sufficient for the crops that were growing there?

A Yes sir.

Q Now, what is your judgment as to whether or not the same crops could have been grown with half the water?

A I don't think they could under the conditions.

Q You stated that in irrigating these tracts you endeavored to keep the water upon the land as much as possible, that is correct, is it?

A Yes sir, we endeavored to apply only sufficient water to get it over the land and not allow it to run and run off.

Q And it took that quantity, you stated, to get over the lands?

A Yes sir.

Q Did you think that half the quantity would not have produced the same crop?

A Yes, could not have covered the ground with half the quantity, could not have got over the land.

Q I don't hardly think I understand you or else you don't mean what you say.

A I say that they could not have -- half the quantity would not have produced the crop because they could not have covered the land with half of the quantity.

Q What do you mean by that, Mr. Swan, they could not have covered the land with half the quantity?

A Well, if you had cut down the stream to half the size, they could not have gotten it over the land within the time, or if you ~~made~~ cut down the time and left the quantity of water they could not have gotten it over the land.

Q Suppose you had double the quantity and taken it one-fourth of the time, couldn't you have gotten it over the land?

A You might have gotten it over the land if you had done that, yes sir.

Q That would have been only half the water, wouldn't it?

A Excuse me, I understood you you doubled the quantity and took half the time.

Q Took one-quarter of the time.

A No, I don't think you could have gotten over the land, double the quantity taken one-fourth of the time.

Q But you didn't experiment along those lines, did you, to determine that question?           A. NO sir.

Q It was a kind of land much like a sieve?

A It was.

Q You just had to flood it over in order to get it over at all?

A Yes sir, rush it over.

Q To turn half the quantity of water you turned on it would have run all summer without getting across the land, wouldn't it?

A In some of these pieces it would.

Q So a small quantity of water would be practically wasted put upon that kind of land, wouldn't it?

A It would.

Q But by increasing the stream, the size of the stream and rushing it over would be the proper way to irrigate that kind of land, wouldn't it?

A To use as large quantities as he could handle to advantage.

Q If one could not handle it probably two could handle it to a dvantage, could they?

A No, I don't think that two could have done any more on those tracts with a larger stream.

A Where the land is such as you describe, the larger the stream is the quicker it goes over the land, doesn't it?

A Yes.

Q If it will cross the land or flow over the land at all?

A Yes sir.

Q Then if it takes a second, if a second foot will be wholly wasted, if four second feet would be wholly wasted, it would be proper to apply eight or ten second feet, and get it over at once and quick to avoid waste, wouldn't it?

A Provided you didn't get your streams too large to handle. You are handling it small tracts there is a limit to the size of the stream you can handle on a small tract that way. You might waste more water by putting on a stream too large, than you would by having a stream within the proper limits on small tracts.

Q Now, in your table, have you one of these tb tables there, Mr. Swan?

A Yes sir.

Q Experimentations of Prove Irrigation System?

A One of the what -- experiments I made?

Q Yes.

A Yes sir, I have a table here.

Q Now, in your testimony, if I remember correctly, it required more water to irrigate the first time, usually required more, and that it required more in the early part of the irrigation season than it did later to cover the lands. That is correct, isn't it?

A I don't remember making that statement, but it is true.

Q It is true. Now, the George A. Clark tract at the head of the table, on May 14th you used a stream 4.64 second feet, six hours and forty minutes?

A Yes sir.

Q And put the water .577 acre feet? A. Yes sir.

Q Now, on August 28th, the last irrigation you had practically two second feet more water and were two hours longer and irrigated double--- irrigating the same tract of land all the time the same number of acres.

A Yes.

Q Here on August 28th you had 6.41 second feet and were eight hours upon the same tract of land?

A Yes sir,

Q And put on 1.045 acre feet. A. Yes sir.

Q Why was that?

A You will notice the bottom of that table a statement there was some water run off there.

Q Yes, but very small quantity.

A Yes, but the --

Q Take the next one.

A That turn was applied on a very dark night, and there was more difficulty in getting it over the land, so that they took longer time in getting it over, and there was also some of it that run off.

Q The quantity of water then indicates to irrigate that tract of land that it requires in May, the season when the greatest quantity is necessary, under the testimony here, more with which to irrigate the land?

A There is a difference in the land also, Judge. With regard to that statement, on cultivated lands, lands that are plowed up and seeded during the year, they will require relatively larger applications the first application. This land was in alfalfa that had been in there for -- I don't know when it was planted.

Q Do you know whether it was disced or not?

A It had not been plowed up for a year or so.

Q Do you know whether it was disced or not before the water was applied?

A I think not, I didn't see any evidence of the discing on that piece.

Q It is the custom to disc alfalfa in the spring of the year, is it, in this vicinity?

A Sometimes it is.

Q You don't know whether this was disced or not?

A I don't know, but I --

Q You didn't see ?

A I didn't see it disced.

Q The first time it was irrigated?

A Yes, I did, but I didn't notice the evidence of discing .

Q Do you remember now the tract of land, do you have it in mind now so that you know whether any of the lucern was disced or not?

A I didn't note any evidences of its having been disced. I was there on the first occasion and I looked over the land before the water was applied and I don't recall noting any evidences of it having been disced. I have it in mind but it might have been disced and may have escaped my mind.

A You find the same result on the next tract, the L. H. Bean tract, don't you, as the season progressed applied more water?

A No, the largest quantity of water was applied on the L. H. Bean tract the first watering.

Q But the acres were double the quantity that was applied the last watering or practically so.

A On the E. H. Bean?

Q Yes.

A No, I don't know.

Q I will read the top line.

A All right.

Q 4.013 acres.

A Acre feet, quantity applied.

Q It is the same tract of land all the time?

A Same tract of land all the time.

Q Very well, going back to the Clark land on August 13th?

A Yes sir.

Q You have .930, why did that irrigation require practically double the quantity that the first irrigation required?

A I could not state with regard to that why it required it. There was some little portion of this run off on that irrigation also.

Q You were not there at that irrigation?

A I was not there at that irrigation.

Q As a matter of fact, Mr. Swan, weren't these irrigations made with a view to putting upon the land all the water that could possible be put upon it within the time of the turn of the irrigator?  
A. No sir.

Q For the purposes of establishing a small duty?

A No sir, in fact, I did not expect from my observation of the Clark land, I did not expect that it was going to take that amount of water.

Q Do you know of any ---

A And the applications were made by the farmers and they were asked to apply the water as it was their custom to apply it, and allow us to measure the quantity so that we might see how it was applied and what was their method of applying it and to apply it in such a way they did not waste.

Q Do you know of any other tract of land in the vicinity of Provo City upon which <sup>such</sup> experiment can be made and so large a quantity of water used?

A Yes, there are a great many of them.

Q Where is one?

A Well, there are lands all over the --

Q I am just asking for one, Mr. Swan, just name one farm?

A Now, I don't know of a farm that is just exactly that area, but I might point out some --

Q I don't care for the area.

A There is in the western part of the city.

Q Whose land.

A Well, take the Rasmussen garden, take the Merriweather tract.

Q The Rasmussen garden?

A Yes.

Q How much of that is there?

A That is a small garden.

Q One acre?

A I don't remember the exact size of it.

Q Now you mentioned another.

A The Merriweather piece.

Q Where is that?

A On West Center street.

Q About what is the area of it, approximately small piece or large farm?

A He has a larger tract there, he has over three acres, I should say, just guessing on that, it was marked on here.

Q Now, did you make any test to determine the highest duty of water within the Provo City area? You have given us the lowest, as I understand now, have you made any to determine the highest duty?

A No, in picking out these tracts the object was to get tracts that showed the general condition and we picked out such tracts as were available and that we could get to make the experiments on, men who were in the habit of --

Q Why didn't you try to determine the highest duty as well as the lowest?

MR. RAY: Your honor please --

A As I stated, in picking out the Clark land, I expected that the duty on that would be much higher duty. In looking over the condition of the land that prevailed there and there were two pieces right close together, and I thought that the difference in character between that and the Bean land would illustrate two different conditions right close together, and I was surprised in the result on the Clark land from noting the quantity of water that it took to cover that land. I was surprised myself in the quantity of water that it took them to irrigate that land.

Q Are you prepared to say that the duty of water upon the lands that you experimented upon would be the average duty of water required for the area under the city control for irrigation purposes?

A From the results which I have here I would say that that -- that the average of all of these would be a lower duty than the average of the whole city. There are lands in the north-east part of the city here who give a lower duty.

Q A lower duty?

A Or a higher duty. I just reversed the terms, they would give a higher duty, but some of these pieces will illustrate that. The Taylor & Roberts Farm, is a high duty piece of land.

Q What is the acre feet for an irrigation season on that land.

A Well, the acre feet here in the three irrigations measured, there was 1.125 feet in depth on the land and that would be  $\frac{3}{8}$  of the total quantity applied during the season, or about that, about three feet.

Q For the Taylor & Roberts land?

A Yes sir.

Q That would be a sufficient quantity for that land for the season?

A That would be a sufficient quantity for a portion of that farm

that we had under the experiment.

Q What was the depth to the subsurface water level of that land?

A I did not get down to the water plane on that. When I took the sample it was fifteen inches down to the clay, that is, fifteen inches of a sandy loam soil, with a sandy clay subsoil underlying it.

Q How much of the area within the irrigation district would the three acre foot be applied, to how much of it, the area within Provo City Irrigation District?

A Between one-fourth and one-eighth of the area.

Q How much of it would be covered by the same duty as the Elizabeth Sabbs tract, less than two acre feet for the season?

A That duty is subject to special conditions. It only applies in the extreme southern portion of the city and the string of farms along in there, right at the extreme south, not all of them under the irrigation system. It would not apply to -- and the crop on that was different from the crop that is on most of that land. On most of that land down there of that character, the land is in pasture land and is not in beet land.

Q Beets --

A So that the duty would be different.

Q Beets require as much irrigation as any cultivated crop grown in this vicinity, do they not?

A No.

Q What cultivated crop requires more water?

A The alfalfa will require more water and the grass crop will require more water.

Q I asked as to cultivated crops?

A The strawberry crop requires more water, berry crop.

Q Until the berries are matured?

A Until the berries are matured.

Q Thereafter they don't require half the water they do during

the growing of the crop, do they?

A No.

Q And the berries are matured before the high water is over, when there is abundance of water for everyone, aren't they?

A No, not always.

Q In June?

A No, our berry crop is not always off in June, and it is in the middle of June when the high water is over in a large part of the seasons. That is, it is the middle of June when the water begins to descend and decrease and decreases very rapidly.

Q Do you know how many hundred second feet of water is flowing from the provo River into Utah Lake today?

A No sir.

Q There is several hundred to your knowledge, isn't there?

A I haven't been down there recently, but there is some, I judge at this season. This is an unusual season.

Q As a matter of fact, isn't your high water usually exptended, that is, the flood water, until the 20th of June?

A Until the 20th of June?

Q Yes.

A Yes, about then.

Q And usually they don't begin the distribution until after the first of July, do they, to the different users of the waters of the river?

A Along in the latter part of June and first of July.

Q Up to the 10th of July?

A Well, it has been earlier than the tenth of July for two or three years back now.

Q Do you know of a season when the strawberry crop was not harvested prior to the tenth of July?

A Oh, we have strawberries up until -- we have strawberries on the 4th of July very frequently.

Q I am not referring to the ever bearing kind that runs to October,

but the crops that are usually raised here?

A No, but we very frequently have strawberries on the 4th of July.

Q Now, is there any land say except this rocky bed between what used to be the Hines drug store, one block west of Academy Avenue and 4th East Street, extending north and south through the city, is there any lands within the city such as require this excessive amount of water for irrigation purposes?

A Yes sir.

Q Where do they lie?

A Well, there are lands all down along just before 6th South Street and in the southwest portion of the city. There are lands all through there that require this duty.

Q 6th South street takes you to the railroad tracks, does it not?

A 6th South is occupied by the railroad tracks. Now, just south of those railroad tracks, all along the southern portion of the city there are that class of lands. There are occasionally small tracts where the conditions will be different as existed on this Taylor & Roberts farm. The eastern portion of that farm is of the character that I have described. It is gravelly. The west portion of the farm where this experiment was made is of an entirely different character. That happens to be a small tract in there of that character of land, extends very little ways to the north of that piece.

Q As a matter of fact, aren't those lands lying south of the railroad track and west of the Union Station there considered to be among the best lands in this vicinity?

MR RAY: If your honor please, I object to that as irrelevant and immaterial what they are considered to be.

THE COURT: Objection is overruled.

A I could not say as to how they are considered. I only know what they are.

Q What are they?

A Well, they are of such a porous nature when some --

Q Just a moment, aren't they of the best lands in the vicinity?

MR. THOMAS: Let the witness answer the question.

MR. A. C. HATCH: He has given us that in detail. We know what he says about porosity of the land and quantity of water to irrigate, I don't care to have him repeat it, he can answer my question yes or no.

A From what point of view do you mean the best?

Q Crops and most valuable to sell of the farm lands in this vicinity?

A No, I wouldn't say they were the most valuable for that purpose. There are some portions in there which are considered good.

Q Now, have you the sample of the soil taken from the Elizabeth Stubbs tract?

A I think the sample is here. I have two samples from that tract, I believe.

MR. RAY: Exhibit 60, that is.

A The sample is here.

Q Exhibit 60, sample No. 1, the rocks, what do they represent, the rocks and earth?

A The sample is divided into -- there are three portions to this exhibit. The one in the bottom of the sack having two portions in represents the top soil down to a depth of one foot, about. The other portion, the other sample in this same sack represents the portion of the soil immediately below that foot, and the sample in the other sack attached to this, represents the condition below about two feet, twenty-one inches.

Q Now, would you say that is a general average of the whole tract, Stubbs tract, that those samples represent a ~~gane~~ general average of the whole of the Stubbs tract?

A No, as I explained in my testimony, as you go south on the Stubbs tract and get down to the south of this --

Q Nevermind that, Mr. Swan, you have answered my question.

A Towards the --

Q You answered my question when you said no.

A All right.

Q Somebody will have to pay for all this extra talk. What portion of the Stubbs tract would that sample represent?

A Somewhat over three-quarters of the Stubbs land.

Q What would the other fourth be like?

A The other fourth would gradually grade into a sandy clay soil.

Q Now, the third part of that sample is practically loose open rock, isn't it?

A. Yes sir.

Q And the second part is very porous?

A Yes sir.

Q With only a foot of very porous soil on top?

A Yes sir.

Q And they raised a crop, a good crop of sugar beets upon that land with less than a two acre foot duty of water, didn't they?

A On the whole tract of the Stubbs, all this beet field that was under examination which did not include the whole of the Stubbs tract.

Q Well, the tract that you made the test upon?

A The tract I made the test upon, this would represent the conditions on about a fourth of that, ~~as~~ of the tract on which I made the test, less than a fourth.

Q They had what water they wanted, didn't they?

A They had all the water they wanted to use on that.

Q And I think you said the gentleman who is farming this was considered to be an exceedingly good farmer?

A I said he was considered to be a good farmer.

Q Now, how do you account for practically the same kind of soil on the Stubbs farm that you have on the Clark farm?

A On the which farm?

Q The Clark farm, requiring less than half the water?

A I don't think it is the same soil by any means.

QA Show us the difference in the samples. Explain the difference, you have samples of the Clark tract, haven't you?

MR. THOMAS: I don't think that he has.

A I don't think there are any samples from the Clark land.

Q Have you any from the Bean?

A Yes sir.

Q Well, we will take the Bean tract then.

A All right.

Q Show us and explain to us the difference why one would require practically three times the quantity of water that the other tract takes?

A The difference--

Q Show us from the samples.

A From the samples?

Q Yes, so that we may know.

A Well, the difference in those two is not due to those samples.

Q Is it due to the soil?

A It is due to all the conditions that are found on the land.

Q It is first principally due, under your testimony, as I understood, to the soil?

A It is due more to the subsoil.

Q Well now, what is the difference in the subsoil, show and explain to us.

A The difference is that the subsoil in the Stubbs tract which is impervious and lying beneath the gravel bed here comes to the surface in the lower end of the tract, and the water which is in that open gravel soil due to irrigation and to sub-surface waters finds its way to the surface on the lower end of the Stubbs tract and supplies a large part of the needs of that tract.

Q You say it comes to the surface on the Stubbs tract?

A Yes sir.

Q The water does? A. Yes sir. It begins to come, I take

it --

Q What period of the year will the water reach the surface on the Stubbs tract, any portion of it?

A Comes toward the surface.

Q Let me ask a question before you answer.

A All right .

Q What period of the year does the water reach the surface on the Stubbs tract during the raising of crops, that is, the subsurface water?

A The subsurface water and the effect of it is apparent on the lower end of the Stubbs tract now.

Q Wait a minute, read my question, will you please.

(question read)

A The moisture --

Q Oh, Mr. Swan, you understand my question.

A No, I don't understand your question, if you don't mean the moisture and the water in the subsoil.

MR. THOMAS: I think if you would let the witness answer he will answer your question.

MR. A. C. HATCH: I am willing the witness should answer in his own way, but we are making a record here that is hundreds of pages. That if the witness would just answer the question --

MR. THOMAS: I appreciate that.

MR. A. C. HATCH: That would be saved.

A I will say that there is comes to the surface now, and effects of it are apparent on the surface.

Q And it will remain there during the balance of the cropping season, will it?

A If the irrigation is continued on the lands to the north it will remain so the balance of the season.

Q Then the Stubbs tract that you experiments upon, half of it, or a quarter of it, or some portion of that experiment did not require water at all, did it?

A It received the moisture that it needed from the irrigation of the balance of the tract.

Q Mr. Swan -- read my question to him, will you please.

(Question read)

A Not during that season it did not.

Q Then why did you include it within the experiment as water covering a certain number of acres of land?

A Because at the time that I made the -- selected the tract and measured the tract area I did not have a thorough knowledge of that condition and I measured that tract and included it because that was the tract, there was a best tract.

Q You didn't as a matter of fact, irrigate all of it, did you?

A The water was run on all of it.

Q Whether it needed it or not, is that right?

A Well, it needed it.

Q Notwithstanding the sub-surface water reached the surface, it needed irrigation?

A It needed irrigation during a portion of the season.

Q Now, the Smith tract, refer to your table?

A Yes sir.

Q That was irrigated a great number of times?

A Yes sir.

Q What was the necessity for irrigating that tract once a week after July 1st?

A That was a strawberry crop, very shallow rooted, and to mature the strawberries it needed the water.

Q But the strawberries were matured, if I understood you correctly, about July 4th?

A Yes, and after July 7th it received water only once a week.

Q I say, what was the necessity for irrigating it once a week after the crop was matured?

A Well, that land needed the water once a week, received it oftener before that.

MR. THOMAS: I don't believe you have answered the question.

A Then I don't understand it. It was to keep the plants alive.

Q Do you mean to say that it is necessary upon any soil within Provo City to apply the water once a week simply to keep strawberry plants alive?

A I might also state that a portion --

Q Just a moment, wait a moment, will you please read my question.

(Question read)

A Yes sir.

Q Does it require it oftendr than once a week in order to keep them alive?

A No.

Q Strawberry plants -- you get upon this tract 8.119 acre feet from May 12th to August 25th?

A Yes sir.

Q And some applications not recorded?

A One application on June 30th not recorded. If you will allow me to make an explanation in regard to this.

Q I wish you would.

A This is marked "Strawberries". Now, when the land was started, this was in strawberries, some of these berries were old plants, and after a strawberry season was over the land was plowed up on a portion of the tract and sown to oats, and the oats were out <sup>for a</sup> ~~and~~ hay crop. -- Did not mature the oat crop and they were out for a hay crop, and the irrigation covers that, the irrigation for these oats as well as for the strawberries during that season.

Q Now in the application the first one I find is May 12th?

A Yes sir.

Q Then there is a period from May 12th to June 8th. Why that long period in the forepart of the season without irrigation,

the main period of the production of the fruit if they would require water once a week in order to keep the plants alive?

A The weather conditions then will probably account for that. There were some storms along during that period.

Q One hundred and eighty days without any rain, wasn't there?

A Not in May, I think it was eighty-four days and started after that.

Q Eighty-seven days, someone has corrected me.

A Eighty-four or eightyseven.

Q Was there any rain between May 12th and the first of August on the Smith farm, or in that vicinity?

A I think there was, I can tell better by --

Q Not sufficient to answer the purpose of an irrigation, was there?

A For that piece probably for these shallow rooted crops.

Q Then the next irrigation after June 8th is June 12th?

A Yes sir.

Q We have nearly a month between the one preceding that and then only four days, why that difference?

A They were starting to pick the strawberries and the strawberries were maturing and ripened very fast about that time, after the 8th of June.

Q Then the next irrigation in June 26th?

A Yes.

Q Two weeks after? A. Yes sir.

Q They were still irrigating the strawberries, weren't they?

A Yes.

Q Why twoweeks between and only four days between?

A I don't know.

Q At the same picking strawberries .

A We went and measured the water when the man irrigated.

Q Now, isn't it possible, Mr. Swan, that there is some mistake about this experiment or the ~~xxxx~~ recording of it either by the

stenographer or the clerk or somebody, and that you have it incorrectly recorded?

A No, unless there was some irrigation there that we omitted. Might have been an irrigation in there, or might have been due to the weather conditions, storms.

Q You know, as a matter of fact, that there were not storms in this vicinity that would supply water sufficient to irrigate the crops at that period of the year, don't you?

A I don't think there was any that would supply in June.

Q You have stated that you had made a study of irrigation from the books and from your own observations, can you account for the apparent discrepancies in this record as to the Smith farm?

A I cannot account for that period between June 12th and June 26th.

Q Can you between May 12th and June 8th.

A That I believe was due to storms.

Q But you don't have any knowledge of it at this time?

A I have not without looking it up to see what --

Q Then the next irrigation, June 26th, following June 26th we find the water applied on the 30th again?

A Yes sir.

Q But the quantity not given?

A Yes sir.

Q I will ask if from your knowledge, there is any special feature about strawberries that required this varied turns of irrigation?

A No, as I say, I cannot account for that period between June 12th and June 26th. I can account for the strawberries needing more water or watered more frequently during the ripening period.

I can account for the short ~~prize~~ period during the ripening period, but I cannot account for the long period in there.

Q As to the seepage waters in the Provo River to which you testified, you said the seepage waters between the midway dam and the Hoover ranch amounted to seventy second feet at the time

you were investigating?

A About that approximately, I haven't the exact figures here now, I can get them.

Q Do you know how much of that comes from perineal springs that were flowing into the river prior to their being any irrigation in the valleys above?

A No, I could not state what proportion comes from springs of that character.

Q Do you know anything about the natural inflow into the river, other than that that percolates through the soil from irrigation into the Provo River, along that section between Midway dam and the Hoover farm?

A There are some springs in there that I know of, but as to the proportion that comes -- proportion of this water that comes in from those springs I could not give the exact amount.

Q Do you know where the fish hatchery is on what is termed Spring Creek?

A. Yes sir.

Q Just above Charleston?

A Yes sir.

Q Do you know the quantity of water that flows from that one spring?

A No sir.

Q You have seen the stream, haven't you?

A I have.

Q Estimate the distance across it, cross section of it?

A I have observed the stream a number of times but I made no estimate as to the quantity that came in that one stream.

Q Very large flow though for a spring, isn't it?

A Yes, it has considerable flow.

Q And there are two or three streams, branches of the river that inflow, other than that, are there not?

A There are two or three branches that come in there in different places.

Q Immediately below the Midway dam?

A Where the seepage comes in.

Q Immediately below the Midway lower dam, did you notice the stream coming in on the east bank of the river?

A A short ways down the channel?

Q Yes, quarter of a mile below? A. Yes.

Q Quite a large stream? A. Yes.

Q Willows all along the stream, did you notice?

A Yes sir.

Q So that it was a natural tributary to the river?

A Yes sir.

Q And Round Valley Creek comes into the river within that section?

A Yes sir.

Q You spoke of some faults in the river whereby water might be lost by seepage, where are those faults.

A There are some faults that run across the canyon opposite the Pole Canyon extending in a northerly direction, not due north and south.

Q That is above the intake of Plaintiff's canal, isn't it?

A Yes sir.

Q Now, have you ever measured the river to determine whether or not there was any loss at that fault?

A No sir.

Q Why didn't you?

A Well, possibly from lack of time to make the measurements that I would like to have made.

Q If you had believed there was any loss there wouldn't you have measured it at the time you were making the investigation?

A No.

Q Didn't you consider it of interest sufficient to take time to measure it?

A Yes, I considered it of interest, but at that time I was engaged on something else and I would not have taken the time to make the measurements then.

Q Where is the next fault?

A The next fault is farther west.

Q Whereabouts?

A Runs along up the face of the mountain, of the mountain out below the head gates of the Provo Reservoir Company.

Q Do you know whether or not there is any loss of water at that fault? A. No.

Q Speaking of the evaporation of water from the river, what is the cause of evaporation?

A The cause of the evaporation is the fact that the atmosphere becomes warmer, it doesn't have the amount of moisture in it which it is capable of carrying and it will take up moisture from any body of water with which it comes in contact.

Q And the air comes in contact with all surface bodies of water?

A Yes sir.

Q Will it take up more at any one time of the year than another?

A It will.

Q Conditions of the atmosphere as to dryness being the same?

A When you speak --

Q You answered before I had asked my question. Now, answer my question.

A When you speak of dryness, that is a relative term. The absolute amount of moisture in the air may be the same and still the atmosphere be drier at one time than it is at another, or the atmosphere be capable of holding more moisture when it is hotter than when it is cooler.

Q What time of the year does the most evaporation occur?

A In the hot summer time.

Q More than in the cold freezing weather?

A The evaporation occurs more at those times when the weather is changing from cold to a hot condition, that is, as the air becomes hotter it is capable of taking up more moisture and will take up more during the time that it is changing than it will at hotter periods.

Q doesn't the evaporation occur just the same when it is changing from a hot to a cold condition?

A Not the same.

Q What is the relative difference?

A Well, when it is changing from a hot to a cold condition it is changing from a condition where it is capable of carrying more moisture to a condition where it will not carry so much.

Q What is the greatest quantity of water that the air will retain?

A That it would be hard for me to say. There are too many conditions.

Q Well, the air at one hundred degrees fahrenheit.

A I cannot state that off hand, I haven't the knowledge.

Q Now, in your testimony you told of the water being highly agitated and spray, much spray, what effect would that have, if any, upon the quantity of evaporation?

A Well, when the water is beaten up into a spray the air comes in contact with more surface and consequently will take up more moisture.

Q So that the Provo River would give up more moisture according to its surface area than would the Utah Lake, is that true?

A Yes, where it is beaten into the spray that way, it will take up more, the air conditions being the same in the two operations.

Q But as a matter of fact, the air conditions are not the same, are they?

A. No.

Q And where the river is <sup>agitated</sup> ~~agitated~~ the most is at a much higher altitude?

A. Yes sir.

Q Than the lake. And where the absorption by the air would be materially less?

A Not necessary, the range of temperature in the higher altitudes is greater during the twenty-four hours than it would be near the Utah Lake.

Q I understood you to say that there would be practically no loss by seepage in the Provo River?

A I don't remember of making that statement.

Q What do you say with regard to that?

A I say that there would be loss by seepage in my judgment?

Q Where would that seep to?

A It would seep into underground into sub-surface strata in seams or openings in the rocks beneath.

Q And would not again find its way to the river bed of the Provo River?

A Some of it would not.

Q Where would you say it would go to?

A Well, it would go so deep that I could not say where it would finally.

Q Don't you think those planes ever fill up with water to where there is no more seepage?

A Oh, they probably have an outlet somewhere.

Q The ones that you noticed. The lowest point, I think, that you have any knowledge of was the bed of the Provo River, wasn't it?

A Yes, the lowest ones that I have been--

Q That is the lowest surface?

A No, that is not the lowest surface, large portion of the bed of the Provo River is made up of limestone which is blocky and has open seams between it, and is the character of stone which is subject to being dissolved with the waters carrying carbonaceous matter, and is likely to have bodies of water flowing through it, large quantities of water flowing through the block of limestone.

Q Suppose this book represents one of those faults or fissures to which you have referred, the bottom of the V in the book is the bed of the river, now, do you know of any lower surface exposure in any of those figures or bedding planes to which you have referred than the bed of the Provo River?

A I don't understand your question.

Q Read the question again, please.

(Question read)

A I don't grasp your question, the fissure --

Q Just a moment then, you told of a fault crossing the Provo River?

A Yes sir.

Q Yes sir.

Q Near Spring Dell? A. Yes.

Q Understand that to be a crack in the earth?

A Yes sir.

Q Displacement in which your water might find its way?

A Yes sir.

Q When the crack was filled with water it would overflow at the lowest point of outlet, wouldn't it?

A Yes, if it were filled.

Q If it were filled, and it would fill unless there was an outlet at the surface somewhere, wouldn't it?

A No, there might be outlets through the rock between the stratum or different strata of the rock along the bedding plane of the rock.

Q It would find its way to the surface somewhere sometimes, wouldn't it?

A If those bedding planes came up to the surface, yes, some kind of a way.

Q If it didn't, what would become of the water?

A The water, if the water continued to run in them and there were no outlets it would eventually fill up.

Q And if it did fill up it would flow out at the lowest surface exposure, wouldn't it? A. Yes.

A I will ask you if you know of any lower surface exposure on that fault than the bed of the Provo River?

A That fault extends --

Q You can answer that yes or no.

Q I might answer it yes.

- Q where?
- A In Salt Lake County.
- Q Does it reach Salt Lake County?
- A Yes sir, it reaches from the Cache Valley or west side of the Valley, Cache Valley, clear to Escalanti, one of those faults.
- Q Have you seen any water flowing out of it at any point along its course?
- A No sir.
- Q Now, what point in Salt Lake county is lower surface exposure on that fault than the bed of the Provo River up here below Spring Dell ?
- A At the mouth of the Cottonwood and mouth of Parley's Canyon, mouth of most of those canyons along through there. the elevation would be lower than it is here.
- Q Have you ever seen any measurements of those elevations to determine that question?
- A I have seen the record of measurements taken by the Geological Survey.
- Q Contour lines?
- A Yes sir, I have seen maps of contour lines.
- Q Can you say from those records that any one of those points you have mentioned are lower than the point in the bed of the Provo River where this fault that you have testified to crosses?
- A Taking it right now I could not say definitely as to the elevations of those points.
- Q Just guessing at it?
- A But I am taking that in a general way from what I know of the elevations of the country I know that Salt Lake Valley is lower than this Valley.
- Q You spoke of a very large quantity of seepage water entering the Provo River at a point just where you leave the bench coming from the Kamas section to come in to the head of the Provo Canyon. Did you --

A Head of the Provo Canyon?

Q Yes, that is the canyon between Heber and Kamas I understood you to refer to.

A Yes.

Q Comes in from the north sides, does it not?

A The water comes in from the north side of the river, yes.

Q Do you know whether or not that water is any greater in quantity now than it was before they commenced to irrigate to the on the lands east and north of that point?

A I don't, I didn't see it before that time I merely take it on my judgment.

Q Do you know whether or not that is seepage water or whether it is water coming from perineal springs that existed there at the time of the settlement of that valley?

A Only by hearsay.

Q And the persons from whom you heard only knew it by hearsay too, is that true?

A Some of them I understood had been there before the irrigation of that tract commenced.

Q But none of them told you there wasn't a living stream coming from that hollow at the time the first settlers went there, did they?

MR. RAY: Object to that as irrelevant and immaterial.

THE COURT: The objection is sustained.

MR. A. C. HATCH: Note out exception.

Q What is the area drained to fill all of the reservoirs at the head of the Provo River?

A The area of the water shed tributary to the Union -- well that territory in the Catchment Basin, whole Catchment Basin of the main river is about sixteen square miles. That includes some area from which the reservoirs don't receive any drainage, however, where the drainage go into the river and does not pass through the reservoirs. The area on the North Fork Catchment Basin at the head of the North Fork has an area of six

square miles and portion of this does not pass through the reservoir so that the area would be less than that, I don't know just how much.

Q Do you know approximately how much?

A No, just roughly estimating it, I would say there was probably one and a half square miles of that Catchment Basin that would not go through the North Fork Lake and in the neighborhood of two square miles that would not go through the reservoirs on the main system.

Q What is the drainage area of the Provo River and its tributaries total drainage area?

A That I don't know.

Q I understood you to say this morning that the reservoirs covered practically the entire drainage area of the head waters of the river, did you make that statement?

A I don't remember of making that statement. If I did I was mistaken. I misunderstood the question if I made any such statement.

Q Fifteen or sixteen square miles is a very small portion of the are, drainage area of the Provo River?

A Yes, it is a small portion of the drainage<sup>area</sup> of the whole river.

Q Now, can you give us the average flow of water through the water works system of Provo City for any year?

A The average flow take it all the season through would be between seven and eight second feet.

Q That covers the irrigation period?

A That covers the whole season.

Q The whole year?

A The whole year.

Q What is the minimum flow?

A Minimum flow is in the neighborhood of five and a half second feet.

Q And when is that?

A That would be during the period of the year along in the early

part of April and in January and December the flow would also be low.

Q The maximum -- when is the maximum flow?

A The maximum flow occurs along in August, usually, there is a variation in different years.

Q Generally in August?

A But generally commencing along about the middle of July, it reaches the maximum along about the first of August.

Q That is all taken from springs in the canyon is it not?

A Yes sir.

Q And no part of it taken directly from the Provo River?

A No sir, except a stream which is passed through the lower pipe line for the purpose of keeping that pipe line in serviceable condition, just for keeping up that pipe line. I don't know that. That is turned on and turned off by the superintendent of water works and I don't know.

Q Is that pipe line in use for domestic purposes?

A There are some taps off of that north side.

Q None of it goes into the city for city use? A. No.

Q Now, where is the spillway to your pipe line system?

A The overflow to the pressure system is located near the mouth of Rock Canyon.

Q Where does that overflow go to?

A There is no overflow at this period of the year.

Q When there is any overflow?

A When there is any overflow it goes down into , onto those lands which lie above the Timpanogas ditch and into the Timpanogas ditch.

Q Is that as a t a point below your measuring, the Timpanogas measuring gates? A. Yes sir.

Q How far?

A I don't know the exact location of the Timpanogas measuring gates.

Q Is there any overflow --

A It would be below them I am satisfied of that.

Q Is there any overflow from the city pipes above this to which you have referred?

A No sir, unless it would be temporarily while there was some work going on on the pipe line when they might have the valve closed.

Q You have a spillway farther up your pipe line, haven't you?

A We have at the weir houses, we have a gate, and when we measure over those weirs we turn the water out of the pipe line through those weirs, which overflow, and it overflows into the river.

Q Now, if water were overflowing at that weir house what would you say was the reason of it ?

A I would say it was because of some work that was going on in the -- along the pipe lines on account of which the water works department had temporarily closed the gate or partially closed it.

Q Was water overflowing there to the extent of a second foot?

A I would say they had partially closed the gate to relieve the pressure for some reason, on account of work they were doing farther down the canyon on the water works system.

Q There would be some pressure in the pipe at that point, wouldn't there, ordinarily?

A I don't understand.

Q You say that they would close the gate or partially close it to relieve the pressure?

A To relieve the pressure farther down the canyon.

Q There would be no pressure at that point then?

A No, the water at that weir house would be flowing straight through unless that gate were closed.

Q You gave an estimate of sprinkling water required; where does that sprinkling water come from?

A It is taken from the water works system out of the fire hydrants

over a large portion of the city, through the platted portion where the hydrants are available.

Q Is there any water taken for sprinkling purposes within the city area of irrigation other than that taken from the pipe line?

A Yes, some of it is taken from the ditches, as I have stated this morning that -- and the sprinkling was done from the ditches, and there is also some water which is taken from flowing wells, and where the wells are not giving satisfactory service they will be replaced as quick as we reached that point with the water works system.

Q What proportion of the water used for sprinkling purpose is taken from sources other than the city water pipes?

A I have not made a calculation as to the exact proportion, it is relatively small at the present time.

Q How much of the land within the Provo City are is irrigated from artesian water flow?

A I could not say with regard to that, but it is a small area.

Q Great number of wells aren't there?

A There are particularly in the southwest portion of the city, but you know many of those are capped and used only for supplying water for culinary uses, and in those portions where the water mains have not been extended.

Q There are quite a number to the north of us in the city, are there not, north of this court house?

A There are some, not a great many.

Q And they are used for irrigation purposes, some of them are they not?

A There are some of them where they use them for sprinkling lawns and the area of those lawns is not included in the measurement which I gave you for lawns.

Q Aren't some of them used for irrigating gardens?

A They may be, I don't know, very few of them if there are.

Q Calling your attention to the artesian well at the Roberts Hotel, the fountain there is artesian water, is it not?

A Yes sir.

Q And the well at the old Dr. Pike place is a fountain there artesian water, is it not?

A There was, but I haven't noticed the water flowing there for sometime.

MR. A. C. HATCH: If the court please, Mr. Evans has some matter about the flow of water from the city pipes that I have not in mind that he would like to question in regard to that, if there is no objection.

THE COURT: Very well.

CROSS EXAMINATION by Mr. Jacob Evans.

Q Mr. Swan, your supply of water for the city of ten thousand population you first said it would require five hundred thousand gallons for a city of ten thousand population.

A Yes sir.

Q And you further said that Provo City was now a city of approximately ten thousand people?

A Yes sir.

Q Then they have been using within the city that five hundred thousand gallons of water through the pipe lines of the city, have they not?

A I would say no, not that item, that is included in there because the mains have not yet reached all of the city. We are constantly making extensions but we have not yet been able to reach all.

Q In other words, you are not supplying all of the ten thousand people at the present time with water for culinary purposes?

A No sir.

Q Now, the street sprinkling, I think Judge Hatch asked you concerning that, that in a very large measure comes from the city mains?

A. Yes sir.

Q And that I take it has been used, has it not, in the past, from the city mains?

A Large portion of it has been used.

Q They have used all that was necessary to sprinkle the streets, haven't they?

A No, they have not, we need more sprinkling than we have had.

Q How much more?

A Well, I could not state just exactly to the percent of that, we have not been able to cover all of the streets that need to be covered.

Q Do you know how many gallons of water have been used for sprinkling purposes within the city during the past few years?

A Not exactly.

Q Now, you stated that there was twenty-six and a half miles of sewer which required 377 gallons per mile, have you been using that quantity from the city mains.

A Yes sir.

Q The sewer then is up to its full necessities at the present time?

A As far as the sewer has been constructed.

Q Did you figure there was going to be some more sewer?

A I have not included more in this estimate.

Q You have not included --

A I have included here only what has been given.

Q Nine public drinking fountains?

A Excuse me, you stated had this quantity been used?

Q Yes.

A I will state no, I was in error when I stated yes. This quantity has not been used.

Q What proportion of the quantity has been used?

A Between half and three quarters of that quantity. We have not kept the sewer flushed.

Q What information have you that you base that answer upon?

A I base it upon the taking -- the flow of the fire hydrants during the time that it takes to flush the sewers. I can give you the basis of it if you desire.

Q I just asked you if you have a basis.

A The flushing of sewers is done with the fire hose. Every three months it takes one day to flush about twelve blocks of sewer or fifty-eight hundred feet in length. I have estimated that the water during --

Q I don't care anything about your estimate.

MR. THOMAS: That is what you asked him for.

MR. JACOB EVANS: No, he stated that, but have you been flushing the sewers every three months?

A No sir.

Q You say there are nine public drinking fountains and you estimated the requirements of those as being 12,960 gallons, what did you base that upon?

A On the flow of one gallon per minute.

Q They are running now, aren't they?

A Yes sir.

Q Running this quantity? A. Yes sir.

Q And have been ever since they have been put in?

A Yes sir.

Q And from the city mains?

A Yes sir.

Q There are three horse troughs, fifteen thousand gallons, what do you base that estimate upon?

A I base that on a flow from a three inch supply pipe which would cause the water to raise about the outlet of the pipe about three-quarters to one inch above the end of the pipe.

Q They have been flowing that during the past few years?

MR. THOMAS: Have you finished the other answer as to the horse troughs?

Q Did you finish it? A. No sir.

Q Finish it.

A It would give a flow of forty-eight hundred gallons, about fifty-four hundred gallons per day in round numbers five thousand and gallons.

Q And you have estimated that the requirements would be fifteen thousand gallons?

A Yes sir, for the three troughs.

Q Why did you make your estimate fifteen thousand when the actual flow had only been four to five thousand gallons?

MR. THOMAS: That is one trough, three troughs.

MR. JACOB EVANS: I was asking him about three troughs all the time.

MR. THOMAS: No, you are not, you are asking him about on, beg your pardon.

Q Has there been fifteen thousand gallons of water per day running to those three horse troughs?

A No sir.

Q Why not?

A Because as the pressure varies the water does not flow from those fountains at that rate. Then when the pressure is low there is less than that quantity flowing from those hydrants.

Q But you think that would be necessary?

A I think that would be a normal supply for those fountains.

Q How much has been supplied to those three horse troughs?

A I don't know.

Q Have you any estimate?

A I could not say as to the quantity that has flown from them.

Q Now, you testified concerning the lawns, that there was 529,647 gallons used for that purpose, as I remember?

A Yes sir.

Q Has that been used from the city mains in the past?

A Yes sir.

Q All of that quantity?

A I would say there was fully that quantity.

Q You would say there was fully that quantity used?

A Yes sir.

Q The city cemetery, you estimated there should be 117,300 gallons for the city cemetery?

A Yes sir.

Q Eight hours during the day. Has the cemetery been using that quantity of water?

A Yes sir.

Q Public parks and streets? A. Yes sir.

Q 135,253 gallons? A. Yes sir.

Q Has that quantity been used for that purpose from the pipe lines of Provo City in the past?

A As near as I can determine it has.

Q And the public schools, 60,000 gallons.

A That is taken from the meter readings.

Q That has been used?

A That has been used.

Q Provo General Hospital 650 gallons per-day?

A That is taken from meter readings.

Q The State Mental Hospital 200,000 gallons per day?

A That is an estimate made from the nature of the use, I was unable to get at that exactly.

Q Well, when will you say approximately that quantity of water had been used by the State Mental Hospital from the pipe lines of Provo City?

A I would think there had been that amount used considering the nature of the use.

Q Now, what was your next item there. Meters, meter service?

A Meters, lawns, I took the number of square yards of lawns under the metered service, that would be additional to the amount given.

Q What is that?

A I took the number of square yards that are supplied from metered

service and that would be in addition to the lawns given above, and based the calculation for those lawns on the same basis as above.

Q That gave 14,690 gallons?

A Yes sir.

Q Has that water been used from the pipe lines during the past?

A Yes sir, I think it has.

Q Do you know whether the State Mental Hospital used any of this water for the watering of their lawns or their grounds around the hospital, or whether it is used merely --

A They do use it for watering lawns and grounds?

Q Use any of it on the farm for agricultural purposes?

A I think not?

Q Gardens?

A Flower beds.

Q 77 service pipes you estimated at 19,250 gallons?

A Yes sir.

Q Those pipes are already installed, are they?

A Yes sir.

Q And the people are taking water from them now?

A Yes sir.

Q And have been in the past? A. Yes sir.

Q All of this water supply from the city water works system?

A Yes sir.

Q County road sprinkling, that is being taken now and has been in the past from the city water works system, hasn't it?

A Not all of it.

Q What proportion of it?

A Less than half.

Q About approximately 2500 gallons then?

A Perhaps that amount, maybe more.

Q What is the next item you have there?

A Fire fighting reserve.

Q Fire fighting reserve, 2,100,000 gallons?

A Yes sir.

Q Has that been utilized in the past?

A It has not.

Q What proportion of that reserve have you had?

A I could not say, we have not had the reserve there that we need ed.

Q There has always been a good pressure in the pipes, hasn't there, when you required water for fire purposes?

A No sir, there has not.

Q Since the new system has been put in?

A No sir.

Q And since people have been put on turns, requiring them to take their water at certain times, don't you generally have good pressure?

A. No sir.

Q In the pipes?

A No sir, not at all times.

Q Could you make any estimate of what part of that reserve you have had in the past?

A At times when there has been no fires the flow of water into the city has not been sufficient to keep the pressure up without any reserve for fire fighting purposes.

Q You speak of a loss of twenty-five per cent?

A Yes sir.

Q What do you base that upon?

A Upon leakage from mains and service.

Q You<sup>are</sup> having that loss now, aren't you?

A Yes sir.

Q And have had in the past?

A Portion of the time. We are constantly at work on these on the repairs.

Q You have no reason to believe the loss will be any greater in the future than it has been in the past, have you ?

Q That is an indeterminate matter. It might increase, might diminish, at times it will be more at times it will be less.

Q Now, Mr. Swan, that aggregated 14.88 second feet of water, did it not?

A Yes sir.

Q The estimate that you have made?

A Yes sir.

Q And you have only had in the city pipes approximately an average of seven to eight second feet?

A Yes sir.

Q Now, if you have been using all this water in the pipes, as you say you have, in the past, and it was necessary to use it and you only had eight second feet, how do you stretch it out to get fifteen second feet?

MR. THOMAS: I object to that question in that form as it is misleading and destructive and assumes --

THE COURT: In what respect?

MR. THOMAS: Counsel makes the statement if you have the average you said you have an average of such and such, eight second feet. Then he proceeds on the hypothesis he has said if he has this amount eight feet, how could he get this larger quantity. It is unfair to the witness, because the witness has stated the minimum and maximum periods. If counsel will reframe his question I shall not object, to cover the period where the maximum and minimum uses are involved. There are periods when eight feet would be manifestly inadequate and twelve more nearly.

MR. JACOB EVANS: He said that the highest amount he had in the pipes was approximately twelve second feet.

A Twelve and a half.

Q Now, you have stated the quantities you have been using all the time from this system and I will ask you to state to the court how you reconcile your statement where you say that you had

an average from seven to eight second feet in the pipes and yet you say there is a requirement of approximately 15 second feet, and yet you further say most of this water has been used all the time through the pipe line, just explain that to the court?

A Well, twelve and a half second feet or twelve second feet is most of fifteen second feet, and I have mentioned a number of uses here that we were not supplying, have not been supplied but should be supplied from the water works system, and those uses have to be replaced from other sources owing to the fact that they are not available from the water works system at present.

Q The maximum quantity that you have had in the pipes is twelve and a half second feet?

A Yes sir.

Q How long did you ever have that in your pipe line at any one time, and when?

A We have had over twelve second feet for approximately two months and a half and that comes during the period of greatest requirements when the lawn sprinkling and the street sprinkling and such <sup>uses</sup> as that are the heaviest.

Q In addition to this water -- what months were they that you had it, what months of the year, I say?

A What months?

Q Yes.

A From along in the middle of July until the first of August, or of October, the forepart of July until the latter part of September.

Q Now, this water is all spring water, as I understand it?

A Yes sir.

Q And when it gets down to as low as five second feet, you don't turn any river water in to commingle with the spring water and make up the deficiency that you require in the pipe lines?

A No sir.

Q And yet you have a lower system that could be done, have you not?

A It could be done.

Q But it is not done?

A No sir.

Q Even when you get down to as low as five second feet, you don't turn any water in from the river to make up the deficiency at all?

A No sir.

Q Notwithstanding you have a pipe line that it could be done and make up your deficiency?

A Yes sir.

Q And this too in face of the fact you have been turned by the water commissioner twenty-four second feet for municipal purposes directly from the river?

A That twenty-four second feet was not turned into the water works system and does not include Or includes more than than these uses.

Q This twenty-four second feet that was turned to the municipality was supposed to include the water in the water works system, was it not?

MR. THOMAS: Object to that as not proper cross examination, calling for a conclusion of the witness.

MR. JACOB EVANS: That is the point I would like to see whether or not it is the same water or whether Provo owns this particulat spring water.

THE COURT: You may examine as to that, but I don't understand just what you mean when you ask whether it is supposed to include this water; supposed by whom?

Q I will ask you this, that water that you had in your pipe lines was measured to you as a part of the twenty-four second feet that was measured to you by the commissioner for municipal

purposes, is that correct?

A As I understand the commissioner's report, that is correct.

Q That is correct?

THE COURT: Let me understand this, 1 $\frac{1}{4}$  second feet, fourteen and a fraction second feet made up of these several items given in gallons is a part of the twenty-four second feet?

A I understood that the uses applied here were supposed to be covered along with other uses by the 24 second feet which the commissioner allowed us.

Q And this 24 second feet that was distributed to you by the commissioner was supposed to include the water that you had in your pipe line?

A He counted, as I understand it, eight and a third second feet for the flow in the water system. The balance of that 24 second feet was for irrigation purposes.

Q Now, didn't he count the water in the pipe line?

MR. THOMAS: Did you finish your answer?

A No sir.

Q Didn't he count the water --

MR. THOMAS: Let him finish his answer.

A 8.3 the commissioner figured as the quantity flowing in the pipe lines at the present time.

Q Now let's see, didn't you measure the water in the pipe lines, that is, the city officers, and notify Mr. Wentz, the commissioner, how much water there was in the pipe line?

A At some time in June I did.

Q And you would tell him what your measurement was, if it was five second feet you would report five second feet to him, is that correct?

A Yes, but I never have reported five second feet to him as I remember.

Q Whatever quantity you would report to him.

A whatever quantity I would report to him.

Q He would charge that up as a part of the twenty-four second feet, which was a continuous flow to the city?

A He charged the uniform amount throughout the whole season, he asked <sup>me</sup> in June what the measurement was and I told him what it was at that time and he charged eight and a third second feet practically as a constant flow throughout the whole season, and charged that to the water works.

Q Then if your pipe line would actually carry twelve second feet, you were then getting four second feet of water that was not charged to you at all by the commissioner, weren't you?

A We were under those conditions.

Q And to which you were not entitled?

MR. RAY: I object to that as calling for a conclusion of the witness.

THE COURT: Objection sustained.

Q Now, do you know whether or not if the commissioner had known you had twelve second feet then he would have reduced you, wouldn't he?

A I don't know.

MR. THOMAS: Just a minute, I object to that.

THE COURT: The witness has answered he don't know.

MR. A. C. HATCH: I think it is self evident without the answer.

THE COURT: It is evident he could not know.

Q The commissioner had no means of measuring the water that was in your pipes, did he?

A No.

Q You kept your doors locked?

A Yes sir.

Q And the only way he could know how much water was getting in the pipe was when you would tell him?

A Yes.

Q And whenever you would report to him how much water was in the

pipe he would count that as a part of your twenty four second feet for municipal purposes ?

MR. THOMAS: That has already been answered, I submit.

Q This 704 square yards of lawn you speak of that is requiring water from the water works system, I will ask you to state whether or not that same lawn is not covered by irrigation water that the city is asking for to be distributed to them through the irrigation ditches?

A I don't remember any --

MR. THOMAS: What lawn is that?

MR. JACOB EVANS: Any lawn within the city.

MR. THOMAS: What figures did you give?

MR. JACOB EVANS: 704, whatever it was, what is it?

MR. RAY: 157,779 square yards of lawn.

Q I will ask you to state if that number of yards of lawn which you have stated requires water in your estimate does not also draw water from the irrigation system and the irrigation ditches to irrigate that same number of yourds of ground within Provo City?

A We have drawn a certain quantity of water from the irrigation system supposed to cover all the lands in Provo City.

Q That's it.

A And this in the water works system we have drawn for the lawn uses.

Q But you thereby get a double use of water from for the same land, do you not?

A I could not say with regard to that.

Q If you irrigated from the ditches and then irrigated from the city water works system, don't you get a double use of water?

A The lawns that are irrigated from the ditches are not irrigated from the water system.

Q No, but you draw water for them?

A We draw a certain quantity of water according to the degrees

which have been rendered by the court and that is supposed to cover all of the uses for Provo City from that source.

Q Now, in regard to the acreage, you issue tickets for all the lawns for irrigation purposes from the ditches?

A The lawns have the water according to the number of square yards of lawn they have, we assess them for water.

Q You charge them so much for the use of the water out of the city pipes so much for every square yard of lawn which a man has within the city, don't you?

A Two cents for every hundred square yards of lawn.

Q In addition to that you charge for the irrigation water right, don't you?

A Yes.

Q And give them tickets to water their lawns from the irrigation ditches?

A Give them tickets to water their lots.

Q The whole of their lots?

A So much as they desire to use, desire to irrigate.

Q These tickets carry with them a sufficient quantity of water to irrigate the entire lots and including the lawns, and buildings, sheds and barns, outhouses and everything else that is located on the lots?

A No.

MR. THOMAS: J<sup>u</sup>st a moment.

Q You say that is not so?

A That is not so.

MR. THOMAS: Does counsel urge that the barns and houses are irrigated?

MR. JACOB EVANS: Don't they charge for drawing water for irrigating them?

MR. A. C. HATCH: Same as this court house square draws water for the whole block.

Q Let's take my lot for an illustration, you know where I live?

A Yes.

Q Own a six by twelve up there?

A Yes sir.

Q You issue me a ticket to irrigate the whole of that lot, don't you?

A I issue you a ticket to irrigate so much as you desire to .

Q You issue me a ticket, give me time to cover the entire lot?

A Or so much of it as you desire.

Q Now, answer the question.

THE COURT: If you can, answer it.

Q You give me time in proportion to the number of square rods of ground I have to irrigate that lot, don't you?

A Yes sir.

Q The whole of it?

A In proportion to the area of your lot.

Q If I have a six by twelve you give me a ticket running a certain length of time?

A. Yes sir.

Q Which is suppose to be a sufficient length of time to cover the entire lot, that is correct, isn't it?

A I could not say with regard to that.

Q And you know that more than half of that lot is covered with lawn and buildings, don't you ?

A. Yes.

Q And yet I have a ticket to irrigate the entire lot from the irrigation ditch, don't I?

A You have a ticket to irrigate from the irrigation ditch, which entitled you to take in proportion to the size of your lot.

Q Which is a six by twelve, the whole lot?

A Six by twelve.

Q If I owned a three by twelve you would give me a ticket which would run me just half as long?

A Yes sir.

Q And you do that throughout the entire system. don't you?

A We do that throughout the entire system.

Q So that everybody gets a ticket draws water from the irrigation

ditches for their lots including their lawns, their houses and all buildings that may be situated upon those lots, that is a fact, isn't it?

A Ticket for the full area of the lot.

Q Irrespective of where it gets its water from, that is irrespective of whether it uses water from the city mains or not?

A Yes sir.

Q And irrespective of whether there is buildings upon the lot or not? A. Yes sir.

Q And that is true throughout the entire city, isn't it?

A That is true throughout the entire city, the platted -- the entire city.

CROSS EXAMINATION by Mr. Bagley.

Q You said that the overflow from the city main that is the conduit was above the Timpanogos Canal and its overflow water was used on lands above the canal or flowed into the canal, do you know whether any water from this overflow actually reaches the canal of the Timpanogos Canal Company?

A I know that it had some seasons during the year some years.

Q In any constant quantity?

A No, it would not be a constant quantity.

Q How many times have you seen that?

A I could not state accurately.

Q Does the city rent that overflow? A. No.

Q Those people above? A. No.

Q They assert any claim to it as far as you know, people that use it on their lands?

A I don't know of any. That overflow does not occur during the period of the year when it would be of the most use to those people.

Q Most use. Is it any use?

A It would come early in the spring or late in the fall, and would

not come long during the middle of the summer when the sprinkling and street sprinkling, lawn sprinkling and all those things were on.

Q Have you ever taken any measurements so that you could determine anything in any way the amount of overflow?

A No, it is variable, intermittent.

Q Do you know if any such measurements have ever been made?

A I don't know of any ever being made.

Q Haven't any records been kept of the season of the year when this overflow occurs?

A I don't know of any having been kept.

CROSS EXAMINATION by Mr. Ray.

Q Mr. Swan, what becomes of the water in your pipe system when you are carrying twelve and a half second feet during the night time?

A Part of the street sprinkling is done during the night time. During the day the water is drawn down in the pipe line above the city and during the night time it takes the excess that is not used in the day time to fill that pipe back up again so that the pressure is higher in the morning before the morning lawn sprinkling commences and then it is drawn down during the day, and in the latter part of the day when the lawn sprinkling is on, toward the evening, it is drawn down quite low.

Q So that after the evening has progressed so that there has been a substantial inflow your pressure would be considerably higher?

A That pressure would be considerably higher along towards morning just before the morning lawn sprinkling commences.

Q How long would it continue after the morning lawn sprinkling?

A It would commence to draw down again as quick as the morning lawn sprinkling and street sprinkling commences.

Q Have you figured your fire reserve upon a constant of twenty-four

hours or have you taken into consideration the fact that condition in its use during the night time there is created natural fire reserve?

A I wouldn't say there was created a natural fire reserve, because the pressure is too low during part of that time for fire purposes.

Q But there is a period during the day when it is sufficient, isn't there?

A It would not be sufficient with the other uses that are on it to keep the pressure up where it would be a fire fighting pressure.

Q As great a pressure as the <sup>system</sup> ~~city~~ can carry whenever it reaches the stage of overflow, isn't it at least?

A Yes, when it reaches the stage of overflow it is.

Q You have no provision for any greater fire reserve than that have you? A. No.

Q Have you taken into consideration in your two million one hundred thousand gallons the fact there was periods when you actually have such reserve, that is the maximum reserve?

A I don't think we have the reserve, I cannot figure on what Mr. Ray bases his question.

Q You stated that you have an overflow box up here, haven't you, up above the Timpanogos?

A Yes sir.

Q Whenever that is overflowing you have the maximum fire reserve pressure, haven't you?

A We have that pressure until we begin to draw. Now for a fire fighting reserve we would have to be able to maintain that pressure while we were drawing, which we are not able to do with the uses now of the city.

Q If you had an extreme exigency why you wouldn't have to maintain all these uses coincidentally, would you, if you had a serious fire that required such a condition?

A The fire fighting reserve is calculated on the fact that the

other uses are coincident, and if they were not supplied at the time the fire was on they would have to be made up by a later use.

Q Mr. Swan --

A Temporarily suspended.

Q You say the commissioner carried as a constant last year about eight and a third second feet of water, was that the report you gave as to the flowage in your pipe system?

A The report which I gave to him was in June when he asked me as to the quantity that was in the system.

Q Did you ever make any other report to him?

A And I reported to him that that was the quantity which has always been charged against us for that, and on that basis the distribution had always been made, that is on the five hundred minute feet which was the quantity that was measured as flowing into the river from those springs at the time that the springs were first taken into the water system or immediately before that.

THE COURT: I want to ask one matter about this fire reserve. I haven't understood at all just want to ask in relation to it. As I understand it in this computation or this schedule of uses which aggregates 9,616,406 gallons, that is gallons per day of twenty four hours?

A Yes sir.

THE COURT And of that this fire reserve you speak of is 2,100,000 gallons?

A Yes sir.

THE COURT: How do you accumulate that, what number of gallons to every twenty-four hours, where do you put it, where do you keep it, accumulate it, are you prepared, have you some reservoir you will hold it in, or storage?

A The pipe line system extends from the northeast portion of the platted -- northeast corner of the platted portion of the city back up the hill towards Rock Canyon. The Pipe line is higher

at the northeast corner of the city than it is down in the main portion of the city as a general average and farther back up the rise is considerable, but there is a long stretch of pipe line. Now under the present system the pressure is drawn down here by the use<sup>so</sup> that the water would probably be way down in the lower end of the pipe system and during the night time although the street sprinkling due to the street sprinkling being on it doesn't raise as fast as it otherwise would, but probably goes up here in the summer season part way up to that overflow but does not reach it. That pipe line is a long one and acts as a stand pipe would in a city where they have a large stand pipe that they fill up and which stores water, and in case of a fire in order to keep that pressure up the water would have to flow into that as fast as it was drawn out to fight the fire, and the supply would have to be maintained as fast as they drew it out in order to accomplish that.

MR. A. C. HATCH: May I ask a question?

THE COURT: Yes, probably you can clear it up.

RECROSS EXAMINATION by MR. A. C. Hatch.

- Q Suppose you had that quantity flowing into your pipe sufficient to keep it full all the time up to your waste station, it would necessarily under your present system cause a waste of that excess part of the time, would it not?
- A If we had it up so that it kept the supply up to the overflow all the time during a portion of the time unless we distributed the uses differently from the way we now distribute them, there would be some of it overflowing.
- Q You have all the water in your pipe line system that you can put into it, except you take it from the river itself?
- A No.
- Q Why not?
- A Because we can put more in.

- Q From springs?
- A Yes, there are other springs.
- Q Why haven't you put them in?
- A We have been putting them in some nearly every year.
- Q The twenty-four second feet being awarded you for city purposes, then any that you put into the pipe in excess of what you now have would be deducted from the twenty-four second feet, would it not?
- A I couldn't say .
- Q If the twenty-four second feet is sufficient for all purposes it would be immaterial whether you run it into irrigating ditches or whether you put it in your pipe line, wouldn't it.
- A I don't know that twenty-four second feet is sufficient.
- Q I say if it is sufficient you could fill your pipe line to any capacity from that twenty-four second feet, could you not?
- A If it was sufficient, yes.
- Q But if this quantity ran into your pipe line sufficient to keep up that fire reserve except when a fire was actually on and the water was being used for fire purposes the entire reserve would be spilling out and running into the Timpanogos Canal, would it not?
- A Except when there was a fire on, probably, yes, except when it was being used for fire purposes.
- Q And you have not heretofore filled your pipe line and kept up that fire reserve because you thought you had better use for the water elsewhere, isn't that true?
- A No, I couldn't say that it was true in just those terms.
- Q It was not because the commissioner did not turn to the city sufficient water for that purpose, was it?
- A It was because the taps are in every house and anybody could go and draw the water as they needed and they have drawn without regard to whether there was a fire reserve or not.
- Q And left the tap running and twentyfive per cent is wasted?
- A I don't know whether they left the taps running, that is not

what I calculated that 25 per cent for.

Q What was that 25 per cent for?

A That was for leakage and unavoidable leakage in main mains and services.

Q Unavoidable leakage? A. Yes sir.

Q What kind of a pipe line have you?

A We have a wood stave pipe.

Q That accounts for it?

A Well, that is less than the general American average, and the usual pipe systems throughout the country are iron more largely than wood.

Q Worse than the ordinary irrigating ditch, isn't it?

A Yes, it is.

REGROSS EXAMINATION by Mr. Jacob Evans.

Q Calling your attention, Mr. Swan, to the Little Spring, I think you called it Maple Spring, did you not?

A Are you referring to the spring which we took into the --

Q I am referring to the spring that was taken into the city pipe line during the summer of 1915. I understand that is Maple Spring, what is the name of the spring?

A I don't know of any name for it, Mr. Evans.

Q You know of the particular spring?

A I know the spring you mean.

Q Do you know how much water it flows?

A The quantity which is variable, I don't know the amount that it is flowing at this time.

Q Have you ever measured it?

A No, at the time we took it in there was only a small seepage showing at the surface, and when it was opened up and developed and put into the pipe line I did not measure it, but I got an estimate on the quantity from the superintendent of water works, that is all the information I have.

Q Did he measure it?

A I don't know what measurement he made of it, he gave me an estimate of the quantity.

Q How much did he say was flowing in that spring?

MR. RAY: I object to that.

Q Is there any means that you can determine now the quantity of water flowing there?

A Not without cutting the pipe line I could not determine the quantity in that spring separate from the other.

Q During what part of the season of 1915 was it that you connected to that spring and put it into the city system?

A My measurements were made in June of 1915.

Q I am asking you when you made the connection?

A And the connection was made shortly after the time that I made my measurements, along about July 1st, I don't know exactly the date when we completed the connection.

Q I thought you told me you had made no measurements of the water. If you measured the water from that spring how much did it flow?

A I misunderstood you, I understood you to ask for the date they made the connection.

Q I did, and then you said when you made the measurements it was in June.

A My measurement of the location of the spring, my survey of the location.

Q You never measured the water?

A I never measured the water.

Q Do you know whether or not Provo City made any appropriation of that particular spring to the State Engineer's office?

MR. THOMAS: That is not proper cross examination, not the best evidence.

THE COURT: I am inclined to think that is true. I don't think that the city has introduced any evidence of the right to any spring at all.

MR. THOMAS: Nor initiation of any other right.

Q I would like to ask you if you know upon what theory of right you took that spring?

MR. RAY: I object to that as calling for a conclusion, irrelevant and immaterial.

MR. JACOB EVANS: I think it will be very competent, if the court please.

THE COURT: Upon what theory would you contend that?

MR. JACOB EVANS: I contend that their theory is they took the water into the spring on the ground that they had a stipulation with the Telluride Power Company.

MR. THOMAS: That has not been introduced?

THE COURT: At this time the evidence does not disclose any right whatever to take that water into their pipe. They have introduced no evidence on that subject. They have shown they took it in, that doesn't give them any right to it at all.

MR. JACOB EVANS: I shall not press it.

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5:10 P.M., Recess to 9:30 A.M., June 20, 1916.  
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GOERGE C. SWAN - - - - -

RE-CROSS CROSS EXAMINATION By Mr. Ray.

Q Mr. Swan, do you remember what acreage the commissioner distributed water to Provo City for last year, what acreage was claimed by Provo City to the commissioner?

A The acreage last year I think was on the basis of 3595 acres including some land outside of the city which was on the schedule before, but which received their water through the canal --

Q Did that include the city lots?

A That, I think, included the city lots.

Q You have checked with Mr. Stewart and instead of having an

acreage of 3595 acres irrigable under the city you had an acreage of 2058 for the farm acreage and 701 for the <sup>city</sup> lot acreage, did you not?

MR. THOMAS: Just a moment. It was Mr. Goddard who checked with Mr. Stewart.

Q Asking the witness if he did check those is all.

A No, I didn't check with Mr. Stewart, but in figuring that acreage each city lot was counted as an acre of land.

Q About .45 of an acre, isn't it?

A It is 72 square rods, yes sir. I don't know whether the commissioner distributed it on that basis or not, but that is --

MR. A. G. HATCH: If the court please, I would like to get the answer in regard to the city lots. I didn't quite understand it.

(Answer read)

MR. THOMAS: May it please the court, I suggest the better evidence ~~made~~ may be had from the commissioner and water masters. I have no desire to check the examination at all.

Q 72 square rods is less than half an acre?

A Yes sir.

Q Now, assuming that the stipulation as to acreage here accurately states your acreage instead of having 3595 you had something in the neighborhood of twenty-seven hundred acres, did you not?

A Now, this acreage --

Q Just answer that and then we will explain it.

A On the schedule, yes sir.

Q In the distribution you were charged with eight and two thirds second feet of water through the pipe system?

A Eight and one-third.

Q Eight and one-third. As a matter of fact, you had as high as

twelve, did you not?

A. Yes sir.

Q How many of your lots are watered entirely as to lawns from artesian wells?

A I could not state.

Q A great many, aren't there, Mr. Swan?

A No, I wouldn't say a great many, there are some.

Q A hundred?

A No, I don't think there are a hundred.

Q You have never figured it?

A I have never figured it, no, but there are in the neighborhood of three hundred wells in the city, some of which are practically ceased to flow and not providing a sufficient amount to give them a sufficient sprinkling pressure, and great many of them are in districts toward the outside of the city, and take it inside of the city I don't think there would be a hundred of them that use the flowing wells to sprinkle their lawns entirely. There are some of them who use their flowing wells for a portion of their lawn and draw water from the city water system for another portion.

Q Now, to that extent, Mr. Swan, you have three water rights for every lot found in that territory, do you not, you have an irrigation water right which you have charged in the 701 acres the lawn water rights which you have figured in your 150,000 square rods of lawn and your artesian water right to the extent that it covers the same area?

A I would say no.

Q Well now, why?

A In figuring the irrigation water on these lots the use from the whole system has been taken into consideration and the method of distribution in the city and while the lots are timed yet if a man fails to use the water others who are short of water or who have not had sufficient will catch that turn and use it and we find a great many of those throughout the city.

Q Well now --

- A The method of distributing this water in small streams is subject to so many complications it is not to be compared with the irrigation of large tracts, farms on the outside. You cannot distribute and make the water do duty as you would in distributing it on the acreage outside.
- Q That, however, does not approach an answer to my question. Mr. Swan, you issue tickets, do you not for a full lot?
- A Yes sir.
- Q And he has the right to the use of his pro rata of the water for the irrigation of that lot?
- A Yes.
- Q If he has a lawn on it he also has the right to sprinkle it notwithstanding his ticket to irrigate it, hasn't he?
- A Yes.
- Q If he has a flowing well on it he has the right to irrigate it from the irrigation ditch under his ticket, to sprinkle it from his hose and irrigate it from his artesian well, hasn't he?
- A. Yes.
- Q You said in answer to one of counsel yesterday that you figured a loss of 25 per cent in your system here?
- A Yes sir.
- Q As an engineer, do you think that an economic use of water within the city?
- A Comparing it with the average American city I think it is less than the average of American cities.
- Q You think the average American city is higher than that?
- A Yes sir.
- Q Do you know what Provo City actually is?
- A I don't know what it actually is.
- Q Don't know whether it approaches the maximum or minimum loss in that respect?
- A I would say that is is a very heavy loss, but I have not figured it, up to the average.
- Q Would you say that because this water system is particularly

an inefficient system?

A Because we have a wood pipe line. After putting it in we have found causing us a great deal of difficulty and great deal of expense, and it has not held up and there is considerable loss in that.

Q Now, Mr. Swan, you seem to have investigated or estimated loss of other cities, do you know what the requirements as laid down by engineers is for cities?

A I could give you what some of the authorities state with regard to the loss of other cities that have investigated it.

Q And you say this is less than the average?

A This is considerable less than the average.

Q And still those other cities with a greater loss than Provo City has an average supply, their entire municipal needs on three or four hundred gallons per capita for twenty-four hours, do they not?

A Because of the difference in other conditions they do.

Q I asked you if they do?

A They do.

Q Your estimate here is 961 gallons per capita per day for Provo City, is it not?

A Probably, I haven't figured it.

Q On a basis of ten thousand?

A I haven't figured it on the per capita basis for the whole quantity.

Q And with a less proportion of loss in distribution than the average American city?           A. Yes.

Q The average American city is considerably less than three hundred gallons per day per capita for all its municipal uses, is it not?

A In the larger cities, yes.

Q In addition to the artesian wells, the sprinkling and the water distributed for irrigation, there is some land lying west of

the Factory Race that is irrigated from the Factory Race, is there not?           A. Yes sir.

Q How many acres?

A I don't know, the tabulation is checked up there, will give it to you.

Q Substantially give it to me, I don't want it with any great accuracy?

A Why, there is about two hundred and nineteen lots, I forget the acreage under the Factory Race.

Q Mr. Swan, if you should have available for your use 2,110,000 gallons of water for fire reserve that was water except during the period of fire use, if all of your other uses were provided for to the maximum, would be wasted, wouldn't it?

A It might.

Q What use could it be put to if all your other uses were provided for as you have given in your tabulation?

A If overflowed in the eastern portion of the city it would be put on the lands up there which were outside of any irrigation system.

Q Yes, but I mean so far as the city necessities are concerned in the recapture of the water?

A All right except during the use for fire it would be loss.

Q Now, most cities, as a matter of fact, are required to provide for that pressure by some means whereby they can create a constant pressure with the same amount of water all the time -- that question may not be clear-- they take a quantity of water which creates a given pressure and without changing the body of that water they keep their pressure to constant, do they not?

A I would say no.

Q What about Salt Lake City?

A Sa't Lake City happens to be an exception.

Q What about all the cities throughout the United States that use stand pipes?

A Those cities the stand pipes are filled and as the water lowers in the stand pipes the pressure is decreased, and they have to keep that pressure up by filling the stand pipe as the water is drawn off.

Q Certainly, but they would have to do that in any city, <sup>would they</sup> when their pressure is in proportion to the amount of water at their head?

A In Salt Lake City the pressure is furnished because the tanks happen to be located up on the hill sides above the city and the water is up there and the pressure is lowered but very little -- the water surface is lowered but very little as the water is drawn off and the pressure remains practically constant as the water is drawn.

Q To the extent that the head of water remains constant?

A Yes.

Q Just as in a stand pipe?

A No, not just as in a stand pipe.

Q Well, I think that is a matter of physics that we can all work out. That is all.

CROSS EXAMINATION By Mr. Bagley.

Q Mr. Swan, do you know whether the lands of the First Ward Pasture were included in the area which was agreed on by the city and the reservoir company as the irrigable area?

MR. JACOB EVANS: I can answer that and say no.

THE WITNESS: I will say no.

Q You say you don't know?

A I would say no, they were not.

Q The First Ward Pasture then is not considered a part of the lands irrigated by the city system?

A It is not on the city schedule, it receives its water through the city canals, but is not a part of that acreage which has been included in this tabulation that has been submitted and agreed upon with the reservoir company.

Q Is it under the control of the city?

MR. A. C. HATCH: Just a moment, if the court please, I don't understand there is any agreement with the reservoir company as to this acreage.

MR. JACOB EVANS: He is talking about First Ward Pasture.

MR. A. C. HATCH: I know, but the answer of the witness, of course, it is not my question and I cannot move to strike out, but he interjects something in there that he was not asked about. At this time wish to --

THE COURT: You can move to strike it out if it is incompetent and immaterial regardless of whether it is your question or not.

MR. A. C. HATCH: I move to strike out that portion of his answer which says has been agreed upon by the plaintiff.

THE COURT: That may go out. That would not be competent evidence of the agreement.

MR. THOMAS: I take it Judge Hatch has reference to this statement in writing which was presented here a few days ago by plaintiff relative to the acreage agreed upon by plaintiff and Provo City.

MR. BAGLEY: That is what I had in mind and Mr. Stewart testifying they had come to an understanding as to the acreage.

MR. THOMAS: And Mr. Evans produced it.

MR. A. C. HATCH: It now appears to me, if the court please that Mr. Stewart has agreed with the city I knew nothing of it until the witness testified this morning 72 square rods is an acre, and has so listed it.

MR. RAY: Oh, no.

THE WITNESS: That is not so. There was no statement made by me to that effect.

MR. A. C. HATCH: Each city lot was counted an acre.

MR. RAY: He said last year.

THE COURT: That was when they arrived at 3595 acres.

MR. A. C. HATCH: I beg pardon, I understood this tabulation to so state.

THE COURT: No, the tabulation reduces it to approximately twentyseven hundred, had no reference to the estimate of 72 square rods to the acre.

MR. A. C. HATCH: The tabulation makes it some thirty-one hundred.

THE COURT: Whatever it was.

MR. JACOB EVANS: I would suggest this, if the court please, that the schedule as shown by Mr. Wentz's report instead of showing 3595 as distributed in reality, I think, shows 2192 acres and 24 second feet for municipal purposes in addition, but the acreage is shown as 3192 by all of his schedules as he reports the distribution to Provo City.

THE WITNESS: Now, that Mr. Evans speaks I recall that. It had escaped my mind.

THE COURT: Now, is this matter cleared up so Mr. Bagley may proceed with his cross examination?

MR. A. C. HATCH: I got the understanding from the witness that this tabulation 72 rods is counted an acre.

MR. RAY: No.

MR. A. C. HATCH: I guess I would have to investigate that further outside of the record.

THE COURT: Then you may proceed with your cross examination.

Q Does the city exercise any control over the water supplied to the First Ward Pasture?

A It does not, it delivers the water to them through its canals and they take the control of it and manage it themselves.

Q There is no maintenance charges or assessments levied against the Pasture Company?

A No, only that they are required to keep open the Factory Race and the ditches down below the city through their lands.

THE COURT: Let me ask, is the owner of this First Ward Pasture parties to this suit making an independent claim for water?

MR. JACOB EVANS: Yes.

MR. BAGLEY: Yes, this is the first time they have ever been made parties.

THE COURT: Reason I asked is whether their ~~an~~ claim for water is separate and independent of the city.

MR. COLEMAN: Yes.

THE WITNESS: It is now being made independent.

CROSS EXAMINATION by Mr. Thurman.

Q I would like to ask one question, Mr. Swan, have you any judgment as to what proportion of the city lots, that is in area, actually are irrigated as ~~countra~~ distinguish-ed from the portion that is occupied by houses, corrals and barns?

A No, that is something that is constantly changing, and it would be almost impossible ~~taf~~ for us to keep track of it and I could not tell you what the proportion is now nor what it was last year or what it will be next year.

Q I didn't suppose you could give anything like an accurate estimate, but I thought from your familiarity with the town generally, you might approximate as to the percentage of area that is actually irrigated.

A No, I could not, the conditions are so varied all over the town. In the center of town here there may be only small portions of some of the lots that are irrigated, while, as you go farther out there may be a whole block that will be irrigated, every lot on a block, and there is all the conditions in between. I could not form an estimate as to the quantity. There are some of these lots which are not on the schedule and not included in

this tabulation because they have not received water and they have not paid water taxes and irrigation water is not figured for them.

Q Well, I will ask you one further question. Take the tier of blocks running north and south between Fifth and Sixth West, you are acquainted with that?

A Between Fifth and Sixth West, I am acquainted with a part of it, that is, I am acquainted with the territory, but I have not examined all of the lots to see. You cannot tell from the outside of from the street what the condition is in the lot.

Q You would not be willing to venture an approximation of the percentage of that area that is irrigated?

A No, I could not say what it is.

Q Would you be willing to say whether there is half of it irrigated, half of the city lots area?

A I would say there was more than half, but I could not state.

RECROSS EXAMINATION by Mr. A. C. Hatch.

Q In your report of the acreage under the city system in 1914, you report to the commissioner 3181.23 acres?

A That was lots and acres counting each lot the equivalent of an acre as stated in that report.

Q The actual acreage then is 3192 acres, is it. Now, that does not include the streets -- 2760, the streets making a total of 3192.

MR. RAY: The streets are included in the sprinkling of

THE WITNESS: In the estimate for the quantity for the lots, the streets and water used to irrigate trees on the streets are all taken into that consideration and that is part of the quantity. That is part of the reason that the quantity figured to the lots there was or the quantity required by the lots is figured as being equivalent to an acre of land in the quantity of water that it requires.

Q That is by reason of the streets?

A By reason of the irrigation of shade trees and difficulties of distribution and the natural losses incident to these --

Q How many acres of the streets are actually irrigated from the irrigation ditches?

A There are shade trees --

Q Just a moment, Mr. Swan. Please read my question, if you can answer it, answer it, if you can't don't try to answer it.

Q (Question read)

A I could not say unless I can state it as I started in to state it.

MR. THOMAS: Finish your statement that you started in.

THE COURT: No, that would not be an answer at all, and Judge Hatch is entitled to have a responsive answer.

Q Have you been about the city any during the past two weeks, since this trial has been on?

A Yes sir.

Q You find ponds on the streets all over the city, don't you, practically all over the city?

A I find places where the culverts have choked up and the water has overflowed temporarily.

Q Is that a usual condition within the city during the irrigation season?

A That is liable to occur in the spring of the year when the water is first put in the ditches, and brings down the trash that has been -- got swept into the ditches in various way by floods and other things thrown in by careless people, carried down by the streams from above, from outside of the city.

Q Been irrigating for a month now, haven't you?

A Yes, the water has been in for a month now.

Q About time that that condition ceased then?

A Well, you will get those conditions more or less all season, but you get your worst right along during the first month or

so.

Q Then it is, as a matter of fact, that the supply of water heretofore as now had by the city is sufficient that they can waste it by filling the culverts and flooding the streets all over the city, isn't it? A No.

Q All right, that is all.

REDIRECT EXAMINATION by Mr. Thomas.

Q I want to direct your attention, Mr. Swan, to the estimate you made with reference to municipal uses. I will ask you if from your investigation you have found that the average American city has a State Mental Hospital in it which makes a demand of approximately two hundred thousand gallons per day?

A No sir.

Q Can you state from your investigation if the average American city has as arid an atmosphere as Provo City?

A It has not.

Q Isn't it true the average American city has a much heavier rain fall than Provo City enjoys?

A It has.

Q And from such precipitation the lawns are often entirely supplied, isn't that true?

A That is true.

Q And that in the average American city it does not become -- that is, the use of water for irrigating the lawns does not become a necessary factor in making estimates for people?

A That is true.

Q And if we had the same condition here it would make the demands upon the municipality that much less, would it not be true?

A It would.

Q And that would be a very material decrease in the demand upon the water system?

A Decrease in the quantity that has been supplied for that purpose.

Q You spoke yesterday in your cross examination as to the overflow of the water from the system. When did that overflow occur?

A That occurred during the early part of the year or late in the fall, in the winter.

Q You may state if at that time there were heavy demands upon the municipality with reference to irrigation?

A There were not.

Q It was after or without the irrigation season, was it not?

A Yes sir.

Q So that such overflow came at a time when no other irrigating company had use or demand for the water, isn't that true?

MR. A. C. HATCH: Just a moment, I object to the question because the attorney is making a record and the witness is verifying it.

THE COURT Yes, all of these questions are particularly leading, in other words, the question contains the evidence.

MR. THOMAS: I will reframe the question.

Q You were asked something yesterday as to the waste of water or the use of water in the city, what do you say Mr. Swan, as to the waste that might be deemed a necessary waste which occurs through changes or loss of time in making transfers?

A Well, the time allotted to a small tract of land is a short time, and in making a transfer from one user to another a material portion of that time is consumed in each change so so that the time is shortened up. In some places in order to raise the water on to the land it is necessary to bank the ditches up for considerable length before the water can be raised on to that land and it takes a portion of the time that is allotted to that person to fill up that ditch before he can get the water on to his land, and the time lost in making the distribution and then the difficulty of using the water in

small streams conveying it in small streams over these gravelly soils which must be done in irrigating these small tracts, makes the loss very much heavier than it is on the acreage where the water can be conducted in large streams and spread over large areas and controlled as it cannot be on smaller tracts.

Q Are you familiar, Mr. Swan, with the custom, if there be a custom of interchanging or exchanging of water certificates by the water users in Provo City.

A I know that that is frequently done.

Q What do you say as to its necessity?

A It is absolutely necessary in a great many cases where a person has all their lot under irrigation it is absolutely necessary that they either do that or catch the turn of parties who are assigned water and don't use it.

Q Just explain that custom. I have not asked you what the custom was, just explain the custom what it is and how it is done?

A It is the custom of some parties to -- if they are irrigating a lot and have a neighbor who is not irrigating to take the ticket of their neighbor who is not using the water and apply it in conjunction with their own time upon their lot and thus supplement the supply that is allotted to them. That is the custom of exchanging time.

Q Now, I will direct your attention to this fire ~~six~~ fighting reserve, I don't know whether I asked you on direct examination, Mr. Swan, upon ~~which~~ what you base that estimate, on what facts, on what estimation you based it, if I did ask it, I will not renew the question.

A You did not that I remember of.

THE COURT: I don't think you did.

Q Upon what investigation did you base your estimate?

A Well, the American Civil Engineer's Pocket Book is one of the authorities, the editor in chief is Mansfield Merriman, and considered an authority on engineering work. His statement is as

follows:

MR. JACOB EVANS: Wait, we object to his reading from this book.

THE COURT: Objection sustained.

Q You may state not what he says, but <sup>what</sup> your judgment is, Mr. Swan, based upon your knowledge and upon your investigation?

THE COURT He has stated his judgment in his former evidence -- two million -- I have forgotten the amount.

Q What do you say is the necessary pressure for fire purposes?

A The standard fire fighting pressure is the pressure which will deliver through an inch and an eighth smooth bore nozzle, a standard two and a half inch hose, two hundred feet in length, two hundred and fifty gallons per minute, with a pressure at the tip of forty-five pounds. This pressure would be about seventy-seven pounds at the pipe.

Q Was it upon these estimates that you base your general estimate as to the fire fighting reserve that you have heretofore testified to?

A I counted on that, and made calculations with regard to it.

Q Under the demands, or under the present system where the average flow would not exceed seven to eight cubic feet in to the system and with the uses that are ordinarily made and demands ordinarily made upon the system, could you maintain, or could you furnish water to meet an ordinary conflagration without maintaining the reserve which you have estimated as necessary?

A. No sir.

THE COURT: I don't understand that at all. I think you may examine further if you can and explain it. I don't understand how it is expected to use this water. Just let it run away all the time, that fifteen million gallons a month that is provided for, or more. I don't know how he expects to maintain this pressure without the use of the water without a stand pipe or reservoir to hold it.

MR. RAY: Your honor, it is fifty million gallons a month.

THE COURT: Yes, sixty million gallons a month, I don't suppose that it is contended there is a fire every day. Fires are rare. I would like to understand what this plan contemplates with reference to the disposition of this sixty million gallons per month, whether that is to run continuously, what is to be done with it, where it is put.

Q Let me ask you one question before you take up that phase of it. Do you know whether or not Provo City has purchased a reservoir site?

A It has.

Q And state what is the purpose of that reservoir site?

A The purpose is to erect a reservoir there which will hold a supply of water and will assist in the distribution of the water throughout the twenty-four hours and will give a quantity of water which will be always in reserve.

Q State until then what in your judgment will be necessary to maintain a fighting reserve, and how that fire fighting reserve can be maintained until the reservoir is built?

A The condition of the present system is such that the pressure when the pipe is full is one hundred and fifteen to one hundred and twenty pounds before overflow occurs. Under existing conditions through the short period we are unable to raise the pressure up to that. In other words, the pipe is not filled up to the top during the day time, the pressure is drawn down until if a fire broke out during the latter part of the day at any time we would not have sufficient pressure to deliver a fire stream without hooking on an engine and taking it out of the irrigating ditches or some place of that kind.

Q Has that been a necessity heretofore? to take the water out of the irrigating ditches?

A It has.

Q To meet the --

A It is the custom in all cities whether there is a stand pipe or whatever may be their system to provide for a flow which can be taken into the system whenever a fire breaks out and will be always at hand to supply the quantity of water that is needed, and the rule which is adopted for that for calculating that reserve is that if the population expressed in thousandths, if you extract the square root of the population expressed in thousandths the result is the fire supply that should be provided expressed in millions of gallons. In other words, if your population is nine thousand, the square root of nine would be three and three million gallons is the quantity of water that should be supplied daily for fire purposes. That is the rule for American cities, and while it is not necessary to provide what the maximum use on the system or maximum draught on the system should be in force at the time that that quantity is taken, yet it should provide for a heavy draught on the system without cutting down the supply for fire fighting purposes. That is the rule for American cities. Now, in consideration ~~of~~ of the conditions which exist in this town and the light fire losses that have occurred, I have cut that down. The result, following that rule, would be 3,162,000 gallons per day approximately. I have cut that down to 2,100,000 gallons as given in the statement expecting to draw some from the discontinuance of other ~~uses~~ uses and reducing the quantity to some extent. However, sufficient supply should be provided so that that will be available when it is needed because you cannot wait when a fire breaks out to raise the pressure up in your system to get it up where it should be, and you cannot wait for everyone to turn off their supply in order to provide it. Your loss on any building would be an entire loss if you waited for that to take place. At the present time not having enough water to supply those needs or to fill that

pipe we have been building a reservoir on the tract which has been purchased for that purpose at the overflow, and as fast as the city has been able they have extending their collection system taking in more springs, and trying to get the water in their mains to provide for this. As quick as that can be done then the reservoir will be built. As soon as the city is able to provide for it, but until we have water enough so that we can, so that there is an ~~an~~ overflow there, there is no necessity for the reservoir because we could not fill it at any time with the supply we have now. The water does not keep the pipe leading into the city full, to say nothing of filling the reservoir, and the night supply when the draught is not heavy does not fill that up to the overflow, does not fill the length of the pipe line. I don't know whether that explains it or not.

Q I want to direct your attention now to the sewer uses. In answer to Mr. Evans yesterday you said, as I understood you, the sewers had not been flushed satisfactorily. How frequently have the sewers been flushed?

A The flushing of sewers has been intermittent. We have tried to get over them at least once a year and have had to take some chances with them and aside from making a thorough flushing a year once, as I have stated here should be done every three months.

Q What is the result --

A We have taken chances and let them go.

Q What is the result, or what is the effect and result where the sewers are not flushed at least every three months?

A Some of them become clogged and fill up and back the water up into the premises. An illustration last week since this case commenced, we had on one street here a complaint from some one that the sewer, the sewerage was backing up into his house and we sent men out and they found the sludge collected in the man-hole until it would support a man's weight on it, and

they had to break that up and use bars. This sludge and accumulation collects in the pipes and chokes them up, and then the ~~sixy~~ ~~xxxx~~ system has to be dragged and flushed until that is carried off and unless it is flushed at regular periods that condition is liable to occur as it has occurred, that is on account of not being able to provide for the proper flushing.

Q What has been the effect of the digging of the sewer trenches with reference to the draining of the lands?

A The effect has not been to change conditions materially except in local -- at local points in some particular instances. The system as a whole has not been -- it has not had the effect of changing the conditions which existed before to any material extent.

Q Explain the difference between the sewer ~~xxxxxx~~ drainage and the ordinary trench drainage?

A Well, the difference is more in the pipe line that is laid than in the drainage.

Q Explain?

A In the drain trench the pipe is laid with the intention of taking the water into the pipe line and it is made with open joints or with porous pipe which will take the water into the pipe from the outside. The sewer is intended not to take the water in from the outside but to keep the sewage which is in the pipe from going out, and on that account it is made with tight joints and with a glazed pipe which is not porous and is made as tight as it can be under all practical conditions. In fact we tried to get it absolutely tight, and unless some accident occurs or some deficiency, it is absolutely tight, and does not take in the water from the outside nor allow the sewage to work ~~for~~ from the inside out.

Q Have you made any investigation at the outlet of the sewerage system to determine the amount of water that goes out by reason draining, that is, water that would come from around the pipe

and not through it?

A I have frequently been at the outlet and examined conditions around there and I have never yet seen any water following that pipe or coming out around the outside of that pipe.

Q Is the sewer trenches were and the sewerage pipes were effective as drainage what would you say would be the condition at the outlet with reference to the amount of water discharged through and around the pipe?

A If the pipes were defective they might take in or would take in some water from the outside unless the sewers were over filled, in which case the water would work from the pipe out. If the water were following the pipe down through the trenches the full length of those trenches and the trenches were acting as conductors it would come out at the end of the pipe and around the outside.

Q Mr. Swan, have you made any calculation to determine the amount of water in gallons that is consumed or used in Provo City under the minimum inflow into the pipes?

A Yes sir.

Q Give us the result of your investigation?

A I made calculations to determine the amount that the flow would be decreased during the minimum. It would be decreased from the maximum supply 4,775,245 gallons a day.

THE COURT: When you refer to the maximum supply you refer to twelve and a half second feet?

A I refer to the difference in the demand between the time when the street sprinkling, lawn sprinkling and such other uses are on and the time when those uses are not on.

Q Now, as to the artesian wells, how many did you say were, to the best of your knowledge, existing in the city?

A In the neighborhood of three hundred.

Q In Provo City?

A Yes sir, Provo City and vicinity.

Q Do we understand by that there is an artesian well to every lot where there is a lawn?

A No, these lawns that are given here do not include all the lawns in the city. They only include those lawns which are drawing water from the water works system for the irrigation of those lawns. Where the lawns are irrigated from the artesian wells the lawns are not charged against them, and are not included in this total for lawns.

Q I wish you would reduce to acres the square yards of lawn which you have estimated here?

MR. RAY: Thirty-two and a fraction.

MR. THOMAS: If it requires a calculation I will stipulate it is thirty-two.

MR. JACOB EVANS: Thirty-two acres of lawn?

MR. THOMAS: That is what it amounts to, if there is no objection to that.

MR. A. L. BOOTH: That is very close.

Q Let me aid you here, the number of yards that you have given here as square yards of lawn reduced to acreage would be a little over thirty-two acres, would it not?

A Somewhere in that neighborhood, I haven't made the calculation.

MR. JACOB EVANS: That is lawns irrigated from the city water works, is it?

MR. THOMAS: That is described as being the number of square yards in his estimate.

MR. A. L. BOOTH: I understood him to say it was that amount they got paid for.

MR. THOMAS: No, he didn't say anything about that.

MR. A. L. BOOTH: Didn't you say you got so much a square yard?

MR. THOMAS: I was asking him his estimate.

MR. THURMAN: Is that irrigated from the water works?

MR. THOMAS: Yes.

MR. JACOB EVANS: He doesn't say so.

Q You may state if you know what control Provo City has over the artesian wells?

A The only control that Provo City has over the artesian wells is to prevent them from flowing into the ditches and causing flood conditions in the ditches. They have no control over the wells within the property of the individual.

MR. THOMAS: I asked Mr. Swan to prepare a statement showing his measurements in 1912 and 1913 and 1914, measurements which he had made of the water flowing into the city. He has not been able to tabulate that and rather than take up the time, I will ask leave to furnish you with the statement and you can cross examine subsequently if you desire. I will ask leave to have that introduced in the record.

Q Mr. Swan, you have made measurements of the water which has gone into the Provo System?

A Yes sir.

Q And you made measurements during the year 1912?

A Yes sir.

Q 1913? A. Yes sir.

Q 1914? A. Yes sir.

MR. JACOB EVANS: 1915?

A 1915 I made some measurements.

Q I don't know but it would be better for the record to give those records which you now have, have you them with you?

A Just a moment, if I may make an explanation outside of the record. The measurements were sometimes made by the superintendent of water works when he was there.

Q Were you present those times?

A And they were brought to me for record. On some of those occasions I was not there.

Q Mr. Swan, then I will ask you please to furnish a statement and tabulation of the measurements which you made in 1912, 1913,

1914 and 1915 and indicate those which you have measured yourself and those which were measured by someone else?

A Of course, those were made by my predecessor in the early part.

MR. JACOB EVANS: I will suggest we have all the measurements that were made, if he has a record of them let the record be brought in, show what they actually were.

THE WITNESS: That was the intention.

THE COURT: That is what I understand what he was asking for.

MR. JACOB EVANS: I understood you to limit it to the measurements made by him alone.

MR. THOMAS: No, just the reverse, to indicate what he had measured and what had been made by someone else so as to aid in any cross examination that might occur. That is all.

RE-CROSS EXAMINATION by MR. Jacob Evans.

Q I want to clear up a question or two concerning the irrigation of these city lots, if I can.

MR. THOMAS: That has been gone over two or three times, your honor.

MR. JACOB EVANS: I would like to show the method of the irrigation of these lots in view of his testimony.

MR. THOMAS: Just a minute, I object to this, if the court please, not proper cross examination. I think the witness has not stated that he was familiar with the particular methods. In a general way he stated and on that he has been cross examined.

THE COURT: There is no question asked yet, I don't know what the question will be.

Q Mr. Swan, assuming that this line that you have drawn here to be one of the canals of Provo City, and that the city would be located below that canal there are laterals taken out at

different points along that canal running toward the city  
is there not? A. Yes sir.

Q Quite a number of them? A. Yes sir.

Q And those laterals run into ditches on most of the streets  
of the city where there is a ditch, runs on both sides of each  
street? A. Yes sir.

Q The trees that you speak of ~~is~~ <sup>are</sup> growing along those ditches  
on each side of the street, are they not?

A And also on the side of the street where the water is conducted  
across from those.

Q Where did you commence your irrigation from in taking of the  
turns of the water, at the bottom of the ditch or at the  
top of the ditch?

A Usually at the bottom of the ditch.

Q In other words, you put the water to the bottom of the ditch?

A Yes sir.

Q A man who is living on a city lot takes his turn as designated  
by the water master? A. Yes sir.

Q Then when his turn expires the man next to him takes his turn,  
does he not? A. Yes sir.

Q And then the man higher up takes his turn?

A Yes sir.

Q And so on clear on up to ~~th~~ where the lateral connects with the  
main canal?

A Yes sir.

Q Now, how far apart are these people from each other where  
they take their turn; some places not more than three rods  
apart, are they?

A In some cases they are not. Some cases they are considerable  
distances apart. Some places they may be on different blocks  
and take it through different sides ditches.

Q Where you have, we will say a block coming down this way, we  
will assume that is a ditch there, assume those are blocks and  
your ditch runs down below the sidewalk and is taken into each

man's lot, is that whole block irrigated from this ditch on this side?

A No, not --

Q Irrigates only half the block?

A The distribution is shown on the map there, which -- it will show which ditches different lots are taken from. The blocks are not always all irrigated from the one ditch and it depends on the lay of the country as to whether they will be irrigated from one ditch or two ditches.

Q The blocks are twenty-four rods square, are they not?

A Yes sir.

MR. THOMAS: May it please the court, I object to any further examination on this line, on the ground it has all been detailed in his cross examination.

MR. JACOB EVANS: If the court understands it I don't care to cross examine further.

MR. THOMAS: Let us assume the court does understand it without repetition.

THE COURT: I think I understand it fairly well in a general way how this is accomplished. I hardly see the great importance of all this. The principal question that the court wants to be determined is what water rights the city owns. My view is, I will say gentlemen, that the city is not only -- has the right to make some provisions for future uses, but it is the duty of the city to do that. If they have an ownership of the water and acquire a right to it, why it is not of as much importance to show they have a present necessity for it as it is the ordinary user of water because the court takes judicial notice and it is well settled by the cases, as I remember, that it is the duty of the city to make provision for the future to some extent, so that this matter of just what their present necessities are I don't think is of as much importance as it is for you to establish what water you own. That is the view I have of it, that your water rights, how you acquired

them and whether you have them is more important than just the question than whether you have a present necessity every ~~next~~ month in the year for the full quantity of water that you have the right to use. I merely suggest that in the interest of time, yet I don't want to influence you in curtailing your evidence to the extent of not making the record as complete as you desire because it is possible, of course, a case such as this might be reviewed, and if it was all parties ought to have their record as complete as they desire it, notwithstanding this court might be satisfied on this particular proposition. I make these suggestions as to the view the court has as to what is important for you to show. The most important is what water you have had got rather than what water you need, because you may need a great deal more than you have, and the fact you need it would not justify the court in giving you any more of course than you own, but I am inclined to think that the city where it is shown a city of the size of Provo City, growing city, situated as it is, that it is not limited to the quantity of water that it has a necessity for today. That is, in other words, it would not hold that it had no beneficial use for a reasonable excess of water above that because of the fact it is not only the right of the city but it is the ~~city~~ duty of the city to make provision for a reasonable margin for future, but the important question in this case is what water you have.

MR THOMAS: We own.

THE COURT: You own and how you get it. I think, in other words, I am of the opinion you have shown a necessity and beneficial use for the quantity of water that you are claiming. Now, if you own that water, if you have that water and have the right to it, I am inclined to think by proving that fact you have made a prima facie case. I will listen to any suggestion you have along that line.

MR. JACOB EVANS: That is just the very question

whether or not the city owned this water within their pipe line or whether the owned the entire water and I think that is the whole meat of the coconut.

THE COURT: I think so, and the count intends to give you all the time necessary in introducing evidence that will throw any light on that proposition rather than the detailed evidence as to the necessity ~~every~~ from day to day of the use of this water. If you own it, if the city has the right to it, why, that is a question the court wants to have made clear.

MR. A. C. HATCH: If the court please, in view of what the court has said, and that we may have a better understanding of the meaning of it, I suggest that our idea has been that the city is the owner in its own right, owner of such water as it uses through its pipe line, that the city has never acquired any right to any right to any irrigation water in any way, simply as a trustee for the benefit of the real owners or appropriators of that water, and if that be the court's view we are agreed.

THE COURT: I want to correct the impression you may have upon that subject, the court did not intend to express any views upon that subject whatever, ~~was~~ that is, whether the city was the owner of any water, or to what extent it was the owner of water. I merely suggested that was the important question for the court to determine, what water the city was the owner of, rather than the question of the necessity for the use of that water today. Now, whether the city is the owner of the water that is used by the inhabitants of the city for irrigation or not I did not intend to express any views whatever at this time. I have no views yet because --

MR. A. HATCH: As to the pipe line interests the water it has taken into its pipe line and actually used, <sup>except</sup> in the one case where we say it is wrongfully taken, water that belonged

to us, we don't question. What we are questioning here is the irrigation rights to the city, and our position is that the city cannot for irrigation purposes acquire any right other than as any individual would acquire it. It must be by appropriation and beneficial use for irrigation purposes. For strictly municipal purposes comes under a wholly different head. Then the water they have appropriated and used, providing the pipe line system for future use, I think we can fully agree. The question as to the irrigation rights we place upon the same footing as the farmer or anyone else, as far as the city is concerned. I understood from the court by its statement to cover all, is the reason I spoke, whether or not the court's view would ~~cover~~ cover the irrigation as well as the purely municipal purposes.

THE COURT: I did not intend to indicate any views on that subject. Of course, it is a question that the court wants to hear the parties on when the case is submitted.

MR THURMAN: Will the court permit me a moment.

THE COURT: Just a moment, I was going to say it is possible of course the city may have a valid appropriation of water for municipal purposes and for years permit it to be used for irrigation purpose by parties. On the other hand it may be equally as possible or probable that the irrigation rights have been acquired and vested in the individuals and not in the city. These are questions, I take it, that some evidence must be introduced upon, how the appropriations were made and how they have been during the years since they were made, used and maintained, in order <sup>that</sup> the court may determine whether they were for municipal purposes originally and whether the city has the right now to take the water that is used for irrigation and put it in its pipe line even over the objection of the persons who are using it for irrigation. These are questions the court has not sufficient evidence upon now to

have any opinion on, and consequently I would say in response to the the suggestion of Judge Hatch that the court did not intend to express any opinion of course upon what the situation was with reference to this water that is used for irrigation. Now, Judge Thurman.

MR. THURMAN: The court has very largely to a great extent answered the question that was my my mind. The court said the vital question is here is what the city owns, leaving us a little in the air on that question, for after all what the city owns depends upon what it has appropriated, assuming that it has been a matter of appropriation rather than a matter of purchase. Now, that brings up the question as to whether there is a difference between a city appropriation and an appropriation by an individual, and I am inclined to think, in fact, it is reasonable and I have so understood it, that water for strictly municipal purposes for a growing city may stand upon somewhat different ground than water for agricultural purposes or garden, because in the very nature of the case it would be impossible to establish a city without providing to some extent for the future, and I say as regard what the city has taken in its water works system as bearing with considerable weight on that question; put in a sytem which is not used to its maximum capacity at the present time, indicate an intention on the part of the city to eventually when necessary, appropriate to the maximum capacity. Undoubtedly it would have the right to do that, but we have a peculiar condition here different from cities elsewhere. Here the city, without ownership of the water, assumes and is acquiesced in by the owners of the water to control it for purposes other than municipal, so I have no doubt in my mind at the present time from my present opinion but what Judge Hatch's position upon that is absolutely right. That those people for whom the city controls water must establish their right or the city must establish it for them

in this case as trustee or something in the nature of a trustee, just in the same way that John Doe who makes his homestead out on the desert must establish his right to the use of water, beneficial use, the amount necessary being the test of his right; because to go farther than that, if we can say for city lots the city can use a quantity vastly more than necessary with a view in the future of extending it to future city lots no more reason for saying that in that regard than there is to say the farmers under the East Union ditch may taken an extragagant quantity of water with a view to further extension.

THE COURT: There is no question of that.

MR. THURMAN: All the area of these farms; so that as far as the water works system is concerned I can see the force of your honor's suggestion.

MR. RAY: Your honor indulge me just a moment. I don't want to repeat and still I want, if I can, to explain my attitude in this respect to the court. I think it was in the condemnation suit by Salt Lake City against the East Jordan Company recently tried in which our Supreme Court passed upon the question of the necessities of cities and indicated rather a liberality as to the quantity, <sup>which</sup> would be granted cities, but I don't understand that could extend further than a liberality under the provision of the Constitution and as to a beneficial use. Now, in the condition as to a municipal use, there are a great many constants, irrespective of the size of the area city. Areas of lots are constant, ~~now~~ fire protection is a constant and good many of those things are, and out contention will be that the city must show a reasonable necessity in view first of its present condition and the reasonable possibility of meeting the future conditions. In this respect the amount it has used as suggested ~~by~~ by your honor has material bearing, but I don't understand that they could acquire the right to a

present waste of water which would be characterized as an outright waste to insure a future necessity. I think the law has contemplated just such a situation as that in granting to cities the power of eminent domain to meet their future necessities, and then in the interim whether the water is more valuable to the city for municipal uses or to the man who has acquired a right for another use that is a question whether or not they desire to exercise that right. Now, this becomes quite material to me, their past use, as it seems to have been suggested by the court, but I cannot see the materiality of the ownership of the water here for all practical purposes. It seems to me the city is the owner of such water as can be devoted to municipal uses within its limits and I think the decisions of the Supreme Court are very clear upon that in the Holeman case, Springville case and Bountiful case.

THE COURT: I think especially so in the Bountiful case, as I remember, but I did not mean when I suggested the important matter was the ownership, I didn't have in mind when I made that expression the question as to whether the city owned or the other person, but I meant as between the city -- and when I speak of the city I mean all of those uses in the city here through whom this right is claimed as against all of the other claimants -- as to what this ownership was, how much water was owned and where they got it, what the appropriation was; and of course there is a decree pled and decree has been introduced in evidence which defines the right to the city, and as between the parties to that litigation I take it that decree would be binding, but there are parties possibly who were not parties to the litigation and if there are evidence would be necessary to support this claim of some appropriation or long continued use. That was what I had reference to

rather than the question which you have suggested or which Judge Hatch and Judge Thurman suggested as to whether the city owned it or whether the irrigators owned the water. I didn't have that question in mind when I made the suggestion.

MR. THOMAS: May it please the court if I may just add a word. It seems the suggestion of the court has thrown a bomb shell into the camps of the plaintiff. Now, for their peace of mind let me say we expect to try this case along reasonably rapid lines and do expect to show considerable use and appropriation of water. We appreciate the fact if we have not a right to the corpus or usufruct that we must step out of court with empty hands. That is patent. We, however, differ with our brethren very materially as to how much water we have the right to ask for, having in mind the very thing the court has suggested, a reasonable appropriation for future use, that being a duty incumbent upon the city. We don't think we have a right to maintain any wicked or vicious wastings and hold them as against all beneficial uses. Neither do we say, neither will we admit we have had had those vicious uses. It is true, as Judge Thurman has said we have a peculiar condition here, but that condition is not any more peculiar than has existed in any other Utah community, and there are duties incumbent upon a city which the city in the past fifty years has got to live up to, and obligations which it has reasonably well met, and it is those obligations which are just as patent and binding today as they were fifty years ago when the appropriators in Fort Field made the first appropriation and we hope to show the actual history of those appropriations and where they are and so I objected to the class of cross examination which my Brother Evans has insisted upon because they want us to account for every spoonful of water. Now, we will account for that water and we are going to follow the suggestion of the court. We believe unless we have some

right to it of course we will have to go out. We do hope, however, to show our right is paramount to the claims of plaintiff, and we have not been wicked and wasteful in our use of water. We will satisfy you now gentlemen, by telling you we are going to claim all the water which Provo City has been using and we have a better right to it, that it belongs to us, that it is a heritage that came down from our fathers, and we are going to keep it for our children's children. I trust on the matter of future use that is sufficiently plain.

MR. THURMAN: Going to let any outsiders in at all on this?

MR. THOMAS: Not on this.

THE COURT: I think it will be admitted you have not been wicked, but probably some will claim you have been wasteful.

MR. A. C. HATCH: Permit me just a word in reply. It has been the history of the Territory of Utah and of the State of Utah that every person who attempted to bring under cultivation any portion of the public domain has had to fight for the privilege of applying water upon it, and has always had to fight some city. The Timpanogoe Irrigation Company when it attempted to build some reservoirs up there at the head of the Provo River try to bring under cultivation the many thousands of acres of land under this system had to fight Salt Lake City, and all of the old canal companies in Salt Lake County, they claim Utah Lake was a reservoir and their reservoir and the Provo River was a feeder to that reservoir, and that they needed all the water that was stored in Utah Lake for city and other purposes and the same theory was advanced by Salt Lake City that is claimed by counsel for Provo City in this case, future uses of Salt Lake City, the future uses as claimed by them would have prevented the growth of the State of Utah.

MR. THOMAS: Not in the least.

MR. A. C. HATCH: I<sup>4</sup> any particular.

MR. THOMAS: That is untrue.

MR. A. C. HATCH: Now, in the beginning Salt Lake City would have claimed all of the waters of Utah Lake and would not permit anyone to pump a little, <sup>even</sup> for domestic purposes. Provo City has fought every person who has attempted to bring into cultivation any of the lands surrounding and outside of the city limits and formerly within the city limits when the city limits extended to Pleasant Grove and to the summit of the mountain on the east and south, to the limits of Springville City and west to the lake. At that time you could not in traveling from Salt Lake to St. George you could not get outside of some city limits, but the Timpanogos Bench people, the Provo Bench people, everyone of these canals has had the same kind of trouble with Provo City, in order to get some water out on to their lands that the plaintiff is now having, and the next one comes in will have the same fight with Provo City or Salt Lake City, who is claiming it for future uses of a population estimated at anywhere from a few hundred thousand to a half million.

MR. THOMAS: I assume that would be true if the attitude of all the plaintiffs would be like the present plaintiff.

MR. A. C. HATCH: And the bomb that was thrown into the camp of the plaintiff by the expression of the court failed to explode so as to do us any harm, and we expect to find Provo City and all others of these little municipal corporations, as such, contesting every proposed development of this state to the bitter end, but they are not going to be allowed to succeed. We built out reservoirs at the head of Provo River and now irrigating some six or seven thousand acres of

land. We are going to irrigate thirty thousand ~~ac~~ when the system is completed, and Provo City and its inhabitants will be no dryer than Heber is, which is a prohibition town, at the end.

MR. THOMAS: I just wanted to suggest if the bomb had not exploded the enemy are having an awful time to pull out the fuse.

THE COURT: I think the objection may be overruled.

MR. THOMAS: I will ask counsel if there will be any objection to the introduction of Bulletin No. 122 of the Department of Commerce, Bureau of Census, to show the population of Provo City.

MR. JACOB EVANS: Can't we agree what they show?

MR. THOMAS: If you can, yes. Will you agree what it was forty -five years ago?

MR. A. C. HATCH: If you will say what it is now and what it was when you made your appropriation.

MR. THOMAS: I will offer this in evidence.

MR. A. C. HATCH: Not the whole book.

MR. THOMAS: I will offer it all because we might want to use some of it. I now offer in evidence Exhibit 67 Bulletin 122 of the Department of Commerce, Bureau of the Census showing the estimates of population for 1910-11-12-13 and 14, on page 19.

MR. A. CHATCH: Just a moment.

MR. THOMAS: Let me present it first Judge, please. Page 19 under the subheading Utah, showing the population of Provo City as of 1910 and the estimated populations for the years up to and including 1914.

MR. A. C. HATCH: We have no objection to the offer of the bulletin showing what the population was when the census was taken, but we object to any estimates made by any person because it is not the best evidence. I will say my understanding is --

THE COURT: I will hear from Mr. Thomas on this objection, if he insists on the offer as to the estimate.

MR. THOMAS: I insist on the offer; we also hope to show by other means the population of Provo City. If we had the official state canvass that of course would be taken judicial notice of by the court. Now, we offer this as a government report based upon scientific estimates and facts which show an estimate of the population of Provo City for the year 1914.

THE COURT: I am inclined to think it is incompetent, Mr. Thomas, because I can hardly see how it would be of any value to the court at all.

MR. THOMAS: If that is the view of the court --

THE COURT: It is not in the performance of any duty imposed upon anyone by law to make an estimate of that kind, is it?

MR. THOMAS: No, it is not.

THE COURT: It is the opinion of some person who is not before the court for cross examination.

MR. THOMAS: That is true.

THE COURT: And I am inclined to think it is not under any rules of evidence admissible. The record of the census is admissible of course, that is one of the ~~the~~ Departmental papers and documents which is admissible under our statute, but the estimate of some person upon some matter that he is not required to make an estimate on. The other part is admitted and objection sustained as to the estimate.

MR. RAY: May I understand what part is admitted?

THE COURT: Population of Provo as shown by the census.

MR. THOMAS: The court takes cognizance of that?

THE COURT: I think not.

MR. THOMAS: The authorities so hold, but I can read it, it is right here. The official census as taken by the United States Government for 1910 is 8,983.

MR. JACOB EVANS: That is in the estimated, here is the true census column.

MR. THURMAN: The actual is 8,925 and the actual June 1, 1900 was 6,180. Let us have those to read into the record.

MR. THOMAS: There is no objection to that. Under date of June 1, 1900 the census was 6,185, and I note here the principal heading is estimated July 1st would cover the figure I gave so that it was not the official census which I read. The official census of June 1, 1900 was --

THE COURT: 1910.

MR. THOMAS: No, June 1, 1900, was 6,185 and April 15, 1910 was 8,925.

MR. A. L. BOOTH: If the court please, Judge Booth was called to Salt Lake City on the trial of a case and he expressed a wish to cross examine Mr. Swan. On his behalf I would like to ask for the right, for his right to cross examine when he can be here.

THE COURT: He may do so.

MR. THOMAS: Mr. Swan will be in attendance all the time.

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HENRY J. W. GODDARD, called by the defendant, Provo City, being duly sworn, testifies as follows:

DIRECT EXAMINATION by Mr. Corfman.

Q Your name, age and place of residence?

A Henry J. W. Goddard, age 58, residence Provo City.

Q How long have you resided in Provo City?

A Fifty-eight years.

Q All your life? A. Yes sir.

Q In what business have you been engaged during that time?

A Principally in farming.

Q Do you own land? A. Yes sir.

Q Within the corporate limits of Provo City?

A Yes sir.

Q For how many years have you owned lands within the corporate limits of Provo City?

A About thirty-five years.

Q Are you now connected with the city government of Provo City?

A Yes sir.

Q In what capacity?

A City commissioner.

Q How long have you been city commissioner?

A This is the fifth year.

Q Then you have been city commissioner for five years last past?

A Four years.

Q As city commissioner during the last four years, what especially have been your duties?

A I have charge, have had charge of the city's water supply and water works and sewerage.

Q And having charge of the city water works and sewers -- did you say irrigation as well?

A Yes sir.

Q And the irrigation, have you had occasion to familiarize yourself with the water used and controlled by Provo City?

A Yes sir.

Q Have you ever served Provo City in times past in any other capacity? A. Yes sir.

Q What?

A I was city councilman for two terms.

Q What years?

A 1896 to 1899 inclusive.

Q During your service as city councilman for 1896 to 1899, did

you have any special duty assigned to you as a councilman?

A Last term, between '98 and '99, I was a member of the irrigation committee of Provo City.

Q And what were the duties and work of that committee?

A Their duties was general supervision over the water supply and irrigation and water works .

Q Prior to that time had you ever served Provo City in any capacity?

A No sir, later I have.

Q Later? A. Yes sir.

Q When?

A In 1900 and 1903 inclusive.

Q What officer were you of the city at that time?

A I was city water master.

Q What were the duties of the city water master at that time?

A To distribute water that was turned to the city by the water commissioner to the inhabitants of Provo City and under the irrigation district.

Q And did you attend to those duties personally? during that term of office?

A I did.

Q Did you learn to know the irrigation or use of water for irrigation and other neneficial uses made at that time by the city?

A Yes sir.

Q And how long-- are you farming now?

A I have rented my farm.

Q You still own the farm?

A I still own it.

Q Does that farm use water for irrigation?

A Yes sir.

Q In what portion of the city or city limits is your farm located?

A South of Provo City portion of it.

Q How long since you discontinued to run your farm personally?

A Year 1911, 1912, I will say, when I was elected City Commissioner.

Q Will you point out on defendant's exhibit No. 58 the point where Provo City measured the water that is used and controlled by the city?

A The East Union measuring flume is located right opposite the Pressed Brick Company's pen stock. The Factory Race --

MR. JACOB EVANS: If the court please, I submit that was all gone into by the city engineer, and I see no necessity repeating it again unless they contend some error was made by the city engineer.

MR. COREMAN: Now, may it please the court, I am aware that the city engineer pointed out the several diversion canals and testified as to his knowledge as to how -- so far as it went -- as to how the water was diverted and used. I think the court will appreciate having shown by this witness the experience that he has had as a city officer and as a resident of this city in the use and control of that water, that he would be a valuable witness in aiding the court to determine how the water has been distributed and controlled. I am now asking him this question for the purpose of showing that this witness is thoroughly familiar, not only with the principal irrigation ditches but with the laterals to which so much attention has been directed as to how they have been managed, used and controlled, and I expect to follow it up by showing the manner in which the waters have been diverted through the system by this witness, and I think it is only proper and right at this time to show that he is thoroughly familiar with the principal canals and all the ramifications.

THE COURT: May it not be admitted?

MR. JACOB EVANS: We admit he is familiar with the canals and all the ramifications of them and knows this water system.

MR. CORFMAN : We have no desire to incumber the record further then.

Q Mr. Goddard, I will ask you concerning the amount of water that has been used by Provo City since the entering of the decree in this court commonly known and designated as the Morse decree, how has that water been distributed to the city?

A There is two questions there want me to answer the amount of water turned to the city or decreed to them?

Q No, just how it was distributed?

A How it was distributed?

Q How it was distributed?

A It was distributed by the city water master under his direction.

Q I asked you how it has been distributed to the city?

A By water commissioner appointed by the court.

Q For how many years prior to the commencement of this suit?

A Since the decree, it is fourteen years, we had a water commissioner that was selected by the canal companies before that and recommended to the court for appointment.

Q But since the entering of the decree it has always been distributed by the water commissioner?

A Yes sir.

Q Do you know whether or not that commissioner has attempted to and did distribute the water in accordance with that decree to Provo City?

MR. THURMAN: We object to that, calling for a conclusion of the witness.

MR. CORFMAN: Question whether he knows that has been done.

THE COURT: I think the objection should be sustained. That calls upon the witness to determine what constitutes a compliance with all the terms and provisions of the decree. You may ask what was done, what quantity of water has been distributed, and if there any question about it the court will

determine whether that was a compliance with the decree or not.

Q I will ask you whether or not since the entering of the Morse decree the water in during the several stages of the river has been turned by the water commissioners appointed by the court to Provo City in the quantities awarded the city under that decree?

MR. THURMAN: I object to that for the same reason.

THE COURT: Objection is sustained.

Q What water, Mr. Goddard since the entering of the Morse decree has been turned to Provo City?

A At the stage of the river between the eighteen thousand minute foot stage down to fifteen there was thirty-five one-hundredths of Provo River. Between the fifteen thousand and the twelve thousand foot stage there was thirty-eight and a fraction one hundredths of the river.

MR. RAY: Just a minute, between the fifteen and twelve, you say?

A Yes sir.

MR. JACOB EVANS: What was it between eighteen and fifteen?

A Thirty-eight and a fraction, nearly thirty nine.

MR. THURMAN: Is that for any particular year or every year.

A That was every year. And between the twelve and on down there was forty-one hundredths of the river.

MR. JACOB EVANS: What do you mean by twelve?

A Between the twelve thousand minute foot stage or below the twelve thousand minute foot stage there was forty-one hundredths.

THE COURT: Forty hundredths or forty-one hundredths?

A I am not certain about that, I think it was forty-one, either forty or forty-one.

Q And did that include the Cluff and Dixon water that was awarded by the decree?

A. Yes sir.

Q Were you as a city officer, did you ascertain whether or not the commissioner actually delivered that quantity of water to Provo City ? A. Yes sir.

MR. THURMAN: If the court please, the plaintiff and the defendants Timpanogos Irrigation Company, Wasatch Extension Company desires to reserve an exception to this evidence so far as they are concerned. We don't deny the competency of it for some purposes, but as far as we are concerned we are not bound by that decree.

THE COURT: I understand you object to it on behalf of those,

MR. THURMAN: Yes.

THE COURT: Objection is overruled.

MR. THURMAN: Note an exception.

Q After this water was delivered to Provo City in the manner in which you testified, you may state to the court how it was used and controlled by the city.

A The city water master distributed the water to the inhabitants of the city under the irrigation district of Provo City, and to the power companies as well.

Q Through what canals, principal canals?

A Through the East Union Canal, the Factory Race, City Race and Tanner Race.

Q And since the entering --

A Excuse me, I might explain a little there. The water commissioner measured the water in these canals and took the total under the flow of the river of all the canals.

Q Of all?

A So his measurement would be in each canal.

Q Did he fix the quantity of water that was to flow, determine the quantity of water that was to flow in each canal, or just measure the canal?

A Just measure the canal.

Q Who did take the quantity of water that was turned to each canal?

A City water master.

Q And by whom was it distributed to the inhabitants of Provo City?

A By the city water master and his deputies.

Q Now, speaking of the East Union Canal, how was it distributed in that canal?

A To his best judgment and knowledge, he was instructed by the committee on irrigation to use his judgment as to how he should distribute it, where the greatest needs were, and he always acted under that direction.

Q And as a city officer, did you have occasion and did you ascertain whether or not this water was beneficially used by the inhabitants taking water from the East Union Canal?

A Yes sir.

Q For what purposes was the water used?

A Agricultural, culinary and domestic purposes.

Q What kind of crops are raised upon the lands under the East Union Canal?

A Garden, sugar beets, grains, corn, potatoes, squash, all farming products.

Q And some for culinary and domestic?

A Yes sir.

Q The city lots also made use of some of that water?

A Yes sir.

Q And about how many city lots were ~~in~~ under that canal, have you prepared a schedule?           A. Yes sir.

Q How many lots were under the East Union Canal?

A There were seven hundred and ninety-one lots in the platted portion of Provo City, and two hundred farm lots, that is, people living out in the section outside of the platted portion

Q What do you mean by farm lot?

A A lot that their home and garden is situated upon. They wanted the right of raising garden where they lived, and had the privilege of using the water once a week instead of once in two weeks where they did under the acreage or crop system.

THE COURT: How many of these farm lots were there?

A Two hundred.

MR. A. C. HATCHER Just a moment there, please. The question asked was how many lots were irrigated under the East Union Canal. The answer is there was seven hundred ninety-one platted in the city and two hundred farm lots outside of the city plat. I understand that to mean that there are nine hundred ninety-one city lots irrigated from the East Union Canal?

A Yes sir, including the farm lots, nine hundred ninety-one.

Q And how many acres of farming land?

A Nine hundred fifty-six acres farming land.

Q Making a total of how many acres of land under this canal for irrigation?

A Including the lots?

Q Yes.

A In acreage 1402 acres.

THE COURT: How many?

A 1402.

MR. THURMAN: Just for information see if those lots are counted as acres.

Q How are these farm lots counted, so far as the area is concerned?

A Forty-five one hundredths of an acre.

Q Now, under the City Race above the power plant, how many farm acres are watered?

MR. RAY/ That is the Factory Race?

MR. COREMAN: No, that is the City Race.

A There are one hundred and eighty-five acres, three hundred forty-five city lots in the platted portion and forty lots farm lots in the section.

Q A total acreage under the City Race above the power plant would be how many?

A 358.2 acres total acreage above the power plant.

Q Now, what was watered from the city race below the power plant?

A There were 345 acres below and 43 city lots.

MR. THURMAN: Did you say below the power plant?

A Below the foundry.

Q Go on.

A And two farm lots in the section.

Q What is known as the Tanner Race --

MR. RAY: Did not ~~xxx~~ give us the total of that last.

A 365.2 acres.

Q Now, give the amount under the Tanner Race?

A There are 314 acres farm land, 239 city lots in the platted portion and 20 lots in the farm area. Total 430.5 acres.

Q Now, next you give the acreage and number of lots under the Factory Race above Provo Woolen Mills.

A 27 acres of farm land, eighty-six city lots and 20 farm lots in the section, total 74.7 acres.

Q Now, the lands below Provo Woolen mills.

A 98 acres of farm land, 55 city lots in the platter portion, 15 farm lots in the section, total 129.4 acres.

Q Now, will you give the same total irrigated ~~far~~ ~~a~~ from all of those canals in farm acres?

A In farm acres there are 1925 acres. City lots there are 1559 lots, equals 701.4 acres in the platted lots.

Q How many farm lots?

A Farm lots there are 297, which equals 133.6 acres.

Q What is the total acreage?

A Total 2760.1 acres.

Q What would be the total area outside the platted portion of the city?

A I haven't that here.

Q Right below that?

A It is a total of 1925 and 133.6.

Q Making 2,058.6 acres?

A 2,058.6.

MR. A. C. HATCH: Just a moment, doesn't that include the fifty-five lots in the computation above that 1925?

A Sir?

MR. A. C. HATCH: It appeared to me you are giving the same fifty-five platted lots twice in those.

MR. CORFMAN: No, that includes city lots and farm acres  
A Farm lots and acreage.

MR. A. C. HATCH: 1925 total acres includes fifty-five platted lots?

MR. CORFMAN: No, 1925 is the farm acreage then the lot acreage is 133.8.

Q Making a grand total of how many acres under these several canals?

A 2760.1.

Q Now, in your tabulation of the use of water you find the area irrigated by tail water from the power plant?

A Yes sir.

Q How many city lots are irrigated from the tail water from the city race?

A Total area in lots and acres irrigated below the tail race of the foundry, 364.2 acres -- no, the grand total would be 365.2.

MR. RAYP That was given to us before, was it not?

A I think not.

MR. A. L. BOOTH: That is a part of this acreage you have given, Mr. Goddard?

A Yes sir.

Q That land and those crops are irrigated after the water runs past the,--or through the wheels of the Provo Foundry Machine Company?  
A. Yes sir.

Q Now the Factory Race?

A The Factory Race --

Q What is the lot acreage that is watered after it leaves that race?

MR. JACOB EVANS: Object to that because it has already been stated.

MR. THURMAN: You have given us this once.

MR. CORFMAN: I think not in the same form.

MR. THURMAN: You gave us below the Factory and above the Factory separately. It is confusing our record a little.

Q Now, taking the Factory Race, besides the purposes of using the water of that race for irrigation, it is also used for power?  
A. Yes sir.

Q And what is the first plant using water on that race called?

A Provo Brick and Power Company.

Q And in what business are they engaged?

A Manufacture of brick and tiling.

Q For how many years have they been engaged in that industry?

A Fifteen or sixteen years.

A And have they used water constantly?

A Through the summer time.

-----  
12 Noon, Recess to 2:00 P. M.  
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HENRY J. W. GODDARD - - - - -

DIRECT EXAMINATION by Mr. Corfman continued.

Q Now, coming down the Mill Race, Factory Race as it is called what other manufacturer is making use of the water?

A Provo Ice & Cold Storage Company is the next mill.

- Q Is that plant in actual operation? A. Yes sir.
- Q For how many years has the water been used at the Factory Race at that place?
- A I think that is the oldest mill in the city.
- Q About how many years back does the use of the water at that point date?
- A I could not say.
- Q What would be your best judgment?
- A Probably sixty or sixty-five years.
- Q Following down the Race, what manufacturer next makes use of the water?
- A Excelsior Roller Mills or Hoover Mills.
- Q Are they in actual operation? A. Yes sir.
- Q And have been for many years? A. Yes sir.
- Q About how long?
- A Probably thirty-three or four years.
- Q The Provo Ice Cold Storage Company is engaged in the manufacture of what?
- A Ice.
- Q Artificial ice?
- A Artificial ice.
- Q And that is sold and disposed of where?
- A In Provo City and surrounding neighborhood.
- Q And the Excelsior Roller Mills, how long has that been in operation, Hoover Brothers?
- MR. JACOB EVANS: Object to it as the question having been asked and answered.
- A Thirty- or thirty-four years.
- MR. THURMAN: That's the same as the Hoover?
- MR. CORFMAN: Yes.
- Q In what business, or what has that mill manufactured?
- A Es Flour and mill products.
- Q And where are they disposed of?
- A Provo principally, surrounding country.

Q Has the use and operation of that mill been continuous?

A Yes sir.

Q The next mill that is using the water of the Mill Race?

A The Knight Woolen Company.

Q How long has the mill been placed upon the Factory at that point?

A Probably sixty-five years. That was before my time, that is, it was not a factory, it is an old mill a grist mill.

Q Is the woolen mill now in actual operation?

A Yes sir.

Q And has been for how many years last past?

A I think there is a couple of years they did not operate.

Q Exclusive of those two years they did not operate, for how many years has the mill been in actual operation?

A I could not say exactly, some forty or forty-five years -- forty years.

Q The next user of water for power purposes on the Mill Race is what?

A E. J. Ward & Sons.

Q In what business is E. J. Ward & Sons engaged?

A In the planing mill, manufacturing of mouldings.

Q How long has that mill been in actual operation?

A That is before my time, sixty or sixty-five years, I should judge.

Q And they are producing what?

A Manufacturing good, lumber.

Q The next mill that is using the water for power purposes is situated where?

A Situated on Sixth South Street between Academy Avenue and First West.

Q What is the name of the concern that is operating that mill?

A Smoot Lumber Company.

MR. JACOB EVANS: Smoot Investment Company.

A Smoot Investment Company.

Q And they use the water for what purpose?

A For manufacturing lumber products, mouldings, doors and sash.

Q How long have they been in operation?

A About forty years, I think.

MR. THURMAN: How much.

A Thirty-five to forty years, I should judge.

MR. JACOB EVANS: Let me ask a question right there.

Mr. Goddard, you mean when you refer to these various mills not these particular persons named have been using the water that long, but they and their predecessors in interest?

A Yes sir.

Q Now, after the water has passed these several manufacturers, you testified that the water was then used for irrigation purposes to some extent? A. Yes sir.

Q And you gave a schedule of the uses that the water was put to by Provo City for irrigation purposes?

A Yes sir.

Q In addition to that I will ask you whether there are any others who use the water for irrigation that was not included in the schedule that you testified to? A. Yes sir.

Q Who?

MR. RAY: Now, your honor please, is it contended they claim through Provo City. Do they claim through Provo City, Mr. Corfman, the other users?

MR. CORFMAN: Perhaps not.

MR. RAY: Are they parties to this suit?

MR. CORFMAN: They are parties to this suit.

MR. JACOB EVANS: I don't understand the mills claim through Provo City.

MR. CORFMAN: Read the question.

(Question read)

A First Ward Pasture Company.

- Q Do you know how many acres they use the water upon?
- A About one hundred and forty-seven or eight.
- Q And for what purpose do they use it? Growing of what kind of crops?
- A Grass crops, pasture.
- Q And that pasture is used in what manner?
- A Grazing milch cows, principally.
- Q For the inhabitants of Provo City? A. Yes sir.
- Q What other use is made of the water after it passes the mill?
- A Carries the city sewage that empties into the race at the north end of the First Ward Pasture into the lake.
- Q That would be a distance of about how far?
- A About a mile.
- Q Is there any other use that occurs to you at this time that is made of the water after it passes the mill owners premises. To refresh your memory, you remember the Stubbs tract?
- A That is included in this.
- Q They under the supervision of the city? A. Yes sir.
- Q Besides the use of the water for power purposes by the Knight Woolen Mills, do you know of any other use they apply the water of the Mill Race to?
- A Except for power.
- Q Besides power that you have testified to?
- A They use it for wool washing.
- Q And any other use besides the washing of the wool?
- A Carrying off their refuse from the washings, empties into the mill race and carrying off their dye stuff.
- Q Now City Creek, besides the uses of City Creek --
- MR. JACOB EVANS: D<sup>o</sup> you mean City Creek or City Race?
- Q City Race. Besides the uses of the stream of water known as the City Race for irrigation is there any other use?
- A Yes sir.
- Q What?

A power purposes.

Q Who uses that water for power?

A The Provo Foundry & Machine Company.

Q What kind of business is that Provo Foundry and Machine Company?

A It is a foundry, employs quite a number of hands I don't know just how many, working up iron and castings.

Q Are they now in actual operation?

A Yes sir.

Q And for how long have they been?

A I could not say exactly, probably twenty years, maybe not under that name, maybe longer.

Q Now, in regard to the use of water of the Mill Race for power purposes, is there any other use that is made of it for irrigation purposes than that that you have testified to during the low water of the river?

A Yes sir.

Q What?

A In the low water season we have made an exchange with the mill companies, giving them portions of the irrigators water <sup>daytime</sup> in the ~~springtime~~ and taking that in exchange at night and Sunday.

Q For how many years has that arrangement been carried out in the use of the water of the Mill race?

A I know of it for sixteen or eighteen years, sixteen years, that is, in cases of necessity where you get right down to low water.

Q That exchange is made with the irrigators then, I take it,-- during the low water season, many years there was a necessity for making that exchange?                   A. Yes sir.

Q Since you have been water-- during the time that you were water master for Provo City and during the time that you have been connected in an official capacity with Provo City, was there at any time any of the water that Provo City has had

diverted to it by the court commissioner been used wastefully?

MR. JACOB EVANS: Object to it as calling for an opinion of the witness. I think he ought to state the facts concerning the method of the use let the court determine whether or not it is used wastefully.

MR. COREMAN: If the court please, I don't know how to ~~indisate~~ interrogate the witness in any other way. I think he is entitled to answer whether there is any of the water been permitted to waste and the manner in which he supervised it, and saw it supervised.

THE COURT: I will let him express his opinion. I am free to say, Mr. Corfman, that an expression of opinion of that kind there is but little weight with it. I will permit him to express his opinion though, whether in his opinion it was used in a wasteful manner, but unless the manner is stated and the quantity used for particular purposes the opinion of the witness is not entitled to very much weight.

MR. COREMAN: I will follow it up after the question is answered.

THE COURT: He may answer the question.

A No sir, not during my administration.

Q Now, will you tell the court how you used the water during the time that you were water master in the distribution of the water that was used by the city?

A I distributed it to the different irrigators and power companies to the best of my judgment, their needs.

Q Well now, on what was your judgment based?

A On the condition of the crops principally in different localities.

Q Now, taking the Upper East Union, how did you handle the water of that canal?

A That was given out from day to day or from turn to turn.

Q To whom?

A To the irrigators and lot owners principally were timed except

farm interests.

Q How were the farm interests timed?

A It was given out to them verbally. Person would come and ask for a turn maybe two or three of them would take it in rotation and they would give them a turn in succession, fast as we could distribute to them and get through we allowed them time enough to finish their irrigation by attending to it diligently.

Q How often did you permit them to use the water on the farms?

A Once every fourteen days, gardens once every week.

Q That is on what was called farm lots and city?

A Yes sir.

Q Now, from your experience as a practical farmer and as an officer supervising the distribution of water for irrigation purposes, I will ask you whether that frequency was necessary?

A It was.

Q Why?

A The condition of the crops demanded it and the season and that was as near as we could get around to serve them. It could have been used beneficially oftener in lots of cases, but it took that time to give them all a turn around.

Q Now, in the use of the water for the city lots how did you distribute?

A That time was made out by the water master and myself at that time and given to the users. It was a season ticket, hour and a half to a city lot, seventy-two square rods, or a fraction in proportion to that fraction of the lot in proportion.

Q Once each week?

A Once each week.

Q Now, in cases where the city lot, as I understand you, issued these time cards for use to all the lot owners?

A Yes sir.

Q Under the canal?

A. Yes sir, in the platted portion of

the city.

Q And were all the area of the lots actually irrigated?

A No sir.

Q I will ask you whether the area differed in the different lots?

A It did.

Q Materially?

A Well, in some cases quite materially, yes.

Q Then the area irrigated in the city lots was variable?

A Yes sir.

Q In cases where the use was on a small area or not at all, what because of the water?

A It passed down the ditch and some other irrigator would take it that did not manage to get finished up, or he might give his time or sell his time to his neighbor and he would use it.

Q In any of those cases where the use was not applied to any particular lot did the water <sup>go</sup> to waste?

A Not to my knowledge except in places maybe where water was low down to the end of the ditch, some man might not be there at that minute to take his turn, little flow of half an hour or ~~hour~~ maybe fifteen minutes would go by.

Q I will ask you if your schedule and system in the practical operation of the distribution of the water provided for contingencies of that kind?

A Do you mean our ordinance, city ordinance?

Q No, in the distribution of the water, did your schedule provide for contingency where an owner failed to use the water?

A No sir.

Q Was it arranged with that in view?

A Oh yes, yes it was left up to the water master to give that party more time if he could or get some for him from someone else. that had a turn that did not want to use all of it.

Q And the manner in which you distributed and the time allotted to the irrigation of the lots provided for cases of that kind?

A Yes sir.

Q And no water was permitted to run to waste except as you have testified to when some person left it go by. Now, is that the same method that was adopted with respect to the distribution of the water of the other canals as well as the East Union Canal? A. Yes sir.

Q Now, what provision was made in cases of a heavy rainfall for using the water that was in the ditch for a beneficial use?

A Water masters were instructed to turn that water to the power companies in the low water season and let them make use of it.

Q Did they do that? A. Yes, they did.

Q Then I take it that during the irrigation season the power companies were generally short in the use of the water?

A They were.

Q About how much water ordinarily was allowed to the Factory Race for the purpose of operating the wheels of the mills for generating power during the low water stage of the river or irrigation season?

A Well, the capacity of the wheels --

MR. JACOB EVANS: Object to that answer as not responsive.

THE COURT: I didn't hear it.

MR. JACOB EVANS: He attempted to tell what the capacity of the wheels is.

MR. CORFMAN: Read the question.

(Question read)

A Different amounts different seasons of the year.

Q Varied?

A It varied, yes sir.

Q Did the mills at any time during the low stage of the river have all the water that they could use for the generating of motive power?

A All the mills, no sir.

Q About how much did the mills usually have during the irrigation

season?

A From thirty-five to forty-five second feet.

Q And how would that much water furnish -- by what method was that much water furnished the mills during the irrigation season?

A It was furnished in the day time partly from the irrigators' water and partly from what the Factory Race was allowed or what the water master decided they were entitled to.

Q Now, you remember whether or not at any time the mills used a constant stream without interchanging with the irrigators?

A Yes sir.

Q How many years ago was that?

A In some season I think they have used it pretty near all the season.

Q Now, how many years ago was that when they used it during the season?

A In 1907, I think, didn't have to turn the -- exchange the water with them.

Q That was an extraordinary year?

A Yes sir.

Q Now, I am asking you if you remember a time when they had a constant stream day and night in the Mill Race before the arrangement was made for exchanging with the ~~farm~~ farmers?

A Yes sir.

Q If there was such a time? A. Yes sir.

Q And how long ago was that?

A Probably twenty-five years ago, I won't be certain as to that time.

Q And this exchange was made by arrangement between the city and the mill owners? A. Yes sir.

MR. RAY: I object to that and move to strike it upon the ground that the statement of the witness is incompetent as to an arrangement by the city and mill owners. The city can

only make arrangements in a certain official way, it is not the best evidence.

MR. CORFMAN: I simply asked whether that arrangement was made in that manner. I am not asking what the arrangement was or what the provisions of it was, asking when the arrangement was made, who it was made by.

MR. THURMAN: That would be a complete answer to the question, if they had an arrangement by which that was done.

THE COURT: I am inclined to think it is incompetent for him to testify that an arrangement was made in a formal way. If it was merely a plan adopted by the water master and mills without being an arrangement entered into by the city by contract probably he could testify to it.

Q I will ask you if you know how that arrangement was made?

A I think it was made between the water master and mill owners.

THE COURT: Mr. Goddard, you were not asked that question. Listen to the question and answer the question asked. You were asked merely whether you know or not, That must be answered by yes or no, whether you know?

A No, I don't.

Q Now, in regard to what is known as the water works system, what kind of works have been constructed by the city for the purpose of taking care of the water that is used in that system?

A They have constructed a pipe line and distributing system for the city for part of the city.

Q Where does this pipe line commence?

A We have two pipe lines.

Q The first pipe line that is the one that is in use at the present time?

A The one that is in use at the present time --

MR. JACOB EVANS: That was not the first pipe line.

Q I am asking about that one first.

A First pipe line was constructed --

Q I am not asking about the first pipe line, the one that is in use

now, where does it commence?

A It commences just below the bridge crossing the river by the Bridal Veil Falls.

Q How far is that from Provo City?

A About nine or ten miles.

Q Is the water taken in, all the water taken in at that point that is used by the city?

A No sir.

Q Now, will you describe how the water is taken into the system as the pipe line passes down the river?

A The upper pipe line is on the north side of the river, just below the Bridal Veil Fall bridge, it runs down the north side to a point below Spring Dell and crosses the river at that point at the junction with the pipe on the south side, all the way down the this pipe line is taking in springs and laterals into the main. Goes through what we call the weir house situated about a quarter of a mile below Spring Dell. There it enters the pressure line, goes on to Pleasant View Bench and on Pole Canyon bench and from there it runs in a cement conduit to Rock Canyon, where it enters the pressure pipe and proceeds to the city.

Q And after the line reaches the city limits what construction has there been for distributing the water?

A There is a cast iron pipe system running on all the principal streets of the city, and ~~surface~~ service pipes running into residences and business places from the main.

Q Do these mains extend throughout the city?

A No sir.

Q What portion of the city has not been laid to these mains?

A The western portion.

Q About what part of the city would that be?

A From 7th West on west there is no pipe line.

Q What fractional part of the platted portion of the city would that be?

A Probably one-fifth, that is, of the populated.

- Q That is what I am asking you about, one-fifth. How does that one-fifth of the inhabitants at the present time get water for culinary and domestic use?
- A Through irrigation ditches and artesian wells and surface wells.
- Q And has the system as now constructed been extended from time to time or was it all built at one time?
- A It has been extended from time to time.
- Q And it is contemplated by the city to continue to extend?
- A It is.
- Q Now, in the use of the water from the water works system, tell the court as to how it is distributed to the homes for culinary and domestic and lawn sprinkling purposes?
- A It is distributed through a service pipe from half inch up to an inch, depends on the amount of water wanted -- and two inches.
- Q Are those service pipes subdivided by having outlets?
- A I don't understand?
- Q Is there more than one outlet to a service pipe?
- A Yes sir.
- Q What are those outlets?
- A Inside of the dwellings they may have four or five different fixtures, such as bath, toilet, sink, lavatories.
- Q And those purposes are served through the city?
- A Yes sir, and they have hydrants on the outside.
- Q For lawn irrigation?
- A And for culinary and domestic purposes.
- Q As to the water master or committee man of <sup>city</sup> commissioner whose duty it is to look after the distribution of the water belonging to Provo City, have you personally observed as to how the water was used from the service pipes?
- A Yes sir.
- Q On the lawns? A. Yes sir.
- Q Do you know, I will ask you whether the city has in force any ordinances ~~providing~~ providing for the regulation of the

water by the inhabitants from the water works system?

A Yes sir.

Q Now, you testified a while ago that each city lot was accorded an hour and a half once each week? A. Yes sir.

Q For to use water from the ditches or the irrigating system?

A Yes sir.

Q And you have also testified that from the water works system water is used for the sprinkling of lawns?

A Yes sir.

Q Now, will you explain to the court whether both of those uses are enjoyed at by the property owner at the same time or how that is arranged for?

A Every lot owner has the privilege of taking and paying for as much water as he wants through the water system on the lawns.

Q How does he pay for it?

A Pays two cents per square yard for the season.

Q And is he timed? A. Yes sir.

Q And one of the requirements is the payment of that two cents?

A Yes sir.

Q How much did you say, two cents a gallon?

A Two cents per square yard.

Q That is required as a condition for the use of the water?

A Yes sir.

Q And under the irrigation system is there any revenue received by the city for the use of the water for irrigation purposes?

A Yes sir.

Q In what manner do you collect that?

A The city council levies a tax annually for city lots or for lots and farm acres.

Q And for what purpose is that used?

A That is used for paying the expenses of furnishing them the water.

Q And the maintenance of the system?

A And the maintenance of the system.

Q You have been acquainted with the present water works system since it has been in use, have you not?

A More or less, yes sir.

Q For how many years have you been acquainted with its use since it was installed?

A Well, directly acquainted with it for the last four years.

Q In what capacity?

A As commissioner of water and water supply.

Q Were you acquainted with it before that time?

A Yes sir.

Q For how long before that time?

A When I was water master of Provo City.

Q That was before the present water works was installed, was it not?

A: Yes sir.

Q And did you serve the city at one time as city councilman, Mr. Goddard?

A. Yes sir.

Q What years was that?

MR. RAY: Object to it as having been asked and answered.

THE COURT: Yes, '96 and '99.

Q Since the time that you have been in charge and looking after of the water works system in the capacity of a city commissioner, I will ask you whether any of the water that was taken into the water works system was permitted to waste?

MR. JACOB EVANS: We make the same objection.

THE COURT: Objection is overruled, he may answer.

A It was not permitted by the city authorities and regularion we have.

Q Do you know of any? A. NO sir.

Q Being permitted towaste? A. NO sir.

Q What use has been made of the water besides that of serving the homes with water for culinary and domestic purposes

A For fire protection of the city.

Q Any other?

A Well, manufacturing.

Q Now, you are speaking of the water works system, you don't use that water for manufacturing?

A I think we use it for dyeing, I believe, in the factory partly.

Q Any other purpose?

MR A. C. HATCH: Let me ask, don't they have little power works attached to the pipe line in places in the homes, turn churns and such things.

A I believe there is a few that have a motor that turns a washing machine.

MR. A. C. HATCH: Washing machine?

A Yes sir,

Q Any other purpose, street purpose of any kind?

A Use it for first street sprinkling by the city.

Q Now, speaking of street sprinkling, do you know how many miles of streets Provo City has approximately?

A No, I don't know as I could --

THE COURT: Someone gave that the other day.

Q In all the streets of Provo City are all the streets of Provo City sprinkled?

A I think they are.

Q How often?

A Some of them two or three times a day, three or four, and others once a day.

Q Well now --

A Owing to the traffic that is on those streets.

Q Well, I will ask you if that is sufficient in order to keep down the dust, is that a sufficient quantity of water to be applied for keeping down the dust on the streets, do you know?

MR. RAY: I object to that question because of the

fact that there is no basis in the question for an opinion which would be of any value to the court. He says some are sprinkled once and some four times. He says is that sufficient to keep the dust down, one or four times?

Q I will withdraw that question, I will ask you whether in your observations made of the streets that are sprinkled once a day, whether that has been effective in keeping down the dust? A. No sir.

Q Has it been effective where the streets have been sprinkled three times a day?

A It has been better.

Q How?

A Better.

Q It has been better? A. Yes sir.

Q Has it kept down the dust throughout the day?

A Yes, pretty well.

Q About what proportion of the streets are now sprinkled three times a day?

A Well, I couldn't say.

Q What would be your judgment?

A My judgment would be about eight miles, seven or eight miles.

Q About what proportion of the streets are sprinkled once a day?

A Probably fifteen miles.

Q Then not all the streets of Provo City are sprinkled from the water works system, are they?

A Some sprinkled twice a day, some once, some three times.

Q Is there any other use that you think of that is made of the water works system?

A For flushing sewers.

Q How about the streets, any other use made on the streets.

A Flushing off pavement.

Q Used for those purposes? A. Yes sir.

Q Now, I will ask you again, Mr. Goddard, after all the uses that are made of the water in the manner in which you have testified, is there any water from the water works system since you have known it, gone to waste?

A Not with my knowledge, we are trying to prevent all the waste we can, and even arrest and fine people for wasting it whenever we catch them.

Q Has there been, since you have been city commissioner, times when you had to curtail the use of the water?

A Yes sir.

Q In the way you have testified to? A. Yes sir.

Q On what occasion.

A This spring a month ago we had to have notices in the paper and have men ride the town to prevent men sprinkling out of their turn or using hose without a nozzle on, and done everything in our power to prevent waste.

Q Is that necessary in order to keep anything like an adequate supply for the uses that you have mentioned?

A Yes sir.

Q Do you have to curtail the use of water by the residents of the city in order to provide for an adequate supply for fire fighting?

A We do.

Q What is your practice and rule with respect to that?

A We have districted the city in two districts, letting one side water in the evening between five and eight or nine and the other other side in the morning between five and eight, some of them run a little beyond in the day time. The State Mental Hospital and all the city parks, University and other yard users have lawns. We try to equalize it as near as possible to keep uniform pressure.

Q Are you able to do that by that kind of a system?

A Pretty fairly, yes, if we could make them obey the rules.

Q You do have difficulty even then?

A We do.

Q Now, you spoke of a first system of water works, what kind of a system was that?

A It was a wood stave main running from the mouth of the canyon down below the bench to what is called the river bottoms, had a connection with our present distributing system.

Q At what point was the intake for that system?

A Near the head of City Creek, about a quarter of a mile from where City Creek takes out of Provo River by Olmstead.

Q And the water that was used in that system was taken directly from the river?

A From the river.

Q When was that system first installed?

A I would not be sure as to the date, but I think it was about 1890.

Q And was that in use up to the time that you installed the present system?           A. Yes sir.

Q And is that old system still in use?

A There are some people in the river bottoms that are using water from that system and we keep it in repair for emergency, if anything should go wrong with our upper line or the new line.

Q And has there since the new line has been installed, have you had occasion to use the old system?

A Yes sir.

Q For what purpose?

A To repair break in our conduit which ran over a large fill which settled and broke.           We had to switch the spring water into the old settling basin and through the old line for about a week.

Q And it was placed for general usage throughout the city?

A Yes sir.

Q As far as it extended.           When did that occur?

A In 1913.

Q And you have had then and are now keeping it in order for these purposes? A. Yes sir.

Q Now you spoke about furnishing some residences outside of the city with some water from your system? A. Yes sir.

Q Under what kind of an arrangement are you doing so?

MR. RAY: I object to that as irrelevant and immaterial upon the ground that the city has no authority to furnish water to non residents of the city.

THE COURT: You may ask him if he knows, and if he knows you can find out whether it is a matter of record or just an arrangement made between some representatives of the city.

Q Do you know under what kind of an arrangement the residents outside of the city were furnished the water from this old system? A. Yes sir.

Q What?

MR. RAY: Now, may I ask one question there.

THE COURT: Yes.

MR. RAY: Is there a written contract between these users and the city?

A Yes sir.

MR. RAY: Object to any evidence --

Q Can you produce the contract?

A I could in a few minutes.

Q You may do so later.

MR. RAY: My objection to that, your honor, contemplated a little more than whether or not this witness was competent to testify, and I did it largely for the purpose of preserving the record that the city could not acquire the right to furnish water to people non residents of the city. Could not go into the water business under its charter.

MR. JACOB EVANS: They have a regular contract, the contract will show for itself.

MR. A. C. HATCH: The area of the city was larger at

one time and has since been reduced.

MR. JACOB EVANS: Not at that time.

MR. A. D. BOOTH: If the court please, when the first water works were installed I think they were all within the city limits, extended to the mouth of the canyon; since then the boundary has been out down and they have furnished water to people along that line and have continued since they were out out of the city.

Q Do you know whether any water has been allowed to waste from this old system?

A No sir, it has not, except through leaks in the pipe which we repair as soon as possible.

Q Those leakages occur in the new system as well?

A Yes sir.

Q And what is the practice of the city when those leakages occur with reference to making repairs?

A They make repairs as soon as possible.

Q Well, how soon<sup>is</sup> it possible to do that?

A Depends on what we have got on at the present time, may be a little time before we can get to them.

Q What do you call a little time?

A A day.

Q Now, since your knowledge of what was known as the East Union Canal during the irrigation season of each year, has the volume of water in that canal been about the same in all years?

A Nearly so.

Q And is that true of the Factory Race? A. Yes sir.

Q IN regard to the Factory Race, I will ask you whether many years ago that stream of water was larger during the irrigation season than it is now?

A It was.

Q And since that time for what reasons has the volume of that stream been reduced?

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A The upper canals come into existence was the first cause, I believe, and then arrangements were made with all the canal companies to divide Provo River between themselves which went on from year to year for several years and finally it was decreed, put into a decree.

Q Morse decree?

A Morse decree.

Q And since that time has the city turned to the mill race during the irrigation season water for the operation of the mills?

A. Yes sir.

Q And has that stream been used during the day?

A Yes sir.

Q And on nights and Sundays? A. Yes sir.

Q It has been turned to the irrigators, is that true?

A Yes sir.

Q And is the quantity of water that is now used by the mill race as much as it was some thirty years ago when you first knew of it?

A. No sir, I am speaking of the low water.

Q Yes, during the low water season. Do you remember of hearing Commissioner Wentz testify as to having taken during the irrigation season of 1915 water from the Mill Race during the time of scarcity and prorating it among the irrigators?

A I didn't hear him testify, I wasn't in court at that time.

Q Was any such an arrangement as that made with the city for doing that by the commissioner? A. No sir.

Q Did the city know of that being done?

A No sir, not at that time.

Q Now, you testified that during the irrigation season the Factory Race has used for the turning of the wheels of the mill owners from thirty-five to forty second feet of water during the day?

A. Yes sir.

Q Now, when the water of Provo River is at its highest stage and intermediate stage, what quantity of water has been turned by the Mill Race and used by the factories for the generating of power?

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IN DIST. COURT  
UTAH CO., UTAH.

\* FILED \*

SEP 26 1911

*W. M. Hales* Clerk.

*E. B. Astrup* Deputy